India's Agricultural Transformation

From Food Scarcity to Surplus

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PHD CHAMBER OF COMMERCE AND INDUSTRY

India’s Agricultural Transformation: From Food Scarcity to Surplus

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PHD Chamber's Viewpoint

Shri Hemant Jain
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India's agricultural journey has seen a remarkable transformation, evolving from a food-deficit nation to a global food surplus powerhouse. Over the past decade, agriculture has consistently grown at an average rate of 3.7%, with key government policies playing a crucial role in enhancing productivity and ensuring food security. From implementing reforms in 1991 to recent advancements in technology and infrastructure, India has bolstered its agricultural output. This sustained growth, particularly in food grains, has not only met domestic needs but also enhanced India's status as a major player in the global agriculture export market.

Shri Rajeev Juneja
Senior Vice President
PHDCCI

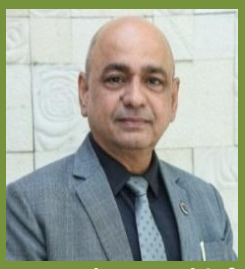
Technological advancements have significantly shaped India's agricultural practices, contributing to increased resilience in food production. It is evident that irrigation technologies and infrastructure improvements have significant impact on food grain production. Modern irrigation practices have reduced India's dependence on erratic monsoons, reflecting a significant shift toward sustainable agricultural practices. To boost this progress, it is recommended that focus on investments in irrigation technology be prioritized further, alongside policy measures aimed at reducing reliance on chemical fertilizers, fostering a more sustainable future for Indian agriculture.

Shri Anil Gupta
Vice President
PHDCCI

Government support has been instrumental in driving India's agricultural sector forward, particularly through subsidies, price support mechanisms, and targeted schemes. Initiatives like the Agriculture Infrastructure Fund and farmer-producer organizations have strengthened market access and diversified income sources for farmers, especially in horticulture and allied sectors. Such measures have not only improved the livelihoods of millions of rural households but also fortified the sector against challenges like climate change. As India continues to prioritize agriculture, sustained government intervention will be essential to support high growth, innovation, and rural employment.

Dr. Ranjeet Mehta
CEO & Secretary General
PHDCCI

India's agriculture sector has displayed remarkable resilience, maintaining steady growth even through difficult periods like the COVID-19 pandemic. The sector’s robust performance, driven by government policies, modern irrigation, and market infrastructure improvements, allowed it to recover quickly in the post-pandemic period. The sector remains vital to India's economy, showing continued steady growth, ensuring that agriculture will continue to play a central role in India’s development trajectory, addressing both domestic needs and global demands.



Dr S P Sharma Chief Economist
Deputy Secretary General

India's agricultural exports have surged, with a significant increase from USD 37 billion in 2012-13 to over USD 48 billion in 2023-24. This growth highlights India's capacity to meet global food demand while maintaining domestic food security. Despite global disruptions, India's agricultural exports remained resilient, with exports of more than USD 32 billion for 2024-25 (April-November). The government's management of key commodities and export policies have helped India navigate global market fluctuations, underscoring the sector's vital role in the economy.

Table of Contents

Executive Summary

India has achieved significant milestones, propelling it to a dynamic and contemporary economy standing strong amidst the global economic uncertainties. A series of transformative shifts have occurred in India's growth journey so far, including ensuring food security, implementing the economic reforms of 1991, attaining nuclear capabilities, launching indigenous satellites, and evolving into a global software hub, among others. India's agriculture sector has played a crucial role in India's development.

India is an agrarian economy, with more than 50% of population dependent directly or indirectly on agriculture. India has undergone a remarkable transformation, evolving from a food-scarce nation to a food-surplus powerhouse. From 2012-13 to 2023-24, the sector maintained a growth rate of 3.7% (average), underscoring its steady contribution to the nation's economy.

Even during the pandemic years, agriculture remained a vital and robust sector, achieving a commendable 4% (average) growth rate in 2020-21. This resilience was further evidenced by a solid recovery in the post-pandemic period. Agriculture growth for 2024-25 is estimated at 3.8%, reflecting the sector's ability to support India on its glorious path to Viksit Bharat@2047.

The agricultural and allied sector has displayed robust performance over the past few years, largely attributed to government measures supporting this sector. These measures include ensuring favorable pricing for farmers, subsidies, targeted schemes, encouraging crop diversification, and enhancing market infrastructure through the establishment of farmer-producer organizations and Agriculture Infrastructure Fund, among others. The Centre and the state governments are boosting India's agriculture sector with their strategic policy measures. There has been a particular emphasis on the horticulture sector and allied activities for diversifying farmers' income sources, creating employment and enhancing their resilience against weather-related challenges.

India's agriculture sector is displaying strength in boosting India's exports. Agriculture exports experienced substantial growth, increasing from more than USD 37 billion in 2012-13 to over USD 52 billion in 2022-23, marking the highest level achieved between 2012-13 and 2023-24. This achievement underscores the sector's strong performance in international markets. In 2023-24, exports stabilized at over USD 48 billion, reflecting a slight adjustment influenced by global factors such as the Red Sea situation and the Russia-Ukraine conflict, as well as domestic policies aimed at managing critical commodities like rice, wheat, sugar, and onions. India's agricultural exports continue to be resilient, with exports of more than USD 32 billion for 2024-25 (April-November).

India's agriculture is popularly believed to be rain fed. For the period from 2012-13 to 2023-24, both rainfall range and foodgrain production growth display a fluctuating pattern. Coupled with normal rainfall, the foodgrain production has followed an upward trend. For the year 2024-25, we expect foograin production to be about 3357 lakh tonnes, given the normal

rainfall range, showing a growth of 2%. The correlation between foodgrain production and rainfall range stands at about 50% which means that they have moderate positive correlation. This indicates that agriculture, especially foodgrain production in India, is only moderately rainfed now, with the continued hand holding by the government, coming of modern technology and widespread irrigation methods. Food grain production has consistently demonstrated a strong upward trend throughout the analyzed period, reflecting the sector's remarkable growth and resilience. From the fiscal year 2014-15 to 2023-24, food grain output surged from 2520 lakh tonnes to an impressive 3288 lakh tonnes, marking a significant expansion in agricultural productivity.

India has seen substantial changes in agricultural methods, technological improvements, and legislative reforms over the last decade. These changes have had an impact on the performance of the sector, bringing both possibilities and challenges in the pursuit of sustainable development. Moreover, India's agriculture, allied and food processing sectors are dependent on factors such as the irrigation and inflation among others. Hence, there is a need to support these sectors with strategic policy initiatives, especially in the foodgrain production as food grains act as the basic input for most of the agriculture processing industries and their production is dependent on volatile factors.

Given the dynamic nature of foodgrain production in our country, it is essential to gauge the factors impacting agriculture, allied and food processing sectors. These factors include Wholesale Price Index (WPI) (Food Articles), Electricity Consumption in Agriculture, warehousing capacity, Annual Rainfall and Consumption of Fertilizers.

According to the regression analysis undertaken by the present study, the WPI, electricity consumption, warehousing capacity, and gross irrigated area all have a substantial impact on food grain output in India. Rainfall does not appear to have a statistically significant impact, contradicting the traditional perception of India's reliance on monsoon rains for agricultural purposes. The significance of gross irrigated area in the analysis indicates that the agriculture sector has made significant technological advances. This movement represents a shift from traditional reliance on rainfall toward modern irrigation technologies, indicating a substantial evolution in India's agricultural practices and increased resilience in food grain production.

It is recommended that more innovation should be undertaken to strengthen irrigation technology further, so that agriculture can be free from the impact of the fluctuating monsoons in India. Since, India is swiftly moving towards greater implementation of sustainability in every sector, hence it is essential that the role of chemical fertilizers be reduced gradually.

Proper incentive mechanism needs to be developed to make the shift towards sustainable agriculture, especially food grain production in India. As per the analysis undertaken, fertilizers and electricity have a significant impact on foodgrain production which indicates that the government via prudent policy measures and subsidies should focus on enhanced ease of availability of electricity and fertilizer. We recommend that Government should continue these handholding measures for agriculture and allied sector.

1. Overall Trend in Agricultural Growth (2012-13 to 2023-24)

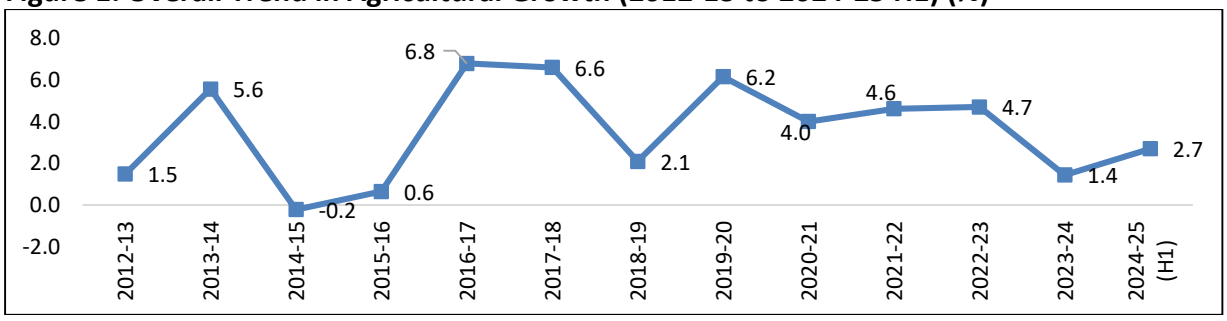
Since Independence, India has achieved numerous significant milestones, from a newly independent to a dynamic and contemporary economy. A series of transformative shifts have occurred, including ensuring food security, implementing the Economic Reforms of 1991, attaining nuclear capabilities, launching indigenous satellites, and evolving into a global manufacturing hub, among other accomplishments.

At the core of all these advancements lies the pivotal role of agriculture, acting as the driving force that liberated the economy from food scarcity to concentrate on the growth of other sectors. This was made possible because post the 1970s, successive governments no longer had to grapple with concerns of food scarcity. Indian agriculture's significance was reaffirmed during the recent Covid-19 pandemic, as it exhibited remarkable growth. Throughout the pandemic, government was relieved of the burden of food shortages, enabling them to dedicate their efforts to managing the crisis.

The trajectory of Indian agriculture has undergone a profound transformation, starting from the "Grow More Food Campaign" to the "Green Revolution" of the mid-1960s, and progressing to recent advancements in "biotechnology". The incorporation of technologies such as Artificial Intelligence and drones has revolutionized farming from what it was during the initial decades following Independence.

Over the past decade, India has experienced significant shifts in agricultural practices, technological advancements, and policy reforms. These changes have influenced the sector's performance, presenting both opportunities and challenges in the pursuit of sustainable development.

Figure 1: Overall Trend in Agricultural Growth (2012-13 to 2024-25 H1) (%)



Source: PHD Research Bureau, PHDCCI compiled from RBI and MOSPI

India's agricultural sector has demonstrated resilience and adaptability over 2012-13 to 2024-25 (HI), showcasing its ability to navigate varying economic conditions. From 2012-13 to 2023-24, the sector-maintained growth rate of 3.7% (average), underscoring its steady contribution to the nation's economy. The sector reached an impressive peak of 6.8% growth in 2016-17, reflecting a period of strong expansion.

Even during the pandemic years, agriculture remained a vital and robust sector, achieving a commendable 4% (average) growth rate in 2020-21. This resilience was further evidenced by a solid recovery in the post-pandemic period, with the growth rate rising to 4.7% in 2022-23. The growth rate moderated to 1.4% in 2023-24, and in the first quarter of 2024-25 the agriculture growth rate was 2%, this reflects the sector's ongoing adaptability to changing conditions, ensuring its continued significance in the broader economic landscape.

Overall, India's agricultural sector continues to be a pillar of strength, demonstrating consistent performance and a capacity to rebound effectively, even in the face of challenges. Its ability to maintain a positive trajectory across different intervals highlights the sector's enduring vitality and importance to the country's development.

2. Food grain production

India has undergone a remarkable transformation, evolving from a food-scarce nation to a food-surplus powerhouse. This journey is marked by a significant increase in food grain production, which has not only ensured domestic food security but also positioned India as a key player in the global agricultural market. The country's agricultural sector has grown substantially over the past decades, driven by advancements in farming practices, strategic government policies, and increased investments in agriculture infrastructure and technology. As a result, India is now capable of not only meeting its own food needs but also contributing to global food supplies through robust agricultural exports.

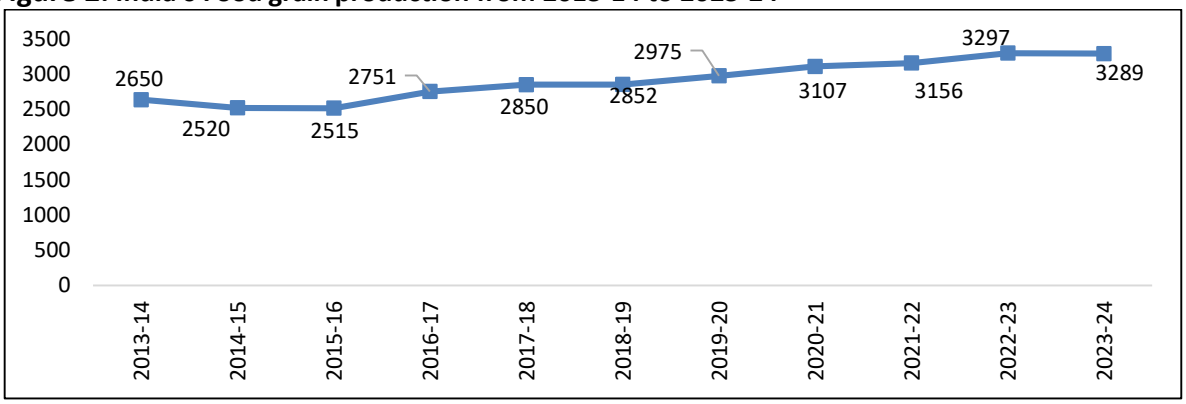
Table- 1 India's Food grain production from 2013-14 to 2023-24

Years	Total Food grain production (lakh tonnes)
2013-14	2650
2014-15	2520
2015-16	2515
2016-17	2751
2017-18	2850
2018-19	2852
2019-20	2975
2020-21	3107
2021-22	3156
2022-23	3297
2023-24	3289
Average	**2904**

Source: PHD Research Bureau, PHDCCI compiled from RBI

Food grain production has consistently demonstrated a strong upward trend throughout the analyzed period, reflecting the sector's remarkable growth and resilience. From the fiscal year 2013-14 to 2022-23, food grain output surged from 2650 lakh tonnes to an impressive 3297 lakh tonnes, marking a significant expansion in agricultural productivity.

Figure 2: India's Food grain production from 2013-14 to 2023-24



Source: PHD Research Bureau, PHDCCI compiled from RBI

This robust increase not only highlights the sector's capacity for sustained growth but also underscores its crucial role in securing the nation's food supply. The consistent rise in production is indicative of the sector's ability to adapt to changing conditions, employ advanced agricultural practices, and benefit from supportive government policies.

Furthermore, this growth reflects the sector's pivotal contribution to meeting the demands of a growing population while also creating opportunities for expanded exports. As the nation continues to build on this momentum, the agricultural sector remains central to ensuring long-term food security and driving economic development through increased productivity and export potential.

3. India's robust Agricultural Exports

India has demonstrated an amazing growth trajectory from a food-scarce to a food- sufficient, to a food-surplus country. All agricultural revolutions, spurred by inventions, incentives, and institutions, have effectively transformed India into a net exporter of agricultural produce.

The government unveiled a comprehensive Agri Export Policy (AEP) in 2018 that focuses on a farmer-centric approach and envisions the promotion of export-oriented production through the encouragement of infrastructure and logistics to enable agricultural exports and the promotion of value-added products. Since the introduction of AEP, India's export has performed well, even throughout the pandemic.

Agriculture exports experienced substantial growth, increasing from more than USD 37 billion in 2012-13 to over USD 52 billion in 2022-23, marking the highest level achieved between 2012-13 and 2023-24. This achievement underscores the sector's strong performance in international markets. In 2023-24, exports stabilized at over USD 48 billion, reflecting a slight adjustment influenced by global factors such as the Red Sea situation and the Russia-Ukraine conflict, as well as domestic policies aimed at managing critical commodities like rice, wheat, sugar, and onions. Despite these adjustments, the overall export performance remains robust, highlighting the sector's resilience and its significant role in the global agricultural trade landscape.

Table-2 Top 10 agricultural export commodities of India (2023-24)

S.No	Commodity	Export (in million USD)	%Share in total agriculture exports
1	Marine products	7,372	15.3
2	Rice -basmoti	5,843	12.1
3	Rice(other than basmoti)	4,573	9.5
4	Spices	4,249	8.8
5	Buffalo meat	3,743	7.7
6	Sugar	2,825	5.8
7	Oil meals	1,714	3.5
8	Misc processed items	1,654	3.4
9	Fresh fruits	1,147	2.4
10	Castor oil	1,072	2.2
11	Others	11,378	23.6
	Total	**48,298**	**100.0**

Source: PHD Research Bureau, PHDCCI compiled from Ministry of Commerce

The top 10 agriculture export commodities contribute more than 72% of total agriculture exports. Marine products play a significant role in India's agricultural exports, making up more than 15% of the total agriculture exports, with a value of USD 7,372 million in 2023-24. They are followed by key commodities such as basmati rice, non-basmati rice, spices, and various other agricultural products. Together, these exports have contributed to a substantial total value of more than USD 34 billion in the year 2023-24. This diverse export portfolio highlights the strength and variety of India's agricultural sector, showcasing its ability to cater to both global and domestic markets with a wide range of high-demand products.

Simultaneously, agricultural exports have also seen a rise, reflecting the sector's enhanced global competitiveness and foreign attractiveness of Indian produce. Exports have increased from more than USD 37 billion in 2012-13 to more than USD 48 billion in 2023-24 to USD 32 billion in 2024-25 (April-November), underscoring the sector's ability to meet rising international demand and its critical role in driving economic growth. This dual growth in both output and exports highlights the ongoing transformation of India's agricultural landscape, positioning it as a key player in the global agricultural market.

4. Analysis of Agricultural schemes and way forward

The agricultural schemes and subsidies provided by the Government of India and state governments play a crucial role in boosting the agriculture sector, which is the backbone of the Indian economy. These initiatives ensure that farmers, especially small and marginal, have access to affordable inputs such as seeds, fertilizers, and machinery. For instance, the government offers subsidies on quality seeds and fertilizers under schemes like the National Food Security Mission (NFSM), which helps enhance crop productivity and reduce input costs. Additionally, the Pradhan Mantri Fasal Bima Yojana (PMFBY) provides crop insurance, protecting farmers against losses due to adverse weather conditions, thus offering financial security and encouraging investment in agriculture.

Government support to farmers routed through subsidies, has its impact on each aspect of agriculture including irrigation, market access, and infrastructure, among others. Irrigation is another critical area addressed by government policies. The Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) promotes efficient water use through micro-irrigation systems like drip and sprinkler irrigation, significantly benefiting water-scarce regions. This initiative helps expand irrigation coverage, improving productivity, especially in drought-prone areas. Mechanization is encouraged through subsidies on agricultural equipment under the Sub-Mission on Agricultural Mechanization (SMAM), which allows farmers to access modern farm machinery, enhancing productivity and reducing labor costs.

In addition to input subsidies, the government promotes sustainable and climate-resilient farming practices through programs like the National Mission for Sustainable Agriculture (NMSA) and the Paramparagat Krishi Vikas Yojana (PKVY), which support organic farming and eco-friendly agricultural methods. These initiatives improve soil health, reduce environmental impact, and help farmers adapt to climate change. Financial support schemes like the Kisan Credit Card (KCC) provide affordable credit to farmers, enabling them to invest in better inputs and technologies. The PM-KISAN scheme, which offers direct income support, further strengthens farmers' financial stability, allowing them to meet both farming and household needs.

In terms of market access, platforms like e-NAM (National Agriculture Market) have revolutionized how farmers sell their produce by connecting them directly to buyers, ensuring better prices and reducing the role of middlemen. Furthermore, infrastructure development schemes, such as the Gramin Bhandaran Yojana, provide storage solutions, reducing post-harvest losses and allowing farmers to store produce until they can sell at favorable prices. The focus on high-value crops through the Mission for Integrated Development of Horticulture (MIDH) and livestock through the National Livestock Mission (NLM) has helped diversify income sources for farmers, making agriculture more lucrative and resilient.

The government's agricultural schemes and subsidies have significantly boosted the sector by increasing productivity, ensuring financial security, and promoting sustainable practices. These initiatives play a vital role in improving the livelihoods of farmers, enhancing food security, and driving rural development across India.

1. Central Government Schemes for supporting agriculture

The Government of India through its scheme and policy initiatives has been boosting the agriculture sector, especially farmer income. These schemes include;

1.1 Pradhan Mantri Fasal Bima Yojna

Pradhan Mantri Fasal Bima Yojana (PMFBY) is the government sponsored crop insurance scheme that integrates multiple stakeholders on a single platform.

Objective:

- The PMFBY works on the One Nation, One Crop, One Premium.
- To provide insurance coverage and financial support to the farmers in the event of failure of any of the notified crops as a result of natural calamities, pests & diseases.
- To stabilize the income of farmers to ensure their continuance in farming.
- To encourage farmers to adopt innovative and modern agricultural practices.
- To ensure the flow of credit to the agriculture sector.

Benefits:

The benefits of this scheme are mentioned as under:

- Comprehensive insurance coverage for Kharif and Rabi crops.
- Add on the coverage available for specific circumstances.
- Optional for farmers, both loanee and non-loanee.
- Stability in the income of farmers so that they can continue farming.

Eligibility

- The farmer must be a cultivator or a sharecropper on the insured land.
- Farmers must have a valid and authenticated land ownership certificate or a valid land tenancy agreement.
- The farmer must have applied for insurance coverage within the prescribed time frame, which is generally within 2 weeks of the start of the sowing season.
- They must not have received any compensation for the same crop loss from any other source.
- The farmer should have a valid bank account and provide details of their bank account, along with a valid identity proof, at the time of enrollment
- All farmers growing notified crops in a notified area during the season who have an insurable interest in the crop are eligible.

1.2 Pradhan Mantri Krishi Sinchayee Yojana: Per Drop More Crop

The scheme "Pradhan Mantri Krishi Sinchayee Yojana: Per Drop More Crop" was launched by the Department of Agriculture & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India on 1st July 2015. The scheme mainly focuses on enhancing water use efficiency at the farm level through Micro Irrigation (Drip and Sprinkler Irrigation System). Besides, it also supports micro-level water storage, and water conservation/management activities (Other Interventions) to supplement source creation for Micro Irrigation.

Objectives:

- Increase the area under micro irrigation technologies to enhance water use efficiency in the country.
- Increase the productivity of crops and income of farmers through precision water management.
- Promote micro-irrigation technologies in water-intensive/consuming crops like sugarcane, banana, cotton, etc., and give adequate focus to extend the coverage of field crops under micro-irrigation technologies.

- Make potential use of micro irrigation systems for promoting fertigation.
- Promote micro-irrigation technologies in water-scarce, water-stressed, and critical groundwater blocks/districts.
- Link tube-well / river-lift irrigation projects with micro irrigation technologies for the best use of energy both for lifting and pressurized irrigation as far as possible.
- Establish convergence and synergy with activities of ongoing programmes and schemes, particularly with created water sources for their potential use, integration of solar energy for pressurized irrigation, etc.
- Promote, develop, and disseminate micro irrigation technology for agriculture and horticulture development with modern scientific knowledge.
- Create employment opportunities for skilled and unskilled persons, especially unemployed youth for installation and maintenance of micro irrigation systems.

Benefits

- Financial assistance to farmers for the installation of irrigation components under Micro Irrigation (all assets/ water sources for this must be mandatorily linked with a Micro Irrigation system to achieve water use efficiency).
- Installation of drip or sprinkler irrigation in the farmers' field for selected crops.
- Installation of the irrigation system can be done either by the farmers themselves or by the selection of any approved Micro Irrigation companies.
- The pattern of assistance payable to the beneficiary under the micro irrigation scheme will be 55% for small and marginal farmers and 45% for other farmers which will be met by both the Central Government and State Government in the ratio of 60:40 for all states except the North Eastern and Himalayan states. In the case of these states, the ratio of sharing is 90:10. For the Union Territories, the funding pattern is 100% granted by the Central Government.
- Direct Benefit Transfer into the accounts of farmers.
- Farmers can also avail benefits like water harvesting structures both at individual and community levels, water lifting devices for conveyance efficiency, and digging of a farm pond, under Other Interventions of Per Drop More Crop.

Eligibility

- The applicant should be a citizen of India.
- All the farmers of the State & Union Territory are eligible to take the benefits of this scheme.
- The subsidy payable to the beneficiary will be limited to an overall ceiling of 5 hectares per beneficiary.

Note 01: The beneficiary has to purchase only BIS-marked systems/components under the scheme.
Note 02: The scheme is to be implemented through the mechanism of Direct Benefit Transfer (DBT). Aadhaar details of the beneficiary are required to access the benefit of the programme.

1.3 Sub-Mission on Agricultural Mechanization (SMAM)

Agricultural machines take an important role to increase productivity with timely and precise fieldwork. To promote the usage of farm mechanization and increase the ratio of farm power to cultivable unit area up to 2.5 kW/ha, the scheme will be implemented in all the Indian states

The SMAM scheme has both centrally sponsored and central sector scheme components. In the centrally sponsored scheme components, the Government of India funds 60% of the cost and the states' share is 40% in all states except north-eastern and Himalayan states where the ratio is 90:10 wherein Government of India (GOI) funds 90%. In UTs, the central share is 100%.

Mission Components

- Promotion and Strengthening of Agricultural Mechanization through Training, Testing and Demonstration.
- Demonstration, Training and Distribution of Post-Harvest Technology and Management (PHTM).
- Financial Assistance for Procurement of Agriculture Machinery and Equipment.
- Establish Farm Machinery Banks for Custom Hiring.
- Establish Hi-Tech, High Productive Equipment Hub for Custom Hiring.
- Promotion of Farm Mechanization in Selected Villages.
- Financial Assistance for Promotion of Mechanized Operations/hectare Carried out Through Custom Hiring Centres.
- Promotion of Farm Machinery and Equipment in the North-Eastern Region.

Objectives

The stated objectives of the SMAM scheme are as follows.

- The main objective of this scheme is to provide agricultural machinery to poor and economically weak farmers and this subsidy is given by the government.
- Enhancing the reach of farm mechanization to small & marginal farmers and to the regions where farm power availability is low.
- Promoting 'Custom Hiring Centres' to mitigate the adverse economies of scale caused due to small landholding and the high cost of individual ownership.
- Generating awareness among stakeholders through demonstration and capacity-building activities.
- Developing hubs for hi-tech & high-value farm equipment.
- Ensuring performance testing and certification at designated testing centres.

Benefits

- Under the SMAM scheme of the central government, farmers are provided with the benefit of subsidies ranging from 50 to 80 % for buying agricultural machinery.
- Under the scheme, priority is given to women farmers.
- Farmers can take advantage of subsidies on agricultural machinery so that they will be able to get agricultural machinery at a low cost.

- Through this scheme, farmers can easily purchase agricultural equipment.
- With the help of agricultural equipment, farmers will be able to do all the farming work in less time.
- There will be an increase in the yield with less cost of equipment, which will increase the income of the farmer.

Eligibility

- All landholding farmers' families, Self Help Groups (SHGs), User Groups, Cooperative Societies, Farmer Producer Organizations (FPOs) and Entrepreneurs
- The farmer must be a native of India.
- Women farmers can also take advantage of this scheme. They will be given priority in this scheme.
- The benefit of this scheme will be given by the central government to those farmers who are financially weak.
- The benefit of this scheme will be given to those farmers who have not taken the benefit of subsidy from any other central scheme earlier.

1.4 National Agricultural Market (e-NAM)

e-National Agriculture Market (e-NAM) is a pan-India electronic trading portal that networks the existing APMC/Mandis to create a unified national market for agricultural commodities.

- National Agriculture Market (e-NAM) is a pan-India electronic trading portal which networks the existing APMC/Mandis to create a unified national market for agricultural commodities.
- e-NAM a pan-India electronic trading portal was launched on 14th April 2016, by the Prime Minister of India, with the aim of networking the existing mandis on a common online market platform as "One Nation One Market" for agricultural commodities in India.
- Small Farmers Agribusiness Consortium (SFAC) is the lead agency for implementing e-NAM under the aegis of Ministry of Agriculture and Farmers' Welfare, Government of India.
- e-NAM portal enables farmers to trade their produce through their nearby e-NAM mandis and facilitate traders to bid online from any location. e-NAM provides single window services for all Agricultural Produce Market Committee (APMC) related services and information. This includes commodity arrivals, quality assaying by Artificial Intelligence based Machines/Equipments, e-Bidding, e-payment settlement directly into farmers account, among other services.
- Horticulture Planning & Marketing Department, J&K initiated e-NAM by integrating 2-Mandis – Narwal (Jammu) & Parimpora (Srinagar) on e-NAM in May-2020 in first phase, and 9 more mandis in 2nd phase. Total 11 mandis of UT of J&K are integrated with eNAM as of now.

Objectives:

- To integrate markets first at the level of the States/UT and eventually across the Country through a common online market platform, to facilitate pan - India trade in agricultural commodities.
- To streamline marketing / transaction procedures and make them uniform across all markets to promote efficient functioning of the markets.
- To promote better marketing opportunities for farmers / sellers through online access to more buyers and markets, removal of information asymmetry between farmer and trader, better and real-time price discovery based on actual demand and supply of Agri commodities.
- To establish quality assaying systems for quality assurance, to promote informed bidding by buyers.
- To promote stable prices and availability of quality produce to consumers

Benefits

Benefits of trading on e-NAM:

- Transparent Online Trading.
- Real-Time Price Discovery.
- Better Price Realization for Farmers.
- Reduced Transaction Cost For Buyers.
- Stable Price and Availability to Consumers.
- Quality Certification, Warehousing and Logistics.
- More Efficient Supply Chain.
- Convenient e-Payment options.
- Error-Free Reporting of Transactions.
- Enhanced Accessibility to more APMCs.

Eligibility

Eligibility criteria for availing assistance under the scheme:

- The scheme is linked to agricultural marketing reforms, the States / Union Territories (UTs) need to undertake mandatory reforms in their Agriculture Produce Market Committee (APMC) Acts in respect of the following three areas to avail the assistance under it.

1. Single trading license to be valid across the State.
2. Single point levy of market fee across the State and
3. Provision for e-auction/e-trading as a mode of price discovery to be facilitated by the State. Agriculture Marketing Department / Board / APMCs / Regulated Market Committees (RMCs), as the case may be.

- In respect of 1 above, State/UT must provide, through appropriate legislation / executive order in consonance with the concerned APMC Act/regulation, for the issue of a single trade license to any eligible person from across India irrespective of one's domicile to enable one to trade through e-NAM portal in the markets across the State / UT. Further, the State / UT must provide for a liberal process of single trade license for wholesale traders / buyers for the entire State & ensure that there are no barriers like prohibitively high security deposits or stipulations regarding minimum quantities

to be transacted or requirements of establishment of purchase center/premise' etc

- In respect of 2 above, State / UT must provide, through appropriate legislation / executive order in consonance with the concerned APMC Act/regulation single point levy of market fee for wholesale trading of the same produce across the State i.e., levy of market fee/cess at point of first transaction only in the State. No further market fee/cess/service charge, or by whatever name it is called, should be leviable on the subsequent wholesale transaction (s) of the same produce.
- In respect of 3 above, State / UT must provide, through appropriate legislation / executive order in consonance with the concerned APMC Act/regulation, that State Agricultural Marketing Department / Directorate / Board, as the case may be, and concerned APMC / RMC shall provide necessary legal framework therefor and required infrastructure connected thereto to promote National Agriculture Market (e-NAM).
- Proposals from such States / UTs meeting the above three pre-requisites received on prescribed proforma (Annexure-I) will be considered for sanction of a one-time grant for the purchase of hardware, internet connection, assaying equipment, and related infrastructure to make the market ready for a plug-in with e-NAM platform.
- In addition, States / UTs must also undertake-

1. To trade 100 % volume of selected agricultural commodities through e-trading / e-auction in the markets proposed to be covered under e-NAM;
2. To make provision for Soil Testing Laboratories (STLs) or ensure that markets are linked to STLs located in close proximity.
3. To meet the balance fund requirement towards implementation of e-NAM, if any, over and above that granted by the Project Appraisal Committee (PAC).
4. To bear all future escalations, as may arise after 5 years upon expiry of service agreement with Strategic Partner;
5. To bear annual maintenance provisions for the software as may arise after 5 years upon expiry of the service agreement with Strategic Partner.
6. To register their implementing agency on the PFMS portal (https://pfms.nic.in) and intimate the same to the Department of Agriculture, Cooperation and Farmers' Welfare (DAC&FW) (hereinafter called Department) along with the bank details, etc. to enable the transfer of funds.

- States / UTs, which either do not have marketing regulation or have one which is not in force, in order to integrate with e- NAM portal and avail grants under the scheme, must identify some institution/organization and frame appropriate legally enforceable guidelines. The entity so identified may develop the appropriate physical infrastructure required for e-trading on e-NAM at the back end and provide the required logistic support. Regulatory framework / legally backed guidelines may include all the required facilitatory provisions for trading on the e-NAM portal including enlisting / registration of traders/buyers, transaction fees, etc.
- The proposals of private markets for providing access to the e-NAM portal may also be considered by the Project Appraisal Committee (PAC) provided they are recommended by the competent authority of the concerned State / UT. However, in such cases they must provide for mandi analyst, related hardware, assaying facilities, and other support services at their own cost.

1.5 Paramparagat Krishi Vikas Yojana (PKVY)

PKVY aims at supporting and promoting organic farming, in turn resulting in improvement of soil health. The scheme promotes Participatory Guarantee System (PGS) For India (PGS- India) form of organic certification that is built on mutual trust, locally relevant and mandates the involvement of producers and consumers in the process of certification. PGS – India operates outside the framework of "Third Party Certification.

Funding pattern under the scheme is in the ratio of 60:40 by the Central and State Governments respectively. In case of Northeastern and Himalayan States, Central Assistance is provided in the ratio of 90:10 (Centre: State) and for Union Territories, the assistance is 100%. The Scheme proposes to cover additional 6,00,000 hectare area under organic farming till 2025-26.

The objective is to produce agricultural products free from chemicals and pesticides residues by adopting eco- friendly, low- cost technologies. Key Thrust areas of PKVY in promoting organic farming include the following:

- To promote natural resource based integrated and climate resilient sustainable farming systems that ensure maintenance and increase of soil fertility, natural resource conservation, on-farm nutrient recycling and minimizing dependence of farmers on external inputs
- To reduce cost of agriculture to farmers through sustainable integrated organic farming systems thereby enhancing farmer's net income per unit of land
- To sustainably produce chemical free and nutritious food for human consumption
- To protect environment from hazardous inorganic chemicals by adoption of eco-friendly low-cost traditional techniques and farmer friendly technologies
- To empower farmers through their own institutional development in the form of clusters and groups with capacity to manage production, processing value addition and certification management
- To make farmers entrepreneurs through direct market linkages with local and national markets.
- Utilize the services of experts from public agricultural research system in India

Benefits

- Promotion of organic farming, in turn resulting in improvement of soil health
- Sustainable production of chemical free and nutritious agriculture produce
- Direct linkages with local and national markets
- To empower farmers through their own institutional development in the form of clusters and groups with capacity to manage production, processing value addition and certification management

Eligibility

All farmers/institutions are eligible to apply. However, maximum land holding is 2 hectare

1.6 Rashtriya Krishi Vikas Yojana

Rashtriya Krishi Vikas Yojana (RKVY) - Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RAFTAAR) aims at making farming a remunerative economic activity by strengthening the farmers" efforts, risk mitigation and promoting agri-business entrepreneurship.

Basic Features

- To incentivise the states so as to increase public investment in Agriculture and allied sectors.
- To provide flexibility and autonomy to states in the process of planning and executing Agriculture and allied sector schemes.
- To ensure the preparation of agriculture plans for the districts and the states based on agro-climatic conditions, availability of technology and natural resources.
- To ensure that the local needs/crops/priorities are better reflected in the agricultural plans of the states.
- To achieve the goal of reducing the yield gaps in important crops, through focussed interventions.
- To maximize returns to the farmers in Agriculture and allied sectors.
- To bring about quantifiable changes in the production and productivity of various components of Agriculture and allied sectors by addressing them in a holistic manner

Benefits

- To strengthen the farmers efforts through the creation of required pre and post-harvest agri-infrastructure that increases access to quality inputs, storage, market facilities etc. and enables farmers to make informed choices.
- To provide autonomy, and flexibility to States to plan and execute schemes as per local/ farmers' needs.
- To promote value chain addition linked production models that will help farmers increase their income as well as encourage production/productivity.
- To mitigate the risk of farmers with a focus on additional income generation activities - like integrated farming, mushroom cultivation, beekeeping, aromatic plant cultivation, floriculture etc.
- To empower youth through skill development, innovation and agri-entrepreneurship-based agribusiness models that attract them to agriculture.

Eligibility

- The RKVY will be a State Plan Scheme. The eligibility for assistance under the scheme would depend upon the amount provided in State Plan Budgets for Agriculture and allied sectors, over and above the baseline %age expenditure incurred by the State Governments on Agriculture and allied sectors.

- The list of allied sectors as indicated by the Planning Commission will be the basis for determining the sectoral expenditure:
  i. Crop Husbandry (including Horticulture).
  ii. Animal Husbandry and Fisheries, Dairy Development.
  iii. Agricultural Research and Education.
  iv. Forestry and Wildlife.
  v. Plantation and Agricultural Marketing.
  vi. Food Storage and Warehousing.
  vii. Soil and Water Conservation.
  viii. Agricultural Financial Institutions.
  ix. Other Agricultural Programmes and Cooperation.

- Each state will ensure that the baseline share of agriculture in its total State Plan expenditure (excluding the assistance under the RKVY) is at least maintained, and upon its doing so, it will be able to access the RKVY funds. The baseline would be a moving average and the average of the previous three years will be taken into account for determining the eligibility under the RKVY, after excluding the funds already received.

The budget for the Pradhan Mantri Fasal Bima Yojanahas risen from Rs.1,620 crore in 2022-23 to Rs.2,423 crore in 2024-25. Similarly, the allocation for the Pradhan Mantri Krishi Sinchai Yojana has increased significantly, growing from Rs.5,637 crore in 2022-23 to Rs.9,339 crore in 2024-25. The budget allocation for Rashtriya Krishi Vikas Yojana also saw a steady rise in funding, with its budget increasing from Rs.5,247 crore in 2022-23 to Rs.7,553 crore in 2024-25.

The rise in budget allocations across these key agricultural schemes implies a stronger government focus on bolstering the agricultural sector. The increase in funding for the Pradhan Mantri Fasal Bima Yojana suggests a greater emphasis on protecting farmers against crop losses. The significant boost in allocation for the Pradhan Mantri Krishi Sinchai Yojana reflects the government's intent to expand irrigation infrastructure, ensuring better water management for crops. Similarly, the growing budget for the Rashtriya Krishi Vikas Yojana signals enhanced efforts to promote agricultural development and modernization. Overall, these budget increases highlight a strategic push toward securing agricultural sustainability and growth in India.

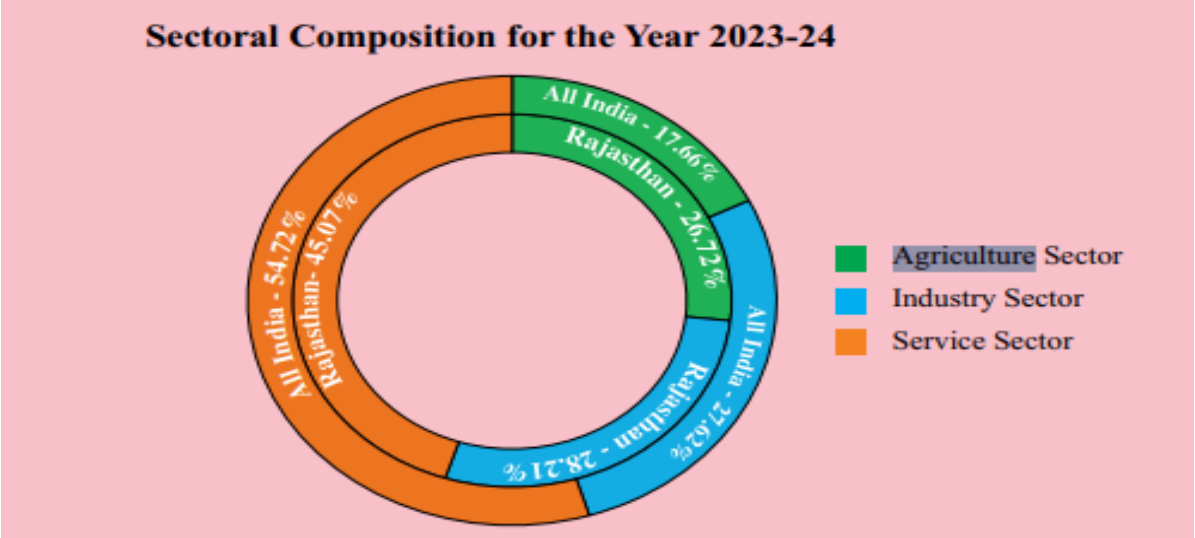
2. Case Study: Rajasthan State Government Policies to support Agriculture

Agriculture and allied sectors play an important role in the Rajasthan State's economy. Agriculture and allied sectors activities primarily refer to cultivation of Crops, Animal Husbandry, Fisheries and Forestry. A large segment of the population is dependent on agriculture and allied activities for its livelihood.

Agriculture in Rajasthan is primarily rain-fed. The period of monsoon is short. In comparison to other states, the onset of the monsoon in Rajasthan is late, and its withdrawal is early.

There is a variation in the time spread of the rainfall, which mostly remains scanty, low and irregular. The level of groundwater in the State is rapidly going down. Despite this, agriculture and allied sectors continues to be the backbone of the State's economy and continues to be a large contributor to the State's GSDP.
The contribution of agriculture sector, which includes crops, livestock, forestry and fishing sector is estimated to be 26.7% as per the second advance estimates of the year 2023-24.

Figure 3: Sectoral composition 2023-24 for Rajasthan



Source: PHD Research Bureau, PHDCCI compiled form Economic Review 2023-24, Government of Rajasthan

2.1 Krishi Yantra

The Krishi Yantra Scheme under the Agriculture Department of the Rajasthan government has decided to start the Agricultural Machinery Subsidy Scheme for the convenience of farmers. In this scheme, if the farmer purchases farming equipment from an authorized dealer, then the state government gives a subsidy to the farmers which is 40% of the total price. Up to 50% subsidy is given to government farmers, under the scheme.

Eligibility

- Own agricultural land in farmer's own name.
- In case of undivided family, the applicant's name must be in the revenue record.
- For tractor-operated agricultural implements, the tractor must be registered in the applicant's name.
- Not have received a grant for the same type of agricultural implement in the last three years.
- Not have received a grant for more than 3 different types of agricultural implements in a financial year.

Benefits

S. No.	Mechanization (Tractor/Power Operated Equipment)	Horsepower Range	SC/ST/small/marginal and women farmers	Other category farmers
1	Seed drill/seed cum fertilizer drill	20 (Brake Horse Power) B.H.P. With a capacity of less than 35 B.H.P. to a capacity of more than	50 % of the price or maximum Rs.15,000- Rs. 28,000 whichever is less.	40 % of the price or maximum Rs.12, 000- Rs. 22,400, whichever is less.
2	Disc Plough/Disc Harrow	20 B.H.P. With a capacity of less than 35 B.H.P. to a capacity of more than	50 % of the value or maximum Rs.20,000- Rs.50,000 whichever is less	40 % of the price or maximum Rs. 16,000-Rs.40,000, whichever is less
3	Rotovator	20 B.H.P. With a capacity of less than 35 B.H.P. to a capacity of more than	50 % of the price or maximum Rs.42,000- Rs. 50,400. Whichever is less	40 % of the price or maximum Rs. 34,000- Rs. 40,300, whichever is less.
4	Multi crop thresher	20 B.H.P. With a capacity of less than 35 B.H.P. to a capacity of more than	50 % of the value or maximum Rs.30,000. Rs.1,00,000. whichever is less.	40 % of the value or maximum Rs. 25,000- Rs. 80,000, whichever is less
5	Ridge Furrow Planter/ Multi Crop Planter/ Tractor Operated Ripper	20 B.H.P. With a capacity of less than 35 B.H.P. to a capacity of more than	50 % of the value or maximum Rs. 30,000- Rs. 75,000. Whichever is less	40 % of the price or maximum Rs. 24,000-Rs. 60,000, whichever is less
6	Chisel plow	20 B.H.P. With a capacity of less than 35 B.H.P. to a capacity of more than	50 % of the price or maximum Rs. 10,000- Rs. 20,000. Whichever is less	40 % of the price or maximum Rs. 8,000- Rs. 16,000, whichever is lower

Source: PHD Research Bureau, PHDCCI compiled from myscheme, Digital India Corporation (DIC) Ministry of Electronics & IT (MeitY) Government of India

2.2 Fawara Sanyantra

The Fawara Sanyantra under the Agriculture Department of the Rajasthan government will give 70% to 75% subsidy to the farmers for installing sprinkler plants. Through this farmers

can irrigate more land by getting sprinkler subsidy. The subsidy given by the state government to the farmers will be sent directly to their bank accounts through Direct Benefit Transfer (DBT). To avail of the benefit of the Rajasthan Fawara Sanyantra Subsidy Yojana, a farmer should have land up to 0.2 hectares. So that the fields can be irrigated by installing sprinkler plants. The income of farmers will improve through this scheme. Apart from this, efficient utilization and production will also increase. Besides, 50% to 55% of water can be saved by irrigating the fields through sprinklers.

Benefits

- The grant amount is 70% of the unit cost for general farmers.
- The grant amount is 75% of the unit cost for small and marginal farmers, Scheduled Caste/Tribe farmers, and women farmers.
- The grant is payable up to a maximum area of 5 hectares.

Eligibility

- The Applicant should be a farmer.
- The applicant should be a native of Rajasthan.
- The farmer should have at least 0.2 hectares of irrigated agricultural land.

2.3 Naye Fal Bagicho Ki Sthapana

The "Naye Fal Bagecho Ki Sthapana" under the Agriculture Department of the Rajasthan government Increases farmers' income by facilitating the cultivation of high-value fruit crops that have a potentially higher market demand and profitability compared to traditional crops. Extend financial support and subsidies to smallholder farmers to facilitate the establishment of new orchards, enabling them to access resources and inputs required for fruit cultivation.

Benefits

- For high-value and common interval crops, the maximum grant amount is 50% of the unit cost, up to a maximum of Rs. 30,000/- per hectare.
- For intensive horticultural orchards, the maximum grant amount is 40% of the unit cost, up to a maximum of Rs. 40,000/- per hectare.
- A farmer will be given a grant for a minimum of 0.4 hectares and a maximum of 4.0 hectares area.
- Small/marginal farmers are eligible for an additional 25% grant.

Eligibility

- The applicant should be a farmer.
- The applicant should be a native of Rajasthan.
- The applicant must have agricultural land ownership and irrigation sources.
- Farmers with land between 0.4 and 4 hectares are eligible for the grant.
- For Scheduled Caste/Tribe farmers and tribal areas, the minimum area limit is 0.2 hectares.

2.4 Diggy

In Agriculture Department, Rajasthan Government has started the Diggy Scheme to provide subsidies to the farmers of Rajasthan for making dig for irrigation. Under the scheme, farmers can prepare ways in their fields collect water in one place, and do more irrigation with the help of sprinklers. By providing this grant amount to the farmers, the government will encourage the farmers to grow good crops by building dig and irrigating the crops without any financial pressure. This scheme is to help farmers improve their farming by using more water resources and encourage them to grow good crops.

Benefits

- The farmer must purchase a permanent container with a minimum filling capacity of 4 lakh liters and above.
- The state government will provide a 75% to 85% subsidy.
- Farmer will be provided a grant amount of up to Rs.3,00,000/- to Rs.3,40,000/- by the government for making a dig in fields.

Eligibility

- The applicant should have a native of Rajasthan.
- The applicant should be a farmer.
- A farmer must have at least 0.5 (half) hectares of irrigated agricultural land.

2.5 Shednet House scheme

The Shednet House scheme under the Agriculture Department Rajasthan Government provided subsidies to farmers so they could earn more income by cultivating horticultural crops like vegetables, flowers, fruits, etc. by controlling the agro-climatic factors, temperature, humidity, and sunlight. A shednet house or other woven material is a structure that has openings for the necessary sunlight, moisture, and air to enter from the open spaces. It creates a suitable microenvironment conducive to the growth of the plant. It is also called shednet house or net house.

Benefits

- 50 % subsidy is given to general-category farmers.
- 70 % subsidy is given to small, marginal, scheduled caste, and scheduled tribe farmers.

Eligibility

- The applicant should be a farmer.
- The applicant should be a native of Rajasthan.
- The applicant must have agricultural land ownership and irrigation sources.

2.6 National Mission on Agriculture Extension and Technology

The **objective** of the scheme is to create a "Strategic Research and Extension Plan" with the active participation of farmers and to increase programme coordination and integration among all stakeholders at the block level in the allocation of resources so that innovation in agricultural systems, encouragement to farmer groups/organizations, technology reducing the gap in extension, restructuring of farmer-marketing processing linkage extension department, implementation of programmes like training and knowledge enhancement etc. can be implemented smoothly and effectively. Major activities of the scheme include farmer training, farmer visits, exhibitions, farmer interest groups, farmer award, agricultural exhibitions and farmer fair, farmer seminars and field day, farmer friend and innovative activities.

National Agriculture Extension and Technical Mission consists of 3 sub-missions:

- Sub Mission on Agriculture Extension (SMAE)
- Sub Mission on Agriculture Mechanization (SMAM)
- Sub-Mission on Seed and Planting Material (SMSP)

During the financial year 2023-24, an expenditure of Rs.107 crore has been incurred against the provision of Rs. 143 crore under sub-mission of National Mission on Agriculture Extension and Technology.

2.7 Paramparagat Krishi Vikas Yojana (PKVY):

Organic agriculture is production of agricultural products free from chemicals and pesticide residues, by adopting eco-friendly low cost technologies. Under PKVY, organic farming is promoted through cluster approach and Participatory Guarantee Systems (PGS) certification. Participatory Guarantee System under PGS-India programme is the key approach for quality assurance under the PKVY. The farmers have options to adopt any form of organic farming in compliance with PGS-India standards. During the year 2023-24, under PKVY an expenditure of more than Rs. 28 crore has been incurred against the provision of Rs.27 crore up to March, 2024.

2.8 Rashtriya Krishi Vikas Yojana (RKVY)

Looking at the consistent decrease in investments in agriculture and allied sectors, the Central Government introduced RKVY during 2007-08 to draw up plans for agriculture sector more comprehensively, taking into account agro-climatic conditions, natural resource issues and technology. In this scheme project-based assistance is provided to prepare Integrated District Agriculture plan in the field of Agriculture, Horticulture, Forest and State Agriculture Universities and other organizations/departments considering the agro-climatic conditions and natural resources of the State. The funding pattern with respect to Government of India (GoI) and Government of Rajasthan (GoR) is 60:40. During the year 2023-24, an expenditure of more than Rs.142 crore has been incurred against the provision of more than Rs.153 crore. Under this, date palm cultivation, horticulture development program in districts deprived of

NHM, vegetable cluster in urban areas, strengthening of centers of excellence in Jhalawar, Dholpur, Tonk, Bundi, Chittorgarh and Sawai-Madhopur, Bassi, Jaipur and Nanta (Kota), promotion of protected farming, development of nurseries etc.

2.9 Pradhan Mantri Krishi Sinchai Yojana (PMKSY)

Horticulture Department is the Nodal Department for the scheme and different activities i.e. construction of farm pond are being implemented by both Agriculture and Horticulture departments. The funding pattern is 60:40 (GoI: GoR). During the financial year 2023-24, an expenditure of Rs.40.91 crore has been incurred against the provision of Rs.77.85 crore.

2.10 Pradhan Mantri Fasal Bima Yojana (PMFBY)

Pradhan Mantri Fasal Bima Yojana (PMFBY) was launched from Kharif 2016. The scheme covers food grain crops (cereals, millets and pulses), oilseeds and commercial/ horticultural crops. The farmer premium for Kharif crops, Rabi crops and commercial/ horticulture crops is 2 per cent, 1.5 per cent and 5 per cent respectively. According to the revamped guidelines of PMFBY issued by the Government of India from Kharif 2020, the maximum premium subsidy to be borne by the GoI would be 25 per cent for irrigated area and 30 per cent for non-irrigated area. For payment of premium, subsidy and incentive to primary workers for conducting crop cutting experiments, a State funded scheme is in operation. In the year 2023-24, the claim of Rs.3,838 crore has been distributed among eligible farmers.

2.11 Pradhan Mantri Krishi Sinchai Yojana-Micro Irrigation (PMKSY-MI)

Water is a limited and valuable resource in the State. In view of this drip and sprinkler techniques of micro irrigation are being used to enhance crop yield and quality along with water saving. To increase the adoptability of the system, Government of India is providing subsidy to different categories of the farmers as well as Government of Rajasthan is also providing additional subsidy. The ratio of central share and State share for all categories is 60:40 under the scheme. For the year 2023-24, a provision of revised estimates of Rs.382 crore (Rs.229 crore as central share and Rs.153 crore as State share) has been kept. As additional subsidy on drip and sprinkler irrigation, an amount of Rs.270 crore has been kept under schematic budget During the year 2023-24, an expenditure of Rs.182 crore (Rs.109 crore as central share and Rs.72 crore as State share) has been incurred and Rs.231 crore received against additional subsidy. Under drip and mini sprinkler, and sprinkler an area of 91,250 hectare and 1,28,514 hectares have been covered respectively.

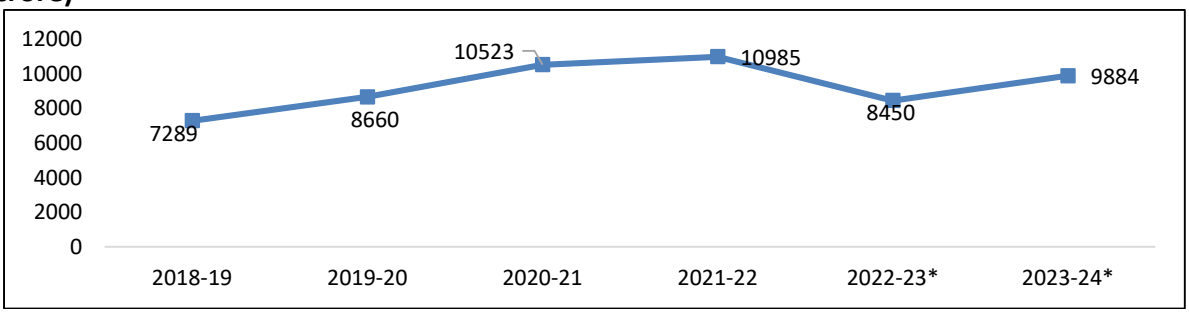
Table 3: State Government's Expenditure on Agriculture and allied sector (in Rs Crore)

Years	Agriculture & Allied Services
2018-19	7289
2019-20	8660
2020-21	10523
2021-22	10985
2022-23*	8450
2023-24*	9884

Source: PHD Research Bureau, PHDCCI compiled form Economic Review 2023-24, Government of Rajasthan
*Tentative Expenditure

The Rajasthan government's expenditure on agriculture and allied sectors witnessed significant growth, rising from Rs.7, 289 crore in 2018-19 to Rs. 9,884 crore in 2023-24. The expenditure reached its highest point in 2021-22, with an allocation of Rs. 10,985 crore. This increase reflects the government's continued focus on strengthening the agriculture sector, enhancing farmer welfare, and addressing challenges such as water scarcity, climate resilience, and agricultural productivity.

Figure 4: State Government's Expenditure on Agriculture and allied sector (in Rs crore)



Source: PHD Research Bureau, PHDCCI compiled form Economic Review 2023-24, Government of Rajasthan
*Tentative Expenditure

The Government of India and Rajasthan state government are making steady strides in boosting agriculture productivity and farmer incomes, as a large section of the population directly and indirectly is dependent on agriculture sector. The centre and Rajasthan state governments are boosting the agriculture sector by means of strategic policy intervention and schemes for strengthening irrigation, risk cover and other inputs. It is evident that such subsidy-based initiatives boost agriculture productivity and farmer's income.

5. India's Journey toward Self-Reliance in Food Security

India's progress in achieving food security is a story of resilience, determination, and strategic interventions. The concept of food security, as outlined by the Food and Agricultural Organization (FAO), revolves around ensuring that all individuals have access to sufficient, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life. Food security is built on three interconnected pillars: availability of food, access to food, and the absorption of food. In India, these pillars are supported by robust policies, extensive programs, and significant investments that have enabled the country to move

closer to self-reliance in food security. India's journey towards ensuring the availability of food began with the Green Revolution in the 1960s and 1970s, which was a turning point in the country's agricultural history. The introduction of high-yielding varieties of rice and wheat, coupled with improved irrigation practices and the use of fertilizers and pesticides, significantly increased food production. This surge in agricultural productivity transformed India from a food-deficient nation to one that could not only feed its population but also export surplus grains.

Today, India is the World's largest producer of milk, pulses and jute, and ranks as the second largest producer of rice, wheat, sugarcane, groundnut, vegetables, fruit and cotton. The maintenance of buffer stocks by agencies like the Food Corporation of India (FCI) and Central Warehousing Corporation ensure that food is available even in times of crisis. These strategic reserves help stabilize prices and prevent food shortages during emergencies, thus playing a crucial role in maintaining food availability.

Table 4: Total foodgrain production in India and Agriculture exports (2013-14 to 2023-24)

Year	Total foodgrain production (Lakh tonnes)	Export(USD Billion)
2013-14	2650	39.3
2014-15	2520	37.3
2015-16	2515	30.9
2016-17	2751	32.1
2017-18	2850	36.7
2018-19	2852	36.5
2019-20	2975	33.8
2020-21	3107	39.7
2021-22	3156	47.4
2022-23	3297	52.6
2023-24	3289	48.2

Source: PHD Research Bureau, PHDCCI compiled from Ministry of Commerce and Industry, GoI and RBI

India's food grain production saw a significant increase from 2,650 lakh tonnes in 2013-14 to 3,289 lakh tonnes in 2023-24. Even during the challenging post-COVID period, food grain production rose from 2,975 lakh tonnes in 2019-20 to 3,107 lakh tonnes in 2020-21. This growth not only underscores India's self-sufficiency in food but also highlights the nation's resilience in ensuring food security during the pandemic. Despite global disruptions, India managed to be self-sufficient and continued to export agricultural products. Agricultural exports grew from about USD 34 billion in 2019-20 to about USD 40 billion in 2020-21, surpassing USD 50 billion in 2022-23. By 2023-24, exports moderated to more than USD 48 billion, maintaining India's strong presence in the global agricultural market.

The Indian government has implemented various programs to ensure that food is accessible to all sections of society, particularly the economically vulnerable. The National Food Security Act (NFSA) of 2013, also known as the Right to Food Act, is a landmark piece of legislation that aims to provide subsidized food grains to approximately two-thirds of India's population. This Act marks a significant shift from a welfare-based approach to a rights-based framework, legally entitling up to 75% of the rural population and 50% of the urban population to receive subsidized food grains through the Targeted Public Distribution System (TPDS).

Table 5: Total off take of food grains from the Central Pool in 2023-24 ((in lakh MT)

Name of Scheme	Rice	Wheat	Total
NFSA			
TPDS	340.9	152.1	492.9
WBNP	7.7	9.3	17.1
PM Poshan	17.5	3.8	21.3
TPDS (Tide Over)	17.2	6.7	23.9
Total	383.4	171.9	555.3
OWS			
Hostels and Welfare institutions	3.2	0.9	4.1
Scheme for adolescent Girls (SAG)	0.05	0.12	0.17
Annapurna	0	0	0
Total	3.3	1.05	4.3
Total (NFSA+OWS)	386.7	172.9	559.6
NATURAL CALAMITY/DROUGHT/FESTIVAL/ETC			
Natural Calamity etc (MSP Rates)	0.1	0	0.1
festival/Additional Requirement etc (Economic Cost)	0.12	0	0.12
Total	0.22	0	0.22
DEFENCE ALLOCATION			
Defence allocation & Jail	0.98	0.05	1.03
OPEN TENDER SALE [OMSS]			
OMSS	17.2	100.8	118.1
Grand Total	405.1	273.8	678.9

Source: PHD Research Bureau, PHDCCI compiled from Annual Report 2023-24, Department of Food and Public Distribution Ministry of Consumer Affairs, Food and Public Distribution. GOI

In 2023-24 the offtake of food grains (wheat and rice) from the Central Pool under the National Food Security Act (NFSA) and the Targeted Public Distribution System (TPDS), including initiatives like PM Poshan and the Wheat-Based Nutrition Programme (WBNP), a component of the Integrated Child Development Services (ICDS), amounted to 555 lakh tons. Additionally, 0.22 lakh tons were allocated to States and Union Territories at economic cost or Minimum Support Price (MSP) rates.

The substantial offtake of food grains from the Central Pool under the National Food Security Act (NFSA) and Targeted Public Distribution System (TPDS), along with programs like PM Poshan and the Wheat-Based Nutrition Programme (WBNP), plays a critical role in ensuring food security for millions of Indians. By distributing wheat and rice to the vulnerable population, the government guarantees consistent access to basic staples, addressing both food availability and affordability.

Further, under various Other Welfare Schemes, 4.3 lakh tons were distributed. Moreover, an offtake of 119 lakh tons was recorded under other schemes such as Open/Tender Sales, Relief programs, World Food Programme (WFP) contributions, and Defence-related provisions, ensuring a robust safety net for those affected by emergencies, including natural disasters or economic hardships. This strategic food distribution system not only strengthens India's food security but also aids in poverty alleviation, improves nutrition outcomes, and supports broader economic stability by ensuring that even during crises, food remains accessible and affordable to all.

The Central Government is providing free food grains to more than 81 crore beneficiaries, including Antyodaya Anna Yojana (AAY) households and Priority Households (PHH). This initiative falls under the Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY) and will run for a duration of five years, starting from January 1, 2024. The financial outlay is estimated at Rs.11.8 lakh crore, will be covered by the Central Government. This move aims to ensure food security for vulnerable sections of the population over the long term. Presently, more than 80 Crore Pradhan Mantri Garib Kalyan Ann Yojana (PMGKAY) beneficiaries are getting benefits of free foodgrains across the country.

Table 6: State-Wise number of PMGKAY Beneficiaries (as on 31.01.2024)

S. No.	States/ UTs	Present coverage (In lakh)			
		AAY		Priority HH	Total persons
		No. of families	No. of person	No. of persons	
1	Andhra Pradesh	9.1	23.5	244.7	268.2
2	Arunachal Pradesh	0.4	1.5	6.9	8.4
3	Assam	6.9	28.1	223.1	251.2
4	Bihar	25.0	125.1	746.1	871.2
5	Chhattisgarh	7.2	20.4	180.4	200.8
6	Delhi	0.7	2.8	70.0	72.8
7	Goa	0.1	0.5	4.9	5.3
8	Gujarat	7.7	35.5	316.1	351.6
9	Haryana	2.7	11.4	l 15.14	126.5
10	Himachal Pradesh	1.8	7.7	21.0	28.6
11	Jharkhand	8.9	34.8	229.4	264.2
12	Karnataka	11.0	43.9	358.0	401.9
13	Kerala	6.0	25.6	129.2	154.8
14	Madhya Pradesh	14.6	54.9	479.9	534.8
15	Maharashtra	25.1	108.0	592.2	700.2
16	Manipur	0.6	1.8	18.3	20.1
17	Meghalaya	0.7	2.9	18.5	21.5
18	Mizoram	0.3	0.6	6.2	6.8
19	Nagaland	0.5	2.1	11.9	14.1
20	Odisha	12.5	37.5	288.5	326.0
21	Punjab	1.8	7.6	133.8	141.5
22	Rajasthan	6.3	22.3	417.7	440.0
23	Sikkim	0.2	0.6	3.2	3.8
24	Tamil Nadu	18.6	65.8	298.3	364.1
25	Telangana	5.7	15.3	176.3	191.6

26	Tripura	1.1	4.6	19.8	24.4
27	Uttar Pradesh	40.9	132.7	1372.5	1505.2
28	Uttarakhand	1.8	7.9	54.0	61.9
29	West Bengal	16.4	55.0	546.9	601.8
30	A&N	0.0	0.1	0.5	0.6
31	DNH&DD	0.1	0.2	2.5	2.7
32	Lakshadweep	0.0	0.0	0.2	0.2
33	Chandigarh (DBT)	0.0	0.0	3.0	3.0
34	Puducherry (DBT)	0.3	0.8	5.5	6.3
35	J&K	2.3	10.6	61.8	72.4
36	Ladakh	0.1	0.3	1.2	1.4
Total		**237.31**	**892.45**	**7157.5**	**8049.9**

Source: PHD Research Bureau, PHDCCI compiled from Minister of state for ministry of rural development and consumer affairs, food & public distribution, GOI

This large-scale distribution helps shield low-income and marginalized communities from food price volatility and inflation, ensuring they have access to sufficient and nutritious food. Programs like PM Poshan, which specifically target schoolchildren, contribute to improved educational outcomes by ensuring that children are well-fed and able to focus on learning.

The TPDS is the backbone of India's food distribution mechanism, delivering food grains at subsidized prices to eligible households. The system protects the poor and vulnerable from price volatility due to inflation, ensuring that food remains within their economic reach. Over the years, while government spending on food subsidies has increased, the proportion of people living below the poverty line has decreased, highlighting the effectiveness of this program.

Other significant programs include the Mid-Day Meal Scheme, which provides nutritious meals to schoolchildren, and the Integrated Child Development Services (ICDS) Scheme, which focuses on the nutritional needs of children under six years of age, pregnant women, and lactating mothers. There is a growing commitment to tackling "hidden hunger," where individuals meet their calorie needs but may lack vital vitamins and minerals. To address this, the focus of the government is increasingly on enhancing food quality and encouraging dietary diversity. The government's swift response, including distributing free food grains to vulnerable populations, in the pandemic year helped mitigate the impact. While India has made significant strides in improving food security, challenges remain. These include addressing malnutrition, particularly hidden hunger, and ensuring that food distribution systems are efficient and equitable.

To further strengthen food security, there is a need to invest in agricultural research and development to develop high-yield and climate-resilient crop varieties. Promoting sustainable farming practices, such as organic farming and precision agriculture, will be crucial in ensuring long-term food security. Encouraging crop diversification is essential to reduce dependency on a few staple crops and improve dietary diversity. Promoting the cultivation of nutritious crops, fruits, and vegetables will help address malnutrition and improve overall health outcomes.
Small-scale farmers play a crucial role in India's agricultural landscape. Promoting farmer

cooperatives and self-help groups can help them gain better access to markets and resources. Improving rural infrastructure, including roads, storage facilities, and markets, is vital to reducing post-harvest losses and connecting farmers to consumers. Public awareness campaigns about balanced nutrition and healthy eating habits are essential to improving food absorption.

Building resilience to climate change is critical for ensuring food security in the face of changing weather patterns and extreme events. Developing climate-resilient farming practices and promoting sustainable land use will help safeguard food production in the long term.

India has not only achieved self-sufficiency in food production but has also emerged as a key exporter of food grains, especially during times of global crises. Decades of agricultural reforms, such as the Green Revolution in the 1960s, transformed the country from a food-deficient nation to one of the World's largest producers of staples like rice and wheat. Today, India ranks among the top global producers of cereals, pulses, and sugar, ensuring food security for its population of over 1.4 billion people.

Table 7: India's Food support to countries during the time of crisis.

Year	Humanitarian Assistance
2020	Government of India provided 270 MT of food aid to Sudan, South Sudan, Djibouti and Eritrea, to alleviate the suffering of the people affected by natural calamities and the Covid pandemic. The food aid comprised of 155 MT of wheat flour, 65 MT of rice and 50 MT of sugar.
2021	Government of India provided 2000 MT of rice to strengthen food security in Syria.
2022	India stepped in to provide significant humanitarian assistance to Afghnaistan, including 50,000 metric tonnes of wheat. This aid was crucial in addressing the severe food shortages affecting millions of Afghans, especially vulnerable populations like women and children. India also provided medical supplies and COVID-19 vaccines during this period.
	Sri Lanka experienced its worst economic crisis in decades in 2022, leading to severe shortages of food, fuel, and essential goods. India supplied thousands of tonnes of rice, sugar, and other essentials to help the country manage its food supply during the crisis.
2024	The Government of India has extended humanitarian assistance to the Government and people of the Republic of Malawi, Government and people of the Republic of Zambia and Government and people of the Republic of Zimbabwe to address the food deficit which has occurred due to severe drought caused by El Nino phenomenon.Shipments of food grains were despatched from the Nhava Sheva port for Malawi (1000 MT Rice); Zambia (first tranche of 1300 MT Maize of the scheduled 2500 MT Maize) and Zimbabwe (1000 MT Rice) to help in their food security and management efforts.

Source: PHD Research Bureau, PHDCCI compiled from Ministry of External Affairs, GOI

With surplus food stocks, India has been able to extend support to other nations during emergencies. Its well-established food security programs, such as the Public Distribution System (PDS) and schemes like the Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY), ensure that the domestic population has access to food during challenging times. Simultaneously, India exports significant quantities of rice, wheat, sugar, and pulses to countries facing shortages.

During the COVID-19 pandemic, India stepped up as a reliable supplier of food grains to nations affected by supply chain disruptions. Similarly, when countries like Afghanistan, Sri Lanka, and Lebanon faced severe crises, India provided both humanitarian aid and food supplies, reaffirming its role as a global partner. This dual capability—ensuring domestic food security while supporting international needs—highlights India's growing importance in the global food supply chain, particularly during periods of crisis.

India's journey towards self-reliance in food security is a testament to the power of strategic planning, robust policies, and effective implementation. While challenges remain, the country's progress in increasing food availability, improving access, and enhancing absorption has laid a strong foundation for future growth. By continuing to invest in agriculture, infrastructure, and social safety nets, India can ensure that all its citizens have access to adequate and nutritious food, thereby fulfilling the right to food and contributing to the economy's overall development and stability.

6. Impact of rainfall on foodgrain production

In India agriculture is believed to be highly dependent on rainfall and majorly rain-fed.

Table 8: Pattern of rainfall and foodgrain production of states

S.no	Year	Rainfall range	Efficient/Deficient/Normal rainfall	Foodgrain production	Foodgrain production Growth
1	2012-13	-11%	Normal	2571	-0.8
2	2013-14	5	Normal	2650	2.5
3	2014-15	-12	Normal	2520	-4.4
4	2015-16	-9	Normal	2515	-0.2
5	2016-17	-9	Normal	2751	9.4
6	2017-18	-5	Normal	2850	3.6
7	2018-19	-14	Normal	2852	0.1
8	2019-20	10	Normal	2975	4.3
9	2020-21	10	Normal	3107	4.4
10	2021-22	5	Normal	3156	1.6
11	2022-23	8	Normal	3297	4.5
12	2023-24	8	Normal	3289	-0.2
13	2024-25	8	Normal	3357	2.07

Source: PHD Research Bureau, PHDCCI compiled from IMD (The current forecast for the food crop production is entirely based on the current status of monsoon; however, these forecasts may change with monsoon behavior, going forward.).

For the period from 2012-13 to 2023-24, both rainfall range and Foodgrain production growth display a fluctuating pattern. Coupled with normal rainfall the foodgrain production has followed an upward trend. For the year 2024-25, we expect foograin production to be about 3357 lakh tonnes given the normal rainfall range of 8%, showing a growth of 2% (The current forecast for the food crop production is entirely based on the current status of monsoon; however, these forecasts may change with monsoon behavior, going forward).

The correlation between foodgrain production and rainfall range stands at about 50% which means that there is a moderate positive correlation. This indicates that agriculture, especially foodgrain production in India is only moderately rainfed now, with the continued hand holding by the government and coming of modern technology and widespread irrigation methods.

7. Recent Policy Initiatives in Agri and allied, and Food processing sectors

The agriculture sector has risen at an average annual growth of more than 4% in the last five years. The country also has an adequate supply of food grains and India exports over 7% of its food grains. The expansion of agriculture and related sectors has aided the growth of the Indian economy. However, certain challenges remain.

Looking ahead, over 50% of the Indian population depends on agriculture for a living. The government's strong handholding to the agriculture, allied and foodgrain production sectors is clearly evident with scheme and initiatives. Digitalization initiatives in agriculture are expected to empower farmers by providing better decision-making tools. Welfare schemes such as the PM Gareeb Kalyan Yojana (PMGKAY), the National Food Security Act (NFSA), and India's food management strategy, which includes food purchase and allocation, are propelling the agriculture sector to new heights. India's agricultural sector is undergoing a significant transformation with the integration of digital technologies. The Digital Agriculture Mission 2021–2025 aims to modernise agriculture through advanced technologies like Artificial Intelligence, remote sensing and drones, etc.

The roles, animal husbandry and fisheries play in improving farmers' income, especially when agriculture holdings are reduced, are duly recognised. The scheme such as the Rashtriya Gokul Mission (RGM), National Digital Livestock Mission (NDLM), and National Programme for Dairy Development (NPDD) include interventions to improve quality, enable access to the organised markets and the development of indigenous breeds.

The fisheries sector has been supported through programmes for improving productivity, access to institutional credit, and infrastructure development through the Fisheries Infrastructure Development Fund (FIDF) with a total fund size of Rs. 7.52 thousand crore. Similarly, Pradhan Mantri Matsya Sampada Yojana (PMMSY) introduced in May 2020 aimed at strengthening fisheries infrastructure, enable technology infusion and promote optimal water management. These interventions in fisheries sector have resulted in increasing fish production by an average annual growth of 7.4 % in 2022-23.

Recognising the need to crowd in private investments, the government, has been implementing the Agriculture Marketing Infrastructure (AMI) sub-scheme of the Integrated Scheme for Agricultural Marketing (ISAM), under which capital subsidy is provided, with the objective of improving the extent of storage infrastructure. It is a demand-driven, credit-linked scheme offering subsidies of 25% (for the plains) and 33.33% (for North-East and hilly regions) to individuals, farmers, Farmer Producer Organizations (FPOs), cooperatives, and state agencies. As of 30th April 2024, 48357 projects were sanctioned for storage infrastructure with Rs. 4570 crore released as subsidy, and 20878 other projects are also

under progress with Rs. 2084 crore released as subsidy. To give further fillip to farm gate infrastructure and also involve the private sector more actively, the Agriculture Infrastructure Fund (AIF) was launched with a financing facility of Rs. 1 lakh crore to be disbursed between FY 2020-21 to FY 2025-26 with support extending till FY 2032-33.

The AIF provides medium-term debt financing for post-harvest management and community farming projects, offering interest subvention and credit guarantee support. As of 5th July 2024, AIF mobilised an investment of Rs. 73194 crore, supporting more than 17000 custom hiring centres, more than 14000 primary processing units, more than 13000 warehouses, over 2900 sorting and grading units, 1792 cold storage projects, and more than 18000 other projects. In addition, the Pradhan Mantri Kisan SAMPADA Yojana (PMKSY) introduced credit-linked financial assistance through grants-in aid to build efficient supply chain management from farm to retail to reduce the wastage of perishable produce and extend food shelf life. Under PMKSY, 1044 projects were completed till end March 2024. A total of 1685 projects with project cost Rs. 32.78 thousand crore and approved subsidy of Rs. 9.3 thousand crore have been approved till end March 2024.

The allied sectors of Indian agriculture are steadily emerging as robust growth centres and promising sources for improving farm incomes. From 2014-15 to 2022-23, the livestock sector grew at an impressive Compound Annual Growth Rate (CAGR) of 7.4 % at constant prices.

The contribution of livestock to the total GVA (at constant prices) in agriculture and allied sectors increased from 24.3% in 2014-15 to 30.4% in 2022-23. In 2022- 23, the livestock sector contributed 4.6% of the total GVA, significantly boosting the per capita availability of milk, eggs, and meat. The fisheries sector, a crucial contributor to the Indian economy, makes up about 6.7% of the agricultural GVA and has grown at compound annual rate of 8.9% between 2014-15 and 2022-23 (at constant prices). This "sunrise sector" supports approximately 30 million people, particularly marginalised and vulnerable communities.

India's food processing industry is also booming, supported by rapid growth of agriculture production, the economy in general and handholding by the government. India is the largest producer of milk and the second largest producer of fruits, vegetables and sugar. The availability of reasonably priced agricultural inputs, the vast labour force, and continuously growing consumer demand provide the essential elements for a robust food processing industry. The sector also plays a vital role in reducing the wastage of perishable agricultural produce, enhancing the shelf life of food products, ensuring value addition to agricultural produce, and incentivises diversification & commercialisation of agriculture.

The PM Formalization of Micro Food Processing Enterprises (PMFME) scheme with a total outlay of Rs. 10 thousand crore provides credit-linked subsidy and capacity building, including marketing and branding support. Convergence is being sought with the existing ecosystem to support and complement other schemes such as the National Rural Livelihood Mission, National Urban Livelihood Mission, One District One Product, AIF, and PMKSY implementation. Further, 2 national level technical institutes and 44 state level technical institutes in 36 States/ UTs have also been approved, as per the Economic Survey 2023-24.

The scheme for developing the Tomato, Onion and Potato (TOP) value chain was launched in 2018-19. The coverage of Operation Green has been expanded from 3 crops (tomato, onion & potato) to 22 perishables crops, which include 10 fruits, 11 vegetables (including TOP) and one marine, i.e. shrimp. The scheme's objectives include enhancing farmers' value realisation, reducing post-harvest losses, increasing food processing capacities, and adding value. The scheme has two-pronged strategies: Price Stabilization Measures (short-term measures) and Integrated Value Chain Development Projects (long-term). Under the short-term interventions of the scheme, there is a provision for a 50% subsidy on the cost of transportation and storage for fruits & vegetables for evacuation of surplus production from production centres during the glut situation. For the long-term, grant-in-aid is provided in the range 35% to 50% for setting up food processing project for eligible crops in the identified production clusters in major producing states.

Recent policy announcements in Union Budget 2025-26

The Union Budget 2025-26 announced various dedicated initiatives to boost agriculture.

'Agriculture as the 1st Engine'	
Prime Minister Dhan-Dhaanya Krishi Yojana - Developing Agri Districts Programme Yojana' in partnership with states, the programme will cover 100 districts with low productivity, moderate crop intensity and below-average credit parameters.	It aims to enhance agricultural productivity, adopt crop diversification and sustainable agriculture practices, augment post-harvest storage at the panchayat and block level, improve irrigation facilities, and facilitate availability of long-term and short-term credit. This programme is likely to help 1.7 crore farmers.
A comprehensive multi-sectoral 'Rural Prosperity and Resilience' programme will be launched in partnership with states. In Phase-1, 100 developing agri-districts will be covered.	This will address under-employment in agriculture through skilling, investment, technology, and invigorating the rural economy. The goal is to generate ample opportunities in rural areas so that migration is an option, but not a necessity.
Aatmanirbharta in Pulses: National Mission for Edible Oilseed for achieving atmanirbhrata in edible oils. 6-year "Mission for Aatmanirbharta in Pulses" with a special focus on Tur, Urad and Masoor.	
A Makhana Board will be established in the state to improve production, processing, value addition, and marketing of makhana.	
A National Mission on High Yielding Seeds will be launched 'Mission for Cotton Productivity' Kisan Credit Cards (KCC) facilitate short term loans for 7.7 crore farmers, fishermen, and dairy farmers. The loan limit under the Modified Interest Subvention Scheme will be enhanced from Rs 3 lakh to 5 lakhs for loans taken through the KCC. India Post to act as a catalyst for the rural economy	

Gene Bank for Crops Germplasm The 2nd Gene Bank with 10 lakh germplasm lines will be set up for future food and nutritional security. This will provide conservation support to both public and private sectors for genetic resources	This will help in strengthening the research ecosystem, targeted development and propagation of seeds with high yield, pest resistance and climate resilience, and commercial availability of more than 100 seed varieties released since July 2024.

Source: PHD Research Bureau, compiled from Union Budget 2025-26

Recent policy announcements

The Union Cabinet chaired by Prime Minister, Shri Narendra Modi, today approved seven schemes to improve farmers' lives and increase their incomes at a total outlay of Rs 14,235.30 crore. These include;

1. Digital Agriculture Mission: based on the structure of Digital Public Infrastructure, Digital Agriculture Mission will use technology for improving farmers' lives. The Mission has a total outlay of Rs 2.817 crores. It comprises two foundational pillars

1. Agriculture Stack

a. Farmers registry
b. Village land maps registry
c. Crop Sown Registry

2. Krishi Decision Support System

a. Geospatial data
b. Drought/flood monitoring
c. Weather/satellite data
d. Groundwater/water availability data
e. Modelling for crop yield and insurance

The Mission has provision for

- Soil profile
- Digital crop estimation
- Digital yield modelling
- Connect for crop loan
- Modern technologies like AI and Big Data
- Connect with buyers
- Bring new knowledge on mobile phones

2. Crop science for food and nutritional security: with a total outlay of Rs 3,979 crore. The initiative will prepare farmers for climate resilience and provide for food security by 2047. It has following pillars:

1. Research and education
2. Plant genetic resource management
3. Genetic improvement for food and fodder crop
4. Pulse and oilseed crop improvement
5. Improvement of commercial crops
6. Research on insects, microbes, pollinators etc.

3. Strengthening Agricultural Education, Management and Social Sciences: with a total outlay of Rs 2,291 crore the measure will prepare agriculture students and researchers for current challenges and comprises the following

1. Under Indian Council of Agriculture Research
2. Modernising Agriculture research and education
3. In line with New Education Policy 2020
4. Use latest technology: Digital DPI, AI, big data, remote, etc
5. Include natural farming and climate resilience

4. Sustainable livestock health and production: with a total outlay of Rs 1,702 crore, the decision aims to Increase farmers income from livestock and dairy. It comprises the following

1. Animal health management and veterinary education
2. Dairy production and technology development
3. Animal genetic resource management, production and improvement
4. Animal nutrition and small ruminant production and development

5. Sustainable development of Horticulture: with a total outlay of Rs 1129.30 crore the measure is aimed at increasing farmers' income from horticulture plants. It comprises the following

1. Tropical, sub-tropical and temperate horticulture crops
2. Root, tuber, bulbous and arid crops
3. Vegetable, floriculture, and mushroom crops
4. Plantation, spices, medicinal, and aromatic plants

6. Strengthening of Krishi Vigyan Kendra with an outlay of Rs 1,202 crore

7. Natural Resource Management with an outlay of Rs 1,115 crore

8. Cabinet approves continuation of schemes of Pradhan Mantri Annadata Aay SanraksHan Abhiyan (PM-AASHA)

The Union Cabinet chaired by the Prime Minister Shri Narendra Modi has approved the continuation of schemes of Pradhan Mantri Annadata Aay SanraksHan Abhiyan (PM-AASHA) to provide remunerative prices to farmers and to control price volatility of essential commodities for consumers. The total financial outgo will be Rs. 35,000 crore during 15th Finance Commission Cycle upto 2025-26. The Government has converged the Price Support Scheme (PSS) & Price Stabilization Fund (PSF) schemes in PM AASHA to serve the farmers and consumers more efficiently. The Integrated scheme of PM-AASHA will bring-in more effectiveness in the implementation which would not only help in providing remunerative prices to the farmers for their produce but also control the price volatility of essential commodities by ensuring their availability at affordable prices to consumers. PM-AASHA will now have the components of Price Support scheme (PSS) ,Price Stabilization Fund (PSF) , Price Deficit Payment Scheme (POPS) and Market Intervention Scheme (MIS).

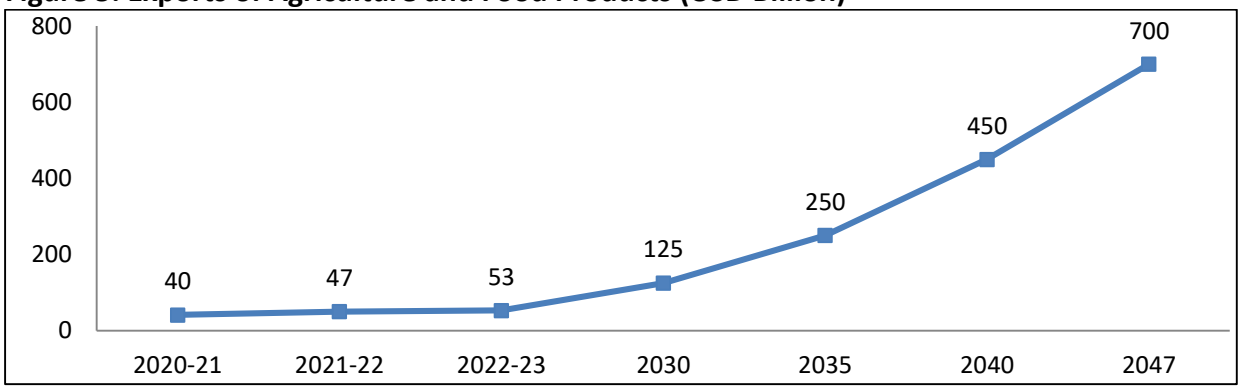
8. Road to Viksit Bharat @ 2047: Agriculture as engine of growth

In recent years, the agriculture and allied sector has witnessed a remarkable buoyancy, attributed largely to the robust reforms undertaken by the government. Significant strides have been made through strategic policies aimed at enhancing crop and livestock productivity, ensuring stable returns for farmers via price support mechanisms, fostering crop diversification, and bolstering market infrastructure through initiatives like farmer-producer organizations and investments facilitated by the Agriculture Infrastructure Fund. This proactive approach has fueled growth and fortified the resilience of the agricultural sector, pivotal for both economic growth and creation of employment opportunities within the country.

8.1 Exports of Agriculture and Food Products

The agriculture sector's performance remains pivotal for both economic growth and employment generation in the country, underscoring the need for sustained focus and investment. Looking ahead, PHDCCI projections indicate a significant expansion in agricultural and processed food products exports, with exports reaching to USD 125 billion by FY2030, USD 250 billion by FY2035, USD 450 billion by FY2040, and USD 700 billion by FY2047.

Figure 5: Exports of Agriculture and Food Products (USD Billion)

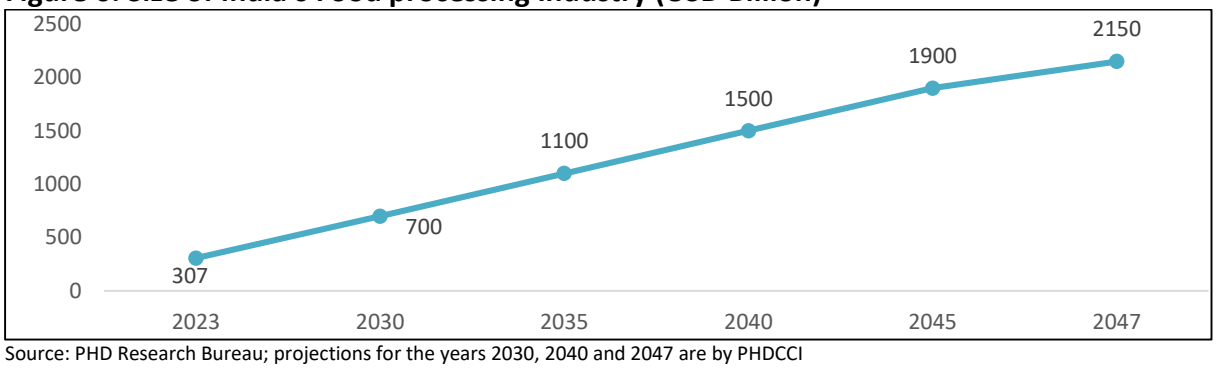


Source: PHD Research Bureau; projections for the years 2030, 2040 and 2047 are by PHDCCI

8.2 India's Food processing Industry

The food processing sector stands as a linchpin in India's economic advancement, fostering robust synergies between industry and agriculture. With the growing demand for processed food items shaping consumer preferences, this sector unveils a new horizon of prospects for both agricultural and industrial domains. This dynamic landscape propels diversification and commercialization in agricultural practices, optimizing resource utilization, augmenting farmers' earnings, and broadening export opportunities for agro-based products and employment opportunities.

Figure 6: Size of India's Food processing Industry (USD Billion)



Source: PHD Research Bureau; projections for the years 2030, 2040 and 2047 are by PHDCCI

India's food processing sector is expected to reach USD 700 billion by FY 2030, USD 1100 billion by FY2035, USD 1500 billion by FY 2040 and USD 1900 billion by FY 2040 and USD 2150 billion by 2047.

Recognizing the immense economic potential inherent in the food processing sector, the Government has taken proactive measures to spearhead its development. Through initiatives such as the Pradhan Mantri Kisan SAMPADA Yojana (PMKSY), administered by the Ministry of Food Processing Industries, substantial financial assistance is provided to propel the growth trajectory of this vital industry.

9. India's Total Foodgrain production and factors affecting its output

Foodgrain production considered an appropriate yardstick to deeply understand India's agriculture sector and the factors that affect it. The food grain production has increased from 2650 lakh tonnes in 2013-14 to 3297 lakh tonnes in 2022-23, registering a growth of more than 24% in a span of a decade. India's agriculture, allied and food processing sectors are dependent on dynamic factors such as the monsoon and inflation among others. Hence, there is a need to support these sectors with strategic policy initiatives, especially in the foodgrain production as food grains act as the basic input for most of the food processing and allied industries and their production is dependent on volatile factors.

In the light of the same, this analysis examines the impact of WPI (Food Articles), Electricity Consumption in Agriculture, warehousing capacity, Annual Rainfall and Consumption of Fertilizers on food grain production (FGP).

Table 11: India Total Foodgrain production and factors affecting its output

Years	Total Foodgrain production (lakh tonnes)	WPI (Food Articles)	Electricity Consumption in Agriculture (GWh)	Warehousing capacity (Lakh Metric Tonnes)	Rainfall in thousand mm	Consumption of Fertilizers (N+P+K) (lakh tonnes)	Gross Irrigated Area (Area in Lakhs Hectares)
2012-13	2571	10.9	147462	731.63	1.07	255.4	927.8
2013-14	2650	12.3	152744	748.08	1.26	244.8	962.7

2014-15	2520	5.6	168913	709.22	1.07	255.8	978.5
2015-16	2515	2.6	173185	814.84	1.12	267.5	977.5
2016-17	2751	4	191151	772.93	1.12	259.5	994.4
2017-18	2850	2.1	199247	843.03	1.16	265.9	1,012.70
2018-19	2852	0.3	213409	855.68	1.02	273.8	1,044.90
2019-20	2975	8.4	211295	755.94	1.32	293.7	1,122.30
2020-21	3107	3.1	221303	817.96	1.24	325.4	1,152.60
2021-22	3156	4.1	228451	788.42	1.21	298	1,183.72
2022-23	3297	7.3	243852	711.59	1.2	303.364	1,215.68

Source: PHD Research Bureau, PHDCCI compiled from various sources

10.1 Methodology

To understand the impact of various factors on foodgrain production the following methodology was employed;

1. **Variables**:
   a. Dependant = Food grain Production (FGP)
   b. Independent = WPI (Food Articles), Electricity Consumption in Agriculture, warehousing capacity, Annual Rainfall and Consumption of Fertilizers
2. **Time period**: 2012-13 to 2022-23
3. Secondary data from various sources was utilized to undertake the analysis
4. The data was analysed using the statistical software **Stata/IC 15**, using the techniques of correlation and linear regression.
5. Each of the variables holds a significant importance to understand the agriculture, allied and food processing sectors in India;
   a) Total Foodgrain production (lakh tonnes)
   b) WPI (Food Articles (FA)): measured at 2011-12 as the base year
   c) Electricity Consumption in Agriculture: Electricity Consumption in Agriculture (Plan-wise Growth of Electricity Consumption - Category Wise Utilities & Non-Utilities (GWh)
   d) Warehousing capacity measured in Lakh Metric Tonnes
   e) Annual Rainfall measured in thousand mm
   f) Consumption of Fertilizers (N+P+K) (lakh tonnes)
   g) Gross Irrigated Area (Area in Lakhs Hectares)

Table 12: List of the variables

S.No	Variable	Reasoning
1	Total Foodgrain production	Foodgrain production can be considered an appropriate yardstick to deeply understand India's agriculture sector and the factors that affect it

2	WPI (Food Articles)	This represents the price component of food production
3	Electricity Consumption in Agriculture	This represents inputs utilized in food production
4	Warehousing capacity	This represents the logistics support to the food production sector
5	Annual Rainfall	This represents inputs utilized in food production
6	Consumption of Fertilizers	This represents inputs utilized in food production
7	Gross Irrigated Area	This represents inputs utilized in food production

6. The year **2019-20** was dropped as it was an outlier from the series, given the impact of COVID -19 pandemic.

Figure 7: Stem and leaf Outlier test

	Years	r
1.	2019-20	-2.52748
2.	2018-19	-1.626369
3.	2015-16	-.994857
4.	2014-15	-.1496115
5.	2022-23	.1329419
6.	2013-14	.3514073
7.	2012-13	.4749003
8.	2016-17	.6435453
9.	2021-22	.6833434
10.	2017-18	1.087029

The stem-and-leaf plot reveals potential outliers, as indicated by studentized residuals that exceed +2 or -2. Specifically, the studentized residual for 2019-20 is -2.5, which surpasses the -2 threshold, identifying it as an outlier.

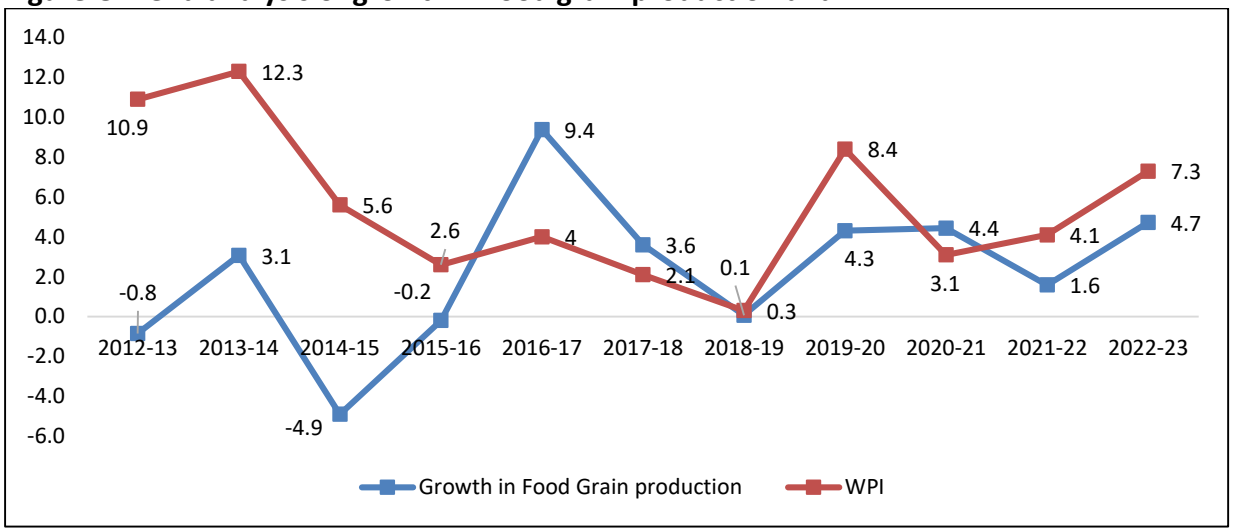
10.2 Trajectory of Food grain production and associated variables

It's common knowledge that India's foodgrain production is majorly impacted by fluctuations prices, rainfall, gross irrigated area, factors of production including consumption of electricity, availability fertilizers, and access to warehousing facilities, among others.

10.2.1 Trend analysis of growth in food grain production and WPI

WPI and growth in the food grain production (FGP) follow a similar pattern of growth for the period of 2012-12 to 2022-23. In the said period, both WPI and growth in the food grain production, touched highs in 2013-14, 2016-17 and 2019-20. The years 2014-15, 2018-19, 2020-21 and 2021-22, were the years that saw lows for both WPI and FGP, marked by economic slowdown in the economy and COVID-19 pandemic.

Figure-8 Trend analysis of growth in food grain production and WPI

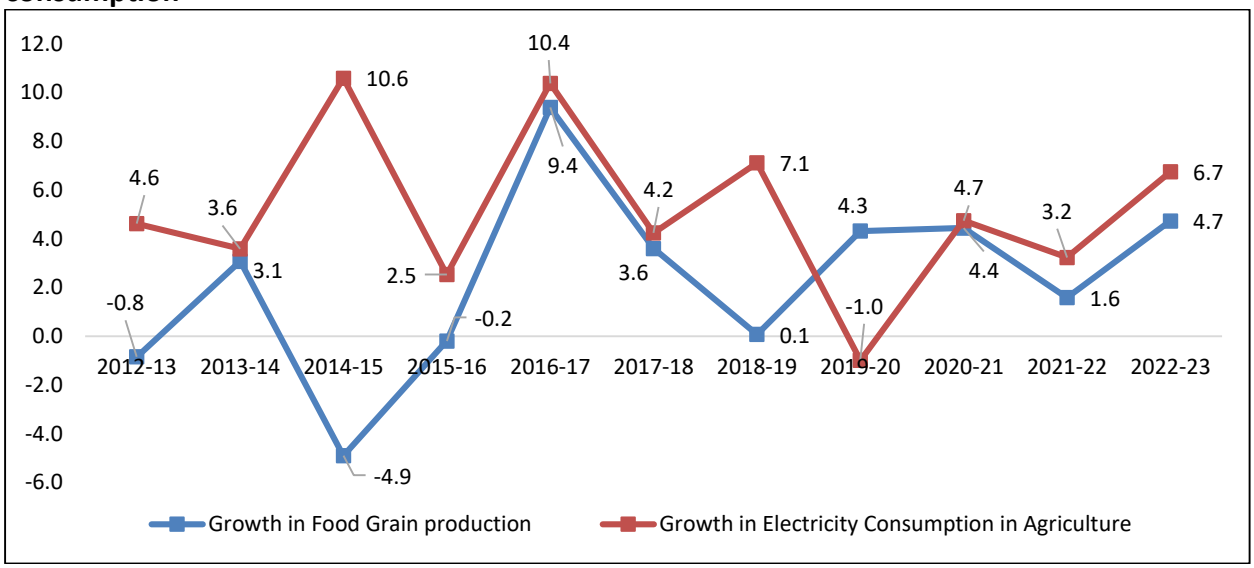


Source: PHD Research Bureau, PHD Chamber of Commerce and Industry compiled from RBI

10.2.2 Trend analysis of growth in food grain production and growth in electricity consumption

Electricity happens to be an important input for food grain production, hence it is crucial to analyse the impact of growth in electricity consumption on growth in food grain production. For the period of 2012-13 to 2022-23, growth in electricity consumption and growth in food grain production display a fluctuating pattern. It has been observed that growth of electricity consumption touched highs in the years 2014-15, 2016-17, 2018-19 and 2020-21. Among these years, during 2014-15, and 2018-19, growth of FGP was at its low. Growth of FGP touched highs during 2016-17, 2018-19 and 2020-21.

Figure-9 Trend analysis of growth in food grain production and growth in electricity consumption

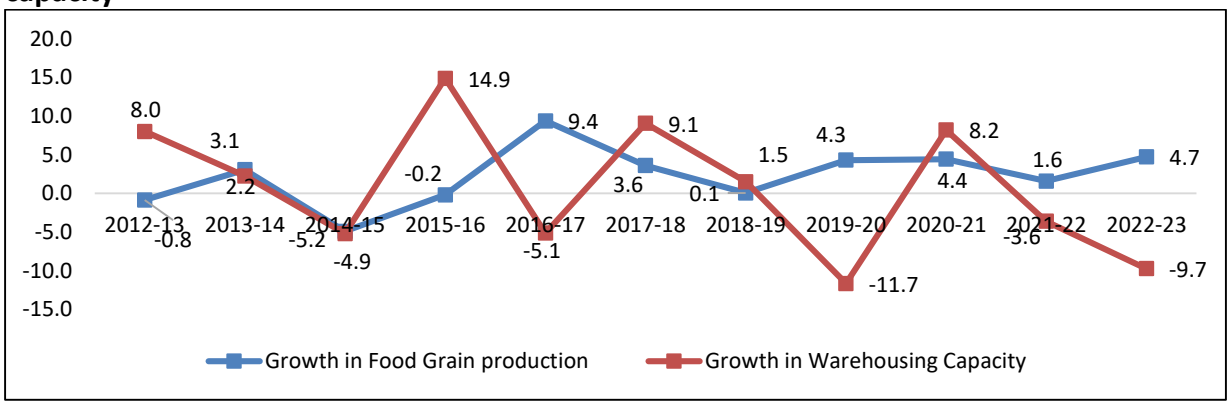


Source: PHD Research Bureau, PHD Chamber of Commerce and Industry compiled from RBI

10.2.3 Trend analysis of growth in food grain production and growth in warehousing capacity

The agriculture sector needs the unwavering support of the logistic system to flourish. Appropriate warehousing facilities support agriculture food production as farmers have an assurance that their post-harvest produce has an appropriate storage facility. For the period from 2012-13 to 2022-23, the growth of FGP and growth of warehousing capacity have shown a fluctuating trend. The growth in warehousing capacity saw peaks during 2015-16, 2017-18 and 2020-21, whereas it witnessed lows during 2014-15, 2016-17, and 2019-20, marked by economic slowdown and the COVID 19 pandemic. On the other hand, given the declining growth in warehousing capacity, growth in FGP witnessed lows during 2014-15, 2018-19 and 2021-22. Due to the appropriate availability of warehousing capacity, growth in FGP was high in 2013-14, 2015-16 and 2020-21.

Figure-10 Trend analysis of growth in food grain production and growth in warehousing capacity

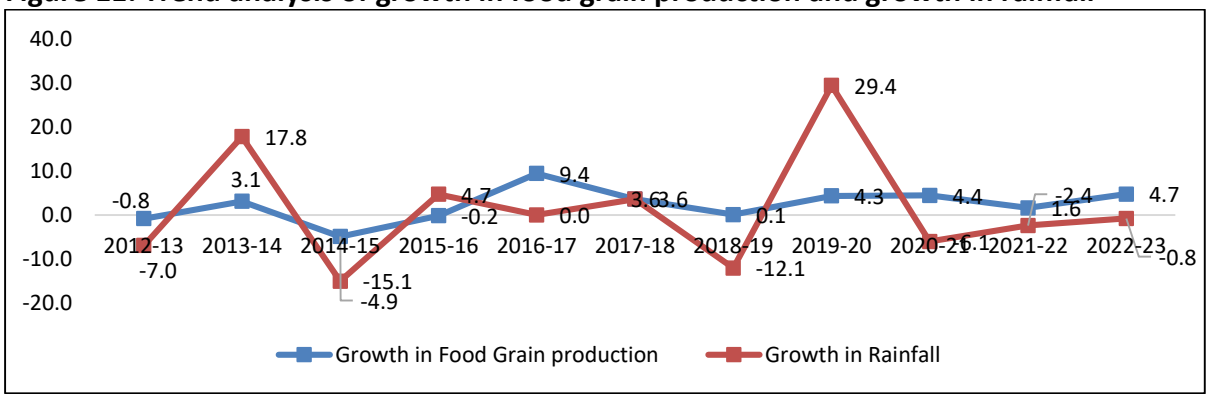


Source: PHD Research Bureau, PHD Chamber of Commerce and Industry compiled from RBI

10.2.4 Trend analysis of growth in food grain production and growth in rainfall

It is a popular belief that agriculture in India is rainfed. Despite the fluctuating trend of rainfall, growth of FGP has maintained a steady growth during 2012-13 to 2022-23. This is indicative of the strong support provided by the irrigation system to food grain production in India. FGP growth reached high points during 2013-14, and 2016-17, with lows during 2014-15, 2018-19 and 2021-22. Simultaneously, growth in rainfall saw highs during 2013-14, 2015-16 and 2019-20, with lows during 2014-15, 2018-19 and 2020-21.

Figure 11: Trend analysis of growth in food grain production and growth in rainfall

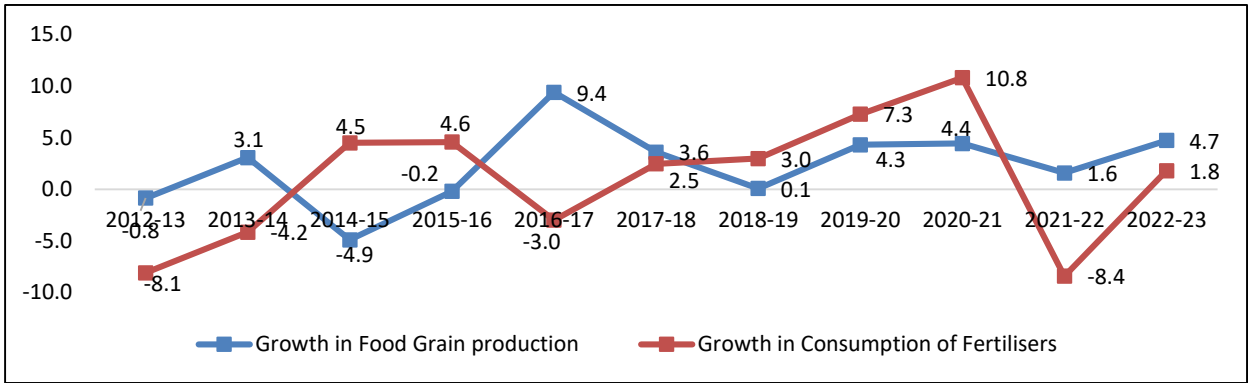


Source: PHD Research Bureau, PHD Chamber of Commerce and Industry compiled from RBI

10.2.5 Trend analysis of growth in food grain production and growth in consumption of fertilizers

Large scale food production is dependent on fertilizers, currently in India. Growth in food grain production and growth in consumption of fertilizers, both have witnessed a fluctuating trend between 2012-13 and 2022-23. Growth in food grain production touched the highest point during 2016-17, at 9.4% whereas growth in consumption of fertilizers touched the highest point in 2020-21 at 10.8%. Growth in food grain production touched its lowest point during 2014-15, at -4.9% whereas growth in consumption of fertilizers touched the lowest point in 2021-22 at -8.4%.

Figure- 12 Trend analysis of growth in food grain production and growth in consumption of fertilizers

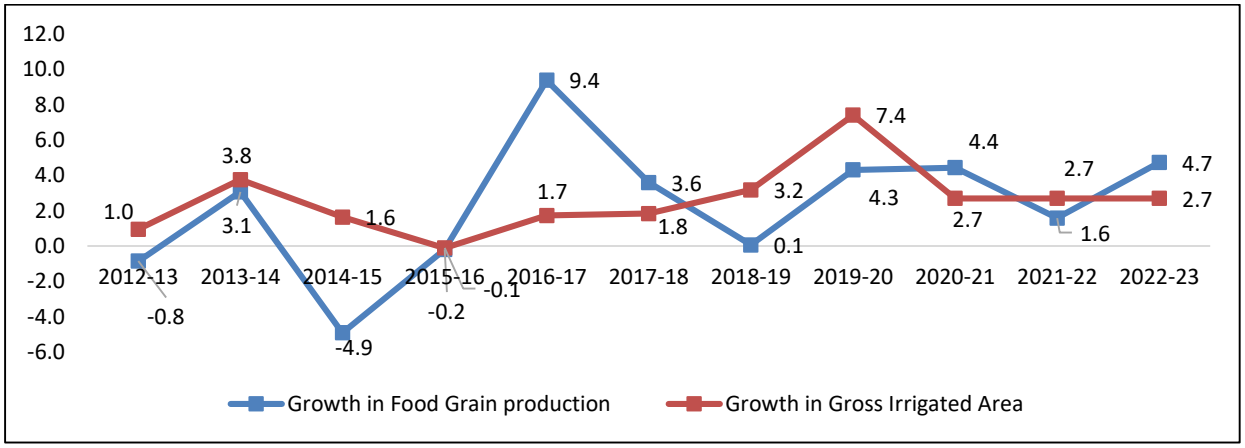


Source: PHD Research Bureau, PHD Chamber of Commerce and Industry compiled from RBI

10.2.6 Trend analysis of growth in food grain production and growth of gross irrigated area

With the advent of irrigation technology in food production, the dependence of food production on monsoon has reduced, therefore it is necessary to understand the impact of growth in gross irrigated area on growth in food production. For the period of 2012-13 to 2022-23, both growth in gross irrigated area and growth in food production display a fluctuating pattern. It has been observed that growth of FGP was highest in 2016-17. Simultaneously, growth in gross irrigated area was highest in 2019-20. Growth of FGP touched its lowest point during 2014-15, whereas the same for growth in gross irrigated area was in 2015-16.

Figure-13 Trend analysis of growth in food grain production and growth of gross irrigated area



Source: PHD Research Bureau, PHD Chamber of Commerce and Industry compiled from RBI

10.3 Dwelling deeper into the factors affecting food grain Production in India

Food grain production is shaped by several key factors, such as the Wholesale Price Index (WPI), access to electricity, the availability of adequate warehousing capacity, rainfall patterns, and the application of fertilizers, among others. These elements collectively determine the efficiency and output of agricultural activities. To understand the impact of various factors on foodgrain production following analysis has been undertaken utilizing correlation and regression.

10.3.1 Correlation Analysis

Correlation explains the degree of association between the foodgrain production and the factor affecting it.

Figure-14 Correlation Matrix

	FGP	WPI_2	Ele	lwc	RN	Fer
FGP	1.0000					
WPI_2	-0.2120	1.0000				
Ele	0.9251	-0.5339	1.0000			
lwc	0.0987	-0.7545	0.2710	1.0000		
RN	0.5085	0.3094	0.2714	-0.0794	1.0000	
Fer	0.8445	-0.3729	0.8356	0.2135	0.4254	1.0000

Key: FGP = Foodgrain production; WPI_2= Whole sale price index (Food articles); Ele = electricity consumption; lwc = Warehousing facilities; RN = rainfall; Fer = Fertilizer

Electricity and food grain production have a strong positive correlation indicating that increased electricity availability is closely linked to higher food grain output. This high correlation suggests that reliable and adequate power supply is crucial for enhancing agricultural productivity, as it supports essential activities such as irrigation, mechanization, and processing.

Warehousing capacity and food grain production show a positive but weak correlation, indicating that while increased storage facilities have some influence on production levels, other factors play a more significant role in driving agricultural output. This suggests that while improving warehousing is important for post-harvest management, it alone may not be sufficient to substantially boost food grain production.

Rainfall and food grain production share a moderate positive correlation. Rainfall acts as a primary source of natural irrigation, replenishing water tables, filling reservoirs, and directly watering crops in rain-fed areas. When rainfall is abundant and well-distributed during the growing season, it leads to optimal soil moisture levels, which are essential for the healthy growth of crops.

Fertilizer and food grain production are strongly correlated, highlighting the significant role fertilizers play in Indian agriculture. This high correlation suggests that Indian farming is heavily reliant on the use of chemical fertilizers to enhance soil fertility, boost crop yields, and sustain agricultural productivity. Fertilizers provide essential nutrients like nitrogen, phosphorus, and potassium, which are crucial for the healthy growth of crops. As a result, their use is a key factor in driving food grain production across the country.

10.3.2 Regression Analysis

In this research study, two regression models were developed to analyze the factors influencing food grain production:

1. **Model 1:** This model examines the impact of the Wholesale Price Index (WPI), rainfall, warehousing capacity, and electricity consumption on food grain production. The functional form of the model is:

Foodgrain Production = f (WPI, Warehousing Capacity, Rainfall, Electricity)

2. **Model 2**: This model focuses on understanding the relationship between gross irrigated area and food grain production. The functional form is:

Foodgrain Production = f (Gross Irrigated Area)

This model is a complimentary model to further strengthen the analysis.

These models aim to identify key determinants of food grain production and provide insights into how different variables contribute to agricultural output in India.

Analysis of Model 1:

Foodgrain Production = f (WPI, Warehousing Capacity, Rainfall, Electricity)

Source	SS	df	MS	Number of obs	=	10
				F(4, 5)	=	99.76
Model	702222.248	4	175555.562	Prob > F	=	0.0001
Residual	8799.17559	5	1759.83512	R-squared	=	0.9876
				Adj R-squared	=	0.9777
Total	711021.424	9	79002.3804	Root MSE	=	41.95

FGP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Wpi_2	74.94881	17.21065	4.35	0.007	30.70744	119.1902
WC_2	2.929859	1.392942	2.10	0.089	-.6508118	6.510529
Rn_2	407.2424	487.1874	0.84	0.441	-845.1127	1659.598
Ele	.009678	.0006676	14.50	0.000	.0079619	.0113941
_cons	-240.1684	390.4583	-0.62	0.565	-1243.873	763.5365

Key: FGP = foodgrain production; WPI_2= Wholesale price index – food articles (square root) WC_2= warehousing facilities; Rn_2= rainfall; Ele = electricity

Key Findings:

1. **WPI**
   - Coefficient: 74.94
   - t-value: 4.35
   - p-value: 0.007

The p-value is well below the 10% significance level, indicating a strong, statistically significant positive relationship between the Wholesale Price Index (WPI) and food grain production.
A positive coefficient for the Wholesale Price Index (WPI) in relation to food grain production suggests that higher WPI, which reflects rising prices, might incentivize farmers to increase production. This could be due to the prospect of higher income, which encourages greater investment in agricultural inputs like seeds and fertilizers. Additionally, favorable government policies, such as subsidies and minimum support prices (MSP), further motivate farmers to boost production when market prices are high. The relationship also indicate that farmers respond to increased demand and improved market access, leading to higher production during periods of rising prices.

2. **Warehousing Capacity:**
   - Coefficient: 2.92
   - t-value: 2.10
   - p-value: 0.08

The p-value is 0.08, which is below the 10% significance level. This indicates a statistically significant positive relationship between warehousing capacity and food grain production. This suggests that improvements in warehousing capacity contribute positively, although modestly, to food grain production.

3. **Rainfall:**
   - Coefficient: 407.24

- t-value: 0.84
- p-value: 0.4

The p-value of 0.4 exceeds the 10% significance level, suggesting that rainfall does not have a statistically significant impact on food grain production within this model. This outcome indicates that, after accounting for other factors, rainfall does not directly influence production. This finding underscores a positive shift in Indian agriculture, which traditionally relied heavily on monsoons. The reduced dependence on rainfall highlights the sector's successful adoption of modern irrigation techniques and technological advancements, reflecting significant progress in enhancing agricultural resilience and sustainability.

4. **Electricity Consumption in Agriculture:**
   - Coefficient: 0.009
   - t-value: 14.50
   - p-value: 0.00

The p-value is well below the 10% significance level, indicating a strong and statistically significant relationship. The positive coefficient suggests that as electricity consumption increases, food grain production also rises. This correlation reflects the critical role electricity plays in agricultural processes such as irrigation, powering machinery, and supporting other essential activities that enhance productivity.

Model Summary:

- R-squared: 0.98, indicating that more than 98% of the variance in food grain production is explained by the model.
- Adjusted R-squared: 0.97, which accounts for the number of predictors and suggests a very good fit.
- F-statistic: 99.76 with a p-value of 0.0001, indicating that the model as a whole is statistically significant and a good fit to explain the relation between the variables.

At the 10% significance level, the analysis reveals significant positive relationships between WPI, electricity consumption and warehousing capacity with food grain production, rainfall does not have a statistically significant impact. The model effectively explains the variations in food grain production.

Analysis of Model 2:

Foodgrain Production = ƒ (Gross Irrigated Area)

Source	SS	df	MS		
Model	653544.719	1	653544.719	Number of obs	= 10
Residual	57476.7055	8	7184.58819	F(1, 8)	= 90.96
				Prob > F	= 0.0000
Total	711021.424	9	79002.3804	R-squared	= 0.9192
				Adj R-squared	= 0.9091
				Root MSE	= 84.762

FGP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
GIA	2.650262	.2778767	9.54	0.000	2.009477	3.291047
_cons	58.10192	291.6296	0.20	0.847	-614.3972	730.601

Key: GIA = Gross irrigated area

Gross Irrigated Area

- Coefficient: 2.65
- t-value: 9.54
- p-value: 0.00

At the 10% significance level, the gross irrigated area shows a statistically significant and positive relationship with food grain production. This finding underscores the crucial role of irrigation in foodgrain production. As the extent of irrigated land increases, farmers can cultivate crops more efficiently and reliably, reducing dependence on unpredictable rainfall and enhancing crop yields. The results suggest that investments in expanding irrigation infrastructure could be a key driver in sustaining and boosting food grain production, highlighting the role of water management in ensuring agricultural resilience and food security in India.

Overall, the regression analysis suggests that food grain production in India is significantly influenced by factors such as the Wholesale Price Index (WPI), electricity consumption, warehousing capacity, and gross irrigated area. Rainfall does not appear to have a statistically significant impact, which contrasts with the traditional view of India's heavy reliance on monsoon rains for agriculture. The significance of gross irrigated area in the second model suggests that the agricultural sector has undergone substantial technological advancements. This shift indicates a move away from traditional dependence on rainfall toward modern irrigation methods, reflecting a significant evolution in India's agricultural practices and improved resilience in food grain production.

10. Conclusions and Recommendations

India's journey towards self-reliance in food security is a testament to the power of strategic planning, robust policies, and effective implementation. While challenges remain, the country's progress in increasing food availability, improving access, and enhancing absorption has laid a strong foundation for future growth. By continuing to invest in agriculture, infrastructure, and social safety nets, India can ensure that all its citizens have access to adequate and nutritious food, thereby fulfilling the right to food and contributing to the economy’s overall development and stability.

Agriculture has been acting as the driving force that liberated the Indian economy from food scarcity to concentrate on the growth of other sectors. Indian agriculture's significance was reaffirmed during the recent Covid-19 pandemic, as it exhibited remarkable growth. Throughout the pandemic, government was relieved of the burden of food shortages, enabling them to dedicate their efforts to managing the crisis. India's agricultural sector has demonstrated resilience and adaptability over the period 2012-13 to 2023-24, showcasing its ability to navigate varying economic conditions.

From the fiscal year 2013-14 to 2022-23, food grain output surged from 2650 lakh tonnes to an impressive 3297 lakh tonnes, marking a significant expansion in agricultural productivity. Agriculture exports experienced substantial growth, increasing from more than USD 37 billion in 2012-13 to over USD 48 billion in 2023-24.

Agriculture and allied sectors play an important role in the State's economy. Agriculture and allied sectors activities primarily refer to cultivation of Crops, Animal Husbandry, Fisheries, Forestry and food processing. A large segment of the population is dependent on agriculture and allied activities for its livelihood.

Discussing the special case of Rajasthan, agriculture in Rajasthan is primarily rain-fed. The period of monsoon is short. In comparison to other states, the onset of the monsoon in Rajasthan is late, and its withdrawal is early. The level of groundwater in the State is rapidly going down. Despite this, agriculture and allied sectors continues to be the backbone of the State's economy and continues to be a large contributor to the State's GSDP.
The agricultural schemes and subsidies provided by the Government of India and state government play a crucial role in boosting the agriculture sector. These initiatives ensure that farmers, especially small and marginal, have access to affordable inputs such as seeds, fertilizers, and machinery.

Agriculture in India is believed to be very dependent on rainfall. Both the range of rainfall and the rise in foodgrain output show fluctuations between 2012–13 and 2023–24. When combined with rainfall, foodgrain output has witnessed an increasing trend. There is a moderately favourable association, of around 50%, between foodgrain production and the range of rainfall. This suggests that India's agriculture, particularly the production of foodgrains, is currently only partially rainfed due to the government's support, the

application of modern technology, and the extensive use of irrigation techniques.

The study examines the impact of WPI (Food Articles), Electricity Consumption in Agriculture, warehousing capacity, Annual Rainfall and Consumption of Fertilizers on food grain production (FGP). Overall, the regression analysis suggests that food grain production in India is significantly influenced by factors such as the Wholesale Price Index (WPI), electricity consumption, warehousing capacity, and gross irrigated area. Rainfall does not have a statistically significant impact, which contrasts with the view of India's heavy reliance on monsoon for agriculture. The significance of gross irrigated area in the second model suggests that the agricultural sector has undergone substantial technological advancements. This shift indicates a move away from traditional dependence on rainfall toward modern irrigation methods, reflecting a significant evolution in India's agricultural practices and improved resilience in food grain production.

Overall, India's agricultural sector continues to be a pillar of strength, demonstrating consistent performance and a capacity to rebound effectively, even in the face of challenges. Its ability to maintain a positive trajectory highlights the sector's enduring vitality and importance to the country's development towards Viksit Bharat@2047.

Several **recommendations** can be made to further propel the agricultural sector's growth, ensure its resilience in the face of 21st-century challenges, and contribute effectively to the realization of Viksit Bharat@2047. We **recommend**,

1. **Embrace Science-Led Technology**: Advancements in science-led technology are pivotal to overcoming the multifaceted challenges that agriculture encounters today. Investing in research and development to develop drought-resistant and pest-tolerant crop varieties, precision agriculture techniques, and digital farming solutions can significantly enhance productivity while conserving resources. Initiatives to provide farmers with access to relevant technology and training should be prioritized.

2. **Private Sector Engagement**: The active participation of the private sector across both pre- and post-harvest phases is crucial. This can be fostered through partnerships, investments, and incentives that encourage innovation and efficiency. Private sector involvement can lead to improved supply chains, better market linkages, and enhanced access to credit and technology for farmers.

3. **Market Liberalization**: Facilitating a liberalized output market enables farmers to explore diverse markets, thus reducing their dependence on a single buyer and ensuring better pricerealization. Strengthening farmer-producer organizations and cooperative networks can empower smallholders to collectively engage in market negotiations and access value-addedmarkets.

4. **Infrastructure Development**: Infrastructure is a critical driver of agricultural growth. Focusing on building rural infrastructure, including roads, bridges, storage facilities, cold chains, and veterinary services, can significantly reduce post-harvest losses and improve market access for farmers in remote areas.

5. **Capacity Building**: Strengthening the skills and knowledge of farmers through training programs and extension services is essential. Educating farmers about modern farming practices, technological advancements, and sustainable resource management can empower them to make informed decisions and adopt innovative techniques.

6. Additionally, **Crop diversification** and implementation of **best practices** of the states, need to be widely adopted.

7. It is advised that more **innovation** be done to improve irrigation technology even more so that India's agriculture won't be impacted by the unpredictable monsoons. India is rapidly implementing more sustainability in all areas of its economy; hence it is imperative that the use of artificial fertilisers be gradually curtailed.

8. A suitable system of **incentives** must be created in order to move towards sustainable agriculture, particularly in India's production of food grains.

9. According to the analysis conducted, electricity and fertilisers have a major impact on foodgrain production. This suggests that, with government support in the form of reasonable policy measures, subsidies, and ease of availability, fertiliser and electricity are important components of foodgrain production. We advise the government to keep up this handholding measures for agriculture and allied sectors to further strengthen agriculture in India.

10. Broaden the **range of agricultural exports** by emphasizing value-added products and reducing reliance on a limited number of commodities. Target diverse international markets to enhance export resilience and growth potential.

11. Invest in **modern agricultural infrastructure**, including cold storage, processing facilities, and efficient transportation and logistics systems. These improvements will help reduce post-harvest losses and enhance the competitiveness of Indian agricultural exports.

12. **Strengthen diplomatic efforts** to negotiate favorable trade agreements and reduce trade barriers.

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NOTES

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PHDCCI, acting as the "Voice of Industry & Trade" reaching out to more than 1,50,000 large, medium and small industries, has forged ahead leveraging its legacy with the industry knowledge across multiple sectors to take Indian Economy to the next level.

At the global level, we have been working with the Embassies and High Commissions in India and overseas to bring in the International Best Practices and Business Opportunities.

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