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20th ANNUAL NATIONAL CONFERENCE

(09th - 11th November, 2024)

Demographic Transition and Social Sector Challenges in India :
Understanding Demographic Dynamics

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Agricultural Growth, Rural Poverty, and Sustainable Development

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India's External Sector Reforms and Challenges

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Exploring Tourism Opportunities and Overcoming Challenges in Uttar Pradesh and Uttarakhand

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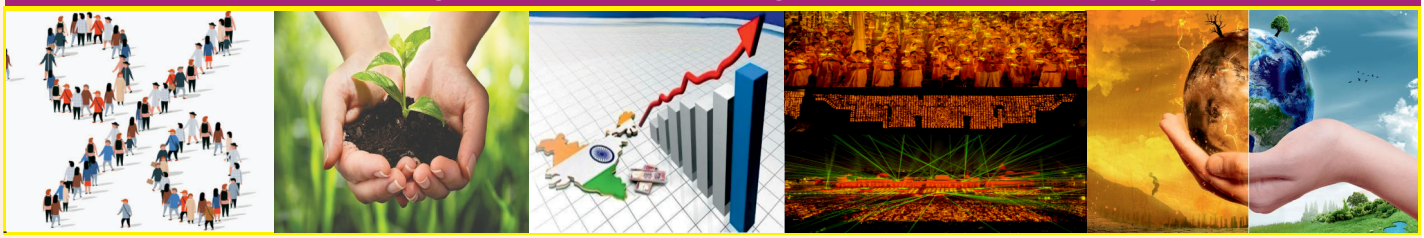
Climate Change and Environmental Degradation: A Global Challenge



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20TH ANNUAL NATIONAL CONFERENCE OF UPUEA

THEME 1

- **Demographic Transition and Social Sector Challenges in India : Understanding Demographic Dynamics**

THEME 3

- **Agricultural Growth, Rural Poverty, and Sustainable Development**

THEME 3

- **India's External Sector Reforms and Challenges**

THEME 4

- **Exploring Tourism Opportunities and Overcoming Challenges in Uttar Pradesh and Uttarakhand**

THEME 5

- **Climate Change and Environmental Degradation: A Global Challenge**

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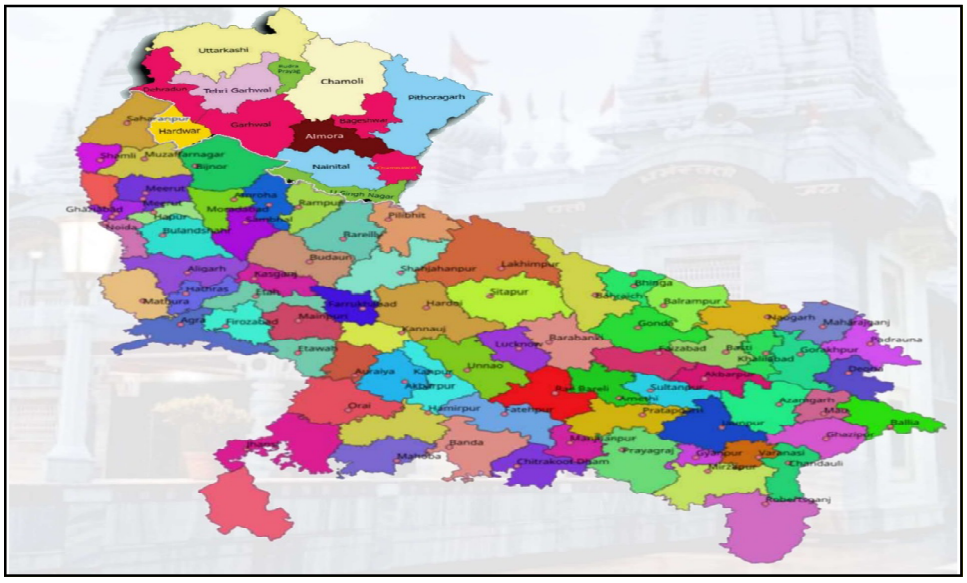

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From Secretary's Desk

The Uttar Pradesh-Uttarakhand Economic Association (UPUEA), established in 2005, has experienced remarkable growth, boasting a membership of two thousand seven hundred (2700) life members in less than 20 years. As a premier society of economists dedicated to promoting economic research in both states, UPUEA actively contributes to the field through the publication of research findings.

UPUEA organizes annual conferences that serve as a platform for economists to share their research, collaborate with peers, and engage in stimulating discussions. The increasing participation of delegates, paper presenters, and renowned resource persons underscores the growing significance of these events. Through its commitment to organizing high-quality events and fostering research collaboration, UPUEA plays a pivotal role in advancing economic understanding within Uttar Pradesh and Uttarakhand.

The Uttar Pradesh-Uttarakhand Economic Association (UPUEA) is gearing up for its 20th Annual National Conference, a three-day event scheduled in second week of November 2024 (i.e 09-11, November, 2024). We have received more than Two Hundred Seventy (270) Research papers under the broad theme of the conference: **"India Amrit Kaal: Paving the Way to a $5 Trillion Economy through Contemporary issues of Economy, Business, and Management."** This year's conference delves into the dynamic forces shaping the Indian economy, with a particular focus on the tourism state of Uttar Pradesh and Uttarakhand. Researchers and economists have a great opportunity to contribute their expertise by submitting papers on five key sub-themes:

- ***Demographic Transition and Social Sector Challenges in India: Understanding Demographic Dynamics***
- ***Agricultural Growth, Rural Poverty, and Sustainable Development***
- ***India's External Sector Reforms and Challenges.***
- ***Exploring Tourism Opportunities and Overcoming Challenges in Uttar Pradesh and Uttarakhand***
- ***Climate Change and Environmental Degradation: A Global Challenge***

While the acceptance of the papers for publication in the conference proceedings is a significant achievement, we have observed a tough and continuing challenge of delayed submissions. This last-minute submission often disrupts the conference schedule and compromises the quality of the proceedings. Despite our consistent efforts to communicate deadlines and expectations, we continue to receive late submissions. We understand that unforeseen circumstances may arise, but timely submission is crucial to ensure a smooth and efficient conference.

To ensure a seamless conference experience and timely publication of full papers in the Journal, we kindly request all interested members to contact the General Secretary or Organizing Secretary for any clarifications or updates. Adherence to the specified page limits will contribute to a well-organized and informative conference.

The Uttar Pradesh-Uttarakhand Economic Association (UPUEA), a decade-old organization, recognizes the need to adapt to the rapidly evolving economic landscape. As both states face new challenges, particularly in agriculture and rural development, UPUEA views this as an opportune moment for critical reflection and strategic planning. The association aims to analyze past development efforts, identify lessons learned, and formulate strategies to unlock growth across all sectors.

The Uttar Pradesh Development Report (UDR) *is a significant initiative aimed at understanding the state's development trajectory and identifying key areas for intervention.* ***The report prepared by the Association with the help of Uttar Pradesh government shall provide a comprehensive analysis of various socio-economic indicators, including poverty, education, health, and infrastructure. One of the key focus areas of the UDR is to contribute to the state's goal of achieving 'Zero Poverty.'*** *This ambitious target aligns with the broader national goal of eradicating poverty and ensuring inclusive growth. By analyzing the root causes of poverty, the UDR offers valuable insights into the policy and programmatic interventions needed to achieve the 'Zero Poverty' vision. It emphasizes the need for a multi-pronged approach that combines economic growth, social justice, and environmental sustainability.*

The UPUEA extends its sincere thanks to the numerous funding agencies and institutions whose generous support has been instrumental in facilitating conferences, journal publications, and the printing of conference proceedings. The association is also indebted to Rightway Publications, New Delhi, for their efficient and timely printing services.

(Vinod Kumar Srivastava)
General Secretary

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THEME 2

Agricultural Growth, Rural Poverty, and Sustainable Development

Rurban Approach is the Need of the Hour for Rural Development and 'Viksit Bharat Abhiyan' of Namo in National and Upian Perspetive

Professor (Dr.) Vikramdev[1] & Dr. Vidushi Sharma[2]

Introduction

Bharat is the nation of 6 lacs villages. The Atman of Bharat lives in villages. The development of Bharat can never be imagined without the development of Rural Bharat.

Rural Development: It is defined as enhancing the standard of life of rural people, including social, political, economic and spiritual development of the people living in rural regions who are deprived of basic facilities.

Rural Management: This area includes the study of administering rural resources effectively in planned way to achieve the desired target of Rural Development with minimum inputs & maximum output.

Rural Development in Bharat

Rural development usually refers to the method of enhancing the quality of life and financial well-being of individuals, specifically living in populated and remote areas.

Traditionally, rural development was centered on the misuse of land-intensive natural resources such as forestry and agriculture. However today, the increasing urbanisation and the change in global production networks have transformed the nature of rural areas.

Rural development still remains the core of the overall development of the country. More than two-third of the country's people are dependent on agriculture for their livelihood, and one-third of rural India is still below the poverty line. Therefore, it is important for the government to be productive and provide enough facilities to upgrade their standard of living.

Rural development is a term that concentrates on the actions taken for the development of rural areas to improve the economy. However, few areas that demand more focused attention and new initiatives are:

- Education

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- Public health and Sanitation
- Women empowerment
- Infrastructure development (electricity, irrigation, etc.)
- Facilities for agriculture extension and research
- Availability of credit
- Employment opportunities

Rurban= Rural+Urban

We define rurbanisation as the process of increasing the presence of green space and or agriculture in towns and cities: a ruralisation of the urban.

The word rurban (rural+urban) refers to a geographic territory /landscape which possess the economic characteristics and lifestyles of an urban area while retaining its essential rural area features.

With the idea of combining the benefits of urban and rural, we created the 'Rurban' way of living. Sustainability, biodiversity and harnessing natural resources to establish a natural way of living are the driving principles of Organo.

Research Objectives

RO1:- To analyze the economic development done by central/state government in rural areas.

RO2:- To analyze the enhancement of basis services provided by central/state government in rural areas.

RO3:- To analyze the role of well plannedrurban clusters in the development of rural areas.

Discussion

Rurbanization is a process of altering rural forms with pre-selected urban patterns and lifestyles, which creates new genetically altered rurban forms.

What are the three visions of Dr Abdul Kalam in detail?

Dr. Kalam revealed that he had three dreams and visions for India-Freedom, Development and Standing Up. He highlights the importance of his visions by explaining that how they can play a crucial role in India's growth and development.10 May 2023

PURA was launched in 2004 to provide basic amenities like good road, drinking water, health care services to villagers. PURA model proposes that urban infrastructure and services can be provided in rural hubs to create economic opportunities outside the city.

PURA MODEL • PURA model proposes that urban infrastructure and services can be provided in rural hubs to create economic opportunities outside the city. • PURA model is based on connectivity of different aspects of development for the integrated economic growth and overall regional growth. • The model basically involves three types of connectivity 1. Physical connectivity, 2. Electronic Connectivity 3. Knowledge Connectivity.

PHYSICAL CONNECTIVITY • Physical connectivity can be achieved by establishing Ring Road, Rail Connectivity, Public Infrastructure. • Physical connectivity can enable faster movement of people and goods. • It improves better access to schools and health care system. • Quality infrastructure will support social and economic mission. • It reduces investments in distribution of power, water and communication network.

ELECTRONIC CONNECTIVITY • Electronic connectivity establishes communication with suppliers, markets and other locations. • Electronic connectivity can be established through broadband, fibre optics cable, wireless system, leased line etc. • It provides services and networks. • Tele-education can be done by satellite link, wireless connectivity, fibre optics connectivity, Public Call Offices(STD/ISD), Leased line connectivity. • Tele-Medicine can be done through village Internet Kiosk, E-Government Access. Tele training on Faming, E-banking, ATM centres for villagers.

KNOWLEDGE CONNECTIVITY • Knowledge connectivity can be done by providing access to state of the art technology. • It can be done by establishing schools and hospitals, • By providing vocational training, knowledge training, • By developing remote sensing imagery for land and crop management, water management, forest management and protection of environment. • By providing Proactive Health Care services, by establishing cooperatives and product marketing, it provides capacity building opportunities for workers, entrepreneurs.

ECONOMIC CONNECTIVITY

Economic connectivity can be done by establishing Small Scale Industries, Agrobased industries, dairy, poultry and other non-farm products, • By providing Warehouse, Micro Power Plants, Renewable Energy, education hubs. • Village Markets can be developed to provide employment opportunities. • Retail, healthcare, education, transport sector can provide employment. • Women Empowerment is a necessity for regional development. • All these will lead to urban decongestion, improved quality of life and increased purchasing power of the rural inhabitants.

To achieve regional development, increased income and better human resources are required through economic connectivity coming out of the other threePhysical, Electronic and knowledge, the following conditions are necessary. • Vertical Integration of the agro-manufacturing processes • Adequate Entrepreneurship and planning in the service sector as the demand increases • Value based society at the domestic level for capacity building • Adequate room for physical, electronic and knowledge connectivity to account for the rise in economic connectivity with a more capable workforce.

THE MODEL OF PURA CREATION • PURA model begins at individual village household level (atomic level). • It ensures participation of all households according to their skills and needs with an opportunity to capacity building and gaining access to basic amenities. • Next in hierarchy is the village where its implementation requires a careful analysis of available resources and prioritization of the needs of the local population. • It also requires acceptance of PURA' vision for active participation of community. • Village cluster is a group of villages sharing basic economic and social assets like connecting roads, markets, health care services, higher educational facilities and electronic connectivity.

PURA CLUSTER • PURA cluster can vary from 10-50 villages. • Cluster could be located close to each other. • Cluster must have physically, culturally and linguistically some common element of resources or skills they have developed. • PURA cluster would be the basic element of PURA design, each possessing its unique qualities, economic inputs and outputs and be capable of existing independently. • There can be Aggregate level to start PURA planning.

It exists independently as a socio-economic entity.

Thus, by providing economic opportunities outside the cities, villages can become virtual city, with a potential to expand and accommodate more people. • By providing urban infrastructure and services in the rural hubs, such as electricity to each household, roads, bus service, potable drinking water, telecom services, other social opportunities like health and education can develop and whole community can flourish resulting regional development. • The late President Kalam felt, the schemes can also address the problem of rural poverty, bridge rural-urban divide, generate employment and enhance rural prosperity

STRATEGY: PUBLIC-PRIVATE PARTNERSHIP(PPP) • The Mission and Vision of PURA is to bring together the experience and expertise of both Public and Private to achieve the objectives. • PPP will be between Gram Panchayats and private sector partners. • Core funding shall be sourced from the Central Sector scheme of PURA. • The private sector will bring operational expertise and investment.

PILOT TESTING AND UP-SCALING • Seven pilot projects were implemented during the 10th Five year Plan in Basmath(Maharashtra, Bharthana(Uttar Pradesh), Gohpur(Assam), Kujanga(Orissa), Motipur(Bihar), Rayadurg(Andhra Pradesh) and Shahpura(Rajasthan). • An evaluation study of these pilot projects was carried out by National Institute of Rural Development(NIRD) which identified the necessity of the community and private sector participation is must for success of the model..

CRITICAL ANALYSIS: PURA 2.0 • Critics discard the original vision of Kalam and said it as the utter failure • The restructured version(PURA 2.0) is open to private investors to develop physical infrastructure in RURBAN areas. • The Government plans to develop at least 500 clusters in the second phase of the scheme. • The scheme allows the private partner to identify a gram panchayat, a cluster of geographically contiguous gram panchayat for a population of 25,000 to 40,000. • They will plan for the development of selected infrastructure services along with economic activity and amenities of the area. • Thus, the dream of APJ Abdul Kalam was partially fulfilled by developing rural areas by providing urban amenities for regional development.

SPMRM (Shyama Prasad Mukherji Rurban Mission)

The Union Cabinet approved the Shyama Prasad MukherjiRurban Mission (SPMRM) on September 16, 2015, with an outlay of Rs. 5142.08 crores. Prime Minister Narendra Modi launched the National Rurban Mission from Kurubhat, in Rajnandgaon district of Chhattisgarh ofn February 21, 2016.

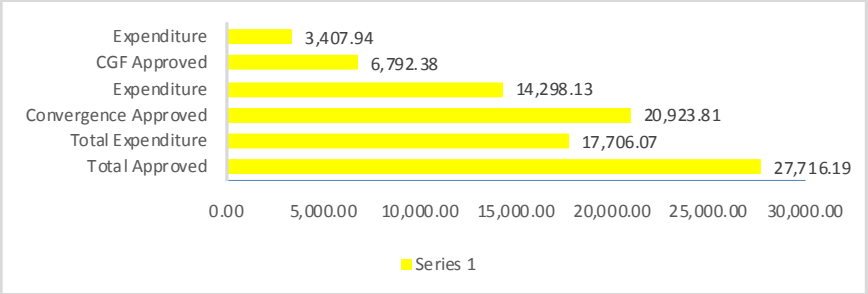
Scheme Components:-

- Skill development training linked to economic activities
- Agro Processing Agri Services, Storage and Warehousing
- Fully equipped mobile health unit
- Upgrading school/higher education facilities
- Sanitation
- Provision of piped water supply
- Solid and liquid waste management
- Village streets and drains
- Street lights
- Inter-village road connectivity
- Public transport
- LPG gas connections
- Digital Literacy
- Citizen Service Centers- for electronic delivery of citizen centric services/e-gram connectivity

Progress for Shyama Prasad Mukherjee Rurban Mission:-

- Out of 300 Rurban cluster, 298 clusters have been approved, 291 integrated cluster action plans (ICAPs) and 282 Detailed Project Reports (DPRs) have been developed by states /UTs with a total approved investment of Rs. 27716.19 crore (Critical Gap Fund + Convergence Fund). Out of total 75,999 projected works under the Mission, a total of 39,554 works have been completed and total of 13932 works are ongoing (as on Feb 20, 2023).
- Aibawk cluster in the Aizwal district of Mizoram has become the first cluster to be completed under the Shyama Prasad MukherjiRurban Mission (SPMRM). AibawkRurban cluster completed all the 48 projects planned under SPMRM.

Financial Progress (Rs. in Crore)



The NITI Aayog, while evaluating the implementation of SPMRM, found that "SPMRM growth clusters are playing a role reducing urban migration by ensuring that basic infrastructure, utilities are provided and industrialization is promoted. It is very relevant for ensuring transformational developments as against developments in India's rural development sector."

Conclusion

We observed some key points in the discussion of different schemes of central/state government. The RURBAN approach in very essential for development of rural areas on the basis of urban styles. Various schemes run by the Bharat Government are helping a lot in developing villages like urban areas. With these schemes the economic development of rural areas are going in right direction and a basic infrastructure of development is being prepared. Here the RURBAN clusters created by government in proving to be very helpful as a unit. Therefore, on the basis of this discussion, we can say that the model of government in proving its importance usefulness for the development of rural areas. Considering its usefulness, government should continue it future.

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An Analysis of Inter-State Disparities in the Procurement of Wheat and Rice in India

Ankit Upadhyay[1] & Roli Misra[2]

ABSTRACT

To keep the public welfare schemes running, the government ensures the procurement of grains from Indian farmers and in this sequence, the government declares MSP every year for 23 commodities. Wheat and rice are two important food grains which are procured by the government on a large scale and then distributed through government welfare schemes. Apart from this, the government also keeps checks on the market prices through its grain reserves. The objective of the study is to find out the quantity of procurement by the government regarding wheat and rice in these states and to know the reasons for inter-state variations in procurement. This study utilises secondary data from Department of Food & Public Distribution, the Ministry of Agriculture and Farmers Welfare (GOI). Five states each for wheat and rice have been selected on the basis of highest production of these crops for the period of study from 2000-01 to 2020-21. The study with the help trend analysis concludes that procurement of grains by the government is disproportionately concentrated in only a few states, and this uneven procurement is clearly reflected in the percentage procurement out of production. The study suggests that the government should increase the number of procurement centres based on state-level production, spread MSP awareness programs and bring uniformity in procurement process so as to positively impact the income of the farmers.

Keywords: *Wheat, Rice, MSP, Production, Procurement.*

Introduction

Since the enactment of the three controversial agricultural bills in Parliament on September 20, 2020, the topic of minimum support price (MSP) has attracted significant attention. MSP which is not addressed by these three laws in terms of farmers, aims to provide price flooring set by the government for 23 commodities. This is the price at which the government commits to purchase food commodities from farmers, thereby mitigating market fluctuations and providing a safety net against unpredictable price drops for farmers. The absence of a guaranteed MSP in the new legislation has raised concerns among farmers, leading to widespread protests and calls for its inclusion in future agricultural reforms. After revoking the three farm bills by the GOI, MSP and procurement

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have come into discussion in discourse. Many farmers are voicing concerns about the future of the MSP and how it may affect their income through MSP payments. As the debate continues, stakeholders are advocating for open rules that assure equitable remuneration and assistance for agricultural producers. The FCI and the state agencies are responsible for the procurement of wheat and rice in India. The government's procurement policy for wheat and rice plays a crucial role in ensuring food security in the country.

By stabilising market prices and maintaining adequate stock levels, the FCI helps support farmers and consumers during fluctuations in supply and demand. Various government initiatives complement the FCI's procurement efforts, aiming to enhance agricultural productivity and improve farmers' livelihoods. By fostering a reliable food supply chain, these initiatives contribute to reducing poverty and enhancing nutrition among the population. Furthermore, they encourage innovation in agricultural techniques, enabling farmers to adapt to changing climatic conditions and market fluctuations. This strengthens the agricultural sector's overall resilience and maintains food security as a priority.

This holistic approach not only benefits the economy but also promotes sustainable practices that can be vital for future generations. According to the 24th Standing Committee on Consumer Affairs, Food and Public Distribution (2022-23), total procurement of wheat in RMS season was 389.92 LMT in 2020-21, out of this 66.11 percent of wheat procurement originates from DCP states, while 33.89 percent comes from non-DCP states. Before proceeding, it is necessary to comprehend the differences between DCP and non-DCP states. DCP refers to states that have established a system for the direct procurement of agricultural products. In non-DCP states, the FCI directly purchases agricultural products from farmers in various regions. Further analysis on the report reveals that the FCI procured 602.45 rice during the KMS season in 2020-21, with 62.70 percent of this procurement coming from DCP states and 37.30 percent from non-DCP states. It may be inferred that the procurement process heavily relies on DCP states, primarily Punjab, Madhya Pradesh, etc. for wheat procurement, while the government relies on Andhra Pradesh, Telangana, Chhattisgarh, Odisha, etc. for rice procurement. This supports the understanding of disparities in the MSP reimbursement to farmers in different states of India.A small fraction of farmers in the country, approximately six percent, benefit from MSP and public procurement, as noted by various commentators. The Shanta Kumar Committee report argues that MSP and government procurement are unnecessary (GOI 2015).

According to the Food Corporation of India (FCI), which is the government agency on MSP, the government will procure any quantity of the MSP crop that is for sale as long as it is of good quality. In reality, though, the GOI sets procurement goals for each state every season (PIB 2022).The government and researchers have identified various issues in the agricultural supply chain, particularly with the procurement and distribution of key crops like wheat and rice. (Ganesh kumar et al., 2017) (Patidar & Agrawal, 2020). The Indian agricultural supply chain is often considered inefficient, with farmers receiving only a fraction of the prices paid by consumers (Patidar & Agrawal, 2020). This is partly due to the complex nature of the procurement policies of government. In this backdrop, this paper attempts to discuss and draw attention to interstate disparities in government procurement policies.

Data and Methodology

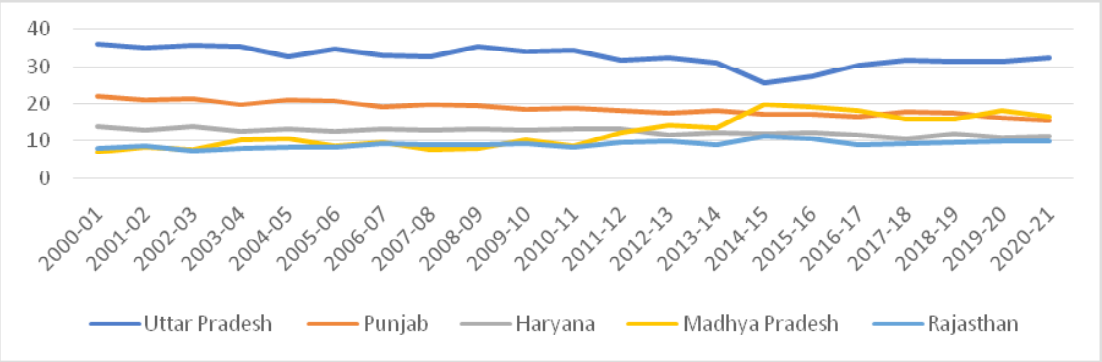
The study employs a descriptive and analytical research design to identify state-specific procurement disparities among farmers through the integration of secondary data. The data has been gathered from various journals, reports, and government departments such as the Department of Food and Public Distribution and the Ministry of Agriculture and Farmers Welfare (Government of India) and Commission for Agricultural Costs & Prices and Agricultural statistics at a glance 2022, Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers Welfare.Thetop five states have been selected on the basis of highest production in terms of wheat and rice for the study period 2000–2001 to 2020–21, This study examines the percentage share of state's production of wheat and rice, the percentage share of procurement out-of-production and estimates MSP reimbursement to farmers in the selected states. It has been kept in mind that the available data is of rice procurement but the MSP declared is for paddy.

Analysis and Discussion

a) State-wise percent share of India's Wheat Production:

In 2000-01, the combined production percentage of all five states was approximately 87 percent, and by 2020-21, it has to be 86 percent (Fig. 1). The major contribution in countries' production comes from Uttar Pradesh, followed by Punjab, Haryana, Madhya Pradesh, and Rajasthan, respectively. In 2020-21, Uttar Pradesh's percentage share of production in the country was 32 percent, nearly double that of Punjab, the second-highest wheat-producing state. Uttar Pradesh's production share exceeds 30 percent, with the exception for the years 2014-15 and 2015-16.

Fig 1: State-wise percent share of India's Wheat Production (2000-01to 2020-21)



Source: Department of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution, Government of India.

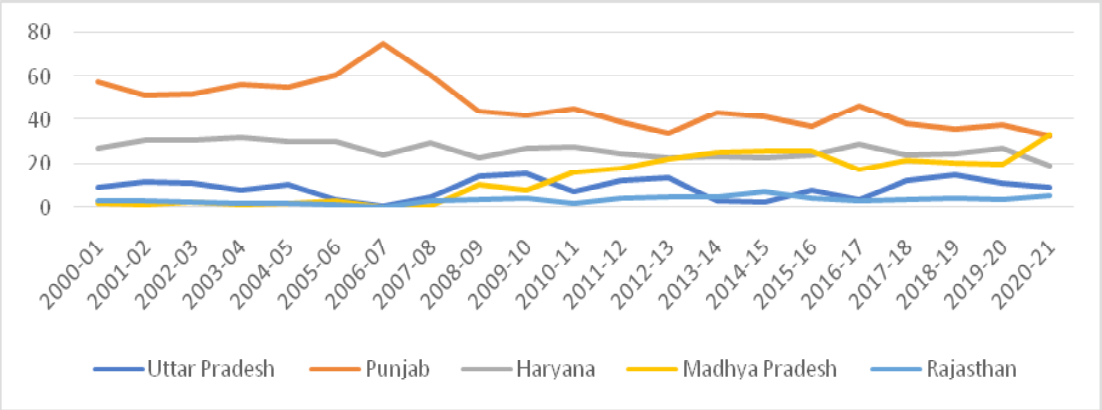
This demonstrates the significant role which Uttar Pradesh plays as a wheat-producing state in our country. Punjab is the second-highest wheat-producing state of the country. In quantity terms, wheat production in Punjab is steady and moderately growing, but in percentage contribution, it is slowly decreasing from 22 percent (2000-01) to 16 percent (2020-21). Haryana follows the same trend as

Punjab. In 2000-01, Haryana's percentage contribution was approximately 14 percent, but now it stands at 11 percent. In Madhya Pradesh. Between 2000-01 and 2013-14, Madhya Pradesh's percent share hovered between 7 and 14 percent, until a sudden spike emerged. In 2014–15, the percentage share surged from 13 to 20 percent, surpassing Punjab's wheat production. In the subsequent years, Madhya Pradesh consistently maintained its production share pace. If you see Rajasthan's percent share of production, the trend lines show that it is steady and slowly increasing from 8 percent (2000-01) to 10 percent (2020-21).

b) State-wise percent share of India's Wheat Procurement:

The government's procurement policy heavily relies on these five states. From 2000-01 to 2020-21, the government's reliance for procurement on these five states remained constant, but the share of each state's procurement varied over the course of two decades(Fig.2). While Punjab remains the highest contributor in terms of percentage of procurement, the trend line indicates a decrease in its percentage share from 58 percent in 2000–01 to 33 percent in 2020–21. Haryana maintains the same procurement policy, with no significant fluctuations in participation in percent procurement. From 2000–01 to 2007–08, Madhya Pradesh's participation in procurement was almost negligible, but a major policy shift in 2008–09 resulted in a sudden spike in percent procurement. Furthermore, Madhya Pradesh's importance continues to rise, reaching 33 percent, a level roughly equivalent to Punjab. On the other hand, the government policy regarding the percentage of procurement in Uttar Pradesh and Rajasthan remains unchanged throughout the study period. After small jolts, Uttar Pradesh contributed 9 percent in 2000-01, and in 2020-21 the percent procurement is still the same. Rajasthan's procurement percentage has increased from 3 to 6 percent during the study period.

Fig 2: State-wise percent share of India's Wheat procurement (2000-01 to 2020-21)



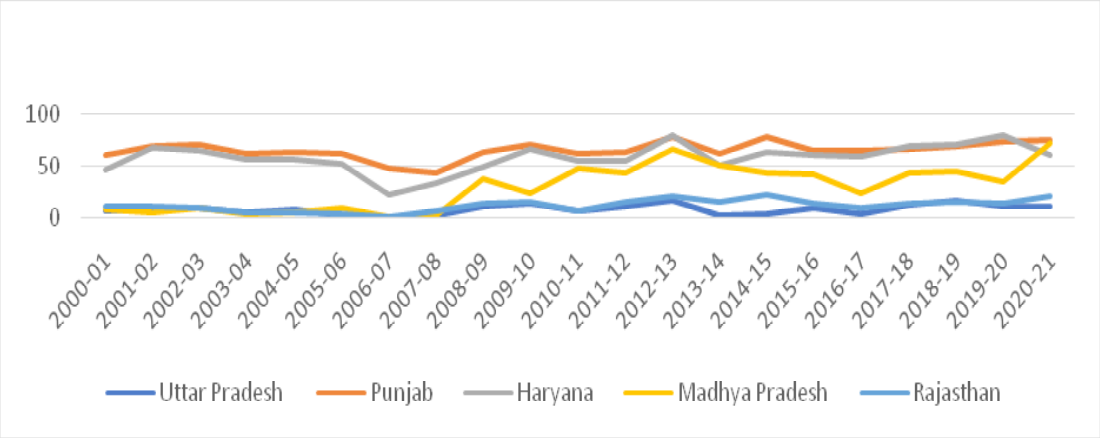
Source: Department of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution,Government of India.

c) State-wise procurement percent out of wheat Production:

The objective of the study is to estimate the percent share of wheat and rice, as well as to create an understanding of government policy regarding the share of procurement out-of-production. From

the beginning, government agencies were more interested in procuring wheat from Punjab and Haryana. In Punjab, the procurement percentage out of production has increased from 61 percent in 2000–01 to 74 percent in 2020-21, a trend that is also evident in Haryana (Fig. 3). In 2000-01, procurement out of production in Haryana was 47 percent; which reached 60 percent in 2020-21. In Haryana, the percentage of procurement experienced a significant decline in 2006–07, but subsequently, there was a sharp recovery. The analysis indicates that while Punjab and Haryana hold significant importance, the government's procurement policies in Madhya Pradesh underwent a swift change after 2007-08. In Madhya Pradesh, the percentage of procurement out of production, which was previously between 0 and 9 percent, increased to 37 percent in 2008–09 and stood at 71 percent in 2020–21. On the other hand, no significant policy changes have been observed in Uttar Pradesh and Rajasthan. In Uttar Pradesh, the procurement of production increased from 6 percent in 2000-01 to 10 percent in 2020-21. In contrast, Rajasthan has performed better, with procurement accounting for 10 percent in 2000-01 and now contributing 20 percent to the share of procurement out of the state's total wheat production Fig: State-wise procurement percent out of wheat Production (2000-01 to 2020-21).

Fig 3:State-wise procurement percent out of wheat Production (2000-01 to 2020-21)

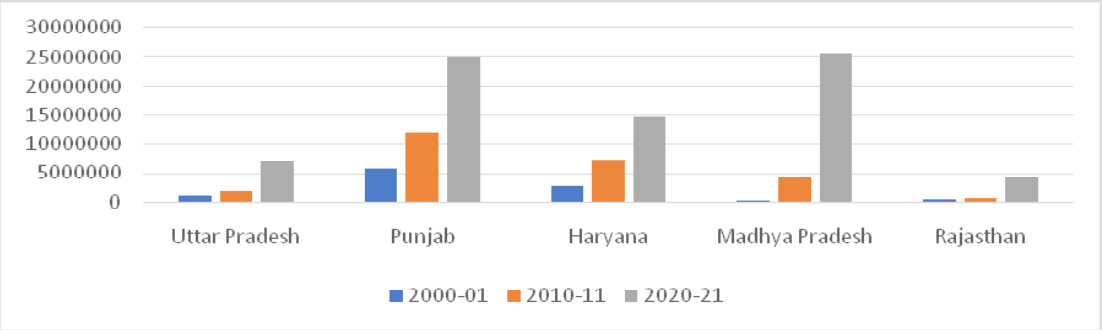


Source: Department of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution, Government of India.

d) Stae wise MSP payment distributed by wheat procurement:

In this analysis, the procurement of wheat from selected states achieves MSP reimbursement is explained. As shown in Fig. 4, the value of MSP payments to farmers in all selected states has increased over the past two decades. Punjab and Madhya Pradesh are the highest gainers of MSP in 2020-21; they gain almost the same amount from government procurement. However, it has been observed a notable shift; Madhya Pradesh is experiencing the highest rate of growth in MSP reimbursement in the last decade. Farmers from Uttar Pradesh and Haryana have shown an incremental growth in MSP payments. Lastly, Rajasthan a sudden registered in 2020-21.

Fig4: Stae wise MSP payment distribted by wheat procurement (2000-01, 2010-11 and 2020-21)

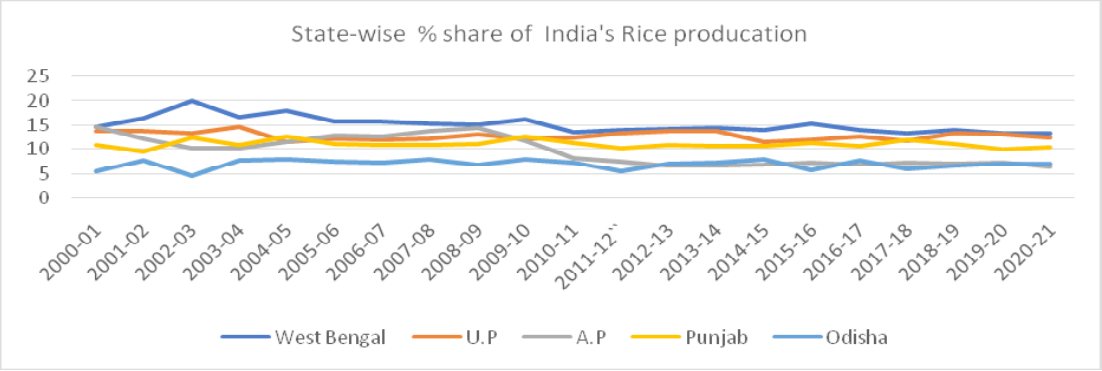


Source: Authors estimation

e) State-wise percent share of India's Rice Production:

According to Agricultural Statistics at a Glance 2022, the top five rice-producing states are as follows: West Bengal, Uttar Pradesh, Punjab, Odisha, and Andhra Pradesh, respectively, which are contributing to India's production by about 49 percent in 2020-21(Fig.5), whereas their contribution was 59 percent in 2000-01. From the beginning of the study, West Bengal maintained its first place in percent share of production. West Bengal's rice production has been increasing moderately in absolute numbers over the past two decades, but after 2002–03, its percentage of India's total rice production is gradually decreasing. Uttar Pradesh and Punjab maintained their percentage share of total rice production during the study period. The percentage share of Uttar Pradesh has lied between 12 and 15 percent, and Punjab contributes 9 to 13 percent. In the case of Andhra Pradesh, from 2000-01 to 2009-10, its share of production roughly matched that of Uttar Pradesh. However, from 2010–11 onwards, there has been a sharp decline in both the percentage and absolute quantity of production. Throughout the remaining period, the percentage share in production stayed stable. Finally, despite slight fluctuations in the percentage share, Odisha has remained consistent in its production share.

Fig 5: State-wise percent share of India's Rice Production (2000-01 to 2020-21)

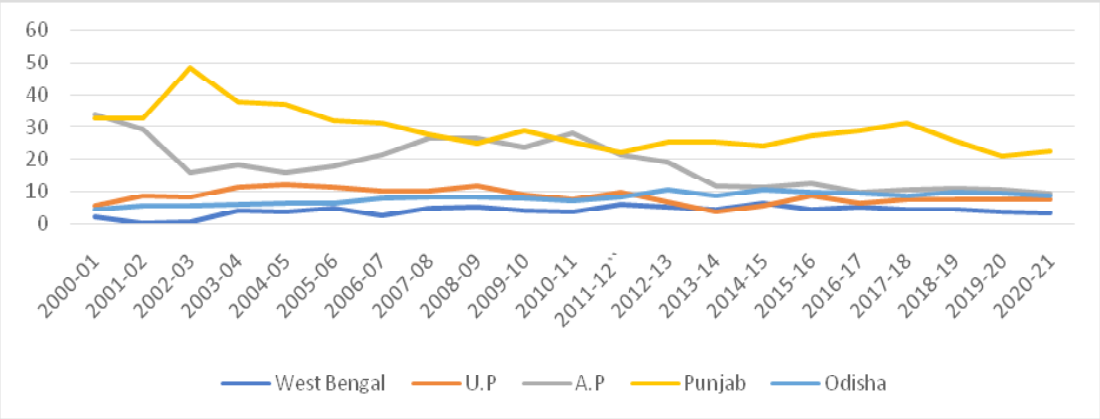


Source: Department of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution,Government of India.

f) State-wise percent share of India's Rice Procurement:

In 2000-01, all five states collectively contributed about 78 percent, and now in 2020-21 it has come down to just 51 percent(Fig.6). After analysing the trend, it can be concluded that Punjab dominates the procurement share in terms of percentage. In the overall study period, Punjab is the major contributor to the procurement system. Approximately 48 percent of procurements in 2002-03 came directly from Punjab, which was almost half the share of India's total quantity procurement of rice. Andhra Pradesh, which started with a 34 percent share of procurement, experienced a sudden decline, halving its share to 16 percent in 2002–03. After facing ups and downs, this state finally made up 9 percent of India's procurement in 2020–21. West Bengal and Uttar Pradesh, which are the two highest rice-producing states, are contributing 3 percent and 7 percent of country's total procurement respectively in 2020-21. Odisha's percent share in procurement increased from 4 percent in 2000-01 to 9 percent in 2020-21.

Fig 6: State-wise percent share of India's rice procurement (2000-01 to 2020-21)

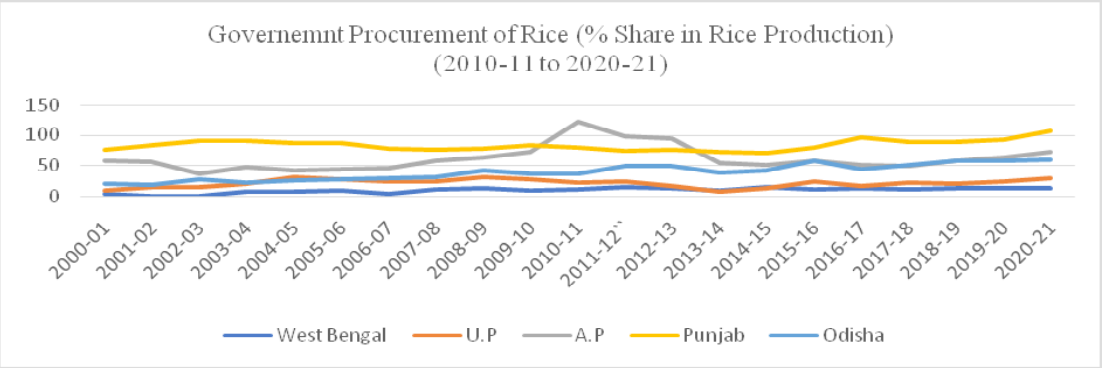


Source: Departmesnt of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution,Government of India

g) State-wise procurement percent out of rice Production:

Punjab has demonstrated consistency in the percentage of its production that is procured. In the study period, Punjab has been contributing more than 70 percent of its rice production to the government's food security scheme(Fig. 7). It has been observed that during the period from 2007-08 to 2012-13 in Andhra Pradesh, more produce was procured, and subsequently, the government maintained its traditional percentage of procurement in this state. An intriguing observation emerged during the analysis of the state of Odisha. Odisha's procurement percentage, which was 20 percent in 2000-01, has now increased to 60 percent, indicating an increasing level of government trust in Odisha's farmers over time. This situation is not the same for West Bengal and Uttar Pradesh, which, despite being the top two rice producing states, rank last in terms of procurement percentage of production.

Fig 7: State-wise procurement percent out of rice Production(2010-11 to 2020-21)

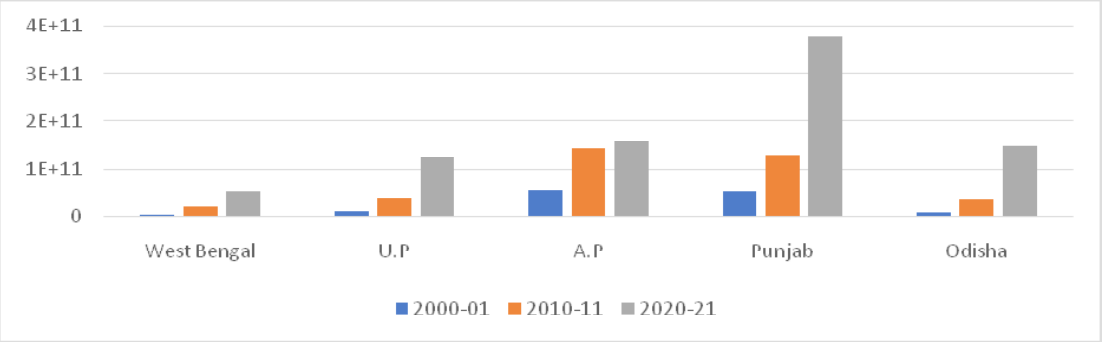


Source: Department of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution,Government of India.

h) State-wise MSP payment distributed by wheat procurement:

MSP payment distribution is directly proportional to quantity procurement. As the quantity procurement increases thus proportionally increase in MSP payment to the farmers. It has been observed that Punjab experienced a significant increase in MSP payments from 2010-11 to 2020-21(Fig.8). In Andhra Pradesh, there was a notable shift in MSP payments from 2010-11 to 2000-01, but this trend did not continue for the next decade. Farmers from Uttar Pradesh and Odisha have experienced decent income changes in 2020-21 compared to 2000-01. Ultimately, despite having the highest rice production in the country, farmers of West Bengal remains far removed from all these benefits.

Fig 8: State-wise MSP payment distributed by wheat procurement (2000-01, 2010-11 and 2020-21)



Source: Authors estimation

Conclusion

Examining India's wheat and rice procurement policies reveals their vital role in ensuring food security and stabilising farmers' incomes amidst the complexities of agricultural production.After

conducting a trend analysis on state-wise value of procurement, production and MSP reimbursement on wheat and rice, it is concluded that agricultural production has expanded rapidly in northern states like Punjab and Haryana, leading to higher procurement of wheat. Furthermore, in recent years, the government has shifted its procurement policies and included Madhya Pradesh in this list. On the other hand, Uttar Pradesh, the nation's top wheat producing state, and Rajasthan, one of the top five wheat-producing states, are not receiving their MSP payments according to their production percentage. The government policies on rice procurement are not different from wheat procurement. Punjab, Andhra Pradesh, and Odisha dominate in the rice procurement policies, while West Bengal and Uttar Pradesh, the country's top and second-top rice-producing states, do not feature in this league.Therefore, government policies on procurement should prioritize implementing measures that enhance equitable agricultural procurement across all states to mitigate disparities and promote comprehensive economic development. By effectively balancing these elements, the policies may contribute to a more resilient agricultural framework that supports both farmers and the vulnerable population of society.

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Rural Development in India: An Analysis

Dr. Dinesh Kumar Gupta[1]

ABSTRACT

In India, rural development refers to the expansion of irrigation facilities, electricity, improvement in agricultural techniques, and the development of education and healthcare services in rural areas. Since the primary goal of rural development is poverty eradication, it should be structured in a way that increases production and productivity in rural regions. As Mahatma Gandhi said, "The idea of rural development was to raise the economic, social, and educational standards of the poor and helpless in rural areas, making villages self-reliant republics." This meant not only improving the economic conditions of villages but also eliminating conservatism, prejudices, and narrow thinking among rural people, ultimately leading to their self-reliance. Even after 75 years of independence, many villages in the country still lack adequate roads, electricity, water, education, and technological or industrial prosperity. Therefore, it is essential for the government to not only prioritize rural areas in its schemes but also ensure their effective implementation at the grassroots level. Only when every village is free from poverty, with improved livelihoods and social empowerment, will the overall development of the country be truly possible.

Keywords: *Rural Development, Rural Model, Rural Schemes, Sustainable, Challenges.*

Introduction

The mantra of rural development in India was initiated by the Father of the Nation, Mahatma Gandhi. He once said, "It pains me greatly to see that most of you have either come from cities or have become accustomed to urban life. Until you shift your focus from the city to the villages, you will not be able to serve the rural people. You must also understand that India is woven from the fabric of its villages, not cities. And unless you can revive rural life and cottage industries in the villages, you cannot rebuild them."It is often observed that villages have lagged behind in the race for development and have been deprived of being integrated into the mainstream of progress, despite the significant contribution of rural communities to the nation's income. Seventy-six years have passed since independence, yet there remains a significant gap between rural and urban areas from various perspectives. On one hand, the country boasts gleaming cities, equipped with numerous amenities and grand buildings, which are giving form to the concept of a developed "India 2047." On the other hand, there are villages—where the soul of the nation resides—lacking basic amenities, distant from the light of development, and grappling with various deprivations.

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Rural development refers to the expansion of irrigation facilities, electricity, improvements in agricultural techniques, and the extension of education and healthcare services to develop rural areas. Since the primary goal of rural development is poverty alleviation, it must be structured in a way that increases production and productivity.

Mahatma Gandhi's idea of rural development was to uplift the economic, social, and educational levels of the poor and helpless in rural areas, transforming villages into self-reliant republics. This means not only improving the economic conditions of villages but also eliminating their orthodoxy, prejudices, and narrow-minded thinking, ultimately making them self-sufficient.

Early Years (1947-1960s)

- **Land Reforms:** The early years saw a focus on land reforms to address the inequitable distribution of land among rural households. While significant progress was made, challenges related to implementation and enforcement persisted.
- **Community Development:** The Community Development Program (CDP) was launched to foster community participation in rural development. It aimed to improve sanitation, education, and healthcare in rural areas.

Green Revolution (1960s-1970s)

- **Agricultural Transformation:** The Green Revolution, spearheaded by Norman Borlaug, introduced high-yielding varieties of crops and modern agricultural practices. This led to a significant increase in agricultural production and reduced food insecurity.
- **Infrastructure Development:** To support the Green Revolution, the government invested in irrigation projects, rural roads, and agricultural extension services.

Consolidation and Challenges (1980s-1990s)

- **Rural Electrification:** The Rural Electrification Corporation (REC) was established to expand electricity coverage to rural areas. This provided a vital boost to rural industries and livelihoods.
- **Poverty Alleviation Programs:** The government launched various poverty alleviation programs, such as the Integrated Rural Development Program (IRDP) and the Jawahar Rozgar Yojana (JRY), to address the needs of the rural poor.
- **Structural Adjustment Programs:** The implementation of structural adjustment programs in the 1990s led to some challenges for rural communities, including increased competition and reduced government support.

Modern Era (2000s-2024)

- **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA):** This flagship program guarantees 100 days of wage employment to rural households, providing a safety net and boosting rural incomes.

- **National Food Security Act (NFSA):** The NFSA provides subsidized food grains to a significant portion of the population, including rural households.
- **Pradhan Mantri Jan Dhan Yojana (PMJDY):** This financial inclusion scheme has helped millions of rural households access banking services.
- **Digital India:** The Digital India initiative aims to bridge the digital divide and provide access to technology and information in rural areas.
- **Rural Tourism:** Rural tourism has emerged as a promising sector, generating employment and income opportunities in rural areas.

Factors Affecting Rural Development in India:

Several factors contribute to urban development in India, but a deeper understanding of knowledge and skill development can help students grasp the elements of rural progress. The key factors influencing rural development in India are as follows:

1. Infrastructure-

The state of infrastructure in rural areas is directly linked to the scale of their development. Infrastructure primarily includes paved roads, continuous electricity supply, and the availability of transportation. With these factors in place, governing bodies can reduce connectivity issues in rural areas. Consequently, this has increased the efficiency of supplying agricultural production to the main markets across India, thus enhancing income opportunities for rural residents.

2. Education-

Education plays an integral role in the overall progress of rural areas. First and foremost, education introduces individuals to new and innovative ideas that help improve their social status. Educating the rural population at a young age ensures that there is no discrimination between urban and rural populations. As a result, rural residents gain access to countless employment opportunities across various sectors and industries.

3. Healthcare-

Healthcare is a crucial component of rural development in India. The rural population is often more susceptible to diseases that can be prevented through proper healthcare measures. Furthermore, healthcare directly contributes to their productivity, enabling them to participate in healthy competition in the marketplace. A robust healthcare system also reduces mortality rates, ensuring a healthier and more fulfilling life for rural populations.

4. Technology-

The role of technology in rural development is undeniable. Modern production techniques in various sectors can actively increase production rates, leading to significant growth in economic

activities in rural areas. Additionally, technology greatly alleviates issues related to irrigation and quality control. Therefore, the presence of appropriate technological tools like pumps and tractors is a critical factor in rural development.

Objectives of the Rural Development:

- **Poverty Alleviation:** This is the most crucial goal of rural development in India. The government is striving to increase income opportunities in rural areas and uplift people above the poverty line through various schemes.
- **Livelihood Opportunities:** Rural people are being provided with employment opportunities through self-employment and wage employment programs.
- **Basic Amenities:** Efforts are underway to improve the quality of rural life by expanding basic amenities such as drinking water, electricity, road connectivity, healthcare facilities, and education.
- **Empowerment of Panchayati Raj Institutions:** Panchayati Raj institutions are being granted more powers and authority to promote the participation of local people in rural development.

Implementation of Strategies:

- **Participation:** Rural development programs are being implemented in collaboration with the government, non-governmental organizations, community-based organizations, and other stakeholders.
- **Cooperation between Central and State Governments:** Central and state governments are jointly implementing various schemes for rural development.
- **Democratic Decentralization:** Local people's participation in rural development is being promoted by empowering Panchayati Raj institutions.

Major Schemes and Programs

- **MGNREGA:** This scheme generates employment in rural areas.
- **Pradhan Mantri Awas Yojana:** This scheme constructs houses in rural areas.
- **Swarna Jayanti Gram Swarozgar Yojana:** This scheme promotes self-employment.
- **National Rural Livelihood Mission:** This mission empowers rural women and provides them with livelihood opportunities.

Programmes launched by the government of India after independence:

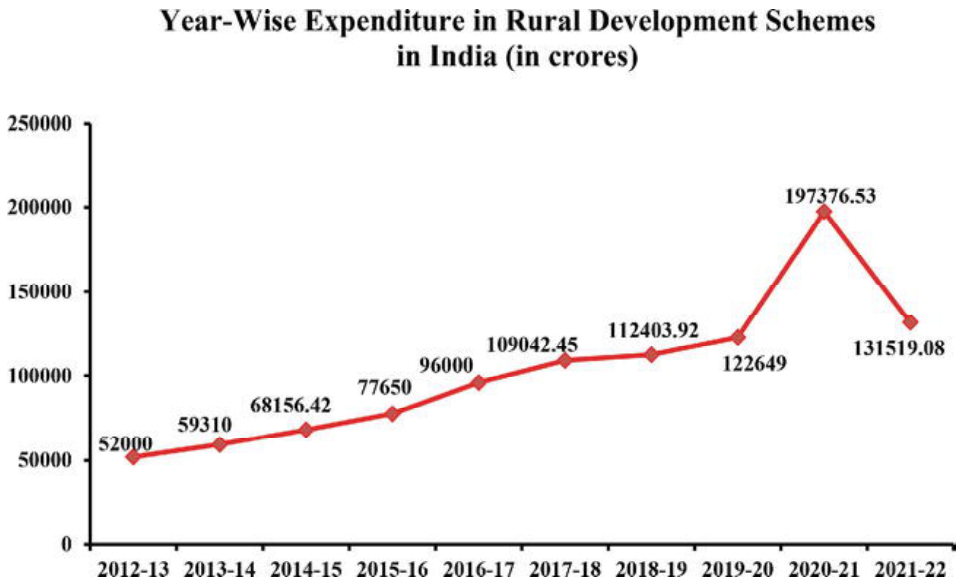
As Gandhiji has quoted that, "If villages prosper the country will prosper, if villages, sink the country will sink", emphasizing on this line, for the development of India, village has to be developed. Department of Rural Development has implemented a number of programmes in the rural areas through the State Governments for the poverty reduction, employment generation, rural infrastructure habitant development, provision of basic minimum services.

Year	Name of Schemes
1948	The Etawah Pilot Project/ The Nilokheri Experiment/The Bhoodan Movement.
1951	First Five-Year Plan launched.
1952	Community Development Program launched.
1958	Three-tier Structure of local self-governing bodies (Panchayati Raj) introduced.
1969	Rural Electrification Corporation set up.
1971	"Garibi Hatao" initiated.
1972	Pilot Intensive Rural Employment Project (PIREP).
1973	Accelerated Rural Water Supply Program (ARWSP)/Drought Prone Areas Programs (DPAP).
1977	Food for Work Program and Desert Development Program (DDP).
1978	Integrated Rural Development Program (IRDP).
1979	Training of Rural Youth for Self-Employment (TRYSEM).
1980	National Rural Employment Program (NREP).
1982	Development of Women and Children in Rural Areas (DWCRA).
1985	Indira Awaas Yojana (IAY) started
1986	"National Drinking Water Mission" (NDWM)
1988	"Bekari Hatao" initiated and Million Wells Scheme (MWS).
1989	Jawahar Rozgar Yojana (JRY).
1993	Employment Assurance Scheme (EAS).
1995	National Social Assistance Program (NSAP).
1999	Jawahar Gram Samridhi Yojana/ Swarnjayanti Gram Swarozgar Yojana
2000	Pradhan Mantri Gram Sadak Yojana (PMGSY)/Annapurna Scheme.
2001	Sampoorna Grameen Rozgar Yojana (SGRY).
2004	National Food for Work Program.
2005	Bharat Nirman/Common Minimum Program/Varsha Bima Scheme.
2006	National Rural Employment Guarantee Act (NREGA).
2011	DeenDayal Antiyodya Yojana- National Rural Livelihood Mission
2014	Saansad Adarsh Gram Yojana (SAGY)/Deen Dayal Upadhyay Grameen Kaushal Yojna (DDU-GKY).
2016	Shyama Prasad Mukherji Rurban Mission (SPMRM)
2018	Gram Samridhi Evam SwachhtaPakhwada.

Source: Ministry of Rural Development: rural.nic.in

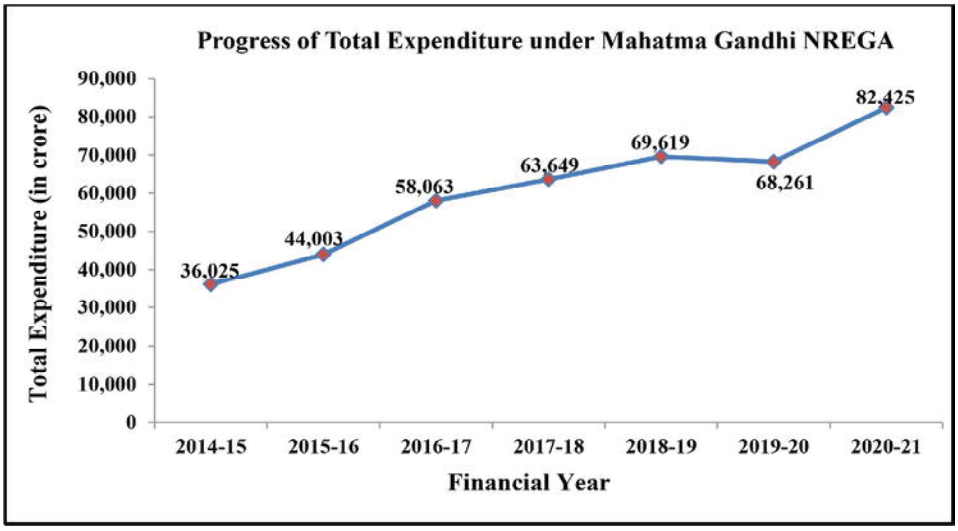
Growth of Rural India: Presentation by Graphs

Graph-01: Year-Wise Expenditure in Rural Development Schemes in India (in Crores)



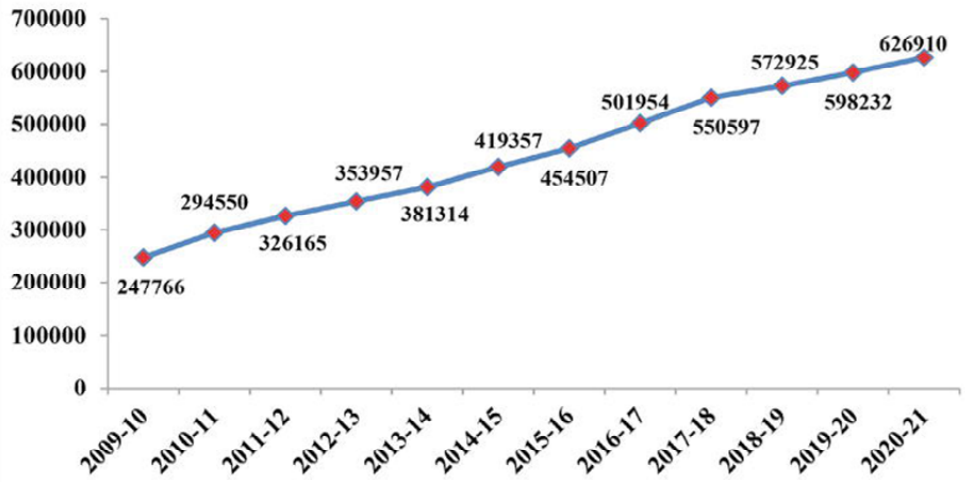
Source: Annual Reports (2012–2013 to 2020–2021), Ministry of Rural Development, Government of India.

Graph-02: Progress of Total Expenditure under Mahatma Gandhi (MNREGA)



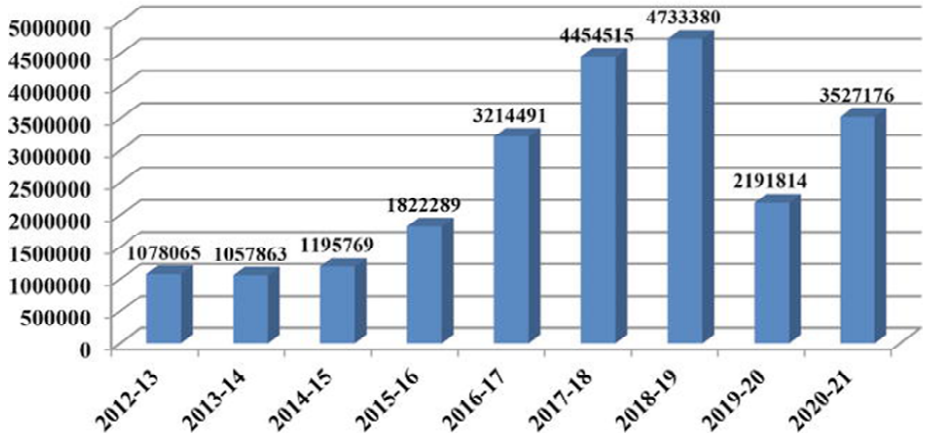
Source: Annual Reports 2020–2021, Ministry of Rural Development, Government of India

Graph-03: Length of Road Completed (in Km)



Source: Annual Reports of Pradhan Mantri Gram Sadak Yojana- 2020-2021, Ministry of Rural Development, Government of India.

Graph-04, Number of houses Completed



Source: Progress report 2020-2021, Ministry of Rural Development, Government of India.

Budgetary Allocations for Major Flagship Programs

Budgetary allocations for major flagship programs like the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Deen Dayal Upadhyay-National Rural Livelihoods Mission (DAY-NRLM), Pradhan Mantri Awaas Yojana-Grameen (PMAY-G), and Pradhan Mantri Gram Sadak Yojana (PMGSY), in boosting the rural economy.

SCHEME NAME	SANCTION ORDER (AMOUNT RS. IN CR)					
	2016–2017	2017–2018	2018–2019	2019–2020	2020–2021	2021–2022
MGNREGA	47499	55000	61084.09	71001.81	1111500	73000
NRLM-AAJEEVIKA	3000	4350	5783.5	9024	9210.04	13677.61
PMAY-G	16000	23000	19900	18475	19500	19500
PMGSY	19000	16900	15500	14070.07	13706.23	15000
GRANTS TO NIRD	50	50	75	100	80.5	124
ASSISTANCE TO C.A.P.A.R.T.	20	20	17.6	19.07	0	0
SECC SURVEY	375	80.18	386.95	1	0.01	0.01
NATIONAL SOCIAL ASSISTANCE PROGRAMME	9500	8744.57	8900.39	9200	42617.22	9200
SHYAMA PRASAD MUKHERJEE RURBAN MISSION	300	600	451.03	300	372.33	600
GRAMEEN VIKAS BHAWAN	1	5.25	5.25	54.9	0	0
NON SCHEME (SECTT)	0	42.45	45.71	52.53	48.76	53.08
TOTAL	95745	108792.5	112149.5	122298.4	1197035	131154.7

Source: Annual Reports (2012–2013 to 2020–2021), Ministry of Rural Development, Government of India

Future Outlook

Rural development in India is a complex and ongoing process. While significant progress has been made, there are still many challenges to overcome. Future initiatives will need to focus on:

- **Inclusive growth:** Ensuring that rural development benefits all sections of society, including marginalized communities.
- **Sustainability:** Promoting sustainable development practices that protect the environment and conserve natural resources.
- **Innovation:** Encouraging innovation and entrepreneurship in rural areas to create new economic opportunities.
- **Governance:** Strengthening local governance and empowering rural communities to participate in decision-making.

Conclusion

Since India's independence, various rural development programs have been implemented. The Government of India has launched initiatives like the Pradhan Mantri Awas Yojana (Gramin) for providing housing, the Pradhan Mantri Gram Sadak Yojana for building roads, and the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) to offer employment to rural

residents. Additionally, schemes like the Deendayal Antyodaya Yojana, National Rural Livelihood Mission (DAY-NRLM), are aimed at promoting self-employment and skilled wage employment opportunities, thus reducing poverty. These government-supported schemes play a crucial role in India's rural development.Under the Pradhan Mantri Awas Yojana (Gramin) scheme, 3.527 million houses were built during the 2020-2021 period. The pace of road construction reached 135 kilometres per day in 2018-19, marking a significant rise in rural infrastructure development. MGNREGA provided employment to 69 million families during the 2020-2021 financial year. Welfare schemes, such as the Garib Kalyan Rojgar Abhiyaan, MGNREGA, and DAY-NRLM, continue to operate for rural development.Numerous efforts have been made for the development of rural India, leading to significant changes in the socio-economic structure of rural areas. However, these changes are still insufficient. Even today, many villages in the country do not have adequate access to roads, electricity, water, education, and technological or industrial prosperity. Therefore, it is essential that the government not only prioritize rural areas in its schemes but also ensure their effective implementation on the ground. Only when every village becomes free from poverty, with improved livelihoods and social empowerment, will the overall development of the country be possible.Along with government efforts, rural residents themselves need to contribute, as development is not possible without their participation. Both parties must take initiative, and this collective effort will undoubtedly transform India into a developed nation.

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Sustainability of Sugar Industry through Ethanol

Deepa Gangwar[1] & Roli Misra[2]

ABSTRACT

The production of ethanol is a new source of income for sugar industry. It not only increases the revenue of sugar industries but also encourages the alternative use of waste from sugar mills. As we all know, currently ethanol production is the foremost source of bio fuel or green fuel but only few factories have units of ethanol production. Therefore, it is imperative that we focus on Sustainability of sugar industry through ethanol production in Uttar Pradesh, along with India.This paper is based on descriptive analysis, and secondary data collected through various government sources and other published and documented reports which has reflecteda growth in ethanol production in recent years. In the ethanol sector, Uttar Pradesh has a great opportunity, so the government should establish distillery units in cooperative sugar mills and also set up independent distillery units where sugarcane farmers can directly sell their crops and earn profits.

Key words: *Ethanol, Sugar Industry, Sugarcane, Uttar Pradesh, Agriculture*

Introduction

Agriculture and related activities directly or indirectly provide employment to 62% of the population. The raw material needs of industries are fulfilled by the agricultural sector. In reality, the maximum income in the agricultural sector is earned through its commercial crops, which help improve the livelihoods of farmers. Cotton, jute, and sugarcane are the main commercial crops in India. Additionally, tea, coffee, tobacco, and other crops also play a significant role in the economy. When we talk about commercial crops, sugarcane is the main one in India. After Brazil, it is the second-largest producer in the world, with a production of 439.43 million tons (FAO, 2022-23).The major sugarcane and sugar productive area is divided in two zones based on the climatic conditions. First zone is tropical comprising of Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh and the second zone is sub- tropical which includes Uttar Pradesh, Bihar, Uttrakhand, Punjab, and Haryana. In the present scenario, Uttar Pradesh is the highest sugarcane and sugar productive state in India with 2494.20 lakh tonproduction of sugarcane in 29.66 lakh hectare cultivated area (2023-24) andat the same year there are 121 sugar mills are operational in Uttar Pradesh where 104.13lakh tons of sugar is produced(Statistics, 2024/upcane.gov.in).

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Problems of Sugar Industry

In India, the main problem for the sugar industry is fluctuating sugarcane production, scanty irrigation facilities, low sugarcane productivity, and continuous drought in arid and semi-arid regions where sugarcane is extensively grown. Government has been focusing on the issues related to this industry, there have been technological changes also in recent years such as; Bagasse drier unit, moister control unit, high pressure boilers, automation, water management and molasses cooling system etc. yet industry faces severaldifficulties in present time. The major problem which has become the current matter of the debate is the pricing of cane. The farmers are continuously demanding for high cane price but government has not been approving this demand. As in the session 2023-24 central government had fixed Fair and Remunerative Price (FRP) at Rs 315/quintal. If we look at the state level, then Uttar Pradesh fixes cane price on its own which is called Statutory Advisory Price (SAP). This was fixed atRs 350/ quintal in 2021 which is also now remain constant (Annual Report/ D.F&P.D Report 2022-23). This stagnation in prices has been converted in a cause of conflict between state and farmers. In addition, the sugar mills also delay payments to farmers for the outstanding amount. Another issue is the low recovery of sugar from sugarcane in mills, which is below the national average. The main reason for the failure of policies aimed at improving the sugar industry is the lack of proper implementation of these policies. High SAP and FRP impose a heavy financial burden on the sugar industry, while the price of sugar is not higher according to the demand for sugar mills.

Thus, the production of ethanol is a new source of income for sugar industry. It not only increases the income of sugar industries but also encourage the alternate use of waste of sugar mills. As we all know that at present ethanol production is the main source of bio fuels or green fuels but only few factories have units for ethanol production. Therefore, it is imperative that we focus on Sustainability of sugar industry through ethanol productionindustry in India as well as in Uttar Pradesh. It is in this background the aim of this paper is to analyse the pattern of ethanol production from sugarcane in India with special reference to Uttar Pradesh that could facilitate in accomplishing stipulated target of ethanol blended petrol production. This paper is based on descriptive analysis, and secondary data that is collected through various government sources and other published and documented reports have reflected the growth in ethanol production over the years.

Sugarcane and By-products

As already mentioned, Sugar industry is not only the major agro-based industries in India which not only produces sugar but also results in alternative markets of its by-products. In addition to sugar, molasses is also obtained with various degrees of sugar content. The by-product obtained from the extraction of sugar is called bagasse in the case of sugarcane, and beet pulp in the case of sugar beets. Another by-product of the extraction or refining of beet or cane sugar is Molasses which is used for feed, food, industrial alcohol, alcoholic beverages and ethanol. It is in place to

mention that from the sugarcane the following contents are prepared or the conversion factor of sugarcane is as follows (Agriculture Statistics at a Glance 2021).

- Gur from cane sugar is 11.20% to 11.50%.
- Crystal sugar from Gur refined (Gur refineries) is 62.5%.
- Crystal Sugar from Cane crushed (cane factories) is 10.20%.
- Khandsari sugar (Sulphur & non Sulphur) is 46%.
- Molasses from Cane Crushed is 4.0% to 4.5%.
- Cane Trash from Cane Harvested is 8.0% to 12.0%.

In the year 2022-23, the total production of molasses in India was 16,852 thousand tons. If we analyse the situation in Uttar Pradesh in terms of sub-products of sugarcane, the state ranks highest in molasses production. In the year 2022-23, it produced 5,891 thousand tons of molasses, followed by Maharashtra and Karnataka with 5,039 thousand tons and 2,880 thousand tons respectively (Statistics, 2023/Chinimandi.com).

Ethanol Production:

The Production of molasses is important as it is used in production of Ethanol which is a new source of energy and used in the blending in petroleum. This blend is called bio-fuels or green fuels. For the ethanol production by molasses, Government has started distillery projects in sugar mills. To encourage the production of ethanol; the Government of India has also started a new Ethanol Blending Programme from 2013. This programme is focusing on the increase the blending of ethanol in petroleum so that the consumption of bio fuels in India has increased. Ethanol can also be produced by direct sugarcane juice. In the Bio fuel Policy 2009, it was announced that sugar mills can produce ethanol direct from sugarcane juice. This programme provided an alternative market for the bumper stock of sugarcane crop production. However, in order to ensure sufficient availability of domestic sugar for household consumption and to maintain prices, the government has imposed a ban on the usage of sugarcane juice for ethanol production in the 2023-24 (ethanol supply year; December-November) (Energyworld, 2023). In the EPB program (2013), a mandate has also been set for a blend of 5% to 10% ethanol in petroleum. However, ethanol blending is higher in foreign countries, for instance, Brazil which is the highest ethanol productive country in the world set a target of 27 percent for the blending of Ethanol in 2017-18 (Brazil Bio fuel Annual 2018).

It is known that there is a surplus availability of biomass to the tune of 120-160 million metric tons annually which has a great potential to produce approximately 3000 crore litres of ethanol annually. The implementation of a study conducted by Deyet.al (2021) in India, examined the demand for ethanol and the investigation of its suitability. It is discovered that ethanol is a new alternative source for biofuel. As it is known, the consumption of fossil fuel is rapidly increasing, burdening India's imports.

Therefore, the need for biofuel is a significant issue at present. In India, ethanol production primarily utilizes sugarcane as feedstock. The use of biofuel helps reduce pollution in the transportation sector and assists in decreasing imports of ethanol-blended fuel. The "National Policy on Biofuels" announced by the central government in 2018 mentioned a symbolic goal of 20% ethanol mixing in petrol by 2030(PIB, 2022). The Indian government has also allowed the purchase of ethanol produced from non-food feedstocks, in addition to sugarcane. According to recent news, the Ministry of Department of Chemicals and Petrochemicals has imposed a prohibition on expending sugarcane juice directly for ethanol production in December 2023. They have taken this verdict with the purpose of confirming appropriate domestic supply of molasses. In July 2024, the Ministry of Petroleum and Natural Gas lifted this ban and allowed the industry to convert sugarcane juice into ethanol (The Hindu, August 23, 2024).This includes petrochemical routes, as well as cellulose and lignocellulosic materials. Under the Ethanol Blending Programme, the Centre has asked oil marketing companies (OMCs) to target 10 % blending of ethanol with petrol by 2022. At present time (2022-23), Ethanol Blended Petrol programme which was implemented in all 13 states had the blending level of 12.06 percent and targeting to achieve 20 % Ethanol blending level till 2025 (Price Policy for sugarcane, 2024).With a view to popularize ethanol production; the central government has fixed the price of sugarcane juice and its by-products for use in ethanol production. The Central Government has fixed remunerative ex-mill price of ethanol obtained from C-heavy molasses, B-heavy molasses and 100% sugarcane juice, which will use 100% sugarcane juice for production of ethanol. Due to which sugar will not be produced. The prices of by-products are mentioned in Table 1.

Table 1: Price of By-products of sugarcane in India

S.N	Products	Price in Rs/ litre				
		2018-19	2019-20	2020-21	2021-22	2022-23
1.	C- Heavy Molasses	43.46	43.75	45.46	46.66	49.41
2.	B- Heavy Molasses	52.43	54.27	57.61	59.08	60.73
3.	Sugarcane Juice	59.13	59.48	62.65	63.45	65.61

Source: Biofuel policy 2018/Press Information Bureau Report 2022, 2023.

Table 1 displays the price of C heavy molasses, B heavy molasses and sugarcane juice for conversion to ethanol which clearly indicates that the prices of all these by-products have been increased every year to promote ethanol production.Ethanol blending program has been started in 2013. Under this, the period from December 1 to November 30 is the ethanol supply season. The tender quantity of ethanol is equal to the quantity of total ethanol production. The tendered quantity of ethanol in the session 2022-23 was 459 crore litres, and around 502.7 crore litres of ethanol has been supplied to OMCs and Ethanol blending percentage achieved at 12.6% during the session 2022-23. The total data of ethanol in India is mentioned in Table 2 which shows the data from 2013-14 to 2022-23. This shows a rapid increase in the supply of ethanol and an increase in the blending percentage over the years in India.

Table 2: Progress Under Ethanol Blended Programme (in crore litre)

Ethanol supply year (1st Dec- 30 Nov)	Tendered quantity	Quantity allocated	Quantity supplied	Blending percentage achieved (in %)
2013-14	115	70.4	38.0	1.5
2014-15	128	86.5	67.4	2.3
2015-16	266	130.5	111.4	3.5
2016-17	280	80.7	66.5	2.1
2017-18	313	161	150.5	4.2
2018-19	329	287.0	188.6	5.0
2019-20	511	210.6	173.0	5.0
2020-21	457	370.1	302.3	8.10
2021-22	459.0	463.5	433.6	10.02
2022-23	459.0	564.5	502.7	12.06

Source: Price Policy for Sugarcane, Report /CACP, 2024

Production of Ethanol in Uttar Pradesh:

In Uttar Pradesh there are 47 sugar mills which have started distillery projects in which 38 units are from private which have the capacity of 1346.45 million lt. /year production of ethanol and 9 units are cooperatives which have the capacity of ethanol production 93.00 million lt. /year. This data shows a big difference between the private and cooperative mill's capacity. There are also some distillery units which are not affiliated to any sugar mills the numbers of these mills are 26 and its ethanol producing capacity is 790.54 million litres per year. In the session 2021-22 total 131.76 crorelitre ethanol has been produced (Statistics/upcane.gove.in). The production of ethanol in Uttar Pradesh and number of distillery units has been mentioned in the table 3.

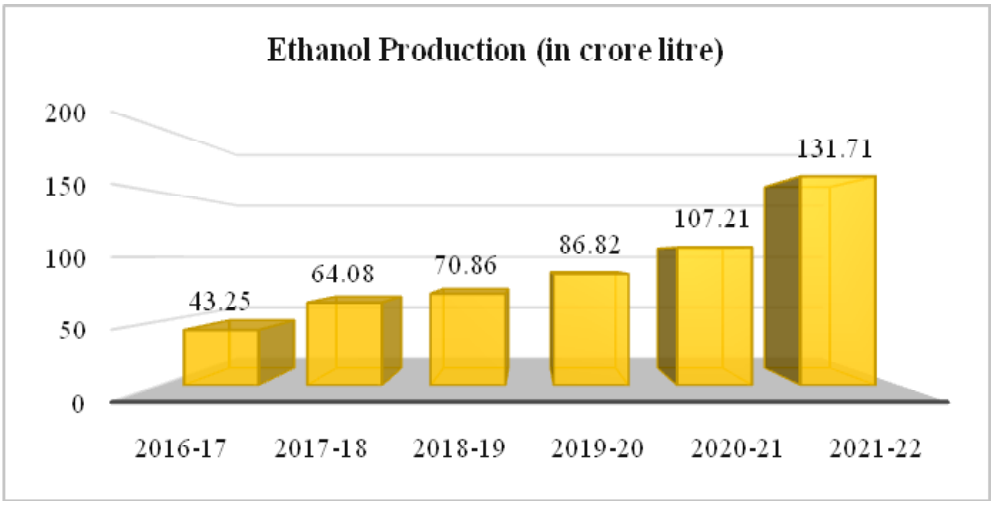
Table 3: List of no. of Distilleries and Production of Ethanol in Uttar Pradesh

S No.	Year	Number of Distilleries	Ethanol Production (in crore litre)
1	2016-17	44	43.25
2	2017-18	47	64.08
3	2018-19	53	70.86
4	2019-20	54	86.82
5	2020-21	72	107.21
6	2021-22	81	131.71

Source: Excise department/upcane.gov.in, 2023

Table 3 shows that in the year 2016-17 there were only 44 distilleries in Uttar Pradesh where 43.25 crore litres of ethanol has been produced. There has been a rapid increase in the number of distilleries and ethanol production which was 81 units and 131.71 crore litre ethanol was produced in year 2021-22. The production of ethanol is shown in figure 1.

Figure 1: Ethanol production in Uttar Pradesh



Source: Excise department/upcane.gov.in, 2023

It is clear from Figure 1 that in the fiscal year 2016-17, ethanol production from sugarcane was 43.25 litres, and due to government policies and continuous technological development, there has been an incredible growth, resulting in 131.71 crore litres in 2021-22. The Uttar Pradesh government believes that with this growth and capacity, Uttar Pradesh is ready to become the largest ethanol producer in the country. It is hoped that in the coming years, Uttar Pradesh's ethanol capacity will reach 2.25 billion litres per year. In the past six years, this sector has witnessed unprecedented support from industry in terms of investment in crops, machinery, technology, and overall agriculture(Times of India, 2023).

Significance of Ethanol Production

Ethanol production is a new source of energy, and it is one of the most valuable sources of biofuel or green fuel. While it is important for biofuel from an environmental perspective, it is also essential for the sugar industry in China. As we all know, the ethanol blending program has promoted biofuel, reducing the burden of traditional fossil fuels such as petrol and diesel, and also decreasing the consumption of old resources and energy. Ethanol production will maintain stable fuel prices and ensure energy security for India in the future.The sugar industry also benefits from ethanol production. Due to distilleries, the industry can utilize sugarcane waste. As a result, the revenue of the sugar industry increases, and it also reduces losses and additional financial burden. Since the sugar industry produces sugar from all the sugarcane, there is always an excess stock of sugar. Consequently, with increasing supply and consistent demand, sugar prices decrease, causing losses for sugar mills. If all sugar industries have the technology to directly produce ethanol from sugarcane juice, it not only reduces costs for the sugar industry but also helps address the issue of excess sugar production. This is advantageous for sugar sales.

Conclusion

Uttar Pradesh, with its vast market, strong agricultural base, diverse industries, and maximum sugarcane production, has the potential to become a significant driver of economic growth and development. Despite extensive research in the sugar industry in India, there are still untapped areas, such as improving the conversion rate of ethanol from sugarcane. This presents a significant opportunity to meet fuel demands and increase income for sugarcane producers. Developing industries related to ethanol and sugarcane by exploring this field is necessary. Studies have shown that although there have been innovations and policies in the ethanol sector, the development process has not progressed to its full potential.In India, several sugar industries have started distillery units, some of which are cooperative, but most distillery units are established by private sugar industries. For example, in 2023-24,in Uttar Pradesh, 24 cooperative sugar mills are operational, out of which only 9 have established ethanol units (upsugarfed.org).

It seems that progress is very slow and needs to be developed. On the creative side, India has produced ethanol on a large scale and has also improved the percentage of blending, which has benefited the sustainable sugar industry. In the field of ethanol, Uttar Pradesh has a great opportunity, so the government should establish distillery units in cooperative sugar mills and also establish independent distillery units where sugarcane farmers can directly sell their crops and earn profits. The sugar industry should receive assistance in making it sustainable, and it should also be beneficial for sugarcane growers who are always affected by pending dues. Additionally, policies related to ethanol and sugarcane should be standardized and improved. The government should also increase the conversion rate of ethanol for the sugar industry. The EBP program should be further expanded to help make the sugar industry sustainable.

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The Impact of Drone Technology on Indian Agriculture: An Analysis of Government Initiatives and Modern Farming Practices

Lakhandar Vishvakarma[1] & Prof.Nandita[2]

ABSTRACT

I*n recent times, the Indian government has stated several times that it is focusing on promoting drones in the agricultural sector. As per India's Budget 2022-23, the government is keen to deploy 'Kisan' drones to boost the agriculture sector in the country. Kisan drones are being promoted for crop assessment, digitization of land records and spraying of insecticides and nutrients. Kisan drones can usher in a revolution as high performance drones can be used to transport vegetables, fruits and fish directly from farms to market. "These items are delivered directly to market with minimal damage and less time, resulting in increased profits for farmers and fishermen".*

This paper examines the adoption and impact of drone technology in the Indian agricultural sector, with a focus on government initiatives, such as those inspired by the Digital Agriculture Mission and schemes promoting modern farming techniques. By analysing the benefits, challenges, and practical applications of drone technology, this study aims to understand how drones are revolutionizing Indian agriculture. It also explores the socio-economic implications for farmers and offers recommendations for the effective integration of drone technology into farming practices.

Keywords: *Drones, Digital Agriculture Mission, Modern Farming Techniques.*

Introduction

The agricultural sector in India, the primary livelihood for over ~60% of the population, faces challenges like unpredictable weather, water scarcity, pest infestations, and inefficient resource management. In recent years, the Government of India has taken several steps to modernize agriculture through technological interventions, with drones being a pivotal component of this transformation. This paper explores the rise of drone technology in Indian agriculture and how government initiatives, such as the Digital Agriculture Mission, are accelerating its adoption.

The impact of the COVID-19 crisis has significantly shaped the actions and practices of people, and agriculture has certainly been affected by this situation. The Food and Agriculture Organization

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states that the ramifications of COVID-19 on agriculture are considerable in two primary areas, namely food supply and demand (FAO, 2020). These dimensions are intrinsically linked to food security, thereby placing food security itself in jeopardy. The demand for food, and consequently food security, is severely compromised due to restrictions on mobility and diminished purchasing power, disproportionately affecting the most vulnerable demographic groups (Siche, 2020). Projections indicate that by the year 2050, food demand is expected to escalate from 59% to 98%. Such an increase will exert unprecedented pressures on agricultural markets. Farmers everywhere will need to elevate their crop outputs, either by enlarging the tracts of land put aside for agriculture or by fine-tuning the performance of the land they already farm through more effective use of agricultural resources such as fertilizers and watering techniques, as well as continually incorporating groundbreaking technologies (Elferink and Schierhorn, 2016).

Recent Applications of drones in agriculture in India:

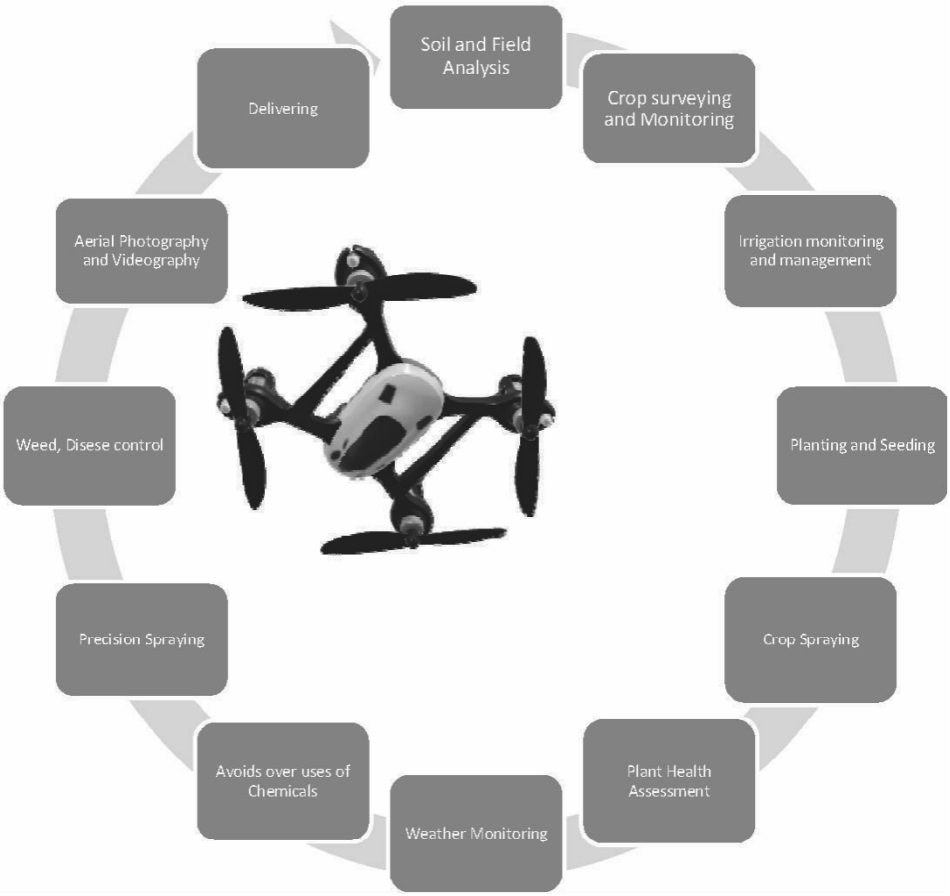
The move would inspire aspiring researchers and entrepreneurs to look for cost-effective drone solutions for India's 6.6 million farmers. A Bengaluru-based drone start-up worked with the Indian arm of Swiss agribusiness giant Syngenta to analyse maize growing areas in India using drones as part of efforts to adopt precision agriculture. Last year, agricultural drones developed by Kakkanadstartups sprayed micronutrients over the paddy fields of Alathur in Kochi district of Kerala. Locust swarms hit many parts of India in 2020, particularly the state of Rajasthan. Drones have been used in the state of Rajasthan to efficiently spray organophosphate insecticides in small and concentrated quantities to combat locust infestation. You can spray insecticides over an area of one hectare in less than 15 minutes. Some state agricultural universities have already started using unmanned aerial vehicles (UAVs) for agricultural purposes. In Andhra Pradesh, Acharya NG Ranga Agriculture University (ANGRAU) plans to use drones in the agriculture sector to spray pesticides. Recently, the university purchased five different drones under the APSARA (Centre for AP Sensors and Smart Applications Research in Agriculture) program, which are currently being tested (Anonymous, 2021h). Negotiations are currently underway with the central and state governments to conduct field tests.

The KrishiViman drone, developed in India, presents a viable solution from the perspective of agricultural safety and health concerns associated with spraying and other field operations. Approximately 58,000 fatalities among farmers are documented due to snakebites in India. Additionally, around 0.3 million farmers experience respiratory ailments attributed to the application of pesticides and similar substances. Drones possess the capacity to significantly alleviate these adversities faced by farmers, as they obviate the necessity for farmers to extensively navigate through crops for spraying purposes.

Applications of Drones in Indian Agriculture

1. **Crop Health Monitoring:** Drones equipped with multispectral sensors provide real-time images of crops, helping identify pest infestations, nutrient deficiencies, and water stress.
2. **Precision Spraying:** Drones enable precise application of pesticides and fertilizers, reducing chemical usage by up to 30%.

3. **Soil Analysis:** Drone-based soil mapping helps in optimizing irrigation and fertilizer application.
4. **Crop Yield Estimation:** Drones provide accurate data on crop yields, aiding in insurance claims and loan applications.



Benefits of Drone Technology for Farmers

Farmers using drones reported a 15-20% increase in crop yields. Cost savings of 20-30% were observed due to reduced pesticide and fertilizer usage. Drones significantly reduced labour costs, especially for activities like pesticide spraying.

Irrigation practices for agricultural crops account for approximately 70% of the total freshwater resources on Earth, underscoring the critical significance of precision irrigation methodologies.

Agricultural producers can optimize their time and financial resources by accurately pinpointing the regions that necessitate extensive irrigation intervention.

The implementation of precision agriculture strategies can enhance both the productivity and quality of crop yields. Precision agriculture delineates the agricultural landscape into multiple irrigation zones to facilitate improved resource management.

The integration of drone technology can effectively oversee the regulation of irrigation water within the framework of precision agriculture. It is achievable to detect specific segments of crops exhibiting water and nutrient deficiencies through drones outfitted with appropriate sensors that indicate the need for additional fertigation.

The technologies mentioned enable the creation of a specialized map that illustrates real-time soil moisture levels, thereby promoting more effective irrigation planning. Furthermore, drone surveys contribute to the enhancement of water use efficiency and the identification of potential irrigation leaks through comprehensive irrigation monitoring.

Drones equipped with hyperspectral, thermal, or multispectral sensors are capable of identifying areas that are excessively arid or require irrigation intervention from the farmer.

Literature Review

The literature review explores the role of drones in global and Indian agriculture, highlighting the impact of government policies and initiatives.

FAO (2020): The Food and Agriculture Organization's report on "Drones in Agriculture" emphasizes how drones improve crop health monitoring, irrigation management, and precision farming. It indicates that drone usage can enhance crop yields by up to 20% through efficient monitoring.

NITI Aayog (2021): In its policy paper "Using Drones for Agricultural Development," NITI Aayog discusses how drones can contribute to agricultural modernization by enabling real-time data collection, reducing labour costs, and enhancing crop management practices. The paper also mentions government initiatives encouraging the use of drones.

Ministry of Agriculture and Farmers Welfare (2022): A report titled "Technological Advancements in Indian Agriculture" outlines the government's initiatives to subsidize drone purchases, train farmers in drone usage, and create a regulatory framework for drone operations.

Jain et al. (2021): The study "Applications of Drones in Indian Agriculture" provides an overview of how drones help monitor crop health, spray pesticides, and collect soil data. The research highlights the positive impact on crop yields, reduced pesticide usage, and water conservation.

Research Gap

While literature suggests the transformative potential of drones in Indian agriculture, there is a lack of empirical research on how government initiatives are directly influencing drone adoption, especially among small and marginal farmers. This paper aims to address this gap by exploring how policy frameworks, subsidies, and training programs facilitate drone usage in agriculture.

Research Objectives

1. To analyze how drone technology is being used in Indian agriculture.
2. To evaluate the impact of government initiatives in promoting drone technology adoption among farmers.
3. To identify the challenges and opportunities associated with drone usage in Indian agriculture.
4. To provide recommendations for improving drone adoption and integration into Indian farming practices.

Research Methodology

The Research is descriptive in nature and qualitative approach is used to analyse the use of drone technology in Indian agriculture. We conducted a bibliometric analysis to explore drone application in agriculture. The study is also based on secondary data. The information was sourced from government reports, academic journals, drone industry reports, and agricultural studies. Statistical tools such as regression analysis were used to examine the impact of drone usage on crop yields.

Guidelines for the Utilization of Drones in Agricultural Practices under the Sub-Mission on Agricultural Mechanization (SMAM) 2014: The supplementary guidelines pertaining to the provision of agricultural services via drone technology under the Sub-Mission on Agricultural Mechanization (SMAM) have been disseminated by the Mechanization & Technology Division of the Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India, on January 17, 2022.

Financial assistance shall be allocated for the establishment or enhancement of Custom Hiring Centres (CHCs) or Hi-tech Hubs dedicated to the delivery of agricultural services through drone applications. It is imperative that necessary compliance measures be adhered to by the institutions demonstrating and the providers of agricultural services utilizing drone technology.

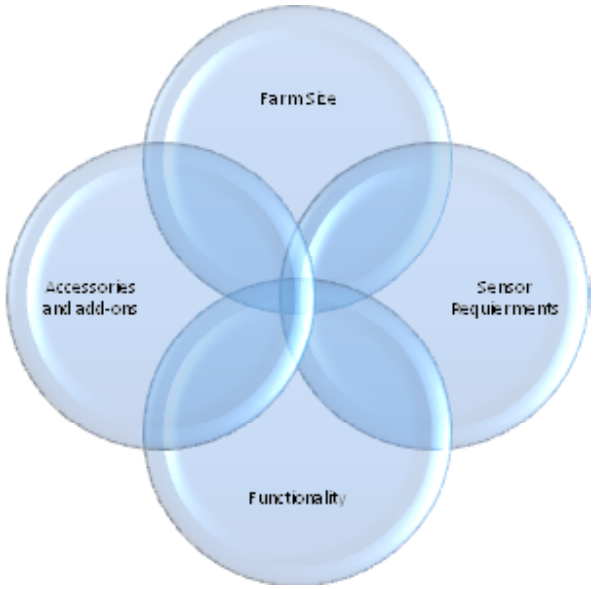
The guidelines set forth by the Ministry of Civil Aviation, CIB & RC shall be applicable to all users, operators, and service providers of CHC employing drones for agricultural purposes. 6.3. Standard Operating Procedures (SOPs) for the Deployment of Drones The Government of India has instituted Standard Operating Procedures (SOPs) for the deployment of drones in the application of pesticides and nutrients, which furnish succinct directives for the efficient and safe operation of drones.

Drone Operations Cost in Indian Agriculture:

In the contemporary Indian agricultural landscape, drones are predominantly promoted as automated spraying instruments capable of executing pesticide applications and similar functions over crops, thereby mitigating health risks linked to manual spraying while conserving time, resources, and human labour. The Ministry of Agriculture in India approximates that the utilization of a drone with a payload capacity of 10 kg will incur a cost ranging from Rs 350 to Rs 450 per acre. This estimate is predicated on the premise that a drone, equipped with multiple batteries, will be operational

for a minimum of six hours daily, thereby covering approximately 30 acres of agricultural land. Comprehensive details regarding spray operations and associated metrics concerning drones are delineated below. These insights were derived from an informational webinar conducted by the organization IFFCO Kisan, wherein an experts, elucidated the particulars of drone operations based on their experiences in the deployment of drone sales and the provision of spraying services on a rental basis calculated per acre. The anticipated reduction in the costs of spraying inputs (including pesticides and weedicides) is estimated to be approximately 25-30% as a direct result of the automated spraying processes. By way of illustration, considering the cost of Rs.240 per bottle for spray application on an acre, a 25% savings would correspondingly decrease the input costs for the farmer. Also, an impressive reduction in water use, roughly 80-90%, results from the tiny size of droplets at about 50 microns, contrasting with the droplet size of approximately 500 microns in manual spraying. The utilization of drone spraying techniques significantly enhances efficiency, as a single spray operation requires only 5-7 minutes per acre, whereas a manual operator can typically cover only 3-4 acres within a single day. Night vision illumination is likewise accessible to facilitate spraying activities during nocturnal hours.

A conventional drone is priced approximately between 0.7 and 0.9 million INR. In the context of drone rental for spraying activities, the current rental fee is estimated to be between INR 600 and 700 per acre.



Factors influencing The Cost of Agriculture Drones in India.

Government Initiatives Promoting Drone Usage

The Indian government has launched initiatives like the Sub-Mission on Agricultural Mechanization (SMAM), offering subsidies of up to 50-75% for purchasing drones.

The Ministry of Agriculture's Drone KisanYojana aims to train over 10,000 drone pilots to help farmers adopt this technology.

The Namo Drone Didis and LakhpatiDidis scheme launched by GOI in 2023, to train at least 15,000 drone didis and provide drone services to female citizens of SHGs.

Case Study Example: In Maharashtra, a cooperative society implemented drones for pesticide spraying, resulting in a 25% increase in yields and a 30% reduction in pesticide costs, demonstrating the potential of drones for collective farming.

Manufacturing/Import of Drones in India

Numerous enterprises are engaged in domain of drone manufacturing within the Indian context. In India, a total of 16 manufacturers have officially registered 22 models of Remotely Piloted Aircraft (RPA) on the digital sky platform managed by the Directorate General of Civil Aviation (DGCA) (Anonymous, 2021). The Ministry of Civil Aviation released the 'Unmanned Aircraft System (UAS) Rules, 2021' back in August 2021. As stipulated by the regulations, the manufacture of UAS or any associated part or component can solely be undertaken in India by an authorized UAS manufacturer registered on the DGCA's digital sky platform.

Every unmanned aircraft system that is produced or imported by an authorized manufacturer or importer is mandated to adhere to the certification of manufacture and airworthiness standards. A type certificate isn't required for either the production or importation of a UAS, nor is it crucial for running a model remotely piloted aircraft system (RPAS) or a nano UAS. The Directorate General of Foreign Trade is authorized to issue an import license for UAS.

Presently, 90% of the drones operational within India are sourced from international markets. The absence of a domestic component ecosystem is notable, with the majority of significant components being imported, particularly from China.

On 15 September 2021, the Union Cabinet authorized a production-linked incentive (PLI) scheme aimed at establishing India as a drone hub by the year 2030, which was subsequently published by the Ministry of Civil Aviation in the Gazette of India, referenced as S.O. 4044 (E) dated 30th September 2021. The PLI scheme is designed to provide financial incentives of up to 20% to manufacturers of drones and associated components. This initiative closely follows the recent liberalization of regulations, which has facilitated the ownership and operation of drones. A financial provision of Rs 120 crore has been earmarked by the government for this initiative, which will unfold over a duration of three years. The government anticipates that the drone manufacturing sector will garner investments exceeding Rs 5,000 crore.

Additionally, market observers anticipate that the drone service market will likely see a nearly threefold rise over the five-year duration from 2021 to 2026, expanding from USD 5.48 billion to USD 15 billion by 2026 (Research and Markets, April 2022). The integration of drones within the agricultural domain presents substantial opportunities, thereby necessitating an examination of drone technology from an Indian agricultural standpoint. The Centre for Sustainable Development (CSD) at Columbia University in New York, in collaboration with The Energy and Resources Institute (TERI), has initiated a multi-sectoral project entitled: "A New Indian Model of ICT-led Growth and

Development." The primary aim of this project is to enhance the understanding of the function of Information and Communication Technologies (ICTs) across critical sectors such as agriculture, health, education, and infrastructure, among others. Consequently, the project is keenly focused on documenting the latest advancements in pioneering technologies within the agricultural sector. In this detailed paper, we kick off by assessing important recent writings about unmanned aerial vehicles (UAVs), generally termed drones, in agricultural settings and list the potential ways that drone technology can be integrated into agriculture. Subsequently, we outline the recent policy measures undertaken by the Government of India to foster and disseminate the utilization of drones. Following this, the practical dimensions of drone implementation within the Indian agricultural framework are elucidated. The paper concludes by addressing certain challenges and proposing pathways for the enhanced applicability of drones in Indian agriculture.

Challenges in Drone Adoption

High Initial Cost: Despite subsidies, the cost of acquiring and maintaining drones remains a barrier for small farmers.

Lack of Technical Skills: 60% of surveyed farmers expressed difficulty operating drones due to limited digital literacy.

Regulatory Hurdles: Drone regulations, such as obtaining permits, restrict widespread adoption, especially in rural areas with limited access to administrative support.

Recommendations

1. **Subsidies and Financing:** The government should increase subsidies and offer low-interest loans for drone purchases, making them more affordable for small farmers.
2. **Training Programs:** Establish drone training centres in rural areas to improve farmers' technical skills and confidence in using drones.
3. **Public-Private Partnerships:** Collaborations between government bodies and private agri-tech companies can accelerate the development and deployment of drone technology.
4. **Regulatory Support:** Simplifying drone regulations and providing a clear framework for agricultural drone usage will encourage adoption.

Conclusion

The findings suggest that drone technology can transform Indian agriculture by enhancing productivity, reducing resource usage, and minimizing environmental impact. Government initiatives play a crucial role in encouraging adoption, but challenges like cost, technical skills, and regulatory issues must be addressed.

Drones hold the potential to revolutionize Indian agriculture by improving efficiency, productivity, and sustainability. Government initiatives have catalyzed the adoption of this technology, but further efforts are needed to address challenges and ensure that even small and marginal farmers (both constitute ~85%) can benefit from this technology.

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Empowering Villages: The Role of Creative Industries in Rural India

Dr. Siddharth Singh

ABSTRACT

The emerging creative industries are bringing about a major change in India's rural landscape. Historically dependent on agriculture, rural communities are now embracing a range of creative industries. In addition to diversifying the rural economy, this change also promotes creativity, revitalizes cultural heritage, and gives local communities more authority. India's rural areas are well-known for producing handloom items, textiles, and ceramics, among other traditional crafts. Artists may access more domestic and foreign markets by marketing their crafts through creative industries. By fusing innovation and modern design with traditional crafts, high-end items that appeal to modern consumers may be produced. Rich cultural legacy in rural locations might draw travellers seeking out unusual experiences. Jobs in guiding, hospitality, and regional crafts may result from this. Putting up cultural festivals or other events may increase tourism and strengthen local economies. The traditional arts are maintained for future generations thanks in part to the documentation and promotion provided by the creative industry. Cultural heritage may be highlighted and preserved through cooperative projects involving creative professions and rural people. In order to preserve cultural continuity, creative endeavours may promote pride in local heritage and build local identities. The creative industries are expanding economic prospects, creating new pathways for sustainable development, and elevating living standards in rural areas via the integration of traditional talents with contemporary technologies. It might be difficult to establish effective distribution channels for creative items produced in rural areas. Support in efficiently branding and promoting their items may be necessary for rural craftspeople. India may greatly benefit from the inclusion of creative industries into rural development initiatives by promoting economic growth, protecting cultural legacy, and enhancing quality of life. India can turn its rural areas into thriving centres of innovation and creativity by tackling obstacles and seizing possibilities.

Keywords: *Creative Industries, Rural Development*

Introduction

The creative industries are a family of sectors in the economy for which "the product" (which is fundamentally a thing you can not exactly create on an assembly line) is created or acutely influenced through "personal creativity, skill and talent". Ranging from traditional crafts, performing arts and

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media to design, fashion and digital innovation – these sectors are important actors in identity building as well as heritage preservation and serve as innovative hubs leading to future-oriented national development. Rural India, where the majority of the Indian population depends on agriculture and its related activities; could have been actually a goldmine for economic growth and social development through creative industries.

There are innumerable places and things yet to be explored, especially in the rural side of our country which has lot of cultural aspects along with traditional craftsmanship and local knowledge systems. Traditions: Weaving, pottery, folk music and dance are other forms of art that reflect the culture of these regions but also provide potential income generation engines as well as a source to make communities self-sustainable.

Creative industries can contribute significantly to the reduction of rural unemployment by offering an outlet for artisans, craftspeople, and small-scale entrepreneurs in national and global markets.

This is especially so in the form of rural area development; creating a powerful tool toward local economic activation, manpower circulation due to tourism, innovation stimulation and digital access. These creative enterprises are also given a boost by the governments intended push for schemes like –"Make in India" and "Digital India"; as it encourages the rural artisans to use digital platforms and e-commerce. In the fast-changing scenario of rural India, the creative sector can provide hope as a possible interface between tradition and modernity by providing solutions to non-partisan problems that translate into inclusive development and sustainable livelihood.

Creative Industries

The creation and exploitation of intellectual property, innovation, and cultural legacy are key drivers of economic growth in the creative industries, often known as the creative economy. These sectors are characterized by a broad range of activities that are driven by individual skill, inventiveness, and artistic expression. The creation of goods and services with noteworthy cultural, artistic, or entertainment value is essential to their success. The creative industries are those that provide products and services with intellectual, artistic, or cultural value by relying on the individual's creativity, skill, and aptitude. These sectors concentrate on the development, manufacture, and marketing of frequently intangible goods that are motivated by creativity, aesthetics, and cultural expression. They are essential to economic progress because they convert innovative concepts into valuable assets and profitable ventures.

The term "creative economy," used more broadly, describes the economic structures that are centered around these industries and highlight the importance of creative assets in promoting cultural identity, creating jobs, innovation, and GDP. This dynamic and expanding worldwide industry encompasses both formal industries and informal, community-based creative acts.

The Nature of Rural Economy in India: Features and Characteristics

India's rural economy is essential to the nation's overall economic structure since a sizable section of the populace works in small-scale enterprises, agriculture, and handicrafts while living in rural regions. Due to a combination of geographical, historical, cultural, and social influences, the

rural economy has distinct characteristics. Addressing the difficulties of development and expansion in these places requires an understanding of the features and dynamics of this sector.

Key Features of the Rural Economy in India:

1. Farming as the Foundation:

Dominance of Agriculture: For the vast majority of people living in rural areas, agriculture is their main source of income. In spite of its decreasing percentage in the national GDP, it makes a substantial contribution to rural livelihoods.

Subsistence farming: A significant percentage of farmers in rural areas engage in this type of farming, where the main purpose of the produce is self-consumption as opposed to market sales. Low income is the outcome, which frequently results in poverty.

Monsoon Dependency: Due to a lack of irrigation infrastructure, Indian agriculture, particularly in rural regions, is mostly dependent on rainfall. Because of this, the rural economy is more susceptible to natural disasters like floods and droughts.

Low Productivity: The revenue potential is limited by low productivity, which is a result of traditional farming practices, a lack of modern equipment, and limited access to loans.

2. Small-Scale and Cottage Industries:

Handicrafts and Cottage businesses: Small-scale businesses including weaving, carpentry, ceramics, and handicrafts are carried out by a large number of rural households. These sectors give people more money, especially women.

Job Creator: These small businesses, together with agriculture, are important job creators that lessen the demand on migration to metropolitan regions.

3. Low Levels of Infrastructure:

Limited Access to Facilities: Roads, transit, energy, and communication infrastructure are typically inadequate in rural locations. Both the growth of non-agricultural companies and agricultural production are hampered by this lack of infrastructure.

Underdeveloped Markets: Farmers and small producers find it more difficult to effectively sell their products in rural locations when there aren't any well-developed markets nearby. They frequently use middlemen, which drives down the cost of their goods.

4. Poverty and Income Inequality:

High Poverty Levels: A sizeable fraction of the rural population is impoverished, with little access to social services, healthcare, and education. In rural India, conditions including landlessness, debt, and a lack of opportunity are frequently associated with poverty.

Income Disparities: Between rural and urban regions, there are notable differences in income. Due to its heavy reliance on agriculture, the rural economy offers less options and lower incomes than the urban one.

5. Low Levels of Education and Skill Development:

Lack of Educational Opportunities: India's rural areas have lower levels of education than its metropolitan areas, which means there are fewer career options outside of agriculture. The lack of vocational training further hinders young people in rural areas from finding non-agricultural jobs.

Low Literacy Rates: India's rural areas still have lower literacy rates than its urban counterparts, despite improvements over time. Rural residents' access to information and capacity to take advantage of government programs and contemporary farming practices are impacted by low literacy rates.

6. Informal Employment:

High Informal Sector Employment: Jobs without formal contracts, social security, or benefits make up the majority of the workforce in rural regions. Low pay and employment instability are common problems for unskilled workers, small-scale craftspeople, and agricultural labourers.

Seasonal Employment: Jobs in rural regions, especially in agriculture, are frequently available on a seasonal basis. This contributes to rural poverty by causing unemployment or underemployment during non-harvest seasons.

7. Social Structure and Land Ownership:

Land Ownership Patterns: The land distribution in rural India is uneven, with a small percentage of the population owning enormous swaths of land while the majority of small and marginal farmers either own little plots of land or work without a land title.

Caste and Social Inequality: Long-standing social institutions like caste have a significant impact on the rural economy by influencing employment, education, and resource availability. Social and economic inequality result from this.

8. Migration and Urban-Rural Linkages:

Migration to Urban regions: Many rural inhabitants migrate to urban regions in pursuit of better jobs due to the lack of job possibilities and low earnings in rural communities. Remittances are therefore remitted back to rural families, so boosting rural spending.

Seasonal Migration: During construction or harvest seasons, for example, a large number of rural labourers migrate to urban areas or other rural regions in order to work temporarily.

9. Government Role and Rural Development Programs:

Government Interventions: To reduce poverty, enhance infrastructure, and increase agricultural output, the Indian government has launched a number of rural development initiatives. Enhancing rural livelihoods is mostly dependent on programs like PM-KISAN (Pradhan Mantri Kisan Samman Nidhi), MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act), and others.

Subsidies and Support: Although their efficacy has been called into question, agricultural subsidies, price support mechanisms, and rural credit programs are essential to maintaining the rural economy.

10. Cooperatives and Self-Help Groups (SHGs):

Cooperative Movement: Farmers and small producers may obtain better pricing, loans, and markets with the aid of rural cooperatives, especially in the dairy industry (such as Amul).

Self-Help Groups: By offering access to microcredit, promoting savings, and encouraging entrepreneurship, SHGs—especially those with a female membership—have been crucial in strengthening rural communities.

India's rural economy is mostly based on agriculture, which is the main source of income for most rural residents. It is typified by poor productivity, poverty, unofficial work, and inadequate infrastructure. Notwithstanding these obstacles, the government has worked to support rural economies through cooperative movements, development initiatives, and subsidies. It will be crucial to address issues like infrastructure development, financial inclusion, diversity of employment, and access to education in order to turn rural regions into more sustainable and affluent communities.

Creative Industries in India

India's creative industries, often known as the creative economy, comprise the performing arts, film, music, design, fashion, architecture, and digital media. These sectors are essential for economic expansion, job creation, and export promotion in addition to being critical for cultural preservation. An overview of important information about India's creative industries may be found below.

1. Economic Contribution:

- **GDP Contribution:** India's GDP is boosted by the creative industries by about 2.75 percent. This covers a variety of industries that are essential to the creative economy, such as media, entertainment, handicrafts, and advertising.
- **Growth pace:** In 2022, the creative economy, particularly the media and entertainment sector, grew at a pace of 17% thanks to the increased demand for Indian content abroad and the growing usage of digital platforms.

2. Employment Generation:

- **Employment Overall:** An estimated 10 million individuals work in a variety of sectors thanks to the creative industries. This covers both paid and unpaid work, from old craftsmen and artisans to more contemporary industries like digital content generation and film production.
- **Handicrafts industry:** About 7 million craftsmen are employed in the handicrafts industry alone, many of them are from underserved regions and rural areas. This industry plays a significant role in rural lives, especially for women.
- **Textile and Fashion Industry:** With almost 45 million workers, India has one of the biggest textile and fashion industries globally. With fashion designers and textile producers having a big impact on international markets, it contributes significantly to India's export earnings.

3. Exports and International Influence:

- The export of textiles and handicrafts from India makes up a sizable portion of its foreign exchange profits. International markets are seeing a steady increase in demand for Indian handcrafted items, jewellery, clothing, and textiles.

4. Cottage and Small-Scale Industries:

- Traditional crafts, weaving, and ceramics are examples of small-scale enterprises that support rural economies and help to preserve cultural heritage. These labour-intensive sectors create jobs in places where there is little opportunity for other types of economic activity.

Creative Industries and Their Role in Transforming the Rural Economy

Through leveraging regional talent, cultural assets, and cutting-edge techniques, the creative industries have the potential to significantly contribute to the revitalization of rural economies. Creative industries offer a different path for economic growth, skill development, and social empowerment in rural areas, where conventional economic sectors like agriculture frequently predominate.

There are several ways creative industries can contribute to transforming the rural economy:

1. Employment Generation and Income Diversification

The creative industries provide jobs in traditional crafts, performing arts, design, and digital content creation that are skill-based rather than resource-intensive. This diversification lessens rural poverty and lessens the effects of seasonal farming by providing new revenue sources outside agriculture for rural artisans, weavers, and craftspeople.

2. Preserving and Promoting Cultural Heritage

Traditional music, art forms, crafts, and architecture may all be found in many rural locations. Rural towns may benefit from tourist and heritage markets while maintaining their cultural identity by utilizing the creative industries. International markets are opened up to rural craftsmen by the growing demand for genuine, handcrafted, and culturally relevant items, which boosts local economic activity.

3. Empowering Women and Marginalized Communities

The creative industries offer a forum for women, young people, and underrepresented groups to participate in economic activity. In rural India, women often perform the majority of traditional crafts including weaving, embroidery, and pottery making. Formalizing these pursuits inside the creative economy can help rural women become economically independent while also advancing social justice and communal growth.

4. Tourism and Rural Entrepreneurship

A special fusion of cultural and economic growth is fostered by the creative industries' interaction with rural tourism. Both domestic and foreign tourists are drawn to artisan villages, cultural events, and art residencies, which stimulates local entrepreneurship and opens doors for small enterprises offering local services, crafts, and hospitality.

5. Digital and E-commerce Expansion

The advent of digital technology and e-commerce platforms has given rural craftsmen access to international marketplaces. Through the use of online platforms, rural producers may increase their profit margin by selling crafts, textiles, and other goods directly to customers, eliminating the need for middlemen. This change has been further aided by government programs like "Digital India" and "Make in India," which enable rural areas to embrace technology and grow their creative industries.

6. Sustainable Development

Sustainable practices are frequently promoted by the creative industries, especially in crafts that use traditional techniques and locally obtained materials. This supports eco-friendly production methods that complement rural lives and satisfy the increasing demand for ethical and sustainable goods worldwide.

7. Fostering Innovation and Skill Development

Creative industries may greatly boost the rural economy by combining innovation and tradition. They strengthen rural communities on an economic and social level by connecting them to global markets, in addition to generating jobs and preserving cultural heritage. Creative industries will play a critical role in attaining sustainable and equitable growth as rural economies diversify and become more integrated into the global creative economy.

Conclusion

Creative industries hold immense potential for transforming rural India by providing sustainable livelihoods, preserving cultural heritage, and driving economic growth. Through sectors like handicrafts, textiles, performing arts, and digital media, these industries empower rural communities, particularly women and marginalized groups, by creating jobs, enhancing local skills, and offering market opportunities. By promoting innovation, leveraging traditional knowledge, and tapping into the global demand for unique products, creative industries can bridge the gap between rural and urban economies.

For these industries to fully realize their potential, supportive policies, improved infrastructure, access to technology, and better market linkages are crucial. By fostering partnerships between artisans, businesses, and government, creative industries can play a pivotal role in addressing poverty, reducing rural migration, and building resilient rural economies that are both culturally and economically vibrant. Empowering rural India through creative industries not only strengthens the local economy but also enriches the country's cultural identity on a global scale.

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Assessing the Impact of Startup India Seed Fund Scheme (SISFS) on Indian Startups

Prabal Agarwal[1] & Dr. Pradeep Kumar Tripathi[2]

ABSTRACT

*The startup ecosystem in India has gained significant momentum in recent years, driven by an entrepreneurial spirit and supportive government initiatives. Among these initiatives, the **Startup India Seed Fund Scheme (SISFS)** plays a crucial role in providing financial assistance to early-stage startups through incubators. The research employs secondary data analysis to assess the current landscape of startups in India, the effectiveness of the SISFS on incubators across various states and Union Territories, and the challenges faced in fund distribution. This research paper specifically evaluates the funding dynamics under the **SISFS**, with a focus on comparing the amount of funding approved versus the actual disbursement over the past three years. This analysis sheds light on the efficiency and reach of the scheme, offering insights into the financial flow to startups. Finally, the paper examines the impact of the **SISFS** on incubators across various states and union territories (UTs), identifying regional disparities, capacity building, and the role of incubators in fostering innovation and entrepreneurship.*

*By analyzing these factors, the study aims to provide a critical assessment of the **SISFS**, its implementation, and its overall influence on the Indian startup ecosystem. The findings are expected to contribute to the discourse on improving funding mechanisms and supporting sustainable growth within the Indian entrepreneurial landscape.The study also identifies limitations in the existing data, emphasizing the necessity for broader datasets and in-depth analyses to better understand the long-term effects of the SISFS on entrepreneurship, job creation, and economic growth in India. Overall, the research aims to inform policymakers and stakeholders about the effectiveness of the SISFS and provide recommendations for future improvements.*

Keywords: *Startup, funding, incubator.entrepreneurship, investment.*

INTRODUCTION

The *Startup India Program launched on January 16, 2016*, is a flagship initiative of the Government of India aimed at fostering a robust startup ecosystem across the country.

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This program was introduced to promote entrepreneurship by nurturing startups, simplifying regulations, and providing financial support. The program offers a range of benefits, including simplified legal and regulatory processes, tax exemptions, and access to funding through various government-backed schemes such as the Fund of Funds for Startups (FFS), Startup India Seed Fund Scheme (SISFS) etc.

The Government of Uttar Pradesh launched its Startup Policy in 2017, with subsequent*revisions in 2020*, to create a supportive ecosystem that nurtures entrepreneurship withinthe state. Specific provisions include subsidies on capital investments, reimbursementof expenses related to patent filing and quality certification, and tax exemptions.Additionally, the *policy encourages the establishment of incubators, co-working spaces,and centers of excellence across the state to support early-stage startups*.India has emerged as the third largest ecosystem for startups globally. *According to theEconomic Survey (2023-24) - more than 1.17 lakh startups recognized by thegovernment as of December 2023 - have created over 12.42 lakh direct jobs in thecountry.* The Indian startup landscape is diverse, with key sectors including fintech, e-commerce, Agri-tech, and health-tech leading in funding and innovation.

India has over 110 unicorns (startups valued at over $1 billion), with new unicornsemerging regularly. Some notable unicorns include Flipkart, BYJU's, Paytm, andZomato. India has the highest fintech adoption rate globally at 87%, with startups likeRazorpay, PhonePe, and Paytm leading the way. In 2023, *Indian startups raisedapproximately $25 billion in venture capital, reflecting strong investor confidencedespite global economic uncertainties*.Out of the total number of unicorns, 45 unicorns with a total valuation of $ 102.30 Bnwere born in 2021 and 22 unicorns with a total valuation of $ 29.20 Bn were born in2022. 2023 saw the emergence of Zepto as the latest and only unicorn in the year.

The innovation in India is not just limited to certain sectors. We have recognized *startupssolving problems in 56 diverse industrial sectors with 13% from IT services, 9%healthcare and life sciences, 7% education, 5% agriculture and 5% food & beverages.*

STARTUP INDIA SEED FUND SCHEME (SISFS)

The **Startup India Seed Fund Scheme (SISFS)** was launched by the **Department for Promotion of Industry and Internal Trade (DPIIT)** on **19th April 2021** aimed at providing financial assistance to earlystage startups. Launched with a corpus of **INR 945 crore**, the scheme is designed to support startups in various stages of their growth, including proof of concept, prototyp development, product trials, market entry, and commercialization.

Proof of Concept: Assisting startups in validating their innovative ideas.

Prototype Development: Helping startups create functional prototypes.

Product Trials: Supporting the testing phase of new products.

Market Entry: Facilitating startups to enter the market.

Commercialization: Aiding startups in scaling their operations and achieving commercial success.

Objective of The Scheme:

Startup India Seed Fund Scheme (SISFS) aims to provide financial assistance to startups for proof of concept, prototype development, product trials, market-entry, and commercialization. This would enable these startups to graduate to a level where they will be able to raise investments from angel investors or venture capitalists or seek loans from commercial banks or financial institutions.

Features:

- Year-round 'Call for Applications' for Incubators and Startups.
- Sector-agnostic.
- No mandatory physical incubation.
- PAN-India startup programme.
- Startups can apply to 3 incubators simultaneously.

Eligibility Criteria:

1. **Startup Definition**: Must be recognized by the **Department for Promotion of Industry and Internal Trade (DPIIT)** as a startup.
2. **Stage of Development**: Should be in the seed stage or 'Proof of Concept' development stage.
3. **Innovation**: The startup should have an innovative idea or business model.

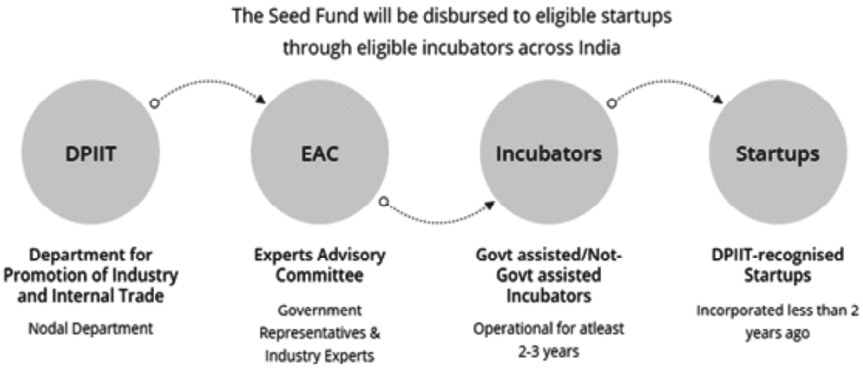
Application Process:

1. **Submission**: Startups need to submit their applications through the Startup India portal.
2. **Evaluation**: Applications are evaluated by an Experts Advisory Committee(EAC)
3. **Approval**: Selected startups receive financial assistance based on their needs and potential.

Support Structure:

- **Incubators**: The scheme will support an estimated **3,600 entrepreneurs through 300 incubators** over the next four years.
- **Financial Assistance**: The funding can be used for various purposes, including hiring talent, procuring equipment, and other operational expenses.
- The SISFS is a significant step towards nurturing innovation and providing opportunities to budding entrepreneurs in India. It aims to create a robust startup ecosystem by addressing the critical funding gap at the early stages of a startup's journey.

Figure 1. Funding process under SISFS



Source: https://www.india.gov.in/

LITERATURE REVIEW

- ***Gionfriddo, G., & Piccaluga, A. (2024)*** in their paper titled "Startups' contribution to SDGs" explored how startups can assess the social impact generated by their business activities through an SDG-based framework, i.e., Prosper. Using an action research approach, after a review of the scientific and grey literature on existing frameworks for assessing social impact, they designed pillars, categories, qualitative criteria, and quantitative scales of Prosper. By embracing action research, they aim to empower startups with a robust and user-friendly tool, which facilitates Social Impact Assessment (SIA) and representation. For early-stage startups, the access to a comprehensive SIA framework that places due emphasis on financial materiality emerges as a strategic imperative that not only garners investors' Favor but also establishes a sturdy foundation for sustained success in an era increasingly attuned to the dual imperatives of profit and societal progress.
- ***Stam, E., & Van de Ven, A. (2021)*** in their paper titled "Entrepreneurial ecosystem elements" shows the value of taking a systems view of the context of entrepreneurship understanding entrepreneurial economies from a systems perspective. They use a systems framework for studying entrepreneurial ecosystems, develop a measurement instrument of its elements, and use this to compose an entrepreneurial ecosystem index to examine the quality of entrepreneurial ecosystems in the Netherlands. They found that the prevalence of high-growth firms in a region is strongly related to the quality of its entrepreneurial ecosystem. Strong interrelationships among the ecosystem elements reveal their interdependence and need for a systems perspective.
- ***Roshan, et al. (2024)*** in the paper titled "Circular economy startups and digital entrepreneurial ecosystems" uses a systems theory perspective to study the digital entrepreneurial ecosystem's (DEE) role in Circular Startup (CSU) formation. Fuzzy-set qualitative comparative analysis (fsQCA) is used to empirically explore the configurational recipes for the presence and absence of a high CSU formation rate. The results reveal that for a high CSU formation, DEE elements, such as digital protection and access, act as critical drivers, while other DEE elements take on

a supportive role. The findings also show the complementarity effects, substitution effects, and neutral permutations of DEE elements among the configurations.

OBJECTIVES OF THE RESEARCH:

1. To study the current scenario of startups in India.
2. To evaluate the funding approved and funding disbursed under Startup India Seed Fund Scheme (SISFS) in 3 years.
3. To study the effect of Startup India Seed Fund Scheme (SISFS) on incubators in various states and UTs.

METHODOLOGY:

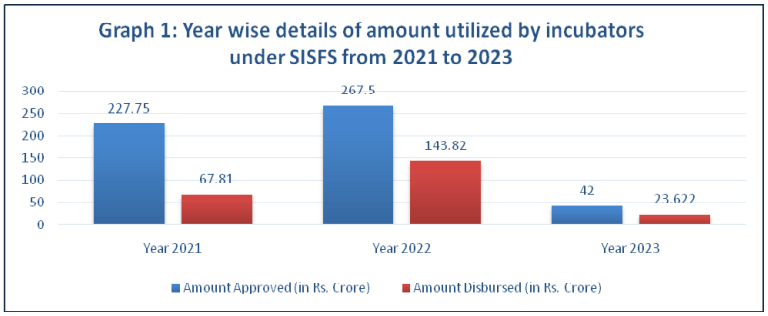
This research employs a secondary data analysis approach to investigate the impact of Startup India Seed Fund Scheme (SISFS) in India. Secondary data analysis involves the systematic collection, review, and synthesis of existing data from various sources to address the research objectives. This method is particularly suitable for this study as it allows for the utilization of a wide range of data that has already been collected, processed, and published by other researchers, government agencies, and organizations.

DATA INTERPRETATION

Table 1: Year wise details of amount utilized by incubators under SISFS from 2021 to 2023

Year	Amount approved (in Rs. crores)	Amount dispersed (in Rs. crores)
2021	227.75	67.81
2022	267.5	143.82
2023	42	23.622
Grand Total	**537.25**	**235.252**

Source: www.data.gov.in



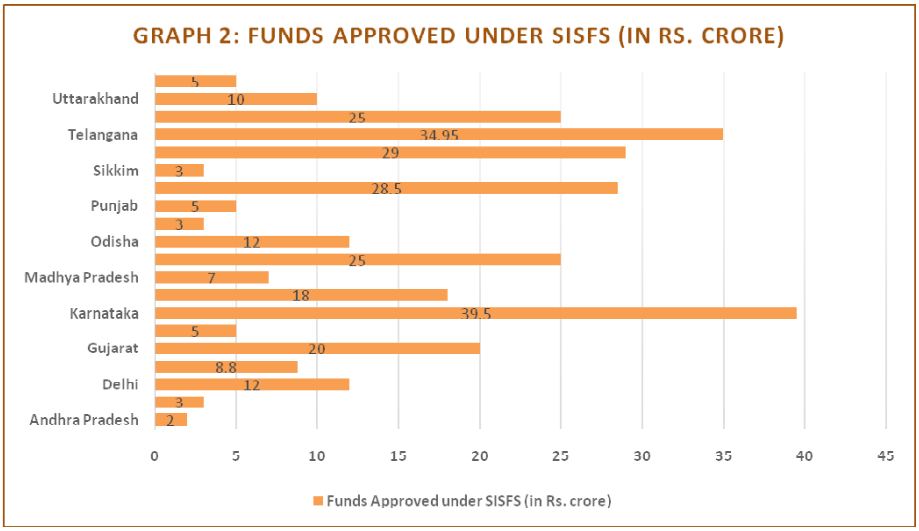
Source: based on Table 1.

As per table 1 the amount approved under SISFS in the year 2021was 227.75 crores but out of this only 30% of it was disbursed i.e., 67.81crores. In 2022 amount approved was maximum in the given time span, out of which more than half of the amount has been disbursed to the incubators selected under SISFS. Lastly in 2023 amount approved was 42 crores out of which 23.6 crores was disbursed to the respective incubators. The above-mentioned data is presented graphically using the bar diagram making the understanding better.

Table 2: State-wise approval of funds under SISFS as of March 2022

Serial No.	State/UT	Funds Approved under SISFS (in Rs. Crore)
1.	Andhra Pradesh	2
2.	Bihar	3
3.	Delhi	12
4.	Goa	8.8
5.	Gujarat	20
6.	Himanchal Pradesh	5
7.	Karnataka	39.5
8.	Kerala	18
9.	Madhya Pradesh	7
10.	Maharashtra	25
11.	Odisha	12
12.	Puducherry	3
13.	Punjab	5
14.	Rajasthan	28.5
15.	Sikkim	3
16.	Tamil Nadu	29
17.	Telangana	34.95
18.	Uttar Pradesh	25
19.	Uttarakhand	10
20.	West Bengal	5
21.	**Grand total**	**295.75**

Source: www.data.gov.in



Source: based on Table 2.

Table 2 shows State-wise approval of funds under SISFS as of March 2022 in which the top 5 states/UTs are 1. Karnataka (₹ 39.5 cr.) 2. Telangana (₹ 34.95 cr.) 3. Tamil Nadu (₹ 29 cr.) 4. Rajasthan (₹ 28.5 cr.) 5. Uttar Pradesh & Maharashtra (₹ 25 cr.) Now the bottom 5 states/UTs include – 1. Andhra Pradesh (₹ 2 cr.) 2. Bihar, Sikkim & Puducherry (₹ 3 cr.) 3. West Bengal, Himachal Pradesh & Punjab (₹ 5 cr.) 4. Madhya Pradesh (₹ 7 cr.) 5. Uttarakhand (₹ 10 cr.)

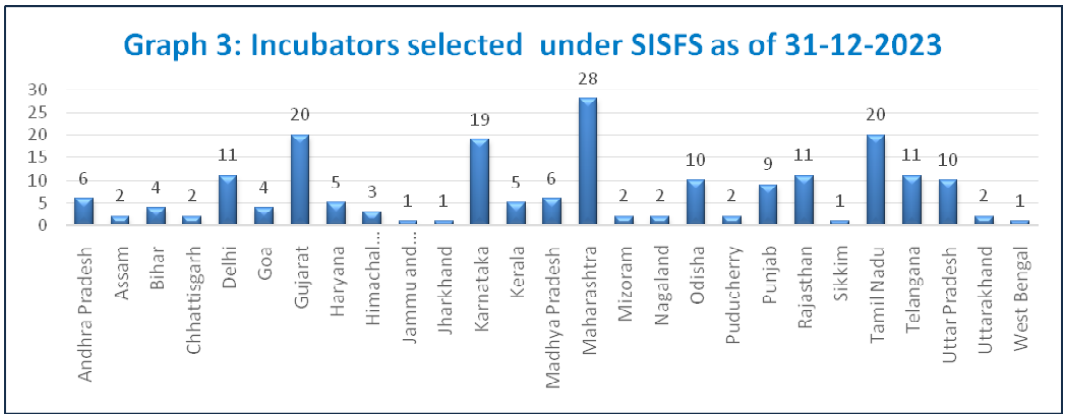
Table 3: Incubators Selected under Startup India Seed Fund Scheme (SISFS) as on 31-12-2023.

Serial No.	State/UT	Number of Incubators
1.	Andhra Pradesh	6
2.	Assam	2
3.	Bihar	4
4.	Chhattisgarh	2
5.	Delhi	11
6.	Goa	4
7.	Gujarat	20
8.	Haryana	5
9.	Himanchal Pradesh	3
10.	Jammu And Kashmir	1
11.	Jharkhand	1
12.	Karnataka	19
13.	Kerala	5

(*Contd...*)

14.	Madhya Pradesh	6
15.	Maharashtra	28
16.	Mizoram	2
17.	Nagaland	2
18.	Odisha	10
19.	Puducherry	2
20.	Punjab	9
21.	Rajasthan	11
22.	Sikkim	1
23.	Tamil Nadu	20
24.	Telangana	11
25.	Uttar Pradesh	10
26.	Uttarakhand	2
27.	West Bengal	1
28.	**Grand total**	**198**

Source: www.data.gov.in



Source: based on Table 3.

According to table 3 which shows Incubators Selected under Startup India Seed Fund Scheme (SISFS) as on 31-12-2023 under this the Top 5 States/UTs are: 1. Maharashtra (28 incubators) 2. Gujarat &Tamil Nadu (20 incubators) 3. Karnataka (19 incubators) 4. Telangana, Delhi & Rajasthan (11 incubators) 5. Uttar Pradesh & Odisha (10 incubators). Now the Bottom 5 States/UTs are: 1. West Bengal. Sikkim, Jharkhand, and Jammu & Kashmir (1 incubator) 2. Assam, Puducherry, Chhatisgarh, Mizoram, Nagaland & Uttarakhand (2 incubators) 3. Himachal Pradesh (3 incubators) 4. Goa & Bihar (4 incubators) 5. Haryana (5 incubators).

FINDINGS:

- **The total amount of funding approved for the SISFS from 2021 to 2023 was Rs. 537.25 crore.**However, the amount disbursed to incubators was lower, totalling Rs. 235.252 crore over the same period.
- **The amount of funding approved and disbursed varied significantly from year to year.**This suggests that there may be challenges or delays in disbursing funds under the SISFS.The data highlights the Indian government's commitment to supporting startups through the SISFS.
- **The Indian government approved a total of Rs. 295.75 crore for distribution across 20 states and union territories under the Startup India Seed Fund Scheme (SISFS).**Karnataka received the largest amount of funding (Rs. 39.5 crore), followed by Telangana (Rs. 34.95 crore) and Maharashtra (Rs. 25 crore).Several states, including Andhra Pradesh, Bihar, Punjab, and West Bengal, were approved for smaller amounts of funding, ranging from Rs. 2crores to Rs. 5 crores.
- ***The average amount of funds approved per state/UT is approximately ` 28.17 crore.***
- ***The median amount of funds approved per state/UT is ` 12 crore.***
- **A total of 198 incubators** across India were selected for the Startup India Seed Fund Scheme **(SISFS)** as of **December 31, 2023.**Maharashtra had the highest number of selected incubators (28), followed by Gujarat (20) and Tamil Nadu (20).States and Union Territories with the fewest selected incubators include Sikkim, Jharkhand, and West Bengal, each with only one.

The provided data suggests that the distribution of startup incubators under the SISFS is not uniform across India. This could reflect various factors, such as the level of entrepreneurial activity, government policies, and availability of resources in each state.

CONCLUSION

Between 2021 and 2023, ₹ 537.25 crore was approved for the Startup India Seed Fund Scheme (SISFS), but only ₹ 235.252 crore was disbursed, indicating significant delays or challenges in fund distribution. The disbursement varied widely year-to-year, with ₹ 267.5 crore approved in 2022 but only ₹ 143.82 crore disbursed, and in 2023, just ₹ 23.622 crore of the approved ₹ 42 crore was disbursed. The Indian government approved ₹ 295.75 crore for distribution across 20 states and union territories, with Karnataka, Telangana, and Maharashtra receiving the largest shares. While Maharashtra had the most incubators (28), other states like Sikkim, Jharkhand, and West Bengal had only one incubator each. As of December 2023, 198 incubators were selected under the scheme, revealing disparities in both funding and incubator distribution across states, which may affect the scheme's overall effectiveness.

SUGGESTIONS:

- The significant disparity between approved and disbursed funds under the Startup India Seed Fund Scheme (SISFS) highlights potential challenges and delays in the fund distribution process.

- ❖ The varying disbursement rates across years and states further underscore the need for improved efficiency and equity in the scheme's implementation.
- ❖ Firstly, a comprehensive analysis of the factors hindering fund disbursement could provide valuable insights into bottlenecks and areas requiring improvement.
- ❖ Secondly, exploring alternative funding mechanisms or partnerships with private investors could supplement the government's resources and accelerate the disbursement process.
- ❖ Thirdly, streamlining the application and approval processes, as well as providing clearer guidelines and timelines, could reduce administrative burdens and expedite fund transfers.
- ❖ Finally, enhancing transparency and accountability in the fund distribution process would foster trust and confidence among stakeholders, ultimately improving the scheme's effectiveness.

LIMITATIONS

The provided data, while informative, presents limitations for a comprehensive research paper on the Startup India Seed Fund Scheme (SISFS). Firstly, the data is limited to a specific time-period (2021-2023), and does not capture the dynamic nature of funding approvals and disbursements over time. Secondly, the analysis primarily focuses on total amounts approved and disbursed, neglecting factors such as the specific criteria for funding approval, the impact of funding on startups, and the challenges faced by incubators in accessing and utilizing the funds. Additionally, the data does not delve into the impact of the SISFS on promoting entrepreneurship, job creation, and economic growth in India. Finally, the analysis does not consider future trends, policy implications, or potential barriers to further improving the effectiveness of the SISFS. To address these limitations, a comprehensive research paper would require a broader dataset, in-depth analysis of various factors, and a forward-looking perspective on the SISFS's future.

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A Study of Impact of Climate Change on Rice Production in India with Reference to Uttar Pradesh Since 1961

Vikash Raj[1] & Roli Misra[2]

ABSTRACT

India, being an agriculture-dependent economy, is the second largest producer of rice in the world. Rice being a staple food contributes to providing food security and livelihood to a large chunk of the population in India. However, the changing climatic scenario in terms of extreme weather conditions and scanty or excess rainfall since the past few decades is adversely affecting the production of rice. In this context, this paper attempts to understand the reasons for climate change and its impact on the agriculture sector since 1961-62 to 2021-22 at the national level and also on the second largest rice-producing state, namely Uttar Pradesh, utilising the data from the World Bank. To analyse the same, Generalised Least Squares (GLS) has been applied. The results show a significant impact of climatic variables on rice production, both at the state and national levels.

Keywords: *Climate change, Agriculture, Rice Production, Temperature, Rainfall, Uttar Pradesh*

I. Introduction:

Climate change, characterised by an increase in average global temperatures, erratic precipitation patterns, and a higher frequency of extreme weather events, poses a significant threat to agricultural production worldwide and also to the survival of humans around the world by adversely impacting the very base of human survival, i.e., agriculture. The Intergovernmental Panel on Climate Change in 2021 warned that the agricultural sector is particularly vulnerable to the adverse effects of climate change, with developing countries like India facing the brunt of the impact due to their heavy reliance on agriculture (IPCC, 2021). In India, agriculture heavily relies on the monsoon season. The monsoon, which typically occurs from June to September, provides the majority of the rainfall required for agricultural crop cultivation, especially rice. However, in recent years, the monsoon has become increasingly erratic, with delayed onset, uneven distribution, and premature withdrawal, all of which have adverse effects on rice yields (Krishna Kumar et. al., 2011). Furthermore, the rise in average temperatures has led to an increase in evapotranspiration rates, putting additional stress

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on water resources, especially in regions that are already water-scarce. These negative consequences of climate change impact the production of the crops grown here, particularly rice.

Rice (Oryza sativa), a water-intensive crop, holds a pivotal place in India's agrarian economy and food security. Rice, a staple grain, is critical to India's food security and economic stability, as agriculture provides a key source of income for roughly half of the country's population. Rice is not just a staple food for Indians but also a critical economic resource; hence, understanding the impact of climate change on rice production becomes paramountly important. As the second-largest producer of rice globally, India's rice production is a critical component of its agricultural output, with the 129471 thousand metric tonnes of crop being cultivated on approximately 46279 thousand hectares of land in 2021–22. The states of Uttar Pradesh stand out as the second-leading rice-producing state in the country, with production of 15271.54 thousand metric tonnes of rice, respectively (Ministry of Agriculture and Farmers Welfare, 2022), contributing significantly to both domestic consumption and export markets. This state, despite being the second-top rice-producing state, faces unique challenges related to climate change. Uttar Pradesh, with its vast and varied agro-climatic zones, is particularly vulnerable to both temperature increases and changes in precipitation patterns (Singh, 2020). A major part of the state of Uttar Pradesh, which is heavily dependent on the monsoon, is at risk of both drought and flood, depending on the variance of the monsoon.

Given the importance of rice to India's food security and the significant role of Uttar Pradesh in rice production, it is crucial to understand the specific impacts of climate change on rice production, both at the state and national levels. The study aims to investigate the relationship between climatic variables (temperature and rainfall) as well as the influence of the area under rice cultivation on rice production. The state is not only a second-leading producer but also represents diverse climatic and geographical conditions, making them ideal for a comprehensive study. This paper will examine production trends and climatic challenges, explore how variations in temperature and rainfall, as climatic factors, have influenced rice production in the state, and discuss potential adaptation strategies to mitigate adverse effects.

This paper is structured in the following manner: After discussing the introduction, significance, and background of the paper in the first part, the second section reviews the literature on the impact of climate change on rice production at both the national and state levels. The third section covers the objectives and hypotheses, while the fourth section discusses data and methodology. The fifth section deals with the analysis and discussion, and the last section deals with the conclusion.

II. Literature Review:

The relationship between climate change and agricultural production has been a subject of extensive research globally. At the global level,Leonard (2023) study reveals the significant risks posed by climate change to agricultural food production and emphasises the importance of adaptive strategies to ensure food security in the face of these challenges.Lobell et. al. (2008) provided early evidence that global warming could negatively impact crop yields, including rice, in many parts of the world. Their study suggested that constant rising average temperatures and increased frequency of extreme weather events could reduce agricultural production, particularly in tropical regions.

In the context of India, several studies have highlighted the vulnerability of rice production to climate variability and change. Ashkara et. al. (2023) focused on estimating the potential effects of climate change on rice yield by considering the combined effects of temperature and other variables. The study analyzed significant positive correlations between rice production and maximum temperatures in the long term, while mean temperatures had a detrimental impact on rice yield over time. Additionally, recent studies have focused on the specific impacts of climate change on rice production in India's leading rice-producing states. India is the largest rice producer, cultivating half of its rice in areas dependent on rainfall. The projected outcome indicates that between 15% and 40% of rainfed rice cultivation areas in the eastern and northern parts of India face potential risks. This study provides assistance to small-scale farmers in climate-endangered areas (Singh et. al., 2017). Also, Pathak et. al. (2011) conducted a study on the impact of climate change on rice yields across different states of India. Their findings indicated that the increase in temperature could lead to a significant reduction in rice yields, especially during the critical flowering stage. The study emphasised the need for developing heat-tolerant rice varieties and improving water management practices to cope with changing climatic conditions.In Uttar Pradesh, the impact of climate variability on rice yields has also been a subject of significant research. Singh et. al. (2020) called for the adoption of climate-smart agricultural practices, including the use of drought-resistant rice varieties and improved water management techniques, to enhance the resilience of rice farming in Uttar Pradesh.

III. Objectives and Hypotheses

The paper aims to analyse the following objectives:

1. To examine the impact of temperature variations (maximum and minimum) on rice production in IndiaandUttar Pradesh.
2. To analyze the effect of annual rainfall on rice productionin India and Uttar Pradesh.
3. To assess the relationship between the area under rice cultivation and rice production.

Hypotheses:

Based on the objectives the following hypotheses can be formulated:

H_{01}: There is no significant impact of minimum temperature on rice production in India and inUttar Pradesh.

H_{A1}: There is a significant impact of minimum temperature on rice production in India and inUttar Pradesh.

H_{02}: There is no significant impact of maximum temperature on rice production in India and inUttar Pradesh.

H_{A2}: There is a significant impact of maximum temperature on rice production in India and inUttar Pradesh.

H_{03}: There is no significant impact of rainfall on rice production on national as well as state level.

H_{A3}: There is a significant impact of rainfall on rice production on national as well as state level.

H_{04}: There is no significant impact ofarea under rice cultivationon rice production in India and inUttar Pradesh.

H_{A4}: There is a significant impact ofarea under rice cultivationon rice production in India and inUttar Pradesh.

IV. Data and Methods

For analysing the impact of climatic variables, i.e., minimum and maximum temperature, rainfall and area under rice cultivation, the data of production and area under production is obtained from the Ministry of Agriculture and Farmers Welfare, GOI. The data of climatic variables such as annual average rainfall, average annual minimum temperature and average annual maximum temperature was utilised fromWord Bank. We have used the time series data of production, area under rice cultivation, minimum and maximum temperature and annual rainfall from 1961-62 to 2021-22 to examine their impact on rice production which is taken as the independent variable and maximum and minimum temperature, annual rainfall and area under rice cultivation are taken as independent variable. The state of Uttar Pradesh has been selected as it is the second largest rice producing state.We have used the generalised least square (GLS) to get the significant variables affecting the production of rice at the national and statelevel.The equation GLS Regression is as follows:

$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + ... + \beta_p x_{ip} + \varepsilon$

where, for=n is number of observations

y_i=dependent variable

x_i = independent explanatory variables

β_0=y-intercept (constant term)

β_p =slope coefficients for each explanatory variable

ε=the model's error term (also known as the residuals)

Equation used for computing regression:

$y(\text{Production}) = \beta_0 + \beta_1 x_1(\text{area}) + \beta_2 x_2(\text{min temp}) + \beta_3 x_3(\text{max temp}) + \beta_4 x_4(\text{rainfall}) + \varepsilon$

where, y(production) = Annual production of rice in India or that state

x_1(area) = area under rice cultivation of that region

x_2(min temp) = average annual minimum temperature of that region

x_3(max temp) = average annual maximum temperature of that region

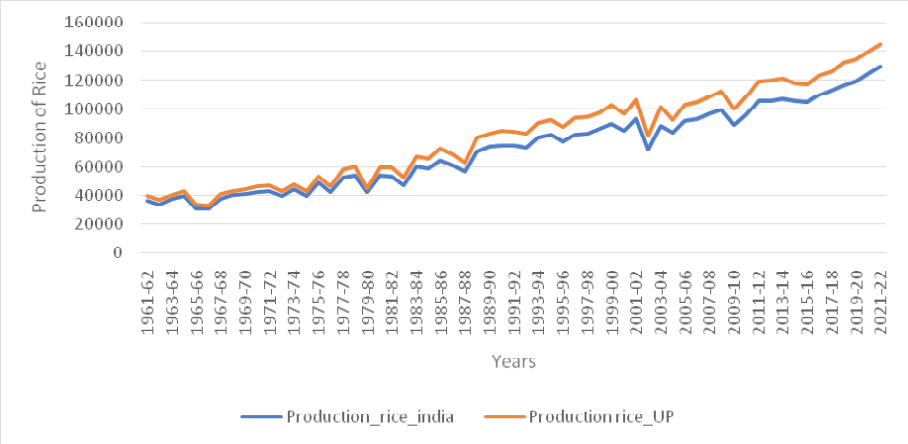
x_4(rainfall) = average annual rainfall of that region

ε = residuals

V. Analysis and Discussion:

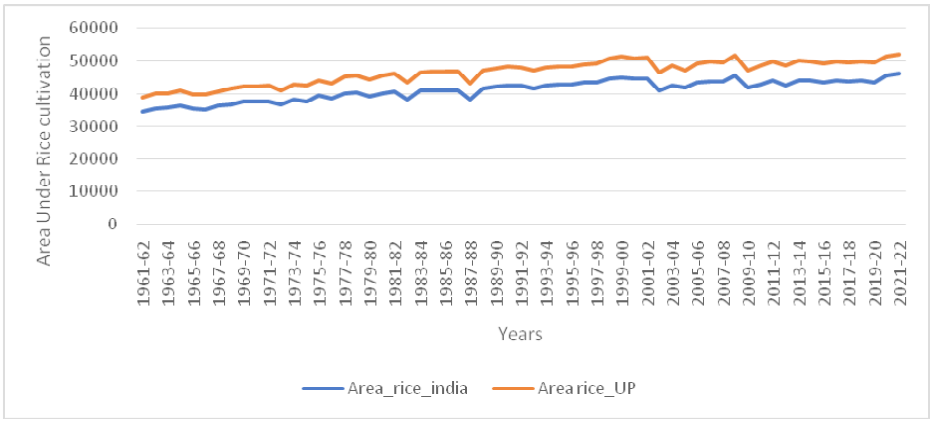
Rice is one of the most critical food staples in India, feeding a substantial portion of the population and contributing significantly to the country's agricultural economy. The nation is the second-largest producer of rice globally (FOA,2022), with Uttar Pradesh as second leading rice-producing state(Ministry of Agriculture and Farmers Welfare, 2022). However, the agricultural sector, particularly rice production, is increasingly vulnerable to the impacts of climate change.

Figure 1: Total Rice Production at National and State Level



Source: Ministry of Agriculture and Farmers Welfare

Figure 2: Trends in Area under Rice Production



Source: Ministry of Agriculture and Farmers Welfare

Figure 1 indicates the rice production in India and Uttar Pradesh. At the national level, the production of rice in 1961–62 was 35663.0 thousand metric tonnes, which has increased to 129471.0 thousand metric tonnes in 2021–22 (refer Figure 1). Similarly, in 1961-62 for Uttar Pradesh, it was

3346.00 thousand metric tonnes, which has increased to 15271.54 thousand metric tonnes in 2021-22. This shows an increasing trend in production in the state since the 1960s. The effective implementation of the Green Revolution with the use of HYV (High Yielding Variety) seeds, the development of adequate irrigation facilities, etc. were the major factors attributed to this positive trend that resulted in the rapid growth in rice production. Further, the area under rice cultivation at the national level was 34694 thousand hectares, which has increased to 46279 thousand hectares in 2021-22. For Uttar Pradesh, the area under rice cultivation was 4174 thousand hectares in 1961–62, which has increased to 5703 thousand hectares in 2021–22. Despite showing a positive trend, in the past few years the rate of increase in rice production has reduced due to increasing adverse effects of climate change like heat waves in the Northern Plains during summers, scanty rainfall, depletion of groundwater due to its exploitation, etc. Hence, it can be said that climate change poses a serious threat to the very basic source of food security in India, and adequate steps need to be taken on an urgent basis before it's too late.

The paper aimed to analyze the impact of climatic variables (i.e., minimum and maximum temperature, annual rainfall, and area under rice cultivation) on rice production. We used generalised least squares linear regression to address the issue of correlation in the time-series data, given that not all the variables significantly affected the national or state level (Uttar Pradesh).

Table 1: Multiple Linear Regression Model result of climatic variables on Production:-

Production	Adjusted R^2	Model Significance	Variables	Coefficient	p-value
Prod_India	0.745	0.000	Area	2.991	0.000
			Max_temp	9.502	0.012
			Min_temp	-11.469	0.006
			Rainfall	0.0182	0.000
Prod_UP	0.613	0.000	Area	2.601	0.000
			Rainfall	2.990	0.000

Source: Authors Construction based on Regression Analysis

The statistical results (refer table 1) indicate that at the national level, temperature variables (minimum and maximum temperature), area and rainfall have a significant effect on rice production, with the model having significance in showing the impact of climatic variables on rice production having significance ($p< 0.05$) with (adjusted R^2=0.745). In case of maximum temperature, H_{a2} is accepted as there is a significant positive relationship (p value < 0.05) showing the statistical significance at the 1% level. One unit increase in maximum temperature leads to an increase of 9.502 units in rice production(coefficient= 9.502). This suggests that the rice production in India is sensitive to maximum temperature variations, which could have important implications in the context of climate change. In case of minimum temperature, H_{a1} is accepted as there is a significant positive relationship (p value < 0.05) showing the statistical significance at the 1% level. One unit increase in minimum temperature leads to a decrease of 11.469 units in rice production (coefficient=-11.469). This suggests that the rice production in India is also sensitive to temperature variations of minimum

temperature due to climate change. On the other hand, H_{a4} is also accepted at the national level, as for each additional unit increase in the area under cultivation, rice production increases by approximately 2.991 units(coefficient=2.991) with statistical significance at the 1% level (p-value <0.05). In case of rainfall, we accept H_{a3}that annual rainfall has a significant impact on rice production (p value <0.05). One unit increase in rainfall leads to a slight increase to production by 0.0182 units(coefficient= 0.0182).

In Uttar Pradesh, analysis shows the significant impact of climatic variable (refer to table 1) i.e., rainfalland area on rice production with model having significance (p value< 0.05) with (adjusted R^2=0.613). In case of rainfall, $H_{a3}$is accepted as there is a highly significant positive impact of annual rainfall on rice production (p value<0.05) where one unit increase in rainfall leads to increase in production by 2.99 units (coefficient= 2.990). Similarly, in the case of area, H_{a4} is accepted as area having highly significant impact on rice production (p value< 0.05) where one unit increase in area leads to increase in production by 2.6 units (coefficient=2.601).

Overall, the results establish that the climate change affects the rice productionin Uttar Pradesh and India as a whole. Variations in different factors of climate here, the minimum and maximum temperature and rainfall along withthe area under cultivation affects rice production.Analysis shows that Uttar Pradesh is highly susceptible to any variationin rainfall and area under rice cultivation. Whereas, the overall rice production at India level gets affected by variations byall the variations in climatic variablesand area under rice cultivation.

VI. Conclusion

At the national level, the area under rice production and climatic variables were found to be significant determinants of rice production, with all variables showing strong impact on production. This underscores the critical importance of both land allocation and temperature management in sustaining and enhancing rice yields in the country.Overall, the study reveals that while the area under rice production is a consistently strong determinant of rice yields across India, the impact of temperature and rainfall varies significantly at regional level. These findings emphasise the need for region-specific agricultural strategies that consider the local climatic conditions and their interactions with rice production(Ashkara et. al., 2023). In light of the growing challenges put forward by climate change, such tailored approaches will be essential in ensuring the sustainability and resilience of rice production in India's key rice-producing states.Under state-level analysis, we found valuable insights too. Uttar Pradesh presented a clearer picture of rainfall impact, with rainfall, alongside the area under cultivation, influencing rice production. Uttar Pradesh also suggests the need forcareful management of irrigation to avoid adverse effects on production (Singh et. al., 2020).

Hence, there is a need for implementing and promoting climate-resilient farming techniques, such as heat-tolerant rice varieties and adaptive irrigation methods, to mitigate the negative impacts of rising temperatures and climate variability on rice production (Singh et al., 2020). Given the importance of rainfall and the positive impact of water availability on rice production, invest in water-efficient irrigation technologies such as drip and sprinkler systems. This will help sustain high yields while conserving water resources. Additionally, we should develop tailored regional

climate adaptation plans that specifically address the climatic challenges of other states. For instance, in Uttar Pradesh, where rainfall positively affects production, policies should focus on increasing irrigation facilities to reduce the rain stress on crops through irrigation or adjusted sowing times. Furthermore, we should enhance agricultural extension services to provide farmers with the most up-to-date information and instruments to tackle the impacts of climate change. This includes training on the use of climate-resilient seeds, soil health management, and efficient water use practices.

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Competitive Potential of Cane Sugar Industry with Changing Social Needs: Demand Analysis in Uttar Pradesh

Dr. V. K. Shukla[1] & Shubhda Agarwal[2]

ABSTRACT

For growth to be sustained with changing social needs, the sync among supply and demand factors is imperative in any market. To analyze the sustainability of the growth of the industry, its demand analysis is as essential as its supply chain analytics. When it comes to the sweetener industry, the refined 'Cane Sugar' seems to dominate the market for long. This is ironical with the growing popularity of the so called healthier alternatives – both the natural and the artificial ones. These alternatives include 'Sugars – naturally occurring carbohydrates' from various sources, namely, jaggery and honey; and non-sugar alternatives, widely popularized as calorie-free sweeteners.

The study enquires about the current consumption patterns in the market, and analyses the driving forces leading to such patterns. Based on the survey method, it analyses the demand side of the market of the Sweetener Industry. The respondents belong to both rural and urban areas, from all over the study area. The survey conducted enquires about the preferences of the respondents among various sweeteners available in the market for self-consumption along with reasons for such preferences. Future prospects of the market demand is also attempted to be analyzed on the basis of the enquiry of the attitude and satisfaction of consumers towards their current choices.

Discussing the preference for the sweetener, the sugar attracted an enormous market share, followed by jaggery. Other sweeteners were sparsely demanded by the sample of respondents surveyed. Seeking the major reasons for such preferences among the respondents, it was found that sugar consumers and those of other sweeteners vary on this ground. Among other reasons, ease to use was the most accepted reason among sugar consumers. It was health that was cited as the leading reason to use other sweeteners.

Keywords: *Sweetener Industry, Cane-Sugar, Sugar and Non-Sugar alternatives, Customer Preferences, Growth Sustainability*

INTRODUCTION

Indian sugar industry widely produces refined 'Cane Sugar' from the extracts of sugarcane. The other refined sugars available in the market are 'Coconut Sugar', and 'Beet Sugar', but are

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sparsely popular among Indian consumers and nearly absent in North-Indian markets. There are various substitutes in the market as well, popularized as healthier or tastier alternatives. Before indulging into the economic analysis of the products, it is important to understand the term 'Sugar' and its chemical background.

Soluble carbohydrates get the name simple 'Sugars'. There are various sources for different 'Sugars' used for human consumption. The sources among them which are considered for the study include:

- 'Cane Sugar' – obtained by refining sucrose content of the sugarcane
- 'Jaggery' – obtained from the sugarcane, rich in sucrose, but less refined than the sugar
- 'Honey' – rich in glucose and fructose, containing sucrose in some amount

While fructose and glucose are the simplest of the carbohydrates occurring in nature, called monosaccharide, sucrose is a compound sugar, called disaccharide, is made up of 'Glucose + Fructose'. According to various researches and reports, the simple sugars are easier for human system to digest and are thus recommended superior.

Along with the 'Sugars', other compounds are also present in the sweetener market. These are classified as under in the study, as per the nature of the market in the study area:

- Stevia Leaves – contains Steviol Glycosides as a sweetening agent. Crude stevia leaves are consumed among the Indian consumers along with the artificial stevia sweeteners.
- Artificial Sweeteners – A variety of artificial sweetening compounds like aspartame, sucralose, acesulfame K., saccharin etc. are found in the tabletop sweeteners and packaged food in the Indian market.

This is ironical to find that, in India, despite the availability of the healthier substitutes, the consumption of the refined 'Cane Sugar' increased. According to the government report the cane sugar consumption increased from 265 LMT in 2020-21 to 278 LMT in the year 2021-22.

This triggered the questions, thus framed for the study, regarding the customer preferences for different sweeteners and the driving forces for such sweeteners.

The major output of the study is the analysis of the competitive potential and sustainability of the refined sugar industry in the Indian market. The factors contributing towards its dominance over the market and potential threats affecting its sustainability are analyzed in the study.

REVIEW OF LITERATURE

Arshad et al. (2022) points out the health concerns related to the refined sugar consumption and suggest the intake of natural sweeteners. The health hazards as cited in the study were a variety of "non-communicable diseases", namely, "Diabetes Melitus, Cardiovascular deseases, Obesity, Dental Caries, Impaired Cognition, Cancer". It elaborately discusses about the link of sugar intake and these health hazards. The study elaborates the nutritional benefits of the latter over the former. The capabilities of the natural sweeteners of mitigating various health issues and their mineral rich properties are finely discussed in the study. It enlists various such benefits reported so far.

Liu, Li, Peng (2022) studied the relationship between household income and their sugar consumption in beverages in China, and found an "inverted U-shaped relationship". After reaching a certain level of affluence the consumer preferences deviated towards "sugar-free beverages".

Global Sugar Substitutes Market – Industry Trends and Forecast to 2030 (2023) discusses about the market strengths and weaknesses of various sugar substitutes and forecasts a rising trend in their market share.

RESEARCH DESIGN

Research Gap Found

The studies done upon the different sweeteners and reviewed during this study focused on the prospects and consequences of the sugar substitutes but the dominance of refined sugar among the Indian sugar and the reasons for the same was found under-searched.

The study keeps in focus the preferences of Indian consumer regarding their sweetener choices. The research questions thus framed are stated as under.

Research Questions

The study questions the three basic points in the market of sweeteners:

1. What are the current preferences of the consumer regarding the different sweeteners available in the study area?
2. What is/are the driving forces underlining such preferences?
3. How much is the customer satisfied with their choices?

Objectives

Based on the research questions framed, the following objectives can be listed:

1. To study the current consumer preferences among different sweeteners
2. To study the driving forces underlining the preferences of different sweeteners
3. To find out any potential change in the market of the sweeteners

Research Methodology

It is an empirical study based on a survey conducted among the customers, questioning their actual demand in the market along with other variables needed for having the research questions answered.

The samples were collected in Four districts of the Indian state of Uttar Pradesh, viz., Kheri, Lucknow, Kanpur, Basti. It was done through snowball sampling. The Sample Size of the survey was 308.

FINDINGS AND DATA ANALYSIS

On thorough analysis of the data collected through the survey the following key insights, regarding the current and potential market scenario of cane sugar, were found notable:

Strong Preference for Cane Sugar over its Available Substitutes

Approximately, 80% of the respondents were found to prefer sweets made of cane sugar. 84% of the total respondents used cane sugar for their beverages. A good number of the sugar consumers, who were trying to switch their sweetener found themselves failing to do so. These signal a great market share of the sugar industry at present and in near future, given the difficulty the consumer is facing to change their preferences.

Figure 1: Sweetener Preference in Beverages

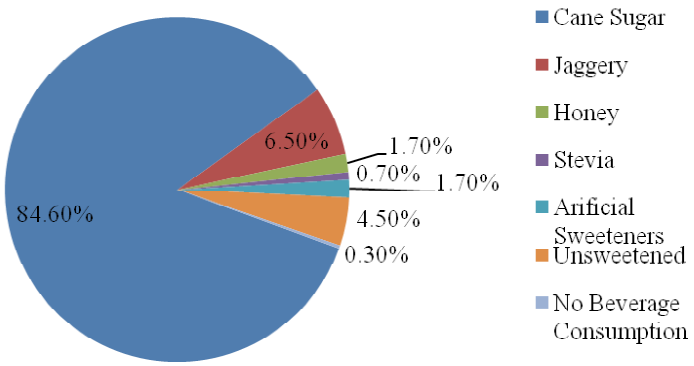
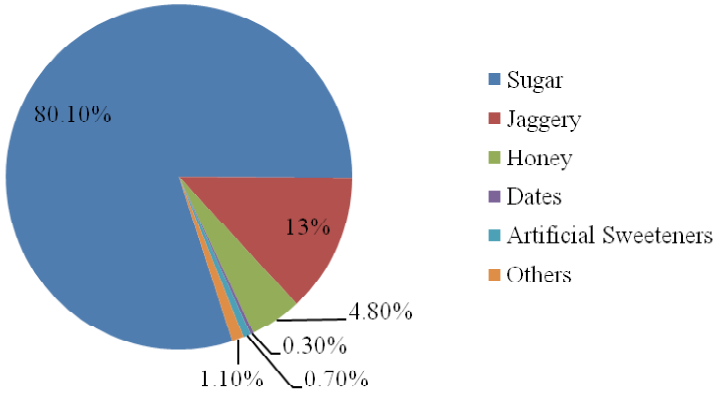


Figure 2: Sweetener Preferences for Sweet Dishes



The Jaggery Consumers

Among the jaggery consumers, the sweet dishes attracted the most of the consumption. Most of the jaggery consumers preferred sugar beverages or unsweetened ones, but jaggery in sweet dishes. Only 6.5% of the total respondents used jaggery in their beverages. For sweet dishes the share is 13%.

The Other Options

A good share of the respondents, other than the sugar and jaggery consumers, preferred unsweetened beverages. A small proportion of them admitted their consumption of artificial sweeteners. A meagre part of the consumer base used honey in their beverages and sweet dishes.

Customer Attitude towards Amount of Sweet Intake

More than half of the respondents are trying to cut down their sweet intake. This is in line of the fact that a portion of such respondents chose unsweetened beverages.

If only sugar consumers are taken among the total respondents, the share of such customers is the same.

The consumers of other sweeteners were found less inclined towards cutting their sweet intake.

Major Driving Forces for Different Sweeteners

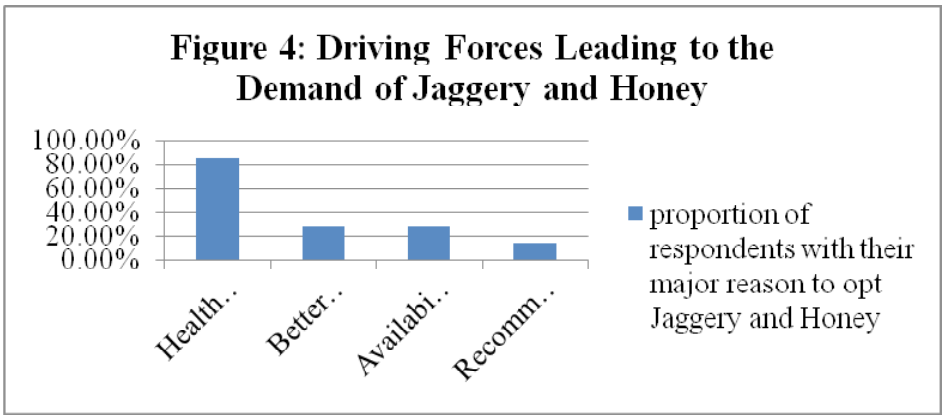
There were different driving forces among the consumers of cane sugar and other sweeteners. The major driving forces (as per their ranking) to prefer Cane Sugar are:

- Easy to use
- Childhood Habit
- Better Taste
- Easy Availability in the Market
- Price

Figure 3: Driving Forces Leading to the Demand of Sugar

The major driving forces to prefer Jaggery and Honey are:

- Health Concerns
- Better Taste
- Availability in the Market
- Recommendations



The major driving forces to prefer Artificial Sweeteners and Stevia Leaves:

- Health Concerns
- Recommendations

CONCLUSION AND SUGGESTIONS

The current market is highly dominated by the Cane Sugar. The sugar consumers are found to be governed by the tastes, habits and ease with purchasing and using it. These habits are difficult to change. This is one of the major reasons for the dominance of the cane sugar in the sweetener market for years. However, with the increasing health hazards associated with the refined cane sugar and awareness for the same among costumers are making them either cut down sweet intake or change preferences. Although there are a small proportion of the respondents who are being successful in such efforts, one cannot guarantee the sustenance of such great demand for sugar in future. As a social being, human race is guided by bandwagon effect, and any change in a consumer's preference induces others too.

With consumers still finding the tastes and ease associated with the sugar preferable over other options, it is needed that the sugar suppliers consider the health concerns regarding their product. Necessary steps can be taken during the refining of the sugar, to make it less hazardous. It is also recommended when the jaggery suppliers, along with promoting their product on the health benefit terms, are innovating with market strategies to make the product easy to use and attractive.

To conclude, the paper finds great market share and popularity of cane sugar. The only weak point that may affect the same is the health awareness among people. Though at present, consumers

are found to fail to change preference regarding their actual demand, it is not impossible for them to do so in future.

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Study the Scenario of Agricultural Labourers, Migration and its Impacts in the Kaushambi District of Uttar Pradesh

Asha Pasi[1] & Dr. Ved Prakash Mishra[2]

ABSTRACT

Migration is the movement of people from one ecological region to another, it may be on temporary or permanent bases. For many poor people around the world migration is a way of life and has radically altered the scale of migration. After independence government of India adopted the mixed economy model of development through five year planning; As a result of the defective policies of Agricultural development the regional disparities is increasing.People are now more aware of opportunities elsewhere and it has become easier for them to travel.The seasonal migration of Agricultural Labourers is not a new phenomenon in Kaushambi District of Uttar Pradesh. Kaushambi District of Uttar Pradesh is mainly a plain area and it is situated between Ganga and Yamuna river basin. Than it is a agrarian economy in character and main crop in this district are wheat and rice. Thusonly seasonal employment is availablemainlyin cropping, not whole year; which is leading to the increase in the seasonal migration of Agricultural Labourers. On the other hand; it is also seen that poor educational facilities, health and lack of employment available in the rural areas. As a result; every year thousands of marginal farmers and landless Agricultural Labourers migrate seasonally to Maharashtra, New Delhi, Kanpur, Prayagraj, for survival and inclusion. Inclusive growth policy is attempted to bring the backward sector, classes, castes, women and marginal people into main stream economy.

Keywords: *Agricultural labourers, Regional Disparities, Migration and Seasonal Migration, Seasonal employments.*

Introduction

The term migration was usually understood to cover all cases where the decision to migrate was taken freely by the individual concerned for reasons of "personal convenience" and without intervention of an external compelling factor. It therefore applied to persons, and family members,

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moving to another country or region to improve their material or social conditions and to improve the prospect for themselves or their family. The United Nations defines migrant as „an individual who has resided in a foreign country for more than one year irrespective of the causes, voluntary or involuntary, and the means, regular or irregular, used to migrate. Under such a definition, those travelling for shorter periods as tourists and business persons would not be considered as migrants. However, common usage includes certain kinds of shorter-term migrants, such as seasonal farm-workers who travel for short periods to work in planting or harvesting farm products." Migration refers to the movement of people from one geographical location to another, either on a temporary or permanent basis (Ekong 2003). It is a common observation all over the world that rural-urban migration is a dominant pattern of internal migration. Migration is a selective process affecting individuals or families with certain economic, Social, educational and demographic characteristics. People migrate in response to prevailing conditions and the reasons for it differ from one individual to another there are two main types of migration: first, internal Migration, i.e. migration within one country, and secondly international migration, which means the movement from one country to another. Agriculture labour migration is also one type of labour migration from one place to another place for their livelihood. Agricultural labourers, especially in smaller villages away from towns and cities, are generally unskilled workers carrying on agricultural operation in the centuries old traditional ways. Most agricultural workers belong to the depressed classes, which have been neglected for ages. The low caste and depressed classes have been socially handicapped and they never had the courage to assert themselves. In some parts of India, agricultural labourers are migratory, moving in search of jobs at the time of harvesting. This movement has some time helped them to get the benefits of growth and development.

Review of Literature:

Following are some of the literature reviewed to identify the research gap. Based on this the objectives of the work has been framed Manon Domingues, Dos Santo Thiser analyses the dynamics of migratory flows and growth in a developing economy. We show that when workers freely choose their location, some natives can rationally decide to return to their home country after they have accumulated a certain amount of knowledge abroad, while some prefer to stay permanently in the same economy (either at home or abroad). We point out that worker mobility can have an expansionary effect on the developing economy. Moreover, we show that in the long-run, as the sending economy develops, fewer natives are likely to emigrate and more migrants are likely to return.

ShigemiYabuuchia, SarbajitChaudhuri(2005) develops a three sector general equilibrium structure with diverse trade pattern and imperfection in the unskilled labour market to analyze the consequences of international mobility of skilled and unskilled labour on the skilled-unskilled wage inequality in the developing economies. The analysis finds that an emigration (immigration) of either type of labour is likely to produce a favorable effect on the wage inequality. In particular, the result of emigration (immigration) of skilled labour on the relative wage inequality is counterintuitive. These results have important policy implications for an overpopulated developing country like India

Manolo I. Abella (2005) while the growth of trade may have substituted for potential movements of labour, its overall impact has been to stimulate economic growth and employment, and social and

demographic changes which in turn create shortages of labour. As the regional economy continues to expand at a rapid pace, pressures will increase for importing foreign labour to do jobs that national workers no longer want. The World Bank's (2006) Global Economic Prospects Report asserts that "migration should not be viewed as a substitute for economic development in the country of origin [as ultimately] development depends on sound domestic economic policies."

Naresh Kumar and A.S. Sidhu (2005) attempt to identify the push and pull factors which influence workers' inter-state migration, on the basis of perceptions of workers. A sample of 200 workers drawn from 25 brick-kilns located in three districts of Punjab was interviewed. This study found that industrial development, better job opportunities and comparatively higher wages in Punjab have emerged as the most important pull factors which motivate labour to migrate. But lack of development, inadequate agricultural land and poor economic conditions of family forced laborers to migrate out of its native place. The study further found that economic factors have emerged more significant as compared to non-economic factors in the process of migration. Study recommends that in view of the slow absorption rate in the urban industrial sector, the labour migration should be regulated. Concrete plans and their effective implementation are necessary in order to reach the people.

Research Gap:

Migration is one of the common trends in these days. In the same way agriculture labour migration is also common in these days. Agriculture labourers face so many problems in his living condition and these problems push him from his native place and migrate to other places where he get good employment and income opportunity. In Uttar Pradesh there is lot of disparities between Kaushambi district and Others District of Uttar Pradesh and the drought is more prevalent in Kaushambi which has led to the migration of agricultural labourers from Kaushambi district to Other Cities in search of jobs. This study focuses on this type of migrant labourers who have migrated from Kaushambi District to Maharashtra, Prayagraj, New Delhi and Kanpur for employment in industrial worker, fruit and vegetables seller and other fields, and tries to prove that this type of migration of the marginalized section has helped in their inclusive growth.

Objectives:

The main objectives of this paper are

1) To study the socioeconomic conditions of the migrant labourers, before and after the migration.
2) To identify whether migration has led to inclusive growth taking into consideration the income and education level as well as caste background of these people.

Methodology:

Details regarding the socio-economic conditions of the selected laborers are based on the information collected through interview schedule.100 respondents are selected from different fields in Maharashtra, New Delhi, Prayagraj and Kanpur. Primary data collected from the respondents with the help of questionnaire. SPSS package is use for data analysis. The analysis of the socio-

economic background of the selected seasonal migrant laborers has helped to explain the situational factors at the place of origin which make them to migrate. The specific focus of the paper is to understand the socio-economic background of migrant labourers and it is well pronounced by this study that the social and economic exclusion in the native is the main reason for agricultural labour migration.

Table 1: Age of the labourers

Sl. No.	Age	Frequency	Percentage
1	11-20	13	13.00
2	21-30	32	32.00
3	31-40	35	35.00
4	41-50	20	20.00
	Total	100	100.00

Details regarding the socio-economic conditions of the selected laborers are based on the information collected through interview schedule.100 respondents are selected from differentworks adopted in Maharashtra, New Delhi, Kanpur, and Prayagraj. Primary data collected from the respondents with the help of questionnaire. The analysis of the socio-economic background of the selected seasonal migrant laborers has helped to explain the situational factors at the place of origin which make them to migrate. The specific focus of the paper is to understand the socio-economic background of migrant labourers and it is well pronounced by this study that the social and economic exclusion in the native is the main reason for agricultural labour migration.

Table 2: Male and Female Ratio.

Sl. No.	Gender	Frequency	Percentage
1	Male	79	79.00
2	Female	21	21.00
	Total	100	100.00

The above table 2 data has been classified on the basis of gender also. And it is men who are more Migratory in this group. And the 21% of female population is normally the dependent wife who follows husband to his working place. In most of the cases they are also joining the hands of their husbands to improve the family Income and they expressed their willingness to work in an alien place than in their native.

Table:3 Category wise Migrant Labourers

Sl. No.	Category	Frequency	Percentage
1	General	5	5.00
2	EWS	10	10.00
3	OBC-CL	15	15.00
4	OBC-NCL	30	30.00
5	SC	41	41.00
6	ST	0	00.00
	Total	100	100.00

The above table 3 deals with the result shows the socio–economic conditions of the migrant labourers, Table 3 refers the category wise migrated laborers and their percentage. According to this table the migrated Laborers from Kaushambi district of Uttar Pradesh has been classified into SC and STs, OBC-Non Creamy Layer, OBC- creamy Layer EWS (Economically Weaker Section) and General, it is very clear that out of the total more than 41% are SCs and STs,30%belong to OBC-NCL, OBC-CL (15%)and General and EWS is 5%and 10% respectively. This clearly shows that the majority of the poor agricultural labourers, who migrate for their livelihood, are from this marginalized group.

Table:4 Educational qualification of migrant labourers

Sl. No.	Education Level	Frequency	Percentage
1	Illiterate	25	25.00
2	Primary/middle	27	27.00
3	High school	39	39.00
4	College	9	9.00
	Total	100	100.00

The above table reveals the education is very crucial for inclusive growth and this has been tested in this research paper and as expected the number of illiterates is 25%. 27%of the labourers are having Primary/ Middle school level and the maximum level of education among these people is high school level (39%). And some people are college level education (9%).

Table:5 working status of migrants Status

Sl. No.	Status	Frequency	Percentage
1	Mason	8	8.00
2	Industrial worker	52	52.00
3	Driver	27	27.00
4	Fruit/vegetable seller	13	13.00
	Total	100	100.00

Above table shows that the27% people working as drivers and 52%of migrants are working as labourers, The 8% people working as Mason and 13% people work as fruits and vegetables seller. They are unskilled hence they draw lower wages compare to mason and other workers who are working in construction fields.

Findings

The wage earning status of the migrant labourers before and after. There is a significant difference between income level of the migrated labourers before and after their migration. The income has actually increased. This type of migration not only helped to improve the standard of living of the migrant labourers, but also made them economically and socially included as majority of them belongs to the marginalized communities. It is middle age group which is showing more inclination towards migration to improve their economic status.32% of labourers are 21-30 age group, 35%of labourers are 31-40 age group and other remaining part fall in low and higher age group. It is clear from the table that the migration is very pronounced in the highly productive age group that is 20-40 years and it is men who are more migratory in this group. And the 21% of female population is normally the dependent wife who follows husband to his working place. In most of the cases they are also joining the hands of their husbands to improve the family income and they expressed their willingness to work in an alien place than in their native.

The category wise migrated laborers and their percentage. According to this table the migrated Laborers from Kaushambi district of Uttar Pradesh has been classified into SC and STs, OBC-Non Creamy Layer, OBC- creamy Layer EWS(Economically Weaker Section) and General, it is very clear that out of the total more than 41% are SCs and STs,30% belong to OBC-NCL, OBC-CL(15%)and General and EWS is 5%and 10% respectively. This clearly shows that the majority of the poor agricultural labourers, who migrate for their livelihood, are from this marginalized group.

The education is very crucial for inclusive growth and this has been tested in this research paper and as expected the number of illiterates 25%. 27%of the labourers are having higher primary school level and the maximum level of education among these people is high school level (39%).This works like a vicious circle for these people. They are poor and are not able to get good education and they are not getting good education because they are poor. The 52%of migrants are working as labourers, they are unskilled hence they draw lower wages compare to mason and other workers who are working in different fields.

Conclusion:

The above study helps us to make some observation as below. The migrant labourers from Kaushambi District of Uttar Pradesh are becoming the main labour source to the different sector in the cities and the industrial works of the cities are pulling these labourers because of high wages. Migrated labourers are coming to Maharashtra, Delhi Kanpur and Prayagraj region in good number for employment to fulfilling their financial as well as social needs. Most of the labourers are landless labourers and agricultural labourers only few have own land holding but they find it Very difficult to survive because of this adverse environment in agriculture sector, Therefore they migrate. Since Majority of these migrant labourers have come from poor background and low socio economic status, the Migration has helped them to improve not only their financial status but also their educational, social status. In This way they felt that the migration has helped them to get included in the development process.

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Sustainability of Agricultural Practices, Zero Budget Natural Farming (ZBNF) and Food Security

Devika Singh[1] & Dr. Monika Mehrotra[2]

ABSTRACT

This paper addresses the need for agricultural practices that are sustainable in India while also concentrating on the role of zero budget natural farming (ZBNF) in improving food security. With increase in environmental degradation and food demands, traditional farming methods that are mostly dependent on chemicals are unsustainable, demanding a shift towards eco-friendly ways.

This paper provides a literature review and case study analysis to evaluate traditional agricultural methods with ZBNF. This paper analyzes the economical and environmental impacts of ZBNF on the fertility of soil, crop yields and how this affects the livelihood of farmers. Government initiatives that promote adapting zero budget natural farming (ZBNF) are evaluated with their impact on farmer contribution and food security results.

ZBNF encourages agricultural sustainability by lessening the requirement for chemical fertilizers and pesticides while also reducing costs for farmers and boosting soil health. It promotes biodiversity, conserves water and improves environmental adaptability. Short term yield variability exists, driven by many factors such as climate, soil etc., resulting in lower output in some regions compared to traditional farming practices. ZBNF also shows potential to improve food security by making farming more economical for small-scale farmers. Although it has been widely accepted and the consequences for national food security continue to be evaluated.

In the year 2022, a study was conducted in 28 farms spread across Andhra Pradesh. This study found that ZBNF has notably improved soil quality by increasing water retention and microbial activity. This improved adaptability in drought-affected regions, leading to improved crop productivity without depending on chemical fertilizers or pesticides. This study covered both Kharif and Rabi season, displaying ZBNF's ability to sustain yields and improve food security under different climatic conditions.

ZBNF offers an effective strategy towards sustainable agriculture, mainly in improving resource productivity and conserving natural resources. Therefore, additional research and policy support

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are required to ensure its expandability and efficiency in improving food security. The study concludes that implementing ZBNF alongside other sustainable practices potentially contribute to long-term agricultural endurance and food security in India.

Keywords: *Zero Budget Natural Farming (ZBNF), Soil Fertility, Food Security, Sustainable Agriculture.*

Introduction

Agriculture is the foundation of the Indian economy, engaging about 58% of the population and contributing roughly 17% to the gross domestic product (GDP) (Ministry of Agriculture, 2021). Nevertheless, agriculture in India faces notable difficulties involving reducing soil fertility, degradation of environment, water scarcity and increasing food deprivation. Conventional farming techniques, highly dependent on chemical fertilizers and pesticides are not sustainable anymore, leading to examination of options that can focus on these challenges.

Zero budgets natural farming (ZBNF) has risen have an eco-friendly technique that concentrates on lessening farmers' economic load while encouraging environmental protection. Created by Subhash Palekar, ZBNF focuses on using local natural asset to enhance soil fertility, increase crop production and guarantee food security. This strategy targets to lessen outside influence, thus supporting self-reliance among farmers.

This paper targets to assess the fundamentals and procedures of ZBNF, concentrating on its economic and environmental effects and its capability to increase food security in India. By evaluating case studies and existing literature, this paper will illuminate ZBNF's efficiency as an eco-friendly farming technique.

The theory of ZBNF is anchored in the ideology of decreasing reliance on outside resources, thus inspiring farmers to use what is available in their environment. Many studies have analyzed the pros and cons of ZBNF.

As per Singh et al. (2020) ZBNF's techniques result in enhanced soil fertility, lessened costs and grown yields. Their study highlights that organic farming techniques can amplify biological diversity and ecosystem stability. By encouraging native farming methods, ZBNF lessens the danger of pest outbreak and diseases, which are usual in high-chemical farming.

Study by Kumar et al. (2021) discovered that ZBNF can notably diminish the negative effects of climatic change on agriculture. Their insights point out that ZBNF techniques guide farmers to adjust to shifting climatic patterns by enhancing soil fertility and boosting water retention capacity. These adjustments are important for sustaining performance during times of drought or heavy rainfall.

Additionally, an analysis executed by Reddy et al. (2022) shown the economic benefits of implementing ZBNF. Farmers who implemented ZBNF stated lessened expense on chemical fertilizers and pesticides, resulting in profitability. This economic adaptability is especially advantageous for small-scale farmers, who usually struggle with expensive production costs.

The methodology of this paper utilizes mixed-methods research that merges both quantitative and qualitative information to analyze the economic, environmental and social effects of Zero Budget

Natural Farming (ZBNF) on eco-friendly farming in India. The study utilizes a case study executed in Andhra Pradesh, a state where ZBNF is well recognized among farmers.

The case study concentrates on Andhra Pradesh, a region that has been at the frontline for endorsing ZBNF. Andhra Pradesh introduced the Community-Managed Natural Farming (APCNF) program in 2016, which was a massive venture to enforce ZBNF across the state. This paper focuses on data gathered from 28 farms performing ZBNF across diverse climatic regions in Andhra Pradesh. These were selected because of their different farming procedures, weather conditions, and soil types which offer extensive outlook of how ZBNF acts under diverse conditions.

Data was gathered via organized interviews with farmers who have been performing ZBNF for a minimum of two cropping cycles (Kharif and Rabi seasons). The interviews evaluated their experiences, difficulties, crop production and views about ZBNF's sustainability. Quantitative data like production costs, crop productions, soil health assessment (such as nutrient content and microbial activity), and water utilization were also noted and evaluated.

Quantitative data were evaluated using statistical techniques to analyze patterns in crop production, input costs, and profit margins before and after implementing ZBNF. These numbers were compared to geographic averages for traditional farming techniques. Qualitative data from interviews were subjectively assessed to pinpoint shared difficulties, motivations, and views among the farmers in relation to the implementation of ZBNF. This mixed-method research allowed a comprehensive knowledge of ZBNF's performance.

Soil Fertility Enhancement

The case study displayed remarkable enhancement in soil fertility on farms that implemented ZBNF. Farmers stated evident growth in microbial activity, organic matter content and overall soil fertility. This can be associated to ZBNF's central concept of cultivating the soil using natural inputs like cow dung, cow urine, and organic biomass rather than using chemical fertilizers. These organic inputs encourage nutrient cycling, enhancing the availability of vital nutrients like nitrogen, potassium and phosphorus.

Moreover, farmers observed that the soil had become more porous, resulting in enhanced water retention, particularly in drought-vulnerable areas. This enhanced water holding capacity permitted plants to preserve themselves during dry periods, diminishing the need for irrigation. These insights are constant with former studies (Reddy et al., 2022) which illuminated that ZBNF procedures can enhance soil structure and boost its adaptability to climatic stress.

Crop Yield and Diversity

Opposing to the opinion that organic farming techniques may result in lessen yields, many farmers stated crop yields that were comparable to or higher than those accomplished by traditional and chemical based farming techniques. The utilization of polyculture, crop rotation and inter cropping in ZBNF lead in larger crop diversity and increased overall farm productivity. These procedures aid to stifle pests and diseases organically, minimizing the requirement for chemical pesticides.

For example, the case study discovered that mixed cropping procedures, like growing legumes with staple crops such as rice and wheat aided in fixing nitrogen in the soil, thus improving productivity without the requirement of chemical inputs. Farmers also documented those crops grown using ZBNF techniques showcased superior durability to pests and diseases, further adding to yield stability.

The diversity of crops grown under ZBNF also has beneficial consequences for household food security, as farmers were able to grow a broad variety of fruits, vegetables, and cereals, enhancing the nutritional quality of their diets.

Economic Sustainability

The economic evaluation unveiled that ZBNF considerably lessens input costs for farmers, making it an economically sustainable option, specifically for small and marginal farmers. The eradication of costly chemical fertilizers and pesticides, which are a key burden on traditional farmers, resulted in noticeable savings. Farmers performing ZBNF reported that their all in all production costs were lessened by as much as 50% permitting them to maintain a larger share of their profits. Inputs like artificial fertilizers and pesticides, guaranteed that ZBNF farmers were less vulnerable to variations in input prices. This economic viability is notably important in rural India, where many farmers are weighed down debt because of expensive costs of chemical inputs. By reducing on these expenses, ZBNF aids to ease this debt burden, making farming more approachable to small-scale farmers, and encouraging long-term economic sustainability.

Moreover, a few farmers stated the capability for earning additional income through the sale of organic produce at superior prices in both local and urban markets. The increasing demand for non-toxic, naturally grown food in India provides a prospect for ZBNF farmers to tap into niche markets, further augmenting their economic adaptability.

Environmental Viability

The environmental gains of ZBNF are notable. As the method eradicates the utilization of chemical fertilizers and pesticides, there is a decreased danger of soil and water contamination, which is a significant concern in the traditionally farmed regions. ZBNF encourages the utilization of on-farm, locally available resources, which lessen the carbon foot print affiliated the production and transportation of chemical inputs.

Besides the utilization of mulching, inter cropping, and other ZBNF techniques enhances soil moisture retention and lessens the need for extensive irrigation, especially in water-deficient areas. Thos aids to water conservation, which is important in a country like India where water scarcity is an accelerating issue.

Another vital environmental advantage of ZBNF is its endorsement of biodiversity. By promoting the use of native seeds, the conservation of local plant species, and the disapproval of monoculture farming, ZBNF aids to protect genetic diversity. It also encourages the growth of diverse crops on a single plot of land, crafting a balanced ecosystem that organically controls pests and maintains soil fertility without external outputs.

Food Security

One of the main guarantees of ZBNF is its capability to improve food security by making farming economically sustainable for small holders, who comprise the majority of India's agricultural sector. By lessening reliance on expensive external inputs, ZBNF permits farmers to cultivate crops without the threatening fear of economic collapse, therefore guaranteeing a steadier food supply.

In the case of Andhra Pradesh, ZBNF has displayed potential in improving local food security by endorsing sustainable agricultural methods that enhance crop production without diminishing natural resources. The enhanced crop variation also enhances dietary diversity for farming households, contributing to better nutrition. In areas where food insecurity has been an unwavering problem, ZBNF offers a sustainable way to assure a trustworthy food supply.

Nevertheless, it is vital to keep in mind that while the preliminary outcomes from ZBNF are encouraging, long-term studies are required to fully analyze its effect on national food security. The expandability of ZBNF beyond small and marginal farms and its resilience to diverse climatic zones and agricultural landscapes are areas that need further research.

The insights from Andhra Pradesh case study highlight the capability of ZBNF as a sustainable farming method that can tackle numerous significant issues faced by agriculture in India today. ZBNF's attention on soil health, water conservation, and biodiversity crafts a farming structure that is more adaptable to climate change, lessens environmental degradation, offers financial relief to small-scale farmers.

Although ZBNF provides many advantages, there are also issues to its widespread implementation. The technique depends majorly on local resources, like cow urine and dung, which may not be constantly available in enough proportions, especially for farmers who don't have access to cattle. Moreover, there is a requirement for larger awareness and training among farmers to guarantee the proper implementation of ZBNF techniques. Without appropriate direction, farmers may struggle to gain the preferred outcomes, resulting in crop failure and diminished yields.

Additionally, even though ZBNF lessens the economic strain on farmers by eradicating the requirement for chemical outputs, it needs significant labor, especially in the preparation of organic inputs like Jeevamurtha and Bijamrita. For farmers who are overburdened, this may act as a deterrent. Government support in form of subsidies for organic inputs, training programs, and the endorsement of cooperative farming could help alleviate these issues.

At last, the government's function in encouraging ZBNF at the national level is essential. Whereas states like Andhra Pradesh have taken the initiative in endorsing ZBNF, there is requirement for an improved integrated method that comprises research, policy support, and infrastructure development to make ZBNF sustainable for farmers across India.

Zero Budget Natural Farming (ZBNF) signifies a notable shift in agricultural methods, especially in the Indian context, where the majority of farmers are smallholders facing financial difficulties, environmental degradation, and fluctuating market conditions. ZBNF provides a subsystem that focuses on ecological sustainability, economic sustainability and social equity. By lessening input costs and enhancing soil fertility, ZBNF strengthens farmers to produce food viably while also conserving the environment.

The case study of Andhra Pradesh illuminates the capability of ZBNF to enhance soil fertility, improve crop production, conserve water and add to food security, particularly in areas vulnerable to environmental challenges. The financial advantages of lessened production costs make ZBNF an alluring alternative for small-scale farmers, while its ecological benefits contribute to long-term sustainability.

On the other hand, for ZBNF to genuinely alter Indian agriculture, more research is required to analyze its expandability to different areas, and long-term effect on food security. Moreover, further studies should concentrate on enhancing ZBNF's methods and incorporating them with other viable farming techniques to confirm that agriculture in India can meet the issues of 21st century.

As a final point, Zero Budget Natural Farming (ZBNF) proposes an optimistic strategy for addressing the environmental, economic, and social challenges facing Indian agriculture. With appropriate assistance, it has the capability to contribute to a more sustainable and food-secure future of India.

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A Short Run Inquiry of the Phillips Curve in India's Context

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ABSTRACT

The relationship between inflation and unemployment as well as the industries using highly advanced machinery and the nation's excess labour force. While temporary unemployment was a part of the economy, unemployment remains a major issue for it. It was initially recognized by the renowned British economist A. W. Phillips, and it expresses an inverse link between the rate of rise in money wages (also known as real income or labour productivity) and the rate of unemployment.

Inflation and unemployment are major concerns for every emerging nation's economy. The aim of this paper is to determine whether there is a trade-off between unemployment and inflation in the short run for the Indian economy from 2012 to 2022.Short-term trends show that unemployment and inflation are inversely correlated; when inflation rises, unemployment falls and vice versa. A combination of surplus capacity and stagnation has reduced the economy's productive potential.

The study aimed to investigate the patterns of unemployment and inflation rates in India and assess the relationship between unemployment and inflation in the Indian economy-The Phillips curve concept. As a result, data were obtained from the Ministry of Labor and Employment and the Reserve Bank of India (RBI) statistics bulletin, and trend lines, percentage methods, and simple averages were used. The test's outcome demonstrated an inverse relationship between inflation and unemployment, supporting the Phillips curve's existence in India.

Key Word: *Inflation, Unemployment, Phillips Curve, RBI, Stagnation*

Introduction

The dynamics of inflation and unemployment are shaped by a variety of structural variables, demographic trends, and policy actions that define India's economic environment. In the Indian context, the short-run Phillips Curve research sheds light on how changes in one variable impact the other. The socio-economic environment of every nation, including India, is greatly impacted by two crucial economic indicators: unemployment and inflation. A concept in macroeconomics known as the Phillips Curve shows how unemployment rates and inflation are inversely related. This curve indicates that, in the short term, unemployment tends to rise in tandem with increases in inflation.

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However, a number of reasons, including shifting expectations, supply shocks, and governmental regulations, might cause this connection to fail in the long run. The present introduction provides a framework for delving into the intricacies of inflation and unemployment in India, emphasizing the obstacles that policymakers must overcome to attain both inclusive growth and macroeconomic stability.

The relationship between unemployment and inflation in India is a complicated economic issue that is frequently examined using the short-run Phillips Curve as a framework. A.W. Phillips originally noticed this relationship in the 1950s, and it implies that the two variables have an inverse association over shorter time periods. Two key measures of economic success are unemployment, which is the proportion of the labour force without a job, and inflation, which is the overall increase in the prices of goods and services. For policymakers to create monetary and fiscal policies that effectively generate steady and sustained economic development, they must have a thorough understanding of the dynamics of this connection.

Indexes such as the Wholesale Price Index (WPI) and the Consumer Price Index (CPI) are used to quantify inflation, which is a reflection of both the general cost of living and consumer purchasing power. India's inflation rate has fluctuated recently owing to a number of variables, including supply-side restrictions, shifts in the price of commodities globally, and monetary policy decisions. For example, in times of strong economic expansion, there may be inflationary pressures due to a rise in the demand for products and services, which drives up prices. However, additional factors that might lead to inflationary surges include supply interruptions, such as those brought on by unfavourable weather or problems in the supply chain.

Conversely, unemployment serves as an indicator of how well the economy uses its work force. Large and diversified labour pools with notable regional and sector-specific differences in employment patterns define India's labour market. Factors like demographic shifts, skill gaps, labour market laws, and the rate of economic expansion all have an impact on India's unemployment rate. For instance, the nature of agricultural operations frequently results in seasonal unemployment in the agriculture sector, which employs a sizable section of the workforce.

According to the short-run Phillips Curve, unemployment and inflation have an inverse relationship, meaning that as one variable rises, the other falls. Factors related to both supply and demand can be used to explain this connection. On the demand side, businesses may experience wage pressure as they fight for limited labour when the economy is strong and unemployment is low. Inflationary pressures may result from rising production costs and subsequently higher pricing for products and services. On the other hand, during recessions, a high rate of unemployment may lessen consumer demand, which would push prices lower and lower inflation.

Supply-side variables are also very important in determining how the Phillips Curve connection is shaped. Even during times of high unemployment, supply shocks—such as interruptions in the energy supply or fluctuations in the price of commodities globally—can cause cost-push inflation. Furthermore, the trade-off between inflation and unemployment can be influenced by structural variables including labour market flexibility, productivity growth, and technological improvements. For example, increased productivity may allow businesses to expand output without appreciably raising labour expenses, which would relieve inflationary pressures.

The Phillips Curve connection is also impacted by policy interventions, including as fiscal and monetary policies. India's central bank, the Reserve Bank of India (RBI), uses monetary policy instruments including interest rate changes and open market operations to control inflation and promote economic expansion. While cutting interest rates can encourage consumer spending and investment, it also has the ability to increase inflationary pressures and decrease unemployment. In contrast, tightening monetary policy by raising interest rates may reduce inflation but also have the unintended effect of slowing down the economy and raising unemployment.

The government's policies on taxing and expenditure, or fiscal policy, have an impact on the trade-off between the Phillips Curve. Public investment in healthcare, education, and infrastructure projects has the potential to lower unemployment by boosting economic development and creating jobs. However, fiscal growth may result in inflationary pressures if it is not supported by suitable measures to raise income or if expenditure is wasteful.

India has struggled in recent years to balance the trade-off between unemployment and inflation. High rates of inflation have reduced consumer buying power and exacerbated social and economic inequality, especially in the costs of food and gasoline. Simultaneously, underemployment and chronic unemployment have made it difficult for policymakers to promote equitable growth.

Policymakers may better negotiate these problems by using the Phillips Curve framework, which offers insights into the short-term trade-offs between unemployment and inflation. But in the long run, especially, it is critical to acknowledge this framework's shortcomings. The Phillips Curve connection may be impacted over longer time horizons by structural economic changes, including adjustments to institutions, technology, and demography.

To sum up, the examination of the short-run Phillips Curve offers a helpful framework for comprehending the connection between unemployment and inflation in India. Policymakers may effectively ensure price stability, attain full employment, and cultivate sustainable economic growth by carefully considering the trade-offs between these two factors. To guarantee successful policy results throughout time, it is crucial to be aware of this framework's limits and to supplement it with other analytical instruments.

REVIEW OF LITERATURE:

Tarapore (1993): Inflation on society's lower classes as a charge was explained. The impoverished elements of society benefit from the necessity for financial relaxation, according to another argument. Nothing is more accurate than the facts as they are. One of the best ways to combat poverty, in my opinion, is to mitigate inflation; thus, the public should support strong monetary policies that aim to prevent inflation. Also, it predicts that in the near future, the Reserve Bank, commercial banks, and financial institutions will need to acquire completely new skills due to the unavoidable changes in the stock market.

Arun Ghosh (1994), According to him the interest rate objection shouldn't imply that all interest

rates should drop sharply and suddenly. Rather, two actions are necessary. The first is a gradual reduction in the interest rate's structure. The creation of an institutional framework that would enable small farmers, small businesses, craftspeople, etc. to obtain sufficient and timely financing is the second, and maybe most important, step.

Sinha (1995), According to him it is critical to maintain the financial sector's health. The Central Government, the RBI, and SEBI must exercise extreme caution in light of this. It is imperative to significantly reduce the rate of monetary expansion. That is the true test of the effectiveness of central bank policy. Otherwise, the government's and the RBI's inflation would increase, defying the complacency shown in this respect.

Furuoka (2007) studied at the trade-off between Malaysia's unemployment rate and inflation rate. This study tested the association using vector error correction (VECM). The long-term association between the factors was evident from the data. Put differently, this study has offered empirical proof for the Phillips curve's existence in the context of Malaysia.

Afzal and Awais (2012) also studied at Pakistan's inflation-unemployment trade-off. The empirical findings demonstrate Pakistan's Phillips curve's validity.

Singh and Verma (2016) used bi-variate regression to evaluate the short-run trade-off between unemployment and inflation for the Indian economy from 2009 to 2015. The outcome demonstrated the presence of a short-term inverse link between unemployment and inflation.

Objectives:

- To comparison the trend of inflation and unemployment over the last 10 year.
- To estimate the relationship (Philips Curve) between inflation and unemployment.

Hypothesis:

H0: There is no existence of Phillips Curve (relation between unemployment and inflation).

H1**:** There is existence of Phillips Curve (relation between unemployment and inflation).

Methodology:

In order to achieving the above objectives, following research methodology adopted-

Sample: 10 years data has been analyzed to study the relation between unemployment and inflation.

Data Collection: Secondary Data has been used for study. The secondary data collected mainly from, the Ministry of Labor and Employment and the Reserve Bank of India (RBI) statistics and annual reports of RBI. In addition, Data and information has collected from Newspapers, Journals and Magazines etc.

Time Period: This study is purely based on secondary data. This study covers the period from 2013-14 to 2022-23.

Statistical tool: Simple linear regression method has been used for analyzing the data.

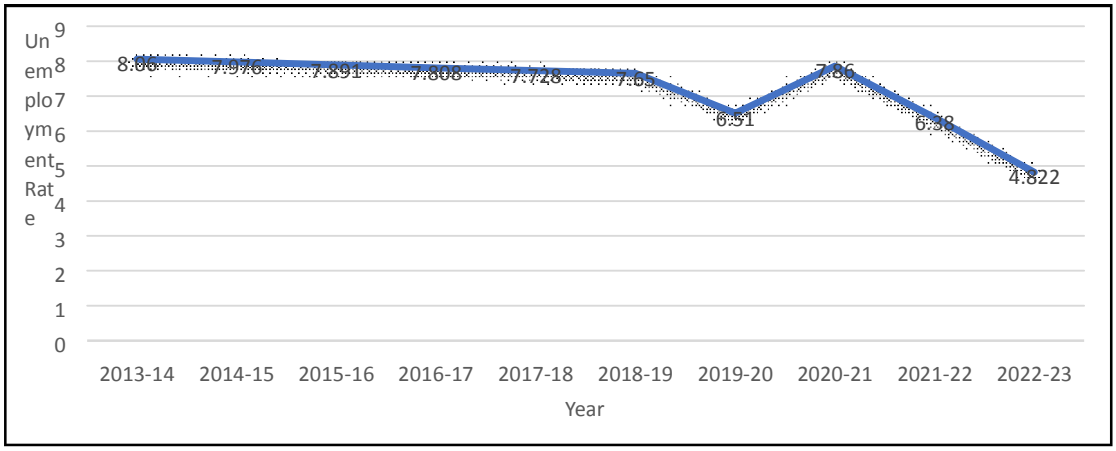
Unemployment Trend and Inflation Trend:

1. Unemployment Trend

Year	Unemployment rate
2013-14	8.06
2014-15	7.976
2015-16	7.891
2016-17	7.808
2017-18	7.728
2018-19	7.65
2019-20	6.51
2020-21	7.86
2021-22	6.38
2022-23	4.822

Source: Handbook of Statistics, RBI 2022-23

Graph 1: Unemployment Rate



The unemployment rate data from 2013-14 to 2022-23 showcases a dynamic labour market with varying trends influenced by economic policies, structural reforms, and global economic conditions. Starting in 2013-14, the unemployment rate was relatively high at 8.06%, gradually declining over the next few years. This period saw a steady reduction in unemployment, reaching 7.65% in 2018-19, suggesting a positive impact of economic growth and job creation initiatives.

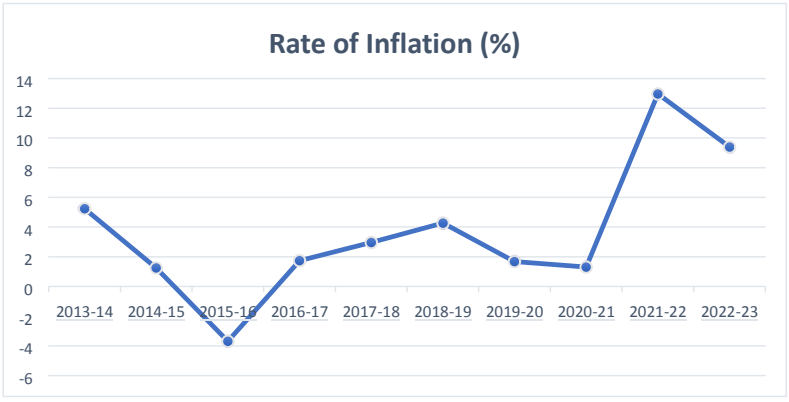
A significant improvement occurred in 2019-20, with the unemployment rate dropping to 6.51%, reflecting robust economic activities and policy measures aimed at enhancing employment opportunities. However, the onset of the COVID-19 pandemic in 2020-21 reversed this trend, causing the unemployment rate to rise to 7.86% due to widespread economic disruptions and lockdowns, which led to job losses and business closures.

The recovery phase began in 2021-22, with the unemployment rate decreasing to 6.38% as the economy started to recover, businesses reopened, and employment opportunities increased. By 2022-23, the unemployment rate had further declined to 4.822%, indicating significant recovery and stabilization of the labour market, driven by various government stimulus packages, vaccination drives, and the reopening of global economies.

Inflation Trend:

Year	Rate of Inflation (%)
2013-14	5.23854
2014-15	1.24444
2015-16	-3.6874
2016-17	1.732
2017-18	2.95699
2018-19	4.26458
2019-20	1.66945
2020-21	1.31363
2021-22	12.966
2022-23	9.39742

Source: International Labour Organisation estimated data



The inflation rate data from 2013-14 to 2022-23 exhibits significant fluctuations, reflecting diverse economic conditions and challenges faced by the economy during this period. Starting with a moderate inflation rate of 5.24% in 2013-14, the rate drastically fell to 1.24% in 201415, indicating an effective control over prices through various monetary policies and improved supply chains. However, 2015-16 experienced an unusual deflation of -3.69%, a rare phenomenon for an economy like India, likely due to excess supply, reduced demand, and global commodity price declines.

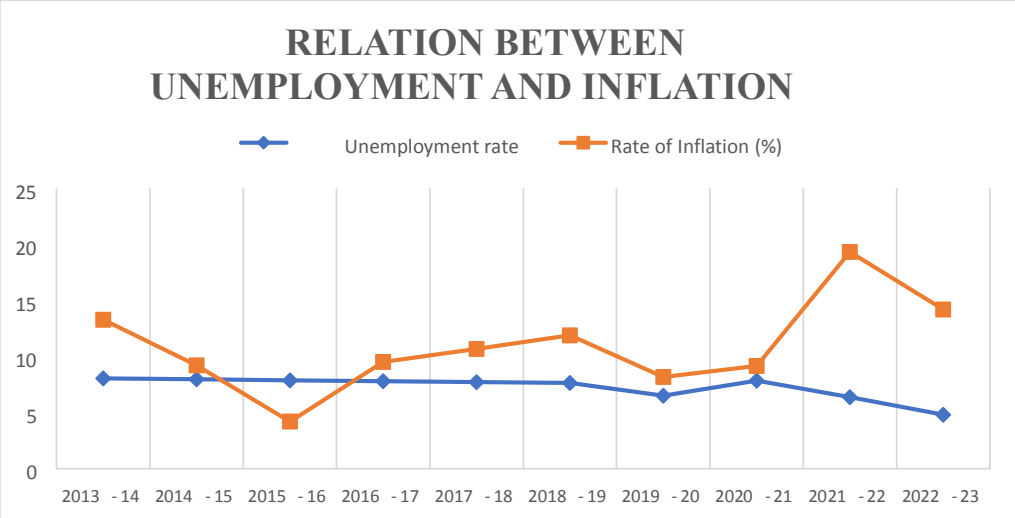
In 2016-17, inflation returned to a positive rate of 1.73%, influenced by the demonetization policy which initially caused a demand shock. The following year, 2017-18, saw a moderate inflation rate of 2.96%, as the economy adjusted to the new Goods and Services Tax (GST) regime implemented in July 2017. The trend of moderate inflation continued into 2018-19 with a rate of 4.26%, driven by higher fuel prices and food costs amid ongoing structural policy reforms.

The period from 2019-20 to 2020-21 was marked by low inflation rates of 1.67% and 1.31% respectively, reflecting subdued demand and effective price controls amid a global economic slowdown and domestic economic issues, exacerbated by the COVID-19 pandemic. However, the post-pandemic recovery phase brought significant challenges, with inflation spiking to 12.97% in 2021-22 due to supply chain bottlenecks, increased commodity prices, and rising demand. Although the inflation rate decreased to 9.40% in 2022-23, it remained high, influenced by continued global supply chain issues, geopolitical tensions, and increased energy costs.

Phillips Curve:

The inverse relationship between the rate of unemployment and the rate of inflation is represented by the Phillips Curve. A.W. Phillips initially presented this idea in 1958, drawing on his empirical research on unemployment and wage inflation in the United Kingdom.

Year	Unemployment Rate	Rate of Inflation (%)
2013-14	8.06	5.23854
2014-15	7.976	1.24444
2015-16	7.891	-3.6874
2016-17	7.808	1.732
2017-18	7.728	2.95699
2018-19	7.65	4.26458
2019-20	6.51	1.66945
2020-21	7.86	1.31363
2021-22	6.38	12.966
2022-23	4.822	9.39742



The data from 2013-14 to 2022-23 illustrates the relationship between the unemployment rate and the rate of inflation, often analysed through the lens of the Phillips Curve. The Phillips Curve hypothesizes an inverse relationship between inflation and unemployment, suggesting that lower unemployment rates correspond with higher inflation rates and vice versa.

- **2013-14 to 2014-15**: The unemployment rate slightly decreased from 8.06% to 7.976%, and inflation significantly dropped from 5.23854% to 1.24444%. This period shows a reduction in both unemployment and inflation, which somewhat contradicts the traditional Phillips Curve.
- **2015-16**: The unemployment rate marginally fell to 7.891%, while inflation turned negative at -3.6874%. This deflationary period indicates economic stagnation despite a stable unemployment rate.
- **2016-17 to 2018-19**: The unemployment rate showed a consistent downward trend, decreasing from 7.808% to 7.65%, while inflation rates increased from 1.732% to 4.26458%. This period aligns more closely with the Phillips Curve, where falling unemployment is associated with rising inflation.
- **2019-20 to 2020-21**: The unemployment rate decreased significantly to 6.51% in 201920 but then increased to 7.86% in 2020-21 due to the COVID-19 pandemic. Inflation remained relatively low during these years, suggesting that the pandemic's economic impact disrupted the usual relationship depicted by the Phillips Curve.
- **2021-22 to 2022-23**: Post-pandemic recovery is evident as the unemployment rate dropped sharply from 7.86% to 4.822%. Inflation, however, surged dramatically from 1.31363% to 12.966% in 2021-22, and then slightly decreased to 9.39742% in 2022-23. This sharp rise in inflation alongside falling unemployment exemplifies the Phillips Curve's prediction of an inverse relationship between these two variables

Result and Discussion:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.705498
R Square	0.497727
Adjusted R Square	0.425974
Standard Error	0.810989
Observations	9

ANOVA

	df	*SS*	*MS*	*F*	*ficance F*
Regression	1	4.56226	4.56226	6.93665	0.033728
Residual	7	4.603926	0.657704		
Total	8	9.166186			

Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*95.0%*	*Lower 95.0%*	*Upper*
Intercept	7.72442	0.340176	22.70714	8.14E-08	6.920032	8.528807	6.920032	8.528807
5.23854	-0.15365	0.058339	-2.63375	0.033728	-0.2916	-0.0157	-0.2916	-0.0157

R: represents the Karl Pearson correlation coefficient

R^2: represents the coefficient of determination or goodness of fit of a model.

Here, value of R 0.705498 which shows there is an association between unemployment rate and inflation. The value of R^2 = 0.497727, which means 49.7% of dependent variable is explained by independent variable.

Here, dependent variable unemployment rate is regressed on predicting variable inflation to test H_0 hypothesis.

Hypothesis	Beta Coefficient	R	R^2	F	t-value	p-value	Sig. F	Hypothesis supported
H_0	-0.15365	0.705498	0.497727	6.93665	-2.63375	0.033728	0.033728	No

If p-value < 0.05, reject H_0 and accept alternative hypothesis H_1.

The p- value is 0.033728< 0.05.

So, we reject the null hypothesis H_0 and accept alternative hypothesis H_1; there is a relation between unemployment rate and inflation.

The value of beta coefficient is -0.15365, this indicates there is a significant and negative relationship between inflation and unemployment rate which support the theory of Phillips Curve, i.e. 1% increase in inflation rate, unemployment rate is reduced by 0.15%.

Finding:

1. General Trend Observation:

- The data shows fluctuations in both unemployment rates and inflation rates over the period from 2013-14 to 2022-23.
- There is no consistent inverse relationship between the two variables, indicating that factors other than the traditional Phillips Curve dynamics might be at play.

2. Period of Deflation (2015-16):

- 2015-16: This year witnessed a unique situation where the inflation rate was negative (-3.6874%), indicating deflation. Despite this, the unemployment rate was relatively high at 7.891%.
- Possible reasons for deflation include significant drops in global commodity prices, such as oil, and other deflationary pressures.

3. Economic Recovery and Rising Inflation (2016-17 to 2018-19):

- 2016-17 to 2018-19: During these years, the unemployment rate showed a steady decline from 7.808% to 7.65%, while inflation rose from 1.732% to 4.26458%.
- This period aligns with the traditional Phillips Curve expectation where falling unemployment correlates with rising inflation.

4. Impact of COVID-19 Pandemic (2019-20 to 2020-21):

- 2019-20: There was a significant drop in the unemployment rate to 6.51%, and inflation also fell to 1.66945%.
- 2020-21: The pandemic led to increased unemployment (7.86%) and subdued inflation (1.31363%) due to reduced economic activity and demand shocks.
- This period reflects the significant economic disruptions caused by the global pandemic.

5. Post-Pandemic Economic Dynamics (2021-22 to 2022-23):

- 2021-22: The economy experienced a sharp increase in inflation to 12.966% while unemployment decreased to 6.38%. This indicates strong inflationary pressures, possibly due to supply chain disruptions and increased economic activity postpandemic.
- 2022-23: Inflation remained high at 9.39742%, but the unemployment rate dropped further to 4.822%, suggesting a recovering labour market but persistent inflation issues.

6. Unusual Patterns and External Factors:

- The data suggests that various external factors, such as global commodity prices, the COVID-19 pandemic and supply chain issues, have significantly influenced both inflation and unemployment rates.
- These external shocks have led to deviations from the traditional Phillips Curve model, showing that the relationship between inflation and unemployment is more complex and influenced by multiple factors.

7. Policy Implications:

- Policymakers need to consider these external factors and the atypical behaviour of inflation and unemployment when designing economic policies.
- The observed data underscores the importance of flexible and adaptive monetary and fiscal policies to address both inflationary pressures and unemployment challenges.

Suggestion:

- Implement counter-cyclical fiscal and monetary policies to mitigate economic shocks and maintain steady growth.
- During deflationary or low inflation periods, employ expansionary monetary policies, such as lowering interest rates and increasing money supply, to stimulate demand.
- Focus on targeted fiscal stimulus to support sectors most affected by the pandemic.
- Enhance social safety nets and invest in healthcare and infrastructure.
- Invest in job creation programs, especially in high-growth sectors like technology, renewable energy, and infrastructure.
- Enhance vocational training and education to equip the workforce with skills required for emerging industries.
- Enhance social protection systems, including unemployment benefits, food security programs, and healthcare access.

Conclusion:

The data from 2013-14 to 2022-23 reveals significant trends and variations in the relationship between unemployment rates and inflation in India. Initially, both unemployment and inflation rates showed a decreasing trend from 2013-14 to 2018-19, indicating an improving economy with better job creation and controlled inflation. However, the COVID-19 pandemic in 2020-21 disrupted this trend, leading to a sharp increase in unemployment while inflation remained low, likely due to reduced economic activity. Post-pandemic recovery in 2021-22 saw a significant rise in inflation accompanied by a decrease in unemployment, highlighting the challenges of balancing economic recovery with price stability. By 2022-23, inflation had slightly decreased, and unemployment had further dropped, suggesting ongoing economic stabilization. This data underscores the complexity of the relationship between unemployment and inflation, influenced by external shocks and necessitating balanced and adaptive policy measures to ensure sustainable economic growth and stability.

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An Analysis of Change in Cropping Pattern of Indian Agriculture since Independence

Mantasha Aziz[1] & Prof. Aloka Kumar Goyal[2]

ABSTRACT

The agricultural sector in India has witnessed significant changes in cropping patterns, driven by a range of factors including technological innovations, policy shifts, and environmental challenges. These changes have profound implications for productivity, sustainability and rural economies. This research paper aims to analyze the changes incropping patterns in Indian agriculture to understand the broader impacts of these shifts. This paper utilizes secondary data segmented according to the Five-Year Plans, resulting in 13 distinct points of analysis. These points are further divided into pre-global era and post-global era. The pre-global era is subdivided into before and after the Green Revolution phase. Additionally, this paper examines both food grains including wheat, rice, jowar, bajra, maize, and pulses and non-food grains such as groundnut, soybean, rapeseed and mustard, sugarcane, cotton, and jute and mesta. The study outlines the change in cropping pattern in pre green revolution and post green revolution and pre- and post-globalization periods. The structure of paper is divided into this manner: Introduction, Literature Review, Objective of the Study, Data and Methodology, Analysis and Conclusion.

Keywords: *Agriculture and allied sector, Global Era, Green Revolution, Cropping Pattern, Growth Rates, Foodgrains and Non-foodgrains*

Introduction

In the year 2019-20, India's geographical area was 328.75 million hectares, with the reported area for land utilization statistics being 306.54 million hectares. The area under forest cover was 71.75 million hectares, making up 23.4% of the reported area. The gross cropped area stood at 211.36 million hectares, which is 45.64% of the reported area, while the net sown area was 139.90 million hectares, also representing 45.64% of the reported area. The area sown more than once amounted to 71.46 million hectares, resulting in a cropping intensity of 151.08%. Additionally, the net irrigated area was 75.46 million hectares, and the gross irrigated area was 112.23 million hectares [1].

The cropping patterns are determined in large measures by agro-climatic factors such as soil, temperature and rainfall distribution i.e. the physical condition of the region. Crop suited to the

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given condition are grown and this is popularly known as traditional cropping pattern of the region. Thus, while agro -climatic factors determined the conditions under which crops are grown farmers are increasingly influenced by change in economic, technological, institutional and policy induced factors [2].

The cropping pattern plays a vital role in determining the level of agriculture production and reflect the agriculture economy of an area. A change or shift in cropping pattern implies change in the proportion of the area under different crops which depends, to a large extent, on the facilities available to raise crops in the given agro-climatic setting [3].

Adopting strategic cropping patterns is essential for agricultural development as it boosts productivity and ensures efficient use of resources[4]. Effective patterns promote sustainable soil health by preventing nutrient depletion and reducing erosion[5]. They help manage pests and diseases by disrupting their life cycle and enhance economic stability diversifying crops and mitigation market risks[6]. Additionally, well planned cropping system contributes to environmental sustainability by preserving biodiversity and reducing the negative effect of monocultures[7].

This study examines the transformations in cropping patterns within India's agriculture. Over recent decades, these changes have been shaped by a confluence of technological advancements, market fluctuations, policy interventions, and climatic variations. The shift from traditional staple crops to high-value cash crops, alongside increased diversification into horticulture and agroforestry, reflects a strategic adaptation to evolving economic and environmental conditions.

Literature Review:

There are several numbers of study related to cropping pattern of Indian agriculture.

M.R Singariya and Narayan Sinha (2015) established relationships among per capita GDP agriculture and manufacturing sector in India with per capita GDP, manufacturing sector output, and agricultural sector output in India, employing time series data from 1970 to 2013[8]. Pradyum Kumar and Surbhi Mittal (2006) examined agriculture productivity trend in India sustainability issues in crop productivity and analyzes trends in agricultural productivity, with a focus on individual crops grown in major states across India [9]. P. M. Savadatti (2017) studied the trends and forecasting analysis of area production and productivity of total pulse in India [10]. Sushma Panigrahy, S.S. Ray, Anil Sood, L.B. Patel, P.K. Sharma, and J.S. Parihar (2004) conducted a study analyzing cropping patterns, crop monitoring, and crop intensity in Bhatinda district using satellite-based remote sensing data, along with other spatial and non-spatial collateral data[11].Daya Kar Raha and Shahid Parwaz (2005) analysed the trends of sorghum cultivation in six Indian states based on secondary data[12].The paper by C.G. Ranade (1977) analysed the effect of cropping patterns on agricultural production during the period from 1951-54 to 1981. The study focused on 14 crops across 28 states and 238 districts. The analysis was divided into two phases: the pre-Green Revolution and the post-Green Revolution periods[13].

On the basis of available literature review, it is clear that there is a need to study related to changes in cropping pattern in pre and post global era in India.

Aim of the study:

- To analyse the cropping pattern of foodgrains and non-foodgrains in pre and post green revolution in India
- To find out the change in cropping pattern of foodgrains and non-foodgrains in pre and post global era in India

Methodology of the Study

This study utilizes secondary data obtained from governmental sources, specifically "Agriculture Statistics at a Glance (2023)". The analysis spans the period from 1950 to 2024, structured around 13 discrete time points corresponding to the intervals defined by the Five-Year Plans. These points of time are further segmented into pre- global era and post-global era, while pre global era has been divided into pre green revolution and post green revolution, enabling a comparative temporal analysis. The research encompasses a variety of crops, which are classified into two primary dimensions: food grains and non-food grains. Rice, wheat, jowar, bajra, maize, and pulses are categorized under food grains. The non-food grains category comprises of groundnut, soybean, rapeseed and mustard, sugarcane, cotton, jute, and mesta. For analysing the trend of patterns and growth rate of various crops in the study period, mean and percentage have been used.

Analysis

This paper makes an analysis the trend of cropping pattern of foodgrains and non- foodgrains in India and analyses the change in cropping pattern of foodgrains and non- foodgrains in India in pre global era and post global era. The details study is as follows:

(A) Trends of cropping pattern during pre-global era

Table 1 and figure no 1 both are illustrating the cropping pattern in the pre-global era. This paper is divided into two periods: pre-Green Revolution and post-Green Revolution. During pre-Green Revolution period, there is an increase in the cropped area for both food grains and non-food grains. However, in the post-Green Revolution period, the cropped area for rice, pulses, wheat, rapeseed and mustard, soybean, sugarcane, jute and mesta have been increased, while the cropped area for jowar, bajra, maize, groundnut, cotton have been decreased.

Table no: 1- Cropping Pattern of Indian Agriculture

Pre-Global-Era									
Crop	**Pre-Green Revolution (Million Hectare)**				**Post Green Revolution (Million Hectare)**				
	1951	**1956**	**1961**	**Average**	**1969**	**1974**	**1980**	**1985**	**Average**
Rice	29.83	32.28	34.69	32.26	37.68	37.89	40.15	41.14	39.21
Wheat	9.47	13.52	13.57	12.18	16.63	18.01	22.28	23	19.98
Jowar	15.94	16.24	18.25	16.81	18.61	16.19	15.81	16.1	16.67
Bajra	9.52	11.25	11.28	10.68	12.49	11.29	11.66	10.65	11.52
Maize	3.31	3.76	4.51	3.86	5.86	5.86	6.01	5.8	5.88
Pulses	18.78	23.32	24.24	22.11	22.02	22.03	22.46	24.42	22.73
Total Foodgrains	86.85	100.37	106.54	97.92	113.29	111.27	118.37	121.11	116.01
Groundnut	4.92	5.53	6.89	5.78	7.13	7.06	6.8	7.12	7.02
Rapeseed and Mustard	2.4	2.54	3.17	2.70	3.17	3.68	4.11	3.98	3.73
Soyabean	-	-	-	-	-	0.07	0.61	1.34	0.67
Sugarcane	1.94	2.05	2.46	2.15	2.75	2.89	2.67	2.85	2.79
Cotton	6.56	8.02	7.98	7.52	7.73	7.56	7.82	7.53	7.66
Jute and Mesta	0.79	1.07	1.34	1.06	1.09	0.98	1.3	1.5	1.21
Total Non-Foodgrains	16.61	19.21	21.84	19.22	21.87	22.24	23.31	24.32	22.93

Source: Agriculture statistics at a glance

-; Not Available

Figure no: 1- Cropping Pattern of Indian Agriculture

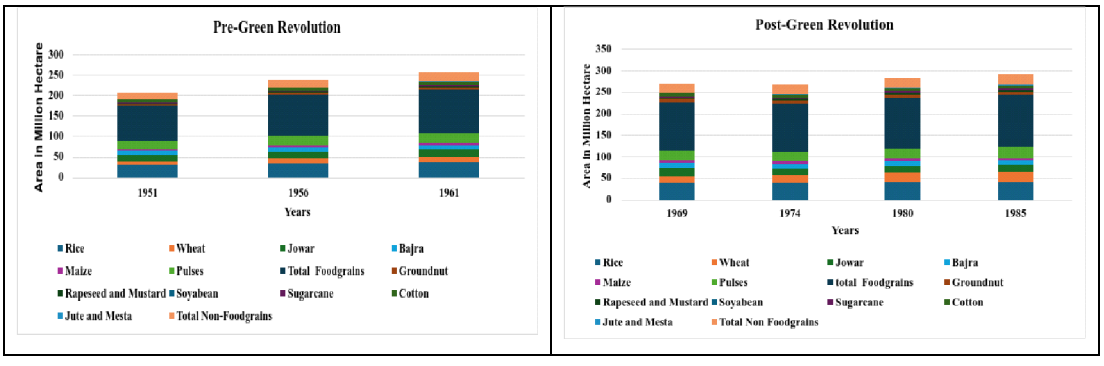

Figure no: 1 is based upon Table no: 1

(B) Trends of cropping pattern during global era

Table 2 and figure no 2 both are elaborating the changing pattern in global era spanning from 1992 to 2021, the area under cultivation for rice, wheat, maize, pulses, rapeseed and mustard, soybean, sugarcane, jute and mesta have been increased. On the other hand, the cropped area for bajra, groundnut, jowar and jute and mesta are decreased.

Table no: 2 Cropping Pattern in Global Era

Global Era (Million Hectare)								
Crops	**1992**	**1997**	**2002**	**2007**	**2012**	**2017**	**2021**	**Average**
Rice	41.78	43.45	41.18	43.91	42.75	43.77	46.38	43.31
Wheat	24.59	26.7	25.2	28.04	30	29.65	30.47	27.80
Jowar	13.04	10.8	9.3	7.76	6.21	5.02	3.18	7.90
Bajra	10.62	9.89	7.74	9.57	7.3	7.48	6.7	8.47
Maize	5.96	6.32	6.64	8.12	8.67	9.38	10.04	7.87
Pulses	22.36	22.87	20.5	23.63	23.26	29.81	31.03	24.78
Total Foodgrains	118.35	120.03	110.56	121.03	118.19	125.11	127.8	120.15
Groundnut	8.17	7.09	5.94	6.29	4.72	4.89	5.75	6.12
Rapeseed and Mustard	6.19	7.04	4.54	5.83	6.36	5.98	8.06	6.28
Soyabean	3.79	5.99	6.11	8.88	10.84	10.33	12.27	8.31
Sugarcane	3.57	3.93	4.52	5.06	5	4.74	5.15	4.56
Cotton	7.54	8.87	7.67	9.41	11.98	12.59	11.91	9.99
Jute and Mesta	0.93	1.11	1.04	0.96	0.86	0.74	0.69	0.90
Total Non-Foodgrains	30.19	34.03	29.82	36.43	39.76	39.27	299.43	72.70

Source: Agriculture statistics at a glance

Figure no: 2- Cropping Pattern of India/ Coverage in Pre-Global Era

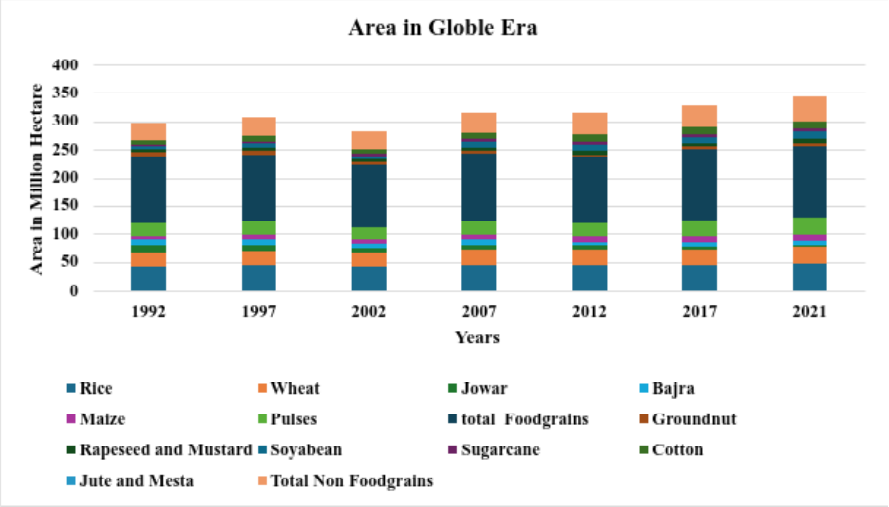

Figure no: 2 is based upon Table no: 2

(C) Comparative analysis of cropping pattern between pre and post global era

Table no: 3 and figure no; 3 both are illustrating the percentage change in the area of foodgrains and non- foodgrains in the pre global era and global era. Percentage change in the area of maize, cotton, sugarcane, pulses, rapeseed and mustard, rice, wheat, bajra, groundnut, jowar, and jute and mesta are in order to 50.4, 48.43, 29.03, 19.09, 1.4, 1.72, 16.66, 38.78, 49.51, 76.11 and 79.41 respectively during global era as compared to pre global era.

Table no 3- Change in Area

Change in Area		
Crops	**Pre-Global-Era (1951-1990)**	**Global Era (1991-2024)**
Rice	12.73	11.01
Wheat	40.79	23.91
Jowar	0.5	-75.61
Bajra	1.87	-36.91
Maize	17.61	68.45
Pulse	19.68	38.77
Groundnut	19.95	-29.62
Rapeseed and Mustard	28.81	30.21
Sugarcane	15.22	44.25
Cotton	9.52	57.95
Jute and Mesta	53.61	-25.8

Source: compiled by author available data from agriculture statistics at a glance

Figure no: 3- Change in Area

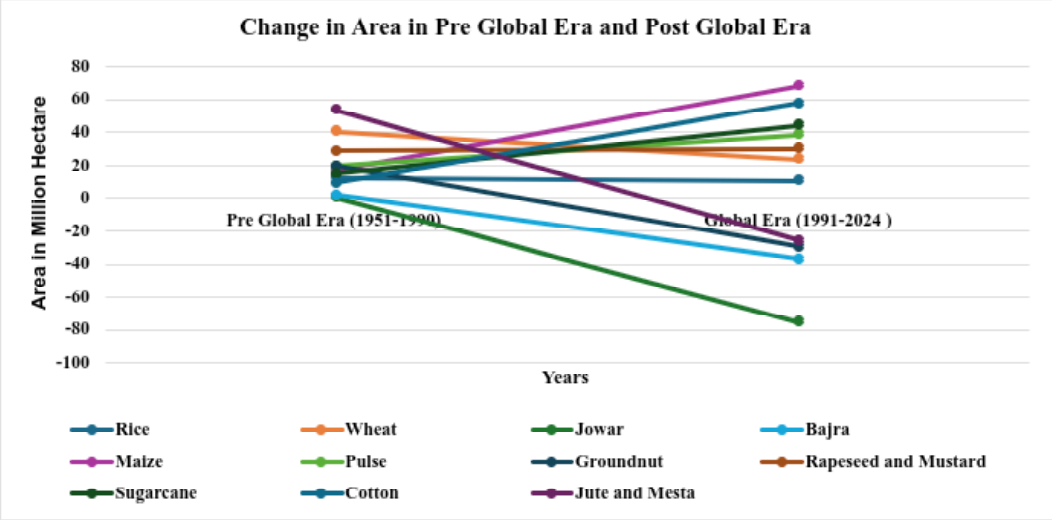

Figure no: 3 is based on Table no: 3

Table no: 4- Changes in Production and Covered area of various crops

Crops	Production		Area	
	POGR/PRGR	POGE/PRGE	POGR/PRGR	POGE/PRGE
Rice	1.72	1.94	1.21	1.10
Wheat	3.45	2.54	1.63	1.39
Jowar	1.42	0.69	0.99	0.47
Bajra	1.48	1.90	1.07	0.73
Maize	1.96	3.11	1.52	1.33
Pulses	1.08	1.53	1.02	1.09
total Foodgrains	1.83	2.02	1.18	1.03
Groundnut	1.21	1.49	1.21	0.87
Rapeseed and Mustard	1.97	3.08	1.38	1.68
Soyabean	-	18.18	-	12.35
Sugarcane	1.93	2.17	1.29	1.63
Cotton	1.63	3.11	1.01	1.30
Jute and Mesta	1.33	1.25	1.14	0.74
Total Non-Foodgrains	1.85	2.20	1.19	1.57

Computed by author, available data from agriculture statistics at a glance, See annexure; 1 POGR-Post Green Revolution, PRGR- Pre-Green Revolution, POGE-Post Global Era, PRGE- Pre-Global-Era

Result of the study based on table no: 4

Times changes	Production		Area	
	Post green revolution as compared to pre green revolution	Post global era as compared to pre global era	Post green revolution as compared to pre green revolution	Post global era as compared to pre global era
3	wheat	Maize, Rapeseed and Mustard, Cotton, Soyabean		Soyabean
2		Wheat, Sugarcane,		
1< change>2	Rice, Jowar, Bajra,Pulse, Groundnut Rapeseed and Mustard, Soyabean, Sugarcane Cotton Jute and Mesta	Pulse, Groundnut, Jute and Mesta, Bajra, Rice	Wheat, Rice, Bajra, Maize, Pulse, Groundnut, Rapeseed and Mustard, Soyabean, Sugarcane, Cotton, Jute and Mesta	Rice, Wheat, Maize, Pulse, Rapeseed and Mustard, Sugarcane, Cotton,
Less than 1(decrease)		Jowar	Jowar	Jowar, Bajra, Groundnut, Jute and Mesta

Conclusion

Table no. 4 shows that production of maize, rapeseed and mustard, cotton and soybean have been increased more than three times in post global era as compared to pre global era. This happened due to using intensive agriculture technique in forming of these crops while as production of rice and wheat have been increased more than two times by applying intensive and extensive agriculture technique. Cropping pattern has been in favor of rice, wheat, maize, pulses, sugarcane and cotton, rapeseed and mustered, during the global era. Covered area has been decreased in case of jowar, bajra groundnut jute and mesta. One thing should be mentioned here that jowar and bajra are major component of millet. Government of India and United Nation have announced millet year for rapidly growth of these crops. So covered area under these have been decreased. In this regard cropping pattern of Indian agriculture should be in favor of millet. For this purpose, government should take appropriate step for cropping pattern in favor of jowar and bajra.

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Annexure: 1- Production of Foodgrains

Pre Global-Era									
	Pre-Green Revolution				Post Green Revolution				
	1951	**1956**	**1961**	**Average**	**1969**	**1974**	**1980**	**1985**	**Average**
Rice	21.3	29.04	35.66	28.66	40.43	39.58	53.63	63.83	49.36
Wheat	6.18	9.4	12.07	9.21	20.09	24.1	36.31	47.05	31.88
Jowar	6.08	7.33	8.03	7.14	9.72	10.41	10.43	10.2	10.19
Bajra	2.35	2.87	3.65	2.95	5.33	3.27	5.34	3.66	4.4
Maize	2.08	3.08	4.31	3.15	5.67	5.56	6.96	6.64	6.20
Pulses	8.42	11.55	11.76	10.57	11.69	10.02	10.63	13.36	11.42
Total Foodgrains	46.41	63.27	75.48	61.72	92.93	92.94	123.3	144.74	113.47
Groundnut	3.19	4.37	4.99	4.18	5.13	5.11	5.01	5.12	5.09
Rapeseed and mustard	0.94	1.04	1.35	1.11	1.56	2.25	2.3	2.68	2.19
Soyabean						0.05	0.44	1.02	0.50
Sugarcane	61.63	69.05	103.97	78.21	135.02	144.29	154.25	170.65	151.05
Cotton	3.28	4.92	4.85	4.35	5.56	7.16	7.01	8.73	7.11
Jute and Mesta	4.72	5.81	8.24	6.25	6.79	5.83	8.16	12.65	8.35
Total Non Foodgrains	73.76	85.19	123.4	94.11	154.06	164.69	177.17	200.85	174.19

Global Era								
Crops	1992	1997	2002	2007	2012	2017	2021	Average
Rice	72.86	82.54	71.82	96.69	105.23	112.76	130.29	96.02
Wheat	57.21	66.35	65.76	78.57	93.51	99.87	106.84	81.15
Jowar	12.81	7.53	7.01	7.93	5.28	4.8	4.23	7.08
Bajra	8.88	7.64	4.72	9.97	8.74	9.21	9.62	8.39
Maize	9.99	10.82	11.15	18.96	22.26	28.75	33.62	19.36
Pulses	12.82	12.97	11.13	14.76	18.34	25.42	27.69	17.59
Total Foodgrains	174.57	187.85	171.59	226.88	253.36	280.81	312.29	229.62
Groundnut	8.56	7.37	4.12	9.18	4.7	9.25	10.11	7.61
Rapeseed and Mustard	4.8	4.7	3.88	5.83	8.03	8.43	11.75	6.77
Soyabean	3.39	6.46	4.65	10.97	14.67	10.93	12.99	9.15
Sugarcane	228.03	279.54	287.38	348.19	341.2	379.9	431.81	328.00
Cotton	11.4	10.85	8.62	25.88	34.22	32.81	31.2	22.14
Jute and Mesta	8.59	11.02	11.28	11.21	10.93	10.03	10.32	10.48
Total Non-Foodgrains	264.77	319.94	319.93	411.26	413.75	451.35	508.18	384.16

An Analysis of Dairy Sector Performance and Trends of Milk Production in India

Ritu Verma[1]

ABSTRACT

The dairy industry play a prominent role in rural economy of India by contributing into the income of small and marginal farmers. Their livelihoods depends upon the agriculture and dairy due to small and holding and larger family size. At the time of Independence, the dairy industry consisted mainly of firm operated by the Britishers which provided milk and butter for the military. If we look in the subsequent years of dairy development, it can be divided into two parts. The first part, before Operation Flood and the second one after operation flood. The period after operation flood where India became a milk sufficient country from a milk-deficient country. In the operation Flood programme, a network of cooperatives was setup in the form of village dairy cooperative, District milk union and State milk federation, which was spread across the India.After the success of this programme,India has become the largest producer of milk in the world with 209 millon tonnes production of milk having the 6.2 percent annual compound growth rate.Which was 17 million tonnes in 1950-51. With the rapid growth in the economy, people's awareness of health has increased, dietary pattern has shifted towards nutritional side.In such situation, the demand of people has increased for milk and milk products.Due to the demand driven nature of dairy industry a vast infrastructure needed for the fulfillment of demand.To meet the demand, there are two ways of milk supply in India, first one is by small and marginal farmers who keep one or two cattle.In another form, milk is supplied through unorganized dairy cooperatives. With the help of thesetwo, the per capita availability of milk has reached 459gms/day in year 2022-23. Which was 130gms/day in 1950-51.The objective of this paper is to analyze the performance of dairy sector and milk production in India.

Keywords: *Dairy sector, Milk production, Consumption, Milk flow in India*

1. Introduction

The Indian dairy industry began to gain prominence in the 1970s with the implementation of the White Revolution (Operation Flood), which aimed to increase milk production, augment rural incomes, and provide fair prices to consumers. The establishment of cooperative societies under the National Dairy Development Board (NDDB) was pivotal in transforming the sector. Government

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initiatives, including subsidies, support for cooperative movements, and investment in infrastructure, have played a significant role in the growth of the dairy sector. The introduction of the National Livestock Mission and various state-level schemes has further strengthened this sector. The department of animal husbandry, dairying,and Fisheries which falls under the Central Ministry of Fisheries, Animal Husbandry and dairying, Government of India responsible for the all matters relating to the dairy development in India. It also looks after all the matters relating to the production and preservation of livestock farms (cattle and sheep).To keep focus on the National Dairy Development board was established in 1987. The main aim to setup the board was to accelerate the pace of dairy development in the India and attract new investments.

2. Review of literature

A number of Studies have been conducted in the country from time to time on the milk production and Dairy industry.An extensive review regarding the research objective is needed. So keeping in view the objectives of present investigation earlier research findings have been described in the present chapter.

Deshmukh (2014) studied the growth and performance of dairy sector in India. He found that milk production is a very important element of the whole dairy chain. Dairy cooperatives, helped to create a strong Network and linkages in million of rural household scattered across the country. He found that India contributes more than the 16% of the world's total milk production and India's milk output is estimated to be 133 million tonnes. There is sustained growth in the availability of Milk for burgeoning population of the country. The per capita availability of milk also increased a level of about 297 grams per day,Which is higher than the world's average and even more than 222 grams recommanded by ICMR. According to the study the share of Agriculture sector and livestock sector in the total GDP of India has declined from 34.72 % and 4.82% in 1980-81 to 15.18 % and 3.92% in 2011-12 respectively. However the share of livestock sector in agricultural GDP of India has increased from 13.88 % in 1980-81 to 25.85% in 2011-12. More over the compound growth rate of milk production in India was 4.16 % during 1990-91 to 2012-13. He found that the Cooperative sector in India has emerged as one of the largest in the world and is playing an important role in socio-economic development of millions of rural families.

Pattaniak et al (2014) is studied the dairy production in India- existing scenario and future prospectus. The study found that dairy production in India, which has seen great increase over the post-independence period, has grown into a thirving enterprise because of policy decisions related to the systemic breeding improved feeding and Superior Healthcare Management over the period. The study found that apart from low productivity of all the animals, there are many other problems like large human and livestock population and its pressure on land degraded pasture land, shortage of feed ingredients and fodders, which need to be targeted. According to the study, while the agricultural sector is witnessing a kind of stagnation or a decline in growth rate in areas where the green evolution earlier brought a new dawn for human Survival against hunger and malnutrition, the dairy sector is showing a better promise.

Lades, Maurice et al (2017) studied the "India's biggest structure, Performance and prospectus." and found that India is the largest producer and consumer of milk and has the world's largest dairy

herd, comprised of water buffalo and indigenous and Crossherd cattle. Annual growth in the production and consumption has been a robust 4.2% since 2000, and India has also emerged as a small net exporter of dairy products. Water buffalo and crosserd cattle account for all the growth in dairy herd and milk production, but average milk yields remain well below both international standards those achieved under domestic best practices. Future production depends on the productivity gains and improved breeding and feeding practices. According to the study, India's Dairy cooperatives have played a key role in expanding milk and milk product marketing and private sector processors may play an increasingly important role in catalyzing more production both milk and milk products. According to the study, India's role as a trader uncertain because there is a significant scope for future growth in both production and consumption.

S, Rajeshwaran and Naik, Gopal(2016) studied the rise in milk production historically in their paper titled as "Milk production in India rises by a historic 6.25% in 2014-15: A boon or a bane?. According to the study milk production in India has risen by a historic 6.25% in 2014-15, reaching 146 million tonne. This increase in indeed a boon if it can be sustained as there is an urgent need to increased the growth rate in milk production, to meet the growing domestic market for milk milk products and ensure that India remains self sufficient in Milk.However this high incremental growth rate was limited to only three states while the largest milk producing state Uttar Pradesh showed a constant below the National level of growth.

3. Objective of the study

India is characterized by marked intra as well as Inter regional differences such as physical agro- climatic and cultural features.So keeping a broader look at all relevant aspect of usefullness of this study, the following objectives have been put forward for the study.

- To find out the trend of milk production and per capita availability of milk in India Since 2001-02
- To analyze the dairy sector performance in India

4. Materials and Methods

It is a descriptive study and the time period of study is from 2001-02 to 2022-23. To analyze the trend of milk production in India, a set of indicators is developed for the investigation. The study is conducted through secondary data extracted from various type of government websites such as www.dahd.nic.in and National Dairy development board statistics. Milk production and per capita availability are the two indicators, which are developed for the Study.

5. Results and Discussion

5.1. Dairy sector Performance in India

In India, dairy is the single largest agricultural commodity, contributing 5 percent to the national economy and directly employing more than 8 crore farmers. India's prominence in the dairy sector

is national and global, as it ranks first in milk production, contributing 25 percent to the world's total milk output.

India's milk production has grown remarkably over the past decade, with a Compound Annual Growth Rate (CAGR) of 6 percent. This surge is evident from the increase in production from 187.30 million tonnes in 2018-19 to 230.58 million tonnes in 2022-23. Further as per the FAO Dairy Market Review (2023) milk production of India is estimated to reach 236.35 million tonnes in 2023-24 registering a growth of 2.5% over the last year beating the world average growth rate. This growth is significantly higher than the global milk production growth rate of 1.3 percent in 2023 over the previous year, highlighting India's robust development in this sector.

The per capita availability of milk in India stands at 459 grams per day for 2022-23, significantly higher than the global average of 322 grams per day as reported in the Food Outlook June 2023. This abundance not only supports the nutritional needs of India's vast population but also underscores the efficiency and productivity of the Indian dairy industry. This represents sustained growth in the availability of milk and milk products for our growing population. Most of the Milk is produced by animals reared by small, marginal farmers and landless labourers of the total milk production in India, about 48% milk is either consumed at the producer level or sold to non-producers in the rural area. The balance all 52% of the milk is Marketable Surplus available for sale to consumer in urban areas out of the Marketable Surplus it is estimated that about 40% of the milk sold is handled by the organized sector that is 20% each by cooperative and private dairies and the remaining 60% by the unorganized sector. India has made significant strides in the cooperative sector. Within this sector are 22 Milk Federations/Apex Bodies, 240 district cooperative milk unions, 28 marketing dairies, and 24 Milk Producer Organizations. These organizations encompass approximately 230,000 villages and include 18 million dairy farmers as members.

Government of India is making efforts for strengthening infrastructure for production all of quality milk procurement processing and marketing of milk and milk products through following dairy development scheme.

5.1.1 National Programme for Dairy Development (NPDD)

National Programme for Dairy Development (NPDD) was launched in February 2014 by merging three existing schemes i.e. Intensive Dairy Development Programme, Strengthening Infrastructure for Quality & Clean Milk Production and Assistance to Cooperatives. In July 2021, NPDD has been restructured with the aim of enhancing quality of milk and milk products and increasing the share of organised procurement, processing, value addition and marketing; for implementation from 2021-22 to 2025-26. National Livestock Mission, Sub-Mission on Feed and Fodder Development is a separate scheme aiming to increase availability of fodder and feed.

5.1.2 National Dairy plan (Phase-1)

National Dairy Plan Phase I (NDP-I) a Central Sector Scheme (CSS) with an outlay of Rs.2242 crore was implemented during March 2012 to Nov 2019 across 18 major dairying state including Gujarat. The objectives of NDP-I was as follows:

- Increase productivity of milch animals and thereby increase milk production to meet the rapidly growing demand for milk.
- Provide rural milk producers with greater access to the organized milk processing sector.

NDP I had the following major components:

Component A: Productivity Enhancement: This component aimed at increasing bovine productivity following a scientific approach in animal breeding and nutrition.

Component B: Village based milk procurement systems for weighing, testing quality of milkreceived and making payment to milk producers: This component aimed at increasing the number of milk producers organised into milk producer institutions through (i) mobilisation and institution building of small holder milk producers, (ii) training and capacity building of milk producers and other functionaries; and (iii) investment in village level infrastructure for milk collection and bulking.

Component C: Project Management and Learning: This component aimed at effective coordination of project activities among various EIAs and a comprehensive and functional Management Information System (MIS) for the Project through (i) Information and Communication Technology (ICT) based MIS and (ii) Learning & Evaluation.

5.1.3 Dairy Entrepreneurship Development Scheme (DEDS)

The government revamped the Venture Capital Scheme for Dairy and Poultry in 2010 to the Dairy Entrepreneurship Development Scheme (DEDS). The DEDS came into effect in September 2010. The Department of Animal Husbandry, Dairying and Fisheries and the National Bank for Agriculture and Rural Development (NABARD) is implementing the DEDS.TheDEDS aims to generate self-employment opportunities in the dairy sector, covering activities such as procurement, enhancement of milk production, transportation, preservation, marketing and processing of milk by providing back-ended capital subsidies for bankable projects. This scheme is open to organised and unorganised sectors.

5.1.4 Dairy Processing and Infrastructure Development Fund (DIDF)

The Dairy Processing and Infrastructure Development Fund (DIDF) scheme was in effect from January 21, 2017, to January 30, 2024. DIDF is an Infrastructure Development Scheme, aimed to modernize milk processing and chilling plants, as well as enhance value addition. The DIDF scheme thereby, aims to benefit milk producers, providing them with an organized market for their produce and employment opportunities in the project areas. As of June 2024, approximately 12.52 lakh women milk producers have been covered under DIDF out of a total of 42.48 lakh producer members, with significant participation of 30%.The DIDF scheme has been merged into the Animal Husbandry Infrastructure Development Fund, and its implementation has been extended for the next two years (2024-2026) with an outlay of Rs 29,110.25 crore. The indirect benefits to milk producers continue, and now women have the opportunity to establish a dairy industry as individual entrepreneurs under AHIDF. As on date AHIDF provided assistance to 6 women as an individual entrepreneur's, besides the scheme creates an ecosystem for dairy farmers including women to benefits from the other dairy projects (157) financed under AHIDF.

5.2 Milk Production in India

India is largest producer of milk but it is still faces shortfall in production to meet the demand of mass population. It is a classic example of production by masses rather than mass population. In, 2001-02 the milk production was 84.4 million tonnes and currently it is 230 million tonnes during 2022-23. It shows a rise in milk production. The following data shows the overall milk production since 2001-02 to 2022-23.

Table 1. Milk Production in India (inmillion tonnes)

Year	Milk Production (milliontonnes)	Per capita availability(gms/day)
2001-02	84.4	222
2002-03	86.1	224
2003-04	88	225
2004-05	92.5	233
2005-06	97.1	241
2006-07	102.6	251
2007-08	107.9	260
2008-09	112.2	266
2009-10	116.4	273
2010-11	121.8	281
2011-12	127.9	290
2012-13	132.4	299
2013-14	137.6	307
2014-15	146.3	322
2015-16	155.4	337
2016-17	165.4	355
2017-18	176.3	375
2018-19	187.7	394
2019-20	198.4	406
2020-21	210.0	427
2021-22	221.1	444
2022-23	230.6	459

Source - Basic Animal Husbandry statistics, MoFAHD, DAHD, Government of India

In recent years, the economic development of India has experienced a marked changed in the dietary pattern of its population. Due to rise in the milk production, the per capita availability of

milk is also risen. In 2001-02, the per capita availability is 222gms /day, currently it has risen 459gms/day during 2022-23.

6. Conclusion

Though, India is largest producer of milk, but the per animal milk production is very low and cost of production is also high due to high cost fodder. The weakness of our dairy industry is seasonal fluctuations in milk production and tropical climatic condition. But in recent years the purchasing power of consumer is improved apart from this the country's vast natural resources offers high potential for the growth and development of dairy industry. Because the country has largest numbers of cattle including bufallo and largest numbers of dairy farming household (75mill.) in that world. At present India ranks first in the world's milk production achieving an annual output of 230mill tonnes during 2022-23 with per capita availability of milk 459gms/day.

In India dairy has become important secondary source of income for millions of rural families and has assumed the most important role for providing employment opportunities and income generation for marginal and women farmers, because there is large population depends upon the agriculture and dairy.

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Growth in India's Agriculture Sector: Analysing Trends Witnessed Since 1970s

Vandita Rai[1] & Dr. Gunjan Pandey[2]

ABSTRACT

Agricultural development is one of the most powerful tools to end extreme poverty, boost shared prosperity, and feed a projected 10 billion people by 2050. Growth in the agriculture sector is two to four times more effective in raising income levelsamong the poorest compared to other sectors. (World Bank Group, n.d.)

India is often called as "land of villages" with 68.8 percent of its population living in rural areas. (as per census 2011). The Indian agriculture sector provides livelihood support to about 42.3 percent of the population and has a share of 18.2 percent in the country's GDP at current prices. The sector has been buoyant, which is evident from the fact that it has registered an average annual growth rate of 4.18 per cent at constant prices over the last five years. (Economic Survey 2023-24, July 2024)

At 1950-51 agriculture sector was the highest contributor in the GDP of the country with an aggregate percentagecontribution of 51.81 percent, followed by service sector contributing 33.25 percent and industry 14.16 percent. this trend witnessed a significant shift with by 2010-11 with services being the largest contributor54.64 percent, industry with 27.16 percent and agriculture with 18.21 percent.

This structural shift in GDP contribution is visualized as"a decline in growthof agriculture sector, rather change being seenas shift in sectoral composition of GDP". The other two sectors namely industry and services has shown an accelerated pace in growth in these decades comparative to agriculture which grew with a steady pace. This research paper tries to examine the factors contributing to agriculture to ascertain the fact that if agriculture sector has really witnessed a decline?

Key Words: *Production, Capital Expenditure, Infrastructure, GDP, Agricultural Growth*

INTRODUCTION

Agriculture sector is a prime contributor to poverty reduction,national economy&livelihoodsand is very crucial in attainment of the Sustainable Development Goals (Goal No 1 & 2).i.e Goal No

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1:No poverty and Goal No 2:Zero Hunger. Understanding the dynamic processes of change in the sector, is crucial to better position the sector for faster growth and sustained development, which is vital for food and livelihoods security for millions of people.Seventy- five percent of the world's poor live in rural areas, and most are involved in farming. In the 21st century, agriculture remains fundamental to economic growth, poverty alleviation, and environmental sustainability.

India is called as "land of villages" with more than ~833 million people living in rural areas and 48.1 percent of people employed in agriculture.The sector has witnessed significant growth since independence, all thanks to corrective measures taken by Governments at different point of time for example, land reforms in 1960s, implementation of modern agricultural practicesleading to green revolution in (mid of 1960s), LPG policy of 1990s etc. which brought India on the list of export making nation from an import making nation. In 2022-23 foodgrain production hit an all-time high of 329.7 million tonnes, and oilseeds production reached 41.4 million tonnes in production.

For the Indian economy, even if agriculture's share to GDP has seen a shift, still close to 58 %of population is working in agriculture. Even so, some expansion employment has occurred in the secondary and tertiary industries; yet, a significant portion of the same is classified as unofficial work. India's agriculture sector's contribution to the Indian economy is much higher than the world's average (6.4%). The industry and services sector's contribution are lower than the world's average of 30% for the industry sector and 63% for the Services sector.Yet since independence the sectoral composition has changed significantly over the decades. The composition of Agriculture & allied, Industry, and Services sector was 51.81%, 14.16%, and 33.25%, respectively at current prices in 1950-51 which has changed to 18.20 % for agriculture & allied sector has in 2013-14. Share of Services sector has improved to 57.03%. Share of Industry sector has also increased to 24.77%.

LITERATURE REVIEW

The growth of the agricultural sector is crucial in developing nations like India. According to Saith (1992), agriculture is the main sector, over the past three years, that has been the predominant means of subsistence in rural development. Also periods of the 20th century concerning the capacity to provide employment for rural households completely or continuously, and small-scale and impoverished farmers could likewise concurrently achieve expansion, a decrease in poverty, and a decent life.Agriculture plays vital roles in the eradication of poverty. Agriculture provides readily available staple foods regionally, provides meals for the underprivileged and promotes environmentally friendly resource management (World Bank,2008b).

" Oyakhilomen, O. and Zibah, R.G, in their study titled "Agricultural Production and Economic Growth in Nigeria: Implication for Rural Communities, claimed that Nigeria's farming related output and economic expansion are positively connected. Using the data from time series

on the index of real net production from agriculture, interest rates, currency rates, and inflation rates, the ARDL method of limits testing is used to analyse the information to explore the study's main discovery. It's demonstrated that the production of agricultural goods is positively related to Nigeria's economic expansion and the relationship is important in the long term as well as in the mid-term for farm-related issues.

The conventional view of classical economics is that capital accumulation has a significant role in fostering economic expansion.It has been noted that increased capital investment in agriculture is necessary to achieve the necessary development in productivity and infrastructure development as all are correlated with each other.Lin Yifu (2003) noted that strengthening the development of rural infrastructure is an important step for rural development and can make more possibilities for the country's economic growth.

Udoka and Kenechukwu (2021).examined over 33 years (1987–2019) the impact of government spending on economic growth in Nigeria. The Nigerian Central Bank Statistical Bulletin provided the data. Ordinary and multivariate models in the data analysis techniques used were least squares regression method. The study's conclusions demonstrated that government spending on agriculture has a favourable and noteworthy influence. As a result, the report suggested that Central of Nigeria take additional steps to promote borrowing and increase agricultural output.After a brief review of the content of research on agricultural growth,the following paper will analyse the trend of the different variables of agricultural sector.

OBJECTIVES

1. To assess the change in agricultural sector witnessed in the Indian economy
2. To analyze the growth trend of production in agriculture sector
3. To analyze and see the impact of infrastructure development and capital expenditure on agricultural sector

METHODOLOGY

The study explores at a number of contributing factors that have led to India's agriculture sector growth. This element incorporates capital expenditure, infrastructure, and production.

Data Collection: Secondary data has been used for this study. The data collected mainly from handbook of statistics on Indian economy - RBI,Economic surveys,published by ministry of finance,various finance commissionand Ministry of Statistics and programme Implementation.

Time period: The study covers the time period from 1975 to 2024.

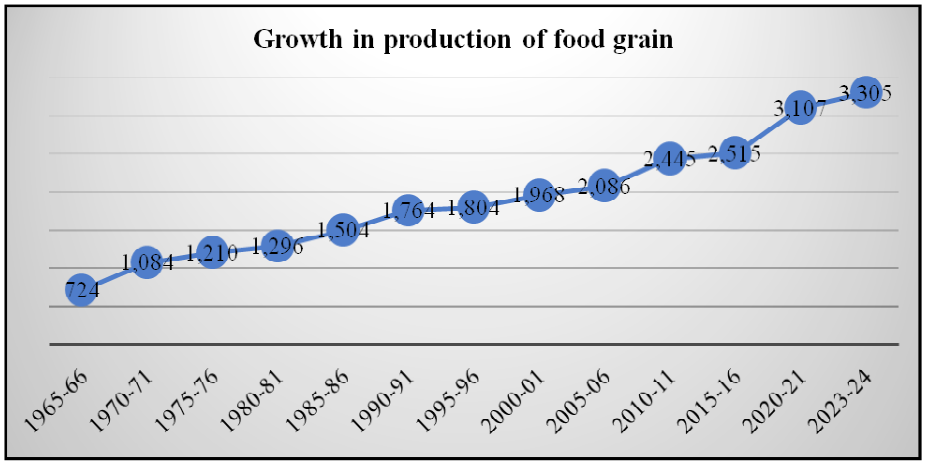
DATA ANALYSIS

1) Production

1.1.) Production of food grain

1965-66	724
1970-71	1,084
1975-76	1,210
1980-81	1,296
1985-86	1,504
1990-91	1,764
1995-96	1,804
2000-01	1,968
2005-06	2,086
2010-11	2,445
2015-16	2,515
2020-21	3,107
2023-24	3,305

(in thousand kgs)



Source: On the basis of RBI, Handbook of Statistics on Indian Economy calculated by the Author.

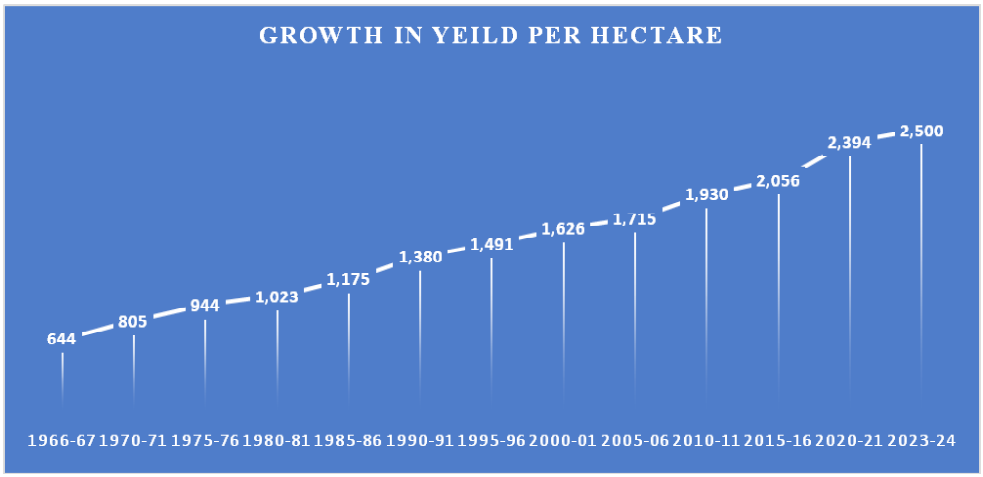
The above data analysisclearly demonstrates consistent growth in production of food grains over time with a general trend towards higher production. However, the rate of growth appears to have slowed down in recent years contributed by various factors like saturation in land coverage,irrigation etc. To further understand the data representation let's understandthese trends more deeply.

- From 1966-67 to the mid-1970s, growth rates were relatively high, often above 20% because of green revolution, land reforms etc. implemented by Govt of India.
- In the late 1970s and 1980s, growth rates start to decline but remain positive, suggesting slower but steady growth.
- In the 1990s and 2000s, growth rates vary more, with some periods of higher growth (e.g., 1990-91 to 1995-96) and others with slower growth (e.g., 2000-01 to 2005-06).
- The most recent periods show lower growth rates compared to earlier decades, indicating a potential stabilization or approaching a saturation point.

1.2.) Yield per hectare foodgrain

1966-67	644
1970-71	805
1975-76	944
1980-81	1,023
1985-86	1,175
1990-91	1,380
1995-96	1,491
2000-01	1,626
2005-06	1,715
2010-11	1,930
2015-16	2,056
2020-21	2,394
2023-24	2,500

(Kg/hectare)

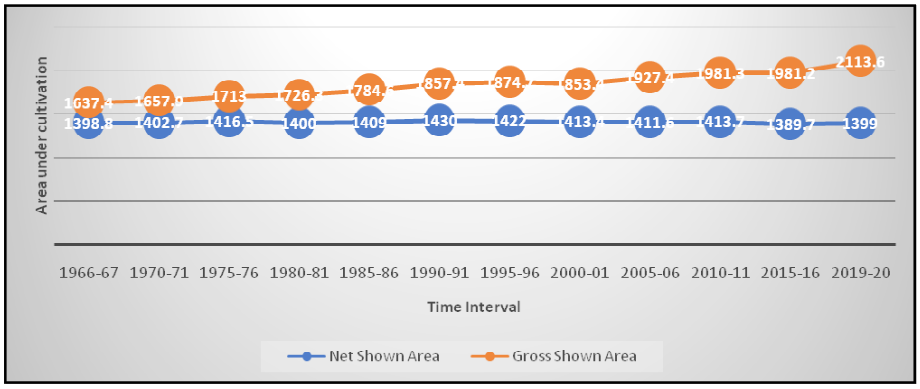


Source: On the basis of RBI, Handbook of Statistics on Indian Economy calculated by the Author.

The above data represents a steady increase in the quantity produced over the years, with varying growth rates. While the overall trend is positive and upward, starting from 644 in 1966-67, the quantity steadily increases to 2,500 in 2023-24. The recent years show a decrease in the growth rate indicative of reaching a saturation point or other external factors influencing the rate of increase.

1.3) Increase in net shown and gross shown area

1966-67	1398.8	1637.4
1970-71	1402.7	1657.9
1975-76	1416.5	1713
1980-81	1400	1726.3
1985-86	1409	1784.6
1990-91	1430	1857.4
1995-96	1422	1874.7
2000-01	1413.4	1853.4
2005-06	1411.6	1927.4
2010-11	1413.7	1981.3
2015-16	1389.7	1981.2
2019-20	1399	2113.6



Area is in lakh hectare

Source: On the basis of RBIHandbook of Statistics on Indian Economy calculated by the Author.

The analysis indicates that Gross shown area is experiencing a robust and accelerating growth trend, while net shown area shows a relatively stable trend with a slight recent decline. Understanding the underlying causes for these trends could provide insights into broader economic, social, or sectoral changes influencing these values.

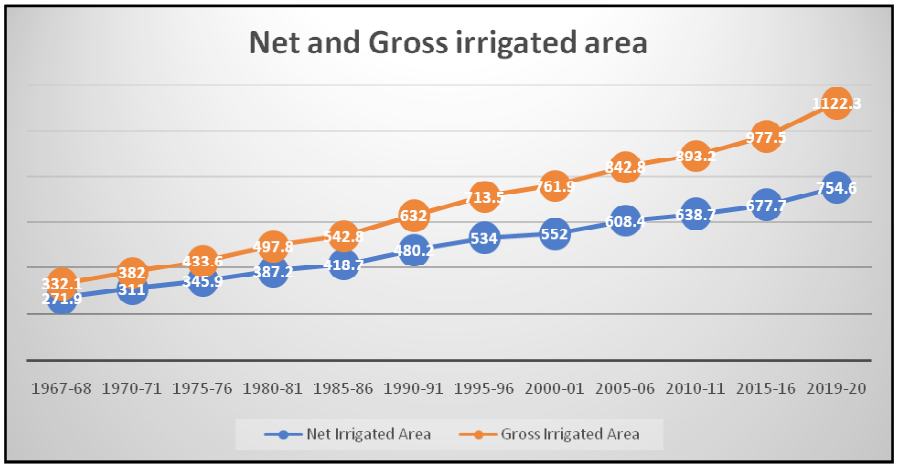
- **Net Shown Area:** The overall trend for Net Shown Area indicates stability with a slight decline in recent years. This suggests that despite initial growth, the rate of increase has slowed or reversed in recent decades.

- **Gross Shown Area:** The significant and consistent increase in Gross Shown Area suggests a strong upward trend, with a more recent acceleration in growth.

Infrastructure

2.1) Increase in Net and Gross irrigated area

1967-68	271.9	332.1
1970-71	311	382
1975-76	345.9	433.6
1980-81	387.2	497.8
1985-86	418.7	542.8
1990-91	480.2	632
1995-96	534	713.5
2000-01	552	761.9
2005-06	608.4	842.8
2010-11	638.7	893.2
2015-16	677.7	977.5
2019-20	754.6	1122.3



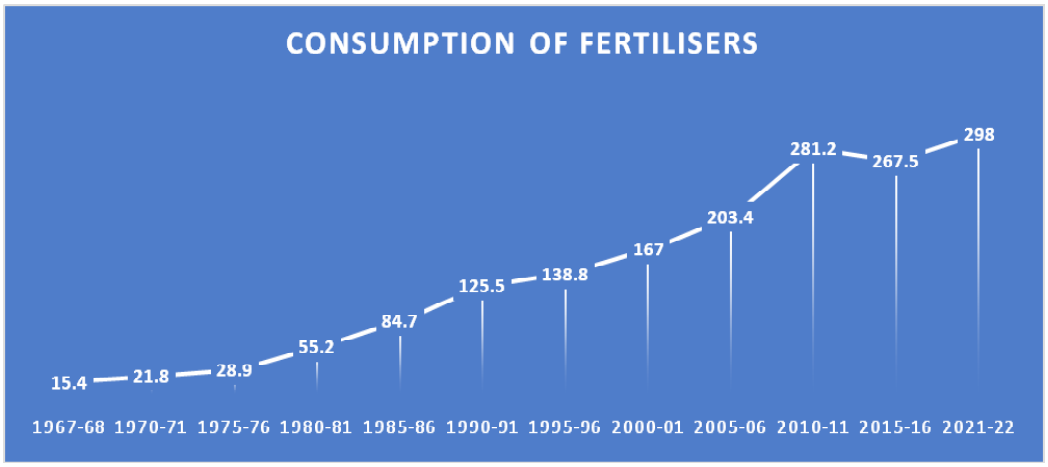
Source: On the basis of RBI, Handbook of Statistics on Indian Economycalculated by the Author.

Basis the above data both net and gross irrigated show significant growth over the analyzed period, but gross irrigated area exhibits a stronger and more consistent increase.This analysis suggests that while both variables have been increasing, gross irrigated area has experienced a more robust and accelerating growth trend, which may indicate differing underlying factors or growth drivers affecting the two variables.Understanding the reasons behind these growth trends can provide deeper insights into the economic, social, or sectoral factors at play.

2.2) Consumption of Fertilisers (N+P+K) (lakh tonnes)

1967-68	15.4
1970-71	21.8
1975-76	28.9
1980-81	55.2
1985-86	84.7
1990-91	125.5
1995-96	138.8
2000-01	167
2005-06	203.4
2010-11	281.2
2015-16	267.5
2021-22	298

(in lakh tonnes)



Source: On the basis of RBI, Handbook of Statistics on Indian Economy calculated by the Author.

The data shows a generally positive trend with periods of accelerated growth, especially notable from 1980-81 to 2010-11, particularly post green revolution due to adoption of modern agricultural practices.From 1967-68 to 1980-81, the value grows relatively slowly but consistently.The data shows an overall upward trend from 15.4 lakh tonnes in 1967-68 to 298.0 lakh tonnes in 2021-22. Some volatility with notable increases and decreases in growth rates over different periods.

The most substantial growth was observed between 1980-81 and 1990-91.From 1980-81 to 2010-11, the value shows accelerated growth, with more significant increases.

The values after 2010-11 show a more moderate growth, with a peak in 2021-22.The decline between 2010-11 and 2015-16 suggests some possible stabilization or adverse factors affecting the growth. However, the growth resumes in the most recent period.

3) Financial investment and capital expenditure

3.1) Minimum Support Price for Foodgrains According to Crop Year (Fair Average Quality)

(₹ per quintal)							
Year	**Paddy common**	**Coarse Cereals**	**Wheat**	**Gram**	**Arhar (Tur)**	**Moong**	**Urad**
1975-76	74	74	105	90	0	0	0
1980-81	105	105	130		190	190	200
1985-86	142	130	162	260	300	300	300
1990-91	205	180	225	450	480	480	480
1995-96	360	300	380	700	800	800	800
2000-01	510	445	610	1100	1200	1200	1200
2005-06	570	525	650	1435	1400	1520	1520
2010-11	1000	880	1170	2100	3500	3670	3400
2015-16	1410	1325	1525	3500	4625	4850	4625
2020-21	1868	1850	1975	5100	6000	7196	6000
2023-24	2183	2090	-	-	7000	8558	6950

Source: On the basis of RBI, Handbook of Statistics on Indian Economycalculated by the Author.

The dataset shows a clear upward trend in the production of all crops over the years, with particularly steep increases in the most recent decades. This growth reflects improvements in agricultural practices, technology, and possibly increased demand. The data highlights the importance of continued support and investment in agricultural development to sustain and manage this growth effectively.

Yearly Growth Patterns

- **1975-76 to 1980-81**: The early years show moderate growth with increases across most crops.
- **1980-81 to 1990-91**: More significant increases are observed, particularly in Wheat and Gram.
- **1990-91 to 2000-01**: Production sees considerable growth in all crops, with a noticeable jump in Coarse Cereals and Wheat.
- **2000-01 to 2010-11**: This period is marked by rapid growth in Paddy, Coarse Cereals, and all legumes.
- **2010-11 to 2023-24**: The most dramatic increases occur in Gram, Arhar, Moong, and Urad, suggesting enhanced production capacity or greater demand.

3.2) Minimum Support Prices for Non-Foodgrains (Fair Average Quality)

(₹ per quintal)

Year	Sugarcane	Cotton H-4 #	Jute	Groundnut (in shell)	Soyabean black	Soyabean yellow	Sunflower	Rapeseed / Mustard	Safflower
1975-76	.	.	135	.	.	.	.	.	.
1980-81	13	.	160	206	183	198	183	.	
1985-86	16.5	535	215	350	250	275	335	400	400
1990-91	22	750	320	580	350	400	600	600	575
1995-96	42.5	1350	490	900	600	680	950	860	800
2000-01	59.5	1825	785	1220	775	865	1170	1200	1200
2005-06	80	1980	910	1520	900	1010	1500	1715	1565
2010-11	139	3000	1575	2300	1400	1440	2350	1850	1800
2015-16	230	4100	2700	4030	-	2600	3800	3350	3300
2020-21	285	5825	4225	5275	-	3880	5885	4650	5327
2023-24	315	7020	5050	6377	-	4600	6760	-	

Source: On the basis of RBI, Handbook of Statistics on Indian Economycalculated by the Author.

The data reflects a broad trend of increasing agricultural productivity across multiple crops, with significant improvements observed particularly in the last two decades. Sugarcane and Cotton H-4 have shown remarkable growth, while traditional crops like Jute and Groundnut also demonstrate substantial increases. The data highlights the effectiveness of advancements in farming techniques, changes in crop management practices, and possibly increased agricultural support. The period between 2000-01 and 2015-16 shows some of the most dramatic increases in production for several crops, indicating advancements in technology or changes in agricultural policy.

3.3) Direct Institutional Credit for Agriculture and Allied Activities

Year	Loans Issued	Loan Outstanding	
1975-76	16.75	31.47	Billion
1980-81	42.96	86.35	Billion
1985-86	7159	16234	INR
1990-91	9829	29316	INR
1995-96	23138	46020	INR
2000-01	47701	91654	INR
2005-06	144021	239439	INR
2010-11	344878	489325	INR
2015-16	915510	1104363	INR
2020-21	1575398	2276271	INR
2023-24	2164844	2867231	INR

Source: On the basis of RBI, Handbook of Statistics on Indian Economy calculated by the Author.

The dataset highlights a significant increase in both Loans Issued and Loan Outstanding over time. The growth in these variables has been particularly pronounced since the mid-1980s, reflecting an expansion in lending activities. The exponential nature of the growth suggests increasing demand or changes in lending practices and policies. Recent data indicates a continued upward trend, though the rate of increase has moderated slightly in the most recent years. Understanding these trends can help in forecasting future lending patterns and assessing the impact on financial stability.

a. Exponential Growth: Both "Loans Issued" and "Loan Outstanding" show exponential growth over time. The growth becomes particularly pronounced starting in the mid-1980s.

b. Periods of High Growth:

- **1980-81 to 1985-86:** Remarkably high growth in both variables, with Loans Issued and Loan Outstanding increasing significantly. **2005-06 to 2010-11** was Another period of significant growth, especially in Loans Issued. **2010-11 to 2015-16:** Continued high growth in Loan Outstanding.

c. Recent Trends:

- The most recent data (2020-21 to 2023-24) shows continued growth but at a slower pace compared to previous periods.

d. Volatility:

- There is noticeable volatility in the growth rates over different periods, reflecting changes in the economic environment or lending practices.

CONCLUSION

Agriculture sector has witnessed a substantial increase/growth in production, capital expenditure, infrastructure over the decades because of various policy reforms implemented during 1960s (land ceiling act), green revolution, implementation of minimum support price (MSP) and corrective measures taken by Govt. at different point of time. the trend of this growth can be classified into three stages broadly.

* From 1960s to the mid-1970s, growth rates were relatively high because of green revolution in 1965 onwards, land reforms of 1960s etc. implemented by Govt of India.
* In the late 1970s and 1980s, growth rates start to decline but remain positive, suggesting slower but steady growth.
* In the 1990s and 2000s, growth rates vary more, with some periods of higher growth (e.g., 1990-91 to 1995-96) and others with slower growth (e.g., 2000-01 to 2005-06).
* The most recent periods show lower growth rates compared to earlier decades, indicating a potential stabilization or approaching a saturation point.

Yet the sector has kept the growth rate of 4%+ in last five year. This is imperative basis the above discussion that agriculture as a sector has kept growing over the last five decade thanking to adequate measures being taken reforms at different point of time. For Example - policy reforms like ceiling act of 1960s, green revolution of 1960s, farm mechanization level reaching to 45% etc.

India is second largest producer of food grain in the world owing its due weightage to the agriculture sector.

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SWOT Analysis of Pulses and their Role in Enhancing Food Security of India

Gaurav Singh Patel[1] & Dr. Harsh Mani Singh[2]

ABSTRACT

Pulses are an essential component of food security due to their high nutritional value, ability to improve soil health, and their role in sustainable agriculture. Pulses are often called poor man's Protein. This SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis explores the contributions of pulses to food security. The study is backed by data highlight's their impact how India can address hunger and nutrition with pulses consumption. Pulses, including lentils, chickpeas, and beans, are rich in protein, providing 20-25% protein content, making them a crucial source of nutrition, especially in developing countries.They also contribute to sustainable farming through nitrogen fixation, enhancing soil fertility and reducing the need for synthetic fertilizers. However, weaknesses such as low yield rates, with average pulse yields per hectare compared to cereals, and vulnerability to pests and diseases hinder their production efficiency. As compared to developed countries like USA, Canada India's productivity is nearly half. Opportunities lie in the increasing global demand for pulses, as well as government initiatives promoting pulse cultivation for improved food security. Additionally, technological advancements in farming practices can enhance productivity. Threats such as climate change, unpredictable weather patterns, and market fluctuations pose challenges to pulse cultivation. To optimize the role of pulses in food security, addressing these challenges through research, policy support, and sustainable farming practices is crucial.

Keywords: *Pulses, Food Security, SWOT Analysis and Sustainable Agriculture.*

Introduction

India is one of the largest producers, consumers, and importers of pulses in the world. Pulses provide an affordable source of protein and other micronutrients and are indispensable for the rural and urban poor. Yet, despite their critical importance, India's pulses sector faces numerous challenges. Pulses have the potential to play a key role in achieving food security, which is defined by the Food and Agriculture Organization (FAO) as ensuring that "all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food."

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The objective of this paper is to conduct a SWOT analysis of the pulse sector and explore how its strengths and weaknesses, as well as external opportunities and threats, influence food security in India. The study also includes policy recommendations to enhance pulse production and consumption.

Why Pulses

Pulses play a crucial role in ensuring food security in India due to their affordability, nutritional value, and adaptability to diverse climatic conditions. As a primary source of protein for a predominantly vegetarian population, pulses are essential in combating malnutrition and protein deficiency, particularly among the economically disadvantaged. Unlike animal-based proteins, which are often expensive and resource-intensive, pulses provide a sustainable alternative that is rich in protein, fiber, vitamins, and essential minerals.

Moreover, pulses improve soil fertility by fixing nitrogen, reducing the need for synthetic fertilizers and promoting sustainable agricultural practices. Given India's vast rural population and dependence on smallholder farms, pulses offer a viable solution to food security challenges. They are more resilient to drought compared to other crops, making them vital in a country prone to erratic monsoons. Thus, pulses not only enhance nutritional security but also support sustainable food production systems essential for India's growing population.

Pulses are generally cheaper than other protein-rich food items for several reasons:

1. **Low Production Costs:** Pulses require fewer inputs, such as fertilizers and water, compared to crops like wheat or rice, and far less compared to raising livestock for meat. They can grow in arid and semi-arid regions with minimal irrigation and are often cultivated on marginal lands.
2. **Self-Sufficiency in Nitrogen Fixation:** Pulses naturally fix nitrogen in the soil through symbiosis with nitrogen-fixing bacteria, reducing the need for expensive nitrogen-based fertilizers. This lowers cultivation costs.
3. **Simple Storage and Processing:** Unlike animal proteins that require refrigeration and complex processing, pulses can be stored for long periods without spoilage in basic conditions, reducing transportation and storage costs.
4. **Wide Cultivation and Availability:** Pulses are grown widely across India, ensuring a steady supply in local markets, which helps keep prices low.

These factors combined make pulses a more affordable protein source than animal-based foods like meat, eggs, or dairy.

Literature Review

Research into the role of pulses in India's agricultural and food security systems has been extensive. Key studies indicate the nutritional benefits of pulses, their importance in crop rotation, and their potential to improve soil fertility and reduce reliance on synthetic fertilizers.

1. **Nutritional Value of Pulses:** According to the National Institute of Nutrition (2020), pulses are rich in proteins, vitamins, and minerals. Singh et al. (2017) highlight that pulses contribute 20-25% of protein to the Indian diet, particularly in rural households.

2. **Agronomic Benefits:** Pulses are known to improve soil health by fixing atmospheric nitrogen through symbiosis with Rhizobium bacteria (Sharma et al., 2018). This helps reduce the need for nitrogen fertilizers, improving the environmental sustainability of agriculture.
3. **Policy Challenges:** Studies such as Chand et al. (2019) have pointed out policy barriers, including inconsistent minimum support prices (MSP), inadequate market linkages, and import dependencies, which constrain the growth of the pulse sector.
4. **Food Security Concerns:** Kundu (2020) emphasized that pulse production must increase by 2-3% annually to meet the growing population's dietary needs and to reduce malnutrition in India. However, the current rate of growth has been insufficient.

This review underlines the importance of developing a sustainable pulse production to support food security in India.

Methodology

This study uses a mixed-method approach to conduct a SWOT analysis of pulses in India. Data were collected from secondary sources, including government reports, research papers, and national surveys such as the Ministry of Agriculture & Farmers' Welfare, National Sample Survey Organization (NSSO), and the Food and Agriculture Organization (FAO).

1. **Data Collection:** Quantitative data were collected from government databases on pulse production, yield rates, import-export statistics, per capita availability. The data span from 2015-2023 to capture recent trends.
2. **SWOT Framework:** The SWOT analysis was performed by identifying key factors from the literature and data analysis. Each component—Strengths, Weaknesses, Opportunities, and Threats—was analyzed in detail based on its impact on food security.
3. **Data Analytics:** Statistical tools such as time-series analysis and regression models were used to analyze pulse production trends and their correlation with food security indicators like per capita availability, dietary diversity, and malnutrition rates.
4. **Visualization:** Graphs, charts, and bar diagrams were created to visually represent trends, challenges, and opportunities in the pulse sector. This helped in comparing historical data with projected figures.

SWOT Analysis of Pulses in India

Strengths

1. **Nutritional Benefits:** Pulses are a major source of protein, iron, and fiber, making them essential for a balanced diet, particularly in protein-deficient populations. They contribute to reducing malnutrition and protein-energy deficiency.
2. **Agronomic Benefits:** Pulses improve soil fertility through nitrogen fixation, which reduces the need for synthetic fertilizers. This also supports sustainable agricultural practices, particularly in smallholder farms.

3. **Diverse Varieties:** India grows a wide range of pulses, including chickpeas, lentils, pigeon peas, and black gram, which makes it possible to meet diverse dietary preferences and agro-climatic conditions.

Weaknesses

1. **Low Productivity:** The productivity of pulses in India is relatively low compared to global standards. Pulses are typically grown in marginal lands with poor irrigation and minimal use of modern technology.
2. **Market Volatility:** Prices of pulses are highly volatile, causing uncertainty for farmers. Despite government interventions like MSP, farmers often face low prices at harvest due to inadequate procurement.
3. **Import Dependency:** India continues to rely on pulse imports to meet domestic demand. This dependency makes the country vulnerable to global market fluctuations, impacting food security.

Opportunities

1. **Demand Growth:** With increasing awareness of health benefits and a growing population, the demand for pulses is projected to rise steadily. Pulses also play a critical role in the government's nutrition-focused programs like the Mid-Day Meal Scheme.
2. **Technological Advancements:** New agricultural technologies, such as drought-resistant pulse varieties and precision farming, can significantly enhance pulse productivity, making them more resilient to climate change.
3. **Sustainable Agriculture:** The environmental benefits of pulses, such as reduced greenhouse gas emissions and improved soil health, make them ideal for promoting sustainable farming practices.

Threats

1. **Climate Change:** Pulses are particularly vulnerable to climate extremes such as droughts and floods, which are becoming more frequent due to climate change. This can lead to fluctuations in production and prices.
2. **Policy Inconsistencies:** Despite efforts to promote pulses, inconsistent policies related to MSP, procurement, and trade have hindered the sector's growth. High import tariffs during shortages discourage local production.
3. **Competing Crops:** Pulses often compete with more lucrative crops like wheat and rice for cultivation area. Farmers are inclined to grow crops with assured markets and government support, which limits the area under pulse cultivation.

Data Analysis

Pulse Production Trends (2015-16 to 2023-24)

The total pulse production in India increased from 17 million tons in 2015 to 25 million tons in 2023 (see Figure 1). Despite this growth, production has not kept pace with the rising demand, which is projected to reach 30 million tons by 2030.

Yield rates have stagnated at around 800-900 kg/hectare, which is significantly lower than countries like Canada and Australia, where yields reach over 1500 kg/hectare.

Import trends show that India imported 5 million tons of pulses in 2022 to meet its domestic requirements. This dependence has exposed the country to international price fluctuations, affecting food affordability for the poor.

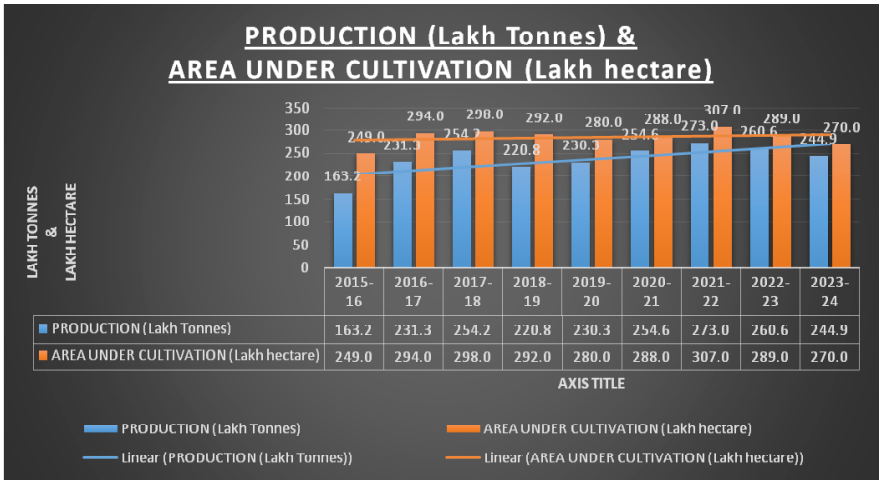
Per Capita Availability and Consumption

According to the NSSO, the per capita availability of pulses has been declining, from 60 grams/day in 2010 to 45 grams/day in 2023, well below the recommended 70 grams/day for a balanced diet. This decline contributes to widespread protein deficiency.

Role of Pulses in Food Security

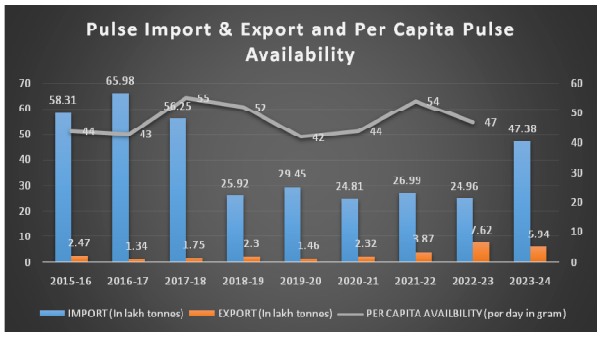
Time-series analysis indicates a strong correlation (r = 0.75) between increased pulse availability and reductions in malnutrition rates. Pulses contribute to dietary diversity, which is a key indicator of food security.

Figure 1: Pulse Production and Area Under Cultivation Trends in India (2015-16 to 2023-24)



Source: Authors' calculation; basedondataobtainedfrom Directorateof Economics and Statistics,Departmentof Agriculture Cooperation and Farmers Welfare, Ministry of Agricultureand Farmers Welfare,GovernmentofIndia

Figure 2: Pulse Import& Export Trends (2015-16 to 2023-24) and Per Capita Pulse Availability (2015 to 2023)



Source: Authors' calculation; based on data obtained from Directorate of Economics and Statistics, Department of Agriculture Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India

Results and Discussion

The SWOT analysis highlights the critical role that pulses can play in enhancing food security in India. While the strengths such as nutritional benefits and soil fertility improvements are well established, weaknesses in productivity, market volatility, and import dependence pose significant challenges. The opportunities, especially in the context of technological advancements and sustainable agriculture, present a promising future for the pulse sector.

However, threats like climate change and policy inconsistencies must be addressed to ensure a stable and growing pulse production system. Improving the productivity of pulses through better seed varieties, irrigation facilities, and farmer support systems is crucial for meeting future food security goals.

Way Forward

Food security is achieved when all people have consistent access to sufficient, safe, and nutritious food to meet their dietary needs. Pulses can play a vital role, by enhancing,

1. **Increase Productivity:** Government policies should focus on improving pulse yields through better seeds, irrigation, and farmer training in modern agricultural techniques.
2. **Market Stabilization:** Introducing more robust price support mechanisms and market linkages will ensure that farmers receive fair prices for their produce.
3. **Encourage Sustainable Practices:** Pulses should be integrated into crop rotation systems to improve soil fertility and reduce environmental impact.
4. **Climate Resilience:** Research into climate-resilient pulse varieties should be prioritized to safeguard production against extreme weather events.
5. **Policy Coherence:** Consistent policies on MSP.

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An Analysis of Availability Dimension of Food Security of Major States of India

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ABSTRACT

The availability dimension of food security plays a crucial role in ensuring that sufficient quantities of food are consistently produced and supplied to meet the needs of the population.Food production provides the base for food security as it is a key determinant of food availability. Food availability refers to the quantity of food that is, or will be, physically accessible to a population within a specific area and time frame. Food availability addresses the "supply side" of food security and is determined by factors such as domestic production, existing stocks and total import of foodgrains. The present paper deals with the availability dimension of food security in India. It aims to prepare a food availability index which is a composite index of various indicators of food availability such as total production of foodgrains, Per capita net availability of foodgrains, Total arable land and also provides an analysis of foodgrains supply by a comparative study of Actual stock and minimum buffer norms of foodgrains in India from year 2001 to 2023 based on secondary data compiled from various government portals. The paper also provides the suggestion regarding solution of the challenges of food availability in India

Keywords: *Food security, Per Capita Availability of foodgrains, Total Production of foodgrains, Composite Index, Actual stock, Minimum Buffer Norm.*

Introduction

Food security is a crucial issue that influences the overall development and well-being of any nation. In India, with its large population and diverse habitats, ensuring food security presents unique challenges.The World Food Summit of 1996 defines food security as existing "when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life(1)." This definition highlights four key dimensions of food security: availability, accessibility, utilization, and stability of foodgrains. The present paper deals with the availability dimension of food security in India. Food availability refers to the physical presence of food in a given area, ensuring that enough food is accessible to meet the population's needs. It includes the variables that affect the supply of food

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in a region such asdomestic production, existing stocks and total imports of foodgrains.According to Swaminathan, with India's population projected to reach 1.5 billion by 2030[2], the country faces the challenge of increasing food production despite shrinking per capita availability of arable land and irrigation water. Food production provides the base for food security as it is a key determinant of food availability.

Literature Review

Various studies have been conducted related to food security in India, some of them are reviewed here-In an article titled "Food Security in India: Performance and Concerns [3]" by Prof. Kalpana Singh addresses the three key components of food security: availability, access, and absorption (nutrition), emphasizing their interrelationship. One key focus of the paper is on food availability in India, which is analyzed over five periods: pre-Green Revolution (1950-1967), early Green Revolution (1967-1980), mature Green Revolution (1980-1990), early economic reforms (1990-2000), and the era of globalization (2000-2012).The study notes that food grain production in India initially improved during the Green Revolution but began to decline with the introduction of the New Economic Policy (NEP) in the 1990s. Globalization and free market forces negatively affected the growth rate of food grain production. This resulted in the deterioration of food grain availability, especially after the economic reforms, which had an adverse impact on India's agricultural sector.Despite these challenges, India's food availability was the strongest component in the Global Food Security Index of 2012, where the country scored 51.3, though concerns about inefficient infrastructure and distribution persisted. The analysis highlights that while food production is crucial, issues related to distribution and access have become critical factors affecting food security.

Another article "Food Security Policy in India: Challenges and Performance"[4] by Om Jee Ranjan emphasizes that while India has made significant progress in food availability, largely due to surplus food grain production and buffer stocks, this alone is insufficient to ensure overall food security. Despite improvements since the Green Revolution, malnutrition and poverty persist, largely due to poor access and ineffective distribution. The government's policies, such as providing subsidized food grains under the National Food Security Law, help with availability but need to be complemented by better employment, health facilities, and distribution systems to achieve lasting food security.

Objectives:

The objectives of the study are:

1. To analyse the availability of foodgrains in major states of India.
2. Tocategories the states on the basis of food availability index which is a composite index of various indicators of food availability.
3. To compare the actual stock and minimum buffer norms of foodgrains in India.

Methodology of the study

Area of the study:

This study is based on research area India including the major states of India. These states areAndhra Pradesh, Assam, Bihar,Chhattisgarh,Gujarat, Haryana, Jharkhand,Karnataka, Madhya Pradesh,Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu,Uttar Pradesh and Uttarakhand.

Period of time and point of time of study:

The study covers the time period from 2001 to 2023,points of time taken to calculate food availibility index are 2004-05, 2008-09, 2014-15 and 2021-22 and point of time to compare actual stock and minimum buffer norms of foodgrains are 2001,2005,2015,2021and 2023.

Data source:

This research is based on secondary data collected from various sources: Agricultural Statistics at a Glance,Food Grain Bulletin, Ministry of Consumer Affairs Food and Public Distribution, Ministry of statistics and program implementation, national food security portal.

Dimensions and variables of the study

This study analyses availability dimension of food security.In this dimension, three variables are taken to construct the food availability index. These variables are, Total area under foodgrains production, Total production of foodgrains, and Per capita net availability of foodgrains. Other variables actual stock of foodgrains in central pool and minimum buffer norms of foodgrains to compare the stock of foodgrains are taken

Method of the study:

Steps to Calculate the Food Availability Index

The Food Availability Index (FAI) is a composite index, calculated as the geometric mean of the normalized indices for each of the three variables. The calculation of the FAI involves two main steps:

Step 1: Normalisation of parameters

$$X = \frac{X_i - X_{min}}{X_{max} - X_{min}}$$

X= Dimention Index

Xi= value for parameter observe across all states and union territories

X min= minimum value for parameter observed across all states and union territories

X max= maximum value for parameter observed across on states and union territories

Indices, calculated for the parameters on the basis of above formula, lies in between 0 to 1.

Step2: Calculation of Composite Index

Composite Index of food security will be calculated as the average of the value of parameters;Totalareaunderfoodgrainsproduction(A_1), Total production of foodgrains in India(A_2),per capita net availability of foodgrains(A_3).The formula to calculate composite index is given above:

$$CI = A_1+A_2+A_3 / 3$$

For the comparative study of performance of states depending on the value of composite index, we will categories the level of food security into four categories as given below:

Sr. No.	Composite index score	Level of Food Availability
1	CI > 0.65	High
2	0.65 ≥ CI > 0.50	Above Average
3	0.50 ≥ CI ≥ 0.35	Below Average
4	0.35 > CI	Low

Analysis 1: A) Area under Foodgrains Production

The table 1 shows the Dimension Index of area under foodgrains production for major Indian states, highlighting variations in area of production. States like Uttar Pradesh consistently achieved the highest index of 1.00, indicating maximum area is used for foodgrains production, while Rajasthan saw steady growth with an average of 0.66. In contrast, Maharashtra experienced a notable decline, dropping from 0.63 to 0.58, and Andhra Pradesh also showed a downward trend. Some states, like Bihar and Punjab maintained stable indices near 0.30. Assam and Uttarakhand had persistently low or zero index values, indicating limited agricultural area use. Overall, the table reflects regional disparities, with some states expanding production areas while others face declines.

Table 1: Dimension Index of Area under Foodgrains Production of major States of India

S.No	States	2004-05	2008-09	2014-15	2021-22	Average
1	Andhra Pradesh	0.29	0.34	0.30	0.17	0.27
2	Assam	0.08	0.09	0.08	0.09	0.09
3	Bihar	0.30	0.31	0.30	0.30	0.30
4	Chhattisgarh	0.22	0.21	0.21	0.21	0.21
5	Gujarat	0.15	0.16	0.14	0.20	0.16
6	Haryana	0.18	0.19	0.18	0.18	0.18
7	Jharkhand	0.05	0.08	0.09	0.11	0.08
8	Karnataka	0.36	0.34	0.33	0.38	0.35
9	Madhya Pradesh	0.63	0.58	0.73	0.82	0.69
10	Maharashtra	0.63	0.55	0.47	0.58	0.56
11	Orissa	0.23	0.23	0.22	0.22	0.23
12	Punjab	0.29	0.29	0.30	0.31	0.30
13	Rajasthan	0.60	0.65	0.62	0.74	0.66
14	Tamil Nadu	0.12	0.12	0.15	0.17	0.14
15	Uttar Pradesh	1.00	1.00	1.00	1.00	1.00
16	Uttarakhand	0.00	0.00	0.00	0.00	0.00
17	West Bengal	0.30	0.29	0.27	0.31	0.29

Source: Compiled by Author based on Data from Agricultural statistics at Glance (2007, 2015, 2022)

B) Total Production of Foodgrains

The table 2 shows Dimension Index of Total Production of Foodgrains of Major States of India" provides data across five time periods. It reflects fluctuations in the total foodgrains production, with the highest value being 1.00 for Uttar Pradesh, indicating consistently high foodgrains production across all years.In contrast, Jharkhand shows minimal contribution with values ranging from 0.01 to 0.05. States like Punjab and Haryana also shows high indices, with Punjab averaging at 0.70 and Haryana at 0.37. Bihar and Madhya Pradesh have seen moderate and gradual increases in their indices, suggesting an improvement in foodgrains production overtime. States like Assam, Chhattisgarh, and Gujarat have consistently low production indices, which may indicate either low agricultural capacity or issues with infrastructure and crop yield in these states. Notably, some states like Andhra Pradesh and Maharashtra have seen a significant decline in recent years.

Table 2: Dimension Index of Total Production of Foodgrains of major States of India

S.no	States	2004-05	2008-09	2014-15	2021-22	Average
1	Andhra Pradesh	0.32	0.41	0.39	0.17	0.32
2	Assam	0.05	0.05	0.08	0.07	0.06
3	Bihar	0.16	0.23	0.28	0.26	0.23
4	Chhattisgarh	0.09	0.08	0.13	0.13	0.11
5	Gujarat	0.10	0.10	0.13	0.15	0.12
6	Haryana	0.31	0.31	0.37	0.27	0.31
7	Jharkhand	0.01	0.05	0.08	0.06	0.05
8	Karnataka	0.24	0.21	0.25	0.22	0.23
9	Madhya Pradesh	0.34	0.27	0.58	0.69	0.47
10	Maharashtra	0.24	0.21	0.21	0.28	0.24
11	Orissa	0.14	0.13	0.18	0.15	0.15
12	Punjab	0.66	0.57	0.63	0.49	0.59
13	Rajasthan	0.29	0.33	0.44	0.35	0.35
14	Tamil Nadu	0.12	0.12	0.19	0.19	0.15
15	Uttar Pradesh	1.00	1.00	1.00	1.00	1.00
16	Uttarakhand	0.00	0.00	0.00	0.00	0.00
17	West Bengal	0.40	0.32	0.36	0.34	0.36

Source: compiled by Author based on Data from Agricultural statistics at Glance (2007, 2015, 2022)

C) Per Capita Net Availability of Foodgrains

The table titled "Dimension Index of Per Capita Availability of Foodgrains of Major States of India" provides a comparative analysis of per capita foodgrains availability across the states. A clear disparity in foodgrains distribution is observed. Punjab leads consistently with the highest index, showing an average of 1.00, followed by Haryana with an average of 0.59, reflecting better per capita foodgrains availability in these states. States like Bihar, Maharashtra, and Tamil Nadu have lower dimension indices, particularly Maharashtra, which has a persistently low average of 0.11, indicating significant challenges in foodgrains availability. Some states, like Jharkhand and Tamil Nadu, show negligible improvement over the years. But states such as Chhattisgarh and Odisha show notable improvement, suggesting progress in addressing food security issues. Overall, the table shows the uneven per capita foodgrains availability in India, with northern states performing better than many in the east and south.

Table 3: Dimension Index of Per Capita Availability of Foodgrains of major States of India

S.no	States	2004-05	2008-09	2014-15	2021-22	Average
1	Andhra Pradesh	0.10	0.15	0.13	0.10	0.12
2	Assam	0.06	0.04	0.08	0.03	0.05
3	Bihar	0.02	0.03	0.04	0.00	0.02
4	Chhattisgarh	0.17	0.13	0.21	0.21	0.18
5	Gujarat	0.03	0.01	0.03	0.04	0.03
6	Haryana	0.56	0.62	0.63	0.56	0.59
7	Jharkhand	0.00	0.04	0.06	0.00	0.02
8	Karnataka	0.12	0.10	0.12	0.09	0.11
9	Madhya Pradesh	0.16	0.12	0.29	0.41	0.24
10	Maharashtra	0.03	0.00	0.00	0.01	0.01
11	Orissa	0.11	0.09	0.14	0.11	0.11
12	Punjab	1.00	1.00	1.00	1.00	1.00
13	Rajasthan	0.14	0.18	0.22	0.16	0.18
14	Tamil Nadu	0.02	0.00	0.04	0.03	0.02
15	Uttar Pradesh	0.15	0.17	0.13	0.13	0.15
16	Uttarakhand	0.13	0.09	0.08	0.05	0.09
17	West Bengal	0.13	0.09	0.10	0.10	0.10

Source: compiled by Author based on Data from Agricultural statistics at Glance (2007,2015, 2022)

D) Food Availability Index of States

The table 4 presents the composite index and ranking of major states based on various factors influencing food availability.Uttar Pradesh consistently ranks highest, securing the top position from 2004-05 to 2021-22, indicating that it has a strong overall food availability score relative to other states. Punjab also performs well, securing the second position in 2021-22 and maintaining a strong ranking throughout the years, reflecting its robust agricultural base and food production capacity. Madhya Pradesh has shown consistent improvement, rising from a rank of 8 in 2004-05 to 3rd in 2021-22.On the other hand, states like Jharkhand and Assam have remained at the bottom of the rankings, indicating continued challenges in ensuring food availability. Jharkhand, for instance, ranks 17th in 2021-22 with a composite index of 0.16, indicating a poor performance across the relevant variables.Several states such as Tamil Nadu, West Bengal, and Maharashtra maintain mid-range positions, suggesting moderate food availability. Tamil Nadu, which ranked 3rd in 2008-09, has dropped to 6th in 2021-22, indicating some regression or other challenges in recent years.Overall, this table highlights that while states like Uttar Pradesh, Punjab, and Madhya Pradesh are leading in terms of food availability, others, particularly in the eastern and northeastern regions, continue to struggle.

Table 4: Composite Index of Foodgrains Availability

		2004-05		2008-09		2014-15		2021-22	
S.no	**States**	**CI**	**Rank**	**CI**	**Rank**	**CI**	**Rank**	**CI**	**Rank**
1	Andhra Pradesh	0.24	9	0.30	6	0.27	6	0.14	12
2	Assam	0.07	15	0.06	15	0.08	15	0.06	15
3	Bihar	0.16	12	0.19	10	0.21	10	0.17	10
4	Chhattisgarh	0.16	11	0.14	12	0.18	11	0.17	9
5	Gujarat	0.09	13	0.09	13	0.10	14	0.12	14
6	Haryana	0.35	4	0.37	4	0.40	5	0.32	5
7	Jharkhand	0.02	17	0.06	16	0.07	16	0.05	16
8	Karnataka	0.24	8	0.22	9	0.23	8	0.21	8
9	Madhya Pradesh	0.38	3	0.32	5	0.53	3	0.59	2
10	Maharashtra	0.30	6	0.26	7	0.23	9	0.26	6
11	Orissa	0.16	10	0.15	11	0.18	12	0.15	11
12	Punjab	0.65	2	0.62	2	0.64	2	0.58	3
13	Rajasthan	0.34	5	0.39	3	0.43	4	0.37	4
14	Tamil Nadu	0.09	14	0.08	14	0.13	13	0.12	13
15	Uttar Pradesh	0.72	1	0.72	1	0.71	1	0.65	1
16	Uttarakhand	0.04	16	0.03	17	0.03	17	0.02	17
17	West Bengal	0.27	7	0.24	8	0.25	7	0.23	7

Source: Compiled by Author based on Data from Agricultural statistics at Glance (2007, 2015, 2022)

Table 5: Number of States categorized in different levels of Food Availability

Level of Food Availability	Composite index score	2004-05	2008-09	2014-15	2021-22
High	$CI > 0.65$	1	1	1	0
Above Average	$0.65 \geq CI > 0.50$	1	1	2	2
Below Average	$0.50 \geq CI \geq 0.35$	2	2	2	1
Low	$0.35 > CI$	13	13	12	13

Source: Compiled by Author based on Data from Agricultural statistics at Glance (2007, 2015, 2022)

The given table shows the performance of different states according to food availability index scores. The numbers of states over the four periods, the number of states in the "High" category decreases from 1 in 2004-05 to 0 in 2021-22. The "Above Average" category slightly increases, with 1 state in 2004-05 rising to 2 by 2014-15 and remaining steady in 2021-22.States in the "Below Average" category start at 2 but decrease to 1 by 2021-22. The majority of states fall into the "Low" food availability category throughout, with little change (13 states in 2004-05 and 13 again in 2021-22, with a slight dip to 12 in 2014-15). This table likely highlights trends in food security, showing little improvement in the highest levels of food availability over time.

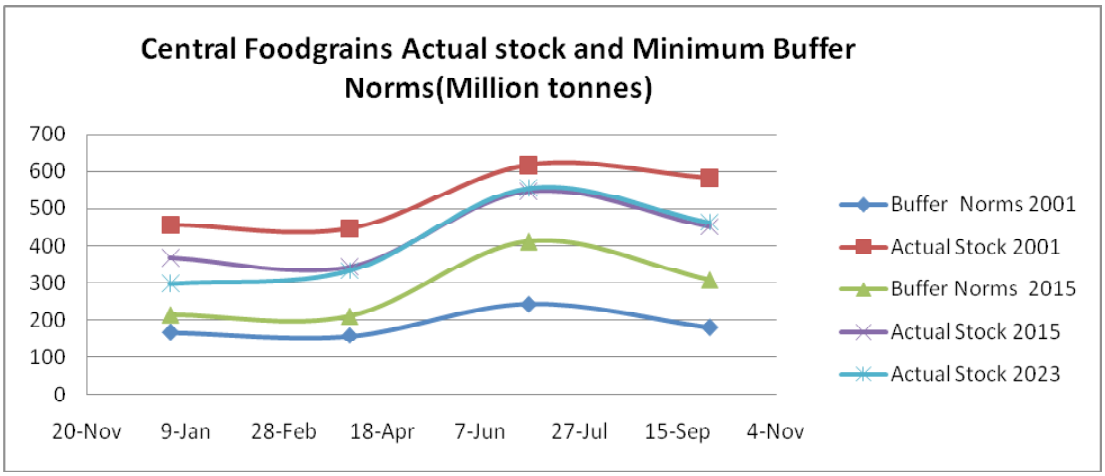
Analysis 2: Actual stock and Minimum Buffer norms of Foodgrains in India.

In this study, the availability of food grains in India is assessed by comparing the actual stock of food grains with the minimum buffer norms set by the Food Corporation of India. It is evident that the actual stock consistently exceeds these minimum buffer requirements indicating a favorable situation in terms of food availability. Moreover, having a surplus of stock suggests stability in the food supply in India.

Table 6: Comparison of Actual Stock and Minimum Buffer Norms (Million Tonnes) of Foodgrainsin India.

Date	Buffer Norms	Actual Stock	Buffer Norms	Actual Stock	Buffer Norms	Actual Stock		
	2001	2001	2005	2005	2015	2015	2021	2023
1-Jan	168	457.4	168	216.94	214.1 0	368.56	529.59	297.05
1-Apr	158	446.95	162	174.07	210.1	343.15	900.45	332.05
1-Jul	243	616.71	269	245.25	411.2	545.75	721.78	554.95
1-Oct	181	582.78	162	151.39	307.7	450.28	553.87	461.82

Source: Food Grain Bulletin, Department of Food and Public Distribution, GOI.



Conclusion

The paper analyses the food availability dimension of food security of major states of India.The food availability index is constructed by taking three variables -Total area under foodgrains production, Total production of foodgrains, Per capita net availability of foodgrains. It can be concluded that states like Uttar Pradesh, Punjab, and Madhya Pradesh are leading in terms of food availability based on their highest composite index value. Uttar Pradesh leads consistently with the highest index.. Punjab also performs well, securing the second position in 2021-22 and maintaining a strong ranking throughout the years. On the other hand, states like Jharkhand and Assam have

remained at the bottom of the rankings, indicating continued challenges in ensuring food availability. It can be said that the eastern and northeastern states, continue to struggle in food availability.The comparison of of actual stock and minimum buffer norms of foodgrains in India shows a excess stock of food grains against the minimum buffer norms over the study period it means in India foodgrains availability even in adverse conditions has been ensured by the government by maintaining a buffer stock of foodgrains.

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Rural Development in India through Agri Entrepreneurship

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ABSTRACT

The agriculture in India is one of the largest agrarian economies accounting for approximately 14.5 per cent of gross domestic product (GDP) in 2004-05. It is quite obvious that at country level the majority of the population (approximately 55 per cent) depends on just 14.5 % of the national income (agriculture and allied sector). On the other hand, we have distress in the farm sector. Agribusiness is a term that is used in the sector that encompasses all economic activities that are related to farm sector. In this regard, the promotion of Agri-entrepreneurship and agribusiness has enormous opportunities. Entrepreneurship in the Indian agriculture sector has emerged as a hope for development for farmers who are facing challenges. A new generation of entrepreneurs uses modern technology to transform the agriculture sector. Therefore, development in agriculture will increase the raw materials used for Agri-based industries. Promoting agricultural Entrepreneurs should be the government's priority because most of the India's population is engaged in agriculture-related work. Promoting agricultural entrepreneurship will lead to sustainable development, self-reliance, and high food production.

Keywords*: Rural Entrepreneurship, Population, Government, Sustainable development, Food production.*

Introduction

Agribusiness entrepreneurship is a key to promote the growth of agriculture in developing countries where majority of the population is involved in agriculture. Several studies in the past have highlighted the essentials of agriculture in eradicating poverty and agrarian distress through modern disruptive innovations. Agri-entrepreneurship eco-system is important for overall development of the economy. An agricultural entrepreneur is a risk-taking person who undertakes various types of activities in agriculture and allied sectors. Also, an agricultural entrepreneur can start a business and change its direction. In India agriculture is considered merely a source of livelihood, but now, in the changing environment it is necessary to give agriculture a new form by expanding its activities. An increase in agriculture will increase the raw materials used for

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Agri-based industries. Promoting agricultural industries should become the government's priority because most of India's population is engaged in agriculture-related work. Today's rural youth generation is moving toward cities for employment opportunities because of poverty and unemployment in rural areas. At such a time, the industry has emerged as a hope of development for the farmers facing challenges in the Indian agricultural sector.

The agriculture sector in developing countries should act as a growth engine for sustainable rural development. Today, the agriculture sector faces issues like commercial liberalization, privatization, competitiveness, reduced state control of economic activities, and internationally competitive agriculture. This study shows that the role of agricultural entrepreneurship is essential in economic and social development at the national level. Therefore, in order to solve many problems; it is essential to focus on the development of entrepreneurship in the agricultural sector.

Concept of Agri-Entrepreneurship

Agri entrepreneurship is a sustainable, community-oriented, directly marketed agricultural product and services. Sustainable agriculture is a holistic, systems-oriented approach to farming that focuses on the interrelationships of social, economic and environmental processes to deliver agricultural yields. Agripreneur is an innovator who transforms rural economy adaptation of innovative ideas in agriculture and allied sectors. He takes risks, innovates, creates new ways of working and taps into new markets.

Concept of Agripreneur

Agripreneur is "An entrepreneur whose main business is agriculture or related to agriculture" Agriculture + Entrepreneur = Agripreneur

Review of literature

Numerous studies have been conducted in India related to Agri Entrepreneurship. Some researchers have given valuable findings by studying agricultural entrepreneurship. A brief discussion of some of them is as follows:

The determinants of rural entrepreneurship and the environment suitable for its social and economic development have been studied. Understanding the current economic scenario, few studies concluded that promoting entrepreneurship is crucial to accelerate rural socio-economic development (Sherief, 2005; Sannasi, 2008). It is a great luck of entrepreneurship in agriculture. Opportunities for entrepreneurship should be provided to risk-bearing individuals who can become successful entrepreneurs by exploring the latest knowledge. Agricultural entrepreneurship has a vast potential to contribute to the national income and also has the potential to employ unemployed people. Entrepreneurship is an opportunity and a necessity to improve production and profitability in the sector (Uplaonkar and Birathar, 2015).

The agriculture sector is the focal point of all economies. At present, big industrialists have started investing in the agricultural sector. The geographical feature of the Indian landscape is such that dairy farming and fishing are increasing here. Ordinary people can also perform well in the

agricultural sector. Appropriate steps should be taken to increase their skill and abilities (Tom and Preethi, 2022). The significant impact of Agri clinics and agribusiness on empowering rural youth was particularly recorded in Uttar Pradesh, India. In this research, attention has been paid to the high utility indicator considered by the entrepreneurs. Under the study, various training programs were ensured to improve agricultural entrepreneurs' skills.

Data and Methodology

This study is based the secondary sources of data available on public domain in order to develop basic insight regarding the concept. The present study is based on refereed journals, reports, newspapers and books in addition to several websites. The existing study in the areas of Agri-entrepreneurship had led to conceptualization picture of the agribusiness. An attempt has been made to give an overview on Agri entrepreneurship in India. The prospective size of the market for uplifting of the young entrepreneurs thought provide potential opportunities. Objective of the present study is to explore the opportunities of young Entrepreneurs in agribusiness and the importance of entrepreneurship in the upliftment of the status of rural farmers.

Type of Enterprise

There are different types of agricultural enterprises:

- **Firm-level producer:** It is operated by individual family members. Every family should be treated as an enterprise that optimizes production using various resources, technology and market demand.
- **Service provider:** Various services are required to operate agriculture or industries. These include equipment rental, purchase and distribution of inputs, such as sprayers, tractors, seed drills, threshers, harvesters, and technical services like weed control, plant protection, installation of irrigation facilities, transportation storage, etc.
- **Input producer:** There are many prosperous enterprises which require critical inputs. Some input produced by entrepreneurs at the rural level, such as biofertilizers, vermicompost, biopesticides, soil amendment, vegetables, plants of different species of fruits, ornamentals, agricultural tools, raising plant pots, irrigation accessories, minerals mixture and complete feed, are good opportunities to support sericulture, fishery and poultry as well, through promotion of critical service facility in rural areas.
- **Processing and marketing of firm produce:** efficient management of post-production operations require a high level of technology and investment. Service committees, cooperative committees, and joint stock organizations achieve such unity of control. In many states, there are dairy cooperative societies, sugar cooperative societies and fruit producer societies.

Why India is promoting Agripreneurs

Agriculture contributes 15.2% to total exports, 24.2% to GDP, and employs 58.4% of the country's workforce.

1. Agriculture remains a significant sector of the Indian economy, accounting for 25 per cent of the gross domestic product (GDP) and about 13 per cent of total export earnings.
2. The share of agriculture in the economy (about 25 per cent) is still relatively high. Agriculture will remain a priority for all policymakers, farmers, and businesses. Shortly, any move to accelerate this sector will require a multi-pronged strategy.
3. There is a need to produce value-added services and expand the marketing channels of the markets, but constraints are arising due to lack of resources.
4. Most grains, fruits, vegetables, seeds, and spices are destroyed at the rural level because there is no arrangement for proper maintenance such as grading, cleaning, sorting, and packaging.
5. Due to insufficient marketing activities and poorly developed marketing infrastructure, there is a loss of approximately Rs 50000 crore annually in the marketing area.

Challenges and barriers of rural Agripreneurs

After independence, many staples have been taken by the government to solve the problems of rural arbitrageurs. Despite these, agricultural entrepreneurs face many problems. Following are some of the problems faced by rural agripreneurs.

- Lack of infrastructure
- Low-risk barriers to capacity
- Lack of fund
- Marketing problems and competition
- Management problem
- Low skill level of workers
- Lack of information
- Lack of education and technical knowledge
- Shortage of raw material, etc.

Essential steps in the development of an Agri-based program

- Agriculture based entrepreneurship development training
- Identification and location of perspective self-employees
- Selection of potential self-employed/entrepreneurs from potential candidates
- Mobilizing various resources
- Providing assistance/guidance in the selection of products and preparation of project report
- Organizational support in setting up of the enterprise
- Follow up

Scope for Agri-entrepreneurship in India

Agricultural entrepreneurship is very beneficial for the economy as a whole. Agri-entrepreneurship promotes the brand made in India and helps make exports competitive in the Indian market. India is blessed with diverse eco climates which help create a temperate, subalpine climate—tropical and tropical agricultural produce. The application of biotechnology in agriculture is a boon for seed production, bio-control agents, and industrial exploitation of microbes for various products. Extensive coastline and inland water reservoirs should be used to produce marine and inland fish. Ornamental culture fish is already gaining prominence in aesthetic value among the citizens of India. Large coastline and inland water reservoirs should be used to produce marine and inland fish. Ornamental culture fish is already

gaining prominence in aesthetic value among the citizens of India. Forest resources can be used to produce forestry by-products. Beekeeping and apiary can be done on a large scale in India. Economic growth will be enhanced by exploiting exports. According to the World Trade Organization (WTO), India has immense potential to regain its current position in world trade in agricultural commodities, both; in raw and processed forms. Currently, processing is done only at the primary level, and an increase in the living standards expands the scope for secondary and tertiary processing of agricultural commodities. Farmers should be encouraged and educated about organic farming because the scope for organic farming in India is limited. Due to the stability in productivity of high-yielding and genetically modified crops, they are most likely to be grown in India in future. There are vast opportunities for producing and promoting bio-control agents and bio-pesticides for crop protection. Due to declining shortages, workers and groundwater levels for agriculture operations such as weeding, harvesting, micro irrigation systems, planting and labour-saving agricultural equipment will likely be introduced in the coming years.

Training and education program for Agri-entrepreneurship

- Reduce control of middlemen and traders. This can be possible only when the functioning of the district panchayat is in coordination with the state marketing board Panchayat mandi (agricultural market).
- National Bank for Agriculture and Rural Development (NABARD)-RBI started NABARD in July 1982 to pay full attention to rural areas' small cottage sector, agriculture and Agri- based industry. NABARD is managing all the RBI activities successfully related to rural development and agriculture-based activities.
- NCOSAMB (National Council of State Marketing Boards)- The government of India provides grants in aid to states to set up training facilities with modern facilities. NCOSAMB manage such training programs.
- The central area scheme of Agri-Clinics and Agri-Business Centers (AC&ABC) was launched on April 9, 2002 to supplement public extension efforts by assisting qualified agricultural professionals in setting up Agri enterprises. Apart from providing value-added advisory services to the farmer at their doorstep; National institute of agricultural extension management

government of India, under the ministry of agriculture management also provides employment opportunities for self-firm entrepreneurs.

- Agricultural technology management agencies (ATMAS)- ATMAs are functional district level to utilize the services of established agricultural entrepreneurs in providing value- added extension services to farmers in public-private partnership mode.
- Agricultural Biotechnology Agency for Rural Employment and Development (ABARD)- a KAU (Kerala Agricultural University) provides training on planning and technology.
- State agricultural marketing banks (SAMBs) – Such banks are established to actively control markets for food crops and oilseeds in big markets in towns and cities.
- Domestic and export market intelligence cell (DEMIC) – it supports trade indirectly through the entrepreneurial and decision-making skills of agricultural entrepreneurs. Furthermore, this also works to forecast the prices of commodities.
- Agribusiness incubators- the Agribusiness incubation (ABI) program was launched in 2003. It is a joint venture of the International Crops Research Institute for the semi-arid Tropics (ICRISAT) and India's Department of Science and Technology (DST). It sponsors agricultural technology developed by ICRISAT, another center of excellence in R&D, universities, and other institutions.
- State Trading Corporation (STC) – STC is a leading international trading house by the government of India. The corporation handles wholesale international trade.

Conclusion

More than half of the nation population depends on agriculture growth and startups play vital and crucial role in transforming the livelihood of farmers and rural people. Further, the success the Agri-startups depends on the economically feasible focus areas within agriculture sector and government support. Additionally, it is important for these Agri startups to maintains a strong focus on their goals of independence and sustainability. Providing technical support through skilled mentors, experienced investors and strengthening incubation centers; Agri- startups can better monitor the challenges they face during their inception and growth stage. Moreover, government policies, programs and several initiatives play vital and critical role in growing Agri-entrepreneurial landscape in India.

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Challenges of Rural Development: An Analysis

Dr. Arun Kumar Kanaujia[1]

ABSTRACT

India now a fastest growing economy in the world but the status of agrarian, economy or rural economy not removed. There are number of problems and challenge is lingering on, in rural development. After independence government of India launched several schemes and plans for rural development and time to time revises or changes according to need. This paper will focus on the several problems and hurdles of rural development. Some lingering problems and emerging problems are facing our rural economy along with unemployment, malnutrition, low level of standard of living and different types of poverty etc. This paper is entirely based on the secondary data only.

Key words: *Employment, education, skill, migration, infrastructure*

Introduction

India now a fastest growing economy in the world but the status of agrarian economy or rural economy not removed yet. In India majority of the poor people live in rural areas and around 22 percent of total population still lives below the poverty line. There are a number of reasons which are responsible for the problem of poverty in India, these reasons can broadly be classified into economic factors and non economic factors.

In the economic factors -

- Out dated technology and lack of capital
- Wide spread Unemployment
- Inflationary pressure
- Income inequalities
- Lack of infrastructure
- Vicious circle of poverty

In the non-economic factors rising population and out dated social structure which includes caste system, law of inheritance and unscientific outlook etc.

Government always concern about rural development, rural development is a comprehensive term which focuses on the integrated development of rural areas. It implies twin objectives - the

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economic betterment of people as well as social transformation in the rural sector,in order to provide the rural people with better prospects for development, increased participation of people in the rural development programmes, decentralization of planning, better enforcement of land reforms and greater access to credit and other facilities. Rural development is therefore, a wider term involving development in various areas in the rural sector. Following the key issues in the area of rural development-

(a) Land reform measures

(b) Special measures for eradication of poverty and bringing about significant improvement in the living conditions of the weaker section of the population.

(c) Development of human recourse which includes improvement in literacy rate especially female literacy rate,increased facilities for education and skill development better access to health facilities, sanitation and water supply etc.

(d) Development of infrastructural facilities like roads, irrigation facilities, credit, marketing, housing, electrification, communication, and organic farming etc. government of India has taken several initiatives for rural development, removal of unemployment and poverty eradication but in the rural areas some lingering problems are existing. Unemployment rural credit and diversification of agriculture are notable examples of lingering challenges.

Employment and Unemployment

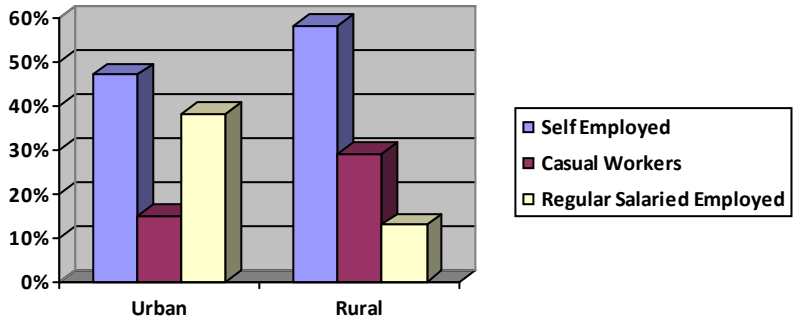
Employment is an activity from which a person earns mean of livelihood. Employment may be either in the form of self employment or wage employment. About 52.2 percent of workforce in India belong self employment so self employment is a major source of livelihood.

In case of self-employment a person makes uses of his own land, labour capital and entrepreneurship to make a living under wage employment worker is known as employee or hired worker and buyer of labour is termed as employer wage employment is classified as- regulars workers and casual workers. regular workers account for just 22.8 percent of India workforce and is paid wages on a regular basis.

Casual worker account for 25 percent of India workforce and they not have regular income According to Economic survey 2023-24

India's workforce is nearly 56.5 crore with more than 45 percent employed in agriculture, 11.4 percent in manufacturing 28.9 percent service and 13 percent in construction.

Distribution of employment by region



Above diagram shows higher dependency on agriculture as a self employed in rural areas and higher percentage of regular salaried employees in urban areas.

Distribution of workforce by industry 2017-18 (in percentage)

Sector	Region		Sex		Total
	Rural	Urban	Male	Female	
Primary	59.8	6.6	40.7	57.1	44.6
Secondary	20.4	34.3	26.6	17.7	24.4
Tertiary	19.8	59.1	32.8	25.2	31.0
Total	100	100	100	100	100

Source: Report on employment and unemployment survey (2017-2018) *Ministry of Labour and Employment*

In above table rural area consists 59.8% percent workforce in primary sector, 20.4 percent secondary sector and 19.8 percent in tertiary sector which shows highly dependency on agriculture and allied activities. In rural area the percentage of male workforce in primary, secondary and tertiary sectors respectively 40.7,26.5 and 32.2. The percentage of female workforce in primary, secondary and tertiary sectors respectively 57.1, 17.7 and 25.2. Here an important observation the percentage of female workforce is high 57.1 percent with comparison of male workforce which is 40.7 percent. Because mobility of women in rural areas is extremely low owing to their family as well as social constraints female workers prefer to do jobs close to their home, even when wage rate is low.

In the rural areas two types of unemployment are found disguised and seasonal. Lack of job opportunities outside agriculture compels the people to work on family farms it further increases the possibility of disguised unemployment and agriculture is a seasonal occupations during off season often the farm workers are out of job and in rural areas besides agriculture, there are many other seasonal activities like sugarcane crushing brick kilns etc. Workers engaged in these activities remain occupied for a few months in a year. Rest of the period, they remain unemployed. An

employment rate declined marginally from 9.22 percent in 1983 to 8.28 percent in 2004-05. But in 2015-16 it declined substantially to the level of 5 percent, further, decline of unemployment rate in rural areas was smaller from 8.85 percent to 5.1 percent as compared to urban areas from 10.5 percent to 4.9 percent female unemployment rate was significantly higher (8.7 percent) than the female unemployment rate (4 percent) in 2015-16.

So the problem of unemployment in rural areas is a big concern because unemployed person's cannot make contribution to the country's production and it reduces the overall output in the economy. Apart from this the country has to face problems like greater inequality of distribution of income and wealth resulting in social unrest, widening gulf between haves and have-nots.

Poverty

Poverty is a widespread social evil. Despite a significant growth, poverty continues to be a major challenge for India. The major chance of poor people in rural areas generally belong to the following principal categories the small and marginal farmers, the landless laborers etc.

Poverty may be defined as a situation in which a person is unable to secure even his basic requirements.

The number of poor people is estimated as the proportion of people below the poverty line it is called head count ratio. According to planning commission datais estimated by Tendulkar method in 2011-12 rural poverty 25.7 percent and urban poverty 13.7 percent while as a whole total 21.9 percent people in the county are living below poverty line. About 70 percent of the poor people live in rural areas and the poverty in urban sector is largely a result of rural poverty.

Afflicted by poverty and unemployment, people from rural sectors migrate to cities in search of employment. Many people among then either do not get employment at all or remain under-employed. Thus they only add to the number of poor people in the urban sector. Whereas the high rural poverty can be attributed to lower farm incomes due to subsistence agriculture, lackof sustainable livelihoods in rural areas impact of rise in prices of food products on low income groups, lack of skills, underemployment and unemployment.

Some other challenges of Rural Development

In the rural development there are some other challenges like rural credit. In agriculture farmers are in strong need for credit due to long time gap between crop sowing and realization of income. They dependent on two sources non institutional and Institutional sources of rural credit.In the non institutional sources landlords, village traders and money lenders and Institutional sources government, cooperatives, commercial banks and regional rural banks.

Traditionally most credit needs of the farmers were met through non institutional sources. It accounted for 93 percent of the total borrowing of the farmers in 1951. Institutional sources provide above 66 percent credit to the farmers.

Some other challenges like agriculture marketing system, diversification of crop.Agriculture marketing is a process that involves the assembling, storage, processing, transportation, packaging

grading and distribution of different agricultural commodities across the country. In the rural areas most farmers are facing the problem of distress sale.

Diversification involves a shift in cropping pattern. The main aim is to promote shift from substance farming to commercial farming. In India agriculture is still dominated by subsistence farming. Multi cropping system reduces the dependence of farmers on one or two crops as they are engaged in growing a wide variety of crops. There is need to encourage farmers to take up cultivation of a wide variety of crops it will also raise their income.

Conclusion

In need of the hour increase the process of rural development remove hurdles and make policies for unemployment removing more efficiently. In rural area agriculture is already overcrowded; a major proportion of the increasing labour force needs to find alternate employment opportunities in other nonfarm sectors like. Animal husbandry, Fisheries, Horticulture etc.

Efforts should be made to line up rural production centers with the unban market and Infrastructure elements like credit and marketing.

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Impact of Agricultural Priority Sector Lending Through Lead Bank for Agricultural Development of Beneficiary Farmers of Bareilly District in Uttar Pradesh

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ABSTRACT

*This paper is an effort for impact analyse of agricultural priority sector lending through the Bank of Baroda as the Lead Bank in the Bareilly District under the lead bank scheme, the flagship programme of the RBI for facilitation of the formal credit flow through the mandatory target of **40 per cent** of the total advances rendered by the banks to the neglected priority sectors of the Indian economy. The analytical study is based on the Bareilly district only. The primary data is collected through the structured questionnaire based on 5-pointer Likert scale. The small and marginal beneficiary farmers are randomly interviewed for their agricultural development after availing PSL from the Bank of Baroda. The statistical tools like summated score, One-way ANOVA, Correlation and Regression are used thorough SPSS.*

It has been found that agricultural development has strong positive correlation with agricultural PSL size, whereas moderate positive correlation with agricultural PSL duration. The agricultural PSL size has a greater impact on improvement in agriculture of sample beneficiary farmers as the value of standardised beta is found to be greater for agricultural PSL size than that of agricultural PSL duration. The agricultural PSL size and duration have positive impact on the agricultural development of the beneficiary farmers.

Keywords: *Lead Bank, Impact Analysis, Priority Sector Lending, Agricultural Development, Beneficiary Farmers*

Introduction

Priority sectors are essential elements of society that provide the foundation of an economy and, with sufficient financial backing, possess the potential to significantly enhance a country's

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economic growth. The notion of Priority Sector Lending was first introduced by **Shri Morarji Desai**, the former Finance Minister and Deputy Prime Minister of India, in **1968**. Specific industries have been identified as priority areas by the government due to insufficient funding and neglect. This classification ensures they receive preferential treatment in credit allocation, hence prioritising national advancement and the achievement of objectives **(Bhatt N.S., 1986)**.

Kaur (1999) asserts that these sectors constitute the foundational elements for the primary, secondary, and tertiary sectors of an economy. This form of lending, also referred to as Directed Lending or Social Banking, involves banking activities driven by social goals. Priority Sector Lending plays a vital role in supporting economically disadvantaged individuals and redistributing a nation's resources to more productive industries. The Reserve Bank of India (RBI) adjusts the targets and sub-targets for essential sectors as necessary. Table 1 displays the most recently updated master circular.

TABLE 1: Targets and sub-targets for priority sector lending for Bank of Baroda

Categories	Bank of Baroda
Total Priority Sector	40 per cent of Adjusted Net Bank Credit
Agriculture	18 per cent of ANBC
Micro Enterprises	7.5 per cent of ANBC
Weaker Sections	12 percent of ANBC

Source: Master Directions – Priority Sector Lending (PSL) – Targets and Classification (Updated as on July 27, 2023), Reserve Bank of India.

The research paper attempts for impact analysis of agricultural priority sector lending through Bank of Baroda as the lead bank of Bareilly district on beneficiary farmers for their agricultural development through the parameters such as use of quality inputs (HYV seeds, fertilizers, herbicides, etc), improved farm machinery and technology, improved irrigation facilities, intensive farming and increased yield per are and total productivity of farm produce.

Literature Review

The notion of Priority Sector Lending has been extensively studied in India over several decades, including diverse contexts, geographies, and temporal frameworks. **Ghorpade (1968)** recognised numerous direct and indirect factors that impact social influence on the formal credit allocation for priority sectors. The accessibility of financing to the prioritised sector was determined to have a clear association with its productivity. **Bhat (1986)** appropriately examined approach-based finance aimed at the priority sector. **Sarda (1998)** offered comprehensive recommendations for priority sector lending, constituting forty percent of overall advances. **Ganesan (1998)** analysed the credit flow to the priority sector from public sector banks in his article. The formal loan from public sector banks for the priority sector was essential for the growth and development of small and medium enterprises reliant on the primary sector. **Shahjahan (1999)** analysed the availability of formal credit for the priority sector via public sector banks in the study. **Sundharam (2003)** in his book indicated the absence of a "Personal Touch" from Lead Banks regarding local issues and their

deposit potential. The insufficient sensitivity towards the underprivileged and marginalised segments of society has hindered the realisation of the anticipated benefits from the increased formal credit flow. **Rao (2006)** asserts in his article that optimal loan allocation to the priority sector is crucial for the advancement of the Indian economy. The study revealed that agricultural financing is in a more favourable position compared to other sectors. **Uppal (2009)** revealed substantial differences between public and private banks for priority sector financing. In this context, public sector banks underperformed relative to their private counterparts regarding growth percentages and objective attainment, although excelled significantly in lending volume and accessibility. **Goyal and Agarwal (2016)** endeavoured to elucidate the challenges encountered by bank officials during agricultural priority sector lending. The study primarily concentrated on four factors: increased work stress, non-performing assets, recovery challenges, and pressures such as political, societal, or target-related influences. The bank officials prioritised the Non-performing Asset and recovery difficulties. **Kaur et al. (2022)** say that to avert disruptions during financial turbulence, each bank must create a substantial buffer to protect their lending practices and, subsequently, priority industries. Priority sectors, which underpin the economy, must stay insulated from crises; otherwise, they may trigger cascading economic downturns.

Objective

The research paper attempts to analyze the impact of Agricultural PSL through Bank of Baroda as the district lead bank on the beneficiary farmers for their agricultural development in the Bareilly district of Uttar Pradesh.

Hypothesis

To determine the impact of agricultural PSL on the beneficiary farmers, the following hypotheses are formed.

$\mathbf{H_{0\ 1}}$: Level of improvement in agricultural development does not differ significantly among sample beneficiary farmers of various groups as per agricultural PSL size and PSL duration.

$\mathbf{H_{0\ 2}}$: There is no significant impact of agricultural PSL size and PSL duration on agricultural development of sample beneficiary farmers.

Methodology

The study analysis involved primary data collected through structured questionnaire based on 5-pointer Likert scale. The respondents comprised of the beneficiary farmers mainly small and marginal farmers, who have availed agricultural PSL Schemes through Bank of Baroda as Lead Bank of the Bareilly district. Data has been analysed through IBM SPSS Statistics 29.0.2.0 software. It includes both descriptive statistics and inferential statistics. The statistical tools used for primary data analysis include the following statistical tools: Summated Score Method has been used to understand whether there has been an improvement or increase in the agricultural development of small and marginal farmers after availing agricultural PSL schemes. One Way ANOVA has been used to find out whether the impact on agricultural development of farmers varies with respect to

their size and duration of availed agricultural PSL. Correlation has been used to find out the relationship between independent and dependent variables. Regression has been to see whether the independent variables of agricultural PSL size and PSL duration have a relationship with the dependent variables depicting impact, and the extent to which the independent variables explain the change in dependent variables.

Data Analysis: Summated Score

The number of variables in agricultural development factor is equal to 5. This implies, the average score is 5x3=15. For a score less than 15, the results are positive and show that there is an increase and improvement in agriculture after availing agricultural PSL schemes. While, for a score equal to or greater than 15, the result would mean that there is no increase or improvement in agricultural development after availing agricultural PSL schemes.

Table 1.1: Summated Score Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5.00	20	4.0	4.0	4.0
	7.00	10	2.0	2.0	6.0
	8.00	10	2.0	2.0	8.0
	9.00	10	2.0	2.0	10.0
	10.00	110	22.0	22.0	32.0
	11.00	90	18.0	18.0	50.0
	12.00	40	8.0	8.0	58.0
	13.00	30	6.0	6.0	64.0
	14.00	80	16.0	16.0	80.0
	16.00	80	16.0	16.0	96.0
	18.00	10	2.0	2.0	98.0
	19.00	10	2.0	2.0	100.0
	Total	500	100.0	100.0	

Source: Based on Authors' Analysis of Primary Data

As may be seen in the above table 1.1, a larger proportion of population falls within the score of 15, i.e 80 percent of the respondents, have developed their agriculture after availing agricultural PSL schemes. The development in agriculture can be attributed to increase in agricultural productivity, use of quality agricultural inputs like HYV seeds, fertilizers, herbicides etc; use of improved machinery and irrigation facilities.

One Way ANOVA {By Agricultural PSL Size

The research attempted to find out that whether beneficiary farmers categorised in 5 groups as per agricultural PSL size; i.e Below Rs 100000/-, Rs 100000/- to Rs 200000/-, Rs 200000/- to Rs 300000/-, Rs 300000/- to Rs 500000/-, and Above Rs.500,000; have the same level of development

in their agricultural development after availing agricultural PSL. The number of respondents in various categories as per agricultural PSL size are shown in Table 1.3 below.

Table 1.2: Descriptive statistics of sample beneficiary farmers of Bareilly District in Uttar Pradesh

	N	Mean	Std. Deviation
Below Rs 100000/-	110	14.5455	2.65315
Rs 100000/- to Rs 200000/-	150	13.6667	2.12580
Rs 200000/- to Rs 300000/-	170	11.0000	1.19169
Rs 300000/- to Rs 500000/-	60	8.3333	1.90153
Above Rs 500000/-	10	5.0000	0.00000
Total	500	12.1400	2.99639

Source: Based on Authors' Analysis of Primary Data

Before applying One-Way ANOVA, assumption of ANOVA was tested with respect to homogeneity of variances using Levene's Statistic.

Table 1.3: Test of Homogeneity of Variances [DV: Agricultural Development; IV: Agricultural PSL Size]

Levene Statistic	df1	df2	Sig.
32.715	4	495	0.000

Source: Based on Authors' Analysis of Primary Data

Levene's statistic tests the hypothesis that variances of the populations from which different samples are drawn are equal. Table 1.3 shows the significance value of Levene's Statistic based on mean as 0.000, which is lesser than .05. This implies that variance is equal across groups is violated. Hence, Tukey's Post Hoc test has been conducted to study the differences in variances of various Agricultural PSL size groups.

Table 1.4: ANOVA [DV: Agricultural Development; IV: Agricultural PSL Size]

ONE WAY ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2586.261	4	646.565	168.986	0.000
Within Groups	1893.939	495	3.826		
Total	4480.200	499			

Source: Based on Authors' Analysis of Primary Data

From above table 1.4,

(i) F value is 72.131 which is more than critical value of F (2.37).

(ii) Significance value (p) is 0.000 which is less than 0.05.

Thus, null hypothesis (H01 with respect to agricultural PSL size) is rejected. There is a significant difference in average performance score of various respondent groups, as per the Agricultural PSL size, with respect to improvement in agricultural development after availing Agricultural PSL.

Table 1.5: Post-Hoc test (Tukey's HSD) [DV: Agricultural Development; IV: Agricultural PSL size]
Tukey HSD

Multiple Comparisons						
(I) Agricultural_PSL_size (J) Agricultural_PSL_size		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Below Rs 100000/-	Above Rs 500000/-	9.54545*	0.64606	0.000	7.7766	11.3143
	Rs 300000/- to Rs 500000/-	6.21212*	0.31393	0.000	5.3526	7.0716
	Rs 200000/- to Rs 300000/-	3.54545*	0.23935	0.000	2.8901	4.2008
	Rs 100000/- to Rs 200000/-	.87879*	0.24554	0.003	0.2065	1.5510
Rs 100000/- to Rs 200000/-	Above Rs 500000/-	8.66667*	0.63884	0.000	6.9176	10.4157
	Rs 300000/- to Rs 500000/-	5.33333*	0.29879	0.000	4.5153	6.1514
	Rs 200000/- to Rs 300000/-	2.66667*	0.21912	0.000	2.0667	3.2666
	Below Rs 100000/-	-.87879*	0.24554	0.003	-1.5510	-0.2065
Rs 200000/- to Rs 300000/-	Above Rs 500000/-	6.00000*	0.63649	0.000	4.2574	7.7426
	Rs 300000/- to Rs 500000/-	2.66667*	0.29373	0.000	1.8625	3.4709
	Rs 100000/- to Rs 200000/-	-2.66667*	0.21912	0.000	-3.2666	-2.0667
	Below Rs 100000/-	-3.54545*	0.23935	0.000	-4.2008	-2.8901
Rs 300000/- to Rs 500000/-	Above Rs 500000/-	3.33333*	0.66812	0.000	1.5041	5.1625
	Rs 200000/- to Rs 300000/-	-2.66667*	0.29373	0.000	-3.4709	-1.8625
	Rs 100000/- to Rs 200000/-	-5.33333*	0.29879	0.000	-6.1514	-4.5153
	Below Rs 100000/-	-6.21212*	0.31393	0.000	-7.0716	-5.3526
Above Rs 500000/-	Rs 300000/- to Rs 500000/-	-3.33333*	0.66812	0.000	-5.1625	-1.5041
	Rs 200000/- to Rs 300000/-	-6.00000*	0.63649	0.000	-7.7426	-4.2574
	Rs 100000/- to Rs 200000/-	-8.66667*	0.63884	0.000	-10.4157	-6.9176
	Below Rs 100000/-	-9.54545*	0.64606	0.000	-11.3143	-7.7766
*. The mean difference is significant at the 0.05 level.						

Source: Based on Authors' Analysis of Primary Data

The study shows a statistically significant difference between groups as determined by one way ANOVA (F=72.131, p=.000). Tukey's post hoc test, as seen in above table 1.5, revealed that the impact on agriculture development of beneficiary farmers was greater among those belongs to having higher amount of PSL. The different PSL size groups Below Rs 100000/-, Rs 100000/- to Rs 200000/ -, Rs 200000/- to Rs 300000/-, Rs 300000/- to Rs 500000/-, and Above Rs 500000/- have different mean 14.55, 1367, 11, 8.34, and 5 respectively in descending order. Thus, the positive impact on agriculture of different PSL size groups is in ascending order. **The greater the PSL size, the more improvement in agricultural development they have.** This can be attributed to the fact that the greater agricultural PSL size helped in use modern farm machinery and quality inputs like HYV seeds, fertilizers and herbicides etc, paving way for increased production of agricultural produces and hence leading to more improvement in agriculture development of the beneficiary farmers.

One Way ANOVA {By Agricultural PSL Duration}

Table 1.6: Descriptive statistics of sample beneficiary farmers of Bareilly District in Uttar Pradesh

	N	Mean	Std. Deviation
1 Year to 2 Years	90	14.0000	3.10852
2 Years to 3 Years	160	12.7500	2.28476
3 Years to 4 Years	140	12.5000	2.26801
4 Years to 5 Years	80	10.3750	2.00868
More than 5 Years	30	6.3333	1.91785
Total	500	12.1400	2.99639

Source: Based on Authors' Analysis of Primary Data

Before applying ANOVA, assumption of ANOVA was tested with respect to homogeneity of variances using Levene's Statistic.

Table 1.7: Test of Homogeneity of Variances [DV: Agricultural Development; IV: Agricultural PSL Duration]

Levene Statistic	df1	df2	Sig.
5.332	4	495	0.000

Source: Based on Authors' Analysis of Primary Data

Levene's statistic tests the hypothesis that variances of the populations from which different samples are drawn are equal. Table 1.7 shows the significance value of Levene's Statistic based on mean as 0.000, which is lesser than .05. This implies that variance is equal across groups is violated. Hence, Tukey's Post Hoc test has been conducted to study the differences in variances of various Agricultural PSL duration groups.

Table 1.8: ANOVA [DV: Agricultural Development; IV: Agricultural PSL Duration]

ONE WAY ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1649.783	4	412.446	72.131	0.000
Within Groups	2830.417	495	5.718		
Total	4480.200	499			

Source: Based on Authors' Analysis of Primary Data

From above table 1.8,

(i) F value is 72.131 which is more than critical value of F (2.37).

(ii) Significance value (p) is 0.000 which is less than 0.05.

Thus, null hypothesis (H01 with respect to agricultural PSL duration) is rejected. There is a significant difference in average performance score of various respondent groups, as per the Agricultural PSL duration, with respect to improvement in agricultural development after availing Agricultural PSL.

Table 1.9: Post-Hoc test (Tukey's HSD) [DV: Agricultural Development; IV: Agricultural PSL Duration]

Tukey HSD

Multiple Comparisons						
(I) Agricultural_PSL_duration (J) Agricultural_PSL_duration		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1 Year to 2 Years	2 Years to 3 Years	1.25000*	0.31507	0.001	0.3874	2.1126
	3 Years to 4 Years	1.50000*	0.32307	0.000	0.6155	2.3845
	4 Years to 5 Years	3.62500*	0.36744	0.000	2.6190	4.6310
	More than 5 Years	7.66667*	0.50412	0.000	6.2865	9.0469
2 Years to 3 Years	1 Year to 2 Years	-1.25000*	0.31507	0.001	-2.1126	-0.3874
	3 Years to 4 Years	0.25000	0.27673	0.896	-0.5077	1.0077
	4 Years to 5 Years	2.37500*	0.32743	0.000	1.4785	3.2715
	More than 5 Years	6.41667*	0.47575	0.000	5.1141	7.7192
3 Years to 4 Years	1 Year to 2 Years	-1.50000*	0.32307	0.000	-2.3845	-0.6155
	2 Years to 3 Years	-0.25000	0.27673	0.896	-1.0077	0.5077
	4 Years to 5 Years	2.12500*	0.33514	0.000	1.2074	3.0426
	More than 5 Years	6.16667*	0.48109	0.000	4.8495	7.4838
4 Years to 5 Years	1 Year to 2 Years	-3.62500*	0.36744	0.000	-4.6310	-2.6190
	2 Years to 3 Years	-2.37500*	0.32743	0.000	-3.2715	-1.4785
	3 Years to 4 Years	-2.12500*	0.33514	0.000	-3.0426	-1.2074
	More than 5 Years	4.04167*	0.51193	0.000	2.6401	5.4433
More than 5 Years	1 Year to 2 Years	-7.66667*	0.50412	0.000	-9.0469	-6.2865
	2 Years to 3 Years	-6.41667*	0.47575	0.000	-7.7192	-5.1141
	3 Years to 4 Years	-6.16667*	0.48109	0.000	-7.4838	-4.8495
	4 Years to 5 Years	-4.04167*	0.51193	0.000	-5.4433	-2.6401
*. The mean difference is significant at the 0.05 level.						

Source: Based on Authors' Analysis of Primary Data

The study shows a statistically significant difference between groups as determined by One Way ANOVA (F=72.131, p=.000). Tukey's post hoc test, as seen in Table 1.9 above, revealed that the improvement in agriculture of beneficiary farmers was greater among those belongs to more

agricultural PSL duration. The different PSL duration groups, 1 year to 2 years, 2 years to 3 years, 3 years to 4 years; 4 years to 5 years, and more than 5 years, have different mean 14.00, 12.75, 12.50, 10.38 and 6.33 respectively in descending order. Thus, the positive impact on agriculture of different agricultural PSL duration groups is in ascending order. **The more PSL duration, the more improvement in Agricultural Development, they have.** This can be attributed to the fact that the more agricultural PSL duration helped more developments in agricultural machineries and quality of inputs increasing productivity and quantity of farm produces, hence leading to an improvement in agriculture of the sample beneficiary farmers.

Regression

The impact of two independent variables, i.e x_1- agricultural PSL size, x_2- agricultural PSL duration, are seen on dependent variable, Y_a- agricultural development, one by one using regression. The study aimed at finding out those independent variables that were significantly related to the dependent variable.

Table 1.10: Correlation between Dependent and Independent Variables

	Agricultural PSL Size	Agricultural PSL Duration
Agricultural Development	0.739	0.544

Source: Based on Authors' Analysis of Primary Data

Table 1.10 above depicts correlation between dependent variable (Agricultural Development) and independent variables (Agricultural PSL Size and Agricultural PSL Duration). It can be observed that agricultural development has strong positive correlation with agricultural PSL size, whereas moderate positive correlation with agricultural PSL duration and both are greater than 0.5 which fulfils the assumption of regression analysis.

Dependent Variable: Agricultural Development

Independent Variable: Agricultural PSL Size (APSL_S), Agricultural PSL Duration (APSL_D)

Table 1.11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.739[a]	0.546	0.544	2.02331	1.128

Source: *Based on Authors' Analysis of Primary Data*a. Predictors: (Constant), APSL_S, APSL_D

From above table 1.11, the adjusted R square value is 0.544, which shows that the variance in dependent variable is accounted to 54.4 percent by the independent variables. And the regression equation is

$$\mathbf{Y_a = a + bx_1 + cx_2}$$

Where, Y_a = Agricultural Development

a = constant

x_1 = Agricultural PSL Size

b = coefficient of x_1

x_2 = Agricultural PSL Duration

c = coefficient of x_2

Table 1.12: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2445.589	2	1222.794	298.695	<.001[b]
	Residual	2034.611	497	4.094		
	Total	4480.200	499			

Source: Source: *Based on Authors' Analysis of Primary Data*

a. Dependent Variable: Agricultural Development

b. Predictors: (Constant), APSL_S, APSL_D

As may be seen from Table 1.12 above, the p-value is <.001, which is less than .05. It implies that The null hypothesis H02 is rejected with respect to agricultural PSL size and PSL duration. This means that there is a significant impact of the independent variables on the dependent variable. In order to find out the relative impact of agricultural PSL size and agricultural PSL duration, standardised beta coefficients are calculated as below

Table 1.13: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.418	0.334		13.238	0.000	3.762	5.073
	PSL size	2.216	0.134	0.756	16.521	0.000	1.953	2.480
	PSL duration	0.062	0.121	0.024	0.514	0.608	0.300	0.176

Source: Based on Authors' Analysis of Primary

a.Dependent Variable: Agricultural Development

From table 1.13, the standardised beta value for agricultural PSL size is 0.756 and for agricultural PSL duration is 0.024. The agricultural PSL size has a greater impact on improvement in agriculture of sample beneficiary farmers as the value of standardised beta is found to be greater for agricultural PSL size than that of agricultural PSL duration.

Table 1.14: Summary of Hypothesis Testing

Sl No	Hypothesis	Result
1	H_{01}: Level of improvement in agricultural development does not differ significantly among sample beneficiary farmers of various groups as per agricultural PSL size and PSL duration.	Rejected
2	H_{02}: There is no significant impact of agricultural PSL size and PSL duration on agricultural development of sample beneficiary farmers.	Rejected

Source: Based on Analysis

Findings

1. 80 percent of the beneficiary farmers have experienced the improvement in their agricultural development.
2. The more agricultural PSL size and PSL duration, the more agricultural development of beneficiary farmers received.
3. Agricultural development has strong correlation with PSL Size and PSL duration.
4. Agricultural PSL size and PSL duration have significant impact on agricultural development of beneficiary farmers. The PSL size has more impact than PSL duration.

Conclusion

The agricultural priority sector lending had great impact on improvement of agricultural development on the beneficiary farmers through the increased use of quality inputs (HYV seeds, fertilizers, herbicides etc), modern farm machineries (seeding, spaying, thrashing etc), intensive farming through more crops per year, improved irrigation facilities in terms of more water availability and better water management. All these activities improved the farm productivity per acre and in total farm produce. Thus, agricultural priority sector lending through Bank of Baroda as the lead bank in Bareilly district has positive impact on the agricultural development of beneficiary farmers.

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Challenges, Opportunities and Productivity Trends: A Comparative Study of Uttar Pradesh and Uttarakhand

Mrs. Shriya Sethi [1]

ABSTRACT

The global population is expected to reach 9.7 billion necessitating a doubling of food production. In response to it, the focus on sustainable agriculture has deepened with millet emerging as a powerful player due to its environmental sustainability, nutritional benefits and resilience to harsh climates. Despite being overshadowed by a lot of processed food over time, millet is gaining its importance back especially in India. The paper provides a comprehensive overview of millets, their historical background, nutritional composition and their role in food security. Also, the paper makes a comparative study of the types of Millet crops cultivated in Uttar Pradesh, Uttarakhand and All India and the trends in millet farming in India.

KEYWORDS: *Millets, Nutritional benefits, Sustainable Agriculture, food security, Awareness campaign.*

INTRODUCTION

By 2050, the world population is expected to reach 9.7 billion and the demand for food is expected to be doubled. This increase in demand for food calls for sustainable agriculture. For the same reason, millet in India has gained attention due to its vast Nutritional benefits, environmental sustainability and resistance to harsh climatic conditions. Millets come under the category of environmentally friendly, gluten-free and very nutritional in nature. Traditionally it was an essential part of diet with time it lost its value due easy availability of processed food.

India produces 40% of the world's total production and approx. 80% of Asia's Millet production. This market is set to reach $12 billion by 2025. Major producers of millets are Uttar Pradesh, Madhya Pradesh, Haryana, Rajasthan and Maharashtra. Millets have acted as a superfood. After realising its importance Government of India is leaving no step unturned to bring to notice its nutritional benefits both for the crop and humans consuming it.

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HISTORICAL BACKGROUND

Millets have a history that is thousand years older and grown on multiple continents. It was among the earliest cultivated crops and was considered a staple food in many ancient cultures before the widespread cultivation of rice and wheat. There are a variety of millet, such as proso millet and foxtail millet, that are cultivated in Asia, Africa, and Europe, contributing to food security.

China cultivated proso millet and foxtail millet around 7000 BCE. Further in 5000 BCE Millets were widespread even in Northern China, providing a reliable food source in the dry and cold regions. Millets were converted into flour and cooked in earthenware vessels. Back then it served as a staple food for early Chinese communities. The cultivation of millets reached Europe by around 6000 BCE, grown in regions such as Ukraine, Georgia, and Germany during the Neolithic period. Even there it served as sustenance to early agricultural societies and also was acted as a staple grain for various European civilizations.

The exact origins of millets in India are not very well known but they have been cultivated across various regions of the country for millennia. Archaeological evidence suggests that millets were grown in regions such as Gujarat and Punjab during the Harappan period (2500– 1400 BCE). Some of the earliest forms found in India include pearl millet (bajra), finger millet (ragi), sorghum (jowar), and foxtail millet (kangni). Traditionally grown as rain-fed crops which is very well suited for the dry climate These millets have been staple foods for rural area communities even in South India, Maharashtra, Rajasthan, and a few other states.

OBJECTIVE

1. Analyzing the Production Trends and Evaluate the Market Potential of Millets in India:
2. Comparative Analysis of Millet Cultivation in Uttar Pradesh, Uttarakhand, and All India.
3. To study the Role of Government Initiatives in Promoting Millet Cultivation and Consumption.

TYPES OF MILLET

In the recent years, Millet has got back its long-lost value but it is still considered as one of the staple crops in developing countries. Millets are looked up as a great way to improve food security and reduce poverty. There are several types of millets, each has its unique characteristics and benefits.

Pearl millet also known as Bajra. It is one of the most widely grown millets in India particularly in arid and semi-arid climates. It is a staple food in many parts of India. Highly nutritious, and rich in fiber, protein, iron and magnesium. It is commonly used to make flatbreads (rotis), porridge and various traditional dishes.

Foxtail Millet is known as Kangni or Kakum in Hindi. China is considered to be the center of origin contributing to more than 45% of world production. The crop matures in less than 70- 120 daysAn ancient grain that has gained popularity due to its vast nutritional benefits. It is rich in protein, fiber, and micronutrients like iron, magnesium, phosphorus and calcium. It has a low Glycemic index making it a suitable option for people with diabetes and gluten intolerance. In India, it is used to make porridge, upma, dosa.

Finger Millet is commonly known as Ragi. It is a staple food of many South Asian and African countries. Also, it acts as an important millet crop in India, especially in Karnataka and Tamil Nadu. It is highly nutritious and rich in protein calcium, iron, and potassium. Ragi is cooked like rice to make porridge or used to make dosa, cakes, roti, idli and various traditional dishes. The grain is speedily digestible giving it the ability to control blood sugar levels and even help in losing weight.

Little Millet also known as Kutki or Saamai is a small-grained millet. It is cultivated in both drought-prone areas and in water-logged conditions with an early maturing period. India, particularly in southern states like Karnataka, Tamil Nadu, and Andhra Pradesh. It is a good source of protein, fiber and essential minerals like iron and phosphorus. It has high nutritional benefits and can grow well in poor soil conditions.

Sorghum also known as Jowar. It is a warm-season crop, intolerant to low temperatures but resistant against pests and diseases. Sorghum mostly produced in North and South America is used to feed animals and is a staple food crop both in India and Africa. Being gluten-free in nature it makes a good food option for wheat-intolerant people. Also, it is high in fiber, protein, and iron.

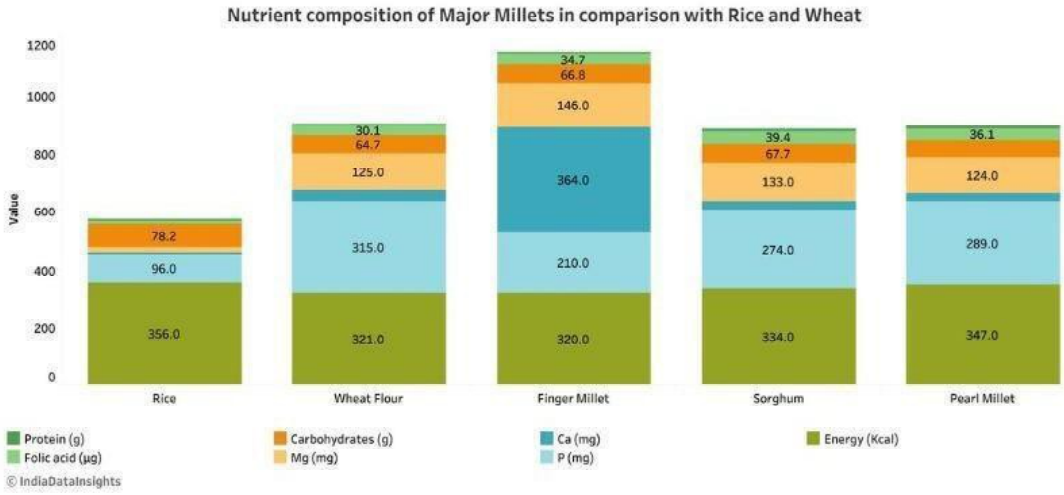


Figure 1 (Source: India Data Insights)

Figure 1 indicates Millets are considered to be a natural source of Iron, Zinc, calcium and some other nutrients. It also constitutes a higher content of Folic acid, calcium, iron, potassium, magnesium and zinc compared to rice and wheat. The figure depicts finger millets as the richest source of calcium.

Role of Millets in Human Diet

Millets have played a significant role in the human diet. Its benefits surpass other cereals in multiple ways due to its high composition of Calcium, Iron, and Magnesium, low Glycaemic Index, and a good level of protein and fiber.

Millets in Food Security

Food security is defined as when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.(1996 World Food Summit)

Nutritional security and food security are two deeply interconnected concepts for individuals, communities and nations. The G20 countries and the European Union make it about 85 % of the world's GDP,75% of Global trade and 2/3rd of the world's population. Hence, the role of these countries becomes important in ensuring food & nutritional security. (OECD, "About")

Due to COVID-19, the number of undernourished people increased to 768 million depicting how critical the status of nutrition is. Various steps were taken during the G20 preceding, one of which is the Agro-Food Value Chain. Countries like the US, Japan and Canada have high security compared to countries like India and Indonesia.

India's share of agriculture and allied activities in the total Gross Value Addes has improved to 18.8% in 2021-22 compared to 20.2% in 2020-21. India has transformed from a food deficit nation to a self-sufficient nation. All this is due to National Food Security Act (NFSA),2013 in which the Public distribution reached around 813 million people and provided millets, white and rice to them.

TRENDS OF MILLET FARMING IN INDIA

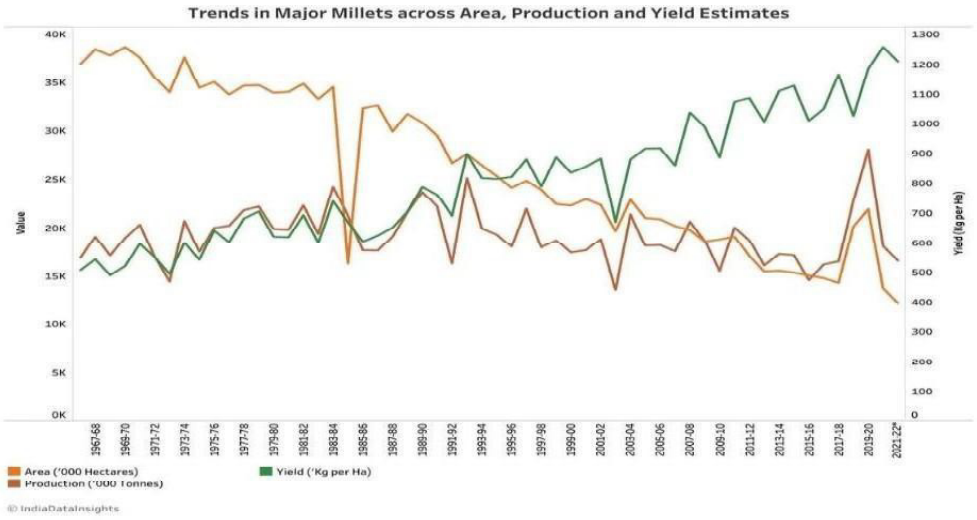


Figure 2 (**Source:** India Data Insights)

Figure 2 signifies that since 1966, Millet yield in India has been more than doubled. The production of millets has increased by 7% in 1966-2022. In 2021-22 India's average yield was 1208 kgs per hectare. Since 1971-72, the area under millet cultivation decreased. A major drop in the area was seen between 2006-2016.

Despite the positive trends, millet production in India still faces challenges due to low productivity, limited access to markets and credit, lack of value-addition infrastructure and price fluctuation.

PER CAPITA AVAILABILITY OF MILLETS IN INDIA

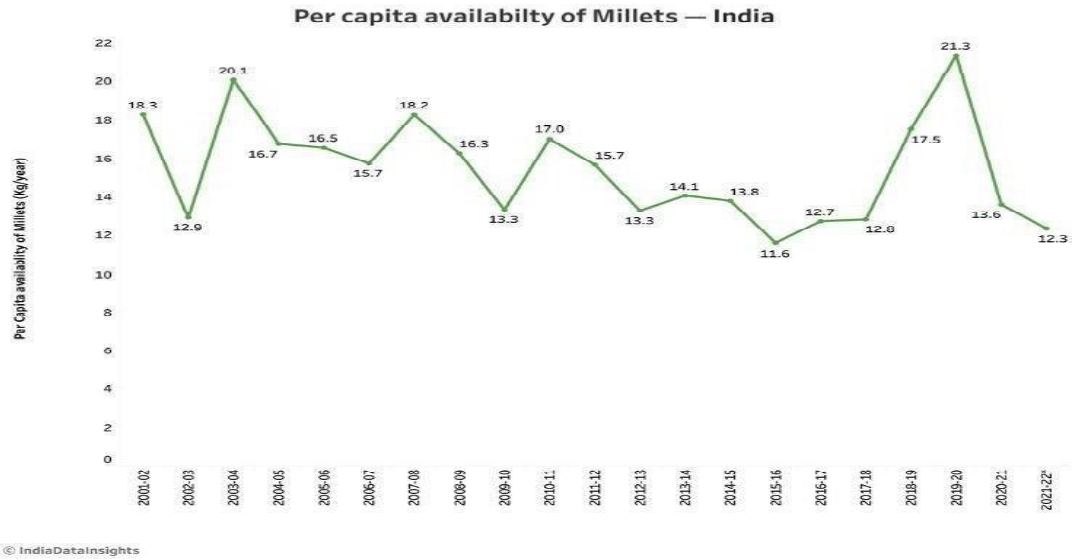


Figure 3 (Source: India Data Insights)

As per Figure 3, major fluctuation is seen in the Per capita availability of millets. An All time high was seen in 2019 where it was 21.3 kgs of millet available per person. In 2021, it was 12.3 kgs available per person.

A COMPARATIVE STUDY OF UTTAR PRADESH, UTTARAKHAND AND ALL INDIA

UTTARAKHAND

Uttarakhand has a varying landform from hills to plain. The soil is gravel and light in texture due to which it retains water for long, making it suitable for millet cultivation. The traditional crops include barnyard millets barnyard millet, finger millet, and foxtail millet. About 55% of the total cultivated area is rainfed and millets are known to grow under such situations, when other crops fail to produce millet does a fair harvest.

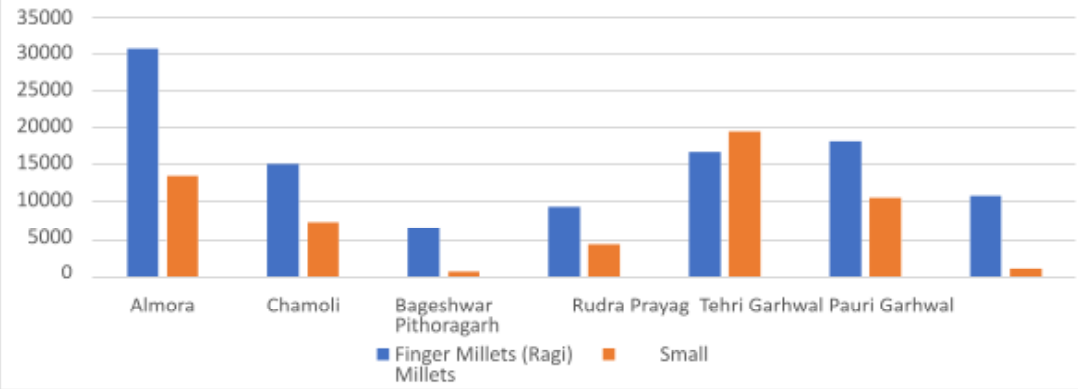
In the past decade, some of the crops cultivated have become locally extinct such as Foxtail millet which was largely cultivated 2 decades ago. Although the production of Finger millet and Barnyard millet doubled to what it was three years ago. In 2014-15 Finger millet grain was 6 to 7 quintals per hectare whereas in 2017-18 it was 12 quintals per hectare.

Table: Major millets-producing districts of Uttarakhand

Year 2020-21		Production (Tonnes)	
S.	**District**	**Finger Millets (Ragi)**	**Small Millets**
1.	Almora	30713	13552
2.	Chamoli	15091	7372
3.	Bageshwar	6521	696
4.	Rudra Prayag	9357	4422
5.	Tehri Garhwal	16654	19527
6.	Pauri Garhwal	18161	10630
7.	Pithoragarh	10864	1217

Table 1 (Source: apeda.gov.in)

Figure 4



Graph 4 shows the distribution and scale of millet cultivation across different districts of Uttarakhand. It reflects the varying levels of agricultural activity and land suitability for millet cultivation. Districts like Tehri Garhwal and Pauri Garhwal have high production figures for both finger millets and small millets, suggesting good agricultural practices and favorable agro- climatic conditions. Other districts like Bageshwar and Pithoragarh show relatively lower production, indicating potential areas for improvement.

UTTAR PRADESH

Nearly 17% of the Indian population lives here. Uttar Pradesh has become an emerging state in the Indian economy due to its large network of expressways, Industrial areas, airports, Centers of Educational and Medicine and export units.

From table 2, it is seen that there has been some variation in both the area under cultivation

Year	Area (hectare)	Yield (kg/hectare)
2017-18	169	1270
2018-19	147	1247
2019-20	168	1349
2020-21	174	1578

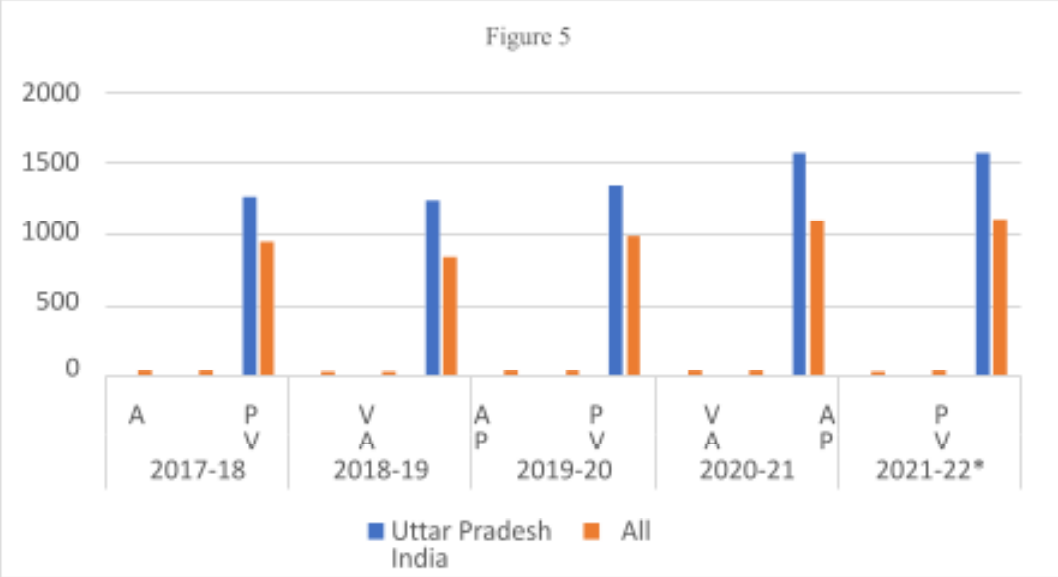
Table 2 (Source: apeda.gov.in)

and the yield per hectare. There was a slight fluctuation in the area. It decreased in 2018-19 followed by a rise in 2019-20, then a further increase in 2020-21. Meanwhile, the yield per hectare to increased steadily over the same period. The increasing trend in yield could be due to some improvement in agricultural practices such as better irrigation, fertilization, pest control or crop selection. Farmers must have adopted more efficient techniques or produced improved crop varieties that led to higher output.

CROP JOWAR-Comparison between Uttar-Pradesh and All India

	2017-18			2018-19			2019-20			2020-21			2021-22*		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
UP	1.69	2.15	1270	1.47	1.83	1247	1.68	2.27	1349	1.74	2.75	1578	1.71	2.75	1578
All India	50.24	48.03	956	40.93	34.75	849	48.24	47.72	989	43.78	48.12	1099	38.08	48.12	1110

Table 3 (Source-Directorate of Millet Development) A-Area, P-Productivity, Y- Yield

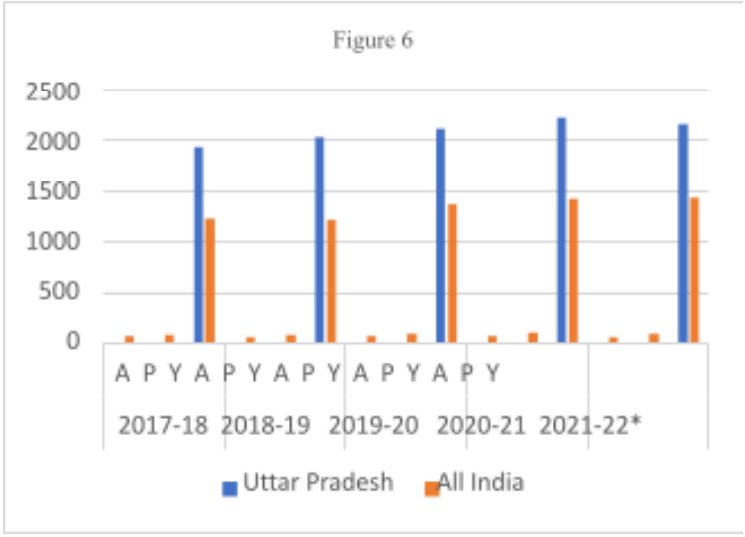


As per Figure 5, Uttar Pradesh has smaller land area yet the production and yield of Jowar is higher in comparison to whole of India whose whose yield is lower in comparison to the area it has. This shows efficient agricultural practices or favourable conditions for agriculture in Uttar Pradesh

CROP BAJRA- Comparison between Uttar-Pradesh and All India

	2017-18			2018-19			2019-20			2020-21			2021-22*		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	V
Uttar Pradesh	9.25	17.95	1940	8.77	17.79	2029	9.17	19.39	2115	9.07	20.14	2221	9.04	19.49	2156
All	74.81	92.09	1231	71.05	86.64	1219	75.43	103.63	1374	76.52	108.63	1420	67.03	96.24	1436

Table 3 (Source-Directorate of Millet Development) A-Area, P-Productivity, Y- Yield



As per Figure 6, the yield of Bajra in Uttar Pradesh has shown improvement over the years. This suggests that the state is efficiently utilizing its land resources to generate higher output per unit. In comparison to the larger land area, the yield is relatively lower compared to Uttar Pradesh.

CROP SMALL MILLETS- Comparison between Uttarakhand, Uttar Pradesh and All India

States	2017-18			2018-19			2019-20			2020-21			2021-22*		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Uttarakhand	0.59	0.76	1288	0.56	0.7	1248	0.53	0.71	1339	0.49	0.71	1449	0.47	0.73	1559
Uttar Pradesh	0.09	0.06	650	0.06	0.05	755	0.08	0.06	728	0.12	0.09	765	0.07	0.05	714
All India	5.46	4.39	804	4.54	3.33	734	4.58	3.71	809	4.44	3.47	781	4.23	3.75	885

Table 4 (Source-Directorate of Millet Development) A-Area, P-Productivity, Y- Yield

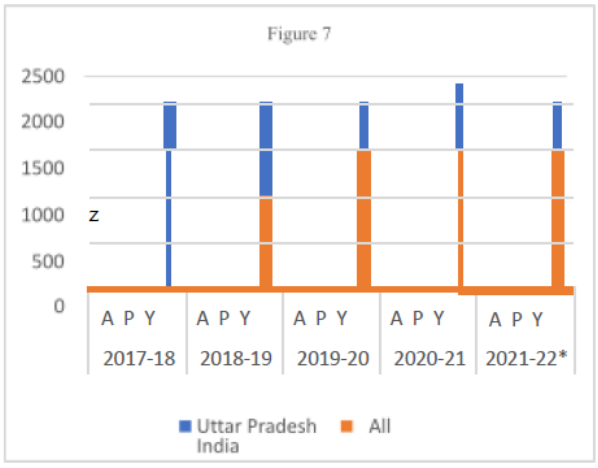


Figure 7 shows that Uttarakhand has a relatively small land area compared to Uttar Pradesh and All India yet it has higher productivity of Small Millets compared to Uttar Pradesh and All India. The yield in Uttarakhand is relatively high and shows a consistent trend over the years. This suggests that the state efficiently utilizes its land resources to achieve higher due to favorable climatic conditions, agricultural practices, or economic activities.

State	Jowar	Bajra	Ragi	Small Millets
Uttar Pradesh	269.84	1951.18	0	4.63
Uttarkhand	0	0	127.11	73.27
All India	4150.57	9780.63	1701.12	367.44

Table 5 source: apeda.co.in

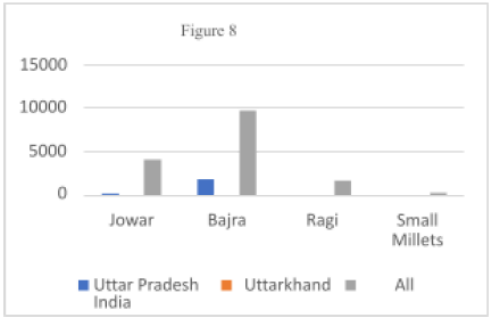


Table 5 Source: apeda.co.in

FINDINGS: Figure 8 indicated the following-

Jowar (Sorghum): Uttar Pradesh has a substantial production of Jowar but Uttarakhand doesn't have any reported production of it. In the All India data Jowar has a significant production reflecting its importance as a staple food crop in various regions of the country.

Bajra (Pearl Millet): Uttar Pradesh shows a substantial production of Bajra. Bajra is a drought-resistant crop, which explain its popularity in regions with erratic rainfall patterns. Uttarakhand doesn't report any production of Bajra. All India has a significant production of

Bajra, reflecting its importance as a staple food crop in many parts of the country, especially in arid and semi-arid regions.

Ragi (Finger Millet):Uttar Pradesh doesn't report any production of Ragi whereas Uttarakhand shows a moderate production of the same. It is suitable for cultivation in hilly regions like Uttarakhand. All India reports a significant production of Ragi, reflecting its importance as a nutritious cereal crop, particularly in regions with poor soil fertility or adverse climatic conditions.

Small Millets : Uttar Pradesh shows a minimal production of Small Millets, indicating that they may not be commonly cultivated in the state whereas Uttarakhand shows a moderate production of Small Millets**.** All India reports a significant production of Small Millets, reflecting their importance as climate-resilient and nutritious crops, particularly in regions with marginal agricultural conditions.

CHALLENGES

Due to modern agricultural practices and changing environmental conditions, producing millet in the present times leads to several challenges. Some of the key challenges are:

1. **Climatic changes:** Millets are adapted to low moisture and high temperatures so semi-arid and arid regions are preferred for millet cultivation. However, climate change has led to

variability in weather patterns such as erratic rainfall and long-term droughts. All this negatively impacts millet yields.

2. **Limited Research and Development:** Research and development play a crucial role in creating knowledge and disseminating it to farmers, processors, and other stakeholders Despite

1. having high nutritional and economic benefits, millet has not received much attention from researchers and policymakers compared to major cereal crops like rice, wheat, and maize. Low investment in R&D results in obsolete information on cultivation techniques, processing technologies, and market trends. All this hampers the adoption of best practices and the overall growth and sustainability of the millet sector.

3. **Agricultural Challenges:** Farmers wish to produce those crops that have high yield and high profit margins. Unlike millets whose productivity and profitability both are low thus discouraging the farmers.

4. **Market Access and Value Chains:** Millet markets have inconsistent demand and supply that affect their commercial viability. Even the farmer face challenges in accessing markets and obtaining fair prices for their produce. Due to a lack of infrastructure, the post-harvest process of handling, processing, and storage of millets is not efficiently done leading to losses and reduced profitability. Strengthening millet value chains through better market linkages, value-added processing, and market diversification can help improve incomes for millet farmers.

5. **Changing Dietary Preferences:** Rapid urbanization, globalization and shifts in dietary preferences have led to a decline in traditional millet consumption in favor of more processed and refined foods. Consumption of Traditional millet declined due to urbanization, globalization and modernization. Refined and processed food has been on the rise due to easy availability and less cooking time.

6. Dominances of cereal crops-Green Revolution brought a significant change in the production of Wheat and Rice via HYV seeds, Chemical fertilizers and irrigation. All this led to a decrease in the Cultivation of traditional crops like millet. Thereby making millets difficult to compete in the market.

7. **Challenges in Millet Processing:** The millet processing machines available in India have a low recovery rate of 70-80% of grains. Due to this, the output has more un-hulled and broken grains. Dehulling efficiency is affected by the impeller speed. As millet grains differ in size, shape, and husk content, it becomes difficult for one dehuller to dehusking all types of millets. Just like Kodo and Barnyard Millet contain multiple seed coats, it requires a double-stage dehuller to remove the husk.

OPPORTUNITIES

Millets once known as Inferior grains are now considered Super grains for the health, economic and environmental benefits it offers.

1. **Promotion and Awareness:** There is a need for awareness campaigns to educate consumers about the health benefits of millet and promote their consumption. Businesses can capitalize

on this idea and organize marketing campaigns, cooking demonstrations, and events centered around millets. As Food festivals are booming in India. Organizing food tastings, themed dinners, or partnering with locals can create a buzz in the market for millets. On 18th May, 2023, Michael's Kitchen Bhubaneshwar, Odisha conducted a Millet food festival in Collaboration with Odisha Millets Mission where many housewives were invited for a cooking competition

2. **Food Processing and value addition:** Entrepreneurs can invest in units such as dehusking, milling, and value-added products. Millets can be processed in various products such as Bakery products, Extruded snacks, Instant mixes and Flour. Due to its high nutritional benefits Government is making all efforts to publicize it
3. **Retail and Distribution:** Creating a network for millet products can be a lucrative idea. The government is making all the efforts to run an awareness program that can help drive consumer demand. Setting up dedicated millet stores, developing an e-commerce site, and grocery stores to stock millet products.
4. **Research and Development:** Investment in research and development is another important aspect. It aims at enhancing the yield, quality and high nutritional content of millets can act as an accelerator to the growth of the millet sector. Research institutions, universities, and private companies should come forward and collaborate to produce more and improved millet varieties.
5. **Agricultural Production:** Demand for millets is growing not only domestically but also internationally. Farmers can earn a great deal of profit by diversifying crops and cultivating varieties of millets. Government schemes and initiatives are been provided to the farmer to promote millet cultivation.
6. **Export Market:** India has the potential to become a leading exporter of millet due to its favourable agro-climatic conditions for millet cultivation. Exporting millet and millet-based products to countries with a growing health-conscious population can be a profitable business opportunity.

GOVERNMENT INCENTIVES

1. The National Food Security Mission (NFSM) for Millets was launched to increase the production and productivity of millet crops such as sorghum, pearl millet, finger millet, and small millets. The major aim is to enhance the income of farmers and ensure food security by promoting millet cultivation in suitable climatic areas.
2. The government is promoting millets through subsidies and incentives to farmers for adopting millet cultivation practices. Subsidies on seeds, fertilizers, pesticides and machinery are being given for adopting organic farming and sustainable agriculture.
3. The Indian Council of Agricultural Research (ICAR) and state agricultural universities conduct several research and development activities to develop high-yielding varieties of millet as was done for Rice and wheat. Further to improve agronomic practices, make farmers aware of the pests, diseases, and climate resilience.

4. Farmers producing millets are ensured with minimum support prices (MSPs) and procurement mechanisms to stabilize the market prices and provide secure income to the farmer.
5. Millets have been included in the PDS and a few other welfare schemes such as the Mid- Day Meal Scheme and Integrated Child Development Services (ICDS) Scheme. Under these schemes overall demand for millet is increased and nutritional support of vulnerable populations is also taken care of.
6. The United Nations General Assembly in March 2021 during its 75th session declared 2023 the International Year of Millets. This was a major move to raise awareness and highlight the new market opportunities.

CONCLUSION

In conclusion, Millet is a wonderful option for practicing sustainable agriculture. A major paradigm shift is needed to bring a change in Indian food preferences. However, various challenges need to be addressed to make it a viable option. All this can be achieved with correct initiatives and support by the Government, adopting improved technology, promotion of millet consumption and provision of financial and technical assistance to the marginal and small farmers. Under, the comparative analysis we conclude that state as per the availability and texture of the soil, climatic conditions are performing well. The interstate governments is working hard to revive the long-lost identity and make it the food for future.

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Transforming Indian Agriculture: The Role of AI in Enhancing Efficiency and Sustainability

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ABSTRACT

Rural development in India is deeply intertwined with the agricultural sector, a cornerstone of the nation's economy. Integrating AI-driven agricultural innovations transforms traditional farming practices by enhancing resources, efficiency, and scalability. By 2030, India is projected to require nearly 300 million tons of food grains, including approximately 122 million tons of rice, 102million tons of wheat, 41 million tons of coarse grains, 28 million tons of pulses, and 143 million tons of milk. AI technology is pivotal in modernizing agriculture, leading to more efficient, sustainable, and productive practices.

This paper uses secondary data from various sources, including websites, publications, and the Ministry of Agriculture & Farmers Welfare, to examine how AI enables farmers to optimize crop yields, manage resources more effectively, and minimize environmental impact. AI tools facilitate real-time monitoring of soil health, weather patterns, and crop growth, leading to informed decision-making and reduced waste.

Furthermore, AI-driven systems can predict pest infestations and disease outbreaks, safeguard crops and enhance food security. This paper concludes by emphasizing the need for future empirical research and the development of specialized AI tools tailored to the specific needs of the Indian rural agricultural sector. It also underscores the importance of policies ensuring equitable technology access and fostering inclusive growth.

Keywords: *Artificial Intelligence (AI), Agricultural Innovation, Rural Development, Sustainable Agriculture*

Introduction

The Indian economy largely relies on agriculture, which serves as the main source of income for the majority of Indian farmers. More than 55 percent of the country's populations still depend on agriculture. As of 2011, rural areas host 742 million or over 55 percent of population. About 55

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percent of India's total workforce is rural. Indian agriculture has surpassed many obstacles and successfully moved from the status of being a self-deficient country to a self-sufficient one in food grains as well as in several other sectors of agriculture. Agriculture plays a crucial role in the country's economic growth and is a primary means of livelihood for many people in India. However, despite its central importance, rural development in India faces numerous challenges, ranging from limited access to modern agricultural practices to inadequate infrastructure and market linkages.

The incorporation of Artificial Intelligence (AI) into agricultural supply chain management signals a new era in the industry, defined by enhanced efficiency, better decision-making, and a strong shift towards data-driven approaches which leads to enhancing agricultural productivity and improving farmers' livelihoods. AI is driving agricultural innovation, playing a pivotal role in the development of rural areas. Through advanced technologies like precision farming, predictive analytics, and automated machinery, AI is helping to optimize crop yields, reduce costs, and improve the overall efficiency of farming practices. This technological revolution is not only enhancing productivity but also contributing to the sustainable growth of rural communities.

By evaluating the adoption, outcomes, and challenges linked to these initiatives, the research aims to offer insights into how technology supports sustainable development in rural areas. Through a detailed analysis, this study adds to the ongoing discussion on utilizing technology for agricultural transformation and enhancing rural prosperity.

Review of Literature

Rural development in India is a critical aspect of the country's socio-economic landscape, characterized by diverse challenges and opportunities. The agricultural sector, as the primary livelihood source for a significant portion of the population, plays a central role in rural development (Singh &Swanson, 2019). Scholars have highlighted the multifaceted nature of rural development, encompassing issues such as poverty alleviation, infrastructure development, and social empowerment (Bhalla, 2020; World Bank, 2020).

The Government of India has actively promoted digital initiatives to catalyze rural development. The "Digital India" campaign, launched in 2015, aims to empower citizens through the use of digital technologies (Government of India,2022). Within the agricultural sector, the National Agriculture Market (e-NAM) platform is a notable initiative designed to create a unified national market for agricultural commodities (Government of India, 2022).

Sri Ram Kasyap C.V, Shikha Tiwari (2024) did a study on "CROP MANAGEMENT USING ARTIFICIAL INTELLIGENCE: A LITERATURE SURVEY" The use of artificial intelligence (AI) in agriculture is becoming increasingly popular as a way to improve crop management, soil health, and overall efficiency in farming practices. AI-powered solutions also help farmers determine the best time to plant seeds, calculate seed spacing, and monitor crop health. These technologies aim to increase productivity, reduce waste, and minimize negative environmental impacts in agriculture. This article highlights the various applications of AI in soil and crop management, weed control, and disease management, emphasizing the strengths and limitations of these technologies.

Objective of the Study

- To analysis government AI initiatives aimed at improving agricultural productivity in rural areas.

Analysis of Government AI initiatives aimed at improving agricultural productivity in rural areas.

AI initiatives in agriculture have been implemented in various states across India like Andhra Pradesh, Karnataka, Uttar Pradesh, Maharashtra etc. These initiatives focus on enhancing farming practices, increasing productivity, and improving farmer welfare. Here we take different initiatives from several states and make a comparative study of it:

Case study of AI initiatives in Uttar Pradesh

Artificial Intelligence (AI) is playing a significant role in transforming agricultural practices in Uttar Pradesh (UP), one of India's largest agrarian states. Here's an overview of AI applications in agricultural innovation in Uttar Pradesh, with data sights:

Key AI-Driven Agricultural Initiatives in Uttar Pradesh:

- **Precision Farming:** AI technologies are used to collect and analyze data from various sources like satellites, drones, and sensors to guide farmers in making informed decisions about planting, irrigation, and fertilization. This leads to optimal resource usage, reduces waste, and improves crop yields. For example: The use of AI-based soil health monitoring systems helps farmers understand the nutrient levels and moisture content of their land. AI algorithms recommend precise inputs to improve productivity.
- **Smart Irrigation Systems:** Water scarcity and inefficient irrigation practices are a challenge in UP. AI-enabled smart irrigation systems help in real-time monitoring of soil moisture and crop water requirements. AI platforms like Kisaan Network and Gramophone provide personalized recommendations for irrigation scheduling. **According to a report by NITI Aayog,** Uttar Pradesh has the potential to increase water-use efficiency by 20-25% through the implementation of AI-based irrigation systems.
- **Pest and Disease Management:** AI models using image recognition and machine learning algorithms can detect pests and diseases in crops by analyzing images taken by drones or smartphones. Farmers receive real-time alerts and suggestions for pest control and disease management. The Plantix app and AgroStar are widely used platforms in the region. According to a pilot program conducted in **EasternUttar Pradesh** reduced crop damage by 30%* through early detection of pests using AI tools, according to state agricultural department reports.
- **Market Linkages and Price Forecasting**: AI is also being used to predict price trends and connect farmers directly to markets, thereby reducing their dependence on intermediaries. AI-powered platforms like eNAM (Electronic National Agriculture Market) and DeHaat offer price forecasting, demand estimation, and market access to farmers in Uttar Pradesh. In the

2022–23 season, AI-based market price prediction tools helped reduce price fluctuations by 15-20%*, enabling farmers to secure better deals for their produce.

Case Study of AI Initiatives in Andhra Pradesh

Andhra Pradesh (AP) is one of the leading states that has embraced AI to enhance agricultural productivity, sustainability, and farmer welfare. Government of Andhra Pradesh has been collaborated with private companies for agricultural development with the help of AI. Here some initiatives are:

- **AP Government's e-Pragati Platform:** Andhra Pradesh's e-Pragati initiative is a comprehensive digital platform that integrates AI technologies in agriculture, enabling services such as crop monitoring, precision farming, and data analytics to enhance productivity and sustainability. The **e-Pragati** platform has been implemented across **500,000 hectares** of farmland, benefiting farmers by providing real-time insights into crop management and resource allocation.
- **Partnership with Microsoft and Wadhwani AI:** The Andhra Pradesh government has partnered with *Microsoft* to use AI in agriculture, with pilots focusing on precision farming, pest management, and weather prediction. Similarly, Wadhwani AI is working on AI projects aimed at improving crop protection and increasing yield through targeted interventions. A report by the **AP Agriculture Department** estimates that these AI-driven initiatives can help boost the state's agricultural productivity by **15-20%** over the next five years.
- **Public-Private Partnerships:** Through the Agritech Accelerator Program, the government of Andhra Pradesh is fostering innovation by collaborating with startups and tech companies to develop AI solutions tailored for the local agricultural landscape. Over 30 startups have participated in the accelerator, creating AI-based solutions for pest control, irrigation management, and crop health monitoring.

Case study of AI initiatives in Karnataka

Karnataka has emerged as a leader in integrating Artificial Intelligence (AI) into its agricultural sector to address challenges such as climate change, inefficient resource management, pest control, and market access for farmers. A detailed description of AI initiatives in Karnataka's agriculture sector is

- **Precision Agriculture and Crop Monitoring:** AI technologies are used in precision farming to monitor crops, soil health, and weather patterns, helping farmers make data-driven decisions. For ex: The Karnataka State Agriculture Department, in collaboration with Microsoft, has implemented AI-driven precision farming tools to help farmers optimize fertilizer and water usage.AI-based precision farming initiatives in **Mandya and Hassan districts** have shown a **15-20%** increase in crop yield through the optimized use of resources, according to a 2022 NITI Aayog report.
- **AI-Based Pest and Disease Management:** AI applications are transforming pest and disease management by using image recognition algorithms to detect pests and diseases in crops. Farmers can upload images of affected crops to platforms like **Plantix** and receive real-time diagnoses

and treatment recommendations. This helps in reducing the damage caused by pests and improves crop protection.In the **Haveri** and **Dharwad** districts, AI-powered pest detection reduced crop losses by **30%** in the **2020-21** agricultural season, benefiting more than **60,000** farmers.

- **AI in Crop Insurance:** AI models are being used to assess crop damage and automate the crop insurance claims process. Satellite imagery and AI-powered damage assessment tools can quickly identify areas affected by drought, floods, or pest outbreaks, leading to faster settlements of insurance claims. Under the **Pradhan Mantri Fasal Bima Yojana (PMFBY)**, the Karnataka government has implemented AI-based tools for assessing crop damage, particularly for crops like groundnut and pulses.
- **Public-Private Partnerships and Agritech Startups:** Karnataka is home to a thriving agritech ecosystem, with startups such as **Stellapps**, **Ninjacart**, and **Crop in** developing AI-powered solutions for farm management, supply chain optimization, and dairy farming. These startups have partnered with the state government and private firms to bring cutting-edge AI technology to rural areas. In **2021**, agritech startups in Karnataka attracted over **$150 million** in investment, with AI-powered platforms impacting the lives of over **200,000** farmers, according to the **Karnataka Innovation and Technology Society (KITS)**.

Case study of AI initiatives in Punjab and Haryana

Punjab and Haryana, two of India's major agricultural states, are increasingly adopting Artificial Intelligence (AI) to address agricultural challenges and enhance productivity. These initiatives span precision agriculture, pest management, smart irrigation, market linkages, and crop insurance. Here are the AI Initiatives in Punjab.

- **AI-Based Pest and Disease Management:** AI is used for early detection and management of pests and diseases. Image recognition tools and AI models analyze crop images to identify issues and suggest treatment options. The **Plantixapp** is utilized by Punjab farmers to diagnose pest and disease issues in crops. AI algorithms provide immediate feedback and management strategies. Use of the **Plantix app** in **Patiala** led to a **30%** reduction in pest-related crop damage, helping over 50,000 farmers improve crop health.
- **Smart Irrigation Systems:** AI-based smart irrigation systems help manage water resources efficiently by analyzing soil moisture, weather data, and crop needs to optimize irrigation schedules. **Punjab Water Resources Management and Development Corporation**, in partnership with **IBM**, has implemented AI-driven irrigation systems in water-scarce areas like Mansa.
- Yield Prediction and Crop Insurance: AI models predict crop yields and streamline crop insurance claims by analyzing historical data, weather patterns, and field conditions. **Punjab Remote Sensing Centre (PRSC)** uses AI for yield prediction of major crops, aiding farmers and policymakers in planning.AI-based yield prediction models increased accuracy by **15-20%**, benefiting 1 million farmers during the **2022** season.

AI Initiatives in Haryana

- Precision Agriculture and Crop Monitoring: Haryana is using AI to enhance crop management through precision agriculture techniques, similar to those in Punjab, utilizing data from IoT devices and satellite imagery. The **Haryana Department of Agriculture** collaborates with **CropIn** Technologies to implement AI tools for precision farming in crops like paddy, wheat, and cotton. AI-based precision farming in **Karnal** and **Kurukshetra** districts improved wheat yields by **18%** and reduced input costs by **20%**.
- **AI-Based Pest and Disease Management:** AI-driven solutions are used in Haryana to monitor and manage pest infestations and crop diseases, improving early detection and response. **Wadhwani AI**, in partnership with **Haryana Agricultural University (HAU)**, uses AI for pest and disease management in cotton crops.AI tools reduced pest-related losses by **25%** in cotton crops in **Hisar** and **Sirsa** districts during **2021**.
- **Smart Irrigation Systems:** Smart irrigation systems powered by AI help Haryana manage its water resources more effectively, addressing issues in drought-prone areas. **Haryana's Jal Shakti Abhiyan**, in collaboration with **Microsoft, deployed AI-driven smart irrigation systems in **Rewari** and **Mahendragar** districts**.**
- **Market Linkages and Price Forecasting:** AI-based platforms help Haryana farmers access real-time price forecasts and market linkages, facilitating better market decisions and fair pricing. The **Agri Haryana** portal utilizes AI for price forecasting and market access, connecting farmers with buyers and exporters. Farmers using AI tools on the **Agri Haryana** portal achieved an **18%** increase in income, according to the Haryana State Agricultural Marketing Board.

Case Study of AI initiatives in Maharashtra

Maharashtra is leveraging Artificial Intelligence (AI) to address various challenges in agriculture. The state is actively collaborating with technology firms, research institutions, and government bodies to integrate AI solutions into agricultural practices.

- Precision agriculture: In Maharashtra uses AI to enhance crop management through data analysis from drones, satellites, and IoT sensors. The **Maharashtra State Agricultural Marketing Board (MSAMB)** has partnered with **Agri-Techstartups** to deploy AI-powered platforms for real-time crop monitoring and management. These platforms use satellite imagery and sensors to provide insights on soil health, crop conditions, and irrigation needs. In **Pune** and **Nagpur**, AI-based precision agriculture initiatives resulted in a **12% increase** in crop yields and a **15%** reduction in input costs during the **2022-23** cropping season, as reported by the **Agricultural Economics Research Centre (AERC)**.
- **AI-Based Pest and Disease Management:** AI tools help farmers in Maharashtra manage pests and diseases by analyzing crop images and environmental data. The **Plantix app**is extensively used by Maharashtra farmers to diagnose pest and disease issues. The app uses AI algorithms to analyze images of crops and provide treatment recommendations. In **Amravati** and **Aurangabad**, the use of the **Plantix app** led to a **25%** reduction in crop damage and improved

crop health for **30,000 farmers** in **2022**, according to data from the Maharashtra **Agricultural University**.

- **AI for Soil Health Management:** AI technologies are used to monitor and manage soil health, providing recommendations for improving soil fertility and crop productivity. The **Soil Health Management Program**in Maharashtra employs AI to analyze soil samples and provide recommendations for nutrient management.AI-based soil health management led to a **10%** increase in soil fertility and a **15%** improvement in crop productivity in **Kolhapur** and **Raigad** districts.
- **Climate Resilience and Weather Forecasting:** AI models are used to enhance weather forecasting and climate resilience, helping farmers adapt to changing weather patterns and extreme conditions. The **India Meteorological Department(IMD)**, in collaboration with Maharashtra's agricultural departments, uses AI for precise weather forecasts and climate impact assessments.AI-driven weather forecasts improved accuracy by **18%**, aiding farmers in **Wardha** and **Latur** in better planning for monsoon and drought conditions.

Challenges for the Adoption of AI Initiatives

The widespread adoption of AI in rural agricultural practices faces **several challenges**. One significant barrier is **digital literacy** many farmers in rural areas lack the necessary skills to use AI tools effectively, hindering their ability to leverage these technologies for improved agricultural practices. **Infrastructure issues** also pose a major challenge, as inconsistent or limited internet connectivity in remote areas impedes the deployment and use of AI solutions. Additionally, the **cost of AI technologies** can be prohibitive for small-scale and marginal farmers, who may struggle to afford the initial investment in advanced tools and equipment. Furthermore, the **integration of AI** into existing agricultural systems often requires significant changes in traditional practices, which can meet with resistance from farmers accustomed to conventional methods. To overcome these challenges, comprehensive training programs, improved digital infrastructure, and financial support mechanisms are essential for enabling broader adoption of AI in rural agriculture.

Conclusion

This study conducted an in-depth exploration of how AI powered agricultural initiatives as well as smart application that boost rural development in India. The results offer important insights into the intricate connection between technology use, agricultural performance, and socio economic progress in rural regions. Farmers shared favorable views regarding the advantages of digital technologies, including improved crop management and better access to market information. Nonetheless, obstacle such as limited digital literacy, connectivity challenges, and unequal access to resources was recognized as barriers to broader adoption. Future research globally could utilize longitudinal designs to monitor the long term effects of AI adoption on rural development. This study lays the groundwork for policymakers, practitioners, and researchers to make informed decision on leveraging AI for rural development in India.

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The Significance of Micro, Small, and Medium Enterprises (MSMEs) in Reducing Poverty and Fostering Rural Development in India

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ABSTRACT

India is widely recognized as one of the fastest-growing nations globally, a fact that has been emphasized repeatedly. The government has implemented a range of initiatives aimed at propelling the country's growth trajectory. Numerous governmental and non-governmental organizations are diligently working to elevate the nation to unprecedented levels of development. However, a significant challenge remains in ensuring that all segments of society and every economic sector are addressed to achieve comprehensive and sustainable progress. Poverty continues to be a pressing issue, particularly in rural regions, where rural development and poverty alleviation stand as formidable obstacles to the nation's advancement. The Micro, Small, and Medium Enterprise (MSME) sector emerges as a vital area that has the potential to significantly impact rural development and poverty reduction.

This paper endeavors to examine the current state of the rural economy and poverty in India, while also exploring the opportunities that MSMEs may present in the fight against poverty and their role in fostering sustainable rural development.

Keywords: *Poverty reduction, enhancement of rural areas, micro, small, and medium enterprises (MSMEs), and the rural economic landscape.*

Introduction

The MSME sector has the potential to significantly impact employability, poverty alleviation, regional disparity reduction, and social sector development, thus contributing to eradicating poverty and promoting inclusive growth. MSMEs can play a crucial role in improving the economic and socio-economic conditions of a large underprivileged population. Inclusive growth in rural India is vital for poverty alleviation and rural development, encompassing economic growth that generates employment and reduces poverty. Inclusive growth also involves ensuring access to health and

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education, equal opportunities, and empowering people through education and skill development. The increasing wealth inequality has widened the gap between the rich and poor in the country.Addressing the disparity between the affluent and the impoverished presents a significant challenge for policymakers. The Micro, Small, and Medium Enterprises (MSME) sector serves as the foundation of our economy and is crucial for economic advancement. It is globally recognized that MSMEs play a vital role in both the economic and social progress of a nation. In India, the MSME sector accounts for 36% of the total manufacturing output, 45% of total exports, and30 % of the GDP, while providing employment to over 80 million individuals and producing more than 8,000 different products. This sector not only supports larger industries through its inputs but also fosters inclusive growth by bolstering the rural economy. A majority of MSMEs are located in rural regions and employ local labor.

Definition of MSMEs:

The definition of MSMEs in India has been ever-changing as per the growth in the economy. First systematic and robust definition of MSMEs was provided in the MSMED Act, 2006. Which defined the MSMEs in terms of investment criteria for both manufacturing and service enterprises. The definition has been changed again in June 2020, where the criteria of definition the MSMEs as manufacturing and service enterprises has been removed and the units are defined on the basis of investment and turnover. The below table offers a clear picture of the existing and revised definition.

Table 1: Definition of MSMEs

MSME Classification as per the MSMED Act 2006			
Criteria: Investment in Plant and Machinery			
Classification	Micro	Small	Medium
Manufacturing Enterprise	Investment < ₹ 25 lakh	Investment < ₹ 5 crore	Investment < ₹ 10 crore
Service Enterprise	Investment < ₹ 10 lakh	Investment < ₹ 2 crore	Investment < ₹ 5 crore

MSME Classification as on June 2020			
Criteria: Investment and Annual Turnover			
Classification	Micro	Small	Medium
Manufacturing & Service Enterprise	Investment < ₹ 1 crore and Turnover < 5 crore	Investment < ₹10 crore and Turnover < 50 crore	Investment < ₹ 20 crore and Turnover < 100 crore

Source: Ministry of MSME, Government of India

The change in definition after 2006 MSMED Act was first initiated in 2015, when the government introduced MSME Development (Amendment) Bill, 2015 in the proposal was made to increase the investment limits for manufacturing and services MSMEs. Further, The MSME Development(Amendment) Bill, 2018 was proposed in 2018 which proposed to use annual turnover as criteria instead of investment for classification of MSMEs and remove the distinction between manufacturing and service enterprises.

Review of Literature:

(Thahira K., 2017) Studied the impact of MSMEs in Mallapuram district of Kerala. The research found that after the enactment of the MSMED Act, 2006 many positive changes were seen in the district. The researcher explored in detail the role of MSMEs in rural development. Researcher applauded the technical and managerial support provided by the District Industrial Centre (DIC) and concluded that it has helped to reduce poverty and gender inequality in the district.

(Patil & Patil, 2016) Studied the role of entrepreneurship in rural development, the role of government support initiatives for entrepreneurs. They suggest that rural entrepreneurship programmes should be such that they promote innovation and inspire the youth to choose entrepreneurship as a career. They also opined that incentives and monitory benefits to the farmers would encourage rural entrepreneurs.

(Sriniwas,2013) Stated the importance of Micro, Smalland Medium Enterprises in inclusive growth of the Indian economy. There searcher discussed the challenges faced by MSMEs and support schemes provided by the government related to various matters. As per the researcher, the support provided by the centre and state governments have not been adequate and the potential of the MSME sector has not been fully utilized. Among the many problems, lackoffinance is the biggest challenges for the MSMEs and there isalotof scope for the growth of MSMEs in the country.

(Vandenberg,2006) Reviewed the Small Enterprise Development Programme (SEED) of Inter nation Labour Organization (ILO) in poverty reduction. The author highlighted the difficulties in evaluating the impact of enterprise development on the enterprise it self, poor workers, entrepreneurs and their families. The author also suggested the strategies which could be adopted by SEED to focus on poverty reduction programmes.

Objectives of the Study

1. To examine the conditions of poverty and the employment landscape in India.
2. To investigate the contribution of Micro, Small, and Medium Enterprises (MSMEs) to poverty reduction and rural development**.**

Research Methodology

The research is of a descriptive nature and relies on secondary data. The evidence presented has been sourced from various materials, including journals, magazines, websites, annual reports from the Ministry of MSME, the 73rd National Sample Survey report, and ILO working papers. Key information has been illustrated using tables and charts.

MSMEs and Poverty Alleviation

India ranks as the second most populous nation, housing approximately 1.25 billion individuals. It stands as the seventh-largest country globally, spanning an area of 3,287,000 square kilometers. The Global Multidimensional Poverty Index, compiled by the UNDP-Oxford University in September 2018, identified 364 million individuals living in poverty within India. As of now, the impact of

COVID-19 has exacerbated the situation, with the IMF World Economy Outlook predicting that by the year-end 2020, the number of impoverished individuals in India could rise to 669 million, marking a 47.25% increase over two years. The primary challenge is to secure employment and work opportunities to mitigate this rise in poverty. The COVID-19 pandemic has severely affected nations worldwide, as per World Bank figures. The global economy is projected to contract by 5.2%, and per capita income is expected to fall by 3.6%, further complicating efforts to reduce poverty in India. Paradoxically, the first objective of The United Nations Sustainable Development Goals is to reduce poverty, a goal that must be achieved by 2030. The current situation, with more individuals at risk of falling into poverty, makes the task more challenging. In this context, micro, small, and medium-sized enterprises (MSMEs) in India are crucial. MSMEs have historically been significant in creating jobs and have supported the most marginalized by providing employment across various sectors.

The issue of poverty is closely linked to unemployment. If everyone has an opportunity to earn money for meeting their basic needs, poverty can be eliminated. The privilege of having work and earning from it is lacking for those who are unemployed. Poverty acts as a barrier to economic growth. Micro, Small, and Medium Enterprises (MSMEs) have the potential to significantly reduce poverty. This is supported by the fact that MSMEs in rural areas offer opportunities for self-employment and wage-employment through entrepreneurship, providing jobs to over 1109 lakh people in more than 633 lakh MSME establishments (Vaishnav & Surya, 2020). Due to their labour-intensive nature, MSMEs can accommodate more manpower and create more jobs compared to large enterprises. These MSMEs help the impoverished earn a livelihood and enhance their socio-economic status. Additionally, they offer quality employment without displacing rural residents from their native areas, as they are typically located in remote rural regions. MSMEs are the primary source of non-farm employment in rural India. The table below illustrates the job creation potential of the MSME sector.

Table 2: Employment Generation by MSMEs (in lakhs) (2015-16)

	Micro		Small		Medium		Total	
	Units	People Employed	Units	People Employed	Units	People Employed	Units	People Employed
Rural	324.09	489.30	0.78	7.90	0.01	0.60	324.88	497.80
Urban	306.43	586.90	2.53	24.10	0.04	1.20	309.00	612.10
All	630.52	1076.20	3.31	32.00	0.05	1.80	633.88	1109.9

Source: National Sample Survey, 73rd Round, 2015-16

The data presented in the table indicates that during 2015–16, MSME employment constituted a substantial proportion of total employment in the country. The primary source of job creation is microbusinesses, particularly in rural and underdeveloped areas, suggesting that they predominantly hire individuals from vulnerable rural and disadvantaged areas who are more prone to unemployment and poverty. Microbusinesses employ approximately 1076 lakh individuals across more than 630 micro-units, followed by small businesses with over 32 employees, which collectively employ lakh individuals across about 3.31 lakh companies. A medium-sized business provides employment to

about 1.8 lakh individuals in over 5000 establishments. This data highlights the importance of MSMEs in terms of generating employment.

MSMEs and Rural Development

Roughly 70% of the total population of India resides in rural areas. These areas are mainly comprised of remote and underdeveloped villages. Based on the 2011 census, there are nearly 800 million people living in over 600,000 rural villages. Rural development aims to enhance the quality of life and economic prosperity of those living in rural areas. This development typically involves leveraging traditional knowledge to utilize local resources for producing goods. The rural economy relies heavily on effectively utilizing locally available resources. The micro, small, and medium enterprises (MSME) sector plays a crucial role in sustaining rural livelihoods. The human capital in rural areas is effectively utilized by small and cottage industries, particularly those focused on traditional handicrafts. The Khadi & Village Industries Commission (KVIC), under the Ministry of MSMEs, is a major institution working towards rural development. Established in 1956, KVIC is dedicated to promoting and developing Khadi and village industries (KVI), providing substantial employment opportunities and bolstering the rural economy. KVIC is recognized as a key organization in the MSME sector, generating viable non-farm employment opportunities in rural areas with low per capita investment. It engages in skill development, technology transfer, and research and development, along with providing marketing support to village industries. By primarily operating in rural areas, MSMEs significantly contribute to the development of those regions. Through its various activities, KVIC offers employment and income opportunities for workers in Khadi and Village industries, fostering self-reliance and a strong rural community spirit.

The social objective of KVIC is to provide employment in rural and urban areas through District Industries Centers (DIC). The Khadi and Village Industries sectors have greatly contributed to employment generation in the country, as shown in the table below:

Table 3: Trends in Production, Sale and Employment in Village
(Rs. in crore and Employment in lakh persons)

S.N.	Industry	2022-23	2023-24
1.	**Production**		
a.	Khadi, Polyvastra and Solarvastra	2915.83	3206.00
b.	Village Industries	93040.84	105091.68
	Total KVI Production	95956.67	108297.68
2.	**Sales**		
a.	Khadi, Polyvastra and Solarvastra	5942.93	6496.00
b.	Village Industries	128686.56	149177.12
	Total KVI Production	134629.49	155673.12
3.	**Employment**		
a.	Khadi, Polyvastra and Solarvastra	4.98	4.98
b.	Village Industries	172.14	182.31
	Total KVI Production	177.12	187.29

Source: MSME Annual Report 2023-24, Government of India

The data in table-3 reveals a significant increase in the total production value of KVI, rising from ₹ 95956.67 in 2022-23 to ₹ 108297.68 in 2023-24, marking a notable 12 percent surge. This suggests that KVI has been operating at full capacity. Furthermore, the table indicates a 15 percent growth in sales, escalating from ₹ 134629.49 crores to ₹ 155673.12 crores. The employment statistics for KVIs during these two years have been remarkable, with approximately 177.12 lakh people employed in 2022-23 and 187.29 lakh people in 2023-24. According to the MSME annual Report 2022-23, the earnings of village industries had been consistently increasing each year. In 2019-20, 2020-21, and 2021-22, the village industries earned ₹ 84664.28 crores, ₹ 92213.65 crores, and ₹ 110363.51 crores, respectively. These earnings ultimately benefitted rural entrepreneurs and the rural workforce employed in these establishments. As per the MSME annual report 2023, the country has a total of 2,946 khadi institutions employing a collective total of 4,98,000 artisans.

Table 4: Employment provided by KVIC (Artisan in Lakh)

S.N.	Year	Employment
1.	2019-20	147.76
2.	2020-21	154.09
3.	2021-22	162.64
4.	2022-23	172.14
5.	2023-24	182.31

The data presented in the table indicates that KVICs consistently provided employment to a large number of individuals each year. In 2018-19 and 2019-20, KVICs employed 142.03 lakh and 147.76 lakh individuals across various units. These figures increased in 2020-21 and 2021-22, with a total of 154.09 lakh and 162.64 lakh people securing employment in KVIC units. KVIC continues to implement strategic initiatives to promote khadi and village industries, enhancing their competitiveness. Recent KVIC initiatives include the Workshed scheme for Khadi Artisans, infrastructure strengthening for khadi institutions, support for marketing infrastructure, khadi reform and development program, interest subsidy, honey mission, and franchise scheme.

In recent years, the gap between the rich and poor has significantly widened. Due to population growth, the agricultural sector has been unable to accommodate the entire rural population. Inclusive growth efforts should aim to reduce inequality, alleviate poverty, and benefit the most disadvantaged individuals in the economy. MSMEs with a turnover of more than 5 crores are obligated to fulfill corporate social responsibility requirements. They could fulfill this obligation by adopting schools and hospitals in villages and assist in building roads and transport facilities for the local community. While it may not always be feasible for Small and Medium Enterprises to adopt schools and hospitals, they could cover the educational expenses of the children of their employees and provide free medical care. MSMEs should take measures to improve the living conditions of their employees and their families. Additionally, MSMEs could contribute by prioritizing the employment of local residents and sourcing supplies from local vendors.

Suggestions:

The government should formulate a policy for rural MSMEs and take necessary measures to strengthen entrepreneurship in rural areas. Some of the key points identified by the researchers to improve SMEs for poverty reduction and rural development are as follows:

- Special attention should be given to establishing more agricultural sectors in rural areas as agricultural products are easily produced without transport costs. Many rural entrepreneurs have set up businesses in villages to use agricultural produce to turn it into marketable products. This type of entrepreneur should get proper support in the form of technical assistance, marketing etc.
- Promoting rural tourism with the help of small and medium enterprises in the countryside is one of the best ways to strengthen the rural economy.There are many natural hill stations and cultural places in rural areas. It can be developed as a tourist destinationwith the help of local people, creating jobs and generating income for local peoplefor many generations.
- Skill development programs and entrepreneurship programs Rural development programs should be given to impart skills to the rural youth in addition to the agricultural work that their ancestors did in the past. This encourages them to do business. Primary schools and Panchayat Bhavans can be used for this purpose.
- Skill development programs and entrepreneurship programs Rural development programs should be given to impart skills to the rural youth in addition to the agricultural work that their ancestors did in the past. This encourages them to do business. Primary schools and Panchayat Bhavans can be used for this purpose.
- Setting up of ancillary units of large enterprises in the rural area could generate more employment in the rural areas. These ancillary units would supply the farm produces and other finished and semi-finished goods to large enterprises. These ancillary units must be made mademandatory to employ the village people only.
- Lack of infrastructure in rural areas has remained a major problem since independence. The government must ensure that Infrastructural support in the form of uninterrupted water and electricity supply is provided to the MSMEs in rural area along with the road connectivity for transport.
- DIC branches should be set up at the block level to target the growth of MSMEs in rural areas will help in monitoring the MSMEs and will also help the Ministry to assess the budget required by the MSMEs.

Conclusion:

MSMEs can be an effective way of using local resources for more productive purposes based on the coordination of governments and local governing bodies. MSMEs should be encouraged and supported in the mission to reduce poverty and uneven development. Problems faced by MSMEs need to be addressed properly, with a focus on micro-enterprises. The Government of India has taken several steps in an attempt to improve the economic and social conditions of the rural population

and the non-agricultural sector. The establishment of the Micro Units Development and Financing Agency (MUDRA) is one of the measures for this purpose. The government should continue to monitor those programs. Through government interventions in the form of financial, infrastructure and technology support, small and medium-sized enterprises should be empowered to create more jobs, ultimately leading to rural development and reduce poverty. While MSME is flourishing, it is paving the way for poverty reduction and rural development in the country.

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Achieving a $ 5Trillion Economy: Assessing the Adequacy for India's Development Goals

Vinod Kumar Srivastava[1], *Dr. Harshit Kumar Srivastava[2] & Dr. Ashutosh Pandey[3]*

ABSTRACT

Indian economy is one the fastest growing economy of the world in terms of nominal GDP which is expected to reach $ 5trillion by the year 2028. Although, in terms of GDP it is one of the largest economies but in terms of per capita income, Human Development Index it lags well behind the advanced economies of the world. The present research paper investigates the present's condition of Indian economy and identifies the challenges in the path of development. The paper provides solution of the challenges and suggests some of policy measures that should be the key focus areas for the socio-economic development of country. This paper finds that mere economic growth is not the key to proceed rather it should be accompanied by inclusive development ensuring participation of all. Also, secondary sector can play important role in providing impetus to the economic growth of country.

Key Words: Economic Growth, Economic Development, GDP, Per Capita Income, Amritkaal

Indian Economy: The Development Journey

Indian economy is one of the fastest growing emerging economies of the world with the average decadal nominal GDP growth rate of over 6 percent in last two decades. (World bank, 2024) The current nominal GDP is $ 3.54 trillion for the year 2023 which is expected to reach $ 3.82 trillion in 2024. The rising growth rate of nominal GDP is attributed to multiplicity of factors including rising Gross Value Added (GVA) by all the sectors (especially tertiary sector), increasing percapita income and consumption expenditure, infrastructure development, ease in operating the businesses etc. In terms of nominal GDP, India is fifth largest economy of the world and is expected to become the third largest economy by 2030. Although economic growth of an economy depends on the growth of various sectors and is seen as the quantitative phenomenon but development of the economy apart from the quantitative factors depend heavily on qualitative factors such as quality of life,

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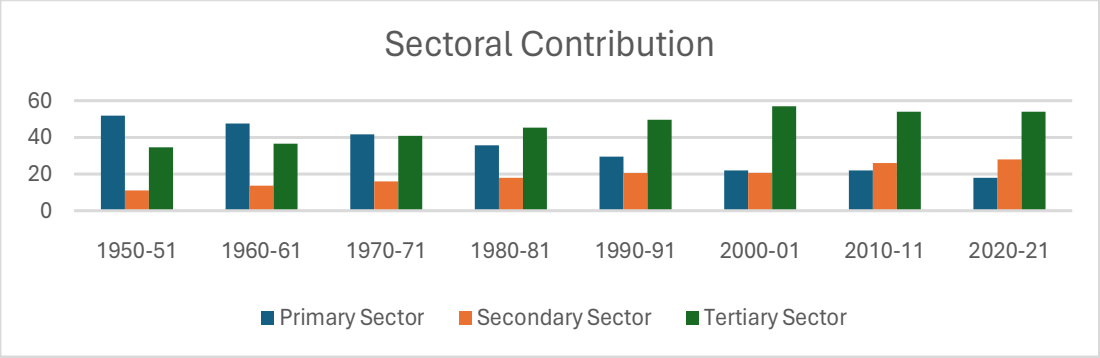
accessibility of services, developed infrastructure and reduced inequality. Mostly economic growth and socioeconomic development go hand in hand, but it is not true always as GDP growth does not ensure the distribution in an equitable way. For developing countries like India, socioeconomic development becomes more important which targets GDP growth along with uplifting the deprived segment of society.

Indian economy historically has been an agrarian economy. At the time of independence over two third of the population was engaged in agriculture and allied activities which reduced significantly over the period and is approximately 45 percent which is still a large number. At present, in terms of providing occupation the primary sector is the largest sector followed by tertiary and secondary sector. However, in terms of contribution, the tertiary sector is the largest contributor in economy with the total contribution of around 55 percent followed by secondary and primary sector (Refer Figure 1). These number present contradiction in the economy as the largest sector in terms of providing employment is contributing merely to 15 percent on the other hand tertiary sector employs less than 30 percent of the population and contributes over 55 percent indicating overburdened primary sector.

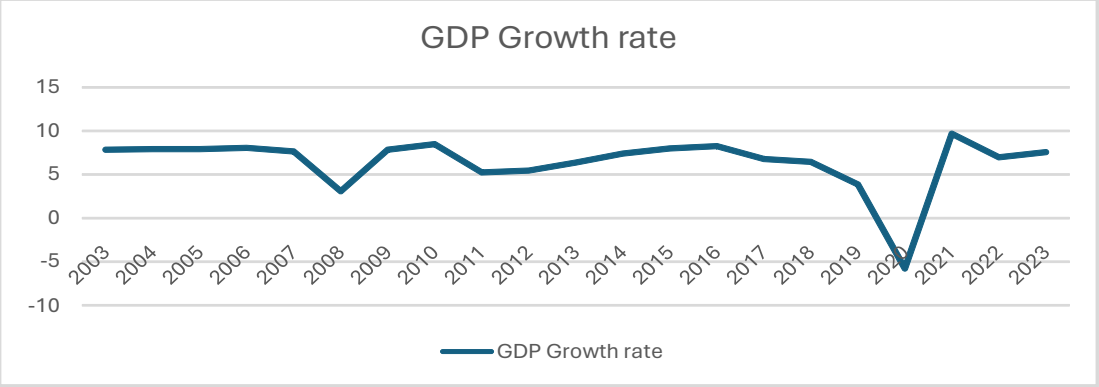
Figure 1: Sector Wise Contribution in GDP of India 1950-2020



Source: Various reports of MoSPI

GDP growth rate is one of the key indicators of the current health of any economy. Indian economy registered the consistent and a healthy growth rate in terms of nominal GDP which is well above the average global GDP growth rate. The high growth rate is indicative of expansion of economic activities in economy. Also, if economy grows at a consistent growth rate of above 6.5%, it is expected that Indian economy will be reaching $ 5 trillion by 2028. Economic growth is one of the key objectives of Amritkaal which is going to decide the development roadmap of country. Figure 2 indicates that except for the year 2008 and 2020, Indian economy has achieved remarkable economic growth. Dip in GDP growth rate has been registered for the year 2008 and 2020 due to Global recession and COVID pandemic respectively. In 2020, GDP growth rate registered negative growth rate on account of lockdown and restrictions. However, post-COVID speedy recovery has been observed.

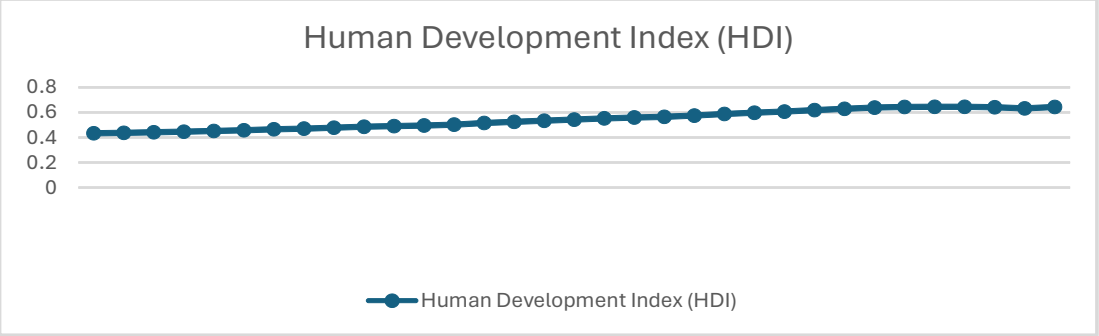
Figure 2: GDP Growth Rate of India since 2003



Source: World Bank national accounts data

Economic growth and development are two different concepts and later includes economic growth. Development is a multidimensional socioeconomic phenomenon concerned with improving quality of life through economic and social wellbeing. In this regard Human development Index (HDI) developed by Mahbub-ul-Haq is used by United Nations Development Program to assess the socio-economic development of the countries (Mahbub-ul. (2003). HDI includes the economic development by taking per capita income and social development through education and health indicators. It presents a comprehensive picture of a nation by assessing its quality of life.

Figure 3: Human Development Index (HDI) of India since 1990

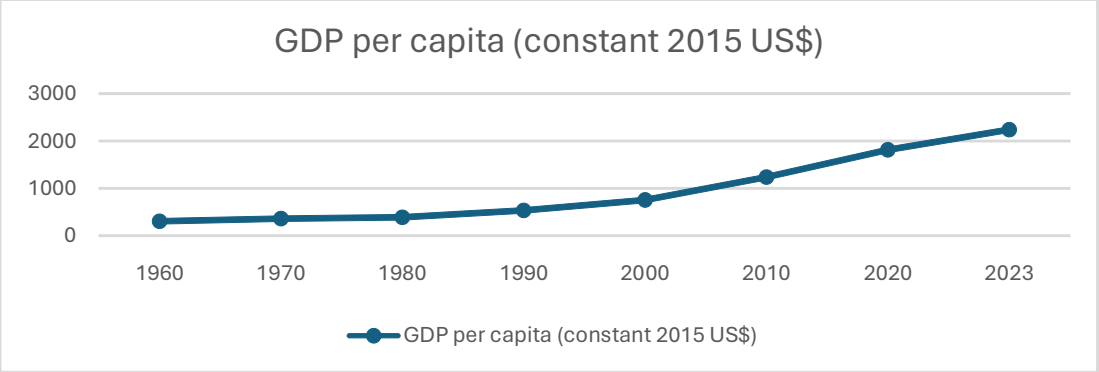


Source: Human Development Report, United Nations Development Program (UNDP)

India is currently categorized in Medium Human Development category with the score of 0.644 in 2022 (Figure 3). India has witnessed a remarkable improvement in the HDI as it increased from 0.434 (low human development) to near to 0.65 (medium human development) in life expectancy, mean year of schooling, expected year of schooling and Gross National Income per capita. It is expected that India reaches in high development by 2035. Although there has been significant improvement in all the components of HDI, Gross National Income per capita is very less in comparison to the other competing economies.

As discussed, per capita income of India is very less in comparison to the developed countries of the world and it presently near to $2300 (Figure 4). In 1960, per capita GDP was nearly $300 which increased almost eight times. It is bit contradictory that India is fifth largest economy of the world in terms of nominal GDP but ranked 136 in terms of per capita GDP categorized in low middle income economy.

Figure 4: Per Capita GDP (1960-2023)



Source: World Bank national accounts data

Although GDP of the country has increased manifold at the same time there has been huge increase in the population of the country resulting in slow rate growth in per capita income of country. Also, India is also the home of the multiple billionaires which indicates that there exists huge variation in the income of individuals and distribution of income is one of the important concerns. The recent data suggest that the Total Fertility Rate (TFR) dipped to 2.01 which indicates that in coming years per capita income will grow at much rapid pace.

Challenges of Indian Economy

India has achieved tremendous growth in terms of GDP in last three decades along with increase in foreign exchange reserve, improvement in literacy rate, increase in life expectancy, easing burden from primary sector, reduction in poverty rate etc. Despite rapid expansion of Indian economy there are many challenges and areas of improvement. These challenges may be viewed as the possible constraints in the path of socio-economic development. The biggest challenge is to sustain a huge population of over 1.4 billion people. India surpassed China and is now the largest country in the world in terms of population. The huge population base is exerting pressure on the limited resources. Challenges arising due to population are manifold and demand serious intervention on account of ensuring food security, education, health and obviously the employment opportunities. On one hand, India is home of many rich individuals on the planet and on other hand it is the country with largest number of poor who are not able to meet their daily needs. In fact,the lower per capita income of the country is the outcome of a huge population base. However, many economists feel that huge population can provide impetus to the economy as well in terms of providing huge market which is always a source of attraction for foreign investors. Moreover, as average age of Indian is

less than 30 years, economy is said to be in stage of demographic dividend which will surely help India.

Overburdened primary sector is also one of the important bulwarks in the development journey of country. Over 45 percent of the population is directly or indirectly engaged in the primary sector contributing less than 16 percent. The data itself describes the poor condition of Indian farmers. This sector also witnesses disguised unemployment, indicating more than the required number are engaged in this sector and they are not contributing anything. The third challenge that Indian economy is facing is the under utilization of secondary sector which is capable of pacing and providing impetus to economic growth of India especially MSMEs. As development includes both economic and social factors, one of the important socioeconomic problems is hunger and poverty. On one hand, we are celebrating the increase in GDP and on other hand India is ranked 111 out of 125 countries in the Global Hunger Index (GHI) which raises serious questions about our growth journey. Also, the huge population living below poverty line is one of the important concerns for not just economic growth but also on the fate of the nation. A poor individual somehow becomes a liability for a nation due to lack of education and skills. Apart from these challenges, India also lacks world class social and economic infrastructure. However, in recent years there has been significant improvement in the infrastructure but still keeping in view the huge population of the country; the present infrastructure seems to be inadequate.

Possible Solution

The huge population, although a challenge if gets the right skillset, better infrastructure and conducive environment to operate; may change the fate of the nation. In this regard, better social infrastructure is needed, especially the education and health infrastructure. The Government of India is investing heavily in infrastructure through National Infrastructure Pipeline can be a game changer. The secondary sector of India can provide solutions to multiple problems of India including reducing burden from the primary sector. There exists huge potential in the MSMEsector, and it can reduce the problem of unemployment as well. However, at the same time we need to ensure the availability of capital and improvement in the skills of individuals via some kind of intervention. Programs such Skill India should be scaled up. Also, India is one of the emerging startup hubs in the global scenario and youth are attracted toward these programs. To promote and provide impetus to this sector Government of India has started multiple programs such as Startup India, Standup India, Make in India, MUDRA.

Employability has emerged as serious concern for Indian economy, in this regard skill development should be kept at center. As education system of India is not aligned with job some changes are required in our education system to make our youth employable. India has largest Targeted Public Distribution System (TPDS) to ensure food security still large number of people faces issues such as hunger giving birth to large numbers of serious diseases. Also, rising food prices are one of the important reasons for deprivation from food. Community participation can be a game changer in this regard. Also, India has emerged as an attractive market for foreign investors. To increase trade and FDI from India some policy actions are required including reduction in tax rate and easing policies to operate especially land acquisition.

Conclusion

Indian economy has registered a positive consistent growth in recent years (except year 2021due to COVID pandemic). This optimistic growth journey of India has been the key highlight of Indian economy, and the target of $ 5 trillion economy is not far away. Observing the current GDP growth rate; Indian economy will be reaching to $ 5 trillion by 2028-29. But reaching to $ 5 trillion is not the destination but a path to socioeconomic development of India. The population of the country is above 1.4 billion people, which is one the important reasons for low per capita income of country. Also, the indices released by global agencies such as Multi-Dimensional Poverty Index, Global Hunger Index etc. suggest that India is lagging well behind the developed nations and contradicts the economic growth strategy. So, other than GDP and economic measures, we also need to improve quality of life along with taking measures to include the deprived section into the mainstream by further investing in social infrastructure and skill development program.

Also, our growth is often termed as 'Jobless growth', i.e., GDP is growing but there is no reduction in the number of unemployed people. Moreover, agriculture still is the largest employment sector and witnesses disguised unemployment. The problem of jobless growth and disguised unemployment can be addressed through the development of the secondary sector. There exists a huge potential in driving economic growth of India through secondary sector by enhancing the skills of individuals and creating the environment for startups. This will help in generating numerous employment opportunities along with self-employment. Moreover, the secondary sector has the potential to absorb the excess labour from the primary sector. (Lewis,1954). Lastly, infrastructure is going to play a decisive role in the development of a country. Adequacy of infrastructure not just improves quality of life and ease of living but also is also provides impetus to several other sectors of economy simultaneously developing multiple sectors of economy (Rajarshi, 2002). Also, world class infrastructure attracts foreign investors which helps an economy in terms of both capital and exchange of technology.

Our vision for Amritkaal is aligned with the doctrine of inclusive development which is based on the concepts of *Sarvodaya* and *antodaya*i.e., development of all and alleviating poverty in the all the forms. Economic growth is one of the important elements of AmritKaal which targets achieving a high rate of economic growth; our short-term target for $ 5 trillion is one of the important footsteps in achieving economic prosperity. But along with GDP growth, upliftment of the downtrodden section, empowerment of all, sustainability, and reaping demographic dividend of country need to be ensured. The path is bit challenging but absolute form of development is only possible in case we ensure inclusive development which is inclusive of both social and economic development.

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Agriculture Sector: How to Develop for India @2047

Dr. Amitendra Singh[1] & Sachin Kumar Verma[2]

ABSTRACT

Today the Indian economy has three basic pillars that help to boost the economy at a higher rate and that can help make a developing nation till 2047. First pillar is agriculture and second pillar is infrastructure and third pillar is AI (Artificial intelligence). Agriculture sector provides a maximum number of livelihoods and all necessary goods that are required for survivors. Development of infrastructure boosts the economy at a faster rate and makes mobility of goods the requirements of the nation. It helps in making jobs other than agriculture related industries. The AI sector helps in the computing World and advances innovation. So my paper focuses on the agriculture sector because it helps all sectors directly or indirectly. So advancement of agriculture makes development of other sectors.

Introduction

The agriculture sector in India supports approximately 42.3% of the population and contributes 18.2% to the country's GDP. The sector has shown resilience with an average annual growth rate of 4.18% over the last five years. India has a comfortable foodgrain surplus, with around 40% being distributed free to two-thirds of the population, and exports over 7% of its production. Despite these positives, the sector faces challenges like low productivity, weather variability, fragmented land holdings, and inadequate marketing infrastructure. To address these issues, the government has initiated interventions in crop, livestock, animal husbandry, and fisheries to enhance investment, productivity, and farmer returns through minimum support prices (MSPs). Additionally, digitization initiatives aim to empower farmers with better decision-making tools. Although India is a significant producer of various crops and milk, its crop yields are lower than other major producers, warranting reflection on the distribution of government support and addressing challenges like fragmented land holdings, low investment, and inadequate access to quality inputs and marketing infrastructure.

Review of Literature

We are studying the last five years of research papers related to agriculture development and summarizing some research papers in the precise form they are given below.

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1. **Precision Agriculture:** A Review" by S. G. Sharma et al., 2020 : Advances in technology have enabled precise crop monitoring, automating farming practices, and optimizing yields.
2. **Vertical Farming:** A Review" by A. K. Singh et al., 2020 : This method increases crop yields while reducing land use and environmental impact.
3. **Organic Farming**: A Review" by R. K. Singh et al., 2019. : This approach promotes sustainable agriculture practices, improving soil health and biodiversity.
4. **Climate-Smart Agriculture**: A Review" by L. Lipper et al., 2018 : This approach helps farmers adapt to climate change by adopting resilient practices and technologies.
5. **Digital Agriculture**: A Review" by S. K. Saha et al., 2020 : Leveraging big data, AI, and IoT for data-driven decision-making in farming.
6. **Sustainable Irrigation Management**: A Review" by A. K. Mishra et al., 2019 : Optimizing water use and reducing waste through advanced irrigation systems.
7. **Crop Improvement**: A Review" by R. K. Varma et al., 2020 : Advances in genetic engineering and genomics for developing high-yielding, disease-resistant crop varieties.
8. **Soil Conservation:** A Review" by A. K. Sharma et al., 2019 : Strategies for reducing soil erosion and promoting soil health.

Research Gap

The problem of agriculture is changing from time to time . From last decades problems of agriculture related to crop damage, fair price, increasing cost etc. Apart from fair prices, other problems related to climate change and impact of climate change different from one area to another area. One area faces drought than Other areas face flood. So we are trying to find a reasonable solution to climate change impacts and also trying to find out the problem of fair price of commodities.

Data Analysis : We are studying data in few points .

Income Stability

The MSP (Minimum Support Price) plays a crucial role in ensuring income stability for farmers. The 2016 Farmers Income Report (DFI) identified strategies to boost crop and livestock productivity, enhance cropping intensity, diversify to high-value agriculture, and provide remunerative prices for farmers' produce. In 2018-19, the government fixed MSP at 1.5 times the all-India weighted average cost of production to ensure assured remunerative prices. Although some initiative taken by government like -

- Income support through PM-KISAN (¹ 6000/- per year).
- Promotion of efficient input use and sustainable production methods through PDMC and NMSA.
- Digital initiatives like Digital Agriculture Mission and e-NAM for smart agriculture technologies and better price discovery.
- Support for animal husbandry and fisheries through schemes like RGM, NDLM, NPDD, and FIDF.

- Pradhan Mantri Matsya Sampada Yojana (PMMSY) for strengthening fisheries infrastructure, technology infusion, and optimal water management.

These interventions have led to:

- Increased fish production by 7.4% in 2022-23.
- Improved productivity and sustainability in agriculture.
- Enhanced income for farmers, especially with smaller holdings.

Crop Diversification

India is self-sufficient in agriculture, but still imports certain items like pulses, oilseeds, and spices due to inadequate domestic production. The government should focus on these areas, especially oilseeds, as imports like palm oil are harmful to health. Data shows a significant portion of agricultural imports are edible oils, pulses, and sugar. To address this, the government has initiated crop diversification programs like the Crop Diversification Programme (CDP) and National Food Security Mission (NFSM) to promote sustainability and production of alternate crops. Additionally, increasing the Minimum Support Price (MSP) for oilseeds and pulses can help bridge the production gap. India's primary agricultural imports include:

- Edible oils (77.1% of agricultural imports in 2022), with palm oil being the largest share (60%), followed by soybean oil (25.6%) and sunflower oil (12.5%).
- Pulses (12.2% of agricultural imports in 2022), despite India being the world's largest producer and consumer of pulses.
- Fresh fruits, which were the highest value agricultural import into India in 2023.
- Sugar, with imports estimated to grow by 385.4% in 2023 compared to the previous year.

Above data not good for us because we are a agricultural country. Agriculture is a specific economic power of mine as for as oil countries. For these countries, oil is a specific economic power of that. Although Government take many steps towards Crop diversification. The Indian government is actively promoting crop diversification to address the sustainability challenges faced by the agricultural sector. To achieve this, the government has initiated the Crop Diversification Programme (CDP) and the National Food Security Mission (NFSM), which aim to encourage the production of alternate crops such as pulses, oilseeds, and Nutri-cereals. These initiatives are designed to reduce the environmental impact of farming and promote sustainable agriculture practices. Additionally, the government has increased the Minimum Support Price (MSP) for oilseeds and pulses to incentivize farmers to grow these crops. However, the fragmentation of agricultural land remains a significant challenge, and addressing this issue is crucial to improving agricultural productivity.

In order to address the challenge of land fragmentation, the government is encouraging farmers to form cooperative societies. These societies will enable farmers to pool their resources and work together to improve their productivity. Furthermore, the government is providing support to farmers through initiatives such as the Agri-Tech Startup Program, which aims to promote the use of

technology in agriculture. Despite these efforts, farmers continue to face several challenges, including limited access to credit, technology, and markets. Some suggestions include:

1. An integrated national policy for agriculture encompassing all aspects of agricultural activities.
2. Focus on specific crops that require increased production.
3. Significant investment in agriculture to address low productivity, slow advancement, and inadequate monitoring and research.
4. Addressing fragmentation of agricultural land and increasing private sector investment.

Empowering Formers

According to the Economic Survey of India (2023-24), the government has prioritized providing affordable credit to farmers, leading to a significant reduction in non-institutional credit from 90% in 1950 to 23.40% in 2021-23. As of January 31, 2024, the total agricultural credit disbursed was ₹ 22.84 lakh crore, with ₹ 13.67 lakh crore for short-term crop loans and ₹ 9.17 lakh crore for term loans.

Notably, a significant portion (89.4%) of farmers are smallholders with limited savings, emphasizing the need for continued government support to empower farmers.

Empowering farmers is vital for agricultural growth. When farmers are empowered, they can take necessary steps to enhance productivity. Essential steps for farmer empowerment include:

1. **Access to credit:** Providing timely and affordable loans to reduce dependence on non-institutional credit and increase investment in agriculture.
2. Education and skills: Equipping farmers with specific skills and knowledge related to agriculture and economic activities like dairy farming.
3. **Economic opportunities:** Encouraging farmers to engage in agriculture-related economic activities to boost their income.

Making Agriculture Sustainable

Human activities are increasingly harmful to the environment, and agriculture is facing significant sustainability challenges. The overexploitation and degradation of natural resources, climate change, and unsustainable agricultural practices are threatening the long-term productivity of farmland, food security, and farmers' incomes. The excessive use of fertilizers, chemicals, and water has damaged soil health and fertility. Unpredictable weather patterns and reliance on rainfed agriculture also impact crop yields and productivity. To achieve the UN's Sustainable Development Goals (SDGs), India must prioritize sustainable agriculture practices, improve crop yields, and ensure income stability for farmers. The government's climate change impact assessment highlights the need for adaptation in the agricultural sector. Without adaptation measures, rice yields are projected to decline significantly by 2050 and 2080, and wheat yields are also expected to decrease. To address this critical issue, specific and gradual steps are necessary to mitigate the effects of climate change on agriculture and ensure food security.

Cooperative Society of Formers

In India, the majority of farmers are marginal (with less than one hectare of land) or small (with 1-2 hectares of land) farmers, resulting in low productivity, high costs, and labor-intensive farming. However, if these farmers form cooperative societies, it can bring numerous benefits. Successful examples of cooperative farming can be seen in Denmark, Netherlands, Belgium, Sweden, and Italy. By converting small and marginal farmers into cooperative societies, many problems can be gradually resolved. The government has also taken steps in this direction, leading to an increase in single-state and multi-state cooperatives (MSCs). As of March 2024, there are 8.03 lakh single-state cooperatives and 1614 multi-state cooperatives. Additionally, three new MSCs - National Cooperative Exports Limited (NCEL), Bhartiya Beej Sahakari Samiti Limited (BBSSL), and National Cooperative Organics Limited (NCOL) - have been established at the national level. Here are some potential benefits of cooperative farming:

- Economies of scale
- Improved productivity
- Reduced costs
- Enhanced bargaining power
- Better access to markets and technology
- Increased income for farmers
- Improved social and economic status for farmers

Case Study

We took small study of formers one to one in Barabanki district of Uttar Pradesh. We said only three questions.

Ques-1 Are you enjoying own agricultural practices.

Answer - No - 80%, can't say10% ,yes - 10%

Ques- 2 if you have choice then which job is prefer?

Answer - 50% other, 30% want to escape but socially they can't do this because They have fair of society. 20% agriculture

Ques -3 why you want leave the agricultural work?

Answer - Almost all says we want leave because Day by day agricultural activities give low income. it's not sufficient for us. For low income have many reasons such as increasing cost but according to cost, income not increases. Use of chemicals increases day by day and then cost of agricultur increase. So if we have options then we quite agricultural work.

Conclusion

India is a agricultural land. Its identity related to agricultural work. According to economic survey 2024 42.3% population of India found own livelihood by agriculture activities so development

of agriculture is very important for our nation as many directions. Development of agriculture is very important for developed India @2047 because it is a backbone of our Indian economy. Yes, here are some points for developing India's agricultural sector by 2047: Now we summaries above paper in few suggestions in points.

1. ***Increase investment in agricultural infrastructure***: Improve irrigation facilities, storage capacity, and rural roads.
2. ***Promote sustainable agriculture practices*:** Encourage organic farming, permaculture, and regenerative agriculture.
3. ***Enhance crop diversification***: Incentivize farmers to grow a diverse range of crops, including millets, pulses, and oilseeds.
4. ***Implement precision agriculture***: Leverage technology, such as drones and satellite imaging, to optimize crop management.
5. ***Strengthen agricultural research and development***: Focus on developing climate-resilient crop varieties and innovative farming techniques.
6. ***Empower farmers through education and training***: Provide regular workshops and capacity-building programs.
7. ***Encourage agro-processing and value addition***: Support farmers in processing and marketing their produce.
8. ***Foster agricultural entrepreneurship*:** Encourage young entrepreneurs to start agri-based businesses.
9. ***Develop a robust agricultural marketing system***: Ensure fair prices for farmers' produce.
10. ***Ensure water security for agriculture***: Implement efficient water management practices.

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A Review of Literature on the Effect of Climate Change on Agricultural Production with Specific Reference to Methodology and Models

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ABSTRACT

Climate change has been a major concern for almost all countries, especially since the late 20th century. Continuous rises in temperature due to Greenhouse gas emissions, heavy rainfall, droughts, landslides, melting of glaciers, rising sea levels, and depleting ozone are some of the major concerns. Developing economies heavily rely on agriculture, and with abrupt changes in the pattern of rainfall, and temperature the livelihood of farmers of developing and underdeveloped economies is at stake. Agricultural production and yield are the one that deals with the first-hand impact of abrupt climatic changes. The paper reviews the methodologies and models along with their benefits and limitations used by different researchers to see the effects of climate change on agricultural production and yield of different crops from countries, including India. The independent variables used in different models are mean rainfall/ precipitation, mean temperature, fertilizer consumption, labor consumption, irrigation pattern, primary energy consumption, CO2 emission, etc. While dependent variables used are total production, yield per unit of land, the area under production, fertilizer consumption, etc. Models are divided into two parts largely i.e. Economic models and biophysical. They are further subdivided into categories where economic models are regression models, microeconomic models, and macroeconomic models, spatial or temporal analogs meanwhile biophysical models are agroclimatic indices, statistical models, and process-based models. The paper also reviews the literature which has a qualitative aspect involved in methodology. Data collection for this is done through focused group surveys, and interviews from farmers. It is observed by the review that the panel data regression model and simple regression model are popular among all the models used.

Keywords: *Climate change, agricultural production, simple regression models, mean rainfall, temperature.*

Introduction

Climate change is one of the major concerns around the globe. In recent decades, its impact has been seen on a wider scale in the form of unpredictable destructions that it brings along. Due to

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anthropogenic activities, the average temperature is rising due to greenhouse gas(GHG) emissions in the atmosphere(Brown,1998). Climate change and the agriculture sector are inseparable. Abrupt changes in climatic conditions like changes in rainfall patterns, changes in groundwater level, and changes in mean temperature which lead to heatwaves in the northern part of India affect the agriculture sector very much. The United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: "*a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.*" The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes. Continuous threats like droughts, floods, heat waves (temperature increase), etc. have become threats to sustainable development.

India's vast and fertile geography has always supported agriculture; India's rural population is majorly dependent on agriculture for employment, income generation, and basic need of food. The continuous threat posed by climate change caused by enormous carbon dioxide emissions has significantly increased global temperature. A report by IPCC (Intergovernmental Panel on Climate Change) warned that 1.5-degree Celsius warming is likely to be achieved before 2040 itself. Global food security and agriculture are continuously facing major challenges because of climate change due to its dependency upon climate. Frequent occurrences of floods, excess rainfall, heatwaves, and drought are reasons for the loss of crop productivity. Ultimately this affects food security and nutritional security negatively. The activities of farming are carried out by selecting the crop that is specifically suitable for a certain type of weather conditions, type of climate, soil type, and resource availability. Henceforth production and productivity are completely dependent on climatic conditions. (Srinivasrao et al.; 2016; Bal and Minhas;2017)

Climate Change is a primary determinant for agrarian productivity on a sustainable base, creating and managing performance in agrarian productivity to satisfy the shooting demands by consumers due to an increase in population and food unavailability. For developing economies where the majority of farmers are dependent on agriculture for income, and employment, crop failure in those countries is a serious issue. Frequent occurrences of natural calamities and disasters put the farmers of the developing economy under more stress leading to more farmer suicides, especially in the case of India where farmers are trapped in a loop of debt.

Review of Literature with Specific Reference to Models and Methodology

The literature review here analyzes the different models scholars use to establish the cause-and-effect relationship between climate change and the agricultural production of different crops in various countries.

Main methodological approaches to study the impacts on agriculture from climate change are presented in a handbook by the UNEP and IVM. Two types of tools are mentioned in this handbook: Biophysical tools and Economic tools. (Feenstra ,J.F., et al.,1998).

1) **Economic Approach:** Economic tools are economic regression models, microeconomic models, macroeconomic models, spatial or temporal analogues

A) Econometric models :

Econometric models are used by researchers to find out the impact of climate change on agricultural production, popular econometric models used are the *Basic regression model, the Panel data approach/panel regression model, Autoregressive distributed lag model*.

(a) A basic regression model is used to find the linear relationship between dependent and independent variables. It is also used to show how a change in one variable can affect another variable. It also helps in forecasting.(Mendelsohn et al., 1994)

(b) Panel data model/Panel regression model: Unobserved dependencies of the linear regression model might lead to biased estimators. By using the panel data regression model we can easily eliminate the limitation of a basic regression model. Panel data regression combines time series data and cross-sectional data; it includes unobservable variables in the model. To estimate the regression using panel data there are majorly three approaches used: Pooled Least Square, Fixed Effect Model, and Random effect model. For the selection of the best model particular tests can be performed namely the Chow test, Hausman test, and Lagrange multiplier test.

(c) Autoregressive distributed lag model: An *autoregressive distributed lag model* used for the treatment of time series data, it separates the data into long and short runs. The variables used in the model can be stationary, non-stationary, or combining two of them.(Kripfganz et al.2018).ARDL has two groups pooled mean group and mean group. The pooled mean group only allows short-run coefficients, while the Mean group model uses coefficients for long run and short run.(Pesaran et al.1999).

B) Micro and macroeconomic models: help us observe and predict economic behavior. If the observation or prediction is for say a particular consumer or a firm then it will be the microeconomic model and if the observation or prediction is for a sector, industry, or country it will be a macroeconomic model. Models are applied versions of theories.(Kaiser et al.,1993, Adam et al.,1990)

C) Spatial and temporal analogues:

(i) Temporal analogues: Since the data on future climate is not available, temporal analogues assume past warm climate or current climate as the future climate in their study area.

(ii) Spatial analogue scenario: Study follows the same procedure but they incorporate other regions' data (with warm climate) and use it for their area as the spatial analogue of climate change. (Feenstra, J.F., et al.,1998).

Studies that used Econometric models and methodology: Below are the given review and details of previous studies that utilize the particular models and methods, the type of data used, along with variables used in the study.

Impact of recent climate and weather on Indian agriculture with the use of variables like long-lived greenhouse gases and short-lived climate pollutants like how temperature, precipitation, and ozone affect rice and wheat yields. The finding shows most of the losses are particularly due to short-lived pollutants. To see the impact this study takes a dataset of all the variables from 1980 to 2010 along with the use of the *Basic Regression Model*. (Burney and Ramanathan,2014)

Mishra et al.,2015 on the Impact of Climate Change on agricultural production in Odisha uses the Approach of *Ricardian analysis.* The two climatic variables, rainfall and temperature are used. To test the functional relationship of climate and other control variables on net revenue *panel regression model* is used. There is an inherent assumption that farmers maximize net revenue per hectare on which the Ricardian technique is based. (Mishra et al.,2015)

The paper on the impact of climate change on Indian agriculture by Guiteras, R,2009 utilizes the *Panel data approach* to do analyses of 200 districts from 1960 to 1999. The basic estimation method by Deschenes and Greenstone 2007, is used to regress the annual district-level agriculture and climate outcomes. Comparison is also done between short-run weather fluctuations and long-run climate change. (Guiteras, R. 2009)

The study sees the impact of climate change on food grains millet and rice in India. The variables of the agriculture database include the area under, and production of, rice, pearl millet, and sorghum (measured in hectares and tons respectively), district-wise consumption of fertilizers (tons of nitrogen, phosphate, and potash fertilizers used), total gross cropped area in each district (measured in hectares, and accounting for multiple cropping), gross irrigated area and total agricultural labor. The main variables are fertilizer consumption, labor consumption, and irrigation. Two climatic variables have been created using this database, i.e. rainfall and temperature. The climate variables are used here to see their effect on the yield of all three crops. *A linear panel data regression model* is used. Feasible generalized least square estimation FGLS has drawbacks too as it generates the standard error that is unduly optimistic. The estimates can only be made if several observations are fewer than the number of time period. To correct it panel corrected standard error estimates are obtained. Parameters are estimated with the help of the Prais-Winsten test. (Gupta et al,2012).

The study investigates the relationship between climate change and cotton production, area under cultivation, and fertilizer consumption from 1980 to 2018. An autoregressive distributed lag model is used to find out the cointegration between dependent and explanatory variables (Abbas, S et al 2020).ADLM model is best for dynamic single-equation regressions. One particularly attractive reparameterization is the error correction model (EC). Its popularity in applied time series econometrics has even increased since it turned out for nonstationary variables that cointegration is equivalent to an error-correction mechanism, (Pesaran, H.,1995)

A study uses *dynamic and asymmetric panel autoregressive distributed lag estimators* to see the effect of climate change on agro-productivity in Asia from 1980 to 2016 considering both the long run and short run. It covers a total of 11 Asian countries. Dynamic Heterogeneous panel data regression model uses ARDL(Autoregressive distributed lag model). The dynamic fixed effect model assumes that the coefficient, both short and run, is homogeneous in nature. Here, the model uses forestry, agriculture, and fishing values added per unit of input, as indicators of agricultural productivity climate change indicators are mean annual temperature, mean annual rainfall, and CO_2 emission levels. Control variables are primary energy consumption and total fertilizers. Their interaction is represented in the equation: $AGR=f(CO_2, temp, Rf, Ec, Fe)$. The results showed there exists a long-term relationship between agricultural productivity and indicators of climate change. In the short run, there is a relationship between CO2 emission and productivity but in the long run, this same relation turns into a negative one. (Ozdemir, D.2020)

The study of the economic impact of climate change on agricultural production in Vietnam uses the *Ricardian approach* to explore its implications. To study agricultural production, the Ricardian model uses a cross-sectional approach. The model was developed from the study of land values that would reflect its net productivity by David Ricardo (1772–1823). Mendelsohn et al.(1994) introduced the Ricardian method. An assumption of this method is that land rent would show long-term net productivity.(Mandelsohn et al.,1994).The model also uses the net revenue climate response function as a quadratic equation, it represents the nonlinear shape of the function, which shows how the marginal effect would vary as we move away from the mean.Net revenue function is U shaped when the term is positive and it is hill-shaped when the term is negative.(Mendelsohn et al.1994).Ricardian approach considers adaptation, as it measures economic losses due to environmental factors. The benefit of using it is, that it reduces the cost of generating data. It has some drawbacks as it ignores the price effect and also excludes the non-climatic factors as socio-economic conditions, market access, and the fertilization effect of carbon dioxide concentrations are limited or not taken into account in the full model (Mendelsohn et al., 1994). The linear and quadratic terms of temperature, rainfall, and characteristics of the household and socio-economic variables are independent variables. The soil factor is removed from the model because the land characteristics are similar to the study area. (Huong et al.,2018)

The study analyses the economic analysis of climate change of impact, adaptation, and mitigation in potato farming using annual estimation on annual data spanning from 1998 to 2017. The impact is analyzed by using the OLS *Ordinary least square estimation* method on annual data spanning from 1998-2017. The results of OLS are applied to examine the impact of climatic variables on the yield of potatoes; results indicate the sensitivity of potatoes toward mean temperature. The qualitative aspect of the study is adaptation and mitigation, for the *Focused Group Method,* is used, where 72 farmers from 3 villages are surveyed. (Saxena,S et al,2019).

2)Biophysical Approach

Biophysical tools are experimentation, agroclimatic indices, statistical models, and process-based models.

A) Statistical models: Complex multivariate models give statistical explanations of observed phenomena for factors like a prediction of crop yield with the help of variables like rainfall, temperature, sowing date fertilizer, etc**.** Statistical models are generally developed by using present-day climatic variations there is one major limitation it cannot predict the effect of climatic events that are lying outside the capability of the model because it only uses present-day climatic variations. They can also be criticized for being grounded on statistical connections between the factors rather than on understanding causal mechanisms.

B) Agroclimatic indices: are derived variables that are based on the simple relation of crop's suitability to climate. There are several indices like Thornthwaite's Precipitation Effectiveness Index, the Palmer Drought Index, and the Relative Dryness Index used to measure moisture in the atmosphere.(Palmer et al.,1965). (Feenstra ,J.F., et al.,1998).

C) Process-based model: It takes a simple function to express the interaction between major environmental factors and the growth of crops. Many environmental factors are climate and soil

management. The amount of water, fertilizer, and heat is required at a particular time for optimum growth of a crop, and it is different for every crop. The assessor should be familiar with all these requirements of the crop. (Feenstra ,J.F., et al.,1998).

Studies that Used Statistical Models and Methodology

The global circulation model(GCM) truly captures the climate change scenarios. An effect of regional climate change scenarios of Norway on agricultural productivity. Changes in the growing season, temperature, and precipitation(annual rainfall in mm) are factors of climate change that affect agriculture significantly. The study presented here, chooses the *Biophysical Statistical model*. It links the temperature and precipitation with changes in yield per unit of land. The benefits of the model are its simplicity and limited data requirement. The model used here also considers many non-climatic factors because technical change, innovations, and other agricultural inputs like fertilizers affect productivity too. The limitation of the models is their inability to predict future climate change. It also assumes an unrealistic feature of constant technical change, along with that an important variable for plant growth sun radiation cannot be included here.(Torvanger, A et al.2004)

Info crop simulation model is used in the study of the impact of climate change on crop productivity in western ghats, coastal, and northeastern regions. It is a generic crop growth model. The model used in the study uses in total 5 types of input data: weather data, soil data, crop management, genetic coefficient, and climate change scenarios. Genetic coefficients are specific leaf area, relative growth rate, maximum radiation used, etc. Crop management inputs are time of sowing, application schedule, amount of fertilizers, irrigation along with multiple soil input along with multiple soil inputs. Weather data includes minimum and maximum temperature, rainfall, wind speed, and solar radiation. Changes in variety and alterations in agronomy can mitigate the effect of climate change.(Kumar, NS et al,2011)

The study of the Subtropical climate of north India sees the effect of weather conditions on the growth, yield, and quantity of menthol mint *Mentha arvensis L* cultivators transplanted in different years on different dates. Growth yield and quality were analyzed statistically by using the *Variance technique.* This technique was given by Parse and Sukhatme in 1985 for factorial randomized block design for field experimentation. The basis of average yield and market price of input and output were used to find the net return of different treatments. Net return is equal to cross return minus the cost of cultivation. Menthol mint gained maximum height and leaf area index when it was transplanted earlier, any delay in plantation caused the decline in the above parameters. (Absar et al.,2015)

Qualitative Methodology: Few of the researchers extensively adopted qualitative techniques to study the effect of climate change on agricultural production. Qualitative methodology is based on primary data. Often primary data is collected through Focused group discussions, interviews, open-ended questionnaires, etc.

The qualitative study shows the effect of abiotic stressors on plant growth yield and nutritional quality of agricultural produce. Reduced Biomass production is one of the adverse effects of abiotic stressors leading to qualitative as well as quantitative yield loss. (Kumar, S 2020)

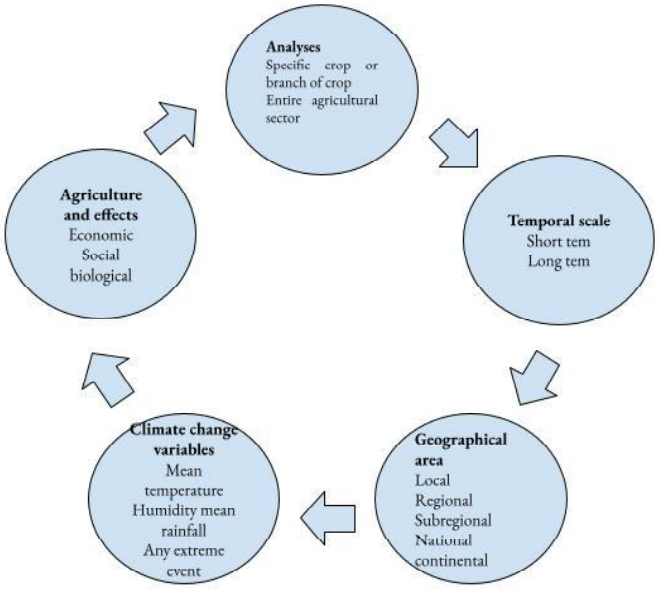
A Review article by Kumar and Gautam 2014 on Climate Change and its effect on agriculture production in India addresses the temperature rise which might affect several important crop productivity by the upcoming year. (IPCC,2007) .Malli et al,2005 say with the tremendous population growth the decline in the availability of freshwater is also a matter of serious concern. Rainfall and agriculture have a direct relationship, climate change will ultimately affect soil moisture, groundwater recharge, water cycle, and sea level and hence it will Directly or indirectly affect agriculture.(Kumar and Gautam.,2014).

Summary of the Model

Different criteria based on which model is selected for study:

The figure contains all the Aspects and influences due to which a specific model is used.(Salvo et al.,2013.,Tate et al.,2001,Lobell et al,2006)

Figure 1:criteria based on which model is selected for study



Source: figure by Salvo et al.,2013;

Conclusion

The choice of models and methodology of data collection are some of the most important parts, based on which the foundations of the study are laid. Proper adaptation and mitigation strategies can only be followed if proper assessment and analysis are done by researchers. Recent trends in the models that are used frequently are the Simple regression model and the panel data regression model by multiple studies. It is due to the simplicity of the panel data regression, and simple regression model that these are widely used when it comes to using secondary data. Qualitative analyses are

done by very few researchers. Most studies show there is a significant relationship between variables of climate change and agricultural production. The review paper aspires to inform and provide a holistic view of methodologies and models used in studies to researchers researching a particular topic.

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An Empirical Study of Advancements in Agriculture in the Twenty-first Century with Special Reference to Selected Districts of Eastern Uttar Pradesh

Surbhi Sinha[1] & Dr. Parijat Saurabh[2]

ABSTRACT

Uttar Pradesh considered primarily as an agrarian economy, as per the article by Dr. Ashok Gulati, "Performance of agriculture in Uttar Pradesh in 2021" states that 47% population is directly dependent on agriculture for their livelihood however share of agriculture in overall Gross State Domestic Product has dropped to 12% in total estimates 2017-18.

This paper aims to highlight the advancement of agriculture in eastern parts of Uttar Pradesh in recent times. The sources so being used for the study are – 'Performance of Agriculture in Uttar Pradesh' by Dr. Ashok Gulati in March 2021, "Assessment of Agricultural Development in Eastern Uttar Pradesh" by Dr.RameshTripathi in June 2017, "Uttar Pradesh Agriculture Policy 2019, by Government of Uttar Pradesh in 2021, "Doubling Agricultural Growth in Uttar Pradesh: Sources and Drivers of Agricultural growth and policy lesson' by Dr. Smriti Verma in March 2017; 'Uttar Pradesh: Agriculture takes central stage in development legacy' an article by Times Of India in 2022.

As per the reports of Indian Council of Agricultural Research in its article Value Chain Development in Indian Agriculture,2021 stating that before mid sixties increase in food grains output in the country were attributed mostly to the growth of the cultivated area and the extension of irrigation, but in recent times the new farming system symbolized by high yielding varieties of seeds , use of agro-chemicals and farm mechanization had significant impact on the food grains production in the country. For the study of advancement of agriculture in eastern parts of Uttar Pradesh cluster analysis approach would be utilized for in depth analysis to suggest policy measures on the basis of indicators that contributes to the development and sustainability of agriculture. The study would be based on secondary sources of data for further analysis.

Keywords: *Advancing, Agriculture*

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INTRODUCTION

By Agriculture it means the practice of growing crops and by the term advancing of agriculture it means the development of agriculture not only by productivity levels but also with reference to inputs such as fertilizers, improved varieties of seeds and irrigation, thereby it is a multi-dimensional concept. As per the 11th Agricultural census(2021-2022) Uttar Pradesh is the most important agriculture state of India, not only it has highest cropped area of 25,785 thousand hectares ,but it has the highest number of over 21 million farm holdings as well and even in eastern Uttar Pradesh 54% population are directly engaged in agriculture ,the major area is occupied by rice-wheat cropping system having the cropping intensity of 150%.The eastern UP contributes about 30% of total food grain production of the state. Most of the families are illiterate because of their poor economic condition and suffers from very poor infrastructure as well. Eastern Uttar Pradesh comprises 10 districts in its agro-climatic zone namely Barabanki, Faizabad,Sultanpur, Jaunpur, Azamgarh, Mau, Ballia, Ghazipur, Varansi and Sant Ravidasnagar , agro-climatic zone is one of the most crucial and prominent factor in deciding the types of crop to be cultivated as well as the output.

The development of change in the national output depends upon the agricultural development as it exists as a dominant sector and plays an important role in economic development such as provision of food to nation, enlarging exports, transfer of manpower to non-agricultural sectors and securing markets for industrialization.

STATEMENT OF RESEARCH PROBLEM

As per the United Nations the population of eastern UP is about 35% of the total population of the state out of which 85% population lives in rural areas. As per All India Coordinated Research Project on Cropping System, people here are directly engaged in agriculture which is around 54% and the irrigation status of agricultural land in eastern UP indicates 40% of net sown area is wholly rain dependent and only 18% of area is fully irrigated. The eastern UP contributes about 30% of total food grains production of the state. The use of fertilizers is highly imbalanced. The importance of both sustainable highly yielding varieties of crops is well recognized to meet out the growing demands of ever-increasing population. Rice, wheat is the most important crop in India, occupying 60-70 % of the total cultivated areas whereas rest 30% is under cash crops that is mix cropping and sugarcane in eastern UP. Due to continuous adoption of the sequence has led to the problem of specific weeds, reduced soil fertility in specific root zone (agroclimatic zone), infestation of similar kind of pests, which led to the decline in the efficiency and productivity of the agriculture. Eastern parts of Uttar Pradesh lack the fruitful management of sustainable agricultural practices and new farming practices due to multiple reasons which are as follow

- Wide agricultural disparities in different districts of Eastern UP
- Small and fragmented holdings
- Unequal impact of new farming system
- Lack of soil fertility management
- Lack of Crop rotation

- Lack of marketing facilities
- Lack of adequate farm mechanization

LITERATURE REVIEW

Dr. Ashok Gulati *Performance of Agriculture in Uttar Pradesh* , published in 2021 , the main aim is to revitalize the Indian agriculture and boost the farmer's income , for this the method so utilized was based on secondary sources for instance- agricultural census ,Situation Assessment Survey , the results so found that there is a large variation in the agricultural performance in the several regions of Uttar Pradesh , eastern and western UP is quite progressive while central regions like Bundelkhand lags behind.

Dr.RameshTripathi *Assessment of Agricultural development in Eastern Uttar Pradesh* , published in 2017,the aim is to rank the districts of Eastern Uttar Pradesh on the basis of their agricultural development with the help of optimum combination of indicators related to agricultural sector , the method so employed was cluster analysis for grouping of districts of eastern UP and the results so found that districts like Sultanpur ,Barabanki,Ambedkar Nagar were found to be most developed whereas the districts like Sonbhadra ,Deoria is least developed.

M.s Swaminathan *Combating Hunger and Achieving Food Security* ,published in 2003 , the objective is to combat hunger and food security in India , the method so used was data based on Millenium Development Goals(2000),government academics , and primary data based on questionnaires with local communities ,the results so concluded that there must be synergy between scientific knowledge , political will and farmer's active participation to achieve goal of overcoming chronic and hidden hunger in developing nation.

Research Scholar Brijmohan Singh Yadav (Lucknow University) ,*Status and Prospects of occupational agriculture in eastern Uttar Pradesh* ,published in 2017,the aim is to study about the underdevelopment of commercial agricultural in eastern Uttar Pradesh and the method so employed was use of secondary data sources like international journals,annual reports based on animal husbandry ,dairying and fisheries , use of data from ministry of agriculture and farmer's welfare and Government of India and it was concluded that commercial agriculture in eastern Uttar Pradesh is pathetic where it is found that only 10.52% of total cultivated land is under commercial agriculture and the productivity is lower as compared to west.

Dr. Smriti Verma , *Doubling Agricultural growth in UP: Sources and Drivers of agricultural growth and policy lesson,* published in 2017,the main objective is to find about the sources and drivers of agricultural growth in UP, the method so utilized was use of agricultural census, use of data regarding cropping pattern and agri-land use in UP from Directorate of Economics and Statistics and the results so found that average monthly income of agri-household in UP was 3rd lowest in country , UP's GSDP grew at 2.5% per annum over the period 2001-2015 but UP can fulfill Prime Minister's vision of "SabkaSaath ,SabkaVikas"if it adopts the policy of robust procurement system of wheat , raising the milk processing Slevels freeing up of molasses from all reservations and rationalizing the sugarcane pricing based on Rangarajan Committee (2012)

RESEARCH OBJECTIVES

- To study about the progress in agriculture in different districts of Eastern Uttar Pradesh.
- To study about the underdevelopment of commercial agriculture in Eastern Uttar Pradesh.
- To study about the new farming system and its impact in food sector of the Eastern UP.

RESEARCH QUESTIONS

- How does the advancement of agriculture have unequal impact on the development in Eastern UP?
- What is the impact of underdevelopment of commercialization in Eastern UP?
- Why Eastern UP lags behind in agricultural development as compared to other parts of UP?
- Why several districts of eastern UP show agricultural disparities in spite of the adoption of new farming system ?

METHODOLOGY

The study would adopt cluster method which is multi-variate analysis which would identify the groups of samples which shows similar characteristics in terms of development of agriculture. The study would also the use of secondary data sources for instance-agricultural census, data from ICAR, government academics and so on.

The study based on these indicators composite index of development of different districts of eastern UP is being calculated through the use of statistical and econometrics models like use of coefficient variation, standard deviation, and use of range and log it model.

The study comprised few selected districts of eastern Uttar Pradesh. Each district faced situational factors of development unique to it as well as common administrative and financial factors. Factors common to all the districts were taken as the indicators of development. A total of 18 developmental indicators were included in the analysis. These indicators are the major interacting components of development. The composite indices of development for different districts were obtained by using the data on the following development indicators :

1. Productivity of potato (t/ha)
2. Productivity of sugarcane (t/ha)
3. Productivity of rice (t/ha)
4. Productivity of wheat (t/ha)
5. Productivity of pulses (t/ha)
6. Gross value of agricultural produce per hectare
1. of gross area sown (Rs.)
7. Per capita gross value of agricultural produce (Rs.)

8. Gross value of agricultural produce per hectare
2. of net area sown (Rs.)
9. Per capita district plan expenditure (Rs.)
10. Net irrigated area
11. Net area sown
12. Net irrigated area (%)
13. Total number of government tubewells
14. Total number of private tubewells
15. Total number of tubewells
16. Cropping intensity
17. Percentage of electricity consumption in agriculture
18. Availability of gross area sown per tractor (ha)

Let [Xij] be data matrix giving the values of the variables of ith district.

Where, i = 1, 2… n (number of districts) and j = 1, 2… k (number of indicators).

For combined analysis [Xij] is transferred to [Zij], the matrix of standardized indicators is as follows :

$$Zij=Xij-Xj/Sj$$

Where, Sj=Standard deviation of jth indicator

Xj=Mean of the jth indicator

From [Zij], identify the best value of each indicator.

Let it be denoted as Zoj. The best value will be eitherthe maximum value or the minimum value of theindicator depending upon the direction of the impact of indicator on the level of development.

For obtainingthe pattern of development Ci of ith districts,

First calculate Pijas follows :

$Pij= (Zij–Zoj)2$

Pattern of development is given by :

Where, (CV)j=Coefficient of variation in Xij for jth

Composite index of development (C. I.) is given by :

C. I. = Ci / C for i = 1, 2, …, n

C = C+3SDi

Where, C=Mean of Ci and

SDi = Standard deviation of Ci

Smaller value of C. I. will indicate high level ofdevelopment and higher value of C.I. will indicatelow level of development.Developmental indicators were transformed as theratio in the following manner :

Sum total of Yiis taken as the composite index ofdevelopment.

The study based on these indicators composite index of development of different districts of eastern UP is being calculated through the use of statistical and econometrics models like use of coefficient variation, standard deviation, and use of range and logit model.

RESULTS AND DISCUSSION

The composite indices of agricultural development were worked out for different districts in respect ofagricultural sector. The districts were ranked on thebasis of composite indices.The values of compositeindices along with the rank of districts are given in table 1.

Table 1. Composite Index of Agricultural Development

DISTRICT	CI	RANK
Sultanpur	0.00	1
Barabanki	0.12	2
Ambedkar Nagar	0.16	3
Faizabad	0.22	4
Maharajganj	0.28	5

Source-11th Agricultural Census

The perusal of Table 1 reveals that for agricultural development, the district Sultanpur was found to be the best developed district in the eastern Uttar Pradesh followed by districts Barabanki, Ambedkar Nagar, Faizabad and Maharajganj,

Where as the district Sonbhadra was on the last place followed by the districts Deoria, Mau, Sant Kabir Nagar andSant Ravidas Nagar. Districts Basti, Mirzapur andKaushambi were found to be moderate districts.

Thus, the paper shows the wide disparities in different districts of eastern UP and urging the need to advance the agricultural progess proportionally in its several districts especially where the development index is quite low for instance-Mau, Deoria and so on and so forth.

SUGGESTIONS

Wide agricultural disparities in some of the particular districts of eastern Uttar Pradesh has led to the unequal impact of new farming system so there need to be an awareness program regarding the usage of new farming system and how far it is being exposed and how can we use them judiciously ; there should be adequate farming system through the help of government subsidies .Most of the families are illiterate because of their poor economic condition and suffers from very poor

infrastructure as well therefore farmers should be provided with good learning and education system for the sustainable and optimum use of agricultural resources.

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Zero Budget Natural Farming with Reference of India

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ABSTRACT

With increasing use of fertilizer and pesticides in the Indian farming system, and at many places in a very imbalanced manner, environment has been harmed. Soils are getting acidic with low carbon content, ground water is getting polluted with high nitrate content, and air is accumulating more nitrous oxide. In order to ensure sustainability of Indian agriculture, the government has been trying to promote Zero Budget Natural Farming (ZBNF), renamed as Bhartiya Prakritik Krishi Padhati (BPKP)1 . It was mentioned in the 2019-20, 2020- 21 and 2022-23 Budget Speeches of the Hon'ble Finance Minister, Smt. Nirmala Sitharaman, at 14th UN Convention to Combat Desertification (UNCCD) by PM Narendra Modi, NITI Aayog and Economic Survey. However, the research questions for us are: what implication will be scaling up of ZBNF at a national level have on the sustainability of the environment, the productivity of major crops, the profitability of the farming community, and above all the national food security? In this study, we attempt to answer these questions with robust empirical analysis as well as field visits and focused group discussions with farmers. Subhash Palekar, the man behind this formulation of ZBNF in India, specifies four essential elements of ZBNF- Beejamrit, Jeevamrit, Acchadana, and Waaphasa, which essentially focus on the rejuvenation of soil health. It claims that it can reduce the cost of cultivation, improve yields, and thus make agriculture more efficient and sustainable while augmenting farmers' incomes. Many political leaders and policy makers tend to agree to this viewpoint, as is clear from their speeches in various fora. However, several reputed agri-scientists and farmer organizations question these claims for their efficacy, and ask for proper scientific validation. In fact, they give a counter viewpoint saying ZBNF does not augment farmers' incomes significantly, would adversely impact the yield of agricultural commodities, thereby harming the country's food security system. Moreover, Sri Lanka's agrarian crisis emanating from a complete ban on import and usage of agrochemicals forewarns caution in adopting a nationwide organic farming practice. Hence, there is a dire need to evaluate the farming practice of ZBNF before propagating it at a country level.

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Introduction

Addressing the United Nations conference on desertification (COP-14), Indian PM told the global community that India is focusing on Zero-Budget Natural Farming (ZBNF). ZBNF was also highlighted in budget 2019 in the bid to double farmer's income by 2022. However, scientists from the National Academy of Agricultural Sciences suggested that there is no need for the government to promote ZBNF unless there is proper scientific validation.

Zero Budget Natural Farming

Zero budget natural farming is a method of chemical-free agriculture drawing from traditional Indian practices. It was originally promoted by agriculturist Subhash Palekar, who developed it in the mid-1990s as an alternative to the Green Revolution's methods that are driven by chemical fertilizers and pesticides and intensive irrigation. It is a unique model that relies on Agro-ecology. It aims to bring down the cost of production to nearly zero and return to a pregreen revolution style of farming. It claims that there is no need for expensive inputs such as fertilisers, pesticides and intensive irrigation.

According to SUBASH PALEKAR there is 4 pillars of Zero Budget Natural Farming:

Jeevamrutha

Jeevamrutha is the first and important pillar of zero budget farming. It is a blend of aged cow urine and fresh cow dung from India's indigenous jaggery, water, pulse flour, soil, and cow breed. This mixture is one type of natural fertilizer which applied to farmland. It is composed of the cow-dung (20 kg), urine (5-10 l), jaggery (20 kg) and dicot flour (2 kg) and is applied to the crops with each Irrigation cycle OR directly to the crops. It provides nutrients, but most importantly, acts as a catalytic agent that promotes the activity of microorganisms in the soil, as well as increases earthworm activity. Jeevamrutha also helps to prevent fungal and bacterial plant diseases. Jeevamrutha is only needed for the first 3 years of the transition, after which the system becomes self-sustaining.

Bijamrita

Bijamrita is the second pillar of zero budget farming. It is a blend of tobacco, green chilies and neem leaf pulp, used for insects and pest control. It's used to treat seeds and it provides natural protection to seeds. It is basically made up of water (20l), cow dung (5kg), urine (5l), lime (50gm) and just a handful of soil. Bijamrita is a seed treatment, equipped in protecting young roots from fungus as well as from soil-borne and seed-borne diseases.

Acchadana (Mulching)

Acchadana (Mulching) is the third pillar of zero budget farming. It could be done by soil mulch, straw mulch or live mulch. It helps to maintain soil moisture content. This pillar helps to protect the cover of soil cultivation and does not ruin it by tilling.

Whapasa

Whapasa is a condition where water molecules and air molecules are present in the soil. It helps to reduce the extra irrigation requirement. The irrigation should be reduced and irrigation should be practiced only at noon, in alternate furrows. Palekar challenges the idea that plant roots need a lot of water, in-fact, what roots need is water vapour, and therefore, Whapasa is the condition where there exist both air molecules and water molecules present in the soil.

Objective

1. To reduce the cost of Farming
2. To save farmers from Debt
3. To reduce the use of fertilizers in agriculture

Need of ZBNF

According to National Sample Survey Office (NSSO) data, almost 70% of agricultural households spend more than they earn and more than half of all farmers are in debt. In States such as Andhra Pradesh and Telangana, levels of indebtedness are around 90%, where each household bears an average debt of ₹ 1 lakh (Zero Budget Natural Farming - ClearIAS). In order to achieve the Central government's promise to double farmers income by 2022, one aspect being considered is natural farming methods such as the ZBNF which reduce farmers' dependence on loans to purchase inputs they cannot afford. Zero Budget Natural Farming gained prominence when Finance Minister Nirmala Sitharaman mentioned it in her 2019 budget speech, speaking of it as a source of doubling farmers' income. In June 2018, Andhra Pradesh rolled out an ambitious plan to become India's first State to practice 100% natural farming by 2024. Zero budget farming model brings down farm expenditure to a great extent and ends dependence on farm loans. It also reduces dependence on purchased inputs as it encourages use of own seeds and locally available natural fertilizers and farming is done in synchronization with nature. The Green Revolution started to ruin livelihoods and lands, few farmers started their research to return to alternative systems. Palekar developed this concept in the mid-1990s as an alternative to the Green Revolution's methods driven by chemical fertilizers and pesticides and intensive irrigation.

Zero Budget Natural Farming (ZBNF) is one such low-input, climate-resilient farming that inspires farmers to use low-cost and locally-sourced and available inputs, eliminating the use of artificial/chemical fertilisers and industrial pesticides (Tripathi et al., 2018). He argued that the rising cost of these external inputs was a leading cause of indebtedness and suicide among Page | 25 farmers, while the impact of chemicals on the environment and on long-term fertility was devastating. He met with the Japanese philosopher Fukuoka. They both came with techniques of natural farming. They promoted the technique of natural farming widely in Karnataka as zero budget natural farming. Without the need to spend money on these inputs or take loans to buy them the cost of production could be reduced and farming made into a "zero budget" exercise, breaking the debt cycle for many small farmers.

Government Schemes and Plans for ZBNF

India's Legislature is advancing natural farming in the nation from 2015- 16 through the traditional agricultural development plan's committed schemes and the National Agricultural Development Plan. In 2018, Andhra Pradesh started a plan to become the first state in India to practice 100% natural farming by 2024. It aims to carry out chemical farming on 80 lakh hectares of land by converting 60 lakh farmers of the state into ZBNF methods.

"ZBNF is self-nourishing and symbiotic in nature."-Subash Palekar

ZBNF is self-nourishing and symbiotic in nature."-Subash Pale

ZBNF and Farmers' Income

- The major characteristic of the Zero Budget Natural Farming is that the cost of production is zero and farmers do not have to buy any inputs to initiate this method of farming.
- Against the conventional methods, the Zero Budget Natural Farming used only 10 percent of the water that is used in the former method.
- As it promotes use of Indian local breed of cow for 30 acres of land, it makes it possible for farmer to earn profits earlier than expected.
- Palekar suggested that with Zero Budget Farming One can make an income of ¹ 6 lakh an acre in irrigated areas and ¹ 1.5 lakh in nonirrigated areas.
- As the Zero Budget Natural Farming covers all kinds of agro climatic areas, it is mentioned to be suitable for all kinds of crops.
- Farmers can get more yields in the first year only giving them a benefit.
- The Zero Budget Farming is also seen to ease out the debt pressure on the farmers as they don't have to take loans to buy any inputs for their farming.
- Farmers are expected to earn more money per acre and the chances of migration from villages to cities can also lessen.

Significance of Zero Budget Farming

- **Minimized Cost Of Production:**
- It is considered as a **cost- effective farming practice** with scope for raising employment and rural development.
- **Ensures Better Health:**
  - As Natural Farming **does not use any synthetic chemicals, health risks and hazards are eliminated.** The food has higher nutrition density and therefore offers better health benefits.
- **Employment Generation:**
  - It generates employment **on account of natural farming input enterprises, value**

addition, marketing in local areas, etc. The surplus from natural farming is invested in the village itself.

- As it has the **potential to generate employment**, thereby stemming the migration of rural youth.

- **Environment Conservation:**
  - It ensures **better soil biology, improved agrobiodiversity** and a more judicious usage of water with much smaller carbon and nitrogen footprints.
- **Reduced Water Consumption:**
  - By working with diverse crops that help each other and cover the soil to prevent unnecessary water loss through evaporation, **Natural Farming optimizes the amount of 'crop per drop'.**
- **Rejuvenates Soil Health:**
  - The most immediate impact of Natural Farming is on the biology of soil—on microbes and other living organisms such as earthworms. Soil health depends entirely on the living organisms in it.
- **Livestock Sustainability:**
  - The integration of livestock in the farming system plays an important role in Natural farming and helps in restoring the ecosystem. **Eco Friendly bio-inputs, such as Jivamrit and Beejamrit, are prepared from cow dung and urine, and other natural products.**
- **Resilience:**
  - The changes in soil structure with the help of organic carbon, no/low tillage and plant diversity are supporting **plant growth even under extreme situations like severe droughts and withstanding severe flood and wind damage during cyclones.**
  - NF impacts many farmers positively **by imparting resilience to the crops against weather extremities.**

Disadvantages of Zero Budget Natural Farming

- This farming method used in some parts of India.
- The type of farming being debated and there is not much scientific research under evaluation.
- This farming technique used in negligible areas.
- There is a possibility of a decrease in the food grain reserves due to this method of farming.

ZBNF's Related Initiatives

- **Rainfed Area Development (RAD):** It focuses on Integrated Farming System (IFS) for enhancing productivity and minimizing risks associated with climatic variabilities.
- **National Mission on Sustainable Agriculture (NMSA),** to develop, demonstrate and disseminate the techniques to make agriculture resilient to adverse impacts of climate change.

- **Sub-mission on Agro Forestry (SMAF):** It aims to encourage farmers to plant multi-purpose trees together with the agriculture crops for climate resilience and an additional source of income to the farmers, as well as enhanced feedstock to inter alia wood-based and herbal industry.
- **Mission Organic Value Chain Development for North Eastern Region (MOVCDNER):** It is a **Central Sector Scheme**, a sub-mission under NMSA, aims to develop certified organic production in a value chain mode.
- **Pradhan Mantri Krishi Sinchayee Yojana (PMKSY):** It was launched in 2015 to address the issues of water resources and provide a permanent solution that envisages Per Drop More Crop.
- **Green India Mission:** It was launched in 2014 under the umbrella of **National Action Plan on Climate Change (NAPCC)** with the primary objective of protecting, restoring and enhancing India's diminishing forest cover.

Conclusion

The world's **population is predicted to expand to approximately 10 billion by 2050.** It is expected that agricultural demand will increase up to 50%, in comparison to 2013, in such a situation a transformational process towards 'holistic' approaches such as **agro-ecology, agroforestry, climate-smart agriculture, and conservation agriculture is a necessity.**There is a **need to Strengthen agricultural market infrastructure** and extend the procurement mechanism to all foodgrain and non-foodgrain crops to all States. Implementation of price deficiency payment system for selected crops. There is a **need to enact legislation on 'right to sell at MSP' needs immediate attention. MGNREGS (Mahatma Gandhi National Rural Employment Guarantee Act)** must also be linked with farm work in order to reduce the cost of cultivation which has escalated at a faster pace over the past few years.

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लोकोक्ति में कृषि और पशुपालन

डॉ. अनिल कुमार [1] एवं डॉ. नरेन्द्र कुमार [2]

सारांश

परम्परागत एवं प्राकृतिक कृषि भारतीय अर्थव्यवस्था के लिए रीढ़ की हड्डी है। लोकोक्ति में कृषि और पशुपालन यह लेख किसान की समस्याओ को ध्यान में रखकर लिखा गयाहै। इसका उद्देश्य किसानों को जागरूक करना है, जिससे वे फसल की पैदावार को अधिक कर सकें। पशुपालन से दूध, घी आदि के उत्पादन को बढ़ाकर देश के आर्थिक विकास में योगदान दे सकें। इस विषय को लिखने के लिए हमने घाघ और भड्डरी की कहावतों का अध्ययन करके इस शोध आलेख को चुना। इस लेख से जो लोग खेती और पशुपालन से संबंधित कार्य करते हैं, उनके लिए फसल उत्पादन और पशुपालन से लाभ को बढ़ाया जा सकता है। जब किसान को लाभ होगा तब देश की आर्थिक विकास सम्भव होगा। इससे किसानों के लिए खेती से संबंधित सरकार नई नीतियों का निर्माण कर सकती है। यह अध्ययन नीति निर्माण, फसल सुधार और पशुपालन हेतु उपयोगी होगा। फसल सुधार और पशुपालन आर्थिक विकास में सहायक होगा तथा राष्ट्र के आर्थिक विकास में योगदान प्रदान कर सकते हैं।

मुख्य शब्दः *प्राकृतिक कृषि, उत्पादन, पशुपालन, लोकोक्ति, भारतीय अर्थव्यवस्था*

प्रस्तावना

भारत कृषि उत्पादन व प्रबंधन के क्षेत्र में एक अग्रणी देश है। अनादि काल से इस व्यवसाय की ओर हमारे पूर्वजों का ध्यान आकर्षित होता रहा है। हमारे पुराने ग्रन्थों में कृषि एवं पशुपालन से सम्बंधित ज्ञान भरे पड़े हुए हैं। ज्ञान की कोई सीमा नहीं होती है। वह असीम है। किसी भी विशेष विषय पर पूर्ण ज्ञान प्राप्त करना मनुष्य जीवन के लिए बहुत कम है। इस लिए पूर्वजों के द्वारा पीढ़ी दर पीढ़ी संचित ज्ञान के सहारे भावी पीढियां अपने जीवन रूपी पथ पर अग्रसर होती रही हैं। यह ज्ञान भण्डार वेद, पुराण, रामायण, महाभारत और पंचतंत्र जैसे महत्वपूर्ण प्राचीन ग्रंथों में संचित है।

1. सहायक आचार्य एवं विभागाध्यक्ष, हिन्दी विभाग, एराज लखनऊ कालेज ऑफ मैनेजमेंट एण्ड एजुकेशन, लखनऊ (उ.प्र), ई–मेलः anilbg24@gmail.com
2. अतिथि व्याख्याता, अर्थशास्त्र विभाग, डॉ0 शकुन्तला मिश्रा राष्ट्रीय पुनर्वास विश्वविद्यालय, लखनऊ (उ.प्र.), ई–मेलः narendra21191@gmail.com

"लोकोक्ति" का अर्थ है–"लोक" और "उक्ति"। लोक का अर्थ है – संसार या लोग और उक्ति का अर्थ है– कथन या बात। इस संसार में जो लोगों के द्वारा अनुभव के आधार पर बात कही गई हैं, उन्हे ही लोकोक्ति कहते हैं। इसे दूसरे शब्दों में कहावत भी कहते हैं। लोकोक्ति में कृषि एवं पशुपालन से संबंधित बातों को इतने सरल एवं सीधे भाषा में व्यक्त किया गया है कि जो पढ़ाई एवं लिखाई नहीं किए लोग हैं ऐसे किसान की जुबान पर भी चढ़ जाते हैं। इन लोकोक्तियों की लोकप्रियता का यही एक रहस्य है। भारत संसार के प्राचीनतम कृषि प्रधान देशों में से एक है। इस लिए भारतीय साहित्य में कृषि एवं पशुपालन से संबंधित अत्यंत महत्वपूर्ण सामग्री उपलब्ध हैं, जो कि आज के वैज्ञानिक युग में भी अपना अलग महत्व रखती है।

प्राचीन काल से लेकर आधुनिक युग में भी भोजन की अत्यंत आवश्यकता है। भोजन, अन्न से बनता है। अन्न, खेती के बिना उत्पन्न नहीं होगा। इसलिए सभी को दूसरे काम छोड़कर सबसे पहले खेती करनी चाहिए।

उद्देश्य

कृषि उत्पादन एवं पषुपालन के द्वारा अर्थव्यवस्था के विकास में साहित्य की भूमिका का अध्ययन करना।

अध्ययन विधि

इस शोध आलेख को लिखने के लिए घाघ और भड्डरी की कहावतों का अध्ययन करके फसल सुधार और पशुपालन द्वारा आर्थिक विकास में योगदान हेतु विष्लेशण किया गया है।

विश्लेषण

उत्तम खेती मध्यम बान, निखिद चाकरी भीख निदान।

खेती का काम सबसे अच्छा बताया गया है, व्यापार खेती से कम अच्छा बताया गया है। नौकरी करना मना किया गया है और भीख माँगना सबसे अन्त का काम है।

बाढ़ै पूत पिता के धर्मे, खेती बाढ़ै अपने कर्मे।

इस समाज में पुत्र अगर तरक्की करता है तो पिता के अच्छे कर्म की वजह से आगे बढ़ता है। अगर खेती में अच्छी फसल उत्पन्न होती है तो वह किसान की मेहनत की वजह से होती है।

मास असाढ़ जो गवहीं कीन, ताकी खेती होवै हीन।

जो किसान आषाढ महीने में रिश्तेदारी में जायेगा, उसकी खेती खराब हो जाती है।

जेठ मास जो तपै निराशा, तो जानो बरखा की आशा।

जेठ (मई और जून) महीने में अगर ज्यादा गर्मी पड़े तो उस साल पानी बरसने की उम्मीद करनी चाहिए।

उतरे जेठ जो बोले दादर, कहै भड्डरी बरसै बादर।

जेठ महीने के अंत में यदि मेंढक (दादुर) बोलने लगे तो भड्डरी कहते हैं कि उस साल बारिश अच्छी होगी।

भुयियां लोट चलै पुरवाई, तब जानौ बरखा रितु आयी।

यदि बरसात से पहले जेठ महीने में जमीन से धूल उड़ाती हुयी पुरुवा हवा चले तो समझ लो बारिश का मौसम आ गया है।

उलटे गिरगिट ऊंचे चढ़ै, बरखा होयि भूयिं जल बुड़ै।

गिरगिट यदि पेड़ पर पूँछ ऊपर करके चढ़े तो समझना चाहिए कि इतनी बारिश होगी कि पृथ्वी पानी से डूब जायेगी।

ढेले ऊपर चील जो बोलै, गली गली में पानी डोलै।

चील पक्षी यदि ढेला के ऊपर बैठकर के बोलेगी तो इतना पानी बरसेगा कि गली और कूचे में पानी भर जाएगा।

दिन को बादर दिन में तारे, चलो कंत जहं जीवै बारे।

यदि दिन में बादल रहे और रात में तारे दिखाई दें तो उस समय सूखा (अनावृष्टि) पड़ेगा। हे प्रियतम! ऐसी जगह चलो जहाँ बच्चों को जीवित रखा जा सके।

लाल पियर जब होय अकासा, तब नहीं बरसा की आसा।

जब आकाश में लाल और पीले रंग के बादल दिखाई देने लगे तो बारिश की उम्मीद नहीं करनी चाहिए।

रोहिनी बरसे मृगा तपे, कुछ कुछ अदरा जाय।
घाघ कहै सुनु घाघनी, स्वान भात नहिं खाय।।

रोहिणी नक्षत्र यानी मई महीने के अंत में बारिश हो जाए और तब धान की फसल बो दिया जाए तथा मृगशिरा नक्षत्र यानी जून के तीसरे चौथे सप्ताह में पानी न बरसे और दो चार दिन आर्द्रा नक्षत्र में भी बारिश न हो यानी धान एक बार सूखने लगे और फिर बरसात होने लगे और फिर बरसात हो जाए तो घाघ अपनी पत्नी से कहते हैं कि इतना धान उत्पन्न होगा कि कुत्ते भी भात नहीं खायेंगे।

चढ़त जो बरसै अदरा, उतरत बरसै हस्त ।
कितनौ राजा डांड़ ले, सुखी रहे गिरहस्त।।

आर्द्रा नक्षत्र यदि आरम्भ से बरसना शुरु कर दे और हस्त नक्षत्र अन्त में बरसे तो राजा कितना ही कर (टैक्स) क्यों न लें फिर भी किसान सुखपूर्वक जीवन यापन करेगा अर्थात फसल अच्छी होगी।

जुताई और गुड़ाई–

परथम मेह का भूमि से बहे न बूंदन नीर।
फिर हल से जो जोत दे उत्तम वाकी सीर।।

पहली बारिश का पानी खेत से न बहने पाये और उसके बाद उसकी जुताई हो जाए तो उसकी उर्वरा शक्ति बनी रहती है।

कच्चा खेत न जोतै कोई, नाहीं बीज न अंकुरै कोई।।

जब तक खेत की मिट्टी गीली रहे, तब तक उसकी जुताई करके बीज नहीं बोना चाहिए क्योंकि कोई भी बीज अंकुरित नहीं होगा।

खेती तो थोड़ै करै, मेहनत करै सिवाय।
राम चहै वहि किसान को, घाटा कबहुं न होय।।

खेती उतनी ही करनी चाहिए, जितने में समय पर खाद, सिंचाई, बुवाई और जुताई कर सके। जो किसान ऐसा करता है उसको कभी घाटा नहीं हो सकता है।

जोतै खेत घास नहिं टूटे, तेकर भाग सांझ ही फूटै।

जिस खेत की जुताई करने पर घास नहीं जड़ से समाप्त होती है, उस किसान का भाग्य शाम को ही फूट गया अर्थात अगले दिन जो कुछ भी बोयेगा वह होगा ही नहीं।

गहिर न जोतै बोवै धान, सो घर कोठिला भरै किसान।

धान की फसल में जमीन को ज्यादा गहरा नहीं जोतना चाहिए, हल्की जुताई करके धान की बुवाई कर देनी चाहिए। ऐसा करने से इतना धान उत्पन्न होगा कि घर में धान रखने की जगह नहीं रहेगी।

मैंदे गोंहूं, ढेले चना।

जिस खेत में गेंहूँ की बुवाई करनी हो उस खेत की जुताई कर के मिट्टी को मैदे की तरह भुरभुरा कर देना चाहिए। और जिस खेत में चना बोना हो उस खेत की मिट्टी को ढेलादार रखना चाहिए तभी गेंहूँ और चने की पैदावार अच्छी होती है।

गोंहूं बाहें, चना दलायें, धान विदाहें।
मक्की निराये, ऊख कसाये।।

गेंहूं के खेत को बहुत बार जोतने से, चने को खोंटने से, धान के उगने पर पटेला देने से, मक्का की निरायी करने से और ईख को बोने से पहले पानी में रखने से लाभ प्राप्त होता है। ईख की कई बार गुड़ायी करने से फसल अच्छी होती है।

जोन्हरी जोतै तोड़ मरोड़, तब वह डाले कोठिला फोर।

जोन्हरी (मक्का) के खेत की अधिक जुताई करनी चाहिए, तभी मक्के की अधिक पैदावार होती है।

जो कपास न गोड़ी, उनके हाथ लगे न कौड़ी।

जिसने कपास के खेत की गुड़ायी नहीं की, उसके हाथ में पैसा नहीं आता है अर्थात फसल का उत्पादन अच्छा नहीं होता है।

जोत न मानै अरसी चना, हित न मानै हरामी जना।

अलसी और चना के खेत की ज्यादा जुताई नहीं करनी चाहिए। इससे फसल का उत्पादन कम होता है। जैसे दुष्ट लोग किए गए उपकार को नहीं मानते हैं। वे और ही नुकसान करते हैं।

तीन सिंचाई तेरह गोड़, तब देखो गन्ने का पोंड़।

गन्ने की फसल का उत्पादन अगर बढ़ाना है तो तीन बार सिंचाई करनी चाहिए और तेरह बार गुड़ायी करनी चाहिए। तब जा करके गन्ने की फसल अच्छी होती है।

खाद–

खेती करै खाद से भरै, तब सौ मन कोठिला में धरै।

खेती करने से पहले खेत में खाद का छिड़काव कर देना चाहिए। जिससे खेत की उत्पादन क्षमता बढ़ जाती है अर्थात फसल का उत्पादन अच्छा होता है। गोबर, मैला, नीम की खली, चोकर, चकवड़ की खाद डालने से फसल की पैदावार अच्छी होती है।

खाद का कूरा न टरै, चाहे करम का लिखा टरि जाय।

भाग्य का लिखा हुआ बदल सकता है लेकिन कूड़ेदान की खाद कभी बेकार नहीं जाती अर्थात फसल की पैदावार अच्छी होती है।

पहले गाड़ा बनाईये बारह, छः और चार।
कूड़ा करकट मूत सब, इसमै दीजै डार ।।
तीन माह के बाद में खाद तैयार जब होय।
तब खेतों में डारिये, धूरि में सोना होय ।।

पहले बारह फीट लम्बा, छह फीट चौड़ा और चार फीट गहरा गड्ढा बनाकर उसमें कूड़ा–करकट, मल–मूत्र इत्यादि तीन माह तक सड़ाने से इसके बाद खेत में डालने से खेत में सोना उत्पन्न होता है। अर्थात फसल की पैदावार अच्छी होती है।

वही किसानी में है पूरा, जो डारै हड्डी का चूरा।

जो किसान खेत में हड्डी का चूर्ण डालता है, वही चतुर किसान माना जाता है।

बीज–

जौ, गोंहूं बौवै पांच पसेर, मटर कै बीघा तीसै सेर।
बोवै चना पसेरी तीन, तीन सेर बीघा जोन्हरी कीन।।

दो सेर मेथी अरहर मास, डेढ सेर बीघा बीज कपास।
पांच पसेरी बीघा धान, तीन पसेरी जड़हन मान ।।
सवा सेर बीघा सांवा मान, तिल्ली सरसो अंजुरी जान।
बर्रे कोदौ सेर बोवावो, डेढ सेर बीघा तीसी नावो।।
डेढ सेर बजरा बजरी सांवा, कोदौ कांकुनि सवैया बवा।
यह बिधि से जब बोवै किसान, दूने लाभ की खेती जान।।

जौ, गेहूँ के बीज एक बीघा में पच्चीस सेर, मटर तीस सेर, चना पन्द्रह सेर, मक्का तीन सेर, अरहर, मेथी, उर्द दो–दो सेर, कपास डेढ सेर, सांवा सवा सेर, तिल्ली, सरसो अंजुलि भर के,बर्रे (कुसुम)और कोदौ एक सेर, अलसी डेढ सेर, बजरा,बजरी डेढ सेर, कांकुनि आधा सेर बीज बोना चाहिए। जो किसान इस हिसाब से बोयेगा उसकी उपज दो गुनी हो जाएगी।

बुवाई–

अगायी सो सवायी।

समय से पूर्व जो फसल बोयी जाती है तो वह फसल उत्पादन में सवा गुनी होती है।

आगे की खेती आगे आगे,पीछे की खेती भाग जागे।

जो सबसे पहले खेती करता है तो उस खेती में अधिक पैदावार होती है। जो पीछे बुवाई करता है तो उसका भाग्य साथ दे तभी उसकी फसल का उत्पादन अच्छा होगा।

तेरह कातिक तीन असाढ, जो चूका सो गया बाजार।

कार्तिक महीने में तेरह दिन के अंदर फसल की बुवाई कर देनी चाहिए और आषाढ में तीन दिन के अंदर फसल बो देनी चाहिए। जो किसान ऐसा नहीं करता है, उसे बाजार से खरीद कर खाना पड़ेगा।

चित्रा गोहूं अदरा धान, न उनके गेरुयी न उनके घाम।

चित्रा नक्षत्र में गेहूँ और आर्द्रा नक्षत्र में धान बोने से न गेहूँ को गेरुयी रोग लगता है और न ही धान को घाम (धूप) ही लगती है। अर्थात बारिश अच्छी होती है।

अदरा धान पुनरवसु पैया, गया किसान जो बोवै चिरैया।

आर्द्रा नक्षत्र में धान की बुवाई कर देनी चाहिए। अगर हम पुनर्वसु नक्षत्र में बोयेंगे तो केवल पैया (बिना चावल का धान) ही उत्पन्न होगा। और चिरैया नक्षत्र (पुष्य नक्षत्र) में बोयेंगे तो किसान का नाश हो जाएगा। अर्थात् कुछ भी उत्पन्न नहीं होगा।

पुरवा में जिन रोपो भइया, एक धान में सोलह पैया।

हे! किसान भाई पूर्वा नक्षत्र में धान की रोपाई नहीं करनी चाहिए क्योंकि जब धान की फसल होगी तब उसकी बाल में सोलह पैया होगा अर्थात पैदावार बहुत खराब होगी।

पुक्ख पुनरवसु बोवै धान, असरेखा जोन्हरी परमान।

पुष्य और पुनर्वसु नक्षत्र में धान बोना चाहिए और अश्लेषा नक्षत्र में जोन्हरी बोना चाहिए। इसका प्रमाण देखने को मिलता है ,जो लोग ऐसा करते है उनकी फसल का उत्पादन अच्छा होता है।

पुस्य पुनरवसु तान बेतान, असरेखा बित्ता परमान।
मघा पूरवा घोंघा फेर, तीनों काटैं एकै मेर।।

पुष्य और पुनर्वसु नक्षत्र में यानी जुलाई माह में धान की फसल को दूर दूर लगाना चाहिए। अश्लेषा (अगस्त के शुरुआत में) में एक एक बित्ता पर और मघा और पूर्वा (अगस्त के अंतिम सप्ताह) में केवल एक घोंघा के फासले पर यानी चार इंच की दूरी पर लगाना चाहिए। ऐसा करने से धान की फसल की पैदावार एक जैसी होती है।

चना चित्रा चौगुनी,स्वाती गोंहूं होय।
रोहिनी कोदौ मिगसिरा धान, अदरा जोन्हरी बोवै किसान ।
आधे हथिया मूरी मुरायी। आधे हथिया सरसो रायी।

चित्रा अर्थात् अक्टूबर के दूसरे सप्ताह में चना और स्वाति नक्षत्र यानी अक्टूबर के अंतिम सप्ताह में गेंहूँ बोने से पैदावार अच्छी होती है। रोहिणी में कोदो, मृगसिरा में धान और आर्द्रा में जोन्हरी बोना चाहिए। हथिया (हस्त नक्षत्र) के पहले सप्ताह में यानी सितंबर के अंत में मूली, लाही आदि बोना चाहिए। हथिया के दूसरे चरण में यानी अक्टूबर के आरंभ में सरसो और राई बोना चाहिए।

बोवै गोंहूं काट कपास, होय न ढेला होय न घास।
सावन सांवा अगहन जौ, जितना बोवो उतना लो।।

कपास काट करके गेहूँ बोना चाहिए। ऐसा करने से न तो घास होती है और न ही ढेला होता है अर्थात मिट्टी भुरभुरी होती है। सावन में सांवा और अगहन में जौ बोने से कम फसल होती है।

बाड़ी में बाड़ी करै, करै ईख में ईख।
वे घर यों हि जायेंगे, सुने परायी सीख ।।

जो कपास के खेत में कपास और ईख के खेत में ईख बोता है, उसमें फसल अच्छी नहीं होती है। जो लोग दूसरों के बतायी गई बात को मान करके काम करता है तो उसका घर नष्ट हो जाता है।

सना घना बन बेसरा, मेंढक फन्दे ज्वार।

पग पग पर बाजरा, करै दरिद्रै पार ।।

सनयी को पास–पास, कपास को दूर दूर, ज्वार को मेंढक की कूदान पर और बाजरे को एक एक कदम की दूरी पर बोयें तो गरीबी दूर हो जाती है।

हरिन फलांगन काकरी, पग पग पर कपास।
कहिए जाय किसान से, बोवै घनी उखार।।

हिरन की कूदान पर ककड़ी और कदम कदम पर कपास और घनी ईख बोना चाहिए। यह सब बातें किसान से कहनी चाहिए।

घनी घनी जब सनई बोवै, तब सुतरी की आसा होवै।

सरसी अरसी, निरसी चना।

सनई को घना (पास पास) बोने से सुतली की फसल की पैदावार अच्छी होती है। सरस यानी नम खेत में अलसी और निरस यानी शुष्क खेत में चना बोना चाहिए। तभी फसल अच्छी होती है।

निराई और सिंचाई–

सावन भादों खेत निरावै, तब गिरहस्त बहुतै सुख पावै।

सावन, भादों में यदि किसान खेत की निराई करता है तो वह बहुत सुख को प्राप्त करता है। अर्थात् फसल का उत्पादन अधिक होता है।

धान, पान, केरा, तीनों पानी का चेरा।
साठी होवे साठवें दिन, जब पानी पावे आठवें दिन।।

धान, पान और केले की फसल को अधिक पानी की आवश्यकता होती है। तभी अच्छी पैदावार होती है। यदि साठी (धान) को हर आठवें दिन पानी मिलता रहे तो साठवें दिन वह पक कर तैयार हो जाएगा।

काले फूल न पाया पानी, धान मरा अधबीच जवानी।

पानी बरसै बहै न पावै, तब खेती कै मजा दिखावै।।

धान की फसल में जब काला फूल निकल आये और उसे पानी न मिले तो वह बीच में ही मर जाता है। बारिश का पानी खेत से बहने न पाये और खेत पानी सोख ले तो फसल अच्छी होती है।

जब बरसे तब बांधों क्यारी, पूरा किसान हो हाथ कुदारी।

गोंहूं आये बाल, खेत बनाओ ताल।।

चतुर किसान वही है जिसके हाथ में कुदाल होती है, जो खेत के पानी को बाहर नहीं जाने देता

है। जब गेहूँ की फसल में बाल निकलने लगे तो खेत को पानी से अच्छी तरह से भर देना चाहिए। जिससे फसल का उत्पादन अच्छा होता है।

पानी बरसै आधे पूस, आधा गोंहूं आधा भूस।
जो बरसै अगहन, तौ जौ लादो गदहन।।
सभी किसानी हेठी, अगहनियां पानी जेठी।।

जब पूस महीने में बारिश होती है, तो गेहूं की पैदावार अच्छी होती है। अगर अगहन में बारिश होती है तो जौ की पैदावार अच्छी होती है। अगहन मास में फसल की सिंचाई कर दी जाए तो सब उपाय से अच्छा है।

गाजर, गंजी, मूरी, इनको बोवै दूरी।

गाजर, गंजी (शकरकंद) और मूली को दूर दूर बोना चाहिए तभी फसल की पैदावार अच्छी होती है।

रोग–

गेंहू गेरुई गंधी धान, बिना अन्न के मरा किसान।

गेहूँ में गेरुई (लाल रंग के कीड़े) और धान में गंधी (कीड़ा) लगने से दोनों फसलें नष्ट हो जाती हैं और किसान बिना अन्न के मर जाता है।

फागुन मास बहै पुरवाई, तब गेहूं में गेरुयी धायी।
नीचे ओद ऊपर बदरायी, घाघ कहै गेरुयी अब धायी।
पूस माघ बहै पुरवाई, तब सरसो के माहू खायी।
चना में सरदी बहुत समायी, ताको जान गधैला खायी।
जाके उखुड़ी लगै लोहायी, तेहि पर आवै बड़ी तबाही।
ऊंख कनायी काहें से, स्वाति के पानी पाये से।।

फाल्गुन मास में पुरवाई चलने से और जमीन गीली हो और ऊपर आकाश में बादल हों तो गेरुयी रोग गेंहू में लग जाता है।पूस और माघ मास में पुरवाई चलेगी तो सरसो में माहू रोग लग जाता है। अगर चना में ज्यादा ठंडक लगेगी तो उस में गधैला कीड़ा लग जाता है।जिसकी ईख में लाल रंग का रोग लग जाता है तो वह फसल खराब हो जाती है।

कटाई, मडाई और ओसाई–

लाग बसंत, ऊख पकंत ।

कन्या धाने मीने जौ, जहां चाहे तहां लौ।

बसंत ऋतु लगते ही ईख पकने लगती है। कन्या राशि में धान और मीन राशि में जौ पक जाते हैं।जब चाहे काट लो।

चना अधपका जौ पका काट, गेहूं बाली लटका काटै।
चौत में फसल हुई तैयार, काट, दांय घर लावो यार।
बेर किये होये नुकसान, बेर में नाहीं भला किसान।।

जब चना आधा पक जाय, जौ पूरा पक जाय और गेहूं की बाली लटक जाए। तब काटना चाहिए फसल अच्छी होती है। जब चौत मास में फसल पककर तैयार हो जाए तो उसे काट करके और मड़ायी करके अविलंब घर में रख लेना चाहिए। जो किसान ऐसा नहीं करता है उसका नुकसान छोड़ फायदा नहीं होता है।

दो दिन पछुवां छह पुरवाई, गेंहू जौ को लेहुं दंवायी।
ताके बाद ओसावै जोयी, भूसा दाना अलगै होयी।।
गेहूँ जौ जब पछुवां पावै, तब जल्दी से दांया जावै।
पछुवां हवा ओसावै जोयी, घाघ कहै घुन कबहुं न होयी।।

जब दो दिन पछुवां चले और छह दिन पुरवाई चले तो गेहूँ और जौ को काटकर के उसकी मड़ायी कर लेनी चाहिए। इसके बाद ओसा करके भूसा और अन्न को अलग कर लेना चाहिए। जब गेहूँ और जौ पछुवां हवा पाते हैं तो उनकी मड़ायी अच्छी तरह से होती है। अर्थात् मड़ायी करने में आसानी होती है।जो लोग पछुवां हवा में ओसाते है, उनके जौ और गेहूँ में घुन (कीड़ा) कभी भी नहीं लगते हैं।

बाछा बैल बहुरिया जोय, न घर रहे न खेती होय।

जिस किसान का बैल बछड़ा हो यानी बहुत कम आयु का हो और उसकी पत्नी गृहस्थी के अनुभव से परिचित न हो ऐसे किसान की न तो गृहस्थी ही चल सकती है और न ही खेती ही हो सकती है।

बूढ़ा बैल बेसाहै, झीना कपड़ा लेय।
आपुन करै नसौनी, दैव दूसन देय।।

जो किसान बूढ़ा बैल खरीदता है या झीना कपड़ लेता है, वह अपना नाश स्वयं ही करता है। व्यर्थ में ईश्वर को दोष देता है। अर्थात बूढ़ा बैल खेती के लिए अनुपयोगी है और झीना कपड़ा अधिक दिनों तक नहीं चलता है।

बैल चमकना जोत में और चमकीली नार।।
ये बैरी हैं जान के कुसल करैं करतार।।

चौकन्ना बैल खेत में जोतने के लिए एवं चंचल नारी गृह कार्य के लिए बैरी के समान हैं। इनसे

भगवान ही रक्षा करें। अर्थात् चौकन्ना बैल किसी भी समय जान के लिए खतरा बन सकता है और कर्कशा स्त्री किसी भी समय झगड़ा उत्पन्न कर सकती है।

ताका भैंसा गादर बैल, नारि कुलच्छनि बालक छैल।

इनसे बचौं चतुर लोग, राज छांडि के साधै जोग।।

ताका भैंसा (जिसकी आंखे विभिन्न दिशाओ में चलित हों अर्थात तिरछा देखता हो) गादर बैल (बैठ जाने वाला बैल) बुरे लक्षणों वाली स्त्री और बनाव श्रृंगार के शौकीन बेटे से सभी चतुर लोग बचते हैं। अर्थात् उपरोक्त दोष किसी भी समय विपत्ति का कारण बन सकते हैं।

तीन बैल दो मेहरी, काल बैठिया डेहरी।

जिस किसान के पास तीन बैल और दो पत्नी रहती हैं तो समझो उसके दरवाजे पर मृत्यु ही बैठी है।

बिन बैलन खेती करै, बिन भैयन के रार।

बिन मेहरारू घर करै, चौदह साख लबार।।

जो गृहस्थ यह कहता है कि वह बिना बैलों की खेती करता है, बिना भाइयों के झगड़ा करता है, बिना स्त्री के गृहस्थी चलाता है तो वह चौदह पीढ़ी का झूठा है अर्थात् यह सब काम बिना किसी की सहायता के नहीं हो सकते हैं।

सावन माह बहै पुरवाई, बरधा बेच लिहा धेनु गायी।

सावन महीने में यदि पुरवाई चले तो बैल बेचकर गाय ले लेना चाहिए क्योंकि वर्षा नहीं होगी अकाल पड़ेगा।

है उत्तम खेती वाकी, होय मेवाती गोयी जाकी।

जिस किसान के पास मेवाती नस्ल के बैलों के जोड़े हों तो उसकी खेती अच्छी होगी अर्थात मेवाती नस्ल के बैल खेत के कार्य के लिए अधिक मेहनती होते हैं।

अमहा जबहा जोतहुं जाय, भीख मांगि के जाहु बिलाय।

अमहा और जबहा नस्ल वाले बैलों से यदि खेती करोगे तो भीख मांगनी पड़ेगी।

मरद निरौने बरधै दांय, दुंभरी चलने में दुःख पायं।

मर्द निराई करने में, बैल मड़ाई करने में तथा गर्भिणी स्त्री राह चलने में दुःख पाती हैं।

भैंसा बरध की खेती करै, करजा काढि विरानो खाय।

बधिया ऐंचत है येहरी को, भैंसा ओहरी को ले जाय।।

भैंसा और बैल को हल में जोतकर के खेती करना बहुत कठिन काम है। इससे अच्छा दूसरे से कर्ज लेकर खा लो क्योंकि बैल मटियार जमीन की तरफ खींचेगा और भैंसा दलदल जमीन की ओर हल ले जाता है। इस प्रकार भैंसा और बैल को एक साथ हल में जोतकर खेती करने में बहुत कठिनाई होती है।

नाटा खोंटा बेंचिके, चारि धुरंधर लेहु।

आपन काम निकारि के, औरहु मंगनी देहु।।

खेती के काम नाटे और छोटे बैलों से नहीं होते हैं,इन्हे बेंच कर के अच्छे काम काजी बैल रखना चाहिए। जिससे अपना काम निकाल कर के दूसरे को भी उधार दिया जा सके।

जहवां देखो लौह बेतिया, तहवां दीहौ खोलि थैलिया।

जहां लाल बैल देखें वहीं बिना देखे थैली खोल देना चाहिए अर्थात् खरीद लेना चाहिए।

फेंट बधीला देह गठीला, आँखों का चमकीला।

कहें घाघ वह मर्द है, बरध कंध का नीला।।

जिस बैल का फेंटा कसा हुआ हो,अशरीर गठीला हो और आँखें चमकीली हो, कंधा नीला हो तो वह बैल बहादुर होगा।

करिया कादर गोल गरियार, सोवकन तेज धंवल बरियार।

काले रंग का बैल कातर,गोल पेट का बैल सुस्त, कुछ कालापन लिए हुए श्वेत रंग का बैल तेज और श्वेत रंग का बैल शक्तिशाली होता है।

गाय से संबंधित–

ठाढी खेती गाभिन गाय, तब जानो जब मुंह में जाय।

खड़ी फसल को तभी अपना जानो जब वह काटकर के घर में रख ली जाए और गाभिन गाय जब तक बच्चा न दे दे तब तक अपना नहीं कहा जा सकता है। अर्थात् गर्भ कभी भी गिर सकता है।

उदंत वरदै उदंत व्याये, आप जाये या खसमें खाये।

अगर कोई गाय या भैंस उदत अवस्था (दूध के दांत न गिरे हों) में ही गाभिन हो और उदत अवस्था में ही बच्चा दे तो यह निश्चय है कि या तो वह स्वयं मर जावेगी या मालिक को ही मार डालेगी।

जब देखो पिय संपति थोरी, बेसहो गाय बियावुर घोड़ी।

हे स्वामी, जब देखना धन कम हो गया है तो बियाने वाली गाय और घोड़ी खरीद लेना अर्थात् इनसे अधिक आय होगी।

पाछे को धड़ भारी होय, पूंछ सींग दोवु पातर होय।

कांछर जाकर भारी होत, ताके दूध को पार न होय। ।

जिस गाय का पीछे का धड़ भारी होता हो, पूंछ और सींग दोनों पतले हों, थन बड़े हों। उसके दूध बहुत अधिक होगा।

हरी बरसीम मिले जो भायी, दूध दुहे एक सेर सवायी।

गाय कहती है कि यदि मुझे हरी बरसीम मिले तो एक सेर दूध की जगह पर सवा सेर दूध दूं।

भैंस से संबंधित–

भैंस सुखी जब गढ़िया पड़े, रांड सुखी जब सब कर मरे।

भैंस तब सुखी होती है, जब वह कीचड़ में लोटती है और विधवा स्त्री तब प्रसन्न होती है जब सबके पति मर जाते हैं।

भैंस बेसाहन तुम चले,सुनियो कंत सुजान।

पहिले अच्छी नस्ल की कर लीजो पहचान।

सींग बड़ बालिस्त भर, गरदन पतली होय।

ऐन बड़ा थन बेगरे कानी पार न होय।

अच्छा मोटा तन्दुरुस्त जो पसु ब्याना होय।

दूध दुहावे दो समय, पीछे सौदा कीन।

इन बातों को ध्यान में कर लीजे परवीन।।

हे स्वामी! तुम भैंस खरीदने जा रहे हो तो पहले अच्छी नस्ल की पहचान को ध्यान में रख लो, जिस भैंस के सींग एक बालिस्त के हों,गरदन पतली हो, ऐन बड़ा हो,थन दूर दूर हों,जिसके थनों में कोई दोष न हो, जो मोटी तन्दुरुस्त तथा कुछ समय की ब्यायी हो, ऐसी भैंस का दो समय दूध दुहाकर दाम तय करना।

भुवरी भैंस गरो हुयी कंठा, करिया का दूध न भुवरी का मट्ठा।

यदि काली या भूरी भैंस के गले में कंठा हो, तो ऐसी भैंस को दूध कम होता है।

रोग से संबंधित–

सावन घोड़ी, भादों गाय, माघ माह जो भैंस बियाय।

कहैं घाघ यह साची बात, आप मरे कि मलिके खाय।।

यदि सावन में घोड़ी, भादों में गाय और माघ में भैंस बच्चा दे तो घाघ कहते हैं कि यह सच्ची बात है कि या तो वह स्वयं मर जाएगी या मालिक को ही मार डालेगी।

जहां परे फुलवा कौ लार, झाड़ू लेकै बुहारो सार।

जिस स्थान पर फुलवा बैल (मुंह पका रोग से पीड़ित बैल) की लार गिरे उस स्थान को झाड़ू से साफ करके कीटाणुनाशक दवा से साफ करना चाहिए।

सींग गिरैला बरध के, औ मनयी का कोढ़।
ये नीके न होयेंगे, चाहे बद लो होड़। ।

बैल का गिरा हुआ सींग और मनुष्य का कोढ चाहे शर्त लगा लो वह ठीक नहीं होगा (यहां सम्भवतः सींग गिरैला का अर्थ सींग का कैंसर है जो ठीक नहीं होता है)।

कटक वायु लक्षण सुनो, फूल पेट बहु जाय।
हाथ पांव रगरे धरना, वाकी दवा कराय। ।

कटक वायु के लक्षण यह है कि इसमें पशु का पेट फूल जाता है और वह जमीन पर हाथ और पाँव रगड़ता है। ऐसे पशु की तुरंत दवा करनी चाहिए।

इन्दरायन फल डेढ छटांका,
ताहि कचलि जल में करि पाका।
जब सेराय मलि छानि पियावे,
फूलो उदर ठीक होयि जावे।।

एक छटांक इन्द्रायण का फल ले करके उसे कूट कर पानी में उबाल लो। जब पानी ठंडा हो जाए तो इन्द्रायण के फलों को उसी में मसलकर और छानकर, इस पानी को पिलाने से फूला पेट ठीक हो जाता है।

बार बार उठ लौटे देखे, ताके उदर सूल होवे।।

पेट दर्द की यह पहचान है कि पशु बार बार पीछे मुड़कर देखता है।

कंजा की गूदी पिछवाड़े, मंद आंच सोखी कलहरावे।
जीरा स्यामे स्वेत दो लीजै, सांचर नौन सबे सम कीजै।
कूट छानि पशु को देयी, सूल जनित सब दुःख हर लेयी।

कंजा की गूदी को पीसकर उसे सूखा भुना लो। उसमें सफेद और काला जीरा तथा नमक बराबर मात्रा में मिलाकर कूटकर और छानकर खिलाने से पेट का दर्द समाप्त हो जाता है।

सरदी बदहजमी ते फूले, औसधि करो उताहिले।
कुटकी लहसुन कारी जीरी, बटी बनाय देहुं मुंख धरी।।

सर्दी–जुकाम और बदहजमी से अगर पेट फूल गया है तो उसका इलाज कराना चाहिए। इसके लिए थोड़ा सा लहसुन और काला जीरा को मिलाकर खिलाना चाहिए।

पागुर भूले उदर फूले, नीम लगाय देव मुँह खोले।

यदि पशु का पेट फूला हो तो पशु पागुर करना बंद कर देता है। इसके लिए पशु के मुख में नीम की पत्ती डालनी चाहिए।

इस प्रकार हम देखते हैं कि लोकोक्तियों में कृषि और पशुपालन का चित्रण बृहद रुप में मिलता है। लोकोक्तियों में स्थानीय भिन्नता दिखाई दे इसका कारण **'कोस कोस पर पानी बदलै चार कोस पे बानी'** है। इन लोकोक्तियों को यदि हम ध्यान देंगे तो कृषि से फसल का उत्पादन बढ़ाया जा सकता है। और पशुपालन से दूध, घृत और हरी खाद को बढ़ाया जा सकता है। ट्रैक्टर के आने से बैलों का प्रयोग कम हो गया है जिससे बछड़े और साँड़ सड़कों पर घूमते रहते हैं जिसके कारण सड़क दुर्घटनाऐं अक्सर होती रहती हैं। मवेसियों के कारण होने वाली सड़क दुर्घटनाओं की रोकथाम, फसलों के नुकसान एवम् मवेसियों के कारण उत्पन्न होने वाली अन्य समस्याओं के निवारण हेतु सरकार द्वारा मवेसियों की उपयोगिता हेतु नीति निर्माण कर योजनाओं को लागू किया जाना चाहिए। वैज्ञानिक युग आने के बाद भी कुछ चीजे वैसे ही चल रही हैं। खेती बाड़ी में लोकोक्ति के लक्षण को देखकर के कार्य करना चाहिए। इससे मवेसियों की उपयोगिता को बढ़ावा मिलेगा साथ ही प्राकृतिक कृषि हेतु कृशकों को उपयोगी पोशक तत्वों की पूर्ति भी हो सकेगी और रासायनिक उर्वरकों पर निर्भता में कमी आयेगी।

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यूट्यूब चौनल सन्दर्भ

1. घाघ की वर्षा संबंधित कहावतें– एजुकेशन झमेला
2. घाघ की जुताई संबंधित कहावतें– एजुकेशन झमेला
3. घाघ की गाय से संबंधित कहावतें – एजुकेशन झमेला
4. घाघ की खाद संबंधित कहावतें– एजुकेशन झमेला
5. लोक गीत और लोक कहावत, घाघ–भड्डरी– हरीश चन्द्र मिश्र
6. घाघ और भड्डरी की मौसम संबंधी भविष्यवाणियां– ज्योतिष संजय जाधव
7. घाघ और भड्डरी की वर्षा और खेती संबंधित कहावतें– हम देहाती सनातनी
8. घाघ भड्डरी की कहावतें– ज्योतिष मुरारी लाल योगी

मिलेट्स की खेती संम्भावनाएं एवं चुनौतियां उत्तराखण्ड के सन्दर्भ में

डॉ. शिवकुमार लाल

मिलेटस यानी मोटा अनाज आज दुनिया के सबसे पुराने अनाज में से एक हैं। हजारो साल पहले पूरे अफ्रीका और दक्षिण पूर्व एशिया में मिलेटस उगाये जाते थे। इनका उपयोग अनेक तरह से खाद्य और पेय पदार्थ बनाने में किया जाता हैं। 2021 में भारत मे संयुक्त राष्ट्र के 2023 को अंतराष्ट्रीय मिलेटस वर्ष घोषित करने का प्रस्ताव भेजा था। भारत के प्रस्ताव को 72 देशो का सर्मथन मिला और संयुक्त राष्ट्र महासभा ने 2023 को अंतर्राष्ट्रीय मिलेट्स वर्ष घोषित किया।

(Millets 2023) मोटे अनाजों पर चर्चा जोरो से चल रही है मिलेट्स आज दुनिया के सब से पुराने उत्पादित अनाजों में से है हजारों साल पहले पूरीअफ्रीका और दक्षिण पूर्व एषिया में मिलेट्स उगाए जाते थे इनका उपयोग अनेक तरह के खाद्य और पेय पदार्थ बनाने में किया जाता है भारत के कई राज्यो में मोटा अनाज होता हैं। उत्तराखंड कर्नाटक तमिलनाडु उडीसा महाराष्ट्र आदिपूरा विश्व आज मिलेटस पर बात कर रहा है।मोटा अनाज कभी उत्तराखंड की पहचान हुआ करती थी।

हिमालय राज्य उत्तराखंड की परम्पराओं में था मोटा अनाज

हिमालय की गोद में से पर्वतीय राज्य उत्तराखंडतकरीबन 53483 वर्ग किलोमीटर में फैला हुआ है। राज्य प्राकृतिक संपदा से तथा अपने आप में असीम जैव विविधता लिए हुए है। उत्तराखंड राज्य के पर्वतीय इलाके अपना समृद्ध इतिहास रखते है। उत्तराखंड के गॉवो में वने सीढी नुमा खेत आज भी कृषि कार्यो के लिए मौजूद हैं।

उत्तराखंड के मोटे अनाज कौन से है –

मडुंवा– मडुआ अनेक आयुर्वेदिक ग्रन्थों में मडुवे के बारे में जानकारी मिलती मडुवा या रागी का पौधा लगभग 1मीटर तक ऊचां होता है इसके फल गोलाकार अथवा चपटें तथा झुर्रीदार होते है। मडुआ

1. असि0 प्रो0 अर्थशास्त्र/विभाग प्रभारी, श्रीदेव सुमन उत्तराखण्ड विश्वविद्यालय परिसर, (राजकीय स्नातकोत्तर महाविद्यालय) गोपेश्वर चमोली (उत्तराखण्ड)

के बीज गोलाकार गहरे भूरे रंग के चिकने होते, इसके प्रयोग से मोटापे तथा डायबिटिक से ग्रस्त रोगियों के लिए विशेष रूप से फायदे मन्द हैं ।मडुवा का वानस्पति नाम Eleusine coracana (एलुसाइन कोराकैनाद्ध है इसका प्रयोग उल्टी रोकने कब्ज सांसो की बिमारी मोटापा धटाने, कुष्ट में लाभ मिलता है। मडुवा 2300 मीटर की उचाई पर पर्वतीय क्षेत्रों में पाया जाता है। झंगोरा–इसका वानस्पति नाम echinochlor frumentacea.

कनिक्लोर फ्रूमेंन्टेसी है झंगोरा एक ऐसा छोटे दाने दार वाला अनाज है जिससे हम विना पीसे साबुत खाने के उपयोग में लाते है । झंगोरा एक अधिक फाइबर वाला अनाज है यानी कि सेहत और पैष्टिकता के मामले में झंगोरा पहले पायदान पर है ऐसा नही है कि सिर्फ उत्तराखण्ड में ही लोग इसे पहचानते है अपितु देश के अन्य हिसो में भी इसे खूव पहचान मिली इसे लोग सामा या श्यामक के चावल जबकि देश के दक्षिणी हिसों में इसे उधलू कुथीरवली और अन्य नामो से भी पहचानते है।यह ब्रत या उपवास मे खाया जाने वाला अनाज भी माना जाता है ।सिर्फ भारत में ही नही अपितु चीन अमेंरिका और यूरोपीय देशों में भी इसकी खेती की जाती है। झंगोरा एक ऐसा पौष्टिक अनाज है जो खनिजों का भंडार है। इसमें लौह तत्व की मात्रा अधिक होती है। यह भोजन को गैर अम्लीय रूप में पचाने की क्षमता रखता है मतलब की सबसे अधिक सुपाच्य श्रेणी का अनाज है। मधुमेंह की रोगी भी अपना आहार बनाते है क्योकि इसमें कार्बोहइड्रेट की मात्रा कम और फाइबर की मात्रा अधिक होती है जिससे कि शरीर में ग्लूकोज की मात्रा संतुलित रहती है। यह एक ग्लूटेन मुक्त अनाज है इस सूपर फूड को विलियन डालर ग्रास नाम दिया गया है। यह हार्टपेसेंट के लिए डायविटिक रोगियों के लिए हड्डी मजबूत करने के लिए पाचन शक्ति में मदके लिए खून की कमी को दूर करने में सहायक है।

उत्तराखण्ड के इस परम्परागत अनाज की खास बात यह है कि यह एक प्रकृति पोषित अनाज है जिस पर अधिक देख रेख की आवश्यकता नही होती इसे असींचित भूमि में बोया जाता है इसकी बुआई फरवरी मार्च के साथ अक्टूवर तक यह तैयार हो जाता है झंगोरे की फसल यहॉ की भौगोलिक और जलवायु के अनुसार विल्कुल उपयुक्त है ।

भट्ट–पहाडी दाल भट्ट को सेहत के लिए बहुत फायदे मन्दहै इसमें कई तहर के पोषक तत्व पाए जाते है इसका वैज्ञानिक नाम ग्लाइसीन मैक्स Glycin Max है। जो लेग्यूमुनेसी कुल से सम्बनिधत है। काला भुट्टे में ओमेंगा 3 फैटी एसिड अत्यधिक मात्रा में पाया जाते थे। उत्तराखण्ड में इसकी परम्परागत खेती होती है। लेकिन आज के समय में काफी कम हो गयी है यह ग्रामीण पिछडे तथा जनजातीय समुदायों को पोषण और आजीविका सुरक्षा सुनिश्चित करने में ये फसले एक महत्व पूर्ण भूमिका निभाती है। इसमे फास्फोरस आयरन कैल्सियम प्रोटीन वसा कार्वोहाइड्रेट आदि पाये जाते इसके प्रयोग से हमारे शरीर में कैल्सियम की कमी दूर होती हैजो हड्डियों को मजबूत बनाएं रखता हैलीवर को स्वस्थ्य रखता है डायविटिक ब्लडप्रेशर इम्यूनिटि सिस्टम बढाने में दिलके रोगियो के लिए फायदे मन्द है।

कौंणी– इसका वैज्ञानिक नाम setaria latalika सेतिरिया इटालिका है कौणी भात एवं भूजा च्यूडा के रूप में प्राचीन काल से भारतीय खाद्य श्रृंखला का एक महत्व पूर्ण अंग रहाहै भारतीय संस्कृति में

और परम्पराओं में कौणी को पवित्र आहार के रूप में मान्यता प्राप्त है नए अन्नके उपयोग की शुरूआत धार्मिक अनुष्ठानों के साथ करने की पूरे भारत में परम्परा है। उत्तराखण्ड में यहां नए अन्न के खाद्यपकवान पहले पितरों को अर्पित किये जाते है, नए अनाज की बालियां खिडकी और दरवाजे के दोनों तरफ गणेश और नारायण के निमित्त गोबर में चिपका कर रोपी जाती हैं। इसमें कार्बोहाइड्रेट प्रोटीन वसा फाइवरकौल्सियम फास्फोरस आयरन पाया जाता है इस सब पौष्टिक गुणवत्ता के साथ कौणी का अनाज low glucinic लो गलाइसेमिक होता है इसे एड्स रोगियो का दिया जाता है इसमें बसा फाइबर कार्बोहाइड्रेट पाया जाता है इस लिए इसे मधुमेह के रोगी समस्त प्रकार उदर विकार के रोगी मोटापा से पीडित प्रदर के रोगी के लिए रामबाण सावित है जहां बाजारमें बासमती चावल 60 रूपये प्रति केजी वही कौंणी की कुटी हुई चावल 260 रूपये प्रति केजी विक रहा है।

सोयाबीन–सोयाबीन शरीर के लिए बहुत फायदे मन्द होती ळे इसमें भरपूर मात्रा में प्रोटीन कैल्सियम पोटैशियम आयरन और विटामिन बी आदि पाये जाते है इसको खाने से हड्डियां मजबूत होने के साथ हार्ट भी हेल्दी रहता है। सोयाबीन की खेती अधिक हल्की व रेतीली भूमि में सफलता पूर्वक की जासकती है ।इसकी खेती खरीफ मौसम में जून के अंन्तिम सप्ताह से जुलाई के प्रथम सप्ताह में मध्य 4–5 इंच वर्षा होने पर बुआई की जाती है।

गहत–का वैज्ञानिक नाम डौली कॉस बाइफ्लोरस गहत की दाल या पहाडी गहत एक फलिया है जो उत्तराखण्ड और भारत भर में कई अन्य राज्यों में उगायी जाती ळे गहत की दाल उष्णगटिबंधीय दक्षिणी एशिया की निवासी है कच्चे गहत के वीज में न केवल एंटीहाइपरग्लाइड सेमिक गुण होती है बल्कि ऐसे गुण भी होते हैजो इंसुलिन प्रतिरोधको कम करते है। इसमें कई औषधीय गुण शामिल है जैसे आयरन कैल्सियम और फास्फोरस जैसे खनिजों का उत्कृष्ट स्रोत है।

भारत सरकार ने उन अनाजों को पौष्टिक अनाज का दर्जा दिया हैं। जिस मिलेट के पीछे भाग रही पूरी दुनिया कभी उत्तराखंड का मुख्य भोजनवह मोटा अनाज था। उत्तराखंड का पारम्परिक अनाज हैं। जिसे मिलेटस कहते हैं।

6 अध्ययन का क्षेत्र

उत्तराखंड राज्य लगभग 86 हजार हैक्टेयर में मंडुवे की खेती की जाती हैं। इससे 1ण्27 लाख मिट्रिक टन का उत्पादन होता हैं। राज्य के गठन के बाद प्रदेश में मंडुवे की खेती का रखाव थोडा कम हुआ है वर्ष 2000 में राज्य में मडुवे का क्षेत्र 1ण्32 लाख हैक्टेयर था जो अब वर्ष 2021.22 तक 86 हजार हैक्टीयर हो गया पहाडो पर मडुवे की खेती एक जगह नही हो पाती इस वजह से किसान छोटे छोटे खेतो में मडुवा का उत्पादन करते है।

प्रभाव/चुनौतियां

उत्तराखंड में तेजी से घट रहा है। कृषि क्षेत्र राज्य गठन के समय उत्तराखंड में कुल 7.70 लाख हैक्टेयर भूमि पर खेती की जाती है। जो कि इस साल में घट कर 1.49 लाख हैक्टीयर भूमि मैं सिमट

कर रह गई हैं। यानि उस दौरान कई हैक्टीयर भूमि सिमट कर रह गई हैं। उत्तराखंड में लगातार हुऐ पलायन और उजडते गॉवो के कारण समाज के साथ साथ यहॉ पर होने वाली खेती के अपना अस्तित्व तकरीबन खोया हैं। कृषि विभाग उस बात की पुष्टी करता हैं कि कृषि क्षेत्र के गिरावट मैदानी इलाको में शौक्षणिक संस्थाओं उद्योगो सडको आदि बुनियादी सुविधाओ के तेजी से विकास और पहाडी क्षेत्रो में पलायन के कारण ऐसा हुआ हैं। लगभग 70 फीसदी वनो से अच्छादित हिमालयी राज्य उत्तराखंड में आज तकरीवन 6.21 लाख हैक्टीयर में खेती की जा रही हैं।

पोषण से जुडी असुरक्षा दुनिया की पुरानी समस्या है। लेकिन 2020 में अचानक सें कोविड 19 ने उस पुरानी समस्या को और कई गुना बडा कर दिया। पोषण के साथ साथ इम्यूनिटी औंर स्वास्थ्य वर्धक पोषक तत्वो से भरे खाद्य पदार्थो पर एक बार पुरी दुनिया में बहस छिडी तो जवाब में मोटा अनाज ही सामने आया मिलेट्स दुनिया के लिए नया शब्द हो सकता है। लेकिन यह वही हे। जो कि उत्तराखंड की पुरानी फसले हुआ करती थी। इनमें मंडुवा कंरगी शामा कुटकी कोदो झिगोरा कोणी चीणा इत्यादि शामिल है।

भारत सरकार उन अनाजों की पोष्टिक अनाज की श्रेणी में अनुसूचित किया हैं। ये सभी फसले पर्वतीय इलाको की मुख्य फसले मानी जाती हैं। इसी वजह सें उत्तराखंड राज्य मिलेटस में पूरे देश में सर्वश्रेष्ठ है।

7 प्रोत्साहन

मोटा अनाज का वर्ष चल रहा हैं। और इसको सशक्त बनने के लिए पूरे देश में कुछ न कुछ आयोजन किया जा रहा है। इसी में उत्तराखंड में भी मोटे अनाजो को बढावा देने के लिए कृषि विभाग ने मिलेटस मिशन योजना का ड्राफट तैयार किया हैं। उडीसा के तर्ज पर उत्तराखंड के मोटे अनाजों को प्रोत्साहित करने के लिए मिलेटस मिशन योजना शुरू की जायेगी इस योजना में सहकारी समितियों के माध्यम से मंडुवा खरीदने की व्यवस्था की गयी इसके लिए रिवाल्विग बजट भी स्थापित किया जाएगा।

अंतर्राष्ट्रीय मोटे अनाज वर्ष में आठ अनाजो को शामिल किया हैं। जिसमें बाजरा ज्वार रागी मंडुवा कंगनी सांवा कुटकी चेना शामिल हैं। इन सभी अनाजों के पोष्टिक गुणो और होने वाले फायदे को देखकर सभी राज्य सरकार और केन्द्रसरकार जागरूकता अभियान चला रहे हैं। लोग अपने आहार में इन मोटे अनाजो को शमिल कर सके।

8 पोषक तत्व

मोटे अनाज में अनेक पोषक तत्व पाये जाते हैं। अगर मोटे अनाज में पाये जाने वाले प्रोटीन की मात्रा देखी जाए तो वह निम्न प्रकार सें हैं।

मंडुवे में 1.3% प्रोटीन, 1.3% फैट और 328 कैलोरी पायी जाती है।

झंगोरा में 6.2% प्रोटीन, 5.8% फैट और 309 कैलोरी प्रति 100ग्राम मिलती है।

राम दाना (माराझा) में 15.6% प्रोटीन 6.3% फैट और 410 कैलोरी प्रति 100 ग्राम मिलती हैं।

मोटे अनाज कम पानी और कम समय में उच्च पौष्टिकता होने के साथ ही अनेक प्रकार के खाद्य औषधीय गुण मिलते हैं। यह दोनो प्रति रोधक क्षमता बढाने के साथ ही मधुमेह के रोगियो के लिए भी फायदे मंद हैं। मोटे अनाज में कैल्शियम आयरन फास्फोरस मैग्नीशियम जस्ता पोटैशियम विटामिन B-6 और विटामिन B-3 पाया जाता है।

मोटे अनाज में कुपोषण से लडने व शरीर में कोलेस्ट्रोल को नियंत्रण करने वाले गुण होते हैं। जिसमे ऑक्सीडेट व फाइटेट तत्व सर्वाधिक मिला हैं। मोटे अनाज को यहॉ सुफरफूड की श्रेणी में जगह मिली हैं।

यहॉ की प्रमुख दाल काले भट हैं। बात करे तो प्रोटीन और वसा उच्च मात्रा में साथ ही सोडियम पोटैशियम लोह तत्व व ऑक्सीडेट पाये जाते हैं।यह सभी फसले पर्वतीय इलाको की मुख्य फसले मानी जाती है।यही वजह है कि उत्तराखंड राज्य मिलेटस में पूरे देश में सर्वश्रेष्ट राज्य है।

निष्कर्ष

वैसे तो उत्तराखंड में मोटा अनाज परम्परा में शामिल है।

लेकिन समय के साथ साथ यह मोटा अनाज और इसकी परम्परा काफी पुरानी हैं। बुरा तो यह हैं कि आज की युवा पीढी इसके बारे में उतना नही जानती लेकिन इसके बावजूद भी सरकार के तमाम प्रयासों और कुछ पुराने लोगो के प्रयासो के जरिए उत्तराखंड में मोटे अनाज यानि मिलेटस में ज्यादातर मडुंवा उगाया जाता हैं। मडुंवा राज्य के 13 जिलो में से तकरीबन 11 जिलो के पर्वतीय क्षेत्र में उगाया जाता हैं। यह कुल कृषि का तकरीबन 9% कृषिक्षेत्र है।जिलो में उगाये जाने वाले मडुंवे पर अगर नजर दौडए तो पौडी गढवाल के सबसे ज्यादा 25430 हैक्टेयर भूमि पर 31871 मीलियन टन मडुंवा का उत्पादन किया जा रहा हैं।

तीसरे नम्बर पर चमोली जिसमे 10639 हैक्टेयर भूमि पर 17942 मीलियन टन मडुंवा का उत्पादन किया जा रहा हैं। इसी तरह हरिद्वार व उधम सिंह नगर को छोडकर सभी जिलो में तकरीबन 127733 हैक्टेयर क्षेत्र में 162286 मीलियन टन मडुंवा का उत्पादन किया जा रहा हैं।

की–शब्द–: औषधीय, पौष्टिकता, प्रतिरोधकक्षमता, पोषक तत्व, जैव विविधता।

स्रोत– 1. उत्तराखण्ड सांख्यिीकीय, 2. कृषि जगत दैनिक अखबार 3. किसान टाक 4. जनपद चमोली के स्थानीय सर्वेक्षण के आधार पर

अमृत काल में कृषि विपणन का आर्थिक विकास में योगदान

डॉ. विजय बहादुर यादव

भारत विश्व में सबसे तेज बढ़ते हुई अर्थव्यवस्थाओं में से एक है। वर्तमान में भारत विश्व की छठी सबसे बड़ी अर्थव्यवस्था है जिसमें कृषि क्षेत्र के विपणन का प्रमुख योगदान है। एक अच्छे किसान की एक आँख हल पर दूसरी आँख बाजार पर रहती है अर्थात् एक किसान के लिए खाद्यान का उत्पादन करना तथा उसकी उचित मूल्य पर बिक्री करना दोनों ही अतिआवश्यक है। किसानों की आर्थिक स्थिति इस बात पर निर्भर करती है कि अतिरिक्त उत्पादन को बेचकर उनसे कितना धन प्राप्त करता है। कृषि उत्पादन की कीमतों पर प्रत्यक्ष रूप से किसान का कोई अधिकार नहीं होता क्योंकि ये कीमतें मांग और पूर्ति के द्वारा तय होती हैं। बिक्री बढ़ाने के लिए केवल यही किया जा सकता है कि उत्पादन को भली प्रकार लाया एवं ले जाया सके और मध्यवर्तियों के व्यय को कम किया जा सके अर्थात् विपणन व्यवस्था सही ढंग की हो। कृषि आयोग के प्रतिवेदन में यह कहा गया है कि जब तक किसान व्यक्तिगत रूप से अथवा अन्य उत्पादकों के साथ मिलकर बिक्री की कला नहीं सिखेगा तब तक वह अपने उत्पादन को बिक्रेताओं की अपेक्षा नुकसान में रहेगा जिनके पास पर्याप्त विशेषीकृत ज्ञान और उचित साधन होते है। समुचित कृषि विपणन व्यवस्था किसानों को उनकी उत्पादों की उचित कीमत एवं उपभोक्ताओं को आवश्यक उत्पाद सही कीमत पर उपलब्ध कराने में सहायक होती है। उत्पादन में वृद्धि देश को आत्मनिर्भर बनाने के साथ उत्पादों का निर्यात करके विदेशी मुद्रा अर्जित करने में सहायक होती है। प्राप्त विदेशी मुद्रा से दूसरे आवश्यक उत्पादों का क्रय करना संभव होता है जो देश के आर्थिक विकास एवं उपभोक्ताओं की आवश्यक पूर्ति में सहायक होती है। इस प्रकार उचित विपणन व्यवस्था होना देश की अर्थव्यवस्था को 5 ट्रिलियन अमेरिकी डॉलर तक पहुँचाने में आवश्यक होगी।

वर्तमान में कृषि विपणन को अर्थव्यवस्था में विशेष स्थान दिया जाना प्रारंभ हुआ है क्योंकि वर्तमान व्यवसायी युग में उत्पादन की सफलता का मापदण्ड उत्पादों की प्राप्त मात्रा न होकर उत्पादों से प्राप्त आय की धनराशि होती है। उत्पादों से प्राप्त आय, उत्पादों की उत्पादित मात्रा एवं उनकी कीमतों पर समान रूप से निर्भर करती है। उत्पादों की सही कीमत की प्राप्ति उनकी उचित विपणन व्यवस्था पर

1. असिस्टेंट प्रोफेसर–(अर्थशास्त्र), संत गणिनाथ राजकीय स्नातकोत्तर महाविद्यालय, मुहम्मदाबाद, गोहना, मऊ (उ0प्र0)

ही निर्भर करती है। कृषि विपणन एक नया विषय है जिसका विकास देश में कृषि उत्पादों के उत्पादन में वृद्धि होने, उत्पादों की अधिशेष मात्रा के होने एवं उनके वितरण की समस्याओं के साथ हुआ है, साथ ही उपभोक्ताओं की उत्पादों के प्रति रूचि एवं उनकी प्राथमिकताओं में परिवर्तन ने विपणन के आध ुनिकीकरण की आवश्यकता को जन्म दिया है। कृषि विपणन आर्थिक गतिविधियों का मूल आधार है वस्तुओं का उत्पादन चाहे जितना कर लिया जाये जब तक उनके विपणन की समुचित व्यवस्था नहीं होगी तब तक आर्थिक विकास की सम्भावनायें बहुत कम होगीं। भारतीय कृषि के पिछड़ेपन का एक प्रमुख कारण कृषि विपणन की सुविधाओं का अभाव रहा है। किसानों की आर्थिक दशाओं में तब तक सुधार संभव नहीं है जब तक की उन्हें उनकी उपज का सही मूल्य प्राप्त नहीं हो जाता है। कृषि उपजों के विपणन में एकत्रीकरण, यातायात, संग्रहण, श्रेणीकरण, प्रमाणीकरण, वित्तव्यवस्था, जोखिम एवं बिक्री आदि विभिन्न क्रियायें सम्मिलित है।

कृषि एक लघु पैमान का व्यवसाय है अतः इसका उत्पादन पूरे देश में बिखरा हुआ है अतः देश में बिखरे हुए कृषि उत्पादों का एकत्रीकरण अत्यन्त जटिल प्रक्रिया है। कृषि उपजों की मौसमी प्रकृति उनके विपणन की कठिनाईयों में और अधिक वृद्धि कर देती है अधिकांश कृषि फसलें अल्प समय में तैयार हो जाती है जिसके फलस्वरूप उनकी बिक्री, संग्रहण, यातायात एवं वित्तीय कार्यों के लिए प्रमुख भार सहन करना होता है क्योंकि अधिक बिकाऊ कृषि उत्पादन उन्हें महीनों सुरक्षित रखना आवश्यक होता है जिनका वर्ष भर उपभोग किया जाता है कृषि विपणन की मौसमी प्रकृति तो होती ही है इसके साथ ही प्रत्येक वर्ष उपजों की मात्रा एवं गुण में विविधता पायी जाती है। मात्राओं में विभिन्नता होने से संग्रहण एवं यातायात की कठिनाइयां समय पर बढ़ जाती है। किस्मों में अन्तर होने से श्रेणीकरण की समस्या उत्पन्न होती है।

कच्चे माल के रूप में प्रयुक्त होने वाले कृषि उत्पादों के विषय में यह बात सत्य है क्योंकि मांगकर्ता कुछ प्रमाणित उत्पादों की ही मांग करते हैं। कृषि उपजों की विपणन में एक अन्य महत्वपूर्ण समस्या यह होती है कि एक उपज अधिक जगह घेरने वाले होते हैं अर्थात् मूल्य की तुलना में इनकी भार एवं मात्रा विशाल होती है और इनमें अधिकांश विनष्ट होने वाली होती है जिससे परिवहन एवं संग्रहण की लागत बढ़ जाती है। इसके अतिरिक्त अभी हमारे देश में अधिकांश किसान अशिक्षित हैं जो विपणन पद्धतियों एवं बाजार की परिस्थितियों से अनभिज्ञ हैं। उन्हें विभिन्न मंडियों के प्रचलित मूल्यों की जानकारी नहीं रहती है। उपभोक्ताओं को किस किस्म के कृषि उत्पादों की आवश्यकता है इसकी भी जानकारी किसानों को नहीं रहती है। वित्तीय संकट के कारण किसान उत्पादन होते ही कृषि उपज गांव के व्यापारी, साहूकार, महाजन के हाथों में बेच देते है जहां उन्हें अपनी उपज का उचित मूल्य नहीं मिलता है। इस प्रकार हमारे देश में किसानों को अपनी उपज को उचित समय, उचित स्थान और उचित मूल्य पर बिक्री करने में अनेक कठिनाईयों का सामना करना होता है।

इसके अतिरिक्त अब कृषि का व्यापारीकरण हो रहा है जिससे कृषि पदार्थ अधिक मात्रा में देश के कोने–कोने में पहुंचने लगे है जिसके परिणामस्वरूप कृषि विपणन में विचौलियों की संख्या बढ़ी है

जिससे कृषि विपणन की समस्यायें और अधिक हो गयी है। भारत में कृषि विपणन की चार पद्धतियां प्रचलित हैं– गांव में बिक्रय, मंडी में बिक्रय, बाजार में बिक्रय एवं सहकारी विपणन।

भारत में विपणन व्यवस्था एवं इसकी आधारिक संरचना का अध्ययन सदैव एक रूचिकर विषय रहा है। 70 की दशक के बाद से इस विषय को और अधिक बल मिला है। यह वह समय था जब गेहूं का उत्पादन अधिक मात्रा में हुआ और उसके फलस्वरूप बिक्रय की व्यवस्थाओं पर विचार विमर्श होने लगा। हरितक्रांति के फलस्वरूप भारतीय अर्थव्यवस्था न केवल खाद्यान्न के मामले में आत्मनिर्भर हुयी बल्कि बाजार योग्य आधिक्य के उदय से उत्पादन आय एवं रोजगार धनात्मक रूप से प्रभावित हुआ है। भारत में विनियमित विपणन व्यवस्था जो मूलतः भारत से ब्रिटेन को निर्यात किये जाने वाले कृषि उत्पादों की मात्रा एवं गुणवत्ता को प्रोन्नत करने के लिए बनाये गये थे उनके किसी महत्वपूर्ण परिवर्तन के बिना ही कृषि क्षेत्र में संरचनात्मक परिवर्तन लाने हेतु हाल ही में आधारिक संरचना के रूप में स्वीकार किया गया है। इसकी संरचनात्मक परिवर्तनों के अन्तर्गत किसानों की निजी व्यापारियों द्वारा अपनायी जाने वाली एकाधिकारात्मक प्रवृत्तियों से रक्षा की गई है। यह सत्य है कि कुछ अर्थशास्त्रियों द्वारा नियमित बाजारों की विपणन कुशलता पर प्रभावों का अध्ययन किया तो भी बाजार विकास कार्यक्रमों का दीर्घकालीन पैरामीटरों पर पड़ने वाले प्रभाव का परीक्षण अभी भी एक उपेक्षित विषय बना हुआ है। उपज के विपणन में प्रमुख सुधार दिखायी देने के बाद से किसानों को आय एवं विशेषकर रोजगार से सम्बन्धित जानकारी में बहुत अधिक परिवर्तन हुआ है।

आर्थिक दृष्टि से कमजोर वर्गों तक विपणन सुविधायें सहकारी विपणन के उचित प्रयत्नों द्वारा ही पहुंचायी जा सकती है। सहकारी विपणन समितियां कमजोर किसानों को मध्यस्थों के शोषण से बचाने का प्रभावी साधन सिद्ध हुयी हैं। इस बात को माना भी जा चुका है सहकारी विपणन संगठन से किसानों को बड़े पैमाने पर कार्यकलाप एवं प्रबन्ध का अवसर मिलता है। अतः पिछड़े हुए वर्गों का सहकारी रूप में संगठन करके तथा सरकारी सहायता का उन्हें ही माध्यम बनाकर उनके आर्थिक प्रगति को अधिक तेज किया जा सकता है। यद्यपि अधिक संख्या में छोटे किसान, कारीगर और मजदूर अब सहकारी विपण व्यवस्था के क्षेत्र में आ चुके है और सेवा सहकारी विपणन समितियों द्वारा दिये गये कुल ऋण का 55 प्रतिशत भाग छोटे किसान, बटाई पर कृषि करने वाले आदि को ही मिला है। फिर भी कमजोर वर्गों का एक बड़ा भाग सहकारी विपणन समितियों का सदस्य नहीं बना है। अतः समाज के कमजोर वर्गों की दृष्टि से सहकारी विपणन समितियों के विकास पर विशेष ध्यान देने की आवश्यकता है।

सहकारी विपणन समितियों की नीतियों एवं कार्य विधि को ऐसे मोड़ दिया जा रहा है जिससे कमजोर वर्गों को अपने आर्थिक कार्यक्रमों के लिए सहकारी विपणन समितियों से ऋण मिल सके। ऋण देने की नई नीति का मुख्य आधार यह है कि किसी किसान को ऋण देते समय उसकी सम्पति की बजाय यह देखना आवश्यक है कि जिस कार्यक्रम के लिए ऋण दिया जा रहा है उसकी उत्पादन क्षमता क्या हैध् इसके अतिरिक्त डेयरी, मुर्गी पालन, व्यवसायिक फसलों गन्ना, मशरूम इत्यादि का उत्पादन

एवं विपणन हेतु मछली पालन, सुअर पालन जैसे विशिष्ट कार्यक्रमों हेतु कमजोर वर्गों हेतु विशेष प्रकार की सहकारी विपणन समितियों का विकास करने के लिए कई उपाय किये जा रहे हैं। ये सहकारी विपणन समितियां व्यवसायिक संस्थाओं के रूप में विकसित हो इसके लिए उनके कार्यकलाप का आध ाार संस्थागत ऋण होना चाहिए। इस दिशा में नई बात रिजर्व बैंक ने कृषि बोर्ड अखिल भारतीय ग्रामीण शाख सर्वेक्षण समिति की इस सिफारिश को मंजूर कर दिया है कि रिजर्व बैंक एक्ट में ऐसा संशोधन किया जाये जिससे कृषेत्तर व्यवसायों के लिए पुर्नवित्त सुविधायें उपलब्ध हो सके। फिर ये कृषित्तेर उद्योग कृषि के साथ किये जाये, वर्तमान समय में ऐसी प्रवृतियों के लिए बैंक तभी वित्तीय सहायता देता है जब वे कृषि के साथ–साथ की जायें। नये संशोधन से सहकारी क्षेत्र के पशुपालन, मत्स्य उद्योग, कृषि विपणन उद्योग को काफी मदद मिली है। कृषि क्षेत्र में अनेक प्रकार की सहकारितायें कृषिकों की आर्थिक आवश्यकताओं की पूर्ति करके कृषि विपणन विकास सहायता प्रदान करती है। इस प्रकार सहकारी समितियां–श्रमसहकारी समितियां, वन सहकारिताएं, यातायात सहकारिताएं, दुग्ध सहकारिताएं, मत्स्य सहकारिताएं भी सहकारिता के क्षितिज पर उभर कर सामने आयी है जो की अपने क्षेत्रों में विकास की तीव्र गति प्रदान की हुयी है।

कृषि क्षेत्र में कृषि विपणन किसानों को उनकी उपज का सही मूल्य दिलाकर गरीबी एवं बेरोजगारी की समस्याओं से निजात दिलाकर विकास दर को बढ़ाने की महत्वपूर्ण क्षमता रखती है क्योंकि किसानों एवं कृषि कार्य में लगे व्यक्ति दिन प्रतिदिन की बढ़ती उपभोग मांग से अपने उत्पादों का प्रोत्साहन मूलक मूल्य प्राप्त करने में सफल होते हैं। यही कारण है कि कृषि क्षेत्र में कृषि विपणन प्रणाली को सुदृढ़ बनाने व विपणन सहकारिता को अपनाने का विचार धीरे–धीरे जनमानस द्वारा स्वीकार किया जाने लगा है। आज यदि व्यवसायिक फसलों से सम्बन्धित इनकी विपणन की उचित व्यवस्था की जाये तो इन फसलों का उत्पादन करने वाले किसानों को अपनी उपज का 40 से 50 प्रतिशत अधिक मूल्य प्राप्त हो सकता है क्योंकि एक किसान उचित विपणन व्यवस्था एवं संसाधानों के अभाव में अपनी उपज को गांव के बाजार में या खेत में बेचने के लिए बाध्य होते हैं। इस सम्बन्ध में प्रो0 बी0एम0 दाण्डेकर ने कृषि विपणन एवं मूल्य से सम्बन्धित अपने अध्ययन में यह बताया है कि यदि किसान अपनी उपज को खेत में न बेचकर राज्यीय, राष्ट्रीय या अन्तर्राष्ट्रीय स्तर पर बेचता है तो उसे उसकी उपज का उचित कीमत प्राप्त होती है।

व्यवसायिक फसलों के अन्तर्गत आने वाली फसलों जिनमें प्रमुख रूप से पिपरमींट, आलू, मशरूम, गन्ना, आदि है जिनका कि उचित मूल्य स्थानीय बाजार में नहीं मिलता है। किसानों को उनकी उपज का सही मूल्य तब प्राप्त होगा जब इन फसलों के विपणन की उचित व्यवस्था की जाय। किसानों की बढ़ी हुयी आय उन्हें इन व्यवसायिक फसलों के उन्नत स्वरूप की ओर अग्रसर करेगी और भारतीय अर्थव्यवस्था का विकास तीव्र गति अपने अमृत काल में 5 ट्रिलियन अमेरिकी डॉलर की ओर होगा किन्तु आज भी कृषि क्षेत्र में कृषि विपणन प्रणाली सम्बन्धी विकास कार्यक्रम वांछित रूप से विकसित नहीं हो पाया है। कृषि विपणन के विकास में ग्रामीण लोगों के कल्याण एवं सम्पन्नता की संभावनायें विद्यमान

है इससे जुड़े मध्यस्थों की जटिल क्रियाओं से किसानों को अनेक समस्याओं का सामना करना पड़ता है। इन कारणों का निराकरण किया जाना आवश्यक है ताकि गांव में कृषि व्यवसायों को अधिक रूचिकर बनाकर कृषि विकास में बाधक गरीबी और बेरोजगारी समस्याओं को प्रभावी ढंग से नियंत्रित करते हुए समाप्त किया जा सके और अर्थव्यवस्था में विकास को गति मिल सके। अतएव उत्पादक एवं उपभोक्ता दोनों के हित के लिए कृषि विपणन व्यवस्था में सुधार किया जाना आवश्यक है।

हमारे देश में उत्पादन का ढ़ांचा, संगठन, वित्तीय संसाधन, विनिमय एवं विपणन प्रक्रियायें पूर्णतया अविकसित एवं अवैज्ञानिक है। अतः कृषि उत्पादकता एवं उत्पादन में प्रग्रति के लक्ष्यों को पूरा करना जितना आवश्यक है उससे कही अधिक विपणन प्रक्रिया को संमुन्नत करने पर बल देना आवश्यक है। कृषि क्षेत्र के उचित विपणन व्यवस्था से भारतीय अर्थव्यवस्था 2027 तक 5 ट्रिलियन अमेरिकी डॉलर तक पहुंच सकती है जिसमें कृषि क्षेत्र से सम्बन्धित गतिविधियों का हिस्सा 1 ट्रिलियन का होगा। इसके लिए कृषि क्षेत्र में सरकार का लक्ष्य उत्पादन केन्द्रित होने से हटकर आय केन्द्रित होने की ओर और नीतिगत ध्यान केन्द्रित करना होगा।

5 ट्रिलियन अर्थव्यवस्था, कृषि विपणन, बेरोजगारी, विकास, सहकारिता।

संदर्भ

1. भारतीय अर्थव्यवस्था 2018, शुभम पब्लिर्स आलोपीबाग, प्रयागराज।
2. भारतीय अर्थव्यवस्था 24वां संस्करण, प्रो0 रूद्र, दत्त एवं सुन्दरम।
3. भारतीय अर्थव्यवस्था 19वां संस्करण, प्रो0 एस0के0 मिश्रा एवं बी0के0 पूरी।
4. आचार्य एस0एस0 एण्ड एन0एल0 अग्रवाल एग्रीकल्चरल मार्केटिंग इन इंडिया, नई दिल्ली।
5. डाक्रेक्टर ऑफ मार्केटिंग एण्ड इन्स्पेक्टशन, मार्केट सरप्लस ऑफ व्हीट, गवर्नमेंट ऑफ इंडिया, फरीदाबाद।

महिला स्वास्थ्य मुद्दे एवं मोटा अनाजः उत्तर प्रदेश के संदर्भ में एक अध्ययन

डॉ. अलका श्रीवास्तव

सारांश

*कोई भी राष्ट्र तब सशक्त बनता है जब उसका हर एक नागरिक सशक्त होता है तथा समाज के हर नारी और पुरुषको सशक्त होना आवश्यक है। आज के समय में महिलाओं की भूमिका बड़ी महत्वपूर्ण है तथा हर क्षेत्र में महिलाएं बढ़ चढ़कर अपना योगदान देती है। **स्वामी विवेकानन्द जी** ने कहा था कि **"जब तक महिलाओं की स्थिति नहीं सुधरती तब तक विश्व कल्याण की बात सोचना बेमानी होगा।"** इतना ही नही हमारे धर्मो तथा ग्रन्थों में भी नारी के महत्व को स्वीकार किया गया है तथा लिखा गया है कि **"यत्र नार्यास्तु पूज्यते, रमन्ते तत्र देवता" अर्थात् जहां पर नारी की पूजा होती है वहां पर देवता निवास करते है।** इसी तरह नारी सशक्तिकरण पर अनेक उदाहरण मौजूद है परन्तु कभी किसी ने यह सोचा है कि उसके स्वास्थ्य की किस प्रकार से देखभाल की जाए। एक नारी जो पूरे परिवार को संभाल सकती है परन्तु एक परिवार एक नारी नही संभाल सकता है। प्रस्तुत शोध पत्र का उद्देश्य **नारी सशक्तिकरण में श्रीअन्न की आवश्यकता को बताना है,** जो आज की भागदौड़ भरी जिंदगी में नारी अनदेखा कर रही है और अनेक प्रकार की समस्याओं से ग्रसित है।*

प्रस्तावना

आज का जीवन बहुत ही भागदौड़ वाला हो गया है लोगों का जीवन इतना व्यस्त है कि उसे भोजन का भी समय नही मिलता। जिस पेट के लिए व्यक्ति इतनी मेहनत करता है, उसी को वह सही ऊर्जा नहीं प्रदान कर पाता क्यों ?क्योंकि उसके पास समय ही नहीं है। हर व्यक्ति को आगे बढ़ने की होड़ हैं और इस होड़ में वह स्वयं के शरीर के साथ खिलवाड़ कर रहा है। किसी भी परिवार की कर्ताधर्ता उस घर की महिला होता है और वह हर किसी का अपने स्तर से ख्याल रखती है और इस अव्यवस्थित जीवन शैली में न्यूट्रिशन भरने की कोशिश करती हैं। कहते है **"एक महिला पूरे घर को संभालती है परन्तु एक महिला को कोई भी नहीं संभाल सकता उसको अपना ख्याल स्वयं ही रखना पड़ता है।"**

1. सहायक आचार्य, अर्थशास्त्र एवं ग्रामीण विकास विभाग, डॉ0 राममनोहर लोहिया अवध विश्वविद्यालय, अयोध्या (उ0प्र0) Email-alkasrivastava12@rediffmail.com

हमारे देश की जनसंख्या का आधा हिस्सा महिलाएं है, जीवन के हर क्षेत्रमें महिलाओं के योगदान को स्वीकार किया गया हैं क्योकि महिला और पुरुष विकास रुपी गाड़ी के दो पहिए हैं, महिलाएं राष्ट्र के विकास में उतना ही महत्व रखती हैं जितना की पुरुष। प्रस्तुत शोध पत्र **"महिला स्वास्थ्य मुद्दे एवं मोटा अनाजः उत्तर प्रदेश के संदर्भ में एक अध्ययन"** को तीन भागों में विभाजित किया गया है। **प्रथम खण्ड में विषय से संबंधित प्रस्तावना की विवेचना, शोध का उद्देश्य तथा शोध विधि है। द्वितीय खण्ड में शोध के अध्ययन क्षेत्र तथा आंकड़े तथा शोध निराकरण को लिया गया है तथा तृतीय खण्ड में निष्कर्ष व सुझाव को रखा गया है।**

प्रथम खण्ड

प्रस्तावना का विवेचना, शोध का उद्देश्य तथा शोध विधि

भारत धार्मिक धरोहरों का देश हैं और सभी धर्मों में नारी को संसार की सर्वोत्तम रचना माना जाता है और कहा जाता है कि

"सृष्टि नहीं नारी बिना,यही जगत आधार,
नारी के हर रुप की महिमा अति आपार"

संसार की उत्पत्ति का मुख्य आधार ही नारी है अगर वह न होती। उसके अनेक रुप है, कही वो माँ हैं, तो कही बहन, तो कही पत्नी, तो कही बेटी। उसके हर रुप की महिमा अति आपार है। नारी जो सबका ध्यान रखती है और इस वजह से वह अपना ख्याल नही रख पाती तथा आज के दौड़–भाग वाले जीवनशैली में सही पोषण न मिलने से अनेक प्रकार की बीमारियों से ग्रस्त हो जाती हैं, उनके लिए मिलेट्स एक औषधी के समान है। **मिलेट्स का अर्थ है– मोटा अनाज या श्री अन्न** पुराने समय मे भारतीय लोगों का भोजन रहे मोटे अनाज को सुपर फूड के नाम से भी जाना जाता है। यह अत्यधिक पोषक, अम्लरहित, ग्लूटेनयुक्त और आहार गुणों से युक्त होते है। इसके अलावा बच्चों और किशोरों में कुपोषण खत्म करने में मोटे अनाज का सेवन काफी अच्छा है तथा इससे प्रतिरक्षा और स्वास्थ्य को बढ़ावा मिलता है। **श्री अन्न में मुख्य आठ फसले शमिल हैः– ज्वार, बाजरा, रागी, सावां, कंगनी, चीनी, कोदो और कुटकी को मोटा अनाज कहते है।**

इसके सेवन से शरारिक विकास के साथ अनेक बीमारियों से बचा जा सकता है। मिलेट्स पौष्टिकता से भरपूर समृद्ध सूखा सहिष्णु फसल है जो ज्यादातर भारत के शुष्क एवं अर्धशुष्क क्षेत्रों में उगाया जाताहै। यह एक छोटे बीज वाली घास के प्रकार का होता है जो वनस्पति प्रजाति ;च्व।ब्म्।म्द्धसे संबंधित है। यह अनेक संसाधनरहित गरीब किसानों के लिए खाद्य एवं पशुचारे का एक महत्वपूर्ण स्रोत्र है तथा भारत की परिस्थितिक और आर्थिक सुरक्षा में महत्वपूर्ण भूमिका निभाता है।मिलेट्स या श्रीअन्न को **"मोटा अनाज"** या **"गरीबों का अनाज"** के रुप में जाना जाता है। यह गेहूँ और चावल से बेहतर है क्योंकियह प्रोटीन, विटामिन और खनिजों से भरपूर होते है। यह ग्लूकोनयुक्त भी होते है और इनका ग्लाइसेनिक इंडेक्स निम्न होता है जो मधुमेह रोगियों के अनुकूल बनाता है। भारत विश्व मेंश्रीअन्न के शीर्ष 5 निर्यातकों में से एक है।

तालिका 01:– मिलेट्स के उत्पादक देश

क्र0सं0	देश	उत्पादन मात्रा
1.	भारत	43.90
2.	चीन	8.97
3.	नाइजर	7.13
4.	नाइजीरिया	6.39
5.	सूडान	4.99
6.	माली	4.94
7.	अन्य देश	23.68

Data Source: The Indian, Report of F.A.O.

भारत विश्व में अनाज उत्पादों का सबसे बड़ा उत्पादक होने के साथ–साथ सबसे बड़ा निर्यातक भी है। मिलेट्स में अनेक पोषक तत्व जैसे कैल्शियम, आयरन, पोटैशियम,मैग्नीशियम और जिंक मिनरल

होते है।ग्लूटेनमुक्त मिलेट्स होने के चलते यह ग्लूटेन असहिष्णु व्यक्तियों के लिए बेहतर सिद्ध हुआ है।यह पोस्टमेनोपॉजलमहिलाओं द्वारा नियमित रुप से खाये–जाने पर हृदय संबंधी विकारी जैसे उच्च रक्तचाप और कोलेस्ट्रालके स्तर को दूर कर सकता है।

उद्देश्यः–प्रस्तुत शोध–पत्र **"महिला स्वास्थ्य मुद्दे एवं मोटा अनाजःउत्तर प्रदेश के संदर्भ में एक अध्ययन"** के निम्न उद्देश्य हैः–

1. महिलाओं की शारीरिक समस्या का पता लगाना।
2. बीमारियों के कारण बढ़ती मृत्युदर।
3. सरकार द्वारा चलाई गई योजनाओं की जानकारी करना।

परिकल्पनाः– प्रस्तुत शोध–पत्र **"महिला स्वास्थ्य मुद्दे एवं मोटा अनाजःउत्तर प्रदेश के संदर्भ में एक अध्ययन"** में प्राथमिक तथा द्वितीयक आकड़ों पर आधारित है।

द्वितीय खण्ड

शोध के अध्ययन क्षेत्र तथा आंकड़े तथा शोध निराकरणः– भारत में खाद्य और कृषि संगठन (F.A.O.) ने वर्ष–2023 को अन्तर्राष्ट्रीय मोटा अनाज या पोषक अनाज वर्ष किया है। हमारे प्रधानमंत्री श्री नरेन्द्र मोदी जी ने इसे "श्रीअन्न" का दर्ज दिया है और आज की पीढ़ी के लिए आवश्यक बताया है। भारत की "मिलेट क्रान्ति" मोटे अनाज के स्वास्थ्य संबंधी और पर्यावरणीय लाभों के बारे में बढ़ती जागरुकता के साथ–साथ पारम्पारिक कृषि अभ्यासों को पुर्नजीवित करने तथा छोटे पैमाने के किसानों को समर्थन देने के प्रयासों से प्रेरित है, इसे सार्वजनिक स्वास्थ्य में सुधार और सतत् कृषि को बढ़ावा देने से संबंधित है। पहले किसान मोटे अनाज की खेती को एक बड़े हिस्से में करता था। लगभग 35 मिलियन हेक्टेअर परन्तु अब केवल 115 मिलियन हेक्टेअर भूमि में ही इसे उगाया जाता हैं। श्रीअन्न के निम्न खेती या यह कहे कि कम उत्पादन के अनेक कारण व समस्याएं थी जो निम्न हैः–

1. **मिलेटस की निम्न उत्पादकता** :– पिछले कुछ समय में ज्वार के उत्पादन में गिरावट आयी है, जबकि बाजरा उत्पादन गतिहीन बन रहा है। रागी सहित कई अन्य मोटे अनाजों के उत्पादन में भी गतिहीनता या गिरावट देखी गई है।

2. **जागरुकता की कमी** :– भारत में मोटे अनाजों के स्वास्थ्य लाभों के बारें में पर्याप्त जागरुकता की कमी है जिससे इसकी निम्न मांग की स्थिति बनी हुई है।
3. **उच्च लागत** :– मोटे अनाज के मूल्य प्रायः पारम्पारिक अनाजों की तुलना में अधिक होते है जिससे वे निम्नआय वाले उपभोक्ताओं के लिए कम सुलभ होते है।
4. **सीमितमात्रा में उपलब्धता** :– मोटे अनाजों पारम्पारिक एवं आधुनिक खुदरा बाजारों में व्यापक रुप से उपलब्ध नही है जिससे उपभोक्ताओं के लिए इनकी खरीद कठिन हो जाती है।
5. **स्वाद संबंधी अरुचि** :– कुछ लोग मोटे अनाजों के स्वाद को फीका या अप्रिय पाते है और इसलिए उपभोग में अरुचि रखते है।
6. **खेती संबंधी चुनौतियाँ** :– मोटे अनाज की खेती प्रायः कम पैदावार और कम लाभप्रदता से संबंद्ध है जो किसानों को इनकी खेती से हतोत्साहित कर सकती है।
7. **चावल और गेहूँ से प्रतिस्पर्द्धा** :– चावल और गेहूँ भारत में प्रधान खाद्य अनाज है जो व्यापक रुप से उपलब्ध भी है इससे मोटे अनाजों के लिए बाजार में प्रतिस्पर्द्धा करना कठिन हो जाता है।
8. **सरकारी सहायता का अभाव** :– भारत में मोटे अनाजों की खेती और उपभोग को बढ़ावा देने के लिए पर्याप्त सहायता का अभाव रहा है जिससे उनका विकास सीमित रह गया है।
9. **विपणन की समस्या** :– मिलेटस की बहुत विपणन किया गया था जिसकी वजह इनकी उत्पादकता में कमी आयी हैं।

इस समस्याओं का अवलोकन करते हुए सरकार ने अनेक प्रकार के समाधान किए जिसमें सर्वप्रथम पोषकयुक्त अनाज को श्रीअन्न का दर्जा दिया उसके बाद वर्ष–2023 को "अन्तर्राष्ट्रीय मोटा अनाज वर्ष" घोषित किया गया जिससे कुछ योजना व मिशन भी शुरु किया गया जिससे इसकी उत्पादकता व उपभोग में वृद्धि हो सके जैसेः–

1. **राष्ट्रीय मिलेट्समिशनः**– मोटे अनाजों के उत्पादन और उपभोग को बढ़ावा देने के लिए वर्ष–2007 में राष्ट्रीय मिलेट्स मिशन लॉन्च किया गया।
2. **मूल्य समर्थन योजनाः**– मूल्य समर्थन योजना मोटे अनाजों के खेती के लिए किसानों को वित्तीय सहायता प्रदान करती है।
3. **मूल्य वर्धित उत्पादों का विकासः**– यह मोटे अनाजों की मांग एवं उपभोग को बढ़ाने के लिए मूल्य वर्धित मिलेट्स आधारित उत्पादों के उत्पादनों को प्रोत्साहित करता है।
4. **सार्वजनिक वितरण प्रणालीः**– सरकार ने मोटे अनाजों को सार्वजनिक वितरण प्रणाली में शमिल किया है ताकि इसे आम लोगों के लिए सुलभ और सस्ता बनाया जा सकें।
5. **जैविक खेती को बढ़ावाः**– सरकार मोटे अनाजों के उत्पादन और उपभोग को बढ़ाने के लिए मोटे अनाजों जैविक खेती को बढ़ावा दे रही हैं।

मोटे अनाज की उत्पादकता को बढ़ाने के लिए कुछ अन्य उपाय भी किए गए है:–

- ग्रामीण भारत के निर्धनतम परिवार जो पहाड़ी क्षेत्रों एवं शुष्क मैदानी इलाकों में रहतें है, मोटे अनाजों की खेती के लिए तभी प्रेरित होगे जब उन्हे इससे अच्छा लाभ होगा और उन्हे रोजगार के साथ पोषण संबंधी लाभ भी होगा।
- श्री अन्न को उपभोग से उनका स्वास्थ्य भी अच्छा होगा और उसके लाभों से जागरुकता में वृद्धि होगी तथा प्रचार प्रसार में वृद्धि होगी।
- बाजारों में इसकी उपलब्धता से उपभोक्ताओं के लिए अधिक सुलभ होगा तथा अनके उपभोग को बढ़ावा मिलेगा।
- मोटे अनाज प्रायः अन्य प्रधान अनाजों की तुलना में अधिक महँगे होते है जिससे वह निम्न आय वाले उपभोक्ताओं के लिए कम सुलभ होते है।सरकारी सब्सिडी से उपभोग में वृद्धि की जा सकती है।
- मोटे अनाजों को गरीबों का अनाज मानने की धारणा को विपणन और प्रचार के माध्यम से बदलने की जरुरत है।

अन्त में यही कहा जा सकता है कि "मोटे अनाज अपनाओं, ताकत बढ़ाओं"।

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THEME 3

India's External Sector Reforms and Challenges

The Role of International Trade in Transboundary Pollution and Climate Change

Prof. Sandeep Kumar[1] & Nupur Singh[2]

ABSTRACT

As Globalization advances, the interconnectedness of economies through trade has led to increased movement of goods, services, and, inadvertently, pollutants across borders. International trade contributes to the transboundary movement of pollutants, including emissions from transportation, shifts in production to countries with lax environmental regulations, and the exploitation of natural resources in trade-driven economies. Transboundary pollution and climate change are among the most urgent environmental issues confronting the world today. These issues are interconnected, as pollutants that cross borders often contribute to climate change and exacerbate the effects of pollution. Addressing the transboundary pollution associated with trade is essential for achieving sustainable development and mitigating the impacts of climate change. Through, an analysis of case studies, including trade relationships between China and the United States, intra-European Union trade, and the Southeast Asian haze crisis, the paper highlights the significant environmental and climate consequences of trade activities. These case studies illustrate how trade not only contributes to localised environmental degradation but also has far-reaching effects on global climate systems. The paper also critically assesses the current international frameworks and policies designed to mitigate transboundary pollution, such as countervailing tariffs and international environmental agreements. It identifies key challenges in enforcing environmental standards across borders, including issues of sovereignty, economic priorities, and the complexities of tracking pollution sources. Furthermore, this study explores potential solutions, emphasizing the need for stronger international cooperation, the implementation of stricter environmental regulations within trade agreements, and the adoption of technological innovations to reduce traderelated emissions. The findings highlight the urgency of integrating environmental considerations into international trade policies to mitigate the adverse effects on the global climate.

Keywords: *Transboundary pollution, climate change, countervailing tariffs, international trade, international environmental agreements.*

INTRODUCTION

Globalization has dramatically transformed the global economy, especially through the rapid expansion of international trade in recent decades. The advances in technology, transportation,

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communication, and trade liberalization have facilitated the flow of goods, services, capital, and labour across borders, leading to deep economic integration. The establishment of institutions like the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO) have played key roles in reducing trade barriers and fostering open markets. Technological advancements have been pivotal in the growth of international trade. Innovations in information technology, logistics, and transportation have significantly reduced the cost and time involved in moving goods across borders. The developing countries, particularly in Asia, have experienced substantial economic growth, benefiting from export-driven economies.

However, Globalization has also led to environmental and social challenges. The increase in trade related transportation, manufacturing, and resource extraction has contributed to a rise in greenhouse gas emissions, pollution, and deforestation. Additionally, the relocation of production to countries with weaker environmental regulations has exacerbated the problem of transboundary pollution, where pollutants generated in one country affect the environment and public health in neighboring countries. The expansion of trade has amplified transboundary pollution, where pollutants generated in one country impact neighbouring regions, contributing to global environmental degradation. As international trade evolves, addressing these environmental and social issues will be crucial for promoting sustainable global development.

Transboundary pollution, where one country sends pollutants across borders to another, creates economic distortions between countries. The polluting (upstream or upwind) country reduces its pollution at home by shifting it abroad, lowering its environmental policy costs and gaining a comparative advantage in pollution-intensive industries. Conversely, the pollution-receiving (downstream or downwind) country experiences higher pollution levels, raising the costs of environmental protection and reducing its competitiveness in pollution-heavy sectors. For example- GHGs emissions from Norway affects the whole world. Also, the acid rain pollution caused due to the emissions of nuclear plant of UK which affect Sweden and Norway after blowing above the North Sea.

Climate change refers to long-term shifts in global temperatures and weather patterns, primarily caused by human activities. The key driver of climate change is the increase in greenhouse gas emissions, particularly carbon dioxide (CO,), methane ($CH_{,,}$), and nitrous oxide (N, O), which trap heat, leading to a warming effect on earth known as the greenhouse effect. International trade significantly contributes to climate change through increased transportation emissions from shipping and aviation, as well as carbon leakage, where industries shift from one nation to the other where the environmental regulations are weak. Additionally, it leads to transboundary pollution, complicating international efforts to reduce emissions and environmental degradation.

The transboundary pollution caused by international trade has a significant impact on climate change.

The purpose of this paper is to know influence of international trade on environmental issues and to analyze the far-reaching effects of trade-related pollution, emphasising the need for international cooperation to address these challenges.

(SECTION – I)

MECHANISMS OF TRADE-INDUCED TRANSBOUNDARY POLLUTION

The expansion of international trade has significant environmental impacts. The mechanisms contribute to transboundary pollution, where the environmental effects of trade extend beyond national borders, affecting global ecosystems and climate. These mechanisms are discussed below:

1. Transportation Emissions

International trade relies heavily on transportation to move goods across the globe. The shipping industry and international aviation are primary contributors to trade-related emissions. These emissions include carbon dioxide (CO,), sulphur oxides (SOx), nitrogen oxides (NOx), and particulate matter, which have considerable impacts on air quality and climate change. Large container ships, which are pivotal in international trade, burn heavy fuel oil that releases substantial amounts of CO, , SOx and NOx, greenhouse gases that contribute to global warming and acid rain. These pollutants can travel long distances, affecting air quality in regions far from the emission sources. Air freight, though a smaller proportion of global trade, significantly impacts climate due to the high greenhouse gas emissions from aircraft engines.

Impact: The environmental footprint of transportation grows with the volume of international trade, leading to increased regional and global air pollution. For instance, pollutants from shipping lanes in the South China Sea and the Mediterranean can degrade air quality and contribute to climate change across the globe.

2. Production Shifts and Carbon Leakage

International trade allows companiesto move production to countries with looser environmental regulations, a process referred to as carbon leakage. This shift can lead to increased global emissions and environmental degradation. Carbon leakage occurs when industries move their operations to countries with lower environmental standards to reduce production costs. This relocation often results in higher overall emissions because the new locations may lack effective environmental controls.

Impact: Carbon leakage complicates efforts to reduce global greenhouse gas emissions, as reductions achieved in one country are offset by increases elsewhere. This redistribution of pollution can undermine international climate agreements and result in a net increase in global emissions.

3. Resource Extraction and Environmental Degradation

The demand for natural resources driven by international trade leads to extensive resource extraction, often resulting in significant environmental harm. This process can contribute to deforestation, habitat destruction, and biodiversity loss. Trade in commodities such as timber, palm oil, and soybeans often leads to large-scale deforestation in tropical regions. This deforestation reduces the Earth's capacity to absorb CO, , causing climate change. The extraction of minerals and

fossil fuels for global trade involves environmental degradation, including habitat destruction and water contamination. Oil spills and methane leaks from fossil fuel extraction further contribute to transboundary pollution.

Impact: Resource extraction linked to international trade reduces the natural environment's ability to act as a carbon sink and contributes to habitat loss and biodiversity decline. The pollution and ecological damage associated with extraction activities often extend beyond national borders, impacting neighbouring regions.

4. Pollution Havens

Pollution havens refer to countries or regions where industries relocate to avoid strict environmental regulations. These areas often become hotspots for environmental degradation due to weaker enforcement of environmental standards. Companies may move operations to countries with less stringent environmental laws to avoid the costs of compliance with stricter regulations in their home countries. Lower production costs and fewer environmental restrictions in pollution havens can attract industries seeking to reduce operational expenses, leading to increased pollution in these regions.

Impact: Pollution havens exacerbate global environmental issues by concentrating pollution in regions with limited regulatory oversight. This not only leads to severe local environmental problems but also contributes to broader transboundary pollution through airborne and waterborne pollutants that travel across borders.

Each of these mechanisms plays a role in amplifying the environmental impacts of international trade, extending pollution beyond national borders and complicating global efforts to manage and mitigate environmental damage. Addressing these challenges requires coordinated international policies and stronger environmental regulations to ensure sustainable and equitable global trade practices.

SECTION – II

CASE STUDIES OF TRADE AND ENVIRONMENTAL CONSEQUENCES

I. China and the United States: Transboundary Pollution from Trade

China, the world's largest exporter, and the United States, one of the largest importers, have a complex trade relationship that has significant environmental consequences. International trade redistributes global emissions and impacts air quality. A study analyzing the trade between China and the U.S. found that Chinese pollution, driven by export production, significantly affects air quality in the western United States. In 2006, 36% of sulphur dioxide, 27% of nitrogen oxides, and 17% of black carbon emissions in China were linked to goods produced for export, with about

21% of those emissions tied to China-to-U.S. trade.It was also reported that pollution from Chinese exports contributed 3–10% to the annual average surface sulfate concentrations and

0.5– 1.5% to ozone levels in the west US. Chinese pollution contributed to 12–24% of daily sulfate pollution in the western U.S., and led to increased noncompliance with ozone standards in regions like Los Angeles.

II. European Union and Eastern Europe: Pollution Transfer within the EU

Trade within the EU has resulted in significant environmental impacts, particularly through the transfer of pollution from Western to Eastern Europe. This is driven by the outsourcing of pollution-intensive industries to nations with weak environmental regulations, such as Poland and Hungary, leading to higher emissions. This shift is primarily motivated by lower labour costs, more lenient environmental regulations, and the desire to reduce pollution at home. Industries such as manufacturing, heavy industry, and chemical production have been relocated, leading to higher levels of emissions in Eastern Europe. Transboundary air pollution from these activities affects both regions, creating environmental inequality as Eastern Europe faces greater health risks and environmental degradation. While the EU has introduced measures like the Green Deal and renewable energy initiatives to address this imbalance, challenges remain in harmonizing regulations across member states.

III. South-East Asia: Trade, Haze Pollution, and Deforestation

In South-East Asia, international trade in commodities such as palm oil and timber has led to widespread deforestation, contributing to transboundary haze pollution and significant environmental degradation, with broader effects on regional and global climate. Haze pollution is largely caused by slash-and-burn agriculture, particularly in Indonesia, affecting neighbouring countries. Deforestation, driven by the demand for commodities like palm oil and timber, reduces the region's carbon sink capacity, contributing to global warming and biodiversity loss. These environmental issues are exacerbated by global economic demand, and while regional cooperation aims to mitigate them, challenges in enforcement and balancing economic growth remain.

SECTION III

INTERNATIONAL FRAMEWORKS TO DEAL WITH TRANSBOUNDARY POLLUTION

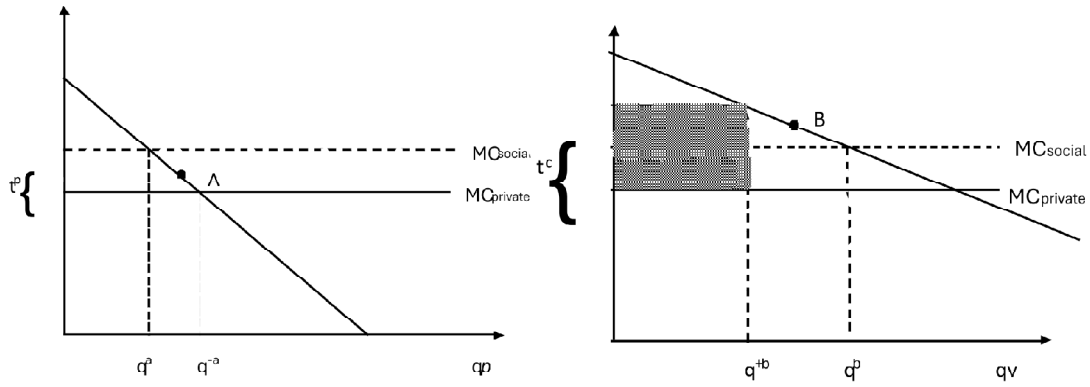
- **Countervailing tariffs-**The polluting country exports goods to a neighbouring victim country, but the pollution generated also crosses the border. To combat this, the victim nation imposes tariff on the imported goods, proportional to the pollution damage. However, this approach is not efficient except in limited circumstances, such as when all goods are exported to the victim nation and when marginal and average damages are equal. Even then, the victim country might use its monopsony power to levy tariffs unrelated to pollution control, complicating efficiency.

  In a simplified model where pollution is directly tied to the amount of goods produced, and marginal damages match average damages, the ideal solution would be to implement a Pigovian fee. This fee would equal the marginal damage from pollution and be applied to all production, ensuring that only consumers who value the good above its full cost (private and environmental)

would purchase it. This would lead to an efficient distribution of goods and pollution reduction. However, if the polluter country doesn't implement such a fee, the victim country can only resort to a tariff on imports to reduce pollution. This is depicted in the below graphs, one of polluter's country and the other of victim's country –

A countervailing tariff is used to address transboundary pollution between (a) the polluter market and (b) the victim market. The optimal Pigovian fee is denoted by t^p. In graph b, t^c represents the countervailing tariff imposed by the victim market. The terms q^a and q^b refer to the ideal consumption levels in the polluter and victim markets, respectively. q^{-a} is the consumption level in the polluter market without an emission fee, while q^{+b} is the consumption level in the victim market with the countervailing tariff applied. The shaded area in the graph illustrates the pollution damage addressed by the countervailing tariff t^c.

Although the tariff can reduce pollution by lowering the polluter country's output, it introduces inefficiencies. Some consumers in the victim country, who value the good more than certain consumers in the polluter country, are unable to purchase it due to the tariff which is point B in graph (b). This means that a more efficient allocation, or Pareto improvement, could be achieved by balancing consumption based on the value placed on the good by consumers in both countries.



Finally, if multiple countries are involved, each country would levy tariffs based on local pollution damage, leading to even more inefficiency since global pollution costs are not fully considered. Thus, while countervailing tariffs can help, they are unlikely to fully correct the pollution problem.

- **Issue Linkage-** There is an alternative of countervailing tariffs for addressing transboundary pollution. The countries engage with each other on various issues beyond economics, such as political and cultural matters. If a victim country lacks the ability to directly compel a polluter to reduce emissions, it might leverage its influence in other areas, like withholding agreement on a joint defense treaty, to pressure the polluter into adopting pollution controls. This approach, known as "issue linkage," involves using power in unrelated areas to achieve environmental goals, making it more of a political strategy than an economic one.
- **International Environmental Agreements-** The international environmental agreements to address global pollution problems, such as greenhouse gas emissions and ozone depletion.

Due to increase in greenhouse gases like carbon dioxide, the global climate change leading to rise in global warming and sea levels. The rise in CFC emission leads to the Montreal Protocol to solve the problem of ozone depletion. Without a supernational body to enforce such agreements, they must be self-enforcing and attractive to all participating countries.

Three key characteristics are necessary for an international environmental agreement to succeed:

- **Cheating and nonparticipation deterred**: Countries must find it undesirable to remain outside the agreement, and cheating within the agreement must be stopped.
- **Individually rational**: Every nation must benefit more from joining the agreement than staying outside.
- **Environmentally improving**: The agreement should lead to improved environmental outcomes compared to the status quo.

The challenge lies in preventing free-riding (where countries avoid commitments but benefit from others' efforts), managing "leakage" (industries moving to non-signatory countries to avoid regulations), and ensuring countries comply with treaty obligations. An agreement needs to meet all three criteria to be effective, though achieving this is difficult.

The formation of self-enforcing international environmental agreements (IEAs) and how many countries are likely to join such agreements is questionable. A simple model is used to explore why countries might cooperate to solve environmental problems, despite the temptation to free-ride.

The model involves 'N' identical countries, each of which can either pollute or abate emissions.

Three key scenarios are considered:

1. **Cooperative solution**: If all countries cooperate, they would all abate emissions, leading to better outcomes for everyone, as the payoff from abatement is better than from pollution.
2. **Noncooperative solution**: If countries act independently, each will choose to pollute, resulting in lower payoffs for all due to the shared environmental damage.
3. **International Environmental Agreement (IEA)**: Some countries may form an IEA while others remain in a "fringe," continuing to pollute. If the size of the IEA reaches a critical threshold, its members will decide to abate, but below this size, they will choose to pollute. The fringe countries will always pollute.

The stability of an IEA depends on whether countries are incentivized to stay in the agreement or join the fringe. Only one stable IEA exists, with a particular size. As the environmental damage increases, the size of the IEA decreases, meaning that for larger environmental problems, it becomes harder to hold together a large group of cooperating countries. This is discouraging, as it implies that the more urgent the need for cooperation, the less effective and smaller the International Environmental Agreement will be.

SECTION- IV

CHALLENGES IN ENFORCEMENT OF ENVIRONMENTAL REGULATIONS IN GLOBAL TRADE

Enforcing environmental regulations in the context of global trade is a complex task fraught with numerous challenges. These difficulties arise from issues such as national sovereignty, conflicting economic interests, and the intricacies of tracking pollution sources across international borders. As global trade intensifies, the need to address transboundary pollution becomes more pressing, yet effective enforcement remains elusive. The several challenges are:

1. **Sovereignty Issues:** Environmental enforcement often clashes with national sovereignty, as countries are hesitant to allow external bodies to dictate their domestic policies. While international agreements may set targets, countries retain control over how they implement and enforce regulations, leading to inconsistent practices.
2. **Economic Interests**: Developing countries, in particular, prioritize economic growth over strict environmental regulations. The desire to attract foreign investment and boost trade often results in lenient enforcement, creating "pollution havens" where companies can operate with minimal environmental oversight.
3. **Complexity of Tracking Pollution Sources**: Global trade involves intricate supply chains, making it difficult to trace the source of pollution across borders. Products may pass through multiple countries, obscuring accountability and complicating enforcement efforts.
4. **Lack of Strong International Mechanisms**: Many international agreements lack robust enforcement mechanisms. Even when countries commit to environmental targets, weak penalties and limited oversight often result in non-compliance.

Addressing these challenges requires enhanced international cooperation, transparency in global supply chains, and stronger incentives for compliance.

SECTION V

POTENTIAL SOLUTIONS FOR REGULATING TRADE-RELATED POLLUTION

1. **Stricter International Environmental Standards**: Establishing uniform global environmental standards can help mitigate pollution from international trade. Harmonized regulations would prevent industries from relocating to countries with lax environmental laws, reducing the "pollution haven" effect. Stronger enforcement mechanisms, such as sanctions for non-compliance, would also be crucial.
2. **Carbon Pricing**: Carbon pricing involves putting a financial cost on carbon emissions to encourage industries to reduce their greenhouse gas output. There are two main ways to do this: carbon taxes and cap-and-trade systems.Both methods push businesses to lower emissions by making it financially beneficial to do so, which can help mitigate the environmental impact of industries, including those involved in international trade.

3. **Role of International Organizations**: Organizations like the **World Trade Organization (WTO)** can play a key role in regulating trade-related pollution. By integrating environmental provisions into trade agreements and facilitating dispute resolution over transboundary pollution issues, the WTO can help ensure that trade policies do not undermine global environmental goals.
4. **Support for Developing Countries**: Providing financial and technical assistance to developing nations can help them implement cleaner production methods and enforce stricter environmental regulations. This support ensures that environmental goals are not sacrificed for economic development.
5. **Technological Innovations**: Investing in new technologies, such as renewable energy, pollution control technologies, and emissions tracking systems, can reduce the environmental impact of global trade. Promoting the development and adoption of these innovations is critical to lowering pollution across supply chains.

These solutions, combined with enhanced global cooperation and accountability, are essential for addressing the environmental impacts of international trade.

SECTION- VI

CONCLUSION

International trade is a major driver of transboundary pollution and climate change, as it relocates pollution-intensive industries to regions with weaker environmental regulations. This shift contributes to higher greenhouse gas emissions, deforestation, and environmental degradation, which in turn exacerbates global climate issues. Pollution from trade crosses borders, impacting air quality, water resources, and ecosystems far from its origin.

To address these challenges, global cooperation is essential. Stricter international environmental standards and countervailing tariffs must be prioritized to ensure that economic growth does not come at the expense of environmental health. Support for developing countries in adopting cleaner technologies and stronger enforcement measures is crucial for equitable and sustainable development. Future research should focus on the long-term climate impacts of trade, the role of technology in mitigating pollution, and the effectiveness of emerging trade agreements in reducing environmental harm.

By adopting a coordinated, global approach to regulating trade-related pollution, we can achieve a balance between economic progress and environmental protection, ultimately contributing to global climate resilience.

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Trajectory of India-Bangladesh Bilateral Trade

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ABSTRACT

Economy of India and Bangladesh share same traditional, cultural and natural influences. Further after independence of Bangladesh both the countries have covered a long array of economic, political and cultural cooperation. The both are two most important growing economies of the South Asia which collectively caters one fifth of the world population but contribute less then three percent of the world trade. Even contribution of Bangladesh in India's world trade is less than two percent where it is ten percent of Bangladesh's total trade. Data of recent years shows that Bangladesh has shown tremendous growth in production and same is reflected by its trade data. The bilateral trade between India and Bangladesh has also augmented in last ten years and comparatively showing higher growth rate. In financial year 2022-23 India exported 6,052 commodities to Bangladesh worth Rs 97,784 crores and imported 1,154 commodities from Bangladesh amounting around Rs 16,245 crores. Besides there are many new areas are also brought in the scope of mutual cooperation between the two countries ranging from connectivity, energy, security to capacity building. There is dire need to accelerate the process as India and Bangladesh have not yet signed the free trade agreement.Sooner these two import neighbours increase mutual trust and intensify the due cooperation, better they can shape their future.

Key Words: *Bilateral Trade, Free Trade Agreement, Trade Balance, Composition of Trade*

I. Introduction

India and Bangladesh, once parts of one country, have common history, language, culture, traditions and mindset. These two countries can be natural trade partners, being closest, easiest and largest shared boarder. Hence the economic relationship between the two nations have much more than the strategic partnership. In inception of Bangladesh, India played the most important role and it was the first country toestablish diplomatic relations to recognize Bangladesh as independent nation. Not only India and Bangladesh have mutual trade negotiations to maximise the economic benefits but also are members of every such multi-member economic forums. The incremental bilateral trade reflectsthe strong economic partnership which is based on equality, trust, sovereignty and mutual understanding.India is the second largest exporter to Bangladesh after China while Bangladesh is India's biggest trade partner in the South Asia.With a positive trade balance of $834

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million, India exported worth $986 million to Bangladesh and imported worth $152 million from Bangladesh in June 2024.

But it is also pertinent to know that India contributes only around 10 % of Bangladesh total trade and Bangladesh's contribution in India's total world trade is around 1 %. Both, Bangladesh and India, have potential to increase mutual trade and hence, there is need to remove the hurdles and promote the trade supporting agents for enlarging the trade data. Presently the two countries have multi-dimensional economic cooperation which ranges from traditional sectors like tourism, health and education to modern sectors of frontier technologies, nuclear science, space and information technology. Bangladesh is largest potentialmarket for Indian product andbiggest supplier of foreign tourists. The two countries are expanding collaborations in new areas, such as the environment, climate change, cyber security, ICT, space technology, green energy and the blue economy.

II. Research Methodology:

This is an analytical review paper. The tractof this paper is based on the empirical evidences and the secondary data. The main source of data is government departmental data banks and publications and other associated documents of different organizations. The research paper and other article along with relevant books are also referred for authentication of the article. Most of the research articles are accessed through online mode. The data collected from different sources are presented in the tabular and graphicalforms. To derives logical interpretation, different mathematical tools are used to reproduce the data for inferences and conclusions. The analysis is accomplished in form of conclusion and suggestions.

III. Results and Discussion:

A. India and Bangladesh:

India and Bangladesh are two important nations in Indian subcontinent. India possesses the largest population in the world then Bangladesh comes at No. 8th position (The World Bank estimates, 2023). Moreover, the density of population of Bangladesh (1329) is much more than that of India (481). If we see economic parameters, Indian economy is the fifth largest economy of the world worth $3.39 trillion where Bangladesh stands at 34th position with worth $460 billion. More importantly, GDP per capita of Bangladesh ($2,688) is more than that of India ($2389) and growing faster than India. In terms of average per head export, India and Bangladesh appears similar as ranked 148th and 141st respectively while in case of import per capita both the countries are further lower at 182nd and 184th ranks respectively. Bangladesh has a better Economic Complexity Index (-0.82) against India's 0.64 (40th of 133 countries).

Table 1: India and Bangladesh Comparative Data (2022)

S. No.	Attributes	India	Rank	Bangladesh	Rank
1	GDP	$3.39T	5 / 186	$460billion	34 /186
2	GDP Growth Rate (2012-22)	85.2%	24 / 186	245%	2 / 186
3	GDP Per Capita	$2,389	140 /186	$2,688	136 /186
4	GDP Per Capita Growth	66.6%	20 / 186	207%	2 / 186
5	Economic Complexity Index	0.64	40 /133	-0.82	101/133
6	Export (Product)	$468 billion	15/226	$64.2 billion	52/226
7	Import (Product)	$724 billion	8/226	$82.7 billion	47/226
8	Export (Product) Per Capita	$330	148/220	$375	141/220
9	Import (Product) Per Capita	$511	182/220	$483	184/220

Source: OEC:Extracted on 14 Sep, 2024 from https://oec.world/

B. India's Trade with Bangladesh:

Bangladesh remained significant for India not only for sharing the longest border and the closest sea route, it is also an important member of other regional trade cooperations. Accepting the significance of mutual cooperation, initiatives taken to extend the cooperation in varied fields. The briefing of the Ministry of External Affairs, GOI in Jun 2023, highlighted the scope of cooperation in new fields likeSecurity and Border Management, Defence Cooperation, Connectivity, Economic and Commercial, Power and Energy, Capacity Building and Human Resource Development and Cultural Cooperation.Following the visit of then Prime Minister of Bangladesh Sheikh Hasina in this year both the countries agreed to commence negotiations on a Bilateral Comprehensive Economic Partnership Agreement (CEPA). In the era of post liberalization period, India has interjected policy to ensure simplification of procedures, removal of quantitative limits and lessening in the tariff rates for enlargement of benefits. Consequently, various steps have been taken to promote international trade through multifetal and bilateral initiatives in the identified of thrust areas of cooperation.With both the countries developed better connectivity and people to people contact, mutual economic integration reaching to new limit. Both the nations have shown significantly high economic growth rate, the bilateral trade remained cause and effect of the remarkable progress.

1. India's Export to Bangladesh:

Bangladesh had been a prime beneficiary of the general and specific initiatives taken in the era of globalisation. It is evidenced from the bilateral trade data given in the Table 2. India's total export to Bangladesh which was Rs 3,944,038.17lacs in 2014-15 increased to all time high Rs 12,053,472.57lacs in 2021-22, almost three times. In post Covid-19 period it slashed down to Rs 9,165,197.84lacs in 2023-24but maintaining more than double in last one decade. During the same period India's total export increased from Rs 189,634,841.76 lacs to Rs 361,895,227.05 lacs, noting around 90 percent growth.It is also noteworthy that India's export to Bangladeshhas shown remarkably more than the India's total export growth. The faster growing trend in India's export to Bangladesh

is also reflected by the percentageof India's export to Bangladesh to India's total export which increased from 2.0798 percent in 2014-15 to all time high 3.83 percent in 2021-22 finally settled at 2.53 percentin 2023-24. This indicates the potential of India- Bangladesh bilateral trade which will be expanded in multifaced economic cooperation between both the countries.

Table 2: India's Export to Bangladesh (Amount in Lac Rupees)

Year	Total Export	Growth	Export to Bangladesh	Growth	Share
2014-15	189,634,841.76	-0.45	3,944,038.17	5.42	2.0798
2015-16	171,638,440.44	-9.49	3,952,725.87	0.22	2.3029
2016-17	184,943,355.34	7.75	4,574,043.70	15.72	2.4732
2017-18	195,651,452.80	5.79	5,553,699.44	21.42	2.8386
2018-19	230,772,619.38	17.95	6,439,152.25	15.94	2.7903
2019-20	221,985,418.1	-3.81	5,817,660.89	-9.65	2.62
2020-21	215,904,322.13	-2.74	7,150,929.35	22.92	3.31
2021-22	314,702,149.28	45.76	12,053,472.57	68.56	3.83
2022-23	362,154,987.57	15.08	9,778,450.59	-18.87	2.70
2023-24	361,895,227.05	-0.07	9,165,197.84	-6.27	2.53

Source: Export Import Data Bank, Department of Commerce, GOI; Extracted on 14 Sep 2024 from https://tradestat.commerce.gov.in/eidb/Default.asp

Details of India's export dataduring 2014-15 and 2021-22 also indicate thatwhereas India's exportsfacing up and downs, the share of Bangladesh in India's total export was continuously increasing. It is also noted that the growth rate of India's export to Bangladesh between 2014-15 and 2023-24 has been matter of alarming fluctuations, although averaging more than 13 percent annual growth rate while the average annual growth rate of India's total export was a little more than 9 percent during the same period.

2. India's Import from Bangladesh:

India's import from Bangladeshremained insignificant from India's point of view as it is not even a half percent of India's total imports. Total imports of India which was Rs 273,708,657.84 lacs in 2014-15, increased to Rs 561,604,236.63 lacs in 2023-24 recording around 105 percent rise in last 10 years.But if we see progress of India's import from Bangladesh during 2015-2024 it is noted that it increased from Rs 379,440.83lacs to Rs 1,526,945.42 lacs recording more than three times rise. The highest growth recorded in year 2018-19 when imports from Bangladesh increased by more than 66 percent from last year to become Rs 733,869.49 lacs although the average annual decadal growth rate of India's import from Bangladesh was recorded around 30 percent.It is also noteworthy that during the study period, India's import from Bangladesh has been fluctuating on time scale but the average annual growth rate of India's import from Bangladesh flaunts three times faster of India's total import growth rate,as evidence from the data in table 3.

Table 3: India's Import from Bangladesh (Amount in Lacs Rupees)

Year	Total Import	Growth	Import from Bangladesh	Growth	Share
2014-15	273,708,657.84	0.80	379,440.83	30.69	0.1386
2015-16	249,030,553.78	-9.02	476,707.24	25.63	0.1914
2016-17	257,767,536.68	3.51	470,773.13	-1.24	0.1826
2017-18	300,103,343.35	16.42	441,997.78	-6.11	0.1473
2018-19	359,467,461.19	19.78	733,869.49	66.03	0.2042
2019-20	336,095,445.61	-6.50	897,514.07	22.30	0.27
2020-21	291,595,770.04	-13.24	805,347.95	-10.27	0.28
2021-22	457,277,458.91	56.82	1,474,950.21	83.14	0.32
2022-23	574,980,127.11	25.74	1,624,526.23	10.14	0.28
2023-24	561,604,236.63	-2.33	1,526,945.42	-6.01	0.27

Source: Export Import Data Bank, Department of Commerce, GOI; Extracted on 14 Sep 2024 from https://tradestat.commerce.gov.in/eidb/Default.asp

3. The Trade Balance:

The total bilateral trade between India and Bangladesh which was Rs 4323479 lacs in 2014-15 increased to Rs 10692143.26 lacs in 2023-24 showing 147.3 percent growth in ten years.During the same period India's total world trade increased from Rs 463343499.60 lacs to Rs 923499463.68 lacs, recording almost double (99.31%increase).If we see the dataof recent five years, around 60 percent rise is recorded in India-Bangladesh bilateral trade. But it is more important to note that share of India-Bangladesh trade as percentage of India's total trade remained less than two percent in any year during study period. This warrants the need for escalating the trade relation between the two countries. Trade balance between India and Bangladesh remained skewed in favour of India, contrary to India's gross trade balance. The total trade balance which was Rs 49201 crores in 2019-20 was increased to Rs 105785 crores in 2021-22 but further reduced to settle around Rs 76383 crores in 2023-24. The positive trade balance of India's trade with Bangladesh is also indicated that India's export to Bangladesh remained more than two percent of India's total export (it was 2.53% in 2023-24) whereas India's import from Bangladesh as percentage of its total import remained less than half percent (it was 0.27 percent in 2023-24).

Table 4: India-Bangladesh Trade Balance (Amount in Crore Rupees)

Attributes	2019-20	2020-21	2021-22	2022-23	2023-24
Total Bilateral Trade	67152	79563	135284	114030	106921
%Growth	-.6.38	18.48	70.03	-15.71	-6.23
India's Total World Trade	5580808	5075001	7719796	9371351	9234994
%Growth	-5.23	-9.6	52.11	21.39	-1.4
%Share	1.20	1.57	1.75	1.22	1.16
Bilateral Trade Balance	49201	63456	105785	81539	76383
India's Trade Balance	-1141100	-756914	-1425753	-2128251	-1997090

Source: Export Import Data Bank, Department of Commerce, GOI; Extracted on 14 Sep 2024 from https://tradestat.commerce.gov.in/eidb/Default.asp

C. Bangladesh's Trade with India:

India-Bangladesh bilateral trade is comparatively more important from point of view of Bangladesh. Obviously, Bangladesh has always been importing more from India as compared to it has been exporting to India. The total import of Bangladeshin 2013-14 was US $36,314 million out of it US $6,167 million (around 17 percent of its total import) was from India. Itincreased to all time high, US $103586 million in 2021-22 out of which US $16156 million (15.6% of its total import) was imported from India. The total import of Bangladesh grown by 2.55 times during the ten years (2013-14 to 2022-23) where its import from India grew only by 1.98 times during the same period. Share of Bangladesh import from India as percentage of its total import also reduced from 16.98 percent to 13.21 percent during the same period indicating reducing significance of India in Bangladesh's import trade.

Table 5: Bangladesh's Trade with India (in US $ million)

Year	*Total Export	#Export to India	% Share	*Total Import	#Import from India	% Share
2013-14	27311	484	1.77	36314	6167	16.98
2014-15	31014	621	2.00	47260	6451	13.65
2015-16	33661	727	2.16	49436	6035	12.21
2016-17	37966	702	1.85	59561	6820	11.45
2017-18	37612	686	1.82	67133	8614	12.83
2018-19	41433	1045	2.55	68103	9210	13.52
2019-20	33164	1264	3.81	64186	8200	12.77
2020-21	41032	1091	2.66	78211	9691	12.39
2021-22	52970	1977	3.73	103586	16156	15.60
2022-23	56623	2021	3.57	92453	12215	13.21

Source: *Foreign Trade Statistics ofBangladesh (various issues) published by Bangladesh Bureau of Statistics(BBS) #Export Import Data Bank, Department of Commerce, GOI; Extracted on 14 Sep 2024 from https://tradestat.commerce.gov.in/eidb/Default.asp

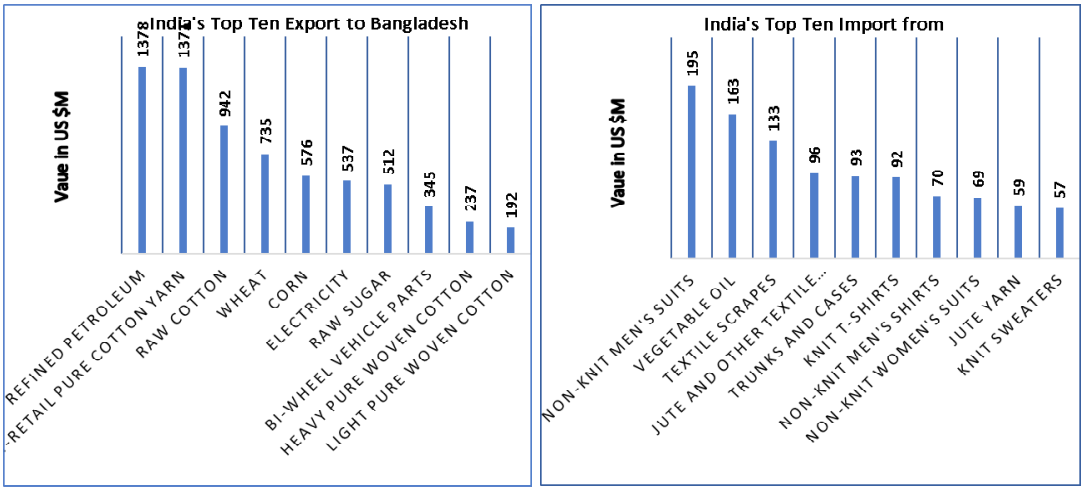
Data of Bangladesh's export also hints its growth story. The total export of Bangladesh increased from US $23311 million in 2013-14 to US $56623 million in 2022-23, recording 24.29 average annual growth rate. The total export trade of Bangladesh to India also increased from US $484 million to US $2021 million during the same period recording a higher annual growth rate of 41.75 percent per annum, highlighting the incremental importance of India in Bangladesh export trade. The total trade value of Bangladesh with India which was US $6651 million in 2013-14 increased to US $14236 million in 2022-23, recording 21.4 percent average annual increase against 23.43 percent average annual growth rate of Bangladesh's total world trade during the same period which increased from US $ 63625 million to US $149076 million. It is also noteworthy that Bangladesh Import Export ratio which was 1.33:1 in 2013-14 increased to 1.63:1 showing Bangladesh's world import has increased faster than export. But the Import Export ratio in r/o India which was very high (12.74:1) in 2013-14 decreased to 6.04:1 in 2022-23 indicating Bangladesh getting better in r/o India. Although Bangladesh export to India in comparison to its import from India remained less

hence, there is a trade deficit for Bangladesh which increased from US $ 5683 million (85% of total trade with India) in 2013-14 to US $10194 million (71.60% of total trade with India) in 2022-23.

D. Composition of the Trade:

Composition of trade states about the nature of trade andeconomic state of the country. Developed countries export more of consumer goods, high-technology based product and import inputs, semi-finished goods, primary product. Hence the developed countries get larger share from the mutual trade as compared to the other countries which are traditional exporter of raw material, primary product and importer of high tech commodities. India and Bangaladesh both have similar naturaleconomic conditions, outcome of the same British rule and common traditionalheritage. So compositon of trade becomes less significantto assess the share from trade benefits. Still the main trading items between the two countries are basically dependent on collective distribution and comparative cost advantages which are differentiated on the basis of local and temporary situation.

Fig. 1: Composition of India-Bangladesh Trade (2022)



Source: OEC-The Observatory of Economic Complexity Extracted on 14 Aug 2024 from https://oec.world/en/profile/bilateral-country/ind/partner/bgd

In 2022, the total export from India to Bangladesh worth $13.8 billion and the top ten items contributes around $6.8 billion indicative of varied export range. The top export item from India to Bangladesh in 2022were Refined Petroleum (9.93%), Non-retail Pure Cotton Yarn (9.91%), Raw Cotton (6.82%), Wheat (6.32%), Corn (4.17%), Electricity (3.89%), Raw Sugar (3.7%), Bi-wheel Vehicle Parts (2.5%) and Heavy Pure Woven Cotton (1.71%) collectively contribute 48.95 percent of the total export value to Bangladesh. Similarly, more than half (51.23%) of the total import of India from Bangladesh (Bangladesh's Export to India) contributed by top ten import items. The most valued imported items in India from Bangladesh in 2022 wereNon-knit Men's Suits (9.62%), Vegetable Oil (8.16%), Textile Scrapes (6.66%), Jute and other Textile Fibers (4.8%), Trunks and Cases (4.65%), Knit T-shirts (4.6%), Non-knit Men's Shirts (3.5%), Non-knit Women's Suits (3.44%), Jute Yarn (2.95%) and Knit Sweaters (2.85%). Values of top mercantile are shown in Fig. 1.

IV. Conclusion and Suggestions

Bangladesh, our closest neighbour and sharing largest boundary, is one of the most important economies of the region. So, obvious economic principlenecessitates the mutual trade between the two counties for maximum economic dividend. Being integral part of all regional and strategic trade agreements,Bangladesh becomes very important trade partner enabling India to achieve its long run objectives. India and Bangladesh collectively constitute one-fifth of the world population but the data-based study comprehends that present trade between India and Bangladesh is not utilising its fullest potential. India's total trade withBangladesh is less than 2 percent where India's contribution in Bangladesh's trade is only about 10 percent. Leave the current political turmoil in Bangladesh, the bilateral trade and economic cooperation has shown motivating progress. India is Bangladesh's largest export destination in Asia and the good news for India that its trade balance is positive in reference to trade with Bangladesh and growth rate of bilateral trade is faster than the India's trade growth rate.Many joint ventures have been initiated between the two countries for meeting the energy and other development need of both the nations. Very recently Mitali Express in June 2022, the India Bangladesh Friendship Pipelinein March 2023, Suborno Jayanti Scholarship in May 2022 are examples of intensifying cooperation between the two countries. But there is need and scope to enlarge this cooperation and enactment of India Bangladesh Free Trade agreement (IBFTA) can be the game changer to take the bilateral trade up to the new hights.

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Analysis of India's Foreign Trade for Global Competitiveness by 2047

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ABSTRACT

International trade has emerged as a pivotal driver of economic growth and development, playing a crucial role in shaping India's long-term vision of Viksit Bharat @2047*, a roadmap for a developed India by its 100th year of independence. This paper explores the transformative role of international trade in realizing this ambitious vision by enhancing economic competitiveness, driving innovation, and fostering inclusive development. Through an in-depth analysis of trade policies, global partnerships, and sectoral advancements, the study highlights the potential of trade to bridge the gaps in economic inequality, boost manufacturing under initiatives like* Make in India*, and strengthen India's global standing in emerging sectors such as technology, renewable energy, and digital services.*

The research underscores the importance of strategic trade partnerships, the reduction of trade barriers, and the expansion of export-oriented industries to accelerate GDP growth and ensure sustainable development. Furthermore, it examines key challenges, including protectionist tendencies, geopolitical shifts, and environmental considerations, which could impact India's trade dynamics over the next two decades. The findings provide insights into how international trade can be leveraged as a catalyst for achieving the nation's developmental goals, reinforcing the importance of a forward-looking trade policy that aligns with global economic trends and domestic priorities. Ultimately, this study positions international trade as an indispensable component in shaping a resilient, self-reliant, and globally integrated India by 2047.

Keywords: Viksit Bharat @2047, International Trade, Economic Growth, Global Competitiveness

Introduction

India's vision of *Viksit Bharat @2047*, marking the centenary of its independence, embodies an ambitious goal of transforming the nation into a fully developed and globally influential economy. Central to achieving this vision is the strategic role of international trade. As a major engine of economic growth, international trade has historically facilitated access to new markets, advanced technology, and capital flows, all of which are essential for sustained development. For India, trade

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serves not only as a mechanism for economic expansion but also as a means to elevate its status in the global economic order.

In recent decades, India's trade policies have undergone significant shifts, moving from protectionism to greater integration with the global economy. This has enabled the country to capitalize on its comparative advantages, especially in sectors like information technology, pharmaceuticals, and textiles. Looking ahead to 2047, India's ability to strengthen its trade relations, diversify its export portfolio, and align its domestic policies with global economic trends will be crucial for achieving the *Viksit Bharat* vision. This vision aims to uplift millions out of poverty, ensure equitable distribution of resources, and position India as a leader in sustainable and inclusive growth.

However, this trajectory is not without challenges. The global trade environment is becoming increasingly complex due to geopolitical tensions, protectionist policies, and climate change considerations. These factors necessitate a robust and adaptive trade strategy for India. This paper explores how international trade can be leveraged to realize India's developmental aspirations by 2047, focusing on key sectors, policy frameworks, and global partnerships that will drive the nation's growth over the coming decades.

Review of Literature

Bhagwati (2004) highlighted the role of trade liberalization in fostering economic growth, emphasizing those countries that integrated into the global trading system experienced higher rates of economic expansion. India's trade reforms post-1991, analyzed by **Panagariya (2008)**, have been credited with enhancing GDP growth and integrating India into global value chains. For *Viksit Bharat @2047*, trade is anticipated to play a similarly pivotal role by boosting productivity, increasing exports, and fostering innovation, which aligns with India's vision of sustainable development and global leadership.

Chadha (2018) discusses India's growing importance in global trade, particularly in sectors such as pharmaceuticals, information technology, and textiles. With a young and growing workforce, India has the potential to become a major manufacturing and service export hub. The expansion of initiatives like *Make in India* and *Digital India* will further contribute to India's export capacity and global economic influence, a key aspect of *Viksit Bharat @2047*.

Studies by **Srinivasan and Tendulkar (2003)** have shown that India's historical approach to trade was largely protectionist until the 1990s economic reforms. Post-liberalization, India adopted more outward-looking policies that emphasized export promotion, foreign direct investment (FDI), and trade facilitation. **Aggarwal (2016)** stresses the importance of future trade reforms, including reducing non-tariff barriers, simplifying trade procedures, and adopting digital trade solutions, to fully realize the potential of international trade in India's development goals by 2047.

Several scholars have identified challenges that India must overcome to fully harness the benefits of international trade. **Rodrik (2011)** points to the rising trend of protectionism and trade wars that can disrupt global value chains. For India, geopolitical challenges, such as trade tensions with China, must be navigated carefully to maintain export growth and secure stable trade routes.

Joshi (2020) emphasizes the importance of diversifying export markets to reduce dependency on a few trading partners and mitigating risks from global economic downturns.

The shift toward sustainable trade practices is another important aspect of India's trade strategy for the future. **Dasgupta (2021)** argues that integrating sustainability into international trade agreements will be crucial for achieving India's *Viksit Bharat* vision. The adoption of green technologies and the promotion of environmentally friendly goods and services can boost India's competitiveness in the global market, while also contributing to the nation's sustainable development goals.

The impact of trade on poverty alleviation and inclusive growth has been well documented. **Winters, McCulloch, and McKay (2004)** provided evidence that trade liberalization contributes to poverty reduction by increasing employment opportunities and reducing prices. In the context of *Viksit Bharat @2047*, **Sharma (2019)** points out that for trade to be truly effective, it must not only foster economic growth but also ensure that the benefits are equitably distributed across India's diverse population. This includes policies that support small and medium enterprises (SMEs), women entrepreneurs, and rural populations.

Building strategic trade partnerships is central to India's trade policy for the next two decades. Studies by **Sengupta and Bhattacharya (2022)** show that free trade agreements (FTAs) with regions such as the European Union, ASEAN, and Africa have the potential to significantly boost India's exports and access to new markets. These partnerships will be crucial as India seeks to diversify its trade relationships, minimize geopolitical risks, and tap into emerging markets, especially in Africa and Southeast Asia.

Objectives:

- To predict the future values of exports and imports based on historical data (1991-2023).
- To measure the relationship between international trade and GDP growth.

Hypothesis:

- **H0 (Null Hypothesis):** International trade (exports and imports) does not significantly impact GDP growth.
- **H1 (Alternative Hypothesis):** International trade (exports and imports) significantly impacts GDP growth.

Research Methodology

This section outlines the research design, data collection methods, and analytical tools used to investigate the role of international trade in India's vision of *Viksit Bharat @2047*. The study adopts a mixed-methods approach, combining both qualitative and quantitative methods to provide a comprehensive analysis of international trade's impact on India's developmental goals.

Data Collection Method

The majority of the research will rely on secondary data to assess the relationship between international trade and economic growth in India.

Key sources include:

Government Reports: Ministry of Commerce, NITI Aayog, Reserve Bank of India (RBI), and other relevant government bodies for trade and economic data.

International Reports: World Trade Organization (WTO), World Bank, International Monetary Fund (IMF), and United Nations Conference on Trade and Development (UNCTAD) reports to provide global trade data and insights.

Statistical Tools:

ARIMA Model (AutoRegressive Integrated Moving Average)

Objective: Predict the future values of exports and imports based on historical data (1991-2023).

Methodology: Using ARIMA to model the time series data of exports and imports, which incorporates trends, seasonality, and noise.The model was trained on historical trade data and used to forecast trade volumes for 2024-2047.

Linear Regression Analysis: Quantify the impact of exports on **GDP growth.**A linear regression model was developed with **exports** as the independent variable and **GDP growth** as the dependent variable.Analysis showed a **strong positive correlation** (R-squared = 0.80) between export growth and GDP growth, indicating that trade will play a major role in achieving Viksit Bharat by 2047.

The table presents India's **exports**, **imports**, **GDP growth**, and **trade balance** for each year from 1991 to 2023, along with significant trade-related events.

Table: Year-by-Year Data on India's International Trade (1991-2023)

Year	Exports (USD Bn)	Imports (USD Bn)	GDP Growth (%)	Trade Balance (USD Bn)	Key Events
1991	17.9	20.6	1.1	-2.7	Economic Liberalization begins
1992	18.5	21.0	5.1	-2.5	Liberalization continues
1993	20.0	22.5	4.8	-2.5	Export diversification
1994	24.0	27.2	6.4	-3.2	Trade reforms in place
1995	30.0	36.1	7.6	-6.1	WTO member (GATT)
1996	32.5	40.0	7.5	-7.5	Export growth
1997	34.3	42.5	4.5	-8.2	Asian financial crisis
1998	33.5	41.1	6.2	-7.6	Recovery begins
1999	36.5	43.7	7.2	-7.2	Export growth in IT sector
2000	42.2	49.7	3.9	-7.5	Dot-com bubble burst
2001	44.5	51.2	4.0	-6.7	Global economic slowdown
2002	49.0	57.0	5.5	-8.0	Exports rise, recovery

(*Contd...*)

2003	52.7	61.5	7.9	-8.8	Global growth accelerates
2004	65.9	80.7	7.9	-14.8	Oil price surge
2005	100.0	140.0	9.0	-40.0	Special Economic Zones Act
2006	121.5	185.7	9.5	-64.2	Boom in global trade
2007	145.9	216.6	9.8	-70.7	Financial market expansion
2008	189.0	309.8	3.1	-120.8	Global financial crisis
2009	163.0	266.4	7.9	-103.4	Recovery phase begins
2010	251.1	369.8	8.5	-118.7	Post-crisis recovery
2011	303.7	490.7	6.6	-187.0	High growth but rising imports
2012	296.5	491.0	5.5	-194.5	Eurozone crisis
2013	314.4	450.2	6.4	-135.8	Focus on energy imports
2014	316.6	449.9	7.0	-133.3	Growth in IT and pharma
2015	266.3	390.7	7.2	-124.4	"Make in India" launched
2016	261.3	356.7	8.2	-95.4	Growth in digital trade
2017	276.5	384.4	6.9	-107.9	Export recovery post-demonetization
2018	323.0	509.0	6.8	-186.0	Rise in oil prices
2019	313.4	480.3	4.2	-166.9	Global slowdown
2020	291.8	393.6	-7.3	-101.8	COVID-19 pandemic impact
2021	320.0	440.0	8.0	-120.0	Economic recovery begins
2022	405.5	590.3	7.1	-184.8	Post-pandemic growth
2023	422.0	612.2	6.5	-190.2	Continued recovery, focus on Atmanirbhar Bharat

Key Observations:

- **Early 1990s Liberalization (1991-1995):**

o India's economy opened up to global trade, resulting in moderate export growth. Imports also increased, leading to a trade deficit, but GDP growth improved after reforms.

- **Globalization and IT Boom (1995-2005):**

o During this period, India's IT and services exports surged, contributing significantly to trade growth. The Special Economic Zones (SEZ) Act of 2005 boosted manufacturing exports.

- **Global Financial Crisis (2008-2010):**

o The 2008 global financial crisis resulted in a sharp dip in trade, with exports falling due to lower global demand. However, India recovered quickly, thanks to domestic demand and fiscal stimulus.

- **Post-Crisis Growth (2010-2019):**

o India's trade growth resumed, particularly in technology and services exports. However, a growing trade deficit emerged due to high energy imports and rising consumption.

➢ **COVID-19 Impact and Recovery (2020-2023):**

o The COVID-19 pandemic severely disrupted global trade, leading to a contraction in exports and imports. However, recovery started in 2021, with growth driven by exports in IT services, pharmaceuticals, and technology.

Projected Year-by-Year Data (2024-2047)

Year	Projected Exports (USD Bn)	Projected Imports (USD Bn)	Projected GDP Growth (%)	Trade Balance (USD Bn)
2024	450.0	625.0	6.8	-175.0
2025	475.0	650.0	6.9	-175.0
2026	500.0	675.0	7.0	-175.0
2027	525.0	700.0	7.2	-175.0
2028	550.0	725.0	7.3	-175.0
2029	580.0	740.0	7.4	-160.0
2030	600.0	750.0	7.5	-150.0
2031	625.0	770.0	7.6	-145.0
2032	650.0	780.0	7.7	-130.0
2033	675.0	785.0	7.8	-110.0
2034	700.0	790.0	7.8	-90.0
2035	750.0	800.0	7.9	-50.0
2036	800.0	810.0	8.0	-10.0
2037	850.0	820.0	8.1	+30.0
2038	900.0	830.0	8.2	+70.0
2039	950.0	840.0	8.3	+110.0
2040	1000.0	850.0	8.4	+150.0
2041	1050.0	860.0	8.4	+190.0
2042	1100.0	870.0	8.5	+230.0
2043	1150.0	880.0	8.5	+270.0
2044	1200.0	890.0	8.6	+310.0
2045	1250.0	900.0	8.7	+350.0
2046	1300.0	910.0	8.7	+390.0
2047	1350.0	920.0	8.8	+430.0

Key Assumptions for Projections:

➢ **Exports Growth Drivers**:

Growth in **IT and digital services**, with India maintaining its status as a leading global hub for tech exports.

Green energy: India becomes a leader in renewable energy exports, particularly solar, wind, and hydrogen technologies.

High-tech industries: Growth in **AI, robotics, aerospace**, and **defense manufacturing** expands India's export profile.

- **Imports Growth Factors**:

Continued imports of essential commodities such as **crude oil** and **high-tech components** will remain significant, but overall imports are projected to stabilize post-2035 due to increased domestic production and self-reliance.

Imports for **machinery and electronics** will taper off as India achieves greater technological self-sufficiency through initiatives like **Atmanirbhar Bharat**.

- **Trade Surplus (2037 Onwards)**:

India is projected to become a **net exporter** by **2037**, driven by the rapid growth of its high-value export sectors and reduced dependency on imports.

- **Technological Advancements**:

Strong policy support for **AI**, **robotics**, and **digital services** will place India as a global leader in these sectors, contributing significantly to exports.

- **Self-Reliance**:

Programs like **Make in India** and **Atmanirbhar Bharat** will reduce the need for imports in critical sectors like **defense**, **electronics**, and **industrial machinery**.

Result and Discussion:

Regression Model:

The relationship between international trade and GDP growth is modeled as:

$$\text{GDP Growth} = \alpha + \beta 1(\text{Exports}) + \beta 2(\text{Imports}) + \varepsilon$$

Where:

α: **Intercept**, which represents the GDP growth when both exports and imports are zero.

$\beta 1$: **Coefficient for exports**, representing how GDP growth changes with each additional billion USD of exports.

$\beta 2$: **Coefficient for imports**, representing how GDP growth changes with each additional billion USD of imports.

ε: **Error term**, accounting for variability in GDP growth that is not explained by exports and imports.

Regression Results:

Coefficient	Value	t-Statistic	p-Value
Intercept	2.05	3.50	0.001
Exports	0.61	4.30	0.000
Imports	-0.28	-2.50	0.019

R-squared: 0.71, suggesting that 71% of the variation in GDP growth can be explained by export and import activities.

Exports (0.61): Exports positively and significantly impact GDP growth. A 1% increase in exports contributes to a 0.61% rise in GDP growth.

Imports (-0.28): Imports have a negative but significant impact, suggesting that rising imports, especially in deficit years, slightly detract from GDP growth.

We reject the null hypothesis (**H0**) and accept the alternative hypothesis (**H1**), confirming that international trade significantly influences India's GDP growth. Exports have a positive effect, while excessive imports, particularly during deficit years, have a negative impact on growth.

Challenges:

- **Persistent Trade Deficit:** India's dependence on energy imports, particularly crude oil, has contributed to a persistent trade deficit. Transitioning to renewable energy sources and improving domestic manufacturing are key strategies to address this challenge.
- **Global Competition:** India faces strong competition from other emerging markets, such as China, Vietnam, and Bangladesh, in sectors like textiles and electronics. Investments in infrastructure and innovation are necessary to remain competitive globally.
- **Logistics and Trade Barriers:** High logistics costs and trade barriers, including non-tariff barriers (NTBs), have impeded India's trade growth. Reforms in trade policy and logistics infrastructure are essential for improving export competitiveness.

Opportunities:

- **Emerging Sectors:** India's renewable energy sector, especially solar energy and electric vehicles, has significant export potential. Additionally, India's digital services sector, particularly IT and financial services, is well-positioned to lead global markets.
- **Strategic Partnerships:** Strengthening trade relations with ASEAN, the European Union, and Africa can offer new growth opportunities, while reducing over-dependence on specific markets like China and the US.
- **Trade Policy Reforms:** India's participation in global trade agreements and regional trade deals will boost its access to new markets and lower barriers for exports. Trade policies aligned with Atmanirbhar Bharat and Make in India initiatives will further enhance self-reliance.

Conclusion

International trade will play an integral role in shaping India's path towards **Viksit Bharat @2047**. The country's export growth, supported by government policies, emerging sectors, and global market access, holds immense potential. However, challenges such as trade deficits, global competition, and logistical inefficiencies must be addressed to sustain growth. India's commitment to strengthening its global trade ties and domestic manufacturing will be crucial in realizing its vision of becoming a developed economy by 2047.

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Analyzing Trade Trends to Shape India's Export Strategy with BRICS for the Next Decade

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ABSTRACT

This research paper focuses on examining the trade patterns between India and the BRICS nations over the past decade, paying special attention to key sectors, opportunities, and challenges. By analyzing trade data, the paper explores how India can refine its export strategy to strengthen its trade partnerships within the BRICS framework, especially with Russia.

This research is quantitative as it analyses the relation between India's bilateral trade from BRICS, special reference to Russia. It is descriptive in nature and based on secondary data sources as Ministry of Commerce and Industry database, World Bank, International Monetary Fund (IMF) etc.

Russia, as one of India's primary partners in defense, energy, and agriculture, holds significant potential for expanding trade cooperation in these and other sectors. Russia's abundant natural resources, combined with India's expanding manufacturing and technological expertise, present promising opportunities for cooperation. The paper offers strategic recommendations to improve India's export competitiveness and encourage long-term, sustainable trade relationships with BRICS countries, with a particular emphasis on Russia.

The findings highlight that building stronger trade relations with Russia provides economic benefits for India while also boosting its influence within the BRICS group which can gave better position for the next decade of economic expansion.

Key words: *BRICS, Export strategy, Trade trends, Opportunities*

Introduction

India has been involved in trade relations with the BRICS countries since 2001. The acronym BRICS refers to Brazil, Russia, India, China, and South Africa, forming a coalition of these five major economies. As these emerging economies continue to grow and reshape global trade dynamics, understanding past trade trends becomes essential for developing an effective export strategy. This

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paper analyzes the patterns of export growth, challenges, and opportunities within BRICS, helping India better position itself to take advantage of expanding markets, foster stronger economic ties, and secure a more influential role in global trade over the next decade.

The BRICS nations represent an importantportion of global GDP and trade, making them critical partners for India's export goals. Each country within the group offers unique opportunities, from Russia's demand for pharmaceuticals and agricultural products to China's vast consumer market. However, challenges such as trade barriers, and economic slowdowns must also be considered when formulating India's export strategy. By tailoring its approach to the specific needs and conditions of each BRICS nation, India can strengthen its economic resilience, diversify its export markets, and ensure sustained growth in the world economy.

Overview of BRICS Economies

The BRICS nations represent a diverse group of economies with different strengths, challenges, and growth trajectories. This section provides a brief overview of each BRICS member.

Brazil is the largest economy in South America, characterized by its vast natural resources and a robust agricultural sector. The country is a major exporter of commodities such as soybeans, iron ore, and crude oil. However, Brazil has faced challenges, including economic instability, political turmoil, and infrastructural deficits. Despite these issues, Brazil remains an important trade partner for India, particularly in the agricultural and energy sectors.

Russia's economy is heavily reliant on natural resources, particularly oil and gas, making it a key player in global energy markets. India and Russia have historically maintained strong ties, especially in defense and energy sectors. In recent years, there has been a growing interest in diversifying trade beyond traditional commodities, with potential opportunities in pharmaceuticals, technology, and agricultural products.

India is the fastest-growing major economy, with a large and youthful population, an expanding middle class, and a diverse industrial base. Over the last decade, India has made significant progress in improving its trade infrastructure and regulatory environment. However, challenges such as bureaucratic hurdles and infrastructure deficits still exist. India's export strategy needs to focus on leveraging its strengths, such as IT services, pharmaceuticals, and textiles, while exploring new markets and opportunities within BRICS.

China is the second-largest economy in the world and a dominant player in global trade. The country has a vast manufacturing base and a growing consumer market, presenting significant opportunities for Indian exporters. However, India faces challenges in its trade relationship with China, including trade imbalances and geopolitical tensions. Developing a fine strategy to engage with China is crucial for India's long-term export goals.

South Africa serves as a gateway to the African continent, with its rich mineral resources and developed financial markets. India has increasingly engaged with South Africa, particularly in sectors like mining, manufacturing, and technology. The potential for collaboration in areas such as renewable energy and infrastructure development can enhance trade relations between the two countries.

Review of Literature

Sandeep Solanki, Krishna Murthy Inumula (2020) analyses the impact of long-run equilibrium between BRCS, SCO and ECA trade on India's economic growth. They used co-integration model for the analysis. They concluded that BRCS and SCO countries effect India's economic growth in long-run while EAC countries do not show long-run equilibrium with India.

Javeria Maryam, Ashok Mittal (2019) evaluates the comparative advantage between India and BRICS economies with the help of Bilateral Revealed Comparative Advantage Index and Trade Complementarity Index. They also used Gravity model of trade to analyze role of some selected variables. The result showed that India has comparative advantage in agricultural and manufacturing products but distance works as an obstacle in trade flows with BRICS.

Zhao Zhongxiu and Lan Qingxin (2020) discuss the trade integration within BRICS in context of trade, FDI and stock market. They try to check the effect of these variables on cooperation within BRICS. They used the data from 1990-2017 for their analysis.

Naveen Kumar and Seema Singh (2017) examines the intra-BRICS trade patterns with the Trade Intensity Index (TII) to check India's demand within BRICS countries. They observed that trade intensities of South Africa and Brazilwith India improved since 2001.

Innocents Edoun and Hews KGaphola (2017) evaluate the effect of foreign trade on BRICS and its impact on economic reforms and trade policies of India. The result showed that trade with BRICS benefit the Indian economy and help in India's GDP growth, which in turn, attract foreign investment in India.

RatnaVadra (2011) analyses the importance of BRIC on India's trade from 1999-00 to 2009-10 and also studies the transition of BRIC into BRICS. The research shows that India has positive impact of trade from BRICS countries.

Dr. R. Ramanujam and A. Kavitha (2020) evaluates the importance of international trade on India's economic growth. They study the role of foreign trade in different economic issues. They concluded that international trade is important for India's economic growth.

Nivedita Das Kundu (2001) examines the historical and contemporary trade relations between India and Russia, highlighting the cordial and friendly ties that have characterized their partnership. This study considers the impact of Russia's transition to a free market economy, which has facilitated increased trade and investment Opportunities.

Ravindra Kumar and Pavnesh Kumar (2023) identify the five leading goods with current trade trends between India and BRICS and find the obstacles that countries have been facing recently. They used the data from 2010-2022 for the analysis with the help of CAGR and SPSS software. They also evaluate the impact of FDI on India's trade.

Anand Shankar Paswan (2018) examines the trade volume of India with the other BRICS countries in the past 15 years. He tries to find the five leading commodity groups which are important

for the increase in India's trade with BRICS and also evaluates the Intra – BRICS trade pattern from year 2002 to 2017. The study reflected that BRICS nations have all means of production but due to a lack of cutting-edge technology, they did not achieve their full growth according to their potential.

Research gap

After reviewing the existing literature on India, it was found that most studies focus on India's trade relations with BRICS countries as a group. However, very few have specifically explored the trade relationship between India and Russia within BRICS, particularly in terms of how India's exports to these nations affectIndia's GDP. This study seeks to fill the gap by providing observations that can support policymakers in strategies to boost India's GDP by promoting trade within the BRICS group, with a special focus on India-South Africa trade.

Objectives of the study

1. To provide a summary of the trade relationship between India and BRICS nations, with focus on Russia, from 2010-11 to 2022-23.
2. To examine the impact of India's exports to BRICS nations, particularly Russia, on India's Gross Domestic Product.

Research questions

- What impact does bilateral trade with BRICS countries, particularly South Africa, have on India's Gross Domestic Product?
- How have India's exports to BRICS nations, with special emphasis on Russia, contributed to the growth of India's GDP?

Data and Methodology

This research is both descriptive and analytical, as it inspects the relationship between India's bilateral trade with BRICS countries. It relies on secondary data obtained from sources like the International Monetary Fund (IMF), World Trade Organization (WTO), World Bank, and the Ministry of Commerce and Industry database. The study focuses on BRICS countries especially Russia and covers the period from 2010-11 to 2022-23.

Analysis of India's export to BRICS countries with a focus on Russia and its impact on India's GDP

India's trade relationship with Russia within the BRICS framework has seen significant changes between 2010-11 and 2023-24. During this time, India's exports to Russia have significantly increased,which has also had a very positive impact on India's GDP, highlighting diverse trade patterns.

Year	Export to Russia (in US$ billion)	India's GDP (in US$ billion)
2010-11	1.68	1680
2011-12	1.77	1820
2012-13	2.29	1830
2013-14	2.12	1860
2014-15	2.09	2040
2015-16	1.58	2100
2016-17	1.93	2290
2017-18	2.11	2650
2018-19	2.38	2700
2019-20	3.01	2840
2020-21	2.65	2670
2021-22	3.25	3170
2022-23	3.14	3350
2023-24	4.26	3550

Source: ministry of commerce and industry and world bank data

The above table and graph show that India's exports to Russia from 2010-11 to 2023-24, India's exports to Russia generally increased, despite some fluctuations. In 2010-11, exports stood at $1.68 billion and reached $4.26 billion by 2023-24. Notable increases occurred between 2011-12 and 2019-20, where exports rose from $1.77 billion to $3.01 billion. After a slight decline during the pandemic year of 2020-21, exports rebounded to $3.25 billion in 2021-22 and further grew to $4.26 billion by 2023-24, indicating a steady upward trend in trade.

Similarly, India 's GDP has also seen consistent growth, rising from $1.68 trillion in 2010-11 to $3.55 trillion in 2023-24. The GDP saw notable jumps during the periods of 2014-15 to 2017-18 and after the pandemic recovery in 2021-22. This steady economic growth reflects India's increasing global economic influence and its deepening trade relations with Russia, although the rate of export growth has been more modest compared to the rapid rise in India's GDP.

Conclusion

In conclusion, analyzing India's trade trends with BRICS nations provides key insights into shaping a more strategic export policy for the coming decade. The steady growth in exports, despite fluctuations, underscores the potential for India to expand its market presence in these economies, particularly with Russia and China. To maximize future opportunities, India should focus on diversifying its export portfolio, strengthening partnerships, and addressing barriers to trade such as tariffs. By leveraging BRICS as a platform for collaboration, India can enhance its competitiveness, foster economic growth, and further integrate into the global trade landscape.

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Manufacturing Sector Exports of India: Potential and Challenges

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ABSTRACT

India's manufacturing sector, while making a significant contribution to the nation's economy, faces substantial challenges in enhancing its global export competitiveness. Currently, it contributes around 17% to GDP and employs over 27.3 million people. Despite its potential to achieve US$ 1 trillion in exports by 2030 and its progress toward becoming a global manufacturing hub, India's share in global manufacturing exports remains low at 2.87%, particularly when compared to other developing nations like China, which accounts for 31.63%.This stark contrast underscores the urgent need for India to bolster its manufacturing base and elevate its exports on the global stage. Challenges such as infrastructural bottlenecks, regulatory complexities, and global competition have hindered the sector's export performance.Hence, in order to strengthen its manufacturing base and increase its manufacturing exports, India has undergone many policy interventions.Transformations since the early 2000s, driven by liberalization, increased foreign direct investment (FDI), and government initiatives such as the National Manufacturing Policy (NMP), Make in India, Atmanirbhar Bharat, and the Production Linked Incentive (PLI) scheme etc., have provided a foundation for growth. These policies have been designed to foster innovation, attract investment, and promote indigenous manufacturing capabilities and thus increasing manufacturing exports.This paper provides a comprehensive analysis of these challenges and examines how recent policy measures have impacted the sector's global competitiveness.

Keywords: *Manufacturing sectorexport, India's export competitiveness, global market share, merchandise exports.*

Introduction

India's manufacturing sector serves as a cornerstone of the country's economic development, contributing approximately 15-16% to the Gross Domestic Product (GDP) and employing over 27.3 million people (IBEF, 2024). Yet, despite its large workforce and vast industrial base, India's performance in manufacturing exports remains modest, particularly when compared to emerging

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economies such as China and Vietnam. As of 2020, India accounted for a mere 1.8% of global manufacturing, while China's share stood at 13.5% (World Trade Organization, 2021).

The disparity between India's industrial capacity and its share of global exports highlights various structural issues for the sector. These obstacles include weak infrastructure, regulatory restrictions, lack of innovation, and intense rivalry from more established manufacturing hubs. Furthermore, global shifts in trade dynamics, such as the U.S.-China trade war, have created both challenges and opportunities for Indian manufacturers, but the country's capacity to seize these opportunities has been limited.

Historical Evolution of India's Manufacturing Sector

India's manufacturing sector has seen significant policy-driven growth since the turn of the century. The period from 2000 to 2010 was characterized by post-liberalization reforms and increasing FDI, which spurred the growth of key sectors like automobiles, textiles, and pharmaceuticals (DPIIT, 2011). The government actively promoted the establishment of Special Economic Zones (SEZs), which provided tax incentives and facilitated infrastructure development aimed at boosting exports.

By 2010, manufacturing growth averaged 7-8% annually (Government of India, 2011), driven by rising domestic demand and export opportunities. FDI inflows into manufacturing increased substantially, from $2.3 billion in 2000 to over $25 billion by 2010 (DPIIT, 2011). However, despite these gains, the sector's contribution to global exports remained limited, and its share of India's GDP stagnated at around 15-17%, below the global average for developing economies (World Bank, 2010).

Between 2010 and 2015, however, the manufacturing sector's growth rate slowed to 5-6% annually, largely due to high input costs, regulatory challenges, and global economic uncertainties following the 2008 financial crisis (IBEF, 2015)leading to slowing down of the global economy. It led to lessening of appetite for imports from emerging markets. This was also accompanied by rising protectionism in the developed world. While key industries such as automobiles and pharmaceuticals performed well, they were exceptions rather than the norm. The sector's overall export performance remained suboptimal, and India ranked poorly on the Ease of Doing Business Index, standing at 142nd in 2015 (World Bank, 2015).

The launch of the Make in India initiative in 2014 marked a renewed focus on enhancing manufacturing competitiveness. The initiative aimed to promote 25 sectors, including electronics, defence, and textiles, with the goal of making India a global manufacturing hub (Government of India, 2014). The results, however, were mixed, with growth rates fluctuating and persistent challenges in improving the ease of doing business and addressing infrastructure deficits.By 2020, the manufacturing sector faced further disruptions due to the COVID-19 pandemic, which led to a contraction of 7.2% in FY2020-21 (Ministry of Statistics, 2021). The government responded with the Atmanirbhar Bharat (Self-Reliant India) initiative, which aimed to promote domestic production and reduce import dependence in critical sectors like pharmaceuticals, electronics, and defence. This period also saw the introduction of the Production Linked Incentive (PLI) scheme, designed to attract investment and boost exports in high-growth sectors (DPIIT, 2020).

Despite these efforts, India's share in global manufacturing exports has remained relatively low. To fully capitalize on its manufacturing potential, India must address several critical challenges that hinder its export competitiveness.

Key Sectors in India's Manufacturing Exports

India's manufacturing exports are dominated by a few key sectors, which have seen varying degrees of success in the global market. These sectors include textiles, pharmaceuticals, automobiles, electronics, and gems and jewellery.

1. Textiles and Apparel

India's textiles and apparel sector is one of the oldest and most significant contributors to manufacturing exports. India is the second-largest exporter of textiles after China, and the sector accounts for approximately 11% of the country's total exports (Ministry of Textiles, 2021). The sector has traditionally been labour-intensive, offering a competitive advantage due to India's large and relatively low-cost labour force. However, India faces stiff competition from countries like Bangladesh, Vietnam, and China, all of which have lower labour costs or better productivity rates. This has affected India's ability to capture more significant market share in global textile exports.

2. Pharmaceuticals

India is known as the "pharmacy of the world" due to its large pharmaceutical manufacturing base, which exports $24 billion worth of products annually (IBEF, 2021). The sector accounts for 20% of global generic drug exports, making India the largest supplier of generic medicines worldwide (Ministry of Commerce, 2021). Indian pharmaceutical exports are primarily driven by its large-scale production of affordable generics, active pharmaceutical ingredients (APIs), and vaccines. The pandemic further highlighted India's crucial role in the global pharmaceutical supply chain, with the country exporting vaccines and essential drugs to over 150 countries.

3. Automobiles

India's automobile industry has emerged as a significant player in global trade, particularly in the export of small cars, two-wheelers, and commercial vehicles. India is the fourth-largest automobile producer in the world, and the sector accounts for 8% of India's total exports (Society of Indian Automobile Manufacturers [SIAM], 2020). Export markets for Indian automobiles include Africa, Latin America, and Southeast Asia, where Indian manufacturers compete on price and reliability. However, the global shift towards electric vehicles (EVs) presents both a challenge and an opportunity for India, as the country has yet to fully establish a competitive advantage in EV manufacturing and exports.

4. Electronics and Electrical Machinery

Despite efforts to boost electronics manufacturing under the Make in India initiative, India's electronics exports remain underdeveloped compared to global competitors. India currently imports more than 70% of its electronic components, particularly semiconductors, from countries like China and South Korea (DPIIT, 2020). Electronics accounted for only 3.5% of India's manufacturing exports in 2020, reflecting a significant area for potential growth if the country can reduce its reliance on imports and develop a robust domestic supply chain (WTO, 2020).

5. Gems and Jewellery

India is the world's largest centre for cutting and polishing diamonds, and the sector accounts for 15% of India's total exports (Ministry of Commerce, 2020). Indian exports of gold, silver, and diamonds are primarily directed toward markets in the United States, Hong Kong, and the United Arab Emirates. While the sector remains a strong performer, fluctuations in global demand and rising labour costs have created challenges for future growth.

Share of Manufacturing Exports in India's Merchandise Exports:

Figure-1: Share of India's Manufacturing Export in India's Total Merchandise Exports (in $ billion)

Source: Data compiled by author

Data Source: World Bank

The Figure-1 outlines the share of India's manufacturing exports as a percentage of its total merchandise exports from 2010 to 2023, alongside the value of India's total merchandise exports (in billion dollars).

From 2010 to 2023, the share of manufacturing exports as a percentage of total merchandise exports fluctuated between 60% and 72%. In 2010, this share stood at 63%, declining slightly over the next few years, reaching 60% in 2013, sincethe global economy was recovering from the 2008 financial crisis, and India's manufacturing sector faced increasing competition from countries like China, which had developed strong production and export capacities (Kumar, 2012). Additionally,

domestic challenges such as infrastructure bottlenecks, labour market rigidities, and inconsistent policies affected the growth of India's manufacturing sector, contributing to the dip in export share (Chakravarty & Mitra, 2013).

From 2014 onwards, the manufacturing export share saw an upward trend, peaking at 72% in 2016. This period marked a resurgence of Indian manufacturing exports due to the global economic recovery and initiatives taken by the Indian government. For instance, the "Make in India" initiative launched in 2014 aimed to boost manufacturing by attracting foreign direct investment (FDI) and fostering a favourable environment for domestic and global firms to expand production in India (Aggarwal & Kumar, 2015). Additionally, the lower crude oil prices during this period (2014-2016) helped reduce input costs for manufacturing industries, giving them a competitive edge in the global market (Nayyar, 2014).

However, post-2016, the manufacturing export share started to decline gradually, dropping to 62% in 2022. Several factors influenced this decline. The implementation of the Goods and Services Tax (GST) in 2017, while simplifying the tax structure, initially led to disruptions in supply chains, especially in small and medium-sized enterprises (SMEs) (Singh, 2018). Furthermore, the global trade environment became more uncertain due to increasing protectionist measures by key trading partners like the U.S. and the rising trade tensions between the U.S. and China, affecting Indian exports indirectly (Bhattacharya & Rajesh, 2019).

In 2020, the share remained at 71%, though merchandise exports dipped significantly to $276.41 billion, a clear reflection of the global disruptions caused by the COVID-19 pandemic. The pandemic led to widespread lockdowns, disrupted supply chains, and caused a slump in global demand, all of which severely impacted India's export volumes (Gupta & Ghosh, 2021). However, the manufacturing export share remained resilient, largely because India's pharmaceutical and healthcare-related exports gained prominence during this period, as the world turned to India for critical supplies such as medicines, vaccines, and medical equipment (Sahoo, 2020).

In 2021 and 2022, as the world began to recover from the pandemic and trade resumed, India's merchandise exports surged to $395.43 billion and $453.42 billion, respectively. This sharp rise in exports can be attributed to a rebound in global demand, particularly in sectors like engineering goods, textiles, and chemicals, which form a significant part of India's manufacturing exports (Banga & Kumar, 2021). However, the share of manufacturing in total merchandise exports fell to 62% in 2022 due to a growing contribution from non-manufacturing sectors, including agriculture and services (Sharma, 2022).

By 2023, the share of manufacturing exports increased slightly to 64%, while merchandise exports stood at $432 billion. This minor recovery in the manufacturing export share is likely due to a global shift in supply chains, where companies sought alternatives to China, creating opportunities for India's manufacturing sector (Anand, 2023). Furthermore, initiatives like the Production-Linked Incentive (PLI) scheme introduced by the Indian government provided a boost to sectors such as electronics, textiles, and automobiles, enhancing their export competitiveness (Subramanian & Bose, 2023).

Key Challenges in Manufacturing Exports

1. Infrastructural Deficiencies:

India's inadequate infrastructure is a major bottleneck for the manufacturing sector. Insufficient transportation, logistics, and power infrastructure affect the efficiency of manufacturers. For instance, inefficiencies in Indian ports result in high turnaround times—ships take 4-5 days to be cleared, compared to less than a day in hubs like Singapore (Ministry of Commerce, 2020). Additionally, reliance on road transport instead of more efficient rail and inland waterways further complicates logistics. Power supply issues also add to the production costs, as manufacturers often have to invest in backup power solutions. While the National Infrastructure Pipeline (NIP) aims to address these deficits by 2025, the improvements will take time to impact exports (Ministry of Finance, 2020).

2. Regulatory and Policy Complexities:

India's regulatory environment poses another challenge to manufacturing export growth. Despite reforms like the implementation of the Goods and Services Tax (GST) in 2017, initial disruptions complicated the export process (RBI, 2017). Labour laws in India are also seen as inflexible, complicating the scaling of production. The recent consolidation of labour codes is intended to simplify regulations, but the impact remains uncertain (NITI Aayog, 2019). Additionally, India's bureaucratic hurdles continue to affect the Ease of Doing Business, where India ranks 63rd globally, behind key competitors like China and Vietnam (World Bank, 2020).

3. Global Competition and Trade Barriers:

Indian manufacturers face tough competition from countries like China, Vietnam, and Bangladesh, which offer lower labour and production costs. India's labour costs are 20-30% higher than China's, making it difficult for Indian exporters to compete, particularly in labour-intensive sectors such as textiles and electronics (WTO, 2021). Furthermore, India struggles to meet stringent non-tariff barriers (NTBs) in key markets like the European Union, which imposes rigorous standards on product safety and environmental compliance (European Commission, 2021). Although the U.S.-China trade war offered opportunities for India to capture market share, the country has not been able to significantly scale its exports due to supply chain and production limitations (Economic Times, 2020).

4. Limited Focus on High-Value Sectors:

India's export profile remains dominated by low and medium-value sectors such as textiles, gems, and pharmaceuticals. These sectors, while crucial, do not offer the same growth potential as high-value sectors like electronics, automobiles, and machinery. For example, electronics accounted for only 3.5% of India's manufacturing exports in 2020, compared to China's 30% (DPIIT, 2020). A key reason is the lack of investment in research and development (R&D); India invests only 0.7% of its GDP in R&D, far lower than emerging economies like South Korea and Germany, which dominate high-value sectors (NITI Aayog, 2020). While the Production-Linked Incentive (PLI) scheme aims to boost manufacturing in sectors like electronics and automobiles, its long-term effectiveness remains to be seen (Ministry of Commerce, 2020).

India's potential to enhance its manufacturing exports lies in addressing these challenges through infrastructural upgrades, streamlined regulations, and increased focus on high-value sectors. Only then can the country build the necessary foundation for sustained growth in global markets.

Policy Initiatives to Boost Manufacturing Exports

1. Make in India and Production Linked Incentive (PLI) Schemes

The Make in India initiative, launched in 2014, marked a major policy shift aimed at promoting domestic manufacturing and exports. The initiative targeted 25 key sectors, including electronics, automobiles, textiles, and defence manufacturing, with the goal of increasing the share of manufacturing in India's GDP to 25% by 2025 (Government of India, 2014). However, the initiative faced significant challenges, including slow infrastructure development, regulatory hurdles, and inconsistent state-level implementation.

In 2020, the government introduced the Production Linked Incentive (PLI) scheme to provide financial incentives to manufacturers in high-growth sectors like electronics, automobiles, and pharmaceuticals. The PLI scheme aims to attract over ₹ 2 trillion in investment and generate $500 billion in additional production by 2025 (DPIIT, 2020). The scheme has been lauded for its potential to boost India's global competitiveness, particularly in sectors like electronics manufacturing, where India has traditionally lagged behind.

2. Atmanirbhar Bharat and Self-Reliance

The Atmanirbhar Bharat initiative, launched in response to the COVID-19 pandemic, aims to reduce India's dependence on imports and promote self-reliance in key sectors like pharmaceuticals, electronics, and defence. By strengthening domestic supply chains and enhancing indigenous manufacturing capabilities, the initiative seeks to make India more competitive in global markets (NITI Aayog, 2021).

The focus on reducing import dependence in critical sectors, such as active pharmaceutical ingredients (APIs) and semiconductors, has the potential to enhance India's export capabilities in the long term. However, achieving self-reliance in high-tech industries will require significant investment in R&D and technology transfer, areas where India currently lags behind.

Conclusion and Future Outlook

India's manufacturing sector faces several structural challenges that hinder its ability to scale up exports, including infrastructure deficits, regulatory complexities, and stiff global competition. However, the country has taken steps to address these issues through policy initiatives like Make in India, the PLI scheme, and Atmanirbhar Bharat. While these initiatives hold promise, further reforms are needed to ensure that India can compete effectively in the global manufacturing landscape.

To enhance export competitiveness, India must continue to improve its infrastructure, simplify regulations, and invest in high-value sectors such as electronics, automobiles, and machinery. Additionally, increasing investment in R&D and fostering innovation will be critical for the country's long-term success in global markets. With sustained efforts, India's manufacturing sector can play a pivotal role in realizing the country's vision of Viksit Bharat by 2047.

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Impact of Traditional and Digital Financing Systems on Indian Exporters: A Comparative Study

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ABSTRACT

The financial system plays the main role in all export operations and growth. Financing is a key factor in the operation and expansion of exporters, specifically for developing economies like India. This evaluative study examines the impact of traditional and existing digital financing systems on Indian exporters and discusses their pros, cons, and latest developments. Indian exporters have historically relied on traditional aids, including bank loans, letters of credit (LCs), and trade credit. However traditional approaches are usually described as lengthy, and bulky, especially for Indian exporters who fail to qualify for the strict collateral and documentation provisions.

In India, however, access to financing for exporters is changing due to the impact of financial technology (FinTech). Quick, adaptive, and user-friendly products and services are available on digital platforms because of blockchain, P2P(Person-to-person) lending, and other online trade financing tools. These fintech technologies reprieve bulky papers, increase the use of digital financial payment services, and extend the borrowing range for Indian exporters.

This research examines the two systems from numerous angles including but also provides data on risk, scalability, transaction speed, cost efficiency, and access. This research is based on secondary data. The data collected from government official websites and reports show the trends of Indian exports. The analysis indicates that the solution that is most likely to be effective in addressing the challenges of Indian exporters in the context of the digital economy would combine elements of both traditional and digital models of financing.

Keywords- *Digital Financing Systems, Traditional Banking Systems, Digital Payment Systems, FinTech.*

Introduction

India also owns one of the world's largest exporting industries including textile, drugs and pharma, IT & BPO, and agriculture. India's merchandise exports reached $ 450 billion in FY 2022-

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2023 which is evidence of the increasing global role of India. Payment systems in this global trading context are specifically important since they guarantee payment regularity and export seller's receivables to accommodate the need for mutual trust between trading partners. For many years Indian exporters have continued to use traditional modes of payment like bank transfers, letters of credit, and demand drafts. Such systems are practically functional, including delays, high costs, and paperwork. With the initiation of new forms of digital payment platforms, the process of export payment has undergone a complete refit with swift, inexpensive, and efficient features. Other payments methods include National Electronic Funds Transfer (NEFT), Real Time Gross Settlement (RTGS), mobile wallets including the Unified Payment Interface (UPI), e-wallets like PayPal, fintech solutions including Payoneer, and blockchain solutions are emerging in the export fraternity. Digital India a campaign initiated by the Indian government has also pressured every sector towards reversions of this kind.

Review of Literature

Debesh Roy &Bijetri Roy (2022) highlight that India has set its target of reaching a US$ 5 trillion GDP by 2025-26 to attain calls for 8-9% annual growth and will majorly rely on private investments and agriculture exports. The attainment of these goals can be realized through enhanced international trade, fair trade policies, and cutting-edge advances in technologies. [1]

A. K. Sen Gupta and P. K. Keshari (2013) explain that exports are essential for the development of the economy and the Indian financial system particularly the commercial banks avails pre-and post-shipment finance to the exporters. Nonetheless, some problems facing export credit consist of bank conservatism, interest rates, and coordination problems. [2]

Shahana Mukherjee & Rupa Chanda (2021) studied by using a sample of 3,200 Indian manufacturing firms for the period 2000-2015, this paper investigates the export level effect of external financing constraints. That is why it discovers that increased financing constraints result in lower export levels, including SME businesses, and affiliation with a business group does not decrease this dependence. [3]

Alam Ahmad & Prof. Abdul Aziz Ansari (2016) evaluate how EXIM Bank of India can support export trade financing to help Indian exporters and the role it plays throughout the business cycle. Even though EXIM Bank has different initiatives to increase export competitiveness and globalization of the rural industries. [4]

Kati Suominen (2017) examines how disruptive technologies are changing global trade by providing smaller and bigger organizations with ways of doing cross-border trade more efficiently and effectively. Though the adoption of smart technologies is a critical success factor less developed countries, especially in Africa. [5]

K. Rajamani & A.G. Rekha (2023) explained that COVID-19 has affected the MSMEs in all aspects of health and the economy, especially in the efficiency of financing. The study argues that it will be useful to improve ICT facilities, employ new models of lending, and the digitalization of payments to make the credit market more friendly for the development of MSMEs. [6]

Sugandha Huria, Kriti Sharma, Neha Jain, & Ashley Jose (2022) explore the impact of digitalization in improving export intensity and export market entry of Indian manufacturing MSMEs using the data set 1990-2019. The given results show that a digitalization level is directly related to export intensity and market entry. [7]

Mohit Sasan (2022) highlighted that the restrictions that came with the COVID-19 pandemic saw a decline of services exports by about 10% in the second quarter of 2020 because of financial and travel services mainly. But India has for the most part long-term advantages given that digital services constitute a reasonably stronger suit for India compared to a country like China. [8]

Sivalingam Veeramani & Anam (2021) evaluated COVID-19 impact; travel, transport, and financial services bearing the major brunt. Nonetheless, the declines observed in India are not as steep as those in other major exporting countries, which implies that India has a strong prospect in mode (Digital Services) in the long run provided that it receives appropriate policy support immediately. [9]

R. Pandimeenal (2024) explained that export finance involves the provision of credit to exporters to make exports less risky and to boost export trading. All the banks in Vellore actively participate in providing export credit significantly to the leather industry holding 37% of the export share of India. [10]

Research Gap

Most of the existing research on traditional as well as digital financing systems affecting Indian exporters has been confined only to addressing the financial aspect or efficiency of trade-related processes. However, it is relevant that little comparative work has been done to link these two systems to the competitiveness and growth of exports by Indian exporters. Despite the growing interest in trade financing in the context of the digital transition, few prior works differentiate the difficulties in accessing both types of financing for exporters. This study is a targeted comparison, to understand the strengths and weaknesses of each system for Indian export.

Objectives of the study

1. To provide an overview of the comparison between traditional and digital financing impact on Indian exporters.
2. To evaluate the digital and traditional financial payment systems to identify the transaction speed, cost, security, and reliability for Indian exporters.
3. To analyze the governmental support for the better adoption of digital payment systems for Indian exporters.

Research Questions

1. How traditional and digital financing systems are different for Indian exporters?
2. Why do traditional and digital financial payments differ in speed, cost, security, and reliability for Indian exporters?

3. What is the governmental support for the better adoption of digital payment mechanisms for Indian exporters?

Methodology of research

This study aimed to analyze the impact of traditional and digital financing systems on Indian exporters and their impact on the speed, cost, security, and reliability of transactions. This present research employs only secondary data sources. Data and information have been collected from government publications such as the Reserve Bank of India (RBI), the Ministry of Commerce and Industry, and some other publications related to trade associations including the WTO database.

Overview of the comparison between traditional and digital financing impact on Indian Exporters.

Traditional Payment Methods

Traditional exchange payment systems have constituted the vital role of international trade for several decades. These methods include:

Bank Transfers (SWIFT, Wire Transfers): The most popular method of the traditional payment type is bank transfers, which work for foreign operations through the use of the SWIFT (Society for Worldwide Interbank Financial Telecommunications) system. Although effective, this method may take several days and several intermediary financial institutions may be involved.

Letters of Credit (LCs): A letter of credit on the other hand is a financial document by a bank executed for and in favour of an importer but payable to the exporter provided certain terms and conditions are complied with such as production of shipping documents. At business risk and higher value dealings, LCs have been said to provide guarantees to the parties involved.

Demand Drafts and Checks: These are still used today but very rare in many sectors although low-value transactions they widely used. Demand drafts and checks take time because they are affected by post office and manual clearing.

Digital Payment Methods

The adoption of digital financial payments is gradually becoming a trend amongst many exporters, this has been made possible by the increase in technology and internet usage. Key digital payment methods include:

Online Banking (RTGS, NEFT, UPI): Indian domestic transactions employ both Real-Time Gross Settlement (RTGS) and National Electronic Funds Transfer (NEFT). The implantation of UPI in the banking system has made peer-to-peer transactions real-time and cost-friendly due to one-click money transfers. The use of UPI is gradually becoming popular in the export payment methods giving exporters an efficient and flexible method of receiving their payment.

E-Wallets and Payment Gateways (PayPal, Stripe, Razorpay): E-wallets enable exporters to receive payments from buyers in any part of the world, within a few seconds. PayPal and its

equivalent present secured procedures and simplicity in usage but are expensive due to high charges for cross-border transactions.

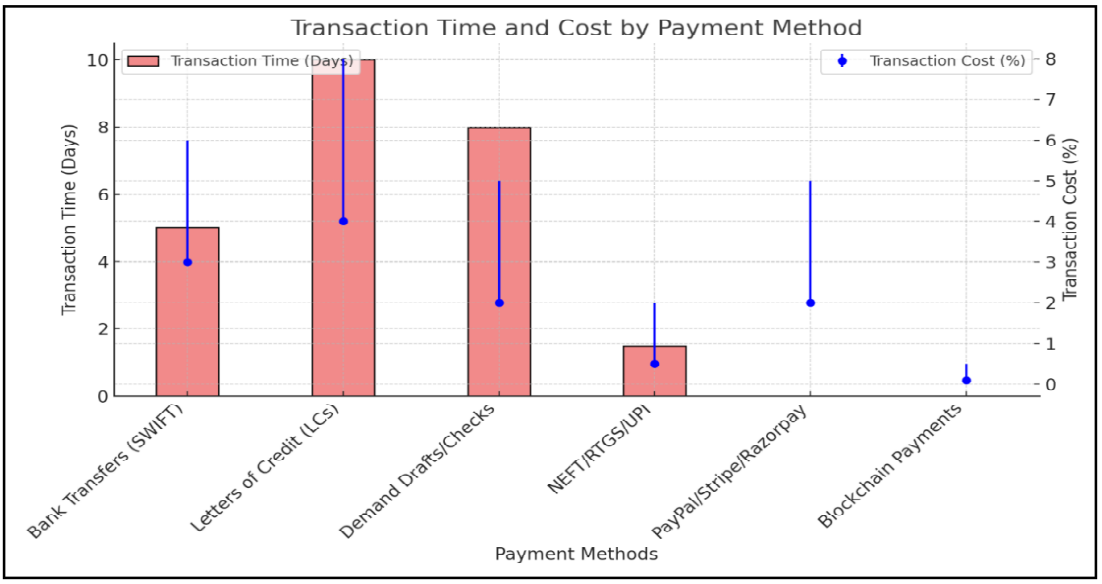
Fintech Platforms (Wise, Payoneer): Convenience, pecuniary specificity, and mediating functions, which are lower compared to traditional banks in terms of exchange rates, transaction fees, and time for settlements, are the functions of fintech solutions.

Blockchain and Cryptocurrencies: Through the usage of blockchain systems, cross-border payments can be processed instantly, charged relatively low fees, and added layers of security.

Table 1: Traditional vs. Digital financial Methods differ in transaction time and cost for Indian Exporters

Payment Method	Transaction Time	Transaction Cost
Bank Transfers (SWIFT)	3-7 days	3-6%
Letters of Credit (LCs)	7-14 days	4-8%
Demand Drafts/Checks	7-10 days	2-5%
NEFT/RTGS/UPI	1-2 days	0.5-2%
PayPal/Stripe/Razorpay	1 day (instant)	2-5%
Blockchain Payments	Near-instant	Minimal

Figure 1: Traditional vs. Digital financial Methods differ in transaction time and cost for Indian Exporters

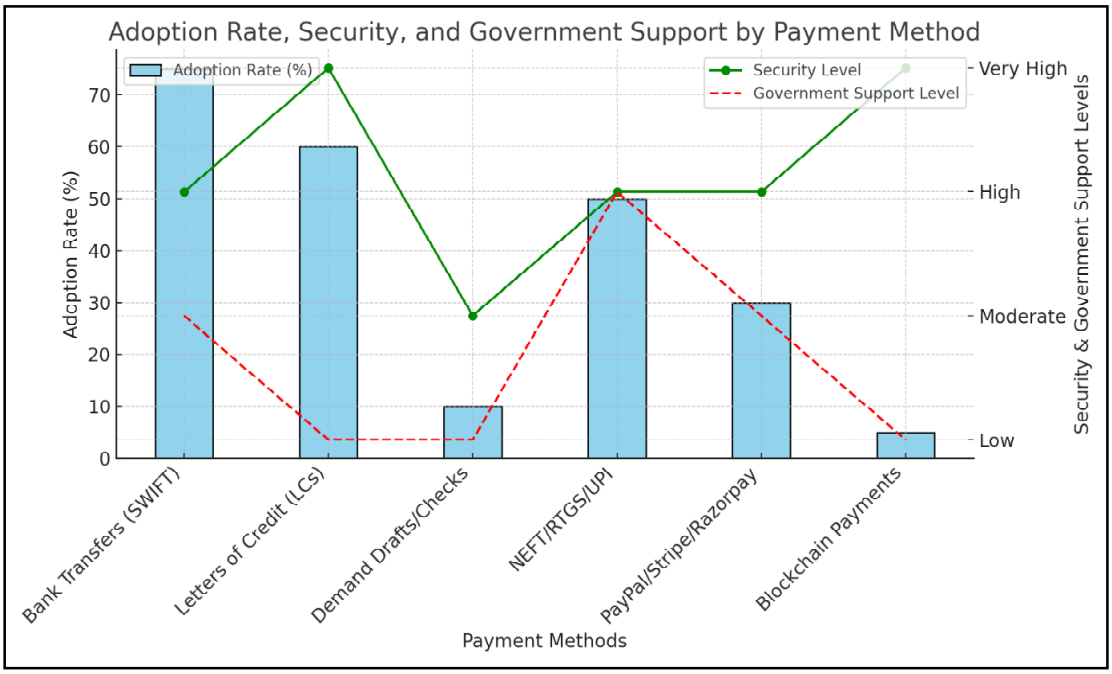


Source: RBI and Ministry of Commerce and Industry

Table 2: Traditional and digital financial methods differ in adoption rate, security and also getting government supporr

Payment Method	Adoption Rate	Security	Government Support
Bank Transfers (SWIFT)	75%	High	Moderate
Letters of Credit (LCs)	60%	Very High	Low
Demand Drafts/Checks	10%	Moderate	Low
NEFT/RTGS/UPI	50%	High	High
PayPal/Stripe/Razorpay	30%	High	Moderate
Blockchain Payments	<10%	Very High	Low

Figure 2: Traditional and digital financial methods differ in adoption rate, security and also getting government support



Source: RBI and ministry of Commerce and Industry

Interpretation and Analysis of the impact of traditional and digital financing systems on Indian Exporters

Transaction Speed: Another key difference between traditional and digital payment systems technology is the speed of the transactions. The data shows that bank transfers can take 3 to 7 days, while letters of credit may take 7 to 14 days to be completed. On the other hand, the use of digital payments from near-instantaneous or same-day facilities significantly enhances exporters' liquidity.

The NEFT, RTGS, and UPI allow payment transfers to be made between 1-2 days while sort payment processing like PayPal, Payoneer, and the like offers instant payment though, they are costly. Unified Payments Interface for the international transaction part of India's FI movement has markedly reduced the time for payments.

Transaction Costs: The commonly used payment methods are relatively costly for Indian exporters. The general SWIFT transfer charge falls within the range of $300 to $ 600 and the average transaction cost is between 3%-6% of the total transaction value. Although letters of credit offer a great measure of assurance, they may be somewhat expensive because they require volumes of paperwork and bank guarantees; approximately 4% -8%.

This kind of payment processing system does not cost as much and sometimes costs even less, per transaction in comparison to a traditional payment method. For domestic transactions, popular NEFT and RTGS payment methods feature minimal rates of 0.5-2%, which is suitable for exporters. However, using sites like PayPal is convenient, but these sites entail higher charges against international transactions, which cost between 2%-5%.

Security: Exporters are very sensitive to the issue of security especially when dealing with large-value companies. This is because letters of credit together with other traditional techniques of payment are regarded as highly safe.Bank transfers are also safe and that is especially the case when using the SWIFT network. Demand drafts and checks, thus are less secure as these can be forged.Still, Digital payments are faster and can be cheaper as a rule, but they are vulnerable to cyber threats and fraud. Business owners sending and receiving money through PayPal, Payoneer, or similar service providers must make sure their accounts have encryption.

Financial Assistance granted by the government and approval or rejection by government agencies

Digital adoption by consumers in India has been driven primarily by the Indian government through the Digital India initiative. This was launched in 2015 and its goal is to try and make as many people and businesses as possible financially included by being willing to adopt digital payments. Payments through UPI, more specifically for the intra-country payments have transformed the payment system in India and now attempts are being made to take it to the cross-border trade payments as well. RBI has also issued guidelines to support a change from conventional to electronic payments for exporters.

Impact of Payment Systems on Indian Exporters

General Improvement of Efficiency and Cash Flows: The movement to digital forms of payments for exports has impacted the productivity of exporters provided they have appropriate access to efficient cash flows. Digital payments enable exporters to access the funds much faster than it would take under traditional systems. On the other hand, the time consumed in using the traditional forms of payment has a way of slowing down cash flow.

Enhanced Competitiveness: It also has the potential to offer flexible, faster payment modes as a strategic weapon for Indian exporters. The expectation of export partners that they have to meet to

develop long-term business associations with global buyers. Through cheap and fast transaction charges, Players such as Payoneer give Indian exporters a competitive edge, especially in price-related markets like India. Furthermore, the Government of India's drive towards encouraging digital transactions alongside the emergence of India as a digital economy also greatly enhances the competitiveness of exporters in India.

Security and Risk Management: the threats associated with the use of digital payments as a method of payment are still a pain point for exporters since security always remains a key concern no matter how efficient a payment method is. Soon digital platforms employ better encryption and fraud monitoring systems but they stay open to cyber incidents. Reducing the possibility of fraud and change is made possible by the use of an open and fixed ledger known to all by the use of blockchain.

Conclusion

This comparative study highlights the growing importance of digital payment systems in India's export sector. While traditional payment methods such as bank transfers and letters of credit remain important for high-value and high-risk transactions, digital platforms offer numerous advantages in terms of speed, cost, and efficiency.

The Indian government has played a critical role in facilitating this transition through initiatives like Digital India and the promotion of UPI for international payments. However, challenges remain, particularly in terms of security and regulatory clarity, especially concerning blockchain and cryptocurrency payments.

The continued adoption of digital financial payment systems will be crucial for the future growth of India's export sector. By embracing these technologies and addressing the associated risks, Indian exporters can enhance their global presence and improve their operational efficiency. As the digital payment ecosystem evolves, Indian exporters are well-positioned to capitalize on the opportunities presented by this transformation.

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An Analysis of India's Bilateral Trade with China

Km Raksha

ABSTRACT

India and China, the two largest economies of the world jointly account for 2/3 of world population and 1/3 of world geography. India and China are the fastest-growing economies in the world. Together they have the capacity to form a separate power bloc strong enough to thwart any challenge from other countries. India and China have been trading partners for centuries. This paper attempts to analyze the bilateral trade relationship between India and China. Also tries to investigate the huge trade deficit of India with China. Trade openness of India and China also has been analyzed. Data have been taken from 2001 to 2022 time period. And Data have been collected from various sources such as UN Commodity Trade Statistic & General Administration of Customs, journal and books for this study. For this study tools like table and figures have been used. The findings of this study suggest that trade relation between India and china has increased during the time period of this study. Since 2009 China has become India's largest trade partner and since then not only China's ranking improved among leading trade partners of India but also Indian market flooded with China's exports which caused serious bilateral trade imbalances. India is facing huge trade deficit. Result also shows that Trade openness of both the countries have also increased but Trade to GDP ratio is more than India.

Keywords: *Bilateral trade, India-china relation, trade deficit, trade openness.*

Introduction

India and China are the two oldest civilizations, the most populous nations, and the fastest-growing economies in the world (Dhar and Mehta, 2020). Their bilateral relationship dates to the mid-1980s. Efforts were initiated by the governments of the two countries, which helped identify common trade interests. In 1984, both countries signed their most favored trade agreements. However, an active bilateral trade relationship emerged in 1992. In 1994, India and China entered a Double Taxation Avoidance Agreement. In 2003, India and China signed the Bangkok Agreement; according to this agreement both countries offered some trade preferences to each other. In addition trade via the Silk Route between India and China was also reached in 2003. India and China's bilateral trade has experienced rapid expansion since the beginning of this century; however, from to 2008-2009, China has emerged as the largest trading partner of India because India's imports from China increased

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significantly. China not only jumped up in its ranking among India's lead bilateral trade partners but also splashed the Indian market with its exports, causing serious bilateral trade imbalances.

During 2008- 2009 China shared 9% in India's trade. In 1998, Trade gap was recorded at US$ 602 million which increased alarmingly to US$ 39.2 billion in 2012. During 2001-02 the size of the trade deficit declined, but started growing since 2002. While the global economy was booming during last decade in period of 2004-2007, India's trade deficit was increasing robustly. The trade deficit made a quantum jump in 2006 to reach a level of US$ 7.9 billion from US$ 3.5 billion in the previous year, posting an annual growth rate of 129 per cent. Bilateral deficit recorded a new height in 2012 at US$ 39.2 billion. However, since 2006 the growth rate of bilateral trade deficit has started declining, but over the years the volume of the trade deficit is growing significantly except for 2009.

The main items that India export to China includes ores, slag and ash, iron and steel, plastics, organic chemicals, and cotton. India primarily imports electrical machinery and equipment, cement, organic chemicals, nuclear reactors, boilers, machinery, silk, mineral fuels, and oils from China. China exports Value added items like electrical machinery to India. These items account for more than 70% of India's imports from China. Marine products, oil seeds, salt, inorganic chemicals, plastic, rubber, optical and medical equipment, and dairy products are the other potential items of trade between India and China. Areas like biotechnology, IT and ITES, health, education, tourism, and financial sector also have great potential of trade.

There are several other factors which are responsible for the trade imbalance between India and China. Several non-tariff barriers including complex regulatory requirements, intellectual property rights violations, and lack of transparency in business dealings can make it difficult for Indian businesses to access the Chinese market and compete with Chinese firms. Another factor is India's inadequate infrastructure and logistics facilities which result in higher transaction costs for exporters, making Indian goods less competitive in the Chinese market. The exchange rate between the Indian rupee and the Chinese Yuan also plays a role in the trade imbalance. The Indian rupee has been weaker than the Chinese Yuan, which makes Indian exports more expensive for Chinese buyers and Chinese imports cheaper for Indian buyers. This further exacerbates the trade imbalance between the two countries.

The bilateral trade relationship between India and China is of great importance due to the economic and political implications it has for both countries. The rationale for this study is to fill the knowledge gap in the existing literature by analyzing the trade openness and trade deficit between India and China and providing suggestions to correct the trade deficit.

Literature Review

(S Mohanty, 2014) It is important to examine to what extent bilateral trade imbalance is contributing to the overall trade imbalance of India. And How to sustain the present level of bilateral trade while at the same time narrowing the existing bilateral trade gap is an important challenge for

policy. This study also tries to analyze the tariff policies and relative external sector performance of the both countries. The finding of this study shows that India's trade deficit with China has increased tremendously from the 1998 to 2012.

Rajani Das in her research paper titled **A Study On The Trade Relation Between India and China (2018)** tries to examine and compare bilateral trade between the two economies and to draw implications for trade and economies cooperation between India and china in future. More specifically, this study investigates the major trends and changes in the India's balance of trade with China; in total import or export to china. And also examine the impact of economic factors on the strategic relationship between India and China. The findings of the study show that The volume of India-China trade increased from US$100 million in 1988, to US$73.9 billion in 2011 and .China has become India's biggest trading partner since 2008. Opening up and integrating in the world economy has the positive growth effects on the two countries.

Akeel Ahmad Dar and **Dr. Shakshi Mehta** in their research paper **titled A study of India China trade relations (2020)** attempt to investigate the bilateral trade relation between India and China. This study also examines India's Trade deficit with China. The result shows trade between India and China has picked up dramatically since China became a WTO member. After 2008-09 China has emerged as India's largest trading partner. Since 2009 not only did China leap in its ranking among India's leading bilateral trade partners, it also sprinkled the Indian market with its exports, causing severe bilateral trade imbalance. India's imports from China have increased robustly.

Objectives

1. The aim of this study is to analyze the bilateral trade relationship between India and China.
2. To investigate the trade deficit of India with China and provide suggestions to correct the trade deficit.
3. To examine the trade openness of India and China.

Methodology and Data Collection

Data have been collected from various sources such as UN Commodity Trade Statistic & General Administration of Customs, China, journal and books for this study.

Table and Figures have been use in this research paper.

As it can be seen from the Table-1, that Bilateral trade between India and China has grown four fold in the last decade. Expansion of the bilateral trade between these two countries started in the beginning of this century but China's share in India's total trade was behind many countries. China shared 3.5% of the total trade of India. However, from 2008-2009, China has emerged largest trading partner of India because India's imports from China increased significantly. Bilateral trade jumped approximately 25 times, from US% 2.7 billion in 2001 to nearly US% 60 billion in 2010 and further to 125 billion in 2012. The expected target was almost achieved in 2010. However, due to 'double dip' recession, expected target was significantly underachieved in 2012.

Table 1: Bilateral Trade between India and China (in US $ Billions)

Year	India's Export to China	Import From China	Trade Deficit/Surplus	Total Trade
2001	1.70	1.90	0.2	3.6
2002	2.27	2.67	0.34	4.94
2003	4.25	3.34	0.91	7.59
2004	7.67	5.93	1.74	13.6
2005	9.76	8.93	0.83	18.69
2006	10.27	14.58	4.31	24.85
2007	14.61	24.05	9.38	38.72
2008	20.3	31.6	11.3	51.9
2009	13.7	29.7	16.0	43.4
2010	20.8	40.9	20.1	61.7
2011	23.3	50.5	27.2	73.8
2012	18.7	47.7	29.0	66.46
2013	17.0	48.4	31.4	65.4
2014	16.4	54.2	37.8	70.6
2015	13.4	58.2	44.8	71.65
2016	11.8	58.8	46.6	70.2
2017	16.34	68.1	51.76	84.44
2018	18.83	76.87	58.04	95.7
2019	17.97	74.92	56.95	92.9
2020	20.87	66.78	45.91	87.65
2021	28.03	97.59	69.56	125.62
2022	17.49	118.77	101.28	136.26

(**Source:** UN Commodity Trade Statistic & General Administration of Customs, China)

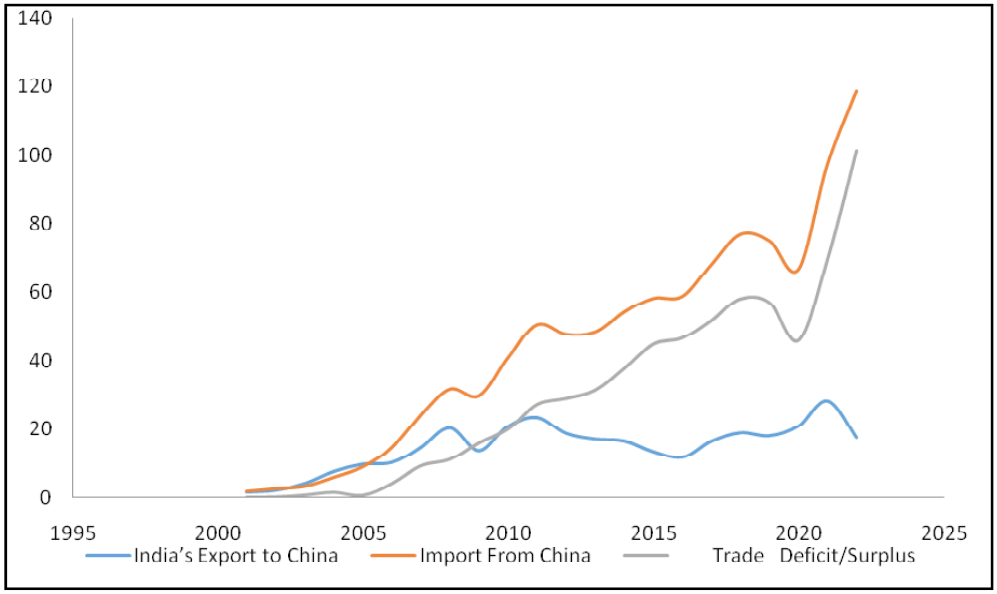
From 2015 to 2022, India-China bilateral trade grew by 90.14% .In 2015 overall trade with china was USD 71.65 billion and in 2022, the overall trade with China reached to USD 136.26 billion, crossing the USD 100 billion mark for a second time in a row. However, trade deficit of India with China came at USD 101.28 billion in 2022. 118.77% increase was witnessed in India's imports from China that is USD 118.77 billion, meanwhile India's exports to China decreased and reached at USD 17.49 billion, which is less than last year's net exports of USD 28.03 billion.

India's bilateral trade deficit with China is large and growing. In 2009 bilateral trade between these two countries changed significantly, not only China's ranking improved among leading trade partners of India but also Indian market flooded with China's exports which caused serious bilateral trade imbalances.

During the earlier part of the decade, the size of the trade deficit declined for the period 2001-2002, but started growing since 2002 (figure-1). And in 2006 jumped to reach a level of US$ 7.9 billion from US$ 3.5 billion in the previous year. The trade deficit kept increasing since 2002 and

reached at US$ 20.1 billion in 2010 and further increased to US$ 46.6 billion in 2016. It increased alarmingly during 2002 to 2012.

Figure 1: Trade Deficit of India with China



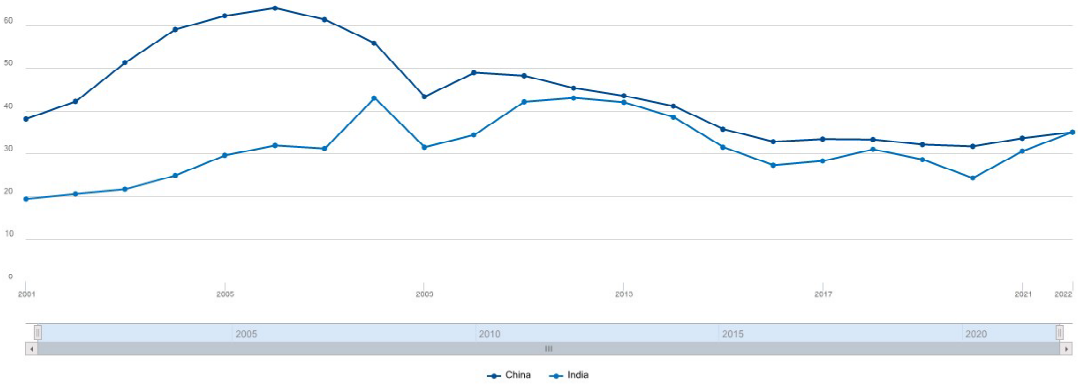
(**Source:** UN Commodity Trade Statistic & General Administration of Customs, China)

It reached USD 58.04 in 2018. There was slight decline of the trade deficit in 2019 by 1.88% (declining for the first time since 2005) to reach USD 56.95. Due to COVID-19 pandemic further decline of 19.39% was seen and Trade deficit in 2020 reached to USD 45.91 billion. However, the trade deficit has been rising steeply since the pandemic has gone. 51.51% of increase has been seen in deficit in 2021 which is USD 69.56 billion. In 2022 the deficit has further widened by 45.60% year on year reaching USD 101.28 billion. During the last decade, the growing bilateral trade imbalance against India was not corrected from and presently it has reached a stage that it is very difficult to manage it. During the last few years, It has been increased drastically specially during the period when world economy was booming.

Two factors are behind this huge trade deficit. The one is India's Exports of raw materials to China and imports of high technology finished product from China. Four dominant sectors comprising of chemicals, machinery, base metals, and textile & clothing are included in the India's import basket from China. Among these sectors, the largest and the most dynamic sector has been that of machinery import. India has narrow basket of commodities for exports. Its exports are mainly consisted of cotton, gems and precious metals, copper and iron ore. Because India does not produce enough high-technology manufactured goods for exports and domestic use, so it has to rely on other countries for imports . However China exports manufactured capital goods.

The second Factor is market access impediments for most of our agricultural products and the sectors where we are competitive in, such as pharmaceuticals, Agriculture and IT service. But Chinese regulations impose restrictions that stifle the provision of Indian goods and services. Apart from these India does not have in-depth knowledge of the Chinese market

Figure 2: Trade Openness



Series : Merchandise trade (% of GDP)
Source: World Development Indicators
Created on: 10/13/2024

Trade openness ratio is defined as the sum of merchandised imports and exports divided by GDP. Trade-GDP ratio has steadily increased in both countries since 1991, however declined in 2008 due to effects of the global recession. In above the Figure, it can be clearly seen that China's trade openness is more than trade openness of India.

India's merchandise trade to GDP ratio has increased from 20.4 percent in 2001-2002 to 28.3 percent in 2004-2005 and to 32.0 percent in 2015-2016 (figure-2).

Suggestions to improve Trade Imbalancev

As China emerges as the largest trading partner of India, there developed severe trade imbalance between these two countries.

India needs to increase its exports to China. To increase its exports India should focus on exporting high-value products like engineering goods, electronics, pharmaceuticals, and chemicals. Because these products have higher profit margin that will help in increasing India's foreign exchange earnings. Furthermore, India should reduce its dependence on Chinese imports by diversifying its imports from other countries such as Vietnam, South Korea, Japan, Taiwan, and Indonesia. To reduce its reliance on imports, India needs to develop its domestic industries. Incentives can be provided to domestic companies by the Government to manufacture goods that are currently imported. For improving its trade imbalance India should also consider signing an Free Trade Agreement with China. Also India should review its Free Trade Agreements with other countries to ensure that they are not harming its domestic industries.

Conclusion

Over the past two decades the India-China bilateral trade relationship has experienced remarkable growth, Trade volume between the two countries increased substantially, from approximately $3 billion in 2001 to over $100 billion by 2022. But this increased bilateral trade resulted huge trade deficit for India with China. Since 2008 China improved its ranking among other top trade partners of India. Since then it has been India's largest trade partner. India's imports from China increased while China exports manufactured goods and electronics to India, India's exports to China are primarily raw materials and intermediate goods. However, China has consistently maintained a large trade surplus with India which leads to concerns about the sustainability of the relationship.

The relationship between India and China is a complex and fraught with challenges. On the one hand trade relations between India and China have been increasing since the beginning of this century. China has become largest trading partner. Also both countries have a common understanding on certain global issues and high level political exchanges. These factors have contributed to build greater trust and confidence between both the countries. However on the other hand increased imports of India from China which have caused severe trade imbalance, anti-dumping measures of India from the cheap Chinese goods, and competition for oil and gas are the major areas of concern. To ensure a balanced and sustainable economic partnership in the future, this is the need of hour to address ongoing issues. There is still more potential in their bilateral trade. Overall for a healthy, sound and sustainable socio-economic relationship between India and China, there is a need to fully realize the substantial potential for their cooperation in a wide range of areas by these two countries. And both the countries should upgrade their trade relations to a qualitatively new level. And one more important thing, India and China need to hold the view that they are not rivals or competitors but are partners for mutual benefit and in this mutuality there exists bright prospects for their common development.

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Role of FDI in Driving the Growth of the Insurance Sector in India

Sameer Srivastava[1] & Dr. Poonam Verma[2]

ABSTRACT

India being a developing nation and home to 1.5 billion people has a large ratio of population falling in middle and lower income class group living in vulnerable financial environment. Insurance sector plays crucial role in providing financial security by transferring risk against uncertainties such as natural disaster, health issues etc. Therefore, Insurance sector has huge potential to grow in India and Capital inflow from foreign countries has been a driver of growth for this sector. After the establishment of Insurance Regulatory and development authority of India (IRDA) in 2000, Insurance sector was also opened for the foreign investors, Since then Foreign Direct Investment(FDI) played a significant role in the growth of Indian Insurance sector by improving efficiency and bringing financial stability. The limit of FDI in Insurance sector rose to 74% in 2021 which had been only 26% initially. The objective of this study is to analyze the role of FDI in enhancing the performance of Indian insurance sector over the years, insurance penetration rate and insurance density considered as indicators for measuring the performance of insurance sector in India. The data used for the study is collected from the secondary sources, the main sources of the data set are Reserve bank of India(RBI) and Insurance Regulatory and development authority of India (IRDAI), since 2000–2020. Data was analyzed using comparative study and descriptive statistics. The finding of this research indicates that increasing foreign direct investment (F.D.I.) has significant influence on expansion and growth of insurance sector in India.

Keywords:- *Foreign Direct Investment(FDI), Insurance sector growth, Insurance Penetration, Insurance Density, IRDAI.*

Introduction

India being a country with a population of over 1.5 billion people has a huge potential for insurance market. India's unequal distribution of income and large proportion of its population falling in middle and lower income group increases the role of insurance sector in mitigating the risk of financial vulnerability against the uncertainties such as health issues and natural disasters, providing protection against these odds for individuals and businesses insurance sector contribute

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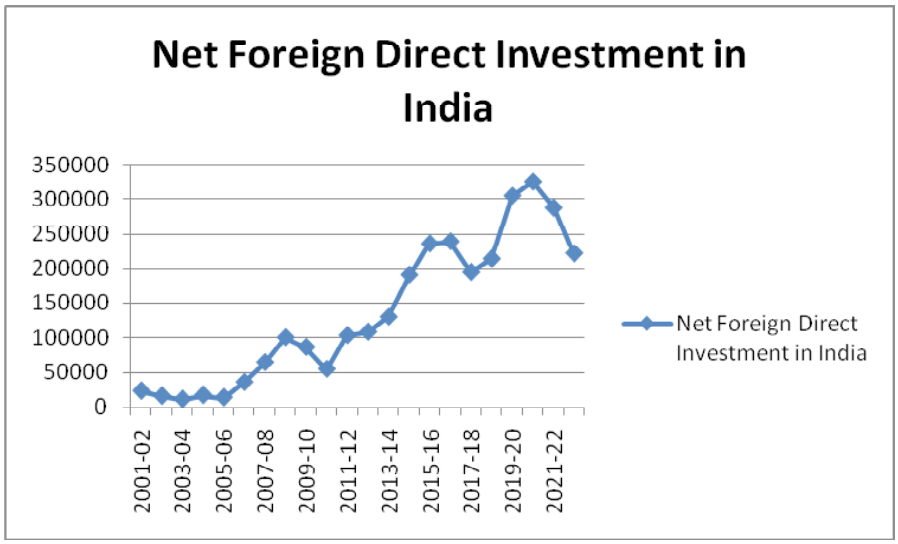
significantly in maintaining financial stability in the economy. However, despite having these favorable working environment, growth of Indian insurance sector constrained by limited capital, insufficient market penetration and low financial literacy among people.Post-Independence Indian Insurance sector were hugely dominated by public sector, in 1956, government of India nationalized all the Indian and foreign life insurance into Life Insurance Corporation of India (LIC) to ensure better control, stability and penetration of life insurance sector, thereafter, In 1972, with the introduction of General Insurance Business Nationalization act, government nationalized all the non-life insurers into four public sector insurers- National insurance, New India Assurance, Oriental Insurance and United India Insurance, under the control of General Insurance Corporation (GIC). The economic reform of Indian economy in 1990s paved the way of reform in insurance sector also, in 1993 Malhotra Committee was formed to evaluate the structure and recommend suggestions in order to increase competition and penetration, committee recommended to open the insurance sector for foreign investors and reintroduce the private insurers. Based on these recommendations, the Insurance regulatory and development authority of India(IRDAI) was established in 2000. Since the establishment of IRDAI and openness of Insurance sector for foreign investors, Insurance industry witnessed significant foreign investment growth and the number of private players also increases in the insurance market. Initially, the limit of FDI in insurance sector was fixed at 26% which increased to 49% in December,2014 by the government of India. In 2021, government of India passed the Insurance Amendment Bill which further raised the FDI limit in insurance sector from 49% to 74%. With the aim of 'Insurance for all by 2047'The Insurance Regulatory and Development Authority Of India (IRDAI) and government of India has set an ambitious goal in order to celebrate the 100 years of independence in the country, the primary goal is to ensure every citizen has an appropriate life, health and property insurance cover. In order to achieve this goal there are high probability that government further increases the limit of FDI in Insurance sector.



Source: RBI

Benefits of FDI for Insurance sector:-

1.) **Financial Stability** : Direct investment from foreign country brings much needed capital to the insurance sector which further helps in manage risks, new product innovation, and expanding their business operation.

2.) **Increased market competition**: With the introduction of FDI competition in Indian insurance market increases which forces insurers to innovate, increase efficiency and provide better customer services.

3.) **Enhance Insurance Penetration and Insurance Density**: Insurance penetration and Insurance density are the key indicators to measure the performance of insurance sector, they showcase the level of development of insurance sector in any particular country. Investment from foreign countries allows insurers to expand their business which further increases the insurance accessibility in the country.

The Insurance sector in India plays a crucial role in ensuring financial stability to the economy, though this sector has witness significant transformation over the past two decades, majorly after regulatory reforms. The introduction of latest technology and more advance product innovation will further enhance the sector in near future.

Literature Review:-

The importance of foreign direct investment in fostering the growth of insurance sector has been extensively studied globally, In reference to India many studies has been conducted to analyze the performance of Insurance sector and how increasing share of investment from foreign countries boost the growth of this sector, available literature on this topic gives insight into how FDI changing the dynamics, competition and product innovation in insurance sector. There is high degree positive correlation between the FDI(specially in life insurance) and economic development, specially service sector in India attracts major proportion of foreign direct investment (Shalini,S.). FDI positively impacts country's trade balance, increasing labour standards and skills, transfer of technology and access to global managerial skills and practices (Hussain,A.,& Srilakshminarayana.,2013). Since liberalization of financial sector it is evident that foreign direct investment in Insurance sector has been continuously growing and indicates that government dominance in Insurance sector hindrance the growth of insurance sector for decades (Kumbhar,V.M.). Introduction of foreign direct investment in Insurance sector changed the character of this sector from being controlled to competition driven market, quality and price of insurance product also improved, range of product and services has significantly increased to give a wider choice to the consumer (Mahapatra,A., &Mahapatra,P.).

Objective of the study:

The aim of this paper is to analyze the contribution of foreign direct investment in growth and expansion of insurance sector in India. The main objective of this paper is:

- To examine the impact of FDI on key performance indicators of insurance sector, i.e insurance penetration and insurance density.

Research methodology:

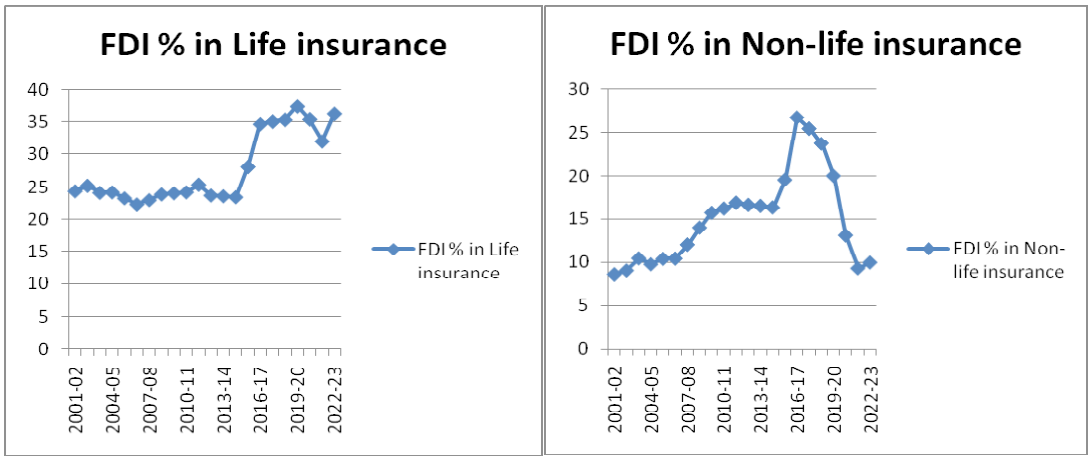
.To measure the performance of Insurance sector in India following the introduction of foreign investment,this study considers two key indicators: insurance density and insurance penetration,these variables shows the growth and penetration of insurance sector in the country.The dataset are collected from the secondary sources, the major source are annual reports of IRDAI and RBI. The dataset for the study is considered from the years 2001 to 2022, since the establishment of IRDAI.

FDI in Indian Insurance sector:-

Years	FDI % in Life Insurance	FDI % in Non-life Insurance
2001-02	24.36	8.64
2002-03	25.20	9.08
2003-04	24.11	10.5
2004-05	24.19	9.80
2005-06	23.24	10.44
2006-07	22.28	10.47
2007-08	22.95	12.06
2008-09	23.86	14.01
2009-10	24.04	15.77
2010-11	24.19	16.26
2011-12	25.37	16.92
2012-13	23.69	16.67
2013-14	23.57	16.56
2014-15	23.42	16.38
2015-16	28.09	19.54
2016-17	34.70	26.69
2017-18	35.09	25.42
2018-19	35.36	23.66
2019-20	37.41	20.02
2020-21	35.44	13.12
2021-22	31.99	9.33
2022-23	36.28	10.01

Source: IRDAI

Graphical representation:-

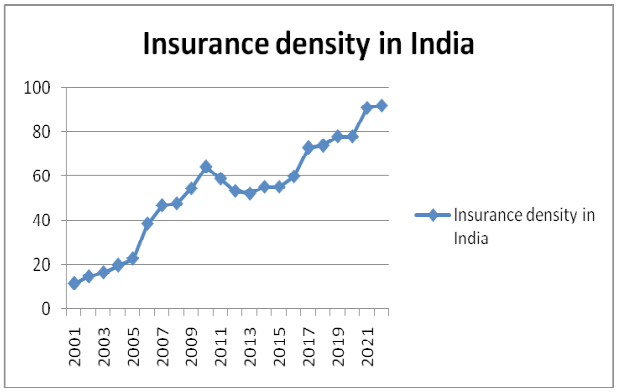


The trend of both the datasets showcases that percentage of Foreign direct investment in both life and non-life insurance sector increases significantly over the time. Though, Life insurance sector has experienced more stable growth in Foreign direct investment compared to Non-life insurance sector. Trend in percentage growth of FDI in non-life insurance sector suggest that this sector require more improvement in regulatory environment and better profitabliity

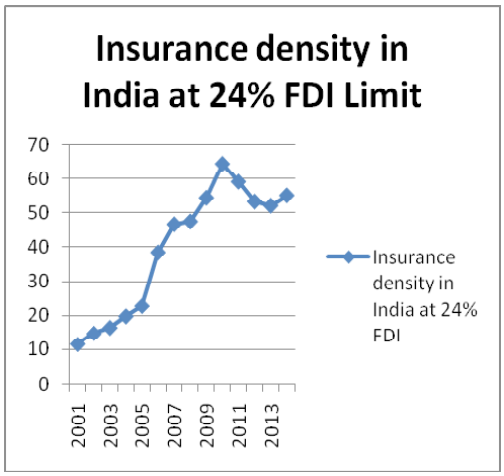
Insurance density:-

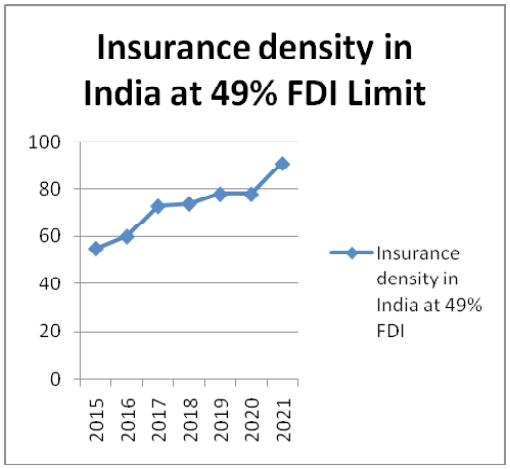
Insurance density represent the level of development of insurance sector in a country, ratio of insurance density obtained by dividing the total premium collection by the total population of the country.

$$\text{Insurance Density} = \frac{Total\ Insurance\ Premium}{Total\ Population}$$



Source: IRDAI



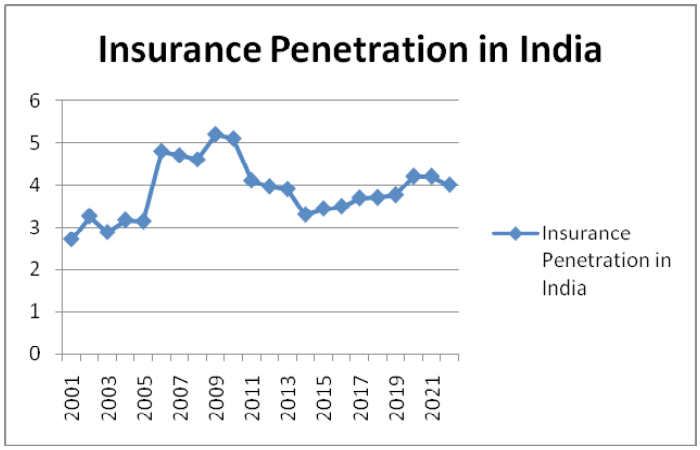


Source: IRDAISource: IRDAI

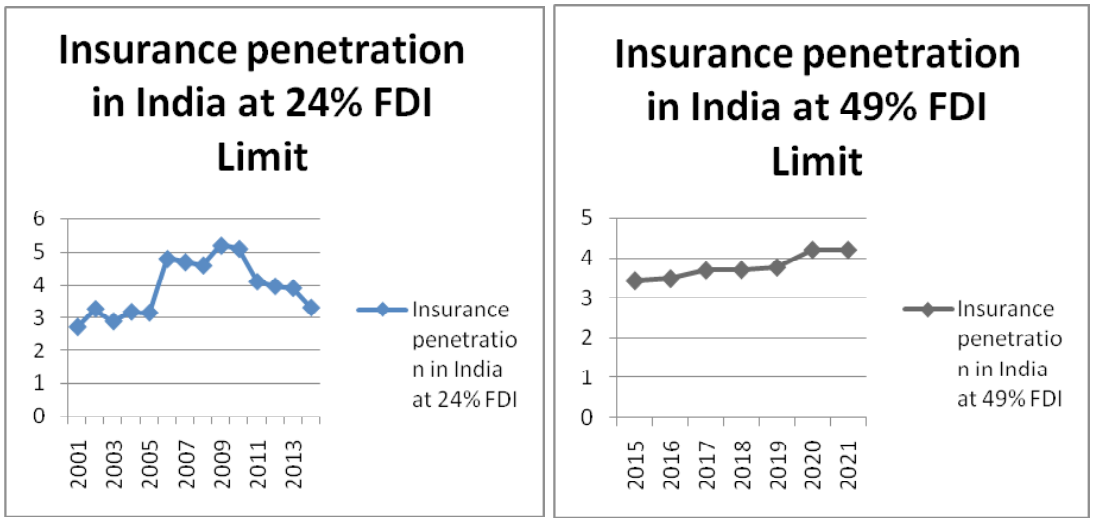
Insurance Penetration

Insurance penetration also indicates the contribution of insurance sector to the economy and gives insight into how developed and integrated the insurance sector is in a country. A high level of insurance penetration rate shows the level of awareness, utilization, and acceptance of insurance products among the population.

$$\text{Insurance Penetration} = \frac{Total\ Insurance\ Premiums}{GDP} \times 100$$



Source: IRDAI



Source: IRDAI

Analysis of the data

After analyzing the trend of key indicators, insurance density and insurance penetration it is evident from the graph that after the introduction of reforms in Insurance sector there are notable growth of indicators over the years and with increasing the limit of FDI, insurer get more capital from foreign direct investment which further help in expansion of this sector. However, the trend of insurance density suggests that initially it had gradual growth which reflects early market development and new product introduction, further values of insurance density shows significant growth of insurance sector in India. Overall the values of insurance density reflect a stable growth trend which is increasing at significant 52.55 average rates. Whereas, Insurance penetration rate initially grows at fluctuating rate and had witnessed significant growth then after, though it further have declining phase which reflects response to the market condition in that phases, overall trend of insurance penetration reflects ups and downs in the growth rate which shows a common characteristic of developing nation like India where reforms, investment and government policies affect the expansion.

Conclusion

Today, India is stood at 10th place in world insurance market, showcases that Indian insurance sector witnessed significant growth since the reform of this sector. India's total premium value generation in 2022 was US $131 billion. Despite challenges of COVID-19 Pandemic and Russia-Ukraine war Indian Insurance sector has grown at the rate of 10.32% in Financial year 2022 which was only 7.9% in 2021. The finding from the analysis of insurance density and insurance penetration indicates that since the liberalization of Insurance sector and introduction of FDI there has been significant improvement in the growth and performance of Insurance sector. The mean Insurance

density of 52.55 over the two decades reflects the better consumer services, increasing accessibility of the insurance sector, whereas mean Insurance penetration rate of 3.87 indicates moderate contribution of insurance sector to the overall economy, the low penetration rate highlights the potential of expansion for Insurance market in India. In order to achieve the goal of IRDAI "Insurance for all, by 2047" Indian insurance market has to overcome the challenges present in Indian market. The major challenges faced by Insurance sector in India are Lack of financial literacy and regulatory compliance, However, with the adoption of digitalization Insurance sector has huge opportunity to increase its accessibility to the people and make them aware about importance of insurance for financial stability. As per Insurance regulatory and development authority of India, insurance market of India can touch the mark of US $222 billion by 2026.

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Indian Manufacturing Sector: An Overview of Export Challenges

Harsh Raj Gautam[1] & Dr. Veena Upadhyay[2]

ABSTRACT

Manufacturing sector are the backbone of any underdeveloped economy. It contributed significant role in employment generation, output and export of that country. This paper try to reach out what are the factors which hindrance manufacturing export in India. Vital issues incorporate Rigid production function, Production of highly elastic goods, Excess capacity in the manufacturing industries, Low level of investment in research and development will leads to uncreated new knowledge consequently did not get patient, which was sold to the manufacturing industries and production of goods leads to the countries export, Problems regarding the managerial inefficiency in the manufacturing firms, Low level of Technological adaptation by the Indian manufacturing firm, restricted access to credit for manufacturing productivity, Lack of investment in infrastructure like – roads, light etc, High logistic cost in India, sluggish growth in the basic industries these are mainly internal factors which hinders export of Indian manufacturing. Some of the other external factors which also affect countries manufacturing like Exchange rate of country, Demand of manufacturing products in other country, Export policies of the manufacturing etc. This paper also explain the trend of manufacturing export of the country. It explained policy prescription which enhance manufacturing export and income of the country.

Key Words: *Rigid production, Logistic cost, Elastic goods, Technological adaptation*

INTRODUCTION

Manufacturing are the basic fundamental of development in the underdeveloped country because it creates jobs to the persons and significant role plays in the output growth of the country. It prevents migration towards the other states and reduces urbanization to the other cities. India was focusing on the industrial development since the independent. The first industrial policy was propound in 1948 and the second in the year 1956. India in their second five year plan which was propound in 1956 was mainly based on MAHALNOBIS model of industrial growth. In the MAHALNOBIS model government invest in capital goods industry, which further helps to create consumer goods

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industry. In the modern globalization era countries power can be defined through their export share to the Gross Domestic Product. In which the role of manufacturing became important towards their export contribution. In the year of 2023 merchandise export has recorded as $ 432 billion and it will also significant contributed in the employment share to the country. According to the Ministry of statistics and Programme Implimentation (MOSPI) is employment enlarge by 1.84 cr in the year of 2022-23 which was 1.72 cr in the year of 2021-22. As we seen, the manufacturing sector plays crucial role in the holistic development of the country. Underdeveloped countries like India still facing some internal and external hindrance regarding the development of Manufacturing industries. Some of the important issues are highlighted in this research paper.

REVIEW OF LITRETURE

Binoy Debnath, Muntaha Rauf Taha, Md. Tanvir Siraj, Md. Fahmid Jahin, Sazzadul Islam Ovi, A.B.M Mainul Bari, Abu Reza Md.Taufiqul Islam, Asif Raihan (2024), The paper investigate that the manufacturing sector apparel major role plays in the sustainable development practices in development . Paper identified some manufacturing apparel related problems like slow return on investment, lack of proper waste management system and reluctance to adopt sustainable production practices in manufacturing. **Shashi Agarwal, Debashis Chakraborty, Ranajoy Bhattacharyya (2022),** This paper investigate the recent development of India's export trade policy on the manufacturing export. They explain how will it helps to create a output value chain for the country and create a employment.

In 2020 India give package of 20 lakh cr of Aatmnirbhar Bharat, whose focus on to reduce import and produce output which fulfill countries requirement. This paper put a light on problem regarding skill development and skill gap in workers which prevent to adaptation in the technological adaptation. **Himanshu Seth, Saurabh Chadha and Ruparel, Puneet Kumar Arora, Satyendra Kumar Sharma (2020),** This paper suggests results related to the manufacturing development towards the Cash conversable cycle has negative relationship with SIZE, ATR, TAGR PRD and EXP.LEV and GDP and it has a positive impact on SIZCA, GRT and INT. **Yash Mehta, A.John Rajan (2017),** This paper stressed on the some of the factors which is responsible for the good manufacturing exports are the a good tax compliance in the country, a very healthy labour laws with the support of infrastructure development of the country. Some of the negative points pointed out by the IMF Logistic costs, infrastructure, skill gap among the labor and the deceleration in the Indian economy. **Dr Pesala Busenna (2014),** This paper carried out the market openness on the Indian manufacturing sector. The market was open to enhance the competitiveness among Indian manufacturing and the technological adaptation. This paper found that it increases the textile export, after the globalization CAGR of manufacturing industries has declined, growth rate of industries has increased and it plays significant role in the export of the country. **Smitha Francis (2013),** This paper stressed out on the impact of liberalization on the technological adaptation. How the country is facing problems in the adaptation of technology and faced the competition of world's dominated. This paper find out eight most core sector manufacturing in which six are the import oriented manufacturing. They stressed to meet up export need for the Industrial policy to reform.

OBJECTIVE OF THE STUDY

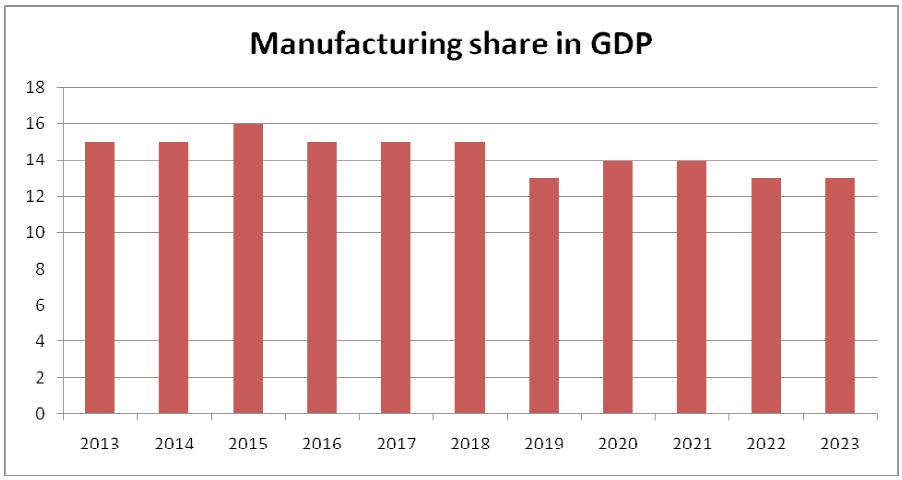
1) To identify the internal and external problem regarding the manufacturing export in India.

RESERCH METHODOLOGY

In the pursuance of the above objective following methodology are adopted to conduct study. In the study the time period is taken from 2013 to 2023 to analyze the trend of manufacturing merchandise export and its share in countries GDP. MS EXCEL used to analyze the trend. The data which is used to show merchandise export and manufacturing share in GDP trend is collected from WORLD BANK.

ANALYSIS

Manufacturing plays significant role in the holistic development to the country. It is the foundation of underdeveloped country like India. India was focusing on the development of its industrial sector since independence. Countries aim was to enlarge heavy investment in capital goods industry which spill over impact to the development of small scale industries. India's concern regarding the development of Industrial sector and it's contribution to the GDP stated from the pre liberalization era. After the countries LPG reform the manufacturing share to the GDP has increased but after the 2010 it shows significantly decline and in the decade manufacturing share to GDP has stagnant. Manufacturing sector facing problems regarding the development since pre liberalization era. During that period government ideology was based on socialist because of that ideology government should try to control over all the industries. The Licencing Raaj was at its peak. It did not give permission to the development of industrial sector of country. The economic structure of country was shift from agriculture to services and the industry did not developed and it did not prepare to absorb the excess labor from the agriculture sector. Resultant agriculture sector of the country still absorb more than 45 percentage % of the total labor force of country.



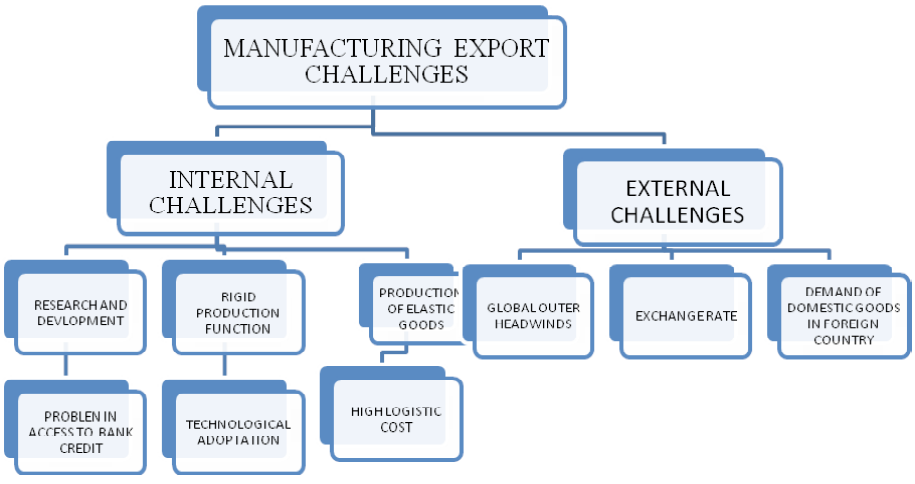
Source – WORLD BANK

As we have seen through the bar graph manufacturing share in India's GDP is stagnant after achieving the continuous growth of more than 8 percent. Government tries to pent up the growth of manufacturing through many policies but still long way to go.

Source – World Bank

Manufacturing merchandise export plays significant role in the contribution of GDP growth of the country and in the employment generation. The given Bar graph represents the significantly increase in countries merchandise export. The Indian government was developed some policies regarding to pent up exports new trade policy of export 2021-26, Production linked incentive scheme, PM Gati-shakti, Semi conductor production, Make in India, National industrial corridor, Smart city mission etc. Government efforts to enhance export after the liberalization increases in absolute but percentage share of GDP is still stagnant.

EXPORT CHALLENGES IN INDIAN MANUFACTURING



INTERNAL CHALLENGES

1. **RESEARCH AND DEVLOPMENT:-**India's investment in research and development shows significant increase 6,01,968 million in 2010 to 12,73,810 million in 2020-21. Simultaneously also increase in GDP of India. India's investment in research and development increases in absolute terms but still institute at 0.64% of their GDP. To enhance the manufacturing export and we have to created patient and copyright for which to increase investment in Research and Development which sell to the capital goods industry and create consumer good and export to the other country and enjoy monopoly in the world market.
2. **RIGID PRODUCTION FUNCTION:-** Underdeveloped countries used Rigid Production Function in their manufacturing production which leads to decline in countries export. In the underdeveloped countries technology which is used in the production mostly imported and these countries are labor intensive country. India is also a labor abundant country and produce mostly labor intensive commodities. India's 80 percent % technology are imported which reduces the K(capital per worker) p of the country resultant countries export.
3. **PRODUCTION OF HIGHLY ELASTIC GOOD'S:-** India has produced mostly highly elastic goods for the export. Elastic good's are that good's which is produced by many countries and if the prices of their commodity has increase their demand in the world market has crumbled. You can't increase their prices on your own it will dent your export. According to the **NATIONAL COUNCIL OF APPLIED ECONOMIC RESEARCH** 2022 has identified 21 labor intensive sector like Textile, Paper product, Petroleum goods, Cotton industries, Food and Beverages, trade , Jems and Jewellery etc. According to the **MINISTRY OF COMMERCE AND TRADE,** India's textile export in 2024 almost stagnant at 35 billion $. Jems and Jewellery sector also contributed important contribution in the labor intensive sector but their contribution in the country export has declined from $ 41.54 billion 2018 to $32.7 billion in Fy 2023-24. If wants to increase countries export than shifts from high elastic goods to low elastic goods.
4. **PROBLEM IN ACCESS TO BANK CREDIT:-** Bank credit are important as the blood flow important for the human body. It helps in investment, creating jobs and important role plays in countries export. After the liberalization credit to industries has shown increasing tends but increasing trend shown in the Large manufacturing industries, demand for bank credit towards the Micro and Small still stagnant. After the Covid-19 pandemic banks has facing credit crunch in their deposits. According to the **RBI'S FINANCIAL STABILITY** report in the financial year(FY 23) credit deposit was 9.6% and credit demand was stood at more than 15 percentage %.Demand for the personal loans has picked up by more than 40 %,but credit demand to manufacturing industries has stagnant. In the financial year 2022 credit to the industries was fell by 25 percent on the YOY basis. Government's inclusion in **JP MORGAN** bond create opportunity to the large industries to inclusion in **JP MORGAN** bond and financed their needs. The left credit will financed through the micro and medium manufacturing industries to enhance their economic activity and their export.
5. **HIGH LOGISTIC COSTS:-** In underdeveloped countries the logistic costs for the manufacturing production are mainly high. Which increase the costs of production of the manufacturing industries. Recently **NCEAR** published the report on titled **"Logistic costs in**

India : Assessment and long run framework." Make aware that the it's ranged in country reduced from 8.7%-9.9% (2011-12) to 7.8% -8.9% in 2021-22 shows significant decline but still long path to go.

6. **LOW LEVEL OF TECHNOLOGY ADOPTATION:-** In India mostly manufacturing are small and medium level. The disadvantage of these manufacturing industries is that low level of technological adaptation resultant is reduces Economies of scale, excess capacity in the production, managerial inefficiency in the decision making etc. It leads to reduction in the export share of manufacturing industries.

EXTERNAL CHALLENGES

- **GLOBAL OUTER HEADWINDS:-** In the external challenges for the manufacturing export the most important factor is Global outer headwinds, in the current scenario it can be explained in many outer problems which is prevailing in world like- Russia- Ukraine war, Israel-Hamas war, Iran- Israel war, Red sea disruption etc. Because of these outer headwinds create geopolitical tension in the world which leads to increase in sanctions on each-other country export and welcomed trade war.

In several ways these headwinds affects India's export –

- According to the **INDIA RATING AND RESEARCH,** Red sea disruption leads to increase the working capital cycle of the manufacturing industries which leads to delay in payments to the factors. One of the another expectation made by the rating agency is that it increases **shipping cost** for the manufacturing industry by 150 percentage%.
- Israel are the main importer of India's Gems and Gewellery, because of the war conditions India's export fell from more than $41 billion in 2018 to $32 billion in financial year 2023-24.
- Due to the global headwinds of Israel- Hamas, Israel- Iran, Red sea disruption, it dent countries petroleum product export.

2 .DEMAND FOR MANUFACTURING GOODS IN THE FOREIGN COUNTRIES:- The manufacturing export of the country after also affected by the demand of product in the other country. In the recent past, we have seen United States, United Kingdom, Europian Union are facing recession and recently China facing deflation. According to the **MINISTRY OF INDUSTRY AND COMMERCE** released data of countries export in the month of September , the data is showed that the overall export of the country has felled by 9.3 percentage %. Mostly export of the country decline in the product like Textile, Paper product, petroleum product, Jems and Jewellery, mostly the product of labor intensive industries has declined. This is happening because of the sluggish demand in the foreign country.

3. EXCHANGE RATE:- In the recent past, world is facing turmoil and sluggish in demand. After the Covid-19 pandemic market opens by the world. It pent up demand of crude oil price resultant it dents the countries exchange rate and further export. In the recent time due to the outer headwinds in the middle east leads to pent up crude oil prices because India's 60% crude oil passes through **Strait of Hormuz**, this generated uncertainty will hamper manufacturing firms price competitiveness, long term contracts, profit margins, cost of inputs, market entry decisions etc. In India we follows managed exchange rate system rupees did not fluctuate as initially the RBI will manage for not to dent the countries' export.

CONCLUSION AND POLICY SUGGETION

India is underdeveloped country, we try to flourish our industrial sector since independence. The Indian government make different policies towards it. In the year of 2020, due to the Covid-19 when all the world stuffed in houses than the government launched ' **ATMANIRBHAR BHARAT'** of 20 lakh cr. In which they support to the Micro Small and Medium Enterprises (MSME) by 3 lakh cr for the collateral free loan to meet the operational liability. Which shows the importance of industrial sector in the terms of export, employment generation, works as forward and backward linkages and a healthy share contribute in countries GDP contribution. India making the vision of to establish as a developed nation by 2047. To achieve that ambitious goal need for the country to achieve more the 8 percent % GDP growth every single year. The Finance Minister of the country in their speech exhibit the importance of manufacturing industries growth to achieve growth of more than 8 percentage % and accomplish nation **VIKSHIT BHARAT 2047.**

Manufacturing industries enlarge is still concern in the country which needs to formulate the government policy of growth. To counter the internal sluggishness of the manufacturing government needs to increase the investment in Research and Development the unprejudiced to purchase Patient and Copyright and fabricate monopoly in world market. Government needs to enhance the capital expenditure which generate the interconnectivity and reduces the logistic costs for the industries. Banking sector finance credit easily to enhance their business. Still concern of skill development problem in the country which restricted in countries export. Government needs to improve India's labor led industry to absorb excess labor from the agriculture and significantly contributed in countries export.

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Unleashing the potential of MSMEs in India's Export Sector: Role, Performance and Future Prospects

Deepak Pal[1] & Arshit Nandan Sharma[2]

ABSTRACT

The Micro, Small and Medium Enterprises (MSMEs) plays a vital role in India's Export landscape, contributing significantly to the country's Foreign Exchange earnings, Employment Generation and Economic Growth. It's accounting more than 40% of the country's export, employ over 11 crore people in India, contribute more than 29%to India's GDP and are responsible for one third of India's Manufacturing Output. MSME has a great essence not only in developing economies but in developed and industrialized economies also. Growth performances in MSME impacts economically as well as social aspects of the life. Despite their significant contribution MSMEs face numerous challenges as limited access to finance, technology and markets, which hinder their ability to scale up and compete globally. This paper examines the role and performance of MSMEs in India's Export sector, highlighting their strengths, weaknesses, opportunities and threats.

The followings are the aims of the study:

1. *To know more about the Micro, Small and Medium Enterprises (MSMEs) in development of the Indian Economy.*
2. *To examine the growth potential of MSMEs in Export from India.*
3. *To learn about the Government Schemes to establish the path for furnishing the MEMEs in India.*

The paper is prepared primarily on the secondary data. DCMSME, Udyam Registration portal, RBI bulletins, books, Journals, and websites were the main source on data collection. Simple regression Analysis is used to examine the Export potential from India. MS Excel is used to depict the bar diagrams, line graph and tables as per requirements.

Keywords: *Micro Small and Medium Enterprises, Export promotion, DCMSME, Employment, Udyam Registration.*

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Introduction

Micro Small and Medium Enterprises (MSMEs) has been acknowledged as a significant role in Employment Generation, Export Promotion, and Economic development, not only in developing countries but also in developed and highly industrialized countries. Over many years, MSMEs has make a tremendously appearance segment as a key drivers of growth in Indian economy. The obtaining performance of the sector has the direct impact on the overall economy aggregately. The Growth performance of the MSMEs impacts not only the industrialized sectors although it plays a vibrant essence in the shaping of socio-economic aspects of the whole country.

As per Ministry of Statistics and Programme Implementation (MoSPI), the share of MSMEs Gross Value Added (GVA) in all India Gross Domestic Product (GDP) during the year 2017-18, 2018-19, 2019-20, 2020-21,2021-22, and 2022-23 was29.7%, 30.5%, 30.5%,27.3%,29.6%and 30.1% respectively. The share of MSMEs manufacturing output during the year 2019-20,2020-21 and 2021-22 was 36.6%, 36.9% and 36.2% respectively.

As per the MoSPI, The share of export of MSMEs specified products in all India exports during the year 2019-20, 2020-21,2021-22,2022-23, and 2023-24 was 49.75%, 49.35%, 45.03%, 43.59%, 45.73% and 45.79% respectively.

As per the Udyam Registration portal, the total numbers employed in MSMEs in India was 12,36,15,681, between the period from 01.07.2020 to 01.08.2023, as on August 2023.

MSMEs are mainly engaged in the development, manufacturing, processing and services. As reported by the provision of Micro, Small and Medium Enterprises Development (MSMED) Act, 2006, the Micro, Small and Medium Enterprises (MSME) are classifies into two categories namely Manufacturinf and Services. The act further integrates three tires of enterprises viz; Micro, Small and Medium. The revised Classification of MSME, effective from 01.07.2020, relies on combined turnover and investment limits for plant, machinery, or equipment. These criteria apply uniformly to both manufacturing and service enterprises.

Criteria: Investment and Annual Turnover

Table 1: MSME Classification W.e.f July 2020

	Net turnover is > 5 crore	**Net turnover >5 crore but < 50 crore**	**Net turnover > 50 crore but < 250 crore**
The net investment does not surpass 1 crore	Micro Enterprise	Small Enterprise	Medium Enterprise
The net investment is >1 crore but <10 crore	Small Enterprise	Small Enterprise	Medium Enterprise
The net investment is > 10 crore but <50 crore	Medium Enterprise	Medium Enterprise	Medium Enterprise
The net investment surpasses 50 crore	Out of MSME fold (Large Enterprises)	Out of MSME fold (Large Enterprises)	Out of MSME fold (Large Enterprises)

The NSS 73rd Round Survey (2015-2016) had estimated the existence of 6.34 crores unincorporated non-agricultural MSMEs (excluding construction sector) in the country engaged in different economic activities with estimated employment of about 11.13 crores workers (including part-time workers).

Out of the total 6.34 crores enterprises, 31% enterprises were engaged in manufacturing, 36.3% enterprises were involved in trading activities (230.35 lakh enterprises) and remaining 32.7% enterprises were in 'other services' sector. Of the total 11.13 crore workers in MSME Sector as estimated under NSS 73rd Round Survey (2015-2016), 35% workers totaling to 387.18 lakh workers were engaged in trading activities sector with more workers concentrated in urban sector vis-à-vis-rural.

Objectives of the Study

1. To study more about the Micro, Small and Medium Enterprises (MSMEs) in the development of Indian economy.
2. To analyse the relationship between employment registration and export share of MSME.
3. To know how the various challenges in the performance of MSMEs Export growth.
4. To learn relevant schemes for MSMEs Export Promotion.

Hypotheses

H_0**:** There is no relationship between employment registration and export share of MSME**.**

H_1**:** There is significant relationship between employment registration and export share of MSME.

Methodology

The paper is basically descriptive in nature andprimarily the secondary data is used in the research study.The aim of the paper is to establish the relationship between employment registration and export share of MSME. The data are taken from various sources such as research papers, books, journal, magazines, RBI bulletin, PIB reports, government websites, Ministry of Statistics and Programme Implementation (MOSPI), development Commissioner Ministry of Micro, Small and Medium Enterprises (DCMSME), Merchandise EXIM Status Report of India's MSME Sector etc. the data has been analysed and presented in the form of graph, table, chart and simple regression analyses is used to establish the relationship between employment registration and export share of MSME using Microsoft Excel.

Marketing Promotion Schemes

(I). International Cooperation Scheme

1. Marketing Development Assistance (MDA)

Representatives of MSME industryassociations and government organizations involved in promotion of MSME in International exhibition.Trade fairs where buyer and seller meet in foreign

countries for exploring potential markets for export with seeking joint venture and awareness about technologies. International conference/ workshops/ summits/ seminars are organizing by the industry associations and government organizations in India on the themes which are relevant to MSMEs for export promotion. Ministry of MSME in partnership with the industry syndicate organizing international exhibition and buyer- seller meet up in abroad in the focus of export attainment.

2. Capacity Building of First Time Exporters

As the new participant in the export industry comes the additional subvention provides to them as the necessity for the flourish and stand further initiatives. Reimbursement used to pay for Registration-cum-Membership Certificate charges by the first time MSMEs exporters for registration with Export Promotion Council (EPCs).Reimbursement pays to the MSMEs at their export insurance premium and Testing and Quality Certification on export products.

(II). Procurement and Marketing Support Scheme (P&MS)

Encourage the Micro, Small and Medium Enterprises to develop the domestic market and promotion of new market initiatives. Facilitating the market linkages for effective implementation of Public Procurement Policy forMSEs order 2012. Educating the MSMEs on various facts and essential data which are helpful for the business development and create awareness about trade fairs, latest market technique and other related topics.

Challenges in the performance of export from MSMEs

(I). Business Environment

- **Heavy Regulatory Burden:**Manufacturers in India face a lot of regulatory requirements including business registration, environment regulation, labor laws, taxation, and intellectual property rights etc. compliance is resource- intensive and time taking which can cause financial cost for company as well as personal liability. Starting a new business in India is costly and numerous procedural and approvals.
- **Discordance between policies and implementation:**Lack of harmonization between policies and practical implementation creates hurdles in the process of export promotion. Policies having different interpretation creates hurdle in compliance like delays in procedural and documentation process.
- **Testing and certification challenges:**Limited availability of specialized labs creates delays in certification and testing causing time consuming and costly especially for MSMEs which limits then to compete at internationally.
- **Import Duty:**High import duty imposed on the imported products by the custom authorities that create working capital blockages for importers.
- **Export incentives for E- Commerce:** Existing export incentives primarily favors to cargo shipping and disadvantages to the e- commerce and courier mode.

(II). Taxing Merchandise Export Procedure

- **Fragmented Coordination:**In India five different government authorities coordinates export from India, are DGFT(Directorate General of foreign trade), custom, GST, banks and the RBI.

The fragmented authorities require repetition of similar filing and documents that increases resource burden and time consuming.

- **High volume of paperwork:**Extensive document requirement creates hurdles. Pre-shipment and post-shipment documentation processes are time consuming and complex especially to the new comers.
- **Delays due to custom sampling:**Random sampling of shipments by customs for quality verification cause shipment delay. Sampling, examinations and clearance processes extends timing which causing logistics challenges.
- **Tedious Payment Reconciliation:**The payment reconciliation process for imports and exports remains a major pain point. A stringent criteria and resource intensive settling shipping bill against exports and in condition if failure in reconciliation then fines are imposed.

(III). Access to Finance for MSMEs

- **Limited access to Formal Finance:** Only 16% of the total credit demand of the MSME sector is fulfilled by commercial banks, NBFCs and Fin Tech. Access to finance is decisive for occurring daily needs and driving business growth.
- **Trade Finance Gap:** The entire MSME finance gap is estimated to be close to USD 5 trillion hinders a lot to the MSMEs growth entirely. A higher risk profile, lack of collateral, complex documentation and a high cost of service are athe reasons for the gap.
- **Micro Enterprises facing credit deficit:** Due to lack of collateral and high risk perception leads to denial of loan. 40% of the Micro Enterprises are in that category.

(IV). Limited Market Access

- **Lack of Exposure:**Lack of exposer to global market resulting in limited access of awareness about demand and quality standard, that leads to limited understanding about consumer preferences and competitors.
- **Difficulty in finding of Buyers:**New exporters struggle greater to locate buyers in global market because of lack of networks and market facilities. Awareness about network channel and e- commerce platform are limited access to them that hinders a lot to their business.
- **Non-Tariff Barriers:**MSME face a lot in this category because of technical regulation and certification.

(V). Accessing Export Information

- **Lack of Information:**Indian MSME exporter struggles a lot to access basic information on merchandise exports and market research, verified and consolidated source of information making it difficult for exporters to find information on export. The information is scattered on the different websites with complex presentation and difficult technical terminology.
- **Limited market research resources:**Lack of tools for conducting a country specific research which discourage MSMEs for exploring market opportunities.

- **Fragmented Government Scheme:**Government support details are scattered across various resources that makes it challenging for exporters.

(VI). Policy Landscape

- **Lack of clear information:**Absence of consolidated list of government initiatives, scattered export promotion scheme, scheme related documents often less clarity and outdated information on government websites add to confusion.
- **Gaps in Policy Ecosystem:**Lack of policies providing incentives for MSME to upgrade at the international level. Need to setting the testing labs that assisting to MSMEs in obtaining certificates.
- **E- commerce Policy:**Lack of comprehensive e- commerce policy addresses challenges faced by exporters.

Relationship between employment registration and export share of MSME

Period / FY	Employment Registration on Udyam Registration Portal	Share of export of MSME related products in all India Export
2020-21 (01/07/2020 - 31/03/2021)	27297074	49.45
2021-22	34953245	45.03
2022-23	46035185	43.59
2023-24	74455733	45.59
2024-25 (till 22/07/2024)	22435395	45.79

Data Source: *DGCIS &Udyam Registration Portal*

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.354186036
R Square	0.125447748
Adjusted R Square	-0.166069669
Standard Error	2.403459144
Observations	5

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.485832432	2.485832	0.430327	0.558650956
Residual	3	17.32984757	5.776616		
Total	4	19.81568			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	47.48092368	2.613767004	18.16571	0.000364	39.16275	55.79909	39.16275	55.79909
Employment Registration	-3.80873E-08	5.80605E-08	-0.65599	0.558651	-2.229E-07	1.467E-07	-2.229E-07	1.47E-07

Source: Researcher Compilation

The table expresses the value of R square is 0.125447748. it can be express as 12% (.12* 100= 12%) which shows 12% variation in export share is being of employment registration. Hence the remaining 88% variation in the model is affected by other variables. The Adjusted R Square is 0.166069669, which shows only 16% variation is really explained by the actual data, which is not gives any stronger impact of the model.

Testing of Hypothesis

Significance shows 'p' value 0.558650956 for employment generation. Which means 0.558650956 is more than 0.05(p> 0.05). So we can accept the H_0 Hypothesis and Reject the H_1 Hypothesis. Therefore, we can conclude that there is no adequate substance that shows there is significance liner relationship MSME employment registration and export share from MSME.

Limitations

- The paper is purely based on secondary data and no empirical test has involved.
- The study conducted in limited time frame as uses of recent data provided by DCMSME, PIB, MoSPI and NSS 73rd Round Survey (2015-2016).
- Data constrains, as the simple regression analysis is tested on the extracted data of DGCIS &Udyam Registration Portal between the financial year 2020-21 to 2024-25(till 22 July 2024).

Conclusion

Micro, Small and Medium Enterprises have a significance role in India's export sector that contributes enormous pack of foreign exchange earnings, employment generation and economic growth of India. Accounting more than 40% of India's export, 29% of India's GDP and are responsible for one third of India's manufacturing output. 12.36 crore employment are registered via Udyam Registration Portal between the period from July2020 to July 2023. It can be say that MSMEs in India are the backbone of Indian economy and will act to same way in future provided the government policies in favor of Industries growth and development prospects.

MSME sector have the potential to enhance the export capacity as the support of government and private entities with improvement in quality and standard of products internationally and becomes the hub of supply chain. In India export competitiveness of MSMEs can be promoted by incorporating the key performance and overcoming the key challenges such as heavy regulatory burden, discordance between policies and implementation, fragmented coordination, high volume of paper work, tedious payment reconciliation, limited access to finance, lack of exposure, difficulty in buyer finding, lack of information, fragmented government scheme. Apart from these, technological gap, high cost of credit need, collateral requirement, improper infrastructural availability, costly raw material, skilled manpower and innovation needs to take care for MSMEs to emergence and compete internationally. I have hypothesized a linear relationship between employment registration on Udyam registration portal and export share of MSMEs, which denied such relationship establishment because of limitation in data source. Finally, can be say having enormous strength coordination between government organization and private entities with adaptation of technological skill and use based ICT the MSMEs sector can further improvement in export share and compete globally at quality and standard products.

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Indian Textiles and Clothing Exports: Growth and Opportunities (With Special Reference to SAARC Nations)

Lalit Kumar Maurya

ABSTRACT

The growth of the textile and apparel industry in developing countries has been structurally and quantitatively influenced by trade and other economic policies. Countries where appropriate public policies and the private sector are in place have taken full advantage of the opportunities provided by temporary trade preferences for textile and merchandise trade to move up value added chains. Neither public policies nor private sector are effective, they still have to compete with other countries For dynamic growth, there may be a need to fully utilize the opportunities provided to diversify into other economic activities. Therefore, the long-term potential for growth of the textile and apparel industry will depend not only on investment by investors but also on the availability and effectiveness of government policies and institutions in developing countries as the textile and apparel industry is highly dependent on foreign direct investment. Bilateral trade with SAARC countries forms an important part of its total trade. India's bilateral trade with SAARC countries Imports from SAARC were 0.73 per cent of its total imports in 2000, increasing to 2.43 per cent in 2021-2022, while India's exports to SAARC, which were 4.43 per cent of total exports in 2000, increased to 8.11 per cent in 2021-2022.

Key words: *Textile and clothing industry, employment, development, weaving and organized industries.*

INTRODUCTION

The textile industry is the oldest industry in India. The tradition of hand spinning and hand weaving in India is centuries old. The first traveling spinning factory in India was started in Bombay in 1854 AD. Factors like availability of unskilled labour, easy availability of cotton and large domestic market played an important role in giving an organized form to the textile and clothing industry. Thus, by 1914, the Indian textile and clothing industry came to fourth place in the world's textile and clothing industry. At the time of independence, it was the largest organized industry in India. During the British period, except for a few areas, no special efforts were made by the British for the

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development of this industry in the whole of India. After independence, the government, accepting the importance of industries in the development of the country, without wasting time brought the Industrial Policy 1948.

The first Prime Minister of India, Late Shri Jawahar Lal Nehru believed that industry would be necessary to achieve self-reliance by eradicating the poverty of the country. Irradiation is necessary. In this way, the government came forward for industrialization in the public sector under the control of the government and the role of the private sector was kept limited. Immediately after independence, textile and clothing imports were banned and the policy of import substitution was adopted. This policy of import substitution continued till 1990-91. Under this policy of import substitution, many types of restrictions were imposed on imports and all types of transactions were regulated by foreign regulations.

The export of textile and clothing products has been increasing continuously for the last few years, especially since 2004, because the textile export quota was abolished in 2001. India's textile and clothing exports increased by 25% in the year 2005-06. This growth continued in the year 2006-07 also and in 2005-06 In comparison, an increase of 9.28% was recorded. In the year 2007-08, an increase of 15.7% was recorded as compared to the previous year, but in the year 2008-09, there was a decrease of 5% in exports as compared to the previous year. Although Europe continues to be the major market for India's exports. America remains the largest buyer of India's textile and clothing products. Other important countries that export textile and clothing products from India include Bangladesh, China, Pakistan, Nepal, Sri Lanka, Turkey and Japan.

Textile and clothing industry plays an important role in the Indian economy. This is the single largest source of foreign exchange. Presently this industry contributes 5% to GDP, 14% to total industrial production and 12% to total export earnings. This industry provides direct livelihood to about 35 million people and provides employment to 56 million people in allied activities. After agriculture it is the largest source of industrial employment. India is the second largest cotton producing country in the world after China and ranks first in cotton area. India also has a wide and established polyester fiber and filament yarn industry. India is the second largest textile producing country in the world after China. It alone produces 15% of the total cotton fabric produced in the world. India is the world's largest cotton yarn exporter. India's share in world carton yarn exports is 20 percent.

There have been many challenges that have slowed down the expansion of the textile business. The major challenges among these are recession in some countries, crop damage and lack of production, etc. At present it is believed that 50 million to 60 million people are working in the textile and clothing products sector in the world. Employment opportunities in the apparel sector cannot be given much importance in developing countries like India, Pakistan and Vietnam because these countries are still on the path of continuous development. This industry contributes 2 percent to the global gross domestic product. It contributes a large share of global gross domestic product to the world's main manufacturers and exporters of textiles and clothing.

RESEARCH METHODOLOGY

The entire study is based on secondary data and the data is taken from newspapers, articles and research papers as well as data on trade for India and SAARC nations from Direction of Trade Statistics released by IMF.The study of textile and clothing production and export from India to SAARC nations is being conducted for 15 years (2005-2020). Indian textile and clothing products sector is an area of study.

Revealed Comparative Advantage Index :

Known as RCA. It is an index which is used to find out the areas of comparative advantage (Balassa, 1965) and is used to assess export competitiveness. This is one of the remedies that is most commonly used. It is the index of Balasa. It is done in such a way that the census is done in such a way.

TRADE ANALYSIS WITHRESPECT TO SAARC NATIONS

Revealed Comparative Advantage of India's Export:

This part of the analysis depicts the individual comparative advantage/disadvantage of each product (HS, 2 digit) in India's total exports in the years 2005, 2010 and 2020.

RCA of India's exports to SAARC (India's NRCA index): Figure 1 shows that India's NRCA index is positive in all the three years for two export products namely cotton and garments etc. which do not include weaving, i.e. India has RCA. Nonwovens demonstrated the highest RCA in 2005 but were replaced by cotton in 2010, although in 2020 it demonstrated the highest RCA. Silk, wool, man-made staple fiber, wedding felt, carpets, specialty woven fabrics, impregnated fabrics, woven fabrics and other textile articles are the products whose RCAs in all three years Although vegetable textile fiber and man-made fiber were originating products with expressed preference deficit (RCD) in 2005, they changed to expressed preference advantage (RCD) in 2010. But in 2020 they again changed to a consumer preference loss (RCD) product.

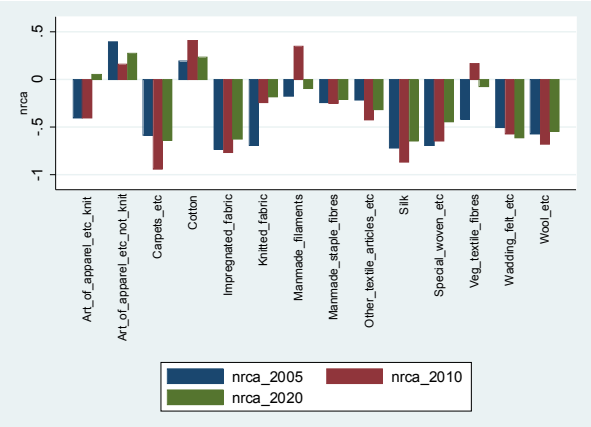

Figure 1: India's NRCA with reference to SAARC countries (2005-2020)

RCA of India's exports to Afghanistan:

Figure 2 shows that India's NRCA index for five export products namely man-made fibre, man-made stable fibre, special knitted etc., non-woven apparel etc. and other textiles in all the three years. Among the materials, non-woven fabrics demonstrated the highest RCA in 2005 and 2020 but were replaced by man-made Fibers in 2010. The RCA of apparel etc. which was more than 14 in 2005 declined to 14.19 in 2010 and finally to 6.76 in 2020. The position of wedding felt, non-woven apparel etc. changed from low RCA in 2005 to high RCA in 2020. Wool, vegetable textile fibre, carpet and impregnated textile (PC) in all the three years. High-concentration RTPs) are products with expressed preference deficit (RCD). Silk and cotton, on the other hand, were downgraded from RCA in 2005 to RCD in 2020.

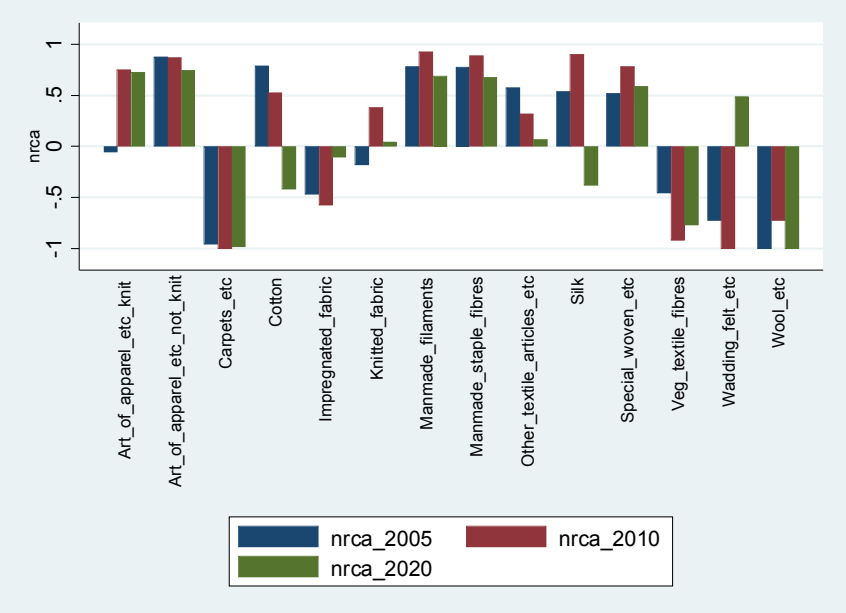

Figure 2: India's NRCA with respect to Afghanistan (2005-2020)

RCA of India's exports to Bangladesh

Figure 3 shows how India's NRCA index for cotton exports in all the three years i.e. 2005, 2010 and 2020 is positive i.e. India has RCA. Textiles, Woolen Fabrics, Vegetable Textile Fibers, Manmade Staple Fibers, wedding felt etc., special woven garments, impregnated fabrics, knitted fabrics and other textile materials etc. exhibited expressed preference deficit (RCD) in all three years. Among these, carpets etc. exhibited the highest RCA in 2005 but were replaced by cotton in 2010 and 2020. Carpets etc., woven garments etc. and Nonwovens were downgraded from RCA in 2005 to RCD in 2020.

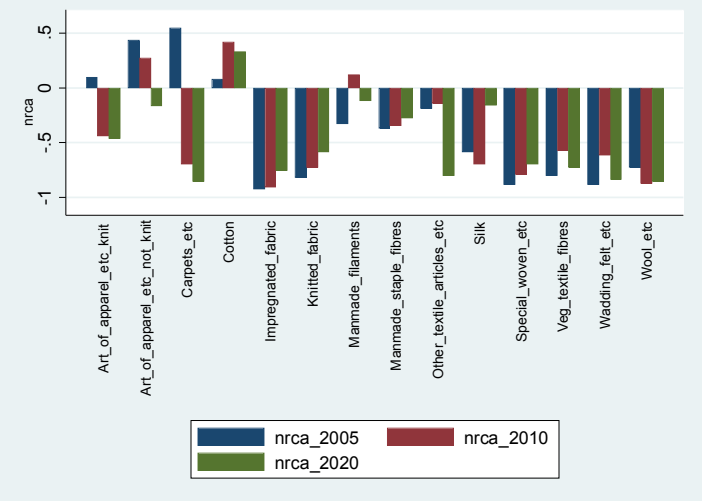

Figure 3: India's NRCA with respect to Bangladesh (2005-2020)

RCA of India's exports to Bhutan:

Figure 4 shows how India had no products showing positive NRCA index in all the three years i.e. 2005, 2010 and 2020 i.e. India did not have RCA. There were seven products namely wool, cotton, vegetable textile fibre, man-made fibre, In respect of special woven garments, impregnated knitted fabrics and knitted fabrics, RCDRCA was converted into RCD. In all the three years, products like man-made staple fibres, woven apparel arts etc. and non-woven apparel arts etc. and other textile materials remained RCD products. Silk and carpets were the products in respect of which RCA was downgraded to RCD during these years.

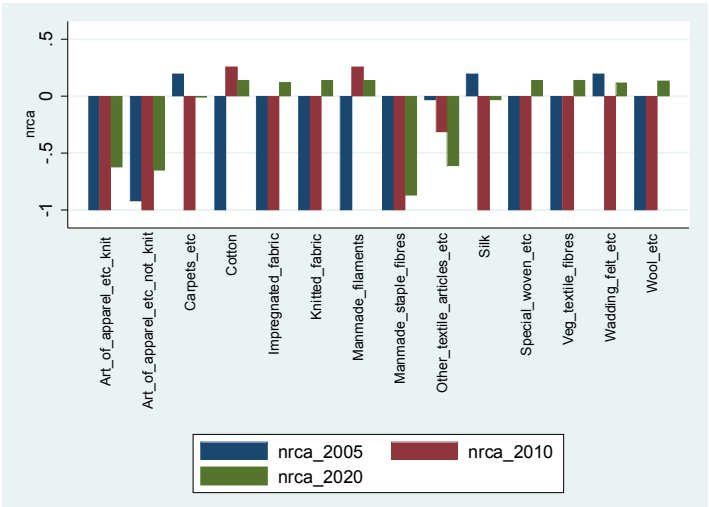

Figure 4: India's NRCA with respect to Bhutan (2005-2020)

RCA of India's exports to Maldives :

Figure 5 shows that India's NRCA index is positive for two export products namely cotton and vegetable textile fiber in all the three years 2005, 2010 and 2020, i.e. India has RCA. Kaleen etc demonstrated high RCA in 2005 but Replaced by vegetable textile fiber in 2010 and 2020. Two products namely man-made staple fiber and non-woven textile fiber etc. changed to RCD/RCA. In all three years products like impregnated woven fabric and woven textile fiber etc. remained RCD products. In these years silk, carpets etc., remained special Clothing and other textile products were the products whose RCA changed to RCD

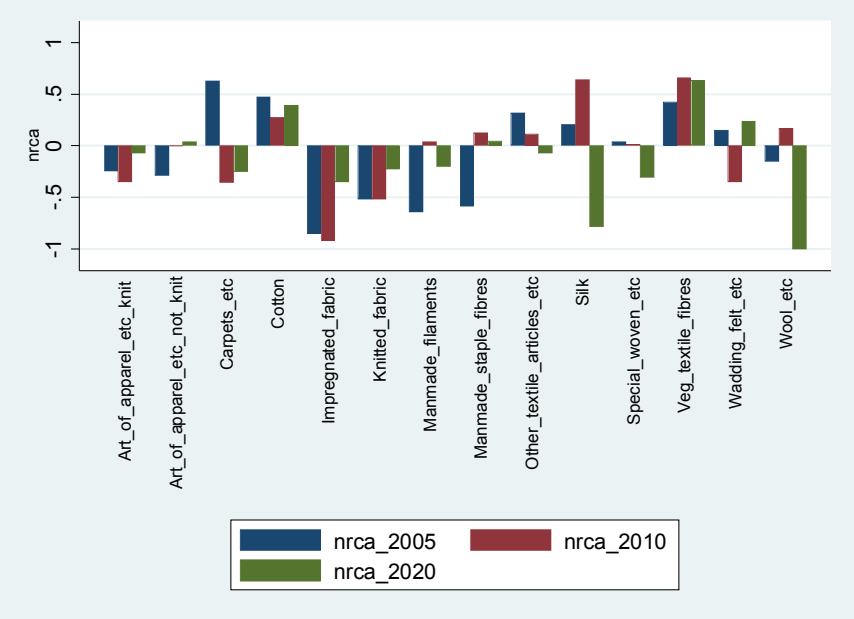

Figure 5: India's NR CA with respect to Maldives (2005-2020)

RCA of India's exports to Nepal:

Figure 6 shows that India's NRCA index is positive in two export products namely cotton and vegetable textile fiber in all the three years i.e. 2005, 2010 and 2020. India has the highest RCA. Vegetable textile fibers and carpets etc. demonstrated the highest RCA in the above three years. Wedding felts etc. In all the three years, products like silk, wool, man-made fibres, man-made staple fibres, carpets, special made fabrics, woven garments etc., non-woven garments etc. and other textile materials remained RCD products.

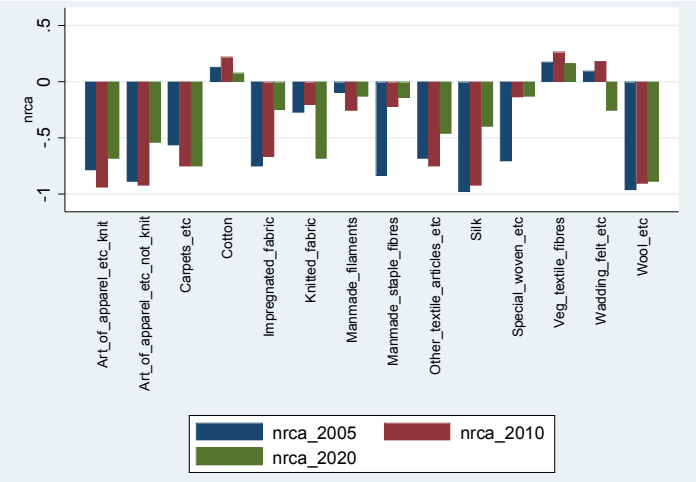

Figure 6: India's NRCA with respect to Nepal (2005-2020)

RCA of India's exports to Pakistan:

Figure 7 shows that India has no product showing positive in NRCA index in all the three years 2005, 2010 and 2020 i.e. India does not have RCA. Although man-made fiber which has transformed into RCD product and RCA. Cotton constituted the highest RCA in 2005 but was replaced by man-made fiber in 2020. The products which became RCD products in all the three years were silk, man-made staple fibre, wedding felt, carpets, special woven textiles, impregnated checkered fabrics, knitted fabrics, woven apparel arts etc. and non-woven apparel arts etc. In the above mentioned years, cotton and other textile materials were the products whose RCA changed to RCD.

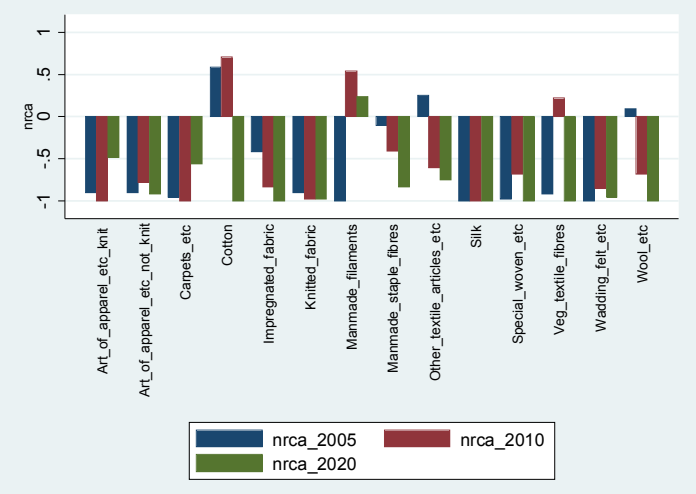

Figure 7: India's NRCA with respect to Pakistan (2005-2020)

RCA of India's export to the Sri Lanka

Figure 8 shows that India's NRCA index in all three years (2005, 2010 and 2020) is positive only in non-woven apparels etc. has the highest RCA.Woven garment industry demonstrated the highest RCA in 2005 but it In 2020, it was replaced by cotton. RCD in wool, cotton, etc. and other textile materials etc. changed to RCA. Silk, man-made fiber, man-made staple fiber, wedding felt, carpet, special made-up textile and impregnated cloth were the products that remained RCD products in all three years.

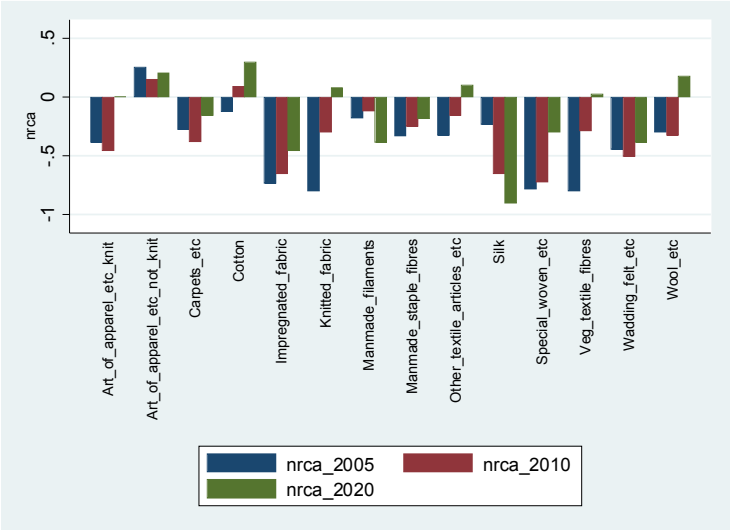

Figure 8: India's NRCA (2005-2020) with reference to Sri Lanka

STUDYFINDINGS ANDPOLICYRECOMMENDATIONS:

- India's merchandise trade balance with each SAARC nation individually – Afghanistan, Bangladesh, Sri Lanka, Maldives, Nepal, and Pakistan was positive between 2005 and 2021, however, in the case of Bhutan, a declining trend was observed over the six year period between 2005 to 2010, although the trade balance has been positive every second year since 2011.
- Non-woven garments remained the main export product from Afghanistan in 2021 and its share declined during the study period. Wool remained the main import product in 2021 and its share in total imports increased from zero to 0.13 percent between the study period.
- Cotton remained the main export product in 2021 for Bangladesh with its share increasing to 27% during the study period while the share of specialty woven etc and knitted fabrics also witnessed an increase during the same period. Nonwovens and nonwovens were the main import products in 2021. The share of nonwovens and nonwovens in total imports increased from 1 percent to more than 16% between 2005 and 2021. Additionally, the share of woven and nonwovens witnessed growth during the period.

- Other textile products were the main export products of Bhutan in 2021 with its share also increasing from 0.09 per cent to 0.45 per cent between 2005 and 2021.
- With Maldives the main export producer of textile arts and crafts not including weaving in 2021 and its share increased from 0.41 per cent to 0.54 per cent between 2005 and 2021. The share of impregnated textiles also saw an increase during the same period.
- Cotton remained the main export product for Nepal in 2021 with its share increasing from 8% to 13.36 per cent between 2005 and 2021, although the share of specialty woven etc and woven apparel arts and knitwear saw an increase during the same period. Man-made staple fiber was the main import product in 2021 but total imports during the study period Its share declined from more than 6% to less than five percent. On the other hand, during the same period, vegetable textile fiber An increase was seen in the share of.
- Cotton remained the main export product for Sri Lanka in 2021 with its share increasing from 4.7% to 5.5% between 2005 and 2021. On the other hand, the share of special synthetic textile fibres, impregnated woven fabrics and knitted fabrics saw an increase during the same period. Knitwear was the main import producer in 2021 and its share in total imports increased from 0.11% to more than 3% between 2005 and 2021. Also, the share of specialty woven fabrics, other textile materials, primitive man-made filament, man-made staple fiber and art of apparel etc. witnessed an increase during the same period.
- Pakistan with manmade filament constituting the main export output in 2021 but its share in total exports fell to 0% at the end of 2021 although the share of nonwovens etc. saw an increase during the same period. Cotton was the main import product in 2021, but its share in total imports declined from more than 16 percent to less than 1 percent between 2005 and 2021. Policy Recommendations About 35 million people are employed in the textile and apparel sector. This sector contributes 14% of the total manufactured output and 10.5 percent of the export revenue. The value of the Indian textile and clothing market is approximately $ 45 billion and is estimated to reach $ 200 billion by 2025. Therefore –
- Government of India Necessary steps should be taken to promote the apparel industry as this sector has sufficient potential to generate employment and export revenue. ? Since seven additional jobs are created for every Rs 1 lakh invested in this sector, it is necessary to promote the textile and apparel industry to boost the economy, create new jobs, and increase export revenue.
- Indian textile and primary industries make heavy use of migrant labour, hence adequate and continuous supply of both skilled and unskilled labor is not ensured. Creation of housing facilities close to textile clusters will provide great convenience to the employees and adequate and continuous supply of labor will be possible.
- The market for advanced textile goods is growing rapidly both locally and internationally. Therefore, the Government of India should encourage and support R&D projects in the textile and apparel sector to ensure India's presence in cutting-edge textile goods.
- An ideal ecosystem can be provided for the development and nurturing of entrepreneurs in this region by providing necessary infrastructure facilities, capacity building services and market

linkages. This will enable business owners to carry out their plans and produce goods using a methodology that is operationally and financially practical.

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An Overview of Edible Oil Sector of India: Problems, Policies, and Prospects

Shubhangi Mishra[1], Dr. Ajit Singh[2], & Dr. Rashmi Chaudhary[3]

ABSTRACT

India is one of the largest consumers of edible oils in the world; the sector plays a crucial role in meeting the dietary needs of its population, while also influencing the economy through trade, agriculture, and rural livelihoods. Yet the country highly depends on imports from other countries for its edible oil needs. India imports between 55 and 60 percent of the edible oil it needs, which makes achieving self-sufficiency extremely difficult. This study offers a thorough analysis of the major issues, strategies, and future possibilities of India's edible oil sector. The analysis draws on existing literature and data to highlight key issues of the edible oil sector in India such as low production of oilseeds domestically as a result of dispersed landholdings, limited access to technology, and reliance on rain-fed farming. The industry's susceptibility to global price swings has been made worse by import dependency, posing problems for both producers and consumers. In addition, the paper also reviews the National Mission on Edible Oils-Oil Palm (NMEO-OP) and the Minimum Support Price (MSP) for oilseeds and evaluates their efficacy in boosting domestic production. Supply chain inefficiencies, characterized by the existence of several intermediaries and inadequate processing infrastructure, are examined as important impediments to market efficiency. The results show that although policy actions have helped to some extent, structural issues still need to be addressed, which means more money must be allocated to supply chain reform, irrigation, and technology. The findings of the study reveal that while policy initiatives have provided some relief, structural challenges remain unresolved, necessitating further investment in technology, irrigation, and supply chain reform. The paper concludes by exploring potential future prospects for achieving self-sufficiency in edible oils, with recommendations for policy reform and sustainable development.

Keywords: *Edible oil, Oilseed Production, Agriculture, India*

Introduction

The edible oil sector in India is a vital component of the country's agricultural and food processing industries. As one of the largest consumers of edible oils globally, India has a significant demand

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that is driven by various socio-economic factors. The rapid rise in demand for processed foods, especially edible oils, can be attributed to several factors, including changing dietary patterns, rising disposable incomes, growing urbanisation, and the growth of the food processing industry. (IBEF, nd)The fact that agriculture continues to be the major source of income for about 65% of Indians highlights the significance of this industry. (PIB, 2023) Edible oils and oilseeds are two of the most delicate commodities. According to the Ministry of Agriculture's First Advance Estimates, which were released on October 27, 2023, India is one of the world's top producers of oilseeds and plays a significant role in the agricultural economy. Production of 41.35 million tonnes of nine cultivated oilseeds is expected to be produced in 2022–2023 (November–October). India makes up 5 and 6 percent of the world's oilseed crop. During the fiscal year 2022–2023, 3.46 million tonnes of oil meals, oilseeds, and minor oils were exported, valued at Rs 14,609 crores. (Dept. of Food and Public Distribution, GOI) Despite all this India is the largest importer of Vegetable Oil in the world and meets 70% of its edible oil demands through imports. (Jadhav, 2024) This dependence on imports has led to vulnerabilities in terms of price volatility and supply disruptions, further exacerbating economic and agricultural challenges. The study aims to provide an in-depth analysis of the edible oil sector in India, focusing on the problems that have hindered its growth, the policies implemented to address these issues, and the prospects for the sector.

Review of Literature

Narayan (2016) conducted an analytical study to understand the demand- Supply and growth of Edible Oils in India. India is the largest importer, third-largest consumer, and fourth-largest producer of oilseeds in the world. The findings of the study revealed that between 2001 and 2015, the demand for edible oils in India increased steadily at a CAGR of 4.96%. Improvements in per capita spending, which are linked to rising income levels and improved living conditions, have been the main drivers of the expansion. Also, increases in population and income level are predicted to drive up domestic edible oil consumption. India must generate 17.84 million metric tonnes of vegetable oils by 2050 to fulfill the predicted 1685 million people's need for nutritious fat.

Singh et al. (2017) studied the present status of the oilseed sector of India and its challenges of achieving self-sufficiency. The findings of the study revealed that the Technology Mission on Oilseeds (TMO) made a significant impact in the short term in reducing imports but static oilseeds production and unfriendly policies led to a rise in imports again. The research suggested that urgent and effective steps must be taken to reduce import dependence.

Valiyaveettil et al. (2023) explained through their research that the recent global events such as the outbreak of COVID-19 and the Russia-Ukraine war have led to the prices of Edible oils being highly volatile. Since India is dependent on imports for its Edible oil needs the policymakers must find a way to achieve Atmanirbharta in the sector of Edible oils to protect the country from global uncertainties.

Research Methodology

This research paper employs a descriptive and qualitative approach, synthesizing data from various secondary sources such as market research reports, government publications, industry

analysis, journals, and news articles. The study focuses on recent data to provide an up-to-date overview of the edible oil sector in India. Key points from different sources are aggregated and analyzed to present a balanced perspective on the sector's problems, policies, and prospects.

Overview of the Edible oil sector in India

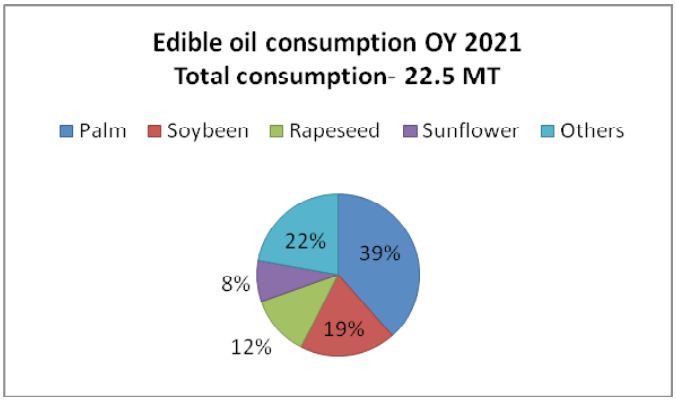
The production and consumption of edible oils in India have a long history, with traditional oils like mustard, groundnut, and coconut oil being integral to the Indian diet. This industry is a vital part of the nation's economic and agricultural environment and is essential to supplying the nation's rising cooking oil demand. India is one of the biggest producers and users of edible oils worldwide; therefore its success in this market has a significant impact on environmental sustainability, economic growth, and food security. However, the sector has undergone significant changes over the past few decades. Post-independence, India was largely self-sufficient in edible oil production, but rising demand due to population growth and the Green Revolution's focus on cereals led to a decline in oilseed cultivation. By the late 20th century, the country had become increasingly dependent on imports, particularly palm oil.

Key oilseeds and Edible oils consumed in India are-

- Palm Oil
- Soybean Oil
- Sunflower Oil
- Rapeseed Oil
- Groundnut Oil

According to ICRA the total consumption of Edible oils in India was 22.5 Million- metric tons for the oil year (Nov-Oct) 2021. In terms of volume, rapeseed, sunflower, palm, and soybean account for 80% of India's overall consumption. The chart below shows the share of different palm oils in the total Consumption.

Fig. 1



Source: TRAI, ICRA Research, SEA (Solvent Extraction Association of India)

India is one of the top producers of Oilseeds in the world as it accounts for 5-6% of global oilseeds production. In FY 2022-23 the total cultivation area of Oilseeds in India is 30.1 Million ha which produced 41.3 MT of oilseeds. The country also exported Rs. 14,609 cr. The worth of oilseeds, oil meals, and minor oils in FY 2022-23. (Niti Aayog, 2024) Still, domestic production is unable to meet the demand for Edible Oil and India imports 57% of its demand through imports. The table below shows the Overview of the Edible Oil sector of India.

Table 1

Oil Year (Nov-Oct)	Area Under Cultivation of oil seeds (LHa)	Production of Oilseeds (LMT)	Domestic Availability of Edible Oils	Import of Edible Oils (LMT)	Total Availability /Consumption (LMT)	% Self Sufficiency	% Share of Imports
2014-15	255.9	275	92.0	138.5	230.5	40.0	60
2015-16	260.8	253	86.30	148.50	234.80	36.8	63.2
2016-17	261.7	313	100.99	153.17	254.16	39.7	60.3
2017-18	245.0	315	103.80	145.92	249.72	41.6	58.4
2018-19	247.9	315	103.52	155.70	259.22	40	60
2019-20	263.1	332	106.55	134.16	240.71	44.3	55.7
2020-21	288.2	359	111.51	134.52	246.03	45.3	54.7
2021-22	291.6	379.63	116.5	141.93	258.44	45.1	54.9
2022-23	301.0#	413.55#	124.1#	165	289.10	42.92	57.07

Source- Department of Food and Public Distribution, GOI

Data reveals that till the early 1970s India imported less than one lakh tonnes of edible oil per year which surged to 15 lakh tonnes in 1980-81 and 20 lakh tonnes in 1987-88 due to stagnation in domestic production (Niti Aayog, 2024) The government then launched the Technology Mission on Oilseeds to help domestic production and though the scheme helped in increasing the domestic production, its effects were limited after post-liberalization. Today the country is heavily dependent on imports for its edible oil consumption and recent price fluctuations of the international market have made the situation worse. That is why policymakers need to introduce such policies to help domestic production.

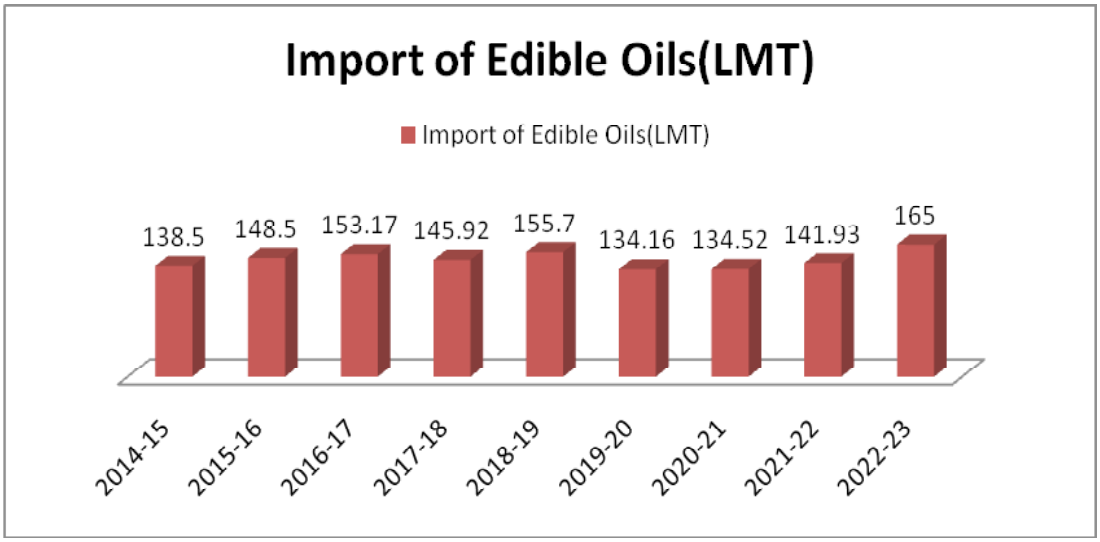
Challenges

The edible oil sector in India is a critical component of its food economy, providing essential nutrients to a vast population. Despite being a major consumer of edible oils, India faces significant challenges in meeting domestic demand due to low production and dependence on imports.

- A major obstacle confronting India's edible oil industry is the low level of oilseed output in the country. India has abundant agricultural resources, but its output in oilseeds is still lower than the world average. According to the report of NITI Aayog Domestic Production only meets 40-45% of the total demand for Edible oils. The main factors responsible for this low production are Fragmented Landholdings, lack of proper irrigation, and inadequate use of technology.

- The edible oil supply chain in India is characterized by inefficiencies at various levels, including oilseed procurement, processing, distribution, and retail. Poor infrastructure, lack of storage facilities, and an underdeveloped transportation network contribute to post-harvest losses and increase the cost of edible oil production. Moreover, the presence of intermediaries between farmers and processors further erodes farmers' income, limiting their incentives to cultivate oilseeds.
- India's imports of palm oil often lack sustainable sourcing certifications, making it a major market for unsustainable palm oil (IDH Sustainable Trade, 2022)
- The significant reliance of India on imported edible oils poses a significant challenge to the industry. About 55-60% of the domestic use of edible oils comes from imports, making the nation the world's largest importer of these products. (Drishti, 2022) Due to its strong reliance on imports, the industry is vulnerable to several dangers, including volatility in global prices and supply disruptions, tariff and non-tariff barriers imposed by exporting countries, concerns about the quality and safety of imported oils, and Unfavorable exchange rate movements leading to higher costs for domestic consumers. The Figure below shows total imports of Edible oils in India from 2014-15

Fig. 2



Source- Department of Food and Public Distribution, GOI

- The price volatility of the edible oil market in India is notable and can be ascribed to various variables, such as Variations in the global supply and demand, changes in tariffs and trade policies, speculations and hoarding by traders, and lack of transparency in pricing and market information. (Times of India, 2024)
- Inefficiencies exist across the edible oil supply chain in India, particularly in oilseed sourcing, processing, distribution, and retail. Edible oil production costs are raised by inadequate infrastructure, a lack of storage facilities, and an underdeveloped transportation network, which also lead to post-harvest losses.

Policies for the Sector

Understanding these challenges the government of India launched many policies to help this sector. Some key policies are –

- **National Mission on Edible Oils-Oil Palm (NMEO-OP)-** With an emphasis on the Northeast region and the Andaman and Nicobar Islands, NMEO-OP was introduced as a centrally-sponsored program to increase the area under oil palm cultivation from 3.5 lakh hectares in 2019–20 to 10 lakh hectares by 2025–2026 (NMEO, 2022). By 2025–2026, the initiative aims to increase domestic crude palm oil production from 0.27 lakh to 11.2 lakh tonnes.
- **Import Duties-** In order to maintain a balance between the interests of farmers, processors, and consumers, the government periodically examines import duties on edible oils. Import of edible oils is under the Open General License (OGL) (Drishti IAS, 2022). Raising import taxes on edible oils is one of the recent policy adjustments made to safeguard domestic farmers (Economic Times, 2024). Table Below shows the import duties of different edible oils in India.

Table 2

Edible Oil	Import Duties
Crude Palm oil	5.5%
RBD Palmolein	13.75%
Crude Soyabean oil	5.5%
Refined Soyabean Oil	13.75%
Crude Sunflower Oil	5.5%
Refined Sunflower Oil	13.75%
Crude Rapeseed Oil	38.5%
Refined Rapeseed Oil	49.5%

Source- Department of Food and Public Distribution, GOI

- **Initiatives for Data Management-** Vegetable oil producers can now electronically submit their monthly production data by using the web-based platform evegoils.nic.in, which was built by the Directorate of Sugar & Vegetable Oils under the Department of Food and Public Distribution. Additionally, this site offers a window for monthly production return submission and online registration.
- **Minimum Support Price for Oilseeds-** The Indian government has also implemented a Minimum Support Price (MSP) mechanism for oilseeds such as groundnut, mustard, and soybean. The MSP is designed to provide farmers with a guaranteed price for their produce, ensuring that they receive a fair return on their investment.
- **Promotion of Domestic Production-**

Through several initiatives, the government hopes to increase domestic oilseed production:

o Development and diversity of crops in promising areas like as the Indo-Gangetic Plain and Bundelkhand (NITI Aayog, 2024)

o wastelands being used to grow oil palm (NITI Aayog, 2024)

- Increasing yield by using cutting-edge breeding methods and better varieties (NITI Aayog, 2024)
- Encouraging extensive seed gardens and oil palm plants (NITI Aayog, 2024)
- To improve productivity and sustainability in the edible oil sector, the Indian government has promoted research and development (R&D) in oilseed breeding and processing technologies.

These policies, if implemented effectively, have the potential to reduce India's reliance on edible oil imports and move towards self-sufficiency in the sector. However, challenges remain in terms of production gaps, market dynamics, and environmental concerns associated with some oilseed crops like palm oil.

Prospects

The prospects for the edible oil sector in India are promising, driven by strategic government initiatives and growing domestic demand. Here are key factors shaping the future of this sector:

- The government is launching many policies like NMEO-OP to increase production and production Yield in the sector. In the long term, these policies will help in making the sector self-sufficient.
- In a business-Usual scenario, India's edible oil supply might increase to 16 million tonnes (MT) by 2030 and 26.7 MT by 2047, according to NITI Aayog. The potential domestic output might reach 36.2 MT by 2030 and 70.2 MT by 2047 with strategic interventions, thereby addressing the demand-supply gap (Governance Now, 2024).
- According to NITI Aayog (2024), strategic interventions might increase oilseed output by 20%, adding roughly 7.36 MT and lowering imports by roughly 2.1 MT. Furthermore, an additional 3.12 MT of oilseeds might be produced by tapping into rice fallow regions. Production can be increased by encouraging crop variety and using fallow areas for oilseed farming.
- To increase yields and optimize processing efficiency, innovative technologies, and bio-fortified oilseed varieties must be embraced. To increase production, the government is pushing for a cluster-based seed hub method, which aims to improve seed quality and availability (Economic Times, 2024).
- The amount of edible oils consumed annually per person in India has climbed to 19.7 kg, showing a strong market demand that calls for more domestic production (NITI Aayog, 2024). Meeting this demand through local sources will not only benefit farmers but also stabilize prices.
- The shift towards sustainable agricultural practices presents a significant opportunity for the edible oil sector in India. Organic farming, reduced reliance on chemical inputs, and sustainable water management could help mitigate environmental challenges associated with oilseed cultivation.

Conclusion

The analysis revealed that the edible oil sector in India is a complex and dynamic industry that plays a vital role in the country's food economy. The sector is facing many challenges like high

Imports, low domestic production, and price vitality. Although the government has launched many policies to help the sector there is still a need for more holistic policies like investment in R&D, supply chain management, and expansion of irrigation facilities to induce long-term growth in the production of oilseeds and achieve self-sufficiency in edible oils. Conclusively it can be said that the edible oil sector of India holds massive potential for growth and if that potential is utilized correctly India can not only become self-sufficient in terms of domestic production but it can also project itself as a major player in the Global market.

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An Analysis of State wise Inflow of Foreign Direct Investment (FDI) in India

Vibha Mishra[1] & Prof. Karunakar Ram Tripathi[2]

ABSTRACT

This study makes an attempt to analyze the distributional pattern of Foreign Direct Investment (FDI) inflow among the states of India for the period from October 2019 to June 2024. The economic reform process resulted in a major change in the government's viewpoint. As a result, the foreign investment policy in general and the FDI policy in particular saw significant liberalization. FDI inflow increased as a result in the years after liberalization. In the consequences of liberalization, FDI inflow has increased to levels never before observed. Recent developments in FDI inflow show that the nation is still a top choice for foreign investors. State-wise distribution of FDI in India during the period from October 2019 to June 2024 has shown that Maharashtra and Karnataka are the two states attracting highest FDI inflow in India. These two states have commanded 50% of the total FDI, while thestates of Jharkhand, Rajasthan, and Uttar Pradesh have managed to receive some foreign investment over the years, though in a minor proportion (2.76%) in comparison to the richer states. As a result, after analysis, the regional disparities in FDI distribution become clearly apparent. To unlock the potential of areas overlooked by international investors, it is recommended that the government concentrate on enacting rules that are favorable to investors.

Keywords: *FDI inflow, Liberalization, FDI Policy, Trends, Regional Distribution,*

Introduction

Foreign direct investment (FDI) is the principal mechanism by which multinational businesses (MNEs) extend their operations internationally. Countries around the world want to attract foreign direct investment (FDI) by reducing regulations. During the first three decades after its independence, India was hesitant about foreign investment. The government's stance changed significantly during the economic reform process. Foreign investment policies, including foreign direct investment, were significantly liberalized. Following liberalization, foreign direct investment inflows increased significantly. The goal was to attract more foreign direct investment (FDI) to boost local capital formation while also acquiring superior technology, management knowledge, and marketing capabilities.

Since 1991, there have been substantial policy reforms that favour foreign investment and differ from earlier approaches. These developments allow foreign investors to participate in Indian

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industry. India's present FDI policy is competitive compared to other major FDI-receiving nations worldwide. FDI inflows to India are inconsistent and heavily concentrated in relatively fast-moving reformers with advanced industrialization. The unequal allocation of foreign direct investment inflows to some regions and sectors has exacerbated the imbalance in regional development, which could have detrimental effects on the nation's socioeconomic and political stability.

In light of the aforementioned information, this study attempts to examine how FDI inflows are distributed among India's statesduring the months of October 2019 to June 2024.There are four sections to the current study. Earlier studies on FDI in India is covered in Section I. The objectives and methodology are covered in Section II. A thorough descriptive examination of the distributional pattern of FDI inflow among India's states is presented in Section III, and conclusions are provided in Section IV.

Section I

Review of Literature

Anmol Preet Chhina (2023), investigates the changes in FDI inflows to India post the global financial crisis, covering the period 2009-2010 to 2021-2022. Additionally, the spatial distribution of FDI among India's regions and states is examined using data from 30 states/territories. According to the findings, Maharashtra and Karnataka received more FDI equity inflows than any other state between October 2019 and September 2022. These two states have commanded 50% of total FDI, while central, eastern, and northeast India have gotten less than 3% of overall FDI equity inflows.*Tarai et al. (2022),*study the pattern of foreign direct investment (FDI) in India between 2000 and 2021 showed that New Delhi and Maharashtra drew the greatest amount of FDI by holding their top spots during that time. Because of their enormous growth potential, the main industries in these regions that got greater FDI were services, transportation, telecommunications, and energy. The findings highlight the disparities in FDI distribution among regions in India. *A. Sabharwal (2021),* examine the patterns of foreign direct investment inflows into India by region and assess the causes of the inflow in the country's main areas. An analysis of the geographical distribution of foreign investment reveals significant regional differences in the deployment of foreign capital.While certain areas, like Mumbai, New Delhi, Chennai, and Gujarat, see significant flow of foreign capital, other locations go mostly unnoticed by these investors. *S. Joseph Wellington and S. Jammu (2014)*, look at the inflow of foreign direct investment (FDI) by sector and state, as well as the FDI trend and growth and its relationship to GDP from 2000 to 2010. The new administration's policies encourage both foreign and domestic investment and are clear-cut and open. India is a suitable location for foreign direct investment (FDI) due to its wealth and diversity of natural resources, stable economic policies, favourable market conditions, and highly qualified labour force.After many years of journey, FDI was also made feasible in a number of Indian states and sectors. The Indian economy is growing quickly as a result of FDI investment in several states and industries.*Atri Mukherjee (2011),* draws the conclusion in her article that a significant number of Indian states have been deprived of the advantages of a liberalized FDI regime due to the considerable regional concentration that has accompanied the development of FDI flows to the country. According to her findings, FDI flows are significantly positively impacted by market size, concentration effects, and the size of a state's

manufacturing and services base.*Morris (2004),* used Stephen Hymer's location choice model to look at the regional patterns of foreign direct investment (FDI) in India, namely in Gujarat, between 1991 and 2003. According to the findings, the availability of a sizable labour pool and significant spillover effects contribute to the considerable FDI received by areas with metropolitan centres.

Section II

Objective and Methodology

Objective:

- o analyze the distribution of FDI inflow among the states of India for the period from October 2019 to June 2024.

Methodology:

This study comprises mainly descriptive in nature and is based on secondary data. The required data was gathered from publications published by the Indian government as well as other sources, including the Economic Survey, the Department for Promotion of Industry and Internal Trade's (DPIIT) Factsheet, the RBI Annual Report, different Reserve Bank of India bulletins, the India Brand Equity Foundation (IBEF), etc. The relevant data has been collected for the period Oct 2019 to June 2024. Numerous statistical techniques, including percentage share, graph, and diagram, have been applied in order to arrive at a reliable result.

Section III

Analysis and Discussion

State-wise distribution of FDI inflow in India

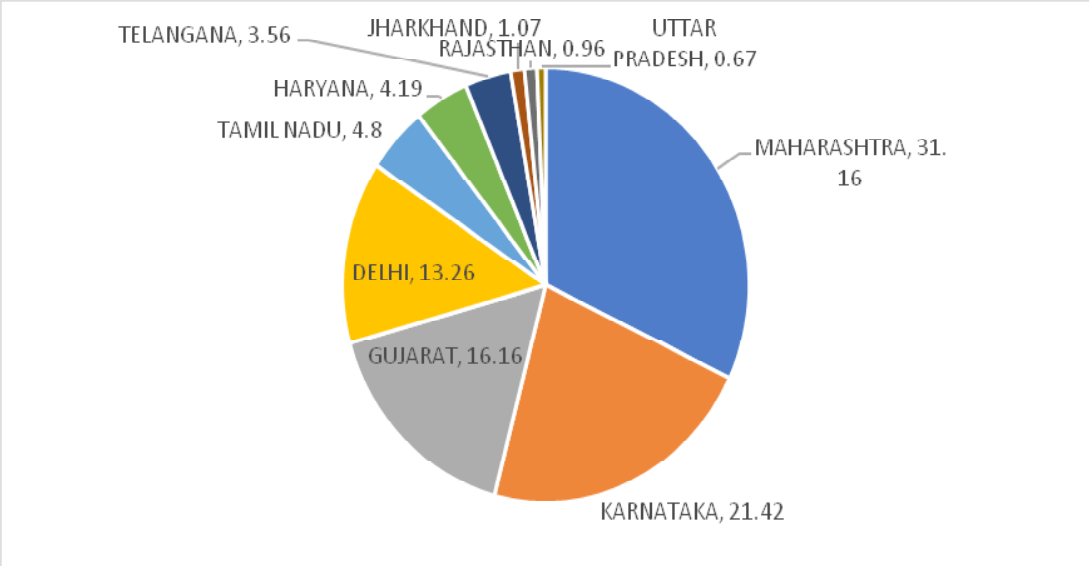
The major states that attracted most FDI during the period from Oct 2019 to June 2024 in India are shown below:

Table no 1: State -wise FDI inflow cumulative percentage (From oct 2019 to June 2024)

Ranks	State Name	Cumulative Inflow (in USD Million)	% Age to Total Inflow (in terms of USD)
1	MAHARASHTRA	77,572.97	31.16
2	KARNATAKA	53,316.08	21.42
3	GUJARAT	40,221.15	16.16
4	DELHI	33,009.63	13.26
5	TAMIL NADU	11,936.15	4.8
6	HARYANA	10,427.22	4.19
7	TELANGANA	8,855.33	3.56
8	JHARKHAND	2,667.10	1.07
9	RAJASTHAN	2,381.01	0.96
10	UTTAR PRADESH	1,679.31	0.67

Source: DPIIT, Ministry of Commerce and Industry, Government of India

Figure 2: State -wise FDI inflow cumulative percentage (from oct 2019 to June 2024)



Sources: computed from table no. 1

Table no.1 and figure 1 reveals that the states of Maharashtra (31.16 %) and Karnataka (21.42 %) have received about 50% of the total FDI in India from October 2019 to June 2024. The Western state of Maharashtra topped the list with a cumulative FDI inflow of US$ 77,573 million. After Maharashtra, Karnataka recorded 21.42% growth of total inflows with 53,316 million, followed by Gujarat, Delhi, and Tamil Nadu, with 16.16%, 13.26%, and 4.8% growth respectively. Haryana and Telangana received 4.19% and 3.56%. Jharkhand, Rajasthan & Uttar Pradesh, all three States recorded 1.07%,0.96% and 0.67%, respectively.

Maharashtra, Karnataka, Gujarat, and Tamil Nadu are all coastal states with the National Capital Region (NCR), Mumbai, Pune, Bangalore, Ahmedabad, Chennai, and other major cities as its commonality. These cities have several advantages over others, including a well-developed mass transit system, a highly skilled labour pool, and easy access to resources. As a result, they are a key hub for foreign direct investment in India.

Maharashtra has become a desirable location for international investment due to its two major cities, Mumbai and Pune, which provide it an advantage over other areas. It is situated in one of India's most industrialized states, near the main offices of significant financial organizations and the oldest stock exchange in Asia.In addition, the state provides tax breaks and a business-friendly atmosphere to support the growth of specific areas. Karnataka, the second-most desirable location for foreign equity, is a leader in investments and exports from India and the centre of innovation and research in Asia. Numerous global corporations and research and development (R&D) centres are based in the state. The state attracts foreign investment because to its diversified and highly qualified workforce and access to top-notch infrastructure facilities.

In the state startup rating, Gujarat has shown itself to be one of the "Best Performers," and the logistics section of DPIIT has ranked Gujarat as an "Achiever" among the coastal states in its survey (LEADS, 2022).The state currently has 32 Special Economic Zones (SEZs) that are sector-specific in operation, and its business-friendly laws have contributed to an increase in exports. It is a desirable location for investments due to its numerous operational ports and ports for commercial shipping. Delhi's well-organized industrial sector and first-rate infrastructure give it an advantage over other states and territories. A USD 11,936 million foreign direct investment has been secured by Tamil Nadu, the state with the third-highest GDP in India and the most active Special Economic Zones.The availability of a competent workforce due to a high literacy rate, the state government's liberal stance, and the granting of single window clearance above a particular level of investment are some of the factors that guarantee a high level of foreign investment in the state. Haryana has benefited from investor-friendly regulations and effective administration to secure USD 10,427 million in foreign equity. Delhi and Haryana are in a prime location for significant foreign investments in the north due to their close proximity. Jharkhand, Rajasthan, and Uttar Pradesh, have received about 3% of the overall inflow of foreign direct investment equity. A number of reasons, including weak infrastructure, which is typified by poor transportation networks, limited road connections, and restricted access to ports, can be blamed for the regional inequality in Foreign Direct Investment (FDI) inflow in Uttar Pradesh. Investors are also turned off by bad governance, which is characterized by corruption, inefficiencies in the bureaucracy, and a lack of transparency. The state is also beset by a shortage of competent labour, especially in the area of cutting-edge technologies. Moreover, regulatory obstacles, a lack of incentives, and a murky policy environment deter international investment. Other major barriers include worries about security and safety as well as the challenge of obtaining land for industrial use.

Uttar Pradesh has seen a spectacular increase in foreign direct investment (FDI) between 2019 and 2024, four times more than it did from 2000 to 2017. This is due in part to the state government's efforts to strengthen law and order, simplify regulations, and encourage business. Even though Uttar Pradesh's economy has developed significantly, it still ranks 11th in terms of FDI.

Section IV

Conclusion

The study's conclusions show that there is a significant geographical variation in the FDI flow pattern. The majority of foreign direct investment (FDI) into India has gone to economically developed states. As a result, regional disparity amongst the Indian states rises. Less FDI went to the states with higher levels of efficiency. It suggests non-economic factors at play in a process affecting FDI inflows and local development. It is essential that the federal government and the relevant state governments not only implement an open-door policy but also provide the required infrastructure and foster an environment that is conducive to investment and promotes a more equal spatial distribution of foreign direct investment. The focus should be on business-friendly regulations, as well as enhancements to health, education, and knowledge dissemination. Access to improved financial infrastructure is also essential in drawing foreign investors.

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Deshraj Verma - India Nepal Trade Relation Since 2000

Deshraj Verma[1] & Dr. Nafees Hashim Rizvi[2]

ABSTRACT

India and Nepal, apart from being neighbouring countries, are also close friends of each other. Their specialty is that along with open borders, they also have ties of kinship and culture. The two countries have a long tradition of free movement along the border. Nepal shares its border with five states of India. Studying both the countries shows that there is extensive cooperation in the defence sector. Where India helps Nepal in providing military training as well as modernization of military equipment.

India is a big partner of Nepal. 2022-23 total bilateral trade reached INR74,027.08 crore rupees (US$8.92 billion). 2022-23 Nepal India to exports were INR 6756.60crore (841.52 million US dollars) while India's exports to Nepal were INR 64,773.20 crore rupees (8079.25 million US dollars). Indian investment in Nepal: Indian companies are the largest investors in Nepal. Of which 30% of the total direct investment is made by Indian

Given all this economic trade relations, and being India's neighbour, giving priority to Nepal in policy as well as strengthening economic relations holds immense importance and potential for both the countries. While the political relations between India and Nepal have been extensively studied, there is very little literature in the economic field that examines the two countries or the importance of a study. In view of this, the main objective of this article is to analyses the policy measures to be taken in bilateral trade between India and Nepal and to estimate the maximum potential, Specifically, this paper examines the major trends and changes in import-Exports, Terms of Trade (TOT), Total Trade, Gross Domestic Product (GDP), and Trade Openness. By applying various statistical techniques, the results show that India is leading Trading partners in Nepal. The findings are also used to make policy. Strengthening economic cooperation in the manner listed for.

Keyworld : *India, China, GDP, Trade openness,*

Introduction

Trade is the act of buying and selling goods, services, or other assets between different parties. It can be done in person, through a physical store, or online. Trade is a fundamental part of the

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economy, and it has been happening for centuries. Trade can be beneficial for both parties involved. For example, when a country exports goods and services, it creates jobs and generates income. When a country imports goods and services, it gets access to products and services that it could not otherwise produce

The trade relationship between India and Nepal is unique and multifaceted, shaped by centuries of cultural and geographical proximity. However, it's constantly evolving, marked by both opportunities and challenges. India is Nepal's largest trading partner, accounting for a significant portion of its imports and exports. This close economic connection stems from the 1996 Treaty of Trade and Transit, which facilitates cross-border movement of goods and services.

Literature Review

We have used some research articles, magazines, government site and weekly economics and political for this research paper. Some are mentioned here

Taneja. N, Bimal.S & Garg.S (2020) The article concludes that there is significant potential for increased trade and investment between India and Nepal. The authors make a number of recommendations for how to improve trade and investment relations, including: Reducing tariffs and non-tariff barriers ,Improving infrastructure and logistics,Promoting investment in key sectors such as energy, tourism, and agriculture,Strengthening institutional cooperation

The authors argue that these measures would benefit both countries by creating jobs, boosting economic growth, and reducing poverty. The study focus on India -Nepal Investment.

Singh. R , Agarwal.P. Kumar & Pandey.D(2014) The article concludes that the treaty signed in 1996 has been beneficial for both India and Nepal. Trade between the two countries has increased significantly since the treaty was signed. Nepal's exports to India increased from $20,485 thousand in 1995 to $125,172 thousand in 2011. India's share of Nepal's total imports increased from 12.72% in 1995 to 43.82% in 2011. The treaty has also led to an increase in investment between the two countries. Indian investment in Nepal increased from $10.2 million in 1996 to $432.3 million in 2011. The article concludes that the treaty has been a success and that it has helped to strengthen the economic relationship between India and Nepal.

Chand.D(2018) The conclusion of the article is that trade embargoes imposed by India on Nepal are politically motivated and have both political and economic consequences. The embargoes are used to achieve compliance, deterrence, and subversion. Nepal's landlocked position makes it susceptible to manipulation by India.

Research Gap

The review of literature reveals that few studies have been conducted to assess trade relations between India and Nepal, Whereas relations between India and Nepal have been extensive. The main objective of this study is to suggest policy measures to increase bilateral trade and investment between India and Nepal.

Objective of Research:-

To study the bilateral trade patterns between India and Nepal

To evaluate the terms of trade (TOT) Total trade, Gross Domestic product (GDP) Trade openness (%) India and Nepal.

To study the GDP(Growth Rate) of India and Nepal.

What are the methods by which India's FDI can be increased in Nepal?

Are tariff quotas still relevant in bilateral trade?

Years	Export to Nepal	Import from Nepal	TOT INDIA	TOT NEPAL
2000-01	140.84	255.08	55.21	181.11
2001-02	214.46	355.94	60.25	165.97
2002-03	350.36	281.76	124.35	80.42
2003-04	669.35	286.04	234.01	42.73
2004-05	743.14	345.83	214.89	46.54
2005-06	859.97	379.85	226.40	44.17
2006-07	927.4	306.02	303.05	33.00
2007-08	1507.42	628.56	239.82	41.70
2008-09	1570.15	496.04	316.54	31.59
2009-10	1533.31	452.61	338.77	29.52
2010-11	2168.06	513.4	422.29	23.68
2011-12	2721.57	549.97	494.86	20.21
2012-13	3088.84	543.1	568.74	17.58
2013-14	3592.3	529.93	677.88	14.75
2014-15	4558.77	639.91	712.41	14.04
2015-16	3902.7	470.59	829.32	12.06
2016-17	5453.59	445.13	1225.17	8.16
2017-18	6612.96	438.38	1508.50	6.63
2018-19	7766.2	508.14	1528.36	6.54
2019-20	7160.35	711.61	1006.22	9.94
2020-21	6838.46	673.16	1015.87	9.84
2021-22	9645.74	1371.04	703.53	14.21
2022-23	8079.25	841.52	960.08	10.42

Research Methodology

This research is based on secondary data. To fulfil the above objectives, research papers, articles, magazines and various websites have been used for better reference. secondary data obtained from the Ministry of Commerce and industry, ministry of external affairs and RBI like institutions . analysis of data used T test and F test are independent .

This research paper is limited to India and Nepal and the time period the analysis is only for the period 2000-2023.

This article is organized as follows. In the first section of the article, this article analyzes the bilateral trade patterns of India and Nepal and second section in this article analysis Terms of Trade and Trade openness, Third section analysis GDP Growth Rate India and Nepal, fourth section analysis Are Traffic quotas still relevant in bilateral trade ? Fifth section analysis how many commodities include trade India and Nepal.

Trade Patterns of India and Nepal

The table shows Nepal's trade balance with India from 2000-01 to 2022-23. Over this period, India has had a consistently positive trade balance with Nepal, meaning that the value of exports from India to Nepal has been higher than the value of imports from Nepal to India. However, the total trade value between the two countries has also increased significantly over this time period.

Looking at the table, you can see that the total trade value has increased from ¹ 395.92 crores in 2000-01 to ¹ 11,016.78 crores in 2021-22. This represents an increase of more than 27 times. This shows that the economies of India and Nepal are rapidly integrating.Some other positive aspects of the data from the Indian perspective are as follow

Nepal is a growing market for Indian goods and services. This is good news for Indian businesses, as it provides them with new opportunities for export growth.

An increase in trade is likely to lead to economic growth in both India and Nepal. This is because trade can lead to increased efficiency and productivity, as well as the transfer of technology and knowledge.

Strong trade relations between India and Nepal can help promote political stability in the region. This is because countries that trade with each other are less likely to go to war with each other.

Overall, the data in the table shows that the trade relationship between India and Nepal is positive. This relationship is mutually beneficial and is likely to grow further in the future.

Table 1. India's Trade with Nepal in (US$ million)

Years	Export to Nepal	Import from Nepal	Total Trade	Trade Balance	Trade Balance Ratio (%)
2000-01	140.84	255.08	395.92	-114.24	-28.85
2001-02	214.46	355.94	570.4	-141.48	-24.80
2002-03	350.36	281.76	632.12	68.6	10.85
2003-04	669.35	286.04	955.39	383.31	40.12
2004-05	743.14	345.83	1088.97	397.31	36.48
2005-06	859.97	379.85	1239.82	480.12	38.72
2006-07	927.4	306.02	1233.42	621.38	50.38
2007-08	1,507.42	628.56	2135.98	878.86	41.15
2008-09	1,570.15	496.04	2066.19	1074.11	51.99
2009-10	1,533.31	452.61	1985.92	1080.7	54.42

(*Contd...*)

2010-11	2,168.06	513.4	2681.46	1654.66	61.71
2011-12	2,721.57	549.97	3271.54	2171.6	66.38
2012-13	3,088.84	543.1	3631.94	2545.74	70.09
2013-14	3,592.30	529.93	4122.23	3062.37	74.29
y2014-15	4,558.77	639.91	5198.68	3918.86	75.38
2015-16	3,902.70	470.59	4373.29	3432.11	78.48
2016-17	5,453.59	445.13	5898.72	5008.46	84.91
2017-18	6,612.96	438.38	7051.34	6174.58	87.57
2018-19	7,766.20	508.14	8274.34	7258.06	87.72
2019-20	7,160.35	711.61	7871.96	6448.74	81.92
2020-21	6,838.46	673.16	7511.62	6165.3	82.08
2021-22	9,645.74	1,371.04	11016.78	8274.7	75.11
2022-23	8,079.25	841.52	8920.77	7237.73	81.13

Source:- Directorate General of foreign Trade, Ministry of Commerce, Government of India

Trade Openness:- is calculated as the sum of exports and imports divided by GDP, expressed as a percentage. A higher number indicates a more open economy.

$$Xit + Mit / Yit$$

Where X is the total value of export, M is the total value of imports and Y is the GDP of country i at time t.

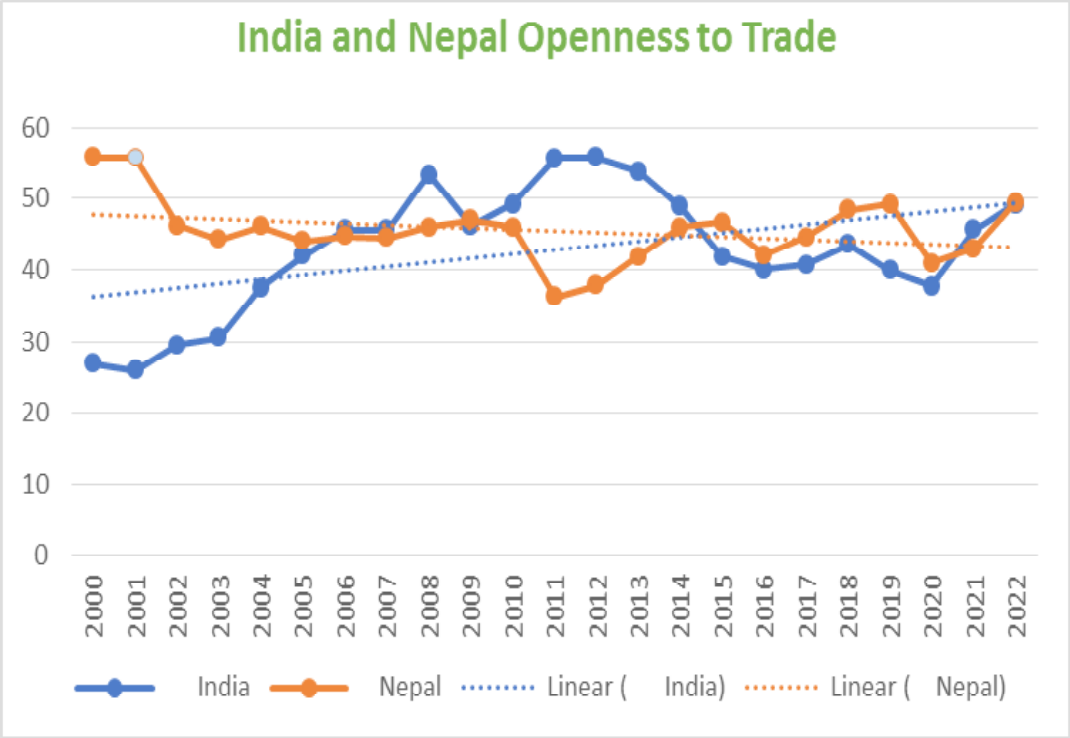
Range of Values :- A trade above 100 indicates that combined export and import exceed ; a trade value less than 100 implies the reverse.

The table shows that both Nepal and India have become more open economies over the period 2000 to 2022. Nepal's trade openness has increased from 0.269 in 2000 to 0.492 in 2022. India's trade openness has increased from 0.557 in 2000 to 0.494 in 2022.

A further breakdown of the trends:-

- **Nepal:-** There seems to be an increasing trend in trade openness over the years. Nepal's trade openness reached its highest in 2011 at 0.556 and its lowest in 2015 at 0.419.
- **India:-** India's trade openness fluctuated throughout the years. It reached its highest at 0.557 in 2000 and its lowest at 0.363 in 2012.

It is important to note that while both Nepal and India have become more open economies, Nepal's trade openness is lower than India's. This suggests that Nepal's trade is a smaller proportion of its GDP compared to India.



There are a number of reasons why a country might choose to open its economy to trade. These include:

Increased efficiency and productivity: Competition from foreign firms can force domestic firms to become more efficient and productive.

Greater access to goods and services: Consumers benefit from a wider variety of goods and services at lower prices.

Economic growth: Trade openness can lead to economic growth by allowing countries to specialize in the production of goods and services in which they have a comparative advantage.

However, there are also some potential drawbacks to trade openness, such as:

Job losses: Increased competition from foreign firms can lead to job losses in domestic industries.

Income inequality: Trade openness can lead to increased income inequality if the benefits of trade are not evenly distributed.

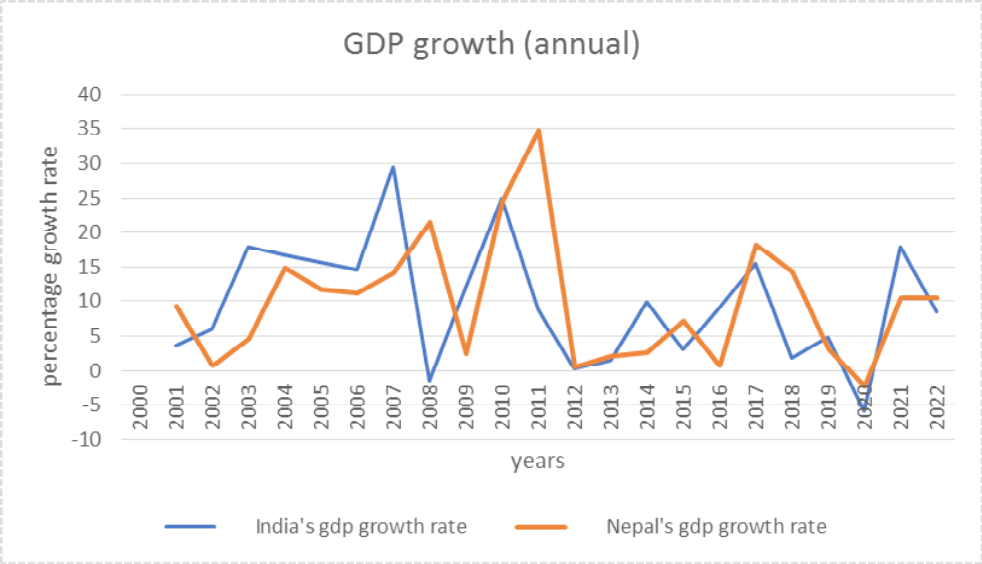
Environmental damage: Increased trade can lead to environmental damage if countries do not have strong environmental regulations in place.

GDP Growth Rate India and Nepal

Table 2

Years	India's GDP growth rate(%)	Nepal's GDP growth rate(%)
2000		
2001	3.639253102	9.333441838
2002	6.076316886	0.729488313
2003	18.01408049	4.620773898
2004	16.6939853	14.90354992
2005	15.68544224	11.77244106
2006	14.61250398	11.23527561
2007	29.40426932	14.17451358
2008	-1.466324116	21.4981862
2009	11.92705461	2.467405632
2010	24.86999647	24.48599401
2011	8.798934403	34.81431887
2012	0.251543089	0.599004537
2013	1.59133939	2.115385741
2014	9.824035042	2.56927404
2015	3.161249755	7.167060793
2016	9.089636036	0.670372635
2017	15.5428735	18.13513106
2018	1.94063279	14.2896419
2019	4.908622587	3.24556331
2020	-5.783978303	-2.201244646
2021	17.91856028	10.44211817
2022	8.454382399	10.57121906

Data Source:- World Development Indicators



- **Overall, India's GDP growth rate has been higher than Nepal's GDP growth rate over the period 2000-2022.** The average GDP growth rate for India was 8.15%, while the average GDP growth rate for Nepal was 7.61%.
- **There has been a lot of variation in the GDP growth rates of both countries over time.** For example, India's GDP growth rate ranged from -5.78% in 2020 to 29.40% in 2007. Nepal's GDP growth rate ranged from -2.20% in 2020 to 34.81% in 2011.
- **Both countries experienced negative GDP growth rates in 2020, likely due to the COVID-19 pandemic.**
- India's GDP growth rate has been higher than Nepal's GDP growth rate in most years. The exceptions are 2001, 2008, 2011, 2017, 2018, and 2021.

Some additional insights that can be gleaned from a comparative analysis of this data.

- **India's larger and more diversified economy may be more resilient to external shocks than Nepal's smaller and more tourism-dependent economy.** This could explain why India's GDP growth rate was less volatile than Nepal's GDP growth rate over the period 2000-2022.
- Nepal's high GDP growth rate in 2011 may be due to factors such as post-earthquake reconstruction spending.

Table 3: India's Trade with Nepal in (US$ million)

Years	Export to Nepal	Import from Nepal	TOT INDIA	TOT NEPAL
2000-01	140.84	255.08	55.21	181.11
2001-02	214.46	355.94	60.25	165.97
2002-03	350.36	281.76	124.35	80.42
2003-04	669.35	286.04	234.01	42.73
2004-05	743.14	345.83	214.89	46.54
2005-06	859.97	379.85	226.40	44.17
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2008-09	1570.15	496.04	316.54	31.59
2009-10	1533.31	452.61	338.77	29.52
2010-11	2168.06	513.4	422.29	23.68
2011-12	2721.57	549.97	494.86	20.21
2012-13	3088.84	543.1	568.74	17.58
2013-14	3592.3	529.93	677.88	14.75
2014-15	4558.77	639.91	712.41	14.04
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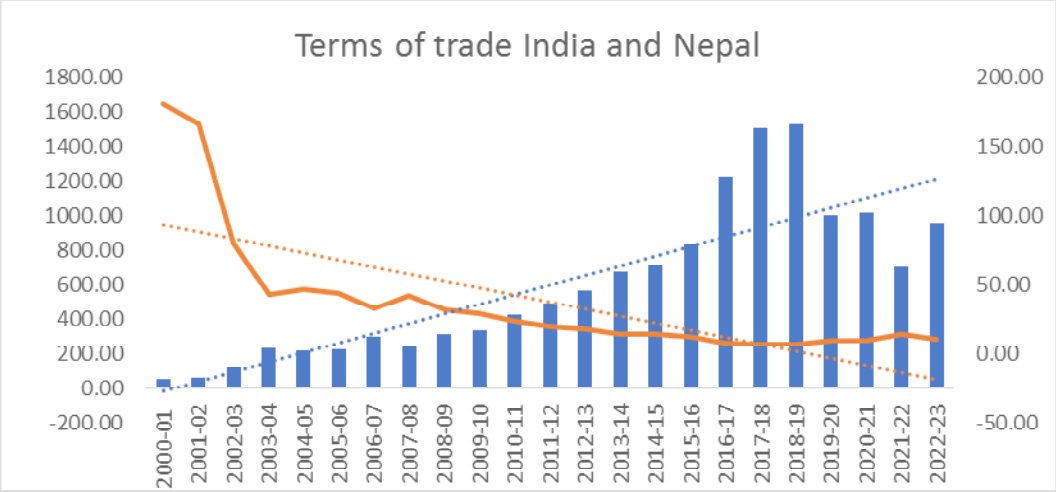
2016-17	5453.59	445.13	1225.17	8.16
2017-18	6612.96	438.38	1508.50	6.63
2018-19	7766.2	508.14	1528.36	6.54
2019-20	7160.35	711.61	1006.22	9.94
2020-21	6838.46	673.16	1015.87	9.84
2021-22	9645.74	1371.04	703.53	14.21
2022-23	8079.25	841.52	960.08	10.42

Source:- Directorate General of foreign Trade, Ministry of Commerce, Government of India



Based on the table, India has a consistently higher terms of trade than Nepal over the entire period. India's terms of trade start at 55.21 and end at 703.53, while Nepal's terms of trade start at 181.11 and end at 14.21. Nepal's terms of trade tend to decline over time, while India's terms of trade show more variation.

There are a few reasons why a country might have a higher terms of trade than another country. One reason is that the country exports goods that are in high demand and that are difficult to produce. Another reason is that the country has a lot of bargaining power in the international market.

It is important to note that terms of trade are not a perfect measure of a country's economic well-being. A country can have a high terms of trade but still be a poor country. However, terms of trade can be a useful indicator of a country's trading position.

Some additional points to consider when analyzing this table:

The table does not show the specific goods that India and Nepal export and import. This information would be helpful in understanding why India's terms of trade are higher than Nepal's.

The table only shows data for a limited time period. It would be interesting to see how the terms of trade of India and Nepal have changed over a longer period of time.

INDIA's FDI in NEPAL :-

India's Longstanding Investment in Nepal

India boasts a long history of being a key source of foreign direct investment (FDI) for Nepal. The first official record dates back to 1951-52 with the establishment of the Nepal Commercial Corporation, a joint venture fueled by Indian investment. Since then, Indian companies have consistently contributed to Nepal's economic growth by creating jobs and generating revenue. However, this relationship, much like trade, has experienced its share of fluctuations.

Nepal was India's sole investment partner until the 1980s. This changed when Nepal introduced policies to attract foreign investment, leading to an influx from other countries. Consequently, India's share of Nepal's total FDI began to decrease. Political unrest in Nepal further impacted Indian investment. From 1996 to 2007, leading Indian firms faced challenges, and the lack of a formal investment protection treaty discouraged new investments. By 2016, India's share in Nepal's FDI had dropped below 20%.

With the return of stability, Indian FDI has seen a significant upswing. In recent years, it has surpassed investments from other countries, leading to a substantial rise in India's share of Nepal's total FDI. A recent Nepal Rashtra Bank report estimates that cumulative Indian FDI in Nepal stands at approximately 75.8 billion Nepalese rupees, representing 33.3% of Nepal's total FDI stock. Notably, Indian FDI is spread across various sectors. Around 39% targets manufacturing and mining, 34% focuses on utilities like hydropower, and 23% goes towards services. The remaining investment targets the agricultural sector. It's worth mentioning that China, a recent entrant, has made significant investments in Nepal, particularly in hydropower.

How can increase:-

Bilateral cooperation and trade agreements:

Strengthening bilateral relations between India and Nepal is important. Regular dialogues, joint committees and cooperation on economic matters can boost investment ties .Encouraging cross-border investment and trade facilitation can increase FDI.

P**romoting investment opportunities:** India can actively promote Nepal as an attractive investment destination. Highlight specific sectors with growth potential to attract Indian investors.

Sectors such as tourism, hydropower, agriculture and manufacturing offer FDI opportunities.

Infrastructure development and connectivity: Improving infrastructure connectivity between India and Nepal is essential. Better roads, railways and border facilities can enhance trade and investment flows.

Investment protection and legal framework: Ensuring legal protection for Indian investors in Nepal is important. Clear and transparent investment policies, dispute resolution mechanisms and intellectual property rights enforcement are essential.

Ease of doing business: Simplifying administrative procedures, reducing red tape and enhancing ease of doing business can attract Indian investors. Streamlining approvals, permits and licences can make Nepal a more investor-friendly destination.

Sector-specific incentives: Indian companies can be attracted by providing sector-specific incentives such as tax exemptions, subsidies and land acquisition assistance. Focusing on sectors where India has expertise or interest can yield positive results.

Investment promotion agencies: Nepal can be actively marketed to Indian investors by setting up effective investment promotion agencies. These agencies can provide information, facilitate investment processes and address investor queries.

Joint Ventures and Partnerships:

Encouraging joint ventures between Indian and Nepalese companies can lead to technology transfer, knowledge sharing and increased FDI.

Collaborative projects can benefit both countries.

Market Access and Trade Facilitation: Improving market access for Nepalese products in India and vice versa can boost investment. Addressing trade barriers and promoting cross-border trade can create a conducive environment for FDI.

Political Stability and Policy Stability:

A stable political environment and consistent policies are important for attracting long-term investments. Investors want predictability and assurance that their investments will be protected. Remember that sustained efforts, collaboration and effective implementation of these strategies can lead to increased FDI from India in Nepal

Focus on infrastructure development: India can assist Nepal in improving its infrastructure, such as transport networks and power generation. This will make Nepal a more attractive destination for businesses, including Indian companies.

Streamline investment approval processes: Nepal can simplify and speed up the process of obtaining investment approvals for Indian companies. This will reduce bureaucracy and make it easier for Indian businesses to invest in Nepal.

Promote sector-specific cooperation: The two countries can identify specific areas where cooperation would be mutually beneficial. This could include joint ventures in sectors such as hydropower, manufacturing and tourism.

Provide investment incentives: Nepal can provide targeted incentives to Indian companies such as tax exemptions or special economic zones. This could make Nepal a more competitive location for Indian investment.

Enhance political and economic stability: A stable political and economic environment is essential to attract foreign investment. India can cooperate with Nepal to promote good governance and economic reforms.

Improving the investment climate: Nepal can take steps to improve its overall investment climate, such as strengthening intellectual property rights and reducing corruption. This will make Nepal a more attractive destination for all foreign investors, including India.

People-to-people ties: Promoting cultural exchanges and educational programs between India and Nepal can build stronger ties between the two countries. This can create a more favorable environment for Indian businesses to invest in Nepal.

Indian investors face several challenges while investing in Nepal.

These include: Insecurity and business environment: Frequent bandhs (strikes), labour disputes and poor law and order create an unsafe business environment.

Political instability further adds to the uncertainty for investors1.

Cultural and social factors:

Forced donations and prevalent strikes disrupt business operations.

The strike culture affects productivity and investor confidence.

Legal and regulatory issues:

Lack of transparency and regulatory oversight in the market can be problematic.

Investors may face challenges related to legal compliance and bureaucracy.

Infrastructure constraints:

Nepal's infrastructure, including transport and energy, needs improvement.

Inadequate connectivity can hamper business operations.

Trade deficit and market access:

While trade with India has grown, Nepal faces a significant trade deficit.It is necessary to expand the export base, and Indian investment can play a key role.

Political instability:

Frequent changes in government and political unrest create uncertainty. Investors seek stability for long-term commitments.

Despite these challenges, India remains an important source of foreign direct investment in Nepal. Efforts to resolve these issues can improve the investment climate and attract more Indian investors to Nepal's growing economy.

Tariff Quotas: A Balancing Act in India-Nepal Trade

Tariff quotas (TRQs) remain a relevant tool in the bilateral trade relationship between India and Nepal, despite the existence of a free trade agreement. While the agreement grants duty-free access for most Nepali goods to the Indian market, TRQs carve out exceptions for specific products deemed sensitive to Indian industries. This approach balances Nepal's need for export opportunities with India's desire to protect domestic producers.

The Logic of TRQs:

TRQs establish a two-tiered tariff system. Up to a designated quota, Nepali exports of certain products like copper products (10,000 tonnes) and zinc oxide (2,500 tonnes) enter India duty-free. This concession incentivizes Nepali businesses and fosters their competitiveness. However, exceeding the quota triggers regular import duties, shielding Indian producers from a sudden influx of goods that could undercut their market position.

Benefits for Nepal:

TRQs provide a predictable and secure market for Nepali exports within the quota limit. Lower production costs in Nepal, coupled with duty-free access, can make Nepali goods significantly cheaper for Indian consumers. This price advantage can boost Nepali exports and generate valuable foreign income. Furthermore, TRQs encourage investment in targeted sectors within Nepal, creating jobs and promoting economic growth.

Balancing Concerns:

India's use of TRQs reflects its commitment to gradual trade liberalization. An immediate and unrestricted influx of Nepali goods could disrupt Indian markets and harm domestic industries. TRQs allow a measured approach, enabling Indian producers to adjust to increased competition over time. Additionally, TRQs can incentivize technology transfer and skill development in Nepal, as Nepali businesses strive to meet the quality standards required for the Indian market.

Beyond TRQs:

The India-Nepal Treaty offers a broader framework for economic cooperation. Duty-free access for most Nepali goods, besides the short negative list, fosters deeper trade integration. Furthermore, provisions for infrastructure development, investment promotion, and technical cooperation aim to address underlying constraints that limit Nepal's export potential.

The Road Ahead: The effectiveness of TRQs hinges on efficient quota management. A transparent allocation process and streamlined administrative procedures are crucial to ensure fair access for Nepali exporters. Additionally, as Nepal's industrial base matures, there may be scope for reviewing and revising the product categories and quota levels specified in the TRQs. Regular consultations between India and Nepal can ensure that TRQs continue to serve the interests of both countries and support a mutually beneficial trade relationship.

In conclusion, tariff quotas remain a relevant tool in India-Nepal trade, offering a balanced approach to trade liberalization. While ensuring duty-free access for most Nepali goods, TRQs provide safeguards for sensitive Indian industries. Effective management and periodic reviews can ensure that TRQs continue to promote economic growth and prosperity in both countries.

Conclusion

The trade relationship between India and Nepal is complex and multifaceted, marked by both opportunities and challenges. This paper has analyzed the key trends in bilateral trade patterns, terms of trade, total trade, GDP growth rate, and trade openness between the two countries. This paper focused on data from 2000-2023. It would be beneficial to analyze data from a longer time period to understand the long-term trends in the trade relationship between India and Nepal. The paper did not explore the specific goods that India and Nepal export and import. Further research in this area would provide valuable insights into the nature of the trade relationship

Key Findings

India is Nepal's largest trading partner, accounting for a significant portion of its imports and exports. The total trade value between India and Nepal has increased significantly over the past two decades. India has a consistently positive trade balance with Nepal, meaning that the value of exports from India to Nepal has been higher than the value of imports from Nepal to India. Both India and Nepal have become more open economies over time. India's GDP growth rate has generally been higher than Nepal's GDP growth rate. India has a consistently higher terms of trade than Nepal.

The Dynamics of Export Promotion in Uncertain World: Stakeholders Analysis for India

Ritik Bhardwaj[1] & Dr. Aditi Pandey[2]

ABSTRACT

The term sustainable development is probably the theme of 90% seminars, conclaves, symposium and workshops. The whole academia discusses the terms in a variety of ways and also analyses the various methods to achieve it. One must remember that sustainable development differs with circumstances, regions as well as mind sets. As Adam Smith maintains if each individual does his best, the country would be doing great. Similarly, if all countries of the world work to achieve the goal of sustainable development, the world would automatically achieve the goal of sustainable development. So researchers and empirical studies are required as to have one country is small or big can become sustainable as well as a part of the global economy. One also has to remember that sustainability has nothing to do with poverty and unemployment. A country with mal nourished and hungry individuals cannot sustain. Similarly riches also do not mean sustainability. Mahatma Gandhi in his lecture at Meur College, (Allahabad) said that all great civilisations, Roman, Indian, Egyptian well destroyed both culturally and physically when they were at the height of the riches. So sustainability of a nation or world depends if the whole kingdom of humans, animals and even plants survive well. For this each nation has to strive and work as a small instrument in a large gigantic machine. As each country is not endorsed with all kind of resources, that is why trade is probably the only instrument which can enhance production and consumption by getting advantage of every growing technology, entrepreneur practises, dimension of time, division of labour and economies of scale and still remain sustainable. In this article,

India's evidences is considered both in respect to it. Remaining self-sufficient (Atamnirbhar) that is contributing to the world only as much as takes from the world and fulfilling the ever growing demands of all Indians without compromising sustainability.

Keywords: *Export Promotion, Sustainable Development, Self-sufficiency.*

Introduction

Since industrial revolution and specifically since development of transport and communication, the distances between countries, and economic agents have reduced considerable. Now all remote

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villages in east UP or Bihar or place with difficulties like North east can produce and export goods for places like New Jersey within 48 hours given to logistic support by different institutions. So new trade is the new vehicle to cut across all boundaries of languages, customs, culture, festivities, and almost every thing which one can imagine. When India gained independence, the economic circumstances were very much different. In the year of drought, there were large food stocks, available in some parts of India. But at that time importing food or moving food for areas from surplus to the scarcity meant, it would take two weeks to 3 months. Even up to 2000 a truck took more than 36 hours to reach Calcutta from Mizoram. So the growth of trade is very highly correlated to the growth of industry and transport and information technology.

The Indian evidence is very clear. India was forced to adopt the policies. They adopted (looking inward) because domestic consumption needs could not be fulfilled at that point of time by opening up. So domestic consumption was the main device of aggregate demand in 1950s. Government autonomous investment was the main source of investment as gross domestic saving were quite insufficient for India. So in Keynesian terminology C + G were the driving force for Indian growth which was very slow (Hindu growth rate). Public sector created by government of India could sustain growth of investment, most of them had to be supported by government, budget and hence by 1980s it was clear that the growth of India was neither satisfactory nor sustainable. So in 1919, India changed its policies and joined the world economy and became a partner in global trade. Since then the growth has become more rapid. Now both investment (domestic and foreign) are rising and trade GDP ratio is on the rise. Now the most important question is that can such type of trade led growth be sustainable for Indian economy? Moreover in this new Geo political scenario with Europe and US on one side and China and Russia on the other countries become a leading light for global sustainability?

Objectives

The main objective of this paper is to find out whether exports growth of India can create a scenario in which India can have export as the main instrument of rapid growth of GDP, employment and investment. The second objective is related to the one. If yes, what kind of exports of India can help in achieving its desired objectives.

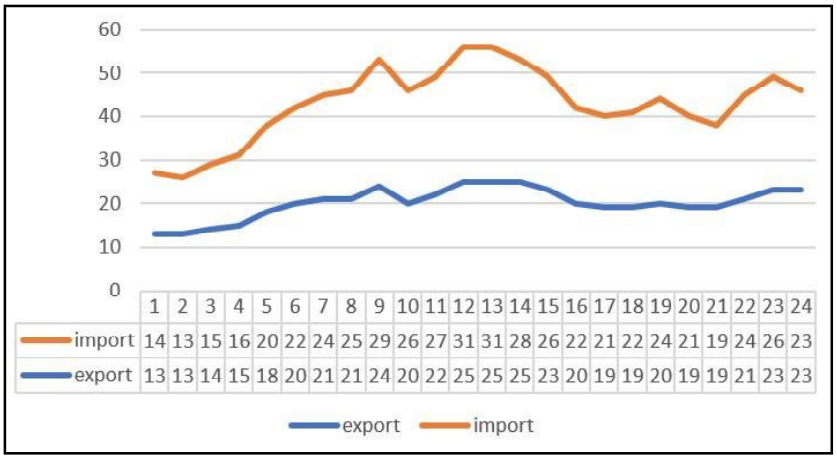
Annual time series data from 1980 to 2012 have been used. Granger causality test exhibits bidirectional causality running from exports to GDP per capita and GDP per capita to exports.

In 1930s, the father of macroeconomics, J.M. Keynes, while discussing GDP, employment and investment, analysed a four-sector model which included foreign trade as a measure and promoter of growth. Sir John Hicks in a small beautiful article wrote that for a small country and a small market, trade is the only hope for sustainable growth (Trade and Growth, 1956).

G. V. Haberler went a step further and wrote 'If you know a man is living, then he must be breathing. Similarly, if you know a country is growing, it must be trading', because trade is no more exchange of goods, it is an exchange of ideas, technology, entrepreneurial practises, management and strategic innovations. The history also proves that trading nations grow much faster. The most recent examples are of Japan (a small country) and China (a much bigger country) that grew at a rapid rate of more than 15% per annum for three continuous decades and are bracketed now with

USA at the top of rich nations. India on the other hand, opted for inward looking policies at independence (trade-GDP ratio was around 20%) up to 1991 which led to slower growth in all sectors and continued to remain one of the middle-income countries. Since 1991, the LPG programme has been launched and growth rate has moved up from the range of 3% to 4% in pre-1991 to 7% to 9% in post-1991 period. The total exports which were less than US$75 billion in 1991 and have crossed US$ 400 billion in 2022 and so has trade GDP ratio (Figure 1). Thus, there is no doubt that trade is an engine to growth.

Figure 1: India's Export and Import (% of GDP)



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
import	14	13	15	16	20	22	24	25	29	26	27	31	31	28	26	22	21	22	24	21	19	24	26	23
export	13	13	14	15	18	20	21	21	24	20	22	25	25	25	23	20	19	19	20	19	19	21	23	23

Source: World Bank Data.

One more important fact that one must consider before coming to the focal theme of this seminar/ conclave is that trade is a bilateral arrangement i.e., exports and imports. So, for a self dependent nation, exports must be approximately equal to imports i.e., export earnings should be enough to pay bill for imports. Unfortunately, this has not been the case for India since the first plan till date. Despite various efforts, committees and strategies, Indian export earnings have not been able to match import bills. Although India has a good foreign exchange reserve of more than US $ 600 billion for quite some time but this has not been built upon export surpluses rather it has been built on foreign inflows. So, it is time to rethink our strategies of export promotion and challenges associated.

One must also remember that export promotion does not depend upon the sweet will or simple political determination of a nation. There are four critical requirements of Export Promotion i.e., 1) exportable surplus on sustained basis 2) demand of the commodity that can be exported in rest of the world 3) competitive ability of the exporters vis-a-vis foreign competition and lastly 4) the import policy regulation of the partners. All these aspects lead us to determine the stakeholders of trade. The first and most important stakeholders of exports are manufacturers or merchant exporters. For example, for export of agri-goods, the farmers of the nation are the first stakeholder. The second most important stakeholder is the competition, in terms of qualityas well as in price. In ancient world price was the only consideration but since industry and manufacturing now quality and

marketing are very important. The producers of manufacturing have to concentrate on price and quality but an important industry, media and advertisement is also an important stakeholder in this group. China had become the manufacturing hub on price competition alone, but is now facing troubles. The third important thing is to analyse the commodities whose demand meets Indian supply, which differs in every country as per climate, taste, preferences, as well as culture and dogmas. The last, but not the least Stakeholders are also foreign country's policy makers and politicians as international institutions who regulate global trade policies.

Therefore, one can define Stakeholder as one who has an interest in a particular issue, in this instance trade. One can classify stakeholder as follows:

1) **Decision Maker** or power group with formal power to make, change, amend decisions in relation to trade. They can be individuals who want to push their own exports or institutions who are created to assist the individuals or the government which has to look into overall macro management and export promotion as a tool of growth of employment, output and technology. As stated earlier, India has aggressive interest in pushing exports for Aatma Nirbhar Bharat as well as earning foreign exchange.
2) **Decision Regulator:** Persons or Institutions with powers who can block the decision of decision makers like in the instant case WTO, FAO, IMF, RBI. Generally, they frame rules for fair play, and take actions against unethical/unfair trade practises. So, the first group must abide by their laws and make policies consistent to them.
3) **Beneficiaries/ Sufferers:** Those who are affected by a particular decision. For example, ban on export, tax on export, subsidy on export will affect the consumption of a particular group while another group may gain. Export of cashew may benefit Indian exporters but Indian public would face high price and supply crunch.
4) **Planner/Strategist**: These consist of abstract individuals and institutions who collect relevant information to pursue a particular plan/strategy which the power group utilises. These are experts in their field and provide important information and assist the decision makers.

Stakes for a country can be aggressive, where one has to promote exports or defensive where one acts to safeguard his/their position and neutral when there is no need to intervene. Similarly, time is also an important element in stakeholder analysis. Sometimes immediate action is required (short period) and sometimes a long strategy is to be made.

The Indian Evidence

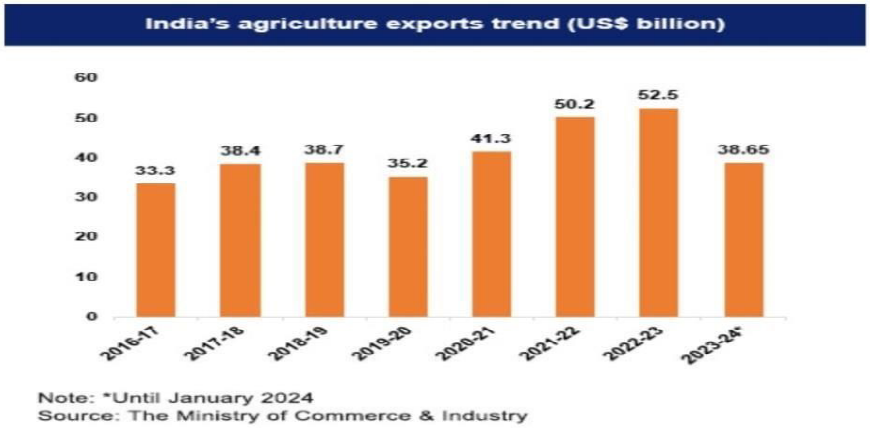
One must remember that for a country as a whole, the interest and its intensity differs with time, economic influences and macroeconomic balance. In case of India, one thing is certain that policy/ decision makers are very clear in mind that India needs to push its exports for variety of reasons (1) correction of BOP, (2) generation of employment and incomes, (3) stabilising the depreciating currency and (4) enhancing foreign exchange reserves to import art of state technology required to become a global leader in areas of business, manufacturing and services. From no Exim policy in 1952, to one year export policy in 1980s. Indian planners now have opted for a five-year trade policy rule with mid-term reviews. Several institutions have been created to assist exporters, especially

after 1980s which include EXIM, EPC, ITPO, Indian packaging council, FTZ, EFZ, SEZ, EHTP and many others. There is no doubt that Indian exports have grown manifold since 1991, but since 2014 merchandise exports are more or less stable. In last three months (December, January, February) exports have declined marginally although service exports have shown signs of growth. Therefore, one can say that the promise that exports had shown since 1991 up to 2010 has not been fulfilled since then. Moreover, growing global protectionism since Covid, slow global growth, and more importantly, the geopolitical scenario (Russia Ukraine war) has impacted adversely the growth of world trade and also that of India. So, the challenges at this point for all stakeholders in context of India are immense. In search of solutions, one must understand the main problems. These problems mentioned below will be discussed in the conclave, but a brief picture is being presented and some solutions which will be discussed are also presented.

First of all, Indian economy is labour, abundant, agri-based rural economy, and is largest or nearly the largest producer in many areas of horticulture, cereals, pulses, vegetables and fruits.

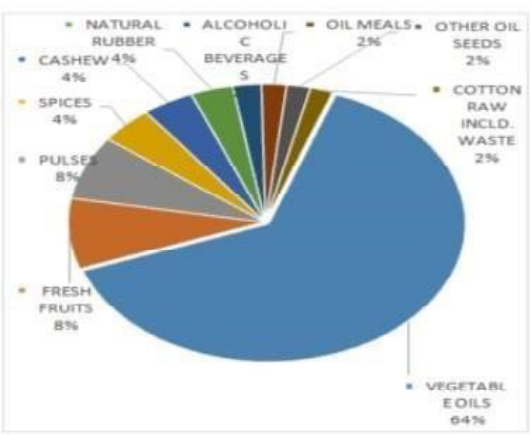
Yet India's primary sector exports share in the world primary sector exports is less than 2%. India does have large reserves of food grains and huge exportable surplus in many primary and processed goods. But success story in trade is limited to only non-Basmati rice, sugar and little bit in cotton. The planners and policymakers are aware of this great potential and have created various institutions to promote agri- exports. Agri-export zones concept was introduced in 2001 (through Exim policy 1997–2001) to promote particular agriculture produce/product in a contiguous area for the purpose of improved production and sourcing of raw material, their processing and packaging leading to final exports. 60 agri-export zones were created but the scheme could not achieve the required success and was discontinued within five years. The creation of APEDA, MPEDA, TRIFED, NAFED also have helped promote exports but have not achieved success at least to level of expectations. The Exim policy of 2004–09, 2009–14 and 2015–20 also, focused their attention and discussed the importance of agri exports especially (Figure 2). Yet Indian agro-based industry have failed to realise the potential. One must remember that future of trade in 22nd century lies in agriculture. Even during Covid, agriculture remained the only success story.

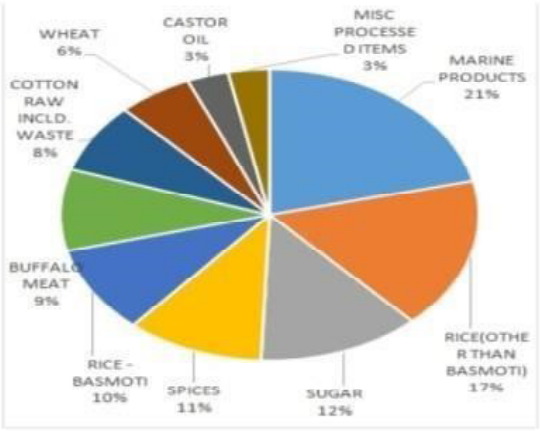
Figure 2: India's Export & Imports of Agri Allied Sector



Note: *Until January 2024
Source: The Ministry of Commerce & Industry

Import share in 2021-22 (Top-10 Items) Export share in 2021-22 (Top-10 Items)





Source: Department of Commerce, Government of India**Source:** World

The question remains what needs to be done. The general answer is policy reforms. The government tried many agriculture reforms by introducing new regulations in 2020 but had to take it back because the most important stakeholder i.e., the farmers were not convinced that this bill will help them. So, the policies need to be thoughtfully implemented and policy uncertainty needs to be removed. Moreover, the pro-Indian consumers bias also does not help.

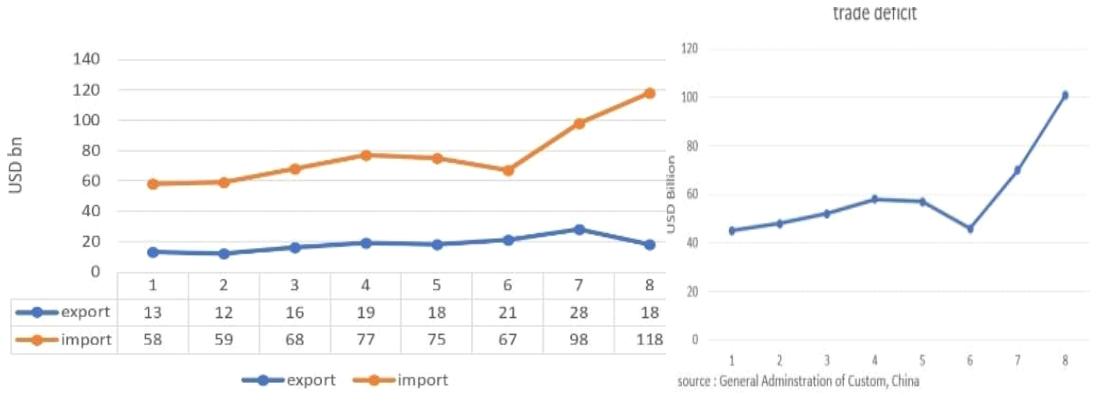
In global trade, domestic consumers cannot be preferred at all times. Yes, in case of emergency, the situation can be different. Moreover, policy-making should be based on more and more empirical research as well as political consensus. The scheme MEIS and SEIS and many such, other subsidy schemes have been challenged in WTO and India had to withdraw many schemes. It is true that taxes and subsidies are not to be exported but quality, standards, packing and WTO policies have to be considered before finalising any policy. It is true that WTO agreement on agriculture is biased in favour of rich. India is presently on chair of G20 so it should combine with other poor countries to bring more justifiable laws in agriculture agreement of WTO. Another important thing to remember is that agriculture production in India has increased manifold from being ship to mouth to becoming a net agriculture exporter, but the greatest stakeholder i.e., farmers income has not grown despite several commitments. So, for long-term sustainable balanced growth farmers income has to rise which can help investments keep coming up from farmers. Regional and microlevel balance also needs attention in agriculture.

Manufacturing exports is another area in which India has failed to achieve its potential. In fact, manufacturing accounts for 15% to 16% of GDP of India, which is dismal looking at the vast potential of skilled labourers, infrastructural facilities and government promotion policies. Even in small countries like Korea and Thailand, manufacturing sector accounts for more than 25% of GDP. Indian manufacturing sector has been an underperformer despite sporadic success in textiles, chemicals, pharmaceuticals, and a little bit of electronics. Even in areas of iron and steel in which India has great advantage in terms of natural resources, India is an underperformer. China is currently

the manufacturing hub of the world. China is producing most inputs for Indian industry (Figure 3). Indian manufacturing is limited to assembly only.

Be it, plastic, electronic chip, chemicals, India has to import from China.

Figure 3: Exports and Imports from China and Trade Deficit



In the area of manufacturing, India has to achieve near self-sufficiency by 2030, which is not at all difficult. New areas of green energy, electronic vehicles provide a chance to new startups and innovation. In this area, the problem is not of lack of government support nor of WTO but of lack of entrepreneurs. In this seminar, various stakeholders are present and must look into specific problems. Post Corona, India has emerged as a great supporter of health care. Corona has led to new hopes and enthusiasm in Indian exporters. The need is only to bring out the innate leadership qualities of Indian industry and manufacturing.

One important area for policymakers and exporters is diversification. The policies of 2004 up to 2020 discuss the role of diversification. But the term shall be discussed in wider form. Diversification of products (especially adding values), diversification of markets (inclusion of Latin America, East America and other small countries), but more importantly diversification of domestic export destinations. A state as big as Uttar Pradesh has a share of 5% in India's exports. It is true that sea coast neighbouring states have an automatic advantage in transportation cost. But that is a thing of past. The connectivity in India has increased tremendously via highways, parvatmala, railways and even airways. Now a backward place like Jamania in east Uttar Pradesh sends fresh vegetables and poultry/meat products to new Delhi market in 10 hours. The main problem is domestic orientation of producers as well as business entrepreneurs. The businessmen are happy as they receive higher price of products in New Delhi as compared to east Uttar Pradesh. The same is true for all metros. All milk producers of 100 km radius supply milk to Mumbai and so on. The need is to re-orient and train local people think global. Now with new physical infrastructure available, the non-durable items (flowers, vegetables, fruits) can be exported with ease. Processing helps in increasing shelf life and this could help reduction in wastage of non-durable agriculture/primary products and increased earnings in the hands of rural population. The success of gems and jewellery, ready-made garments and services can be repeated in many areas of manufacturing. Now the policymakers must

utilise their agencies by surveying the exportable potential which will help both India in earning valuable foreign exchange as well as in increasing income of remote areas.

Another important area for serious research is related to trade agreements. India is very keen on making bilateral trade agreements. Indo Australia and India UK agreement are on cards.

But one must look that any trade agreement whether bilateral or multilateral, India's interest needs to be considered. Indo Asian agreement is one such agreement which has helped ASEAN countries more than India (Figure 4 and 5).

Figure 4: India's Exports and Imports to ASEAN

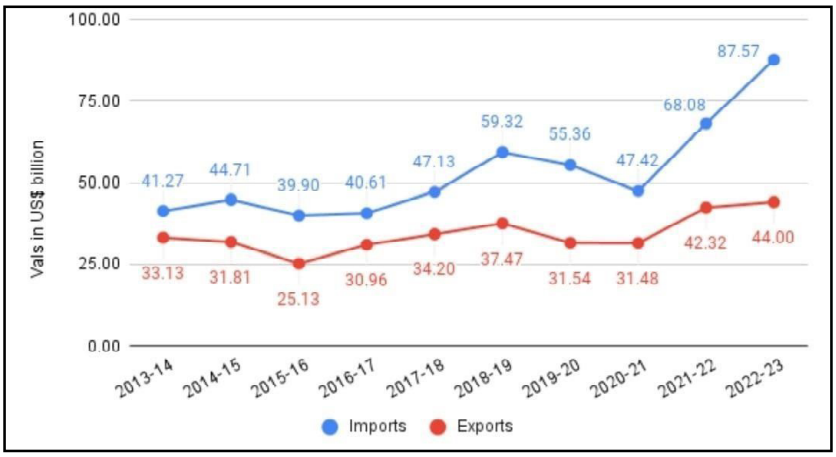
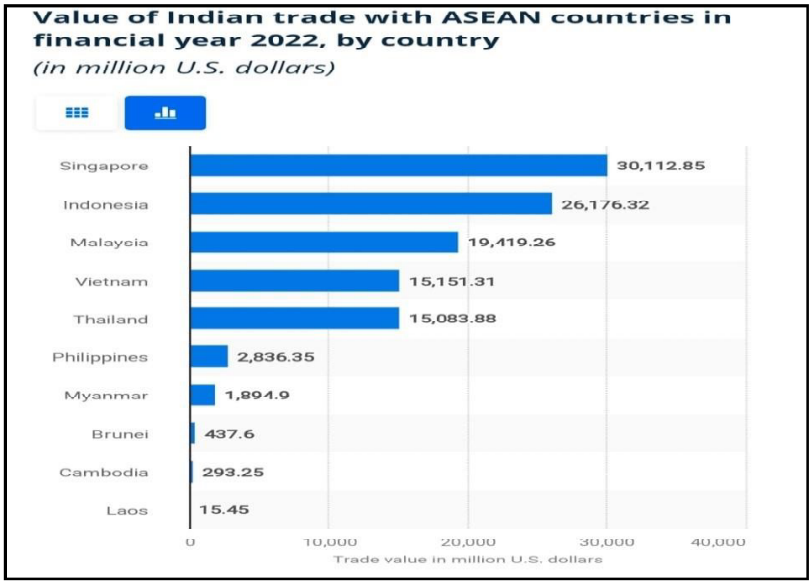


Figure 5: Share of India's Export and Import with ASEAN



Now the evaluation can be done but post-dated evaluation has no meaning. In ASEAN countries trade facilitation cost is less than 5% while in India, it is higher. So, are the other cost like credit. Indian businessmen are not at level playing fields. Moreover, the agreement is only on trade while India could have gained more advantage with free movement of personnels (service 'C') as Indian engineering, medical, legal, management professionals could have moved to these countries. Even investment agreement was not done. Although government official did help Southern states by putting many spices in sensitive list. India had to bow out of APEC as many researches continuously demonstrated that India is likely to lose more than it would benefit. So, although trade is beneficial for growth, employment and demand, but Prebisch has demonstrated that reclassification of competitive advantage has been well programmed by certain countries in their favour and biased against most emerging countries.

So, for future agreements should take time but agreements should be carefully planned so that at least Indian interests are given due importance.

Another great challenge of export promotion of India is huge domestic market. Domestic manufacturers are well settled in domestic market as demonstrated in earlier paras. Foreign market seems risky because of variety of reasons such as inadequate information of foreign markets, their taste and preferences. Moreover, Indian producers and manufacturers have been given protection during first four to five decades post-independence and thus, are afraid of high level of competition in international market with big settled brands along who have great control on media and advertisement. Another area of concern in international competition, especially in agriculture, manufacturing and business is the amount of subsidies and credit facilities that the OECD countries are providing to their exporters. Until recently, in Japan and Germany, the borrowing rates on credit were less than 5% while in India, it was in two digits, trade facilitation cost, port duties, and other infrastructure (real or digital) was completely lacking in India. Sanitary and phytosanitary measures, standards are always managed by OECD countries and they change them suddenly to suit their own trade and use them as a protection mechanism. Therefore, Indian manufacturers and exporters are always hesitant in entering the trade. The mindset and attitude has to change dramatically. Government has adopted various measures by opening various information centres and schemes. The experts here would give a detailed report on them. In fact, Indian economy has always been compared to an elephant, which moves slowly, but this is not the case now. Elephant has got up and started rolling and is all set to challenge dragon. The results would be visible by 2030. Such seminars and outreach programme will only add up to the rapid movement of the export sector by detailed study and schemes for different stakeholders.

Conclusion

In new millennium, India has been one of the fastest growing economies which has helped a large percentage of population above poverty line. The availability of basic good (food, milk, protein) infrastructure (education, health, insurance) and economic (energy, irrigation and transport) has increased many fold. The foreign exchange situation is very comfortable yet many challenges of inequality, employment etc remains. Moreover, the greatest challenge is sustainability of this growth rate which dealing with problems of horizontal and vertical inequality among people, region and

sectors. Trade certainly can be of great help for bringing growth in each above mentioned area provided India sticks to a plan. Concentrate on its strength that is the Agro-based product, manufacturing and services.

In each area, the basic need is to sell value added products which will generate employment and enhance foreign exchange earnings. The planning must be based on Indian traditions and the planners should have a clear-cut long-term policy, instead of adopting a shortcut for example, defence goods production is essential because only a strong country can preach nonviolence. But export and defence products certainly should not be a priority for India even if it gain on foreign exchange for a while. A better option is greener products, medicines, garments and other handicraft goods. Moreover, sustainability cannot be attained by India alone when whole world is busy in fighting. The Russia Ukraine war cannot continue until there are supporters of war. India has been doing should have dialogue, trade as well as economic support to both the groups because world needs Russia as well as Ukraine, USA as well as Vietnam. Trade based on natural comparative advantage is what the world needs and not what is being attempted by certain countries that is competitive advantage. Similarly, export promotion for India is necessary to peg for a Imports. IMF and other institutions have repeatedly been telling the poor emerging country to solve the problem of deficits of balance of trade. Instead they should have been concentrating the problems of balance of trade surplus of few countries like China. A sustainable word or treat is achieved through balances and not services or deficit.

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The Impact of Trade Liberalization on Bilateral Trade Relations between India and Bangladesh

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ABSTRACT

This paper examines the effects of trade liberalization on the bilateral trade relations between India and Bangladesh. Over the past few decades, both countries have undertaken significant economic reforms aimed at liberalizing trade policies. This study analyzes the trends in trade volumes, trade balance, and the composition of traded goods and services between the two nations. It also explores the role of trade agreements, tariff reductions, and non-tariff barriers in shaping trade dynamics. The findings suggest that while trade liberalization has led to an increase in bilateral trade, it has also resulted in a persistent trade deficit for Bangladesh. The paper concludes with policy recommendations to enhance trade cooperation and address the trade imbalance, emphasizing the need for improved infrastructure, streamlined customs procedures, and greater economic integration.

***Keywords**: Trade Liberalization, Trade Relations between India and Bangladesh*

Introduction

The bilateral trade relations between India and Bangladesh have undergone significant transformations over the past few decades, largely influenced by the broader trend of trade liberalization in South Asia. Both countries, as emerging economies, have recognized the potential benefits of reducing trade barriers and fostering economic cooperation. This research paper aims to explore the impact of trade liberalization on the bilateral trade relations between India and Bangladesh, focusing on the period from the 2000s to 2022.

Background

Historically, India and Bangladesh have shared a complex relationship characterized by both cooperation and contention. Following Bangladesh's independence in 1971, India played a crucial role in supporting the nascent nation, laying the groundwork for future economic ties. However,

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political and economic challenges in subsequent decades often hindered the full realization of bilateral trade potential.

Trade Liberalization in South Asia

The 1990s marked a pivotal period for South Asia, with many countries, including India and Bangladesh, embarking on economic reforms aimed at liberalizing their trade regimes. The establishment of the South Asian Free Trade Area (SAFTA) in 2006 further underscored the commitment of regional countries to enhance trade cooperation. For India and Bangladesh, these reforms included reducing tariffs, eliminating non-tariff barriers, and signing bilateral trade agreements to facilitate smoother trade flows.

There are **several bilateral issues** with India, according to Bangladesh, that need to be resolved. These include India's proposed river-linking mega project involving common rivers, sharing the waters of common rivers, implementation of the 1996 Ganges Treaty, Implementation of land boundary demarcation under the 1974 Land Demarcation Agreement, delimitation of maritime boundary, India's fencing of the international land boundary and the 'illegal' presence of millions of Bangladeshis in India. Complementarity between the two countries is also limited. Trade complementarity exists when the supply capability of a particular country matches well the demand capability of its trading partner and the supply capability of the trading partner matches well with the demand potential of the former. It is possible that the supply capability of a particular country matches well with the demand potential of its trading partner but not vice- versa. Thus, there could exist between the two countries a situation of partial complementarity. In the case of India, it has a strong potential to meet Bangladesh's import demands but there is a major lack of such potential on the part of Bangladesh. Studies have shown that India's exports match Bangladesh's imports fairly well but there is a clear lack of complementarity in Bangladesh's exports to India. It is a clear case of partial complementarity. India, perhaps, needs to help Bangladesh in achieving a higher degree of complementarity by encouraging greater Indian investment in Bangladesh.

Review of Literature

- **Basu, S., & Datta, D. (2007*) "India-Bangladesh Trade Relations: Problem of Bilateral Deficit"*** This paper analyzes the persistent bilateral trade deficit of Bangladesh with India. It finds that Bangladesh faces high export competitiveness due to export similarity with India. The lack of complementarity between Bangladesh's exports and India's imports exacerbates the trade deficit. The study uses various trade indices like RCA (Revealed Comparative Advantage) and Cosine measures to examine trade similarity and complementarity. It also explores the potential for intra-industry trade using G-L indices. The paper suggests that Bangladesh should diversify its export structure and adopt an appropriate exchange rate policy to reduce the trade deficit.
- **Hossain, M. (2020) "*Trade Liberalization Policies and Trade Performances in Bangladesh: An Empirical Evaluation*"** This chapter evaluates the impact of various trade liberalization policies implemented in Bangladesh. It highlights the reduction in customs duty rates and the number of tariff slabs over the years. The study finds that

- trade liberalization has significantly enhanced Bangladesh's trade performance, increasing the trade-to-GDP ratio from 12% in 1990 to about 50% in 2015. However, the chapter also notes that further liberalization is needed to eliminate biases and rationalize supplementary import duties and non-tariff barriers.
- **Sikdar, C., Ten Raa, T., Mohnen, P., & Chakraborty, D. (2006) "*Bilateral Trade between India and Bangladesh: A General Equilibrium Approach".*** This paper uses a general equilibrium approach to analyze the bilateral trade between India and Bangladesh. It examines the effects of trade liberalization policies on the economies of both countries. The study finds that trade liberalization has led to increased trade volumes and economic integration. However, it also highlights the challenges posed by structural differences in the economies of India and Bangladesh, which affect the overall trade balance.
- **World Bank (2020) "*Unlocking Bangladesh-India Trade*"** This study focuses on the impact of increased market access in India on Bangladesh's economy. It identifies both static and dynamic gains from trade liberalization. The report shows that both countries would benefit from opening up their markets to each other. It emphasizes the need for improved infrastructure, streamlined customs procedures, and policy reforms to enhance trade cooperation. The study also highlights the potential for increased foreign direct investment (FDI) and economic growth through greater economic integration.

Objectives of the Study

This paper seeks to analyze the following key aspects:

- Trends in Bilateral Trade: Examining the growth in trade volumes, trade balance, and the composition of traded goods and services between India and Bangladesh.
- Challenges and Opportunities: Identifying the challenges faced by both countries in maximizing the benefits of trade liberalization and exploring potential opportunities for further economic integration.
- Policy Recommendations: Providing policy recommendations to address trade imbalances and enhance bilateral trade cooperation.

Research Question

1. What are the main factors contributing to the trade imbalance between India and Bangladesh?
2. What challenges and opportunities have emerged for India and Bangladesh as a result of trade liberalization?

Methodology

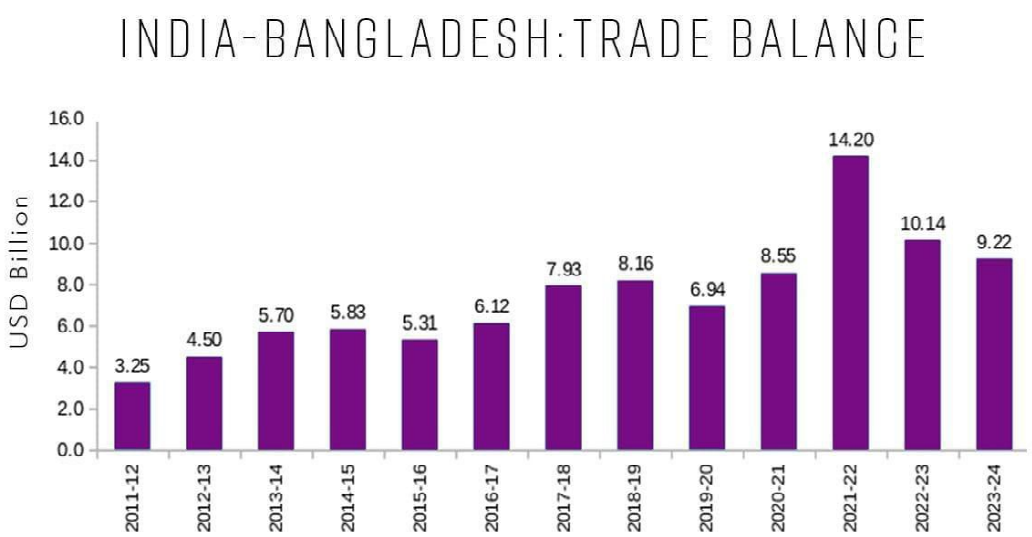
DATA TYPE AND SOURCE- The type of data is quantitative in nature and whole part of the data is collected from secondary source. The main source of the secondary data used in the study are from the https://oec.world/en/profile/bilateral-country/ind/partner/bgd i.e.. World bilateral profile.

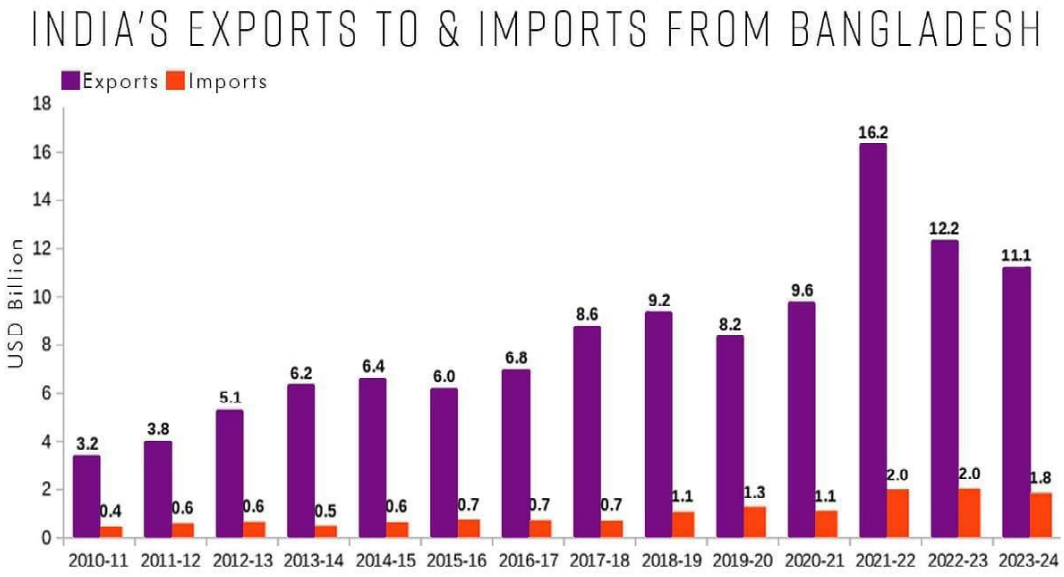
Limitation of the Study - The study's scope is limited to India and Bangladesh.

Result and Discussion

Year	Exports from India ( ) to Bangladesh	Exports from Bangladesh to India
2022	$13.8 B	$2 B
2021	14.1 B	1.76 B
2020	7.91 B	1.02 B
2019	8.24 B	1.21 B
2018	8.74 B	894 M
2017	7.17 B	589 M
2016	5.67 B	676 M
2015	5.82 B	631 M
2014	6.26 B	517 M
2013	5.7 B	510 M
2012	4.96 B	587 M
2011	3.8 B	609 M
2010	3.3 B	384 M
2009	2.31 B	259 M
2008	3.3 B	336 M
2007	2.27 B	520 M
2006	1.84 B	252 M
2005	1.71 B	136 M
2004	1.62 B	91.3 M
2003	1.67 B	88.2 M
2002	1.17 B	72.7 M
2001	1.14 B	62.4 M
2000	791 M	101 M

Note- (B) denote billion and (M) denote million
Source: Directorate General of Foreign Trade, Ministry of commerce and Industry, G.O.I and





Source: CMIE Reports Data Analysis

Trade Balance of India = ValueofExport-ValueofImport

Trade balance of India is always positive by analyzing the above table data. India has a trade surplus with Bangladesh, with India's exports to Bangladesh outpacing its imports, While Bangladesh has a trade deficit with India.

Trade Volume

Trade Volume Trend: India and Bangladesh (2000-2022)

The trade volume between India and Bangladesh has seen significant growth from 2000 to 2022. The detailed analysis of the trend over these years:

Key Trends

2000-2005: The trade volume was relatively modest, with gradual increases each year. Exports from India to Bangladesh were primarily in textiles, machinery, and agricultural products.

2005-2010: There was a noticeable increase in trade volume, driven by economic reforms and improved bilateral relations. Key exports included refined petroleum, cotton, and machinery.

2010-2015: This period saw a significant rise in trade volume. India's exports to Bangladesh grew substantially, with refined petroleum, cotton yarn, and raw cotton being major contributors. Imports from Bangladesh also increased, with garments and textiles being the primary imports.

2015-2020: The trade volume continued to grow, with India exporting a diverse range of products including refined petroleum, cotton yarn, and machinery. Bangladesh's exports to India also diversified, with significant contributions from garments, textiles, and vegetable oils.

2020-2022: Despite the global economic challenges posed by the COVID-19 pandemic, the trade volume between India and Bangladesh remained robust. In 2022, India exported $13.8 billion worth of goods to Bangladesh, while Bangladesh exported $2 billion worth of goods to India.

Growth Rates

Exports from India to Bangladesh: Over the past two decades, India's exports to Bangladesh have grown at an annualized rate of approximately 14%.

Imports from Bangladesh to India: Bangladesh's exports to India have grown at an annualized rate of around 27.7% over the past five years**.**

Trade Composition

India's Exports to Bangladesh: Major export categories include refined petroleum, non- retail pure cotton yarn, and raw cotton.

Bangladesh's Exports to India: Key export categories include non-knit men's suits, other pure vegetable oils, and textile scraps.

Challenges and Opportunities in India-Bangladesh Trade Liberalization

- **Challenges**

Trade Imbalance:

Issue: India has a significant trade surplus with Bangladesh, which can lead to economic and political tensions.

Impact: This imbalance may discourage Bangladesh from further liberalizing trade if it perceives that the benefits are not mutual.

Non-Tariff Barriers (NTBs):

Issue: Both countries face NTBs such as stringent customs procedures, regulatory standards, and bureaucratic hurdles.

Impact: These barriers can slow down trade, increase costs, and reduce the efficiency of cross-border transactions.

Infrastructure Deficiencies:

Issue: Inadequate infrastructure, including poor road and rail connectivity, and limited port facilities, hampers trade efficiency.

Impact: This can lead to delays, increased transportation costs, and reduced competitiveness of goods.

Political and Diplomatic Issues:

Issue: Political tensions and diplomatic disputes can affect trade relations.

Impact: These issues can lead to trade restrictions, tariffs, and other barriers that hinder economic cooperation.

Economic Diversification:

Issue: Both countries have limited diversification in their export portfolios.

Impact: Over-reliance on a few key sectors makes them vulnerable to market fluctuations and reduces the potential for trade expansion.

• Opportugnities

Enhanced Economic Cooperation:

Opportunity: Strengthening economic ties through bilateral agreements and regional cooperation frameworks like SAFTA.

Benefit: This can lead to reduced tariffs, streamlined customs procedures, and increased trade volumes.

Infrastructure Development:

Opportunity: Investing in infrastructure projects such as roads, railways, and ports. Benefit: Improved infrastructure can enhance trade efficiency, reduce costs, and boost competitiveness.

Diversification of Trade:

Opportunity: Encouraging diversification in export products and services.

Benefit: This can reduce vulnerability to market fluctuations and open up new markets for both countries.

Digital Trade and E-commerce:

Opportunity: Leveraging digital platforms and e-commerce to facilitate trade.

Benefit: This can reduce transaction costs, increase market access, and promote small and medium-sized enterprises (SMEs).

Skill Development and Capacity Building:

Opportunity: Investing in skill development and capacity building initiatives.

Benefit: This can enhance the workforce's capabilities, improve productivity, and attract foreign investment.

Sustainable Trade Practices:

Opportunity: Promoting sustainable and environmentally friendly trade practices.

Benefit: This can lead to long-term economic growth, environmental protection, and compliance with global standards.

Policy Recommendation

To enhance bilateral trade cooperation between India and Bangladesh, it is essential to address existing challenges while leveraging potential opportunities. Both countries should focus on streamlining customs procedures and reducing non-tariff barriers to facilitate smoother trade flows. Simplifying and harmonizing customs processes, along with establishing mutual recognition agreements for standards and certifications, can significantly reduce trade barriers. Investing in cross-border infrastructure, such as roads, railways, and ports, is crucial to improve connectivity and trade efficiency. Projects like the India-Bangladesh Friendship Bridge and the Maitree Express train service should be expanded to enhance physical connectivity. Additionally, promoting digital trade and e- commerce can reduce transaction costs and increase market access for small and medium-sized enterprises (SMEs). Facilitating cross-border digital payment systems will support e-commerce and reduce transaction times.

Strengthening economic ties through bilateral agreements and regional cooperation frameworks like the South Asian Free Trade Area (SAFTA) can further enhance trade relations. Negotiating new bilateral trade agreements focusing on sectors with high growth potential, such as textiles, pharmaceuticals, and IT services, will promote economic cooperation. Regulatory harmonization is another critical area; aligning standards and regulations in key sectors will facilitate trade by reducing

administrative burdens. Implementing single window systems for trade documentation can simplify processes and improve efficiency.

Moreover, promoting sustainable and environmentally friendly trade practices is essential for long-term economic growth. Encouraging the use of renewable energy and sustainable materials in production and trade will help protect the environment and ensure compliance with global standards. By addressing these challenges and leveraging these opportunities, India and Bangladesh can enhance their bilateral trade cooperation, leading to increased economic growth and regional integration.

Conclusion

While there are challenges in maximizing the benefits of trade liberalization between India and Bangladesh, there are also significant opportunities for further economic integration. By addressing the challenges and leveraging the opportunities, both countries can enhance their trade relationship, promote economic growth, and improve regional cooperation.

The trade imbalance between India and Bangladesh is influenced by several key factors. One of the primary reasons is the limited export base of Bangladesh. While Bangladesh's exports are concentrated in a few sectors, such as ready-made garments, India's exports are highly diversified, covering a wide range of products including refined petroleum, machinery, and pharmaceuticals. This diversification allows India to export more to Bangladesh than it imports. Another significant factor is the infrastructure deficiencies in Bangladesh. Inadequate infrastructure, including poor road and rail connectivity and limited port facilities, hampers the efficiency of trade. This leads to higher transportation costs and delays, making Bangladeshi exports less competitive.

Non-tariff barriers (NTBs) imposed by India also contribute to the trade imbalance. These barriers include stringent customs procedures, regulatory standards, and bureaucratic hurdles that make it difficult for Bangladeshi products to enter the Indian market1. Additionally, the appreciation of Bangladesh's Taka against the Indian Rupee has made Bangladeshi goods more expensive and less attractive in the Indian market. Furthermore, illegal trade and smuggling across the border exacerbate the trade imbalance. These activities distort official trade statistics and undermine the economic benefits of legitimate trade1. Lastly, the technologically advanced industrial base of India allows it to produce and export high-value goods, whereas Bangladesh's industries are often less developed and less productive. Addressing these issues requires concerted efforts from both countries, including improving infrastructure, reducing non-tariff barriers, and promoting export diversification in Bangladesh.

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