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AGRICULTURAL SITUATION IN INDIA

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From Editor's Desk

This edition of Agricultural Situation in India includes news from the agriculture sector, information on the production and purchase of foodgrains, price indexes, rates of inflation, average daily earnings of field labourers by state, *etc.* The journal includes two research articles, one on "Agricultural Profitability Analysis of Various Crop Combinations within Natural Farming system in Sub-tropical Region of Himachal Pradesh" and second on "Growth in Area, Production and Productivity of Sugarcane in India". In addition to this, an Agro-Economic Research study titled "Decentralised Procurement Scheme for Procurement of Wheat and Paddy under MSP including the Strategy for Crop Diversification in Haryana and Punjab" conducted by the Agro-Economic Research Unit, Institute of Economic Growth (IEG), Delhi, under the Agro-Economic Research Scheme of Economics, Statistics and Evaluation Division, DA&FW

The major farm sector news brought out in this issue are: Viksit Bharat Sankalp Yatra; Meeting of Shri Narendra Singh Tomar with Minister of Foreign Affairs of Suriname; Meeting of Sushri Shobha Karandlaje, MoS for A&FW and H.E. Mr. Janusz Wojciechowski, European Commissioner for Agriculture; Inauguration of ASEAN-India Millet Festival; Union Minister Shri Arjun Munda visited exhibition of ASEAN-India Millet Festival; Cabinet approval for MSP for Copra for 2024 season, *etc.*

The annual rate of inflation based on all-India WPI has decreased from 5.02% percent in December, 2022 to 0.73 percent (provisional) in the month of December, 2023. The annual food inflation rate increased by 5.39 percent in the month December, 2023 (provisional) over December, 2022, whereas on month-on-month basis, the food inflation rate decreased by 1.75 percent in December, 2023 over November, 2023, provisionally. The cumulative post-monsoon season rainfall in the country during the period 1st October, 2023 to 31st December, 2023 has been 9 percent lower than the long period average (LPA). Current live storage in 150 major water reservoirs in the country is 107.70 BCM, as against the average storage of last 10 years, 114.96 BCM.

The article "Agricultural Profitability Analysis of Various Crop Combinations within Natural Farming system in Sub-tropical Region of Himachal Pradesh" explores the socio-economic and profitability aspects of Natural Farming (NF) in Himachal Pradesh, focusing on crop combinations and their economic viability. NF, emphasizing sustainable practices and reduced chemical inputs, shows promising results, with vegetable-based combinations yielding the highest returns (Rs. 2,20,730/ha). The study highlights the importance of diversified cropping systems, such as cereals, pulses, and vegetables, in enhancing productivity and soil health. However, challenges like poor education quality and dependency ratios persist. The findings advocate for widespread NF adoption, supported by farmer training and knowledge-sharing, to promote sustainable agriculture, improve livelihoods, and ensure long-term environmental and economic benefits.

The article "Growth in Area, Production and Productivity of Sugarcane in India" examines trends in sugarcane cultivation in India over the last decade, focusing on area, production, and productivity. Uttar Pradesh and Maharashtra dominate sugarcane cultivation, with significant growth in Chhattisgarh, Madhya Pradesh, and Punjab. However, states like Andhra Pradesh, Tamil Nadu, and Gujarat experienced declines in area and production. Overall, India's sugarcane productivity increased slightly, but stagnant growth rates in area and production suggest a shift to high-value cash crops. The findings highlight regional disparities and the need for targeted policies to sustain sugarcane cultivation, ensuring its role as a key cash crop in India's agricultural economy.

The study "Decentralised Procurement Scheme for Procurement of Wheat and Paddy under MSP including the Strategy for Crop Diversification in Haryana and Punjab" examines India's Decentralised Procurement (DCP) Scheme for wheat and paddy under the Minimum Support Price (MSP) system, particularly in Haryana and Punjab. It highlights the scheme's aim to reduce procurement costs, encourage local procurement, and improve food security. While decentralised procurement has expanded, challenges persist, including cost inefficiencies, inadequate storage infrastructure, and limited crop diversification. The study suggests expanding MSP to other cereals, improving digital transparency, and revising procurement agreements with millers to ensure equitable farmer benefits and a balanced food system.

Promodita Sathish

Farm Sector News

Meetings and Events

Viksit Bharat Sankalp Yatra started from 68 tribal districts spread across the country

Vikasit Bharat Sankalp Yatra campaigns were held across the country to raise awareness through outreach activities and achieve saturation of various welfare programs launched by the Centre on 15th November, 2023. Vikasit Bharat Sankalp Yatra was flagged off by Prime Minister Narendra Modi on the occasion of Janjatiya Gaurav Divas at Khunti, Jharkhand. The yatra aimed to cover all gram panchayats and urban local bodies through IEC vans and camps of various schemes organised at each location.

Union Agriculture and Farmers Welfare Minister Shri Narendra Singh Tomar monitored the Vikas Bharat Sankalp Yatra daily for its smooth operations. Shri Tomar took information about the progress of Vikas Bharat Sankalp Yatra from the nodal officers and other top officials of the states through meetings/virtual meetings. Shri Tomar said that the Central Government is trying to cover more than 2.6 lakh Gram Panchayats as well as other areas by 26th January through the Yatra.

The minister said that Prime Minister Shri Modi has pledged to all to make India a developed nation by the year 2047 and everyone has to work to make this entire program successful in the direction of making Prime minister's dream a reality with the support of 140 crore countrymen. The minister reiterated PM's resolve that every section of the society across the country should be connected with the resolve of a developed India and every section should develop, empower them so that our country can be fully developed by 2047 and take Mother India to the pinnacle of ultimate glory.

Digitally enabled Information, Education and Communication (IEC) vans were deployed in the yatra, which continuously toured and created awareness for more than 17 rural schemes and 5 tribal schemes. The vans also spreaded awareness about 17 urban schemes in the urban bodies. Various activities and services like general health camps, TB screening, sickle cell screening camps etc. were also conducted during the programmes, in which lakhs of people participated enthusiastically. Campaigns like PM Ujjwala enrolment, My Bharat volunteer registration, distribution of Ayushman cards were run during the programs. To capture the details of the programme, an IT portal (Vikas Bharat Sankalp website) was developed which displayed various data and photos/videos captured during the program through various dashboards and reports.

Union Minister Shri Narendra Singh Tomar meets Minister of Foreign Affairs, International Business and International Cooperation of Suriname Mr Albert R. Ramdin at New Delhi

Union Minister of Agriculture and Farmers' Welfare Shri Narendra Singh Tomar met Minister of Foreign Affairs, International Business and International Cooperation of Suriname Mr Albert R. Ramdin at New Delhi on 6th December, 2023.

Union Minister Shri Tomar shared his happiness that the meeting of the Joint Working Group on Agriculture and allied sectors was held on 15th November 2023. He also said that it is encouraging to see that we are moving ahead with the implementation of the work plan for the period of 2023-2027. Shri Tomar said that efforts like the Deccan High-Level Principles for Food Security and Nutrition, and the Millets and other Ancient Grains International Research Initiative (MAHARISHI) launched during India's G20 Presidency, will play a significant role in addressing challenges related to food insecurity, hunger, and malnutrition. The minister invited Suriname to be a part of the MAHARISHI whose secretariat is based in the Indian Institute of Millets Research, Hyderabad. India and Suriname can work together to bring millet *(Shree anna)* to the plates around the world.

Shri Narendra Singh Tomar said that the India-Suriname bilateral relations are based on shared aspirations for development and we have MOU and frequent high-level interactions. He appreciated Suriname's efforts in the areas of millet cultivation and Ayurveda. He concluded that India is doing well in the

area of agricultural technology such as drones and agri-stack and we will be happy to share our expertise with Suriname. He also thanked the visiting Minister for extending invitation to visit Suriname.

Mr Albert R. Ramdin shared that this meeting paves the way to further strengthen bilateral ties between both the countries. He stressed that the twin issues of food and energy security will emerge as major concern in the near future and both countries have ample scope to collaborate in these areas. He also stated that Suriname has launched a project for cultivation of millets and expressed interest to be part of MAHARISHI initiative. Mr Albert R. Ramdin also highlighted that India and Suriname can focus on the areas of training and study visits, technical assistance, knowledge sharing in areas related to climate change, germplasm exchange and food processing. Suriname is also setting up an Ayurveda health centre and look forward to India's cooperation in growing medicinal plants.

Minister of State for Agriculture & Farmers Welfare Sushri Shobha Karandlaje and H.E. Mr. Janusz Wojciechowski, European Commissioner for Agriculture held a meeting at New Delhi

Minister of State for Agriculture & Farmers Welfare Sushri Shobha Karandlaje and H.E. Mr. Janusz Wojciechowski, European Commissioner for Agriculture held a meeting at New Delhi on 8th December, 2023. The agenda of the meeting was to discuss agricultural policies and initiatives towards sustainable food systems, market access issues, India-EU FTA negotiations and bilateral agreement of Organic Products.

MoS highlighted the recent initiatives by the Government of India including National Mission on Sustainable Agriculture (NMSA) and National Innovations in Climate Resilient Agriculture (NICRA) schemes to make agriculture sustainable and climate resilient.

MoS also raised the market access issues that are creating trade barriers in export of agricultural products to the EU and recalled India's request for Protected Geographical Indicator (GI) status for Basmati Rice pending with the European Commission.

The European Commissioner congratulated India on its successful Presidency of G20. He assured that the concerns raised by Indian side are under active consideration and will be addressed soon. He also recalled the market access requests of EU countries which are under consideration of India. MoS informed that many pending market access requests from EU countries have been finalized in recent months and remaining issues will be resolved in due course.

The European Commissioner highlighted the importance of the Joint Working Group mechanism to resolve issues of mutual concern and expressed their readiness to hold its next meeting. MoS agreed and suggested holding the next meeting of the Joint Working Group in early 2024.

Union Minister Shri Arjun Munda inaugurates ASEAN-India Millet Festival at New Delhi

Union Minister of Agriculture and Farmers' Welfare and Tribal Affairs Shri Arjun Munda inaugurated ASEAN-India Millet Festival at New Delhi on 14th December, 2023. Ministers of States for Agriculture and Farmers' Welfare Shri Kailash Choudhary and Sushri Shobha Karandlaje and Secretary, Department of Agriculture and Farmers' Welfare, Shri Manoj Ahuja were also present on the occasion. In line with the International Year of Millets, the festival aimed to increase awareness and establish a larger market for millet and millet based products.

Addressing the delegates from India, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand and Vietnam attending the festival, Union Minister Shri Arjun Munda highlighted the government policies and market innovations to promote the production and consumption of grains. Shri Munda said that millet provides innumerable benefits to farmers, consumers and the environment and makes an important contribution to global food-nutrition security. Highlighting the socio-economic, nutritional and climate benefits associated with its increased consumption, Shri Munda stated that this

program reflects the vibrancy of millets and its immense potential in transforming agriculture and nutrition. Under the visionary leadership of Prime Minister Shri Narendra Modi, the Government of India has played an important role in organizing the mega event of International Millets Year 2023. This concerted effort transcended boundaries and transformed the event into a global milestone of unparalleled significance. Celebration of the International Year of Millets has been important in creating awareness about millet to ensure food security and better nutrition. This has led to investment in extension services along with research and development, which motivates stakeholders to increase the productivity, quality and associated production methods of grain. In the face of global challenges of climate change, the importance of grains increases even more.

Shri Munda said that the Government of India has launched massive campaigns and positioned millet as a better solution to tackle malnutrition, mitigate the adverse effects of climate change and promote the adoption of sustainable farming practices. Ministry of Agriculture is actively implementing Millets Sub-Mission under National Food Security Mission in all the States and Union Territories to promote millets and meet the increasing demand. The Ministry of Agriculture, in collaboration with various ministries and states, has played an important role in the promotion of millets in the country. The launch of several State Millet Missions and Projects is a testimony to our commitment. The International Year of Millets has brought widespread awareness of millet and increased consumption of millet in India and on the global platform through a series of impactful initiatives and strategic commitments. Shri Arjun Munda said that our commitment is not just in words, but goes beyond this. By nominating millets as "One Country-One Priority Product" in the Food and Agriculture Organization and expanding it to "One District-One Product" in 21 districts, we have harnessed the potential of millets, their nutritional value and Economic feasibility. IIMR has played an important role in setting up 25 seed hubs, 18 centers in various institutions and has developed more than 200 improved varieties of grains in collaboration with other agricultural institutions. This has ensured surplus availability of high quality cereal seeds, with the aim of increasing the annual seed replacement ratio to 10%.

The inaugural day featured two enlightening panel discussions, The first panel, 'Issues of Hunger and Malnutrition in Southeast Asia – Millets as a Solution,' moderated by Additional Secretary, Ministry of Women & Child Development, Shri Sanjeev Kumar. It brought out interesting insights on the nutritional merits of millets, its potential to address world hunger and the many ways to turn them into nutrient-packed culinary delights to fight nutritional deficiency. The second panel, titled, 'History and Culture of Millets in Southeast Asia,' moderated by Joint Secretary, Ministry of Culture, Ms. Lily Pandeya delved into the historical and cultural ties between the regions, emphasizing millets' role in reviving traditional connections.

The event followed a preceding festival held in Jakarta, Indonesia from 22-26 November 2023. On day two of the festival, a Business-to-Business (B2B) meeting is organized by APEDA. This meeting is curated to serve as an interactive platform fostering engagement between businesses from India and the ASEAN member states, specifically those involved in trading millets and millet-based products. The objective is to facilitate participants in exploring synergies and commercial opportunities across geographic boundaries. This moment will be crucial for numerous startups and farmer-led organizations to assess the appeal and viability of their products for an international audience.

Union Minister Shri Arjun Munda visited the exhibition of ASEAN-India Millet Festival at New Delhi

Union Minister of Agriculture and Farmers' Welfare and Tribal Affairs Shri Arjun Munda visited the exhibition of ASEAN-India Millet Festival at DLF Promenade Mall, New Delhi on 15th December, 2023. Additional Secretary Ms. Maninder Kaur and Joint Secretary Ms. Shubha Thakur were also present on the occasion. The Indian Mission to ASEAN (Association of Southeast Asian Nations) in association with Ministry

of Agriculture and Farmers' Welfare organized the two-day ASEAN-India Millet Festival 2023. In line with the International Year of Millets, the festival aimed to increase awareness and establish a larger market for millet and millet based products.

Shri Arjun Munda paid a visit to the Millet-centric exhibition being held as part of the festival featuring participation from Millet-based Farmers Producer Organisations (FPO'S) and Agri entrepreneurs.

During interaction, Union Minister urged the farming community to take advantage of several important schemes launched by the central Government like, PM Fasal Bima and PM Kisan Samridhi.

The exhibition aimed to foster collaboration between ASEAN countries, celebrate cultural and culinary diversity and promote sustainable millet practices for a healthier future.

Union Minister for Agriculture & Farmers' Welfare Shri Arjun Munda visited Indian Institute of Agricultural Biotechnology at Ranchi

Union Minister for Agriculture & Farmers' Welfare and Tribal Affairs Shri Arjun Munda paid a visit to the Indian Institute of Agricultural Biotechnology at Garh Khatanga in Ranchi on 16th December, 2023. Shri Arjun Munda also visited ICAR research complex for Eastern Region and interacted with Agro entrepreneurs and agricultural scientists at the National Institute of Secondary Agriculture.

At the Indian Institute of Agricultural Biotechnology, Shri Arjun Munda reviewed the various activities of the Institute for better agricultural production along with Member of Parliament representing Ranchi Lok Sabha Constituency Shri Sanjay Seth and Director Dr. Sujay Rakshit.

In his address Shri Arjun Munda said that our country resides in its villages and agriculture is a major source of livelihood for rural people. Agricultural growth has an intimate connection with rural development. He said that the Institute is working with a broader vision of harnessing the potential of microbial biotechnology in an integrated manner to accelerate the pace of agricultural growth.

At ICAR research complex for Eastern Region, minister interacted with the Farmers Producer Organisation (FPO'S) and the local Farmers and expressed his gratitude to the farmers who contribute a lot towards the country's economy. The country has become self-reliant in food production due to the hard work of our farmers and technologies developed by the agricultural scientists like the introduction of agricultural drones being utilised for additional activities like crop spraying and crop monitoring.

Shri Munda urged the farming community to take advantages of several important schemes launched by the Government like, PM Fasal Bima and PM Kisan Samridhi.

While interacting with Agro entrepreneurs and agricultural scientists at the National Institute of Secondary Agriculture, Shri Munda had a detailed discussion about the different activities of the Institute regarding the challenges and opportunities of Lac cultivation, processing and export to other countries.

Union Minister Shri Arjun Munda joined Prime Minister Shri Narendra Modi online for VBSY from Jharkhand

Union Minister for Agriculture & Farmers' Welfare and Tribal Affairs Shri Arjun Munda joined Prime Minister Shri Narendra Modi online for the Viksit Bharat Sankalp Yatra programme along with residents of Bundu block, at Edalhatu Panchayat, Jharkhand on 16th December, 2023. Prime Minister Shri Narendra Modi interacted with beneficiaries of the Viksit Bharat Sankalp Yatra via video conferencing.

During the programme, PM flagged off Viksit Bharat Sankalp Yatra in the state of Rajasthan, Madhya Pradesh, Chhattisgarh, Telangana and Mizoram. Thousands of Viksit Bharat Sankalp Yatra beneficiaries from across the country were part of the online interaction with Prime Minister.

Viksit Bharat Sankalp Yatra is being undertaken across the country with the aim to attain saturation of

flagship schemes of the government by ensuring that the benefits of these schemes reach all targeted beneficiaries in a time bound manner.

General Agricultural Sector News

Cabinet approves Minimum Support Price for Copra for 2024 season

The Cabinet Committee on Economic Affairs chaired by the Prime Minister Shri Narendra Modi, has given its approval for the Minimum Support Prices (MSPs) for copra for 2024 season. In order to provide remunerative prices to the cultivators, government had announced in the Union Budget of 2018-19, that MSPs of all the mandated crops will be fixed at a level of at least 1.5 times of all India weighted cost of production. The MSP for Fair Average Quality of milling copra has been fixed at Rs.11,160/- per quintal and for ball copra at Rs.12,000/- per quintal for 2024 season. This will ensure a margin of 51.84 percent for milling copra and 63.26 percent for ball copra, which are well beyond 1.5 times the all India weighted average cost of production. Milling copra is used to extract oil, while ball/edible copra is consumed as a dry fruit and used for religious purposes. Kerala and Tamil Nadu are major producers of million copra, whereas ball copra is produced predominantly in Karnataka.

The MSP for 2024 season is an increase of Rs.300/- per quintal for milling copra and Rs.250/- per quintal for ball copra over the previous season. In the last 10 years, the Government has increased MSP for milling copra and ball copra from Rs.5,250 per quintal and Rs.5,500 per quintal in 2014-15 to Rs.11,160 per quintal and Rs.12,000 per quintal in 2024-25, registering a growth of 113 percent and 118 percent, respectively.

A higher MSP will not only ensure better remunerative returns to the coconut growers but also incentivize farmers to expand copra production to meet the growing demand for coconut products both domestically and internationally.

In the current season 2023, the Government has procured a record amount of more than 1.33 lakh metric tonnes of copra, at the cost of Rs.1,493 crores, benefiting around 90,000 farmers. The procurement in the current season 2023 indicates a rise of 227 percent over the previous season (2022).

National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED) and National Cooperative Consumers' Federation (NCCF) will continue to act as Central Nodal Agencies (CNAs) for procurement of copra and de-husked coconut under Price Support Scheme (PSS).

General Survey of Agriculture

Trend in Food Prices

The rate of inflation, based on all-India WPI, stood at 0.73% (Provisional) for the month of December, 2023 as compared to 5.02% during the corresponding period of last year.

WPI Food Index (Weight 24.38%): The Food Index consisting of 'Food Articles' from Primary Articles group and 'Food Product' from Manufactured Products group has increased from 183.1 in November, 2023 to 179.9 in December, 20223. The year-over-year rate of inflation based on WPI Food Index increased from 4.69% in November, 2023 to 5.39% in December, 2023.

Based on Wholesale Price Index (WPI) (2011-12=100), the WPI of cereals, pulses, vegetables, and fruits increased by 5.92 percent, 19.60 percent, 26.30 percent, and 4.58 percent, respectively, in December, 2023 over corresponding period of last year. Whereas, on month-on-month basis, the WPI for cereals, increased by 0.56 percent, and for pulses, vegetables, and fruits it decreased by 1.84 percent, 12.02 percent, and 7.51 percent, respectively, in December, 2023 over November, 2023.

Among cereals, the WPI based rate of inflation for paddy increased by 10.54 percent and for wheat it decreased by 0.40 percent, respectively, in December, 2023 over December, 2022 while on month-on-month basis, the WPI for paddy and wheat increased by 0.31 percent and 0.05 percent, respectively, in December, 2023 over November, 2023.

Rainfall, Crop and Reservoir Situation, Water Storage in Major Reservoirs

Cumulative Post-Monsoon Season (October to December), 2023 rainfall for the country as a whole during the period 1st October, 2023 to 31st December, 2023 has been 9% lower than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been lower than LPA by 1% in North-West India, by 22% in Central India, by 13% South Peninsula but higher than LPA by 10% in East and North East India. Out of 36 meteorological sub-divisions, 07 meteorological sub-divisions received large excess/excess rainfall, 18 meteorological sub-division received normal rainfall and 11 meteorological sub-divisions received deficient/large deficient rainfall.

Current live storage in 150 reservoirs (as on 28th December, 2023) monitored by Central Water Commission having Total Live Capacity of 178.78 BCM was 107.70 BCM as against 134.11 BCM on 28.12.2022 (last year) and 114.96 BCM of normal storage (average storage of last 10 years). Current year's storage is 80% of last year's storage and 94% of the normal storage.

Articles

Agricultural Profitability Analysis of Various Crop Combinations within Natural Farming system in Sub-tropical Region of Himachal Pradesh

Chinglembi Laishram[1], Subhash Sharma[1], Rohit Kumar Vashishat[1] and Rajeshwar Singh Chandel[2]

Abstract

Natural Farming (NF) is an innovative and potentially advantageous agricultural methodology that involves cultivating multiple crops within a given area, incorporating leguminous crops as intercrops to optimize land utilization. The major crop combinations adopted by the selected farmers were categorized as: (i) Vegetables (V), (ii) Cereals + Pulses + Vegetables (C+P+V), (iii) Cereals + Pulses (C+P), (iv) Cereals + Pulses + Oilseeds + Vegetables (C+P+O+V),(v) Cereals + Vegetables (C+V), and (vi) Vegetables + Pulses (V+P). This study aims to assess the profitability of various crop combinations within the natural farming system in the sub-tropical region of Himachal Pradesh. The estimation of profitability is based on the analysis of gross returns and net farm revenue. The research employed a multistage random sampling methodology to collect primary data from a sample of 360 households. The findings indicated that the Cereals + Pulses + Vegetables (C+P+V) crop combination exhibited the most significant variability in gross returns and net farm income. In contrast, the Vegetables + Pulses (V+P) crop combination showed the least variation. Additionally, the Vegetables crop combination yielded the highest quantity of produce (134.43 q/ha), while the Cereals + Pulses (C+P) combination produced the lowest yield (69.21 q/ha).

Keywords: *Natural Farming, Intercrops, Crop combinations, Leguminous crops.*

1. Introduction

For thousands of years, agriculture has served as the fundamental basis of human civilization, providing nutrition, means of subsistence, and a solid framework for societal progress and advancement. Agriculture contributes significantly to economic growth and poverty reduction by employing 56 percent of the workforce and ensuring food security for a large population (Barwal *et al.*, 2023). Agricultural practices have changed dramatically since the mid 20th century Green Revolution. The Green Revolution, which introduced high-yielding crop varieties, chemical fertilizers, and pesticides, substantially increased the global food supply and alleviated hunger and poverty for millions. However, over time, the shortcomings and unintended consequences of this approach have become evident. Unsustainable practices have degraded soil health, polluted water sources, harmed biodiversity, and exacerbated climate change. Given these challenges, a paradigm shift is required to ensure the long-term sustainability of agriculture and food security for future generations. Subhash Palekar Natural Farming (SPNF) is a novel and promising alternative agricultural technique developed by agriculturist Subhash Palekar. Natural farming seeks to return to pre-Green Revolution agricultural practices by minimizing production costs to nearly zero (Khadse *et al.*, 2018). While the search for improved alternatives continues, natural farming currently stands as a viable option (Mishra, 2018). Natural Farming (NF) has garnered attention for its potential to transform agriculture and address its associated challenges. This technique involves cultivating three to four crops on the same land, with leguminous crops as intercrops, to

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maximize land utilization (Laishram *et al.*, 2022). Natural farming offers numerous opportunities for agriculture, the environment, and society. It advocates sustainable agricultural practices, promotes organic farming, and reduces dependence on synthetic fertilizers and pesticides. This approach ensures the longevity of agriculture by protecting soil health, preserving biodiversity, and maintaining ecosystem balance.

An efficient marketing strategy enhances productivity, reduces output and price fluctuations, lowers production costs, and decreases consumer price inequality, thereby boosting economic growth (Barwal *et al.*, 2022a). It also ensures remunerative prices for agricultural products and stimulates both production and consumption among farmers (Barwal *et al.*, 2022b).

Natural Farming (NF) presents a significant market opportunity as consumers increasingly seek organic and sustainable food. Farmers practicing NF can benefit from this growing demand. Reducing the use of synthetic chemicals not only enhances environmental sustainability but also improves the health of both farmers and consumers, which is crucial for long-term well-being.

According to Chandel *et al.*, (2021), farmers have reported a significant reduction in labor and production expenses, ranging from 14 percent to 45 percent. This is particularly important for smallholder farmers, who often struggle to afford agrochemicals. Furthermore, Indian agriculture heavily relies on crop resilience to adapt to changing climatic conditions. NF is emerging as a viable and environmentally friendly alternative to the Green Revolution, offering sustainable solutions to the challenges faced by Indian agriculture.

As Natural Farming gains momentum and support, it holds the potential to shape the future of Indian agriculture by promoting sustainable and resilient farming systems. To facilitate this transition, farmers have been provided with training and necessary machinery to support sustainable farming practices. These efforts aim to double farmers' incomes, enhance soil fertility, and reduce input costs (Vashishat *et al.*, 2021).

Himachal Pradesh stands out as a state where 89.96 percent of the population resides in rural areas (Census 2011). The Himachal Pradesh government has actively supported natural farming by offering financial assistance to farmers to increase their incomes. As of now, the Natural Farming system is being practiced on 2,170 hectares of land (Thakur *et al.*, 2023). The Himachal Pradesh government's "*Prakritik Kheti Khushhal Kissan Yojana*" scheme implements Subhash Palekar Natural Farming (SPNF) with the dual goals of reducing cultivation costs and boosting agricultural revenue.

1.1 Objectives of the study

a) To study the socio-economic status of farmers practicing Natural Farming.

b) To evaluate the profitability of various crop combinations in Natural Farming systems.

c) To determine the CEY (Crop Equivalent Yield) for the NF and CF systems, respectively.

2. Data sources and methodology

2.1 Selection of study area: Sub-tropical region of Himachal Pradesh was selected purposively for the present study.

2.2 Selection of the respondents: A multistage random sampling technique was employed to select farmers engaged in both conventional and natural agricultural practices. In the first stage, six blocks were randomly selected: Solan block in the Solan district, Ghumarwin block in the Bilaspur district, Una block in the Una district, Sundarnagar block in the Mandi district, Nurpur block in the Kangra district, and Hamirpur block in the Hamirpur district. In the second stage, a comprehensive list of Gram Panchayats was compiled by identifying the number of farmers practicing natural farming. From this list, ten Gram Panchayats were randomly selected for each block. In the third stage, primary data collection was conducted by randomly selecting six farmers from each Gram Panchayat. This process resulted in a final sample of 360 farmers for the study.

2.3 Data analysis

2.3.1 Socio-economic characteristics of the farmers

To investigate the socioeconomic status of the sample households, the primary data were recorded. The following formulas were used to calculate the literacy rate, literacy index, and dependence ratio.

a) $$\textbf{Literacy rate} = \frac{\text{Total no.of literate person}}{\text{Total population}} \times 100$$

b) $$\textbf{Literacy Index} = \frac{\sum W_i X_i}{\sum X_i}$$

Where;

W_i = Weights (0, 1,2,3,4 and 5) for illiterate, primary, middle, matric, secondary and graduate & above respectively.

X_i = Number of persons in respective category

c) Dependency ratio w.r.t. total workers = $\frac{\text{No.of dependents in the family}}{\text{Total workers}}$

2.3.2 Profitability analysis

The assessment of the profitability of various crop combinations within the context of natural farming systems was conducted through the utilization of gross margin and net farm income analysis.

$Gm = P_i Y_i - r_i c_i \quad (i = 1,2,\ldots,n)$

where,

Gm = Gross margin

P_i = Farm price of the ith product

Y_i = Output of i^{th} enterprise producing i^{th} product

r_i = Market price of variable input

c_i = Variable cost

n = Number of enterprises

After removing fixed costs from gross margin, the resulting amount is the net farm income.

i.e. Net farm income = Gross return – Fixed cost

In addition, estimations of the coefficient of variation (CV) were used to determine the extent to which individual crop combinations differed in terms of gross margin and net farm revenue.

$$CV = \frac{\sigma}{\bar{X}} * 100$$

where,

σ = Standard deviation

$\bar{X}$ = *Mean value*

2.3.3 Crop Equivalent Yield (CEY)

In the Natural Farming system, multiple types of crops were cultivated using mixed or multiple cropping methods. This made it challenging to compare the economics of multiple crops with those of a single crop. Francis (1986) introduced the concept of Crop Equivalent Yield (CEY) to represent the sum of the equivalent yields of principal crops and intercrops. The yields of different intercrops were converted into the equivalent yield of a chosen crop based on their respective market prices. This approach allowed for a meaningful comparison of economic returns. The Crop Equivalent Yield (CEY) of multiple cropping sequences was calculated by converting the yields of various intercrops or crops into the equivalent yield of a single reference crop, using the price of the produce as the conversion factor. Mathematically, the CEY is represented as: $CEY = C_Y + C_{Y1}\frac{P_1}{P_0} + C_{Y2}\frac{P_2}{P_0} \ldots$

Where,

C_Y = Yields of the main crop

P_0 = Price of the main crop

(C_{y1}, C_{y2}, C_{y3}..... C_{yn})= Yields of inter crop, which are to be converted to equivalent of main crop yield

(P_1, P_2, P_3, ... P_n) = Price of the respective intercrops.

3. Results and discussion

3.1 Socio-economic characteristics of the farmers

The size and structure of the family play a crucial role in influencing crop production. The size and structure of the sampled households in the study area are presented in Table 1. The average family size at the overall level was 5.14 persons per household, comprising 39.68 percent males, 35.79 percent females, and 24.53 percent

children. Among different farm categories, the average family size ranged from 4.76 persons per household in the medium farm category to 5.23 persons per household in the marginal farm category.

Literacy serves as a reliable measure of an individual's educational attainment, reflecting their ability to read and write. Proficiency in literacy enables individuals to actively contribute to the improvement of their social and economic environments. Enhanced literacy skills provide better opportunities for education and employment, thereby helping individuals avoids the risks of poverty and underemployment. The literacy rate is a key indicator of the quality of human capital.

The literacy rate in the study area varied from 86.25 percent to 88.81 percent among different farm categories, with an overall rate of 88.02 percent. The marginal farm category had the highest literacy rate (88.81 percent) compared to other categories. Similarly, the literacy index was highest (2.95) in the marginal farm category and lowest (2.45) in the small farm category, with an overall literacy index of 2.76.

The results of the literacy indices indicate that while the literacy rate in the study area was relatively high, the quality of education was poor. This finding highlights the need for significant improvements in the quality of education.

TABLE 1: SOCIO-ECONOMIC CHARACTERISTICS OF THE SAMPLED HOUSEHOLDS IN THE STUDY AREA

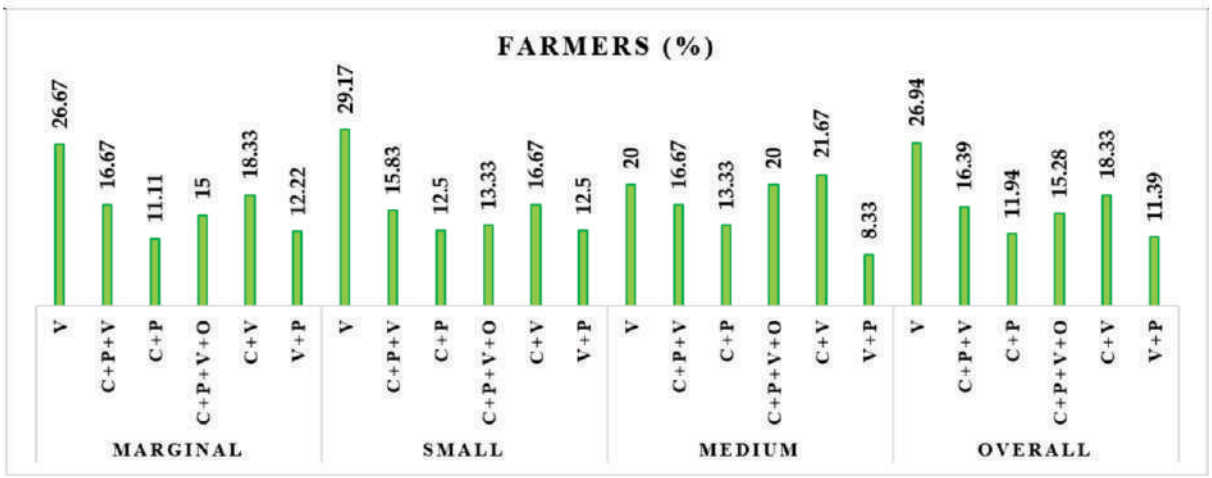
Particulars	Marginal	Small	Medium	Overall
Average size of family (No.)	5.23	5.19	4.76	5.14
Number of males (%)	42.01	39.38	33.02	39.68
Number of females (%)	36.43	36.65	32.12	35.79
Number of children (%)	21.46	23.96	34.85	24.53
Literacy rate (%)	88.81	87.72	86.25	88.02
Literacy index	2.95	2.45	2.79	2.76
Average no. of workers	4.06	3.73	3.99	3.94
Average no. of dependents (<14 yrs &>60 yrs)	1.17	1.46	0.78	1.20
Dependency ratio w.r.t. total workers	0.29	0.39	0.20	0.31

In terms of the average number of dependents, the highest percentage was observed in the small farm category (1.46), followed by the marginal farm category (1.17), and the lowest in the medium farm category (0.78). The number of productive workers at the overall level was 3.94, ranging from 3.73 in the small farm category to 4.06 in the marginal farm category. The dependency ratio with respect to total workers was highest in the small farm category (0.39), followed by the marginal farm category (0.29), and lowest in the medium farm category (0.20). The overall dependency ratio with respect to workers was 0.31. These results indicate that, on average, one worker in the sampled households supports less than one dependent family member.

3.2 Season-wise crop combinations in the Natural Farming systems in the sampled households

In the Natural Farming system, multiple crops are cultivated simultaneously within a given area, including leguminous crops as intercrops. This practice aims to maximize land utilization and minimize resource wastage. The establishment of these crop combinations during the growing season is intended to foster interaction among them, based on the principle of complementarity between plants. Intercropping with leguminous crops is widely regarded as a key component of Natural Farming due to its dual benefits of enhancing crop yield and improving soil fertility through atmospheric nitrogen fixation. The interdependence of diverse crops further enriches soil fertility and nutrient content. Additionally, this practice promotes diversification and profitability by enabling the cultivation and commercialization of a wide variety of cereals, vegetables, legumes, fruits, and medicinal plants. By implementing diverse cropping systems, farmers can significantly increase their income. This approach not only optimizes land utilization but also reduces the risk of yield reduction, thereby contributing to agricultural sustainability and economic stability.

Figure 1: Proportion of Farmers who use Various Crop Combinations in the Natural Farming System



The study revealed that farmers in the study area practiced various crop combinations. The major crop combinations adopted by the selected farmers were categorized as follows:

(i) Vegetables (V),

(ii) Cereals + Pulses + Vegetables (C+P+V),

(iii) Cereals + Pulses (C+P),

(iv) Cereals + Pulses + Oilseeds + Vegetables (C+P+O+V),

(v) Cereals + Vegetables (C+V), and

(vi) Vegetables + Pulses (V+P).

3.2.1 Kharif Season Crops

During the Kharif season, the primary vegetables grown included: okra, maize, soybean, cucumber, black gram, and French beans. The main intercrops (leguminous) were French beans, black gram, and soybean. Major cereals and pulses included maize, beans, and soybean.

3.2.2 Rabi Season Crops

In the Rabi season, the major crops were cauliflower, wheat, pea, and chickpea. Additional crops included radish, fenugreek, coriander, spinach, potato, onion, garlic, and mustard, which were classified as a major oilseed crop. The primary leguminous intercrops during this season were pea, chickpea, and kidney beans.

3.2.3 Crop Combinations by Farm Category

A. Marginal Farm Category: Vegetables were the most preferred crop combination, adopted by 26.67% of farmers. This was followed by:

- Cereals + Vegetables (18.33%),
- Cereals + Pulses + Vegetables (16.67%),
- Cereals + Pulses + Vegetables + Oilseeds (15%),
- Vegetables + Pulses (12.22%), and
- Cereals + Pulses (11.11%).

B. Small Farm Category: Vegetables were also the most preferred crop combination, adopted by 29.17% of farmers, followed by:

- Cereals + Vegetables (16.67%),
- Cereals + Pulses + Vegetables (15.83%), and
- Cereals + Pulses and Vegetables + Pulses (12.50% each)

C. Medium Farm Category: Vegetables were again the most preferred crop combination, adopted by 20% of farmers, followed by:

- Cereals + Vegetables (21.67%),
- Cereals + Pulses + Vegetables + Oilseeds (20%),
- Cereals + Pulses + Vegetables (16.67%),
- Cereals + Pulses (13.33%), and
- Vegetables + Pulses (8.33%).

3.3 Profitability in different crop combinations in Natural Farming system

The findings presented in Table 2 illustrate the estimated net farm income and average gross returns per hectare, calculated using cost while excluding farm managerial costs (Kumar and Sharma, 2023). The results indicate that the various crop combinations examined in the study region are financially viable, as evidenced by positive net farm income projections for each combination. Among these, the Vegetables (V) crop combination achieved the highest per-hectare gross returns and net farm income, estimated at Rs. 2,20,730 and Rs. 1,74,694, respectively. Conversely, the Vegetables + Pulses (V+P) crop combination yielded the lowest returns, with estimated values of Rs. 1,41,886 and Rs. 90,370, respectively. Furthermore, the research highlighted that the Vegetables (V) crop combination exhibited the most significant variations in net farm income and surplus returns at the aggregate level, whereas the Cereal + Pulses + Vegetables (C+P+V) crop combination displayed the least variation.

TABLE 2: GROSS RETURNS AND NET FARM INCOME ESTIMATES OF DIFFERENT CROP COMBINATIONS IN NATURAL FARMING SYSTEM

(Rs./ha)

Particulars	C+P		V		C+P+V		C+P+O+V		C+V		V+P	
	Gross Return	Net Farm Income	Gross Returns	Net Farm Income	Gross Returns	Net Farm Income	Gross Returns	Net Farm Income	Gross Returns	Net Farm Income	Gross Return	Net Farm Income
Marginal	189800	139800	252729	201764	206815	154940	163308	113308	185656	180656	153276	103276
	50.78	60.53	48.41	88.46	36.39	68.86	45.42	65.40	54.56	78.24	50.17	68.72
Small	141440	98485	204598	162890	151475	106405	122179	82179	155171	105171	133308	78308
	43.40	76.98	42.36	89.94	43.38	79.63	50.91	71.77	46.23	64.23	46.28	58.10

Particulars	C+P		V		C+P+V		C+P+O+V		C+V		V+P	
	Gross Return	Net Farm Income	Gross Returns	Net Farm Income	Gross Returns	Net Farm Income	Gross Returns	Net Farm Income	Gross Returns	Net Farm Income	Gross Return	Net Farm Income
Medium	138808	93552	156994	117091	138950	91088	158129	108129	131047	90047	124874	75781
	57.09	72.68	51.83	88.80	37.55	64.61	45.92	47.08	52.97	62.50	50.38	62.96
Overall	165181	118320	220730	174694	177058	128119	148735	102068	166393	140393	141886	90370
	42.705	68.04	50.13	89.01	32.97	71.74	42.35	64.47	46.29	70.95	40.19	64.22

Note: Figures in parentheses are co-efficient of variation of respective estimated values; V=Vegetables, C=Cereal, P=Pulses, O=Oilseed crops.

3.4 Crop Equivalent Yield (CEY)

A single plot of land can support two or even three distinct crops when cultivated under the principles of Natural Farming (NF). Due to the variety of crops grown in multiple or mixed cropping systems, comparing the economic output of NF with Conventional Farming (CF) posed challenges. To address this, the Crop Equivalent Yield (CEY) concept was applied to the mixed cropping system. The analysis, as presented in Table 3, showed that the yield in the NF system was consistently higher than in the CF system across all crop combinations. Among the combinations, Vegetables (V) recorded the highest yield compared to the CF system. In the NF system, the CEY ranged from 33.04 to 134.43 q/ha, while in the CF system, it ranged from 30.89 to 125.73 q/ha. The highest yield of 134.43 q/ha was observed in the Vegetables (V) crop combination, followed by Vegetables + Pulses (47.60 q/ha), Cereal + Pulses + Vegetables (44.15 q/ha), Cereal + Pulses + Oilseeds + Vegetables (37.18 q/ha), and Cereal + Pulses (33.04 q/ha).

TABLE 3: CROP EQUIVALENT YIELD (CEY) OF VARIOUS CROP COMBINATIONS UNDER NF AND CF SYSTEMS

Particulars	CEY (q/ha)		
Cro p Combinations	NF	CF	% change in NF over CF
Cereal +Pulses	33.04	30.89	6.50
Cereal +Pulses +Vegetables	44.15	39.52	10.48
Vegetables	134.43	125.73	6.45
Cereal +Pulses +Oilseeds +Vegetables	37.18	34.3	7.75
Cereal +Vegetables	41.60	36.06	13.31
V+P	47.29	41.65	11.94

4. Conclusions and policy implications

The study identified the major crop combinations adopted by the selected farmers as follows:

1) Vegetables (V),
2) Cereals + Pulses + Vegetables (C+P+V),
3) Cereals + Pulses (C+P),
4) Cereals + Pulses + Oilseeds + Vegetables (C+P+O+V),
5) Cereals + Vegetables (C+V), and
6) Vegetables + Pulses (V+P).

Overall, the Vegetables (V) crop combination exhibited the highest per-hectare gross returns and net farm income, with estimated values of Rs. 2,20,730 and Rs. 1,74,694, respectively. In contrast, the Cereals + Vegetables (C+V) crop combination had the lowest returns, with values of Rs. 1,41,886 and Rs. 90,370, respectively.

The study also revealed that the Vegetables (V) crop combination demonstrated the greatest variation in gross returns and net farm income, while the Vegetables + Pulses (V+P) crop combination showed the least variation. Maximum yield was observed in the Vegetables (V) crop combination at 134.43 q/ha, whereas the lowest yield was recorded in the Cereals + Pulses (C+P) combination at 33.04 q/ha.

Based on the findings, the study recommends that farmers prioritize the comprehensive adoption of the Natural Farming (NF) model in their agricultural practices. A thorough understanding of effective crop utilization strategies is crucial. For instance, it is essential for farmers to gain precise knowledge of techniques such as mulching, as well as the appropriate application of inputs like *Jivamrit, Bijamrit, Ghanjivamrit, Astras,* and other related substances. Accumulating this knowledge is indispensable for enhancing agricultural productivity.

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Growth in Area, Production and Productivity of Sugarcane in India

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Abstract

In the present study, spatial compound growth rates were estimated to analyze the growth patterns in the area, production, and productivity of sugarcane in major sugarcane-growing states of India. Secondary data from the period 2010–11 to 2019–20 (10 years) were utilized for the study. The compound growth rates were computed using an exponential function, and Student's t-test was applied to check for significant differences in area, production, and productivity trends based on compound growth rates (CGR). The CGR of sugarcane production in India during the study period was 11.33%, with a significant growth rate in yield (10.71%). However, the area and production remained stable. The state-wise compound growth rate of sugarcane production was positively significant in Chhattisgarh (81.48%), Madhya Pradesh (11.88%), Punjab (6.02%), and Haryana (3.80%). The highest negative growth rates were observed in Odisha (-17.99%) and Tamil Nadu (-9.21%). The results of the study revealed that the area and production of sugarcane in India declined during the study period. This decline might be due to a shift in acreage under sugarcane to other high-value cash crops. However, the productivity of sugarcane increased during the study period.

Key words: *Area, Compound Growth Rate, Production, and Productivity.*

1. Introduction

The Austronesian and Papuan peoples have long cultivated sugarcane as a crop. In ancient times, Austronesian sailors introduced it to Polynesia, Island Melanesia, and Madagascar. Around 1200 to 1000 BC, Austronesian traders brought sugarcane to southern China and India. Between the sixth and fourth centuries BC, the Persians and Greeks encountered the fabled "reeds that produce honey without bees" in India. They adopted and expanded sugarcane farming. Indian sugar, regarded as an opulent and precious spice, was first traded by merchants. In the Caribbean, South America, the Indian Ocean, and Pacific Island countries, sugarcane production began in the 18th century.

Sugarcane is the primary global source of sweeteners and holds a prominent position as a cash crop. India ranks second in sugarcane cultivation, following Brazil. The climatic conditions in India are favorable for sugarcane cultivation, enabling production to spread across the country. There are two distinct agro-climatic regions for sugarcane cultivation in India: tropical and sub-tropical.

The tropical region includes the states of Maharashtra, Gujarat, Tamil Nadu, Andhra Pradesh, Karnataka, Madhya Pradesh, Goa, and Kerala. This region records high sugar recovery due to long sunshine hours, cool nights with clear skies, and a latitudinal position conducive to sugar accumulation. The sub-tropical region includes states such as Uttar Pradesh, Bihar, Haryana, and Punjab. Climatic conditions in this region are variable depending on the season and sometimes fluctuate within the same season.

The sugarcane crop experiences all seasons within a year. Uttar Pradesh has the largest area under sugarcane cultivation. However, the highest sugar recovery is recorded in Maharashtra. (Bee N, Rahman F, 2020).

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1.2 Objectives of the study

The study was undertaken with the following major objectives:

a) To analyze the trends in the area under sugarcane in India over the last decade and identify regions with increasing or declining acreage.

b) To assess the changes in sugarcane production in India during the last ten years, highlighting states with positive or negative growth.

c) To evaluate the productivity of sugarcane in India over the last decade and determine regions showing significant improvements or declines in productivity.

2. Data sources and methodology

To analyze the changes in the area, production, and productivity of sugarcane in India, annual compound growth rates and coefficients of variation were estimated. For this purpose, data on the area, production, and productivity of sugarcane in India, as well as state-wise data, were obtained. Year-wise data were collected from various volumes of *Indian Sugar and Co-operative Sugar* for the period from 2010–11 to 2019–20.

2.1 Compound growth rates

In the present study, the compound growth rates of area, production, and productivity of sugarcane, as well as sugar production in India, were estimated by fitting an exponential equation.

$Y=ab^t$

Where, Y= Area, production, productivity of sugarcane and sugar.

a= Intercept

b= Regression co-efficient or trend value

t= Time variable

% Compound growth rate= (Anti log b-1) × 100

Percentage change in yield is given by:

$$\%\text{change in yield} = \frac{(\text{Current year yield} - \text{Previous year yield})}{\text{Prvevious year yield}} \times 100$$

3. Results and Discussion

3.1 Area under Sugarcane in India.

The percent share in area under sugarcane of 17 major sugarcane growing states in India is shown in Table 1. The data from the table revealed that the maximum percentage share of sugarcane area was observed in Uttar Pradesh (43.49%) and Maharashtra (19.75%) in 2010–11. The minimum percentage share was recorded in Rajasthan (0.1%) during the same year. In 2019–20, Uttar Pradesh (44.19%) and Maharashtra (20.11%) continued to have the highest percentage shares, while the minimum share was observed in Odisha (0.04%). Chhattisgarh (255.56%) and Madhya Pradesh (81.54%) showed positive and significant percentage changes, indicating an increase in the area under sugarcane cultivation in these states over the period. In contrast, Odisha (-84.62%) exhibited a negative and minimal percentage change, reflecting a decrease in the area under sugarcane cultivation during this period.

TABLE 1: CHANGES IN AREA UNDER SUGARCANE IN INDIA

(000 h)

		Area				
		Time Periods				
S. No.	States	2010 -11	Percent Share	2019 -20	Percent Share	Percent Change
1	Andhra Pradesh	192	3.92	126	2.58	-34.38
2	Assam	30	0.61	30	0.61	0.00
3	Bihar	248	5.07	233	4.78	-6.05
4	Chhattisgarh	9	0.18	32	0.65	255.56

Area						
		Time Periods				
S. No.	States	2010 -11	Percent Share	2019 -20	Percent Share	Percent Change
5	Haryana	85	1.73	118	2.42	38.82
6	Gujarat	190	3.88	153	3.14	-19.47
7	Karnataka	423	8.65	451	9.26	6.62
8	Kerala	3	0.60	1	0.02	-66.67
9	Maharashtra	965	19.75	979	20.11	1.45
10	Madhya Pradesh	65	1.33	118	2.42	81.54
11	Odisha	13	0.26	2	0.04	-84.62
12	Punjab	70	1.43	96	1.97	37.14
13	Tamil Nadu	316	6.46	206	4.23	-34.81
14	Rajasthan	5	0.1 0	6	0.12	20.00
15	Uttar Pradesh	2125	43.49	2151	44.19	1.22
16	Uttarakhand	107	2.18	85	1.74	-20.56
17	West Bengal	15	0.3 0	19	0.39	26.67
18	India	4886	100.00	4867	100.00	-0.39

Source: Cooperative Sugar Vol.51 (5) Jan, 2020.

3.2 Production of sugarcane in India

The percentage share of sugarcane production in India is presented in Table 2. The percent share for sugarcane production across 17 major sugarcane-growing states was estimated. In 2010–11, the maximum percentage share was observed in Uttar Pradesh (35.2%), followed by Maharashtra (23.91%), while the minimum percentage share was recorded in Chhattisgarh (0.007%). By 2019–20, the maximum percentage share was observed in Uttar Pradesh (46.01%) and Maharashtra (19.35%), whereas the minimum percentage share was recorded in Kerala (0.04%). This highlights that Uttar Pradesh and Maharashtra were the major sugarcane-producing states during the study period. Chhattisgarh (7191.67%) and Madhya Pradesh (114.96%) showed positive and significant percentage changes, indicating substantial increases in sugarcane production in these states. In contrast, Odisha (-84.39%) recorded a negative and minimal percentage change, reflecting a decline in sugarcane production over the period.

TABLE 2: CHANGE IN PRODUCTION OF SUGARCANE IN INDIA

(000 tons)

S. No.	States	Production Time Periods				Per cent Change
		2010 -11	Percent Share	2019 -20	Per cent Share	
1	Andhra Pradesh	14964	4.37	9593	2.54	-35.89
2	Assam	1075	0.31	1112	0.29	3.44
3	Bihar	12764	3.72	12833	3.40	0.54
4	Chhattisgarh	24	0.007	1750	0.46	7191.67
5	Haryana	6042	1.76	9484	2.51	56.97
6	Gujrat	13760	4.01	9198	2.43	-33.15
7	Karnataka	39657	6.26	40612	10.75	2.41
8	Kerala	271	8.51	133	0.04	-50.92
9	Maharashtra	81896	23.91	73090	19.35	-10.75
10	Madhya Pradesh	2667	0.77	5733	1.52	114.96
11	Odisha	903	0.26	141	0.04	-84.39
12	Punjab	4170	1.21	7896	2.09	89.35
13	Tamil Nadu	34252	10 .0	20600	5.45	-39 .86
14	Rajasthan	368	0.1 0	411	0.11	11.68
15	Uttar Pradesh	120545	35.2 0	173816	46.01	44.19
16	Uttarakhand	6498	1.89	6417	1.70	-1.25
17	West Bengal	1134	0.33	1710	0.45	50.79
18	India	342382	100.00	377766	100	10.33

Source: Cooperative Sugar Vol.51 (5) Jan, 2020.

3.3 Productivity of sugarcane in India

The changes in the productivity of sugarcane in India are presented in Table 3. The productivity of sugarcane in 17 major sugarcane-growing states was analyzed. In 2010–11, the maximum productivity was observed in Tamil Nadu (108.4 tons/ha), while the minimum productivity was recorded in Chhattisgarh (2.7 tons/ha). In 2019–20, maximum productivity was observed in Kerala (102.24 tons/ha) and Tamil Nadu (100 tons/ha). The minimum productivity was recorded in Assam (37.07 tons/ha) during the same period. Chhattisgarh (1955.56%) exhibited a positive and significant percentage change, indicating a substantial increase in sugarcane productivity over the period. In contrast, Gujarat (-17.13%) showed a negative and minimal percentage change, reflecting a decline in sugarcane productivity over time.

TABLE 3: CHANGE IN PRODUCTIVITY OF SUGARCANE IN INDIA

(tons/h)

		Productivity Time Periods		Percent Change
S. No.	States	2010-11	2019-20	
1	Andhra Pradesh	77.9	76.14	-2.26
2	Assam	35.8	37.07	3.55
3	Bihar	51.5	55.08	6.95
4	Chhattisgarh	2.7	55.5	1955.56
5	Haryana	71.1	80.65	13.43
6	Guj arat	72.4	60 .0	-17.13
7	Karnataka	93.8	90 .0	-4.05
8	Kerala	90.3	102.24	13.22
9	Maharashtra	84.9	74.65	-12.07
10	Madhya Pradesh	41 .0	48.59	18.51
11	Orissa	69.5	59.92	-13.78
12	Punjab	59.6	82.25	38.00
13	Tamil Nadu	108.4	100 .0	-7.75
14	Rajasthan	73.6	66.28	-9.95
15	Uttar Pradesh	56.7	80.81	42.52
16	Uttarakhand	60.7	75.5	24.38
17	West Bengal	75.6	90 .0	19.05
18	India	70.1	77.61	10.71

Source: Cooperative Sugar Vol.51 (5) Jan, 2020

Growth rates in area, production, productivity of sugarcane and sugar production in India

The growth rates in the area, production, and productivity of sugarcane, along with sugar production in India, have been determined. Using the methodology outlined in the study, these growth rates were estimated. The compound annual growth rates for the area, production, and productivity of sugarcane, as well as for sugar production, were calculated for a ten-year period from 2010-11 to 2019-20. The annual compound growth rates for sugarcane area in the seventeen major sugarcane-producing states and for the entire country were calculated and are shown in Table 4 for the period from 2010-11 to 2019-20.

TABLE 4: GROWTH RATES IN AREA, PRODUCTION, AND PRODUCTIVITY OF SUGARCANE IN INDIA

S . No.	States	2010 -11 to 2019 -20		
		Area (000 h)	Production (000 tons)	Productivity (tons/h)
1	Andhra Pradesh	-7.79 ***	-8.01 ***	-0.24 NS
2	Assam	1 NS	1.09 *	0.1 NS
3	Bihar	-0.52 NS	0.4 1 NS	0.93 NS
4	Chhattisgarh	17.8 ***	81.48 ***	54.18 ***
5	Haryana	2.11 **	3.8 ***	1.66 ***
6	Gujarat	-2.09 **	-2.8 **	-0.74 NS
7	Karnataka	0.31 NS	-0.92 NS	-1.24 NS
8	Kerala	-13.44 ***	-8.52 ***	3.02 *
9	Maharashtra	-0.21 NS	-0.6 NS	-0.39 NS
10	Madhya Pradesh	7.73 ***	11.88 ***	3.86 ***
11	Odisha	-18.16 ***	-17.99 ***	-0.48 NS
12	Punjab	2.89 ***	6.02 ***	3.04 ***
13	Tamil Nadu	-7.82 ***	-9.21 ***	-1.5 *
14	Rajasthan	0.84 NS	1.13 NS	-0.43 NS
15	Uttar Pradesh	0.17 NS	4.51 ***	4.34 ***
16	Uttarakhand	-2.78 ***	-0.15 NS	2.71 ***
17	West Bengal	2.93 ***	1.4 NS	-1.47 NS
18	India	-0.35 NS	1 NS	1.36 **

Note: ***, ** and * = Significant at 1, 5 and10 percent level of probability, respectively.

Over the last decade, the area under sugarcane in India has remained stable, with a growth rate of -0.35 percent per year. The annual compound growth rate in the area under sugarcane during this period was found to be non-significant, which could be attributed to a shift in acreage from sugarcane to other high-value cash crops.

The state-wise changes in the area under sugarcane revealed that, at the overall level, the growth rates in the area under sugarcane in Chhattisgarh, Haryana, Madhya Pradesh, Punjab, and West Bengal were 17.8%, 2.11%, 7.73%, 2.89%, and 2.93% per annum, respectively, and were found to be significant. The growth rates in the area under sugarcane in Andhra Pradesh, Gujarat, Kerala, Odisha, Tamil Nadu, and Uttarakhand were -7.79%, -2.09%, -13.44%, -18.16%, -7.86%, and -2.78% per annum, respectively, and showed significant declines. The growth rates in the area under sugarcane in Assam, Karnataka, Rajasthan, Uttar Pradesh, Bihar, and Maharashtra were 1%, 0.31%, 0.84%, 0.17%, -0.52%, and -0.21% per annum, respectively, and were found to be non-significant.

The annual compound growth rates in the production of sugarcane in the major seventeen sugarcane-growing states and the country for the ten-year period from 2010-11 to 2019-20 are calculated and reported in Table 4.

During the last decade, India's sugarcane production has remained stagnant, with a non-significant growth rate of 1 percent annually. The annual compound growth rate in sugarcane production during this period was found to be non-significant, which could be attributed to a shift in sugarcane acreage to other high-value cash crops and a decline in sugarcane productivity.

The state-wise changes in sugarcane production revealed that, at the overall level, the growth rates in sugarcane production in Assam, Chhattisgarh, Haryana, Madhya Pradesh, Punjab, and Uttar Pradesh were 1.09%, 81.48%, 3.8%, 11.88%, 6.02%, and 4.51% per annum, respectively, and were found to be significant. The growth rates in sugarcane production in Andhra Pradesh, Gujarat, Kerala, Odisha, and Tamil Nadu were -8.01%, -2.8%, -8.52%, -17.99%, and -9.21% per annum, respectively, and showed significant declines. The growth rates in sugarcane production in Bihar, Rajasthan, West Bengal, Karnataka, Uttarakhand, and Maharashtra were 0.41%, 1.13%, 1.4%, -0.92%, -0.15%, and -0.6% per annum, respectively, and were found to be non-significant.

The primary factor used to determine crop output growth is productivity. The resulting increase or decrease in productivity serves as a measure for determining whether advancements in agricultural practices have been successful or unsuccessful. Table 4 estimates and presents the annual compound growth rates in the productivity of sugarcane for the ten years from 2010–11 to 2019–20 in the key seventeen sugarcane-growing states and the country.

The productivity of sugarcane in India has significantly increased at a rate of 1.36 percent per annum over the 10-year period, with a 5 percent level of significance. The state-wise changes in the productivity of sugarcane revealed that, at the overall level, the growth rates in productivity in Chhattisgarh, Haryana, Kerala, Madhya Pradesh, Punjab, Uttar Pradesh, and Uttarakhand were 54.18%, 1.66%, 3.02%, 3.04%, 4.34%, 2.71%, respectively, and were found to be significant. The growth rate in productivity in Tamil Nadu was -1.5 percent per annum, showing a decline but was still significant. The growth rates in productivity in Assam, Bihar, Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Odisha, Rajasthan, and West Bengal were 0.1%, 0.93%, -0.24%, -0.74%, -1.24%, -0.39%, -0.48%, -0.43%, and -1.47%, respectively, and were found to be non-significant.

4. Conclusions

1. The area under sugarcane in India slightly declined over the last ten years. The area under sugarcane was largely concentrated in Uttar Pradesh and Maharashtra, where it showed an increasing trend. However, other states like Andhra Pradesh, Tamil Nadu, and Uttarakhand experienced a decline over the last decade. The acreage under sugarcane drastically increased in Chhattisgarh, Madhya Pradesh, Haryana, and Punjab.
2. The production of sugarcane in India increased over the last ten years. The highest production of sugarcane was in Uttar Pradesh and Maharashtra. Uttar Pradesh showed an increasing trend, while Maharashtra experienced a slight decline in sugarcane production during the last decade. The production of sugarcane drastically increased in Chhattisgarh, Haryana, Madhya Pradesh, Punjab, Uttar Pradesh, and West Bengal.
3. The productivity of sugarcane in India slightly increased over the last ten years. The productivity of sugarcane was highest in Tamil Nadu, Karnataka, Maharashtra, and Kerala. Maharashtra and Kerala showed an increasing trend, while Tamil Nadu and Karnataka experienced a declining trend in sugarcane productivity. The productivity of sugarcane drastically increased in Chhattisgarh, Uttar Pradesh, and Punjab.
4. The compound growth rate in the area and production of sugarcane in India over the past ten years was found to be non-significant, indicating it remained stagnant. This may be due to the shift in acreage from sugarcane to other high-value cash crops. In terms of the area under sugarcane,

Chhattisgarh, Haryana, Madhya Pradesh, Punjab, and West Bengal showed growth, meaning the area under sugarcane increased in these states over the period of study. In terms of sugarcane production, Assam, Chhattisgarh, Haryana, Madhya Pradesh, Punjab, and Uttar Pradesh showed positive growth, indicating that production in these states increased over the period of study.

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Agro-Economic Research

Decentralised Procurement Scheme for Procurement of Wheat and Paddy under MSP including the Strategy for Crop Diversification in Haryana and Punjab

Brajesh Jha[1], and Deepak Kumar[1]

1. Introduction

India has one of the largest food subsidy programmes. It has created relatively effective food security for the country but is often criticized for the misallocation of public resources and other factors. Historically, government procurement of cereals has led to selective procurement from certain regions and their distribution across the country. This has caused long travel of food grains on the one hand, and encouraged mono-cropping in a specific region on the other. The decentralised procurement allows a state to procure cereals as per its requirement under different government schemes. This is a close-ended scheme as it limits farmers' produce for procurement. This reduces the distance between the production and consumption of cereals. The decentralised procurement is supposed to be undertaken by the State Civil Supplies Department and its associates. With the unification of institutions and reduction of distance, one would expect a reduction in the cost of procurement of cereals in the decentralised procurement. This also has the potential to benefit farmers in many regions.

Despite these benefits, the state-wise adoption of decentralised procurement in the initial years of the announcement (1997) was weak. Of late, many states have adopted it, and by 2014, more than a dozen states were in the category of decentralised procurement. Since the decentralised system attempts to address many ills of the erstwhile procurement system, the present study, after years of adoption, is an effort to evaluate the performance of the decentralised procurement.

1.1 Objectives of the study

1. To ascertain procurement of cereals and its likely effect on the area and productivity of cereals.
2. To assess the impact of decentralised procurement on the unit cost of procurement of fine cereals.
3. To understand the impact of procurement on the local economy in terms of agricultural production, productivity, procurement-related infrastructure, and prices of related commodities.
4. To assess the experiences of stakeholders, including farmers, in decentralised procurement.

2. Coverage of Study

The present study at the macro-level follows the implementation of decentralised procurement and assesses its possible effect on production, procurement, and cost of procurement. While at the micro-level, it assesses the benefits of decentralised procurement and experiences of different stakeholders, including farmers. The first two objectives of the study are based on secondary data, the bulk of which is obtained from the Food Corporation of India (FCI). The states chosen are Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Punjab, and Uttarakhand. The survey on decentralised procurement was conducted in the selected states. Once the state was chosen, two districts from different regions of the state, and three procurement centres from each district were selected for micro-level investigation. In the next stage of sampling, villages associated with the procurement centres and beneficiary farmers from the villages were selected randomly for the present investigation.

3. Findings of the study

3.1 Findings from the secondary data

The procurement of cereals has increased after a rise in decentralised procurement, though centralized procurement decreased after 2014. The study found that the area under fine cereals increased as the decentralised procurement was extended to new areas

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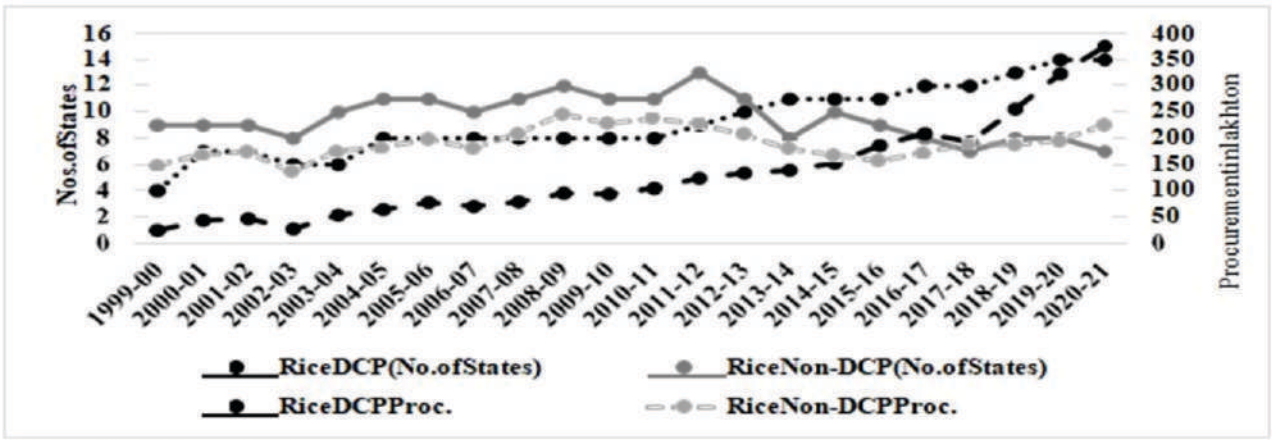
(states), but farmers of the earlier procurement regions were not willing to cultivate crops other than fine cereals since MSP-like price assurance hardly prevails for other crops. Therefore, some states have merely changed their status from a centralized to a decentralised system of procurement. Figure 1 presents progress in alternate methods of procurement in rice.

Figure 1: Number of States and Quantity of Procurement of Rice

(Decentralised and Non- Decentralised)



Source: Food Corporation of India

The secondary data revealed that procurement of rice in some places was more than the production of paddy in that region (districts and states). Though this seemed absurd with the close-ended decentralised procurement, it was true even if we considered the conversion rate of paddy to rice and also the feed and seed requirement of producers. The field visits indicated that in Uttarakhand (UK), the rice millers from the adjoining state (Uttar Pradesh) were selling their rice to the state marketing and civil supplies department, who were responsible for distribution of cereals (through various schemes) in the state. On such accounts, procurement of rice in some regions exceeded the production of paddy in the same. The procurement of more than required cereals has a wide range of implications, including the unit cost of procurement and distribution of fine cereals. In a cereal-deficit state (Uttarakhand) where procurement of cereal is less than the requirement, the regular sale of rice millers directly to the state civil supply department is understandable; but such phenomena were also reported from cereal-surplus states like Punjab. The study, therefore, recommends a relook at the scheme which allows the state civil supply department for direct purchase (procurement) of rice from millers. The relook is necessary, especially in a cereal-surplus state. The cost of procurement has been an important issue for criticism of the procurement system. In decentralised procurement, with the shortening of the distance between procurement and distribution, along with unification of the concerned institutions, the cost of procurement should decrease. However, the secondary information on the pooled cost of procurement did not suggest a reduction in the cost of procurement with the increase in decentralised procurement of fine cereals in the country. This is evident with the case of wheat procurement in Table 1. Some studies which argue for a reduction in the cost of procurement with decentralised procurement expect the creation of many storage structures near the region of procurement. The present study, however, did not find any evidence of creation of storage structures in the area surveyed; this was hardly

reported from any other states. Considering the advantages of decentralised procurement and the central government's initiative for reimbursement of expenditure (incurred in procurement), the states should grab the opportunity of decentralised procurement of cereals. The Central government also wants the states to adopt it, but delay in reimbursement of expenditures at times discourages the states. There can be other reasons for states not to adopt it, but the sampling framework of the present study is not equipped to make categorical statements on the issue.

TABLE 1: WHEAT PROCUREMENT (IN LAKH TON) WITH REAL COSTS OF PROCUREMENT AND ITS COMPONENT

(in rupees per quintal)

Year	DCP Total	Non - DCP Total	Cost of pooling	Proc. Incidentals	Acquisition Cost	Distribution Cost	Economic Cost
2001 -02	4.34	201.96	1072.57	244.17	1316.74	229.61	1546.35
2002 -03	6.07	184.17	1053.42	241.29	1294.71	255.11	1549.82
2003 -04	2.55	155.46	1015.45	229.76	1245.20	282.11	1527.31
2004 -05	4.03	163.92	957.81	285.31	1243.12	347.86	1590.98
2005 -06	5.24	142.62	950.66	255.86	1206.52	350.52	1557.04
2006 -07	0.00	92.25	1021.15	252.60	1273.75	377.68	1651.43
2007 -08	0.59	110.69	1209.23	219.57	1428.80	327.21	1756.01
2008 -09	28.37	197.35	1183.85	222.54	1406.38	304.06	1710.44
2009 -10	21.88	231.94	1214.28	246.92	1461.21	239.15	1700.36
2010 -11	36.34	188.79	1159.45	231.36	1390.81	237.10	1627.92
2011 -12	51.12	232.22	1119.18	235.68	1354.86	240.39	1595.25
2012 -13	88.04	294.11	1140.70	246.35	1387.05	252.39	1639.45
2013 -14	64.17	186.55	1129.88	254.59	1384.46	311.82	1696.28
2014 -15	93.77	187.54	1157.00	304.28	1461.27	339.64	1800.91
2015 -16	77.77	203.11	1281.81	334.62	1616.44	322.84	1939.28
2016 -17	146.43	83.18	1314.96	329.09	1644.04	324.58	1968.62
2017 -18	184.4	123.84	1381.98	264.50	1646.48	353.45	1999.93
2018 -19	201.70	156.25	1399.02	234.44	1633.46	336.27	1969.72
2019 -20	196.87	144.45	1446.26	290.25	1736.51	463.78	2200.29
$2020 -21	257.76	132.16	1499.34	300.30	1799.64	375.28	2174.91
2001 -13 (Avg.)	**20.71**	**182.96**	**1091.48**	**242.62**	**1334.10**	**286.93**	**1621.03**
2013 -21 (Avg.)	**152.86**	**152.14**	**1326.28**	**289.01**	**1615.29**	**353.46**	**1968.74**

Source: Food Corporation of India

Note: Real cost of procurement is derived from deflating nominal cost with wholesale price indices (WPI) of 2011.

The above figures are till 12.10.2021. The sign of $ suggests that kharif marketing season (KMS) 2021-22 is under progress.

Economic Cost=Acquisition Cost + Distribution Cost Where, Acquisition Cost= Pooled Cost of Grain + Procurement Incidentals; Pooled Cost of Grain is the MSP and some bonus (if, any) from state & central govt.; Procurement Incidentals is the Statutory charges + Non-Statutory charges; Distribution Cost is all the expenditure during the operation (from FCI warehouse to PDS warehouse); Statutory charges is the Mandi charges + Arhatias' commission/commission to societies; Non-Statutory charges include Gunny bag cost + Labour and transportation charges + storage and transport/other charges to state agencies + Administrative charges + others/Guarantee Fee.

3.2 Findings from the primary survey

The survey on decentralised procurement was conducted in the selected states. Once the state was chosen, two districts from different regions of the state, and three procurement centres from each district were selected for micro-level investigation. In the next stage of sampling, villages associated with the procurement centres and beneficiary farmers from the villages were selected randomly for the present investigation.

The primary survey found that farmers in regions proximal to urban places receive good prices and they hardly need government procurement. The survey was therefore conducted in a typical rural area with more than 85 percent of people as rural. One of the findings of the survey is against the general belief that big (medium and large) farmers only benefit from government procurement of cereals. A considerable proportion of marginal and small farmers are participating in the DCP, though their proportion (among the beneficiary farmers) was less than their size-wise distribution in the population. Most importantly, the small and marginal farmers were not reported to have been discriminated against in the procurement centre.

The findings suggest that farmers were aware of the Minimum Support Price. The majority of sample farmers, especially in a cereal-deficit state, considered procurement as predictable. The procurement for beneficiary farmers has increased the margin from the crop since the minimum support price hardly prevailed for crops other than fine cereals in the absence of government procurement. The farmers, therefore, try to increase their area under fine cereals. This is also evident with secondary information for blocks, districts, and states. The increase in the area under cereals with a decrease in the net cultivated area results in a decrease in the acreage of many other commodities. This concern prevails despite the observation of a marginal increase in the productivity of cereals for participating farmers.

A continuation of deficit in the area under many crops (other than fine cereals) will make the country dependent on trade. In this context, the experiences suggest that dependence on trade has caused an abrupt rise in the domestic price of the commodity. And the issue of price rise (in agricultural commodities) becomes important in a country like India where the average consumer's expenditure on food is more than 60 percent.

The present study, therefore, recommends an effective MSP for many commodities other than fine cereals. This would minimize the existing skewness of production in favour of cereals. The MSP-like price assurance would minimize divergence between the natural resource endowment and production system of the region. The MSP for many crops may encourage local grain production and this will diversify the food basket of an average consumer in the country.

Farmers perceive the poor quality of cereals as the one with moisture more than the permissible level. The cereals with excess moisture cannot be stored or processed; the process of drying (cereals) reduces the weight of moisture-laden cereals. Therefore, the concerned officials ask for cereals more than recorded. The frequency of cereals with excess moisture has increased in recent years with the increased use of combine machines for harvesting the crop. An arbitrary demand for extra cereals is more frequent from the cooperative-managed (procurement) centres as they are deprived of instruments to measure moisture in cereals.

Digital intervention has increased in recent years in all development programmes. The notable digital interventions in decentralised procurement are the regulation of farmers' eligibility for procurement and payment by digital applications. Digitalization has increased transparency in procurement, it reduces the chance of exclusion of farmers (interested in government procurement) and also the inclusion of non-farmers (traders) in procurement operations.

The digital registration requires farmers to submit some details that include their land and production plan. This is matched with the land-based digital map (BHULEKH) in the sub-divisional office of the magistrate. If the land details of the farmers do not

match with the BHULEKH, it (land detail) goes to Patwari (land-related officials at the lowest level) for physical verification. This process often delays farmers' registration and their eligibility to participate in procurement operations. However, this ensures that only land-owning farmers who have cultivated an area under the said crop in a particular year can dispose of their produce at any procurement centres of the tehsil.

Similar digitization of payment with PFMS ensures that only participating farmers' (producers and landowners) bank accounts are credited with the sale proceeds of procurement. With the digitalization of payment, the possibility of payment to farmers within three days has become a reality, though the cooperative-managed procurement centre takes some additional days for payment.

An inadequate digital literacy of farmers also causes delays in various processes of decentralised procurement. However, such delay would improve gradually by the updation of digital applications and also farmers' digital literacy.

The above study concludes that the close-ended decentralised system has been able to limit many shortcomings of the erstwhile procurement scheme for cereals. The realization of the same, besides improving the scheme, requires a few complementary policy decisions in agriculture.

4. Conclusion and policy recommendations

1. Decentralised procurement based on MSP may be extended to all cereals, not necessarily to fine cereals only. Diversification in the food basket of an average consumer requires different kinds of cereals rather than fine cereals only.
2. The state with the resource advantage to produce the kind of cereals may only be roped in for the decentralised procurement. In that context, procurement of wheat in West Bengal, and paddy in Gujarat may be discontinued.
3. The agreement of the state government departments with rice millers (of the state, and adjoining states) to procure their rice is against the ethos of the decentralised procurement of cereals. Such a government order needs a relook.
4. The local institutions may be encouraged to participate in decentralised procurement, and the state government may ensure that they have the necessary infrastructure, and instruments for procurement. In cases such facilities are rare, institutions may be identified and incentivized to create proper infrastructure, and have instruments.
5. Digitalization has improved transparency in decentralised procurement, therefore it must be continued and problems with digitalization may be worked upon to improve the same. In that context, improvement in land-related digital applications (BHULEKH) in Uttarakhand is desired.
6. Consequences of some cereal distribution programmes for the cereal market of the region have been disastrous, therefore the Union and state governments should arrive at a consensus on the price and quantity of cereals for various cereal distribution programmes.

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Commodity Review

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2023-24 upto 16.01.2024 is 37074 thousand metric tonnes as against 56869 thousand metric tonnes in marketing season 2022-23. The details are given in Table 1. A comparative analysis of procurement of rice for the period of marketing season 2023-24 (up to 16.01.2024) and the corresponding period of last year is given in figure 1. The percentage share of different states in procurement of rice has been given in figure 2.

TABLE 1: PROCUREMENT OF RICE IN MAJOR STATES

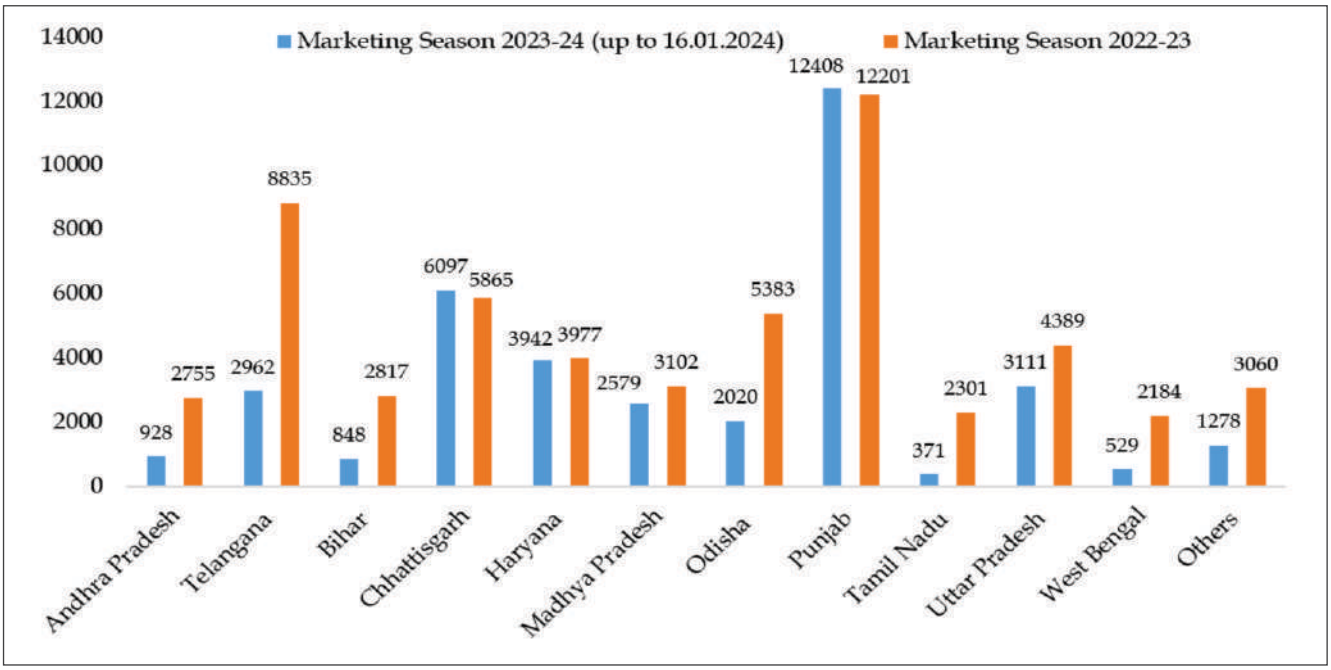
(In thousand metric tonnes)

State	Marketing Season 2023-24 (up to 16.01.2024)		Marketing Season 2022-23	
	Procurement	Percentage to total	Procurement	Percentage to total
1	2	3	4	5
Andhra Pradesh	928	2.5	2755	4.8
Telangana	2962	8.0	8835	15.5
Bihar	848	2.3	2817	5.0
Chhattisgarh	6097	16.4	5865	10.3
Haryana	3942	10.6	3977	7.0
Madhya Pradesh	2579	7.0	3102	5.5
Odisha	2020	5.4	5383	9.5
Punjab	12408	33.5	12201	21.5
Tamil Nadu	371	1.0	2301	4.0
Uttar Pradesh	3111	8.4	4389	7.7
West Bengal	529	1.4	2184	3.8
Others	1278	3.4	3060	5.4
All India Total	**37074**	**100.0**	**56869**	**100.0**

Source: Department of Food & Public Distribution, Govt. of India

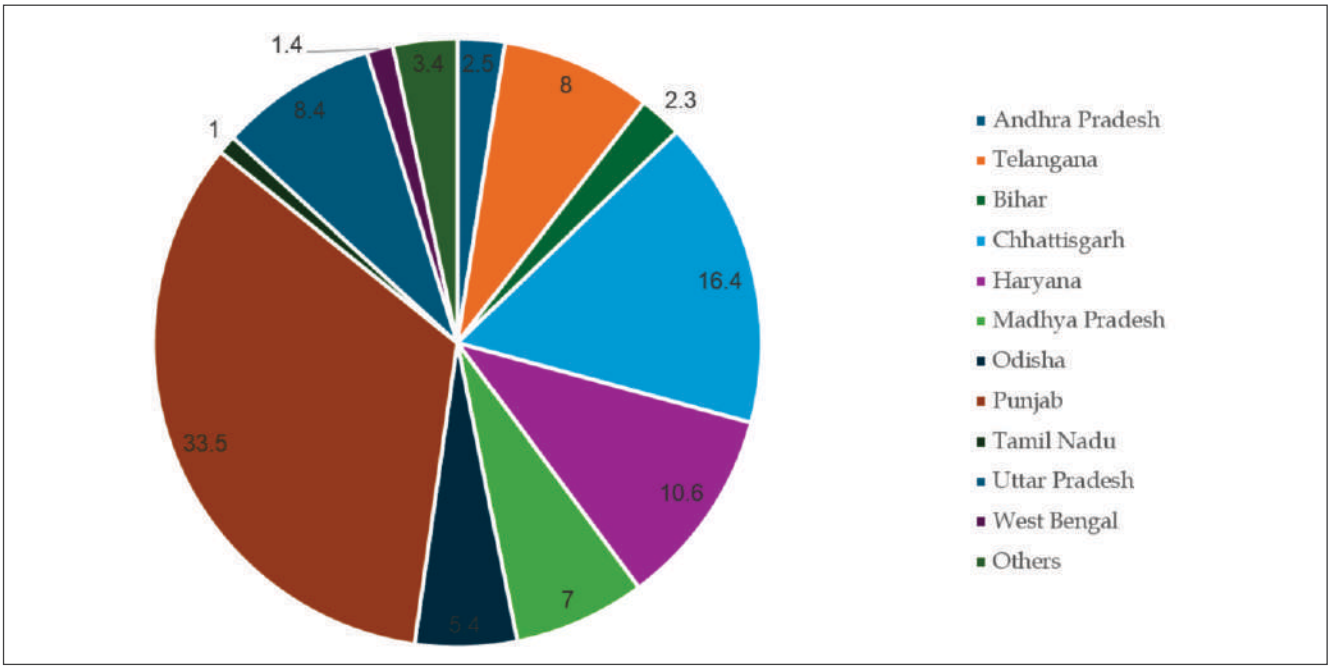
Figure 1: Procurement of Rice in Major States

(In thousand metric tonnes)



Source: Department of Food & Public Distribution, Govt. of India.

Figure 2: Percentage Share of Different States in Procurement of Rice during Marketing Season 2023-24 (up to 16.01.2024)



Source: Department of Food & Public Distribution, Govt. of India

Procurement of Wheat

The total procurement of wheat during Rabi marketing season 2023-24 upto 14.07.2023 is 26202 thousand metric tonnes as against 18792 thousand metric tonnes in marketing season 2022-23. The details are given in Table 2. The figure 3 depicts the comparison of procurement of wheat during the marketing season 2023-24 (up to 14.07.2023) with the corresponding period of last year. The percentage share of different states in procurement of wheat has been given in figure 4.

TABLE 2: PROCUREMENT OF WHEAT IN MAJOR STATES

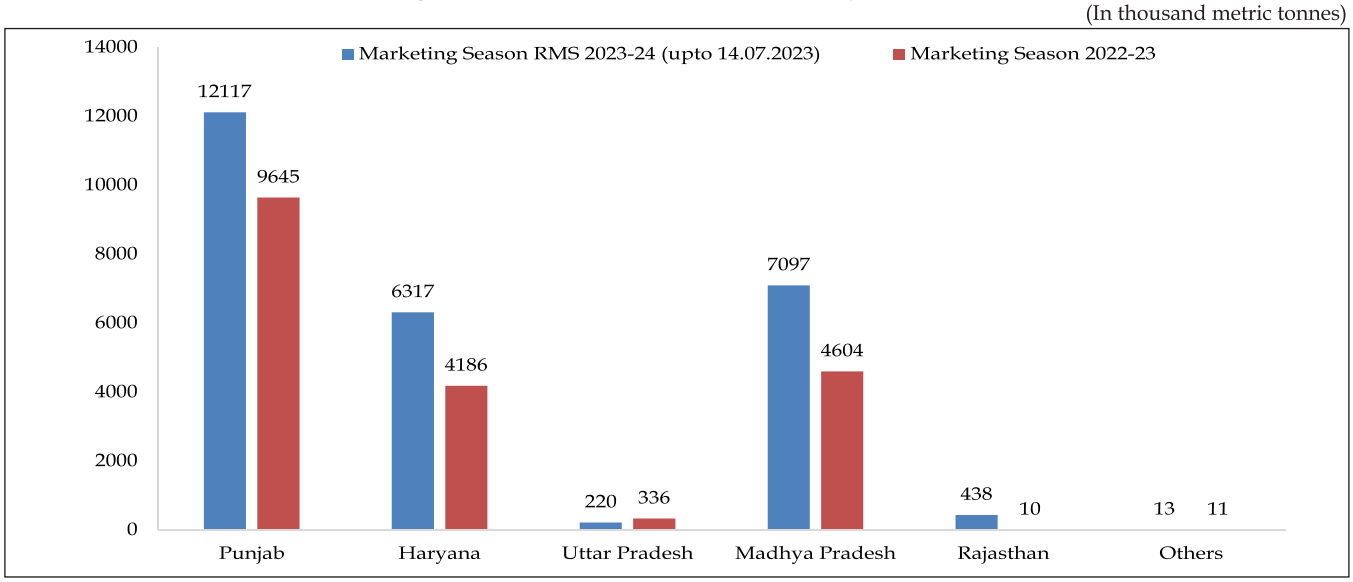
(In thousand metric tonnes)

State	Marketing Season RMS 2023 -24 (up to 14.07.2023)		Marketing Season 2022 -23	
	Procurement	Percentage to total	Procurement	Percentage to total
1	2	3	4	5
Punjab	12117	46.2	9645	51.3
Haryana	6317	24.1	4186	22.3
Uttar Pradesh	220	0.8	336	1.8
Madhya Pradesh	7097	27.1	4604	24.5
Rajasthan	438	1.7	10	0.1
Others	13	0.1	11	0.1
All India	**26202**	**100**	**18792**	**100**

Source: Department of Food & Public Distribution, Govt. of India.

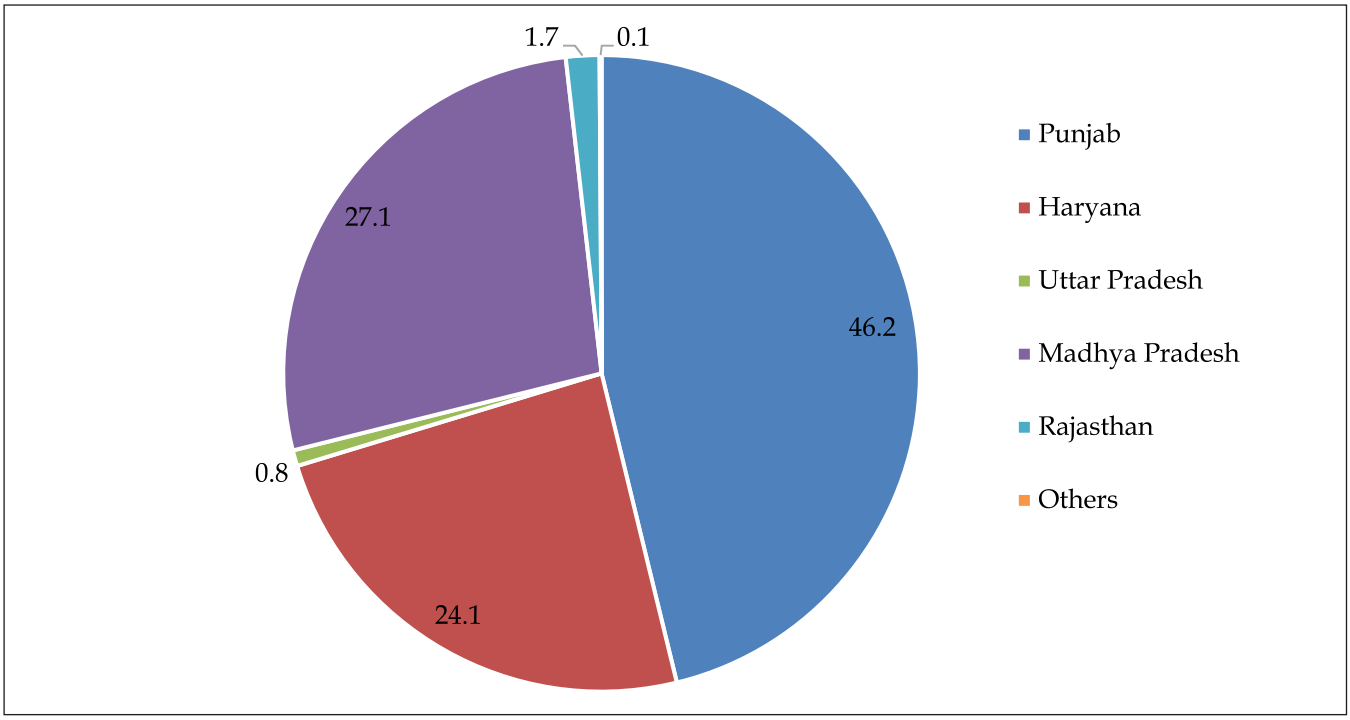
Figure 3: Procurement of Wheat in major States

(In thousand metric tonnes)



Source: Department of Food & Public Distribution, Govt. of India.

Figure 4: Percentage Share of Different States in Procurement of Wheat during Marketing Season 2023-24 (up to 14.07.2023)



Source: Department of Food & Public Distribution, Govt. of India.

Commercial Crops

Oilseeds

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 185.1 in December, 2023 showing a decrease of 0.16 percent over the previous month and decreased by 7.31 percent over the corresponding month of the previous year.

The WPI of all individual oilseeds showed a mixed trend. The WPI of groundnut seed (1.52 percent), cotton seed (0.29 percent), gingelly seed (sesamum) (0.69 percent), safflower (6.47 percent) increased over the previous month. However, the WPI of rape & mustard seed (1.08 percent), copra (coconut) (1.51 percent), niger seed (0.46 percent), sunflower (1.14percent) and soyabean (0.56 percent) decreased over the previous month.

Manufacture of Vegetable and Animal Oils and Fats

The WPI of vegetable and animal oils and fats as a group stood at 141.1 in December, 2023 which shows a decrease of 0.98 percent over the previous month. Moreover, it is decreased by 16.36 percent over the corresponding month of the previous year. The WPI of mustard oil (2.13 percent), soybean oil (2.38 percent), sunflower oil (0.87 percent) groundnut oil (1.15 percent), rapeseed oil (4.11percent), and cotton seed oil (1.39percent) decreased over the previous month. However, the WPI of copra oil (1.06 percent) increased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 202 in December, 2023 showing a decrease of 10.30 percent over previous month and an increase of 16.70 percent over the corresponding month of the previous year.

Potato

The WPI of potato stood at 191.1 in December, 2023 showing a decrease of 9.30 percent over the previous month. Moreover, it decreased by 24.08 percent over the corresponding month of the previous year.

Onion

The WPI of onion stood at 372.6 in December, 2023 showing a decrease of 20.94 percent over the previous month and an increase of 91.77 percent over the corresponding month of the previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 248.4 in December, 2023 showing an increase of 0.98 percent over the previous month and an increase of 29.71 percent over the corresponding months of the previous year. The WPI of black pepper increased by 0.15 percent over the previous month, chillies (dry) decreased by 5.03 percent and turmeric increased by 0.41 percent over the previous month.

Tea

The WPI of tea stood at 159.9 in December, 2023 showing a decrease of 3.50 percent over the previous month and a decrease of 5.16 percent over the corresponding month of the previous year.

Coffee

The WPI of coffee stood at 148.9 in December, 2023 showing no change over the previous month. Moreover, there is a decrease of 3.37 percent over the corresponding month of the previous year.

Sugarcane

The WPI of sugarcane stood at 217 in December, 2023 showing no change over the previous month. Moreover, there is an increase of 3.28 percent over the corresponding month of the previous year.

Raw Cotton

The WPI of raw cotton stood at 152.8 in December, 2023 showing a decrease of 3.35 percent over the previous month and a decrease of 14.59 percent over the corresponding month of the previous year.

Raw Jute

The WPI of raw jute stood at 229.6 in December, 2023 showing a decrease of 0.13 percent over the previous month and a decrease of 10.83 percent over the corresponding month of the previous year.

Wholesale Price Index of Commercial Crops is given in Table 3. A graphical comparison of WPI for the period of December, 2023 and November, 2023 is given in figure 5 and the comparison of WPI during the December, 2023 with the corresponding month of last year has been given in figure 6.

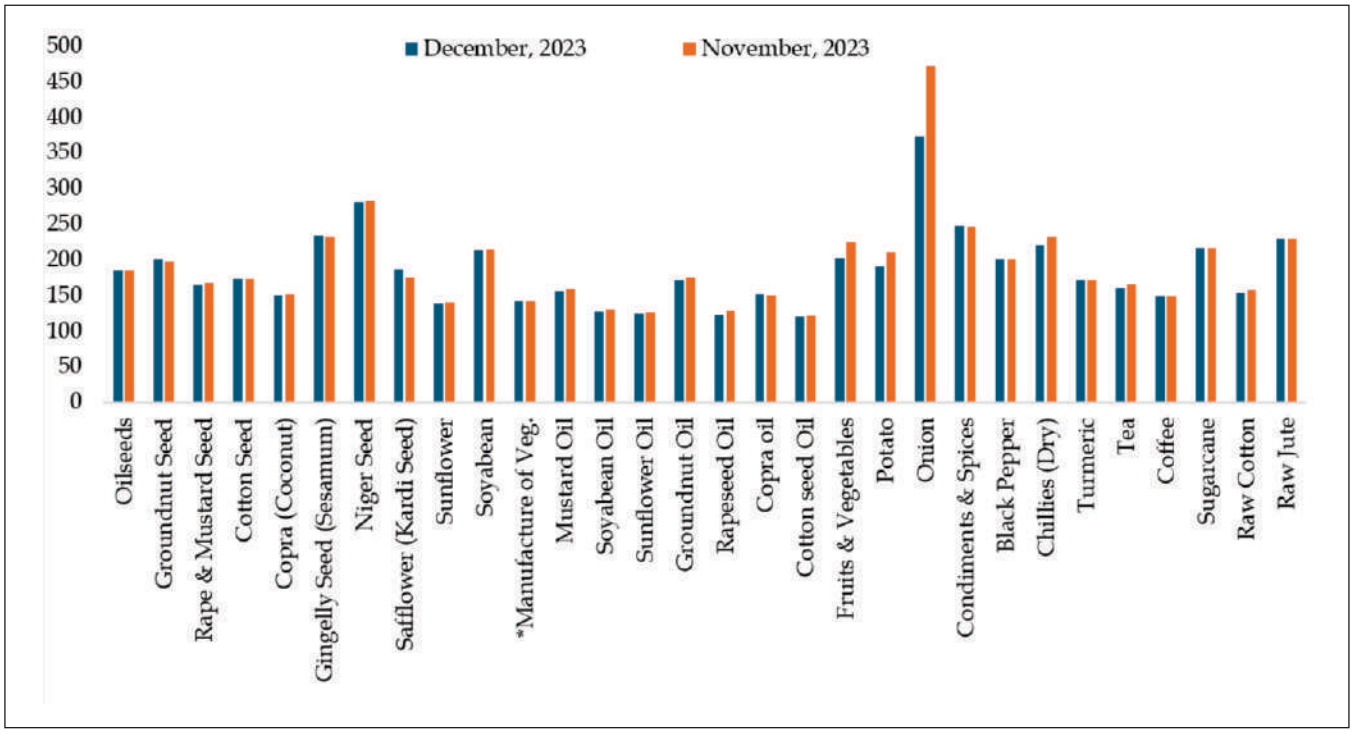
TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base Year: 2011-12)

Commodity	December , 2023	November, 2023	December , 2022	Percentage variation over the	
				Month	Year
Oilseeds	185.1	185.4	199.7	-0.16	-7.31
Groundnut Seed	200.7	197.7	181.6	1.52	10.52
Rape & Mustard Seed	165.3	167.1	199.3	-1.08	-17.06
Cotton Seed	173.5	173.0	181.9	0.29	-4.62
Copra (Coconut)	149.9	152.2	180.6	-1.51	-17.00
Gingelly Seed (Sesamum)	234.4	232.8	191.8	0.69	22.21
Niger Seed	281.2	282.5	248.2	-0.46	13.30
Safflower (Kardi Seed)	186.0	174.7	212.9	6.47	-12.64
Sunflower	138.5	140.1	165.1	-1.14	-16.11
Soyabean	213.3	214.5	234.6	-0.56	-9.08
Manufacture of Vegetable and Animal Oils and Fats	141.1	142.5	168.7	-0.98	-16.36
Mustard Oil	156.0	159.4	196.5	-2.13	-20.61
Soyabean Oil	127.1	130.2	174.5	-2.38	-27.16
Sunflower Oil	124.8	125.9	160.8	-0.87	-22.39
Groundnut Oil	172.3	174.3	174.7	-1.15	-1.37
Rapeseed Oil	123.8	129.1	169.0	-4.11	-26.75
Copra oil	152.2	150.6	164.5	1.06	-7.48
Cotton seed Oil	120.3	122.0	161.2	-1.39	-25.37
Fruits & Vegetables	202.0	225.2	173.1	-10.30	16.70
Potato	191.1	210.7	251.7	-9.30	-24.08
Onion	372.6	471.3	194.3	-20.94	91.77
Condiments & Spices	248.4	246.0	191.5	0.98	29.71
Black Pepper	201.0	200.7	167.0	0.15	20.36
Chillies (Dry)	221.0	232.7	250.2	-5.03	-11.67
Turmeric	172.4	171.7	115.7	0.41	49.01
Tea	159.9	165.7	168.6	-3.50	-5.16
Coffee	148.9	148.9	154.1	0.00	-3.37
Sugarcane	217.0	217.0	210.1	0.00	3.28
Raw Cotton	152.8	158.1	178.9	-3.35	-14.59
Raw Jute	229.6	229.9	257.5	-0.13	-10.83

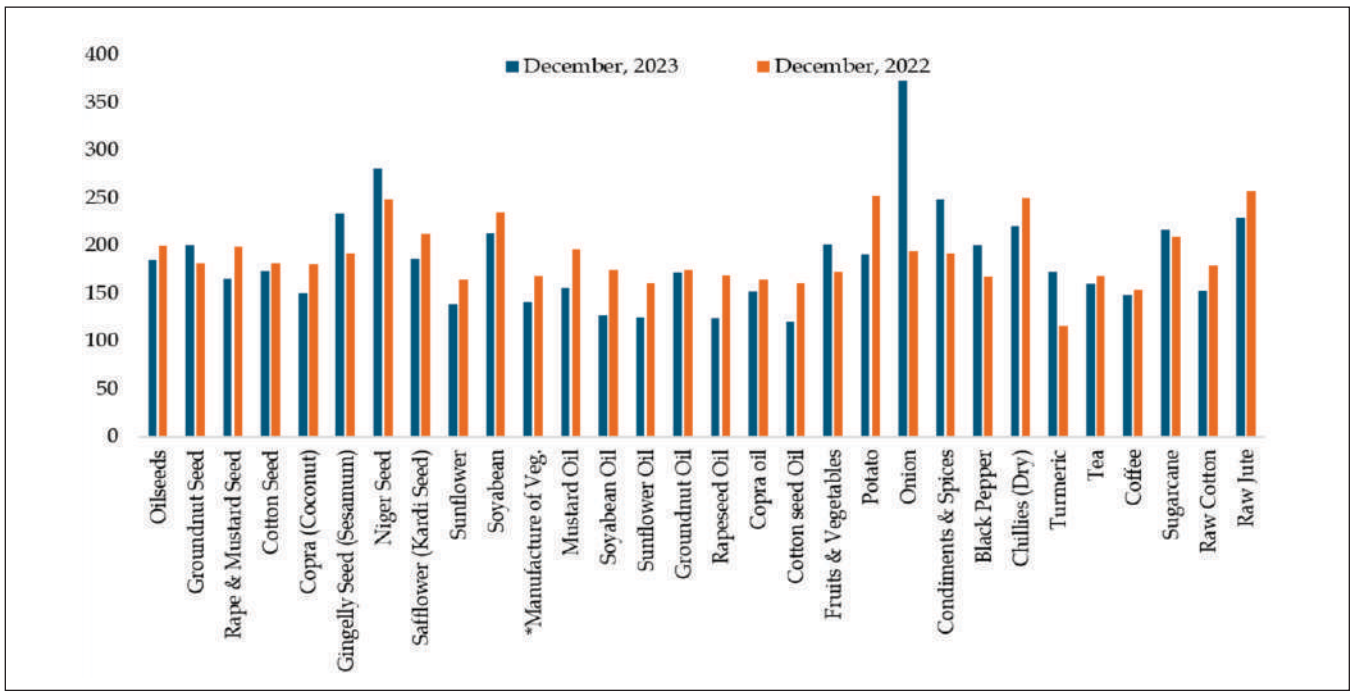
Source: Office of the Economic Advisor, DPIIT, Ministry of Commerce, Govt. of India.

Figure 5: WPI of Commercial Crops during December, 2023 and November, 2023



*Manufacture of Vegetable, Animal Oils and Fats.
Source: Office of the Economic Advisor, DPIIT, Ministry of Commerce, Govt. of India

Figure 6: WPI of Commercial Crops during December, 2023 and December, 2022



*Manufacture of Vegetable, Animal Oils and Fats.
Source: Office of the Economic Advisor, DPIIT, Ministry of Commerce, Govt. of India.

Prices

Wholesale Prices of Certain Agricultural Commodities and Animal Husbandry Products at Selected Centres in India

(All Prices in Rupees)

S.No.	Commodity	Variety	Unit	State	Centre	Dec-23	Nov-23	Dec-22
1	Wheat	PBW 343	Quintal	Punjab	Amritsar	NA	NA	NA
2	Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	2482	2436	2565
3	Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	2997	2841	2496
4	Jowar	-	Quintal	Maharashtra	Mumbai	5500	5000	3940
5	Gram	No III	Quintal	Madhya	Sehore	5653	5750	4464
6	Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	2221	2210	2166
7	Gram Split	-	Quintal	Bihar	Patna	7354	7445	6440
8	Gram Split	-	Quintal	Maharashtra	Mumbai	7300	7800	6400
9	Arhar Split	-	Quintal	Bihar	Patna	13272	14025	9882
10	Arhar Split	-	Quintal	Maharashtra	Mumbai	14500	13500	10060
11	Arhar Split	-	Quintal	Delhi	Delhi	14744	15469	9980
12	Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	13660	14725	9560
13	Gur	-	Quintal	Maharashtra	Mumbai	5125	5438	4780
14	Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4700	4700	4800
15	Gur	Balti	Quintal	Uttar Pradesh	Hapur	2982	3000	2850
16	Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	5509	5476	6466
17	Mustard Seed	Black	Quintal	West Bengal	Raniganj	6400	6388	6480
18	Mustard Seed	-	Quintal	West Bengal	Kolkata	5810	5813	7300
19	Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	5332	5275	7280
20	Linseed	Small	Quintal	Uttar Pradesh	Varanasi	5282	5319	6962
21	Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	3050	2988	3000
22	Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	3750	3750	4160
23	Castor Seed	-	Quintal	Telangana	Hyderabad	NA	NA	NA
24	Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	14890	14613	11836
25	Copra	FAQ	Quintal	Kerala	Alleppey	9230	9325	8990
26	Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	7500	7500	6580
27	Groundnut	-	Quintal	Maharashtra	Mumbai	12500	13000	12160
28	Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1954	1943	2444
29	Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1800	1815	2336
30	Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	2426	2363	2356
31	Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2630	2775	2610
32	Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	2197	2155	2534
33	Castor Oil	-	15 Kg.	Telangana	Hyderabad	2265	2438	2595
34	Sesamum Oil	-	15 Kg.	Delhi	Delhi	2690	2750	2550
35	Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	4572	4493	3790
36	Coconut Oil	-	15 Kg.	Kerala	Cochin	2013	2021	2019
37	Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2930	2976	3170
38	Groundnut	-	Quintal	Telangana	Hyderabad	NA	NA	NA
39	Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	7620	7550	9760
40	Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	5220	5600	7380
41	Jute Raw	TD 5	Quintal	West Bengal	Kolkata	5500	5500	5745

Wholesale Prices of Certain Agricultural Commodities and Animal Husbandry Products at Selected Centres in India *contd.*

S.No.	Commodity	Variety	Unit	State	Centre	Dec-23	Nov-23	Dec-22
42	Jute Raw	W 5	Quintal	West Bengal	Kolkata	5500	5500	5745
43	Oranges	Big	100 No	Tamil Nadu	Chennai	2090	2250	2080
44	Oranges	Nagpuri	100 No	West Bengal	Kolkata	NA	NA	570
45	Banana	-	100 No.	Delhi	Delhi	417	417	417
46	Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	594	604	588
47	Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	67500	61875	55000
48	Almonds	-	Quintal	Maharashtra	Mumbai	73000	71875	75000
49	Walnuts	-	Quintal	Maharashtra	Mumbai	72500	72875	85000
50	Kishmish	-	Quintal	Maharashtra	Mumbai	19000	18875	20800
51	Peas Green	-	Quintal	Maharashtra	Mumbai	8450	8200	7120
52	Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	2150	2115	1430
53	Ladyfinger	-	Quintal	Tamil Nadu	Chennai	5000	2950	1800
54	Cauliflower	-	100 No.	Tamil Nadu	Chennai	2260	2125	1800
55	Potato	Red	Quintal	Bihar	Patna	1120	1265	1392
56	Potato	Desi	Quintal	West Bengal	Kolkata	1600	1538	1200
57	Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	3294	3730	3985
58	Onion	Pole	Quintal	Maharashtra	Nashik	2838	3775	1390
59	Turmeric	Nadan	Quintal	Kerala	Cochin	13000	13000	11000
60	Turmeric	Salam	Quintal	Tamil Nadu	Chennai	18500	17500	11620
61	Chillies	-	Quintal	Bihar	Patna	21845	22375	21710
62	Black Pepper	Nadan	Quintal	Kerala	Kozhikode	57680	58300	48280
63	Ginger	Dry	Quintal	Kerala	Cochin	33000	33000	17500
64	Cardamom	Major	Quintal	Delhi	Delhi	67400	65800	57750
65	Cardamom	Small	Quintal	West Bengal	Kolkata	205000	201250	120000
66	Milk	Buffalo	100 Liters	West Bengal	Kolkata	7750	7750	7000
67	Ghee Deshi	Deshi No 1	Quintal	Delhi	Delhi	57066	58417	61698
68	Ghee Deshi	-	Quintal	Maharashtra	Mumbai	61500	61500	63800
69	Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	49900	50375	48560
70	Fish	Rohu	Quintal	Delhi	Delhi	11180	12000	13000
71	Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	45200	47000	49800
72	Eggs	Madras	1000 No.	West Bengal	Kolkata	6214	5700	5957
73	Tea	-	Quintal	Bihar	Patna	26025	25898	26600
74	Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	10840	10878	11750
75	Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	35800	32500	40000
76	Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	30400	28500	20000
77	Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	9135	9000	9210
78	Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4065	3975	4630
79	Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13220	13300	13260
80	Rubber	-	Quintal	Kerala	Kottayam	13180	13150	13180
81	Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	91200	89750	90400
82	Paddy	2716	Quintal	Andhra Pradesh	Vijayawada	2280	2303	2216
83	Paddy	Basmati	Quintal	Punjab	Amritsar	4388	3788	4330
84	Paddy	No III	Quintal	Uttar Pradesh	Kanpur	2194	2193	2049
85	Paddy	Common	Quintal	West Bengal	Kolkata	2183	2183	2040

Crop Production

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING THE MONTH OF JANUARY, 2024

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Summer Rice, Ragi, (R), Small Millets (R) other Rabi, Pulses, Sugarcane, Onion	Winter Rice, Jowar (K), Maize (R), Ragi, (K), Tur (K), Urad (K), Mung (K), Winter Potato (Plains), Sugar cane, Groundnut,Castorseed, Cotton, Mesta, Sweet Potato, Garlic.
Assam		Winter Rice, Winter Potato, Sugarcane, Sesamum, Cotton.
Bihar	Summer Rice, Winter Potato (Plains), Sugarcane	Winter Potato (Plains), Sugarcane, Groundnut, Rapeseed & Mustard, Linsed.
Gujarat	Sugarcane	Small Millets (R), Tur (K), Sugarcane Ginger, Chillies, Tobacco, Castorseed, Cotton, Turmeric
Himachal Pradesh	Winter Potato (Hills), Onion	–
Jammu & Kashmir	Onion	Winter Potato, Chillies (Dry).
Karnataka	Summer Rice, Ragi (R), Urad, Mung (R) Potato (Plains) Sugarcane	Winter Rice, Jowar (R), Bajra (K), Ragi (K), Wheat, Barley, Small Millets (K), Gram, Tur (K), Mung (K), Other Kharif Pulses Potats (Plains) Sugarcane Black Pepper, Chillies (Dry) Tobacco Castorseed, Rapeseed & Mustard, Linseed, Cotton, Mesta, Sweet Potato, Turmeric, Kardiseed, Tapioca.
Kerala	Summer Rice, Sugarcane, Sesamun (3rd Crop)	Winter Rice, Ragi, Tur, (K) Other Kharif Pulses, (Kulthi), Urad (R) Other Rabi Pulses, Sugarcane, Ginger, Black Pepper, Seamum (2nd Crops) Sweet, Potato, Turmeric, Tapioca.
Madhya Pradesh	Sugarcane, Onion	Jowar (K), Small Millets (R), Tur (K), Urad (R) Mung (R), Other Rabi, Pulses, Sugarcane, Ginger, Chillies (Dry), Tabacco, Castorseed, Rapeseed & Mustard, Cotton, Mesta, Sweet Potato, Turmeric, Sannhemp.
Maharashtra	Sugarcane	Winter Rice, Jowar Gram, Urad (R) Mung (R), Sugarcane, Chillies (Dry), Tobacco, Cotton Turmeric, Sannhemp.

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING THE MONTH OF JANUARY, 2024 -*Contd.*

State (1)	Sowing (2)	Harvesting (3)
Orissa	Summer Rice, Chillies (Dry).	Winter Rice, Winter Potato (Plains), Sugarcane, Chillies (Dry), Tobacco, Castorseed, Nigerseed.
Punjab and Haryana	Potato, Tabacco, Onion.	Potato, Sugarcane, Sweet Potato.
Rajasthan	Sugarcane, Tobacco	Tur (K), Winter Potato (Plains), Sugarcane, Chillies (Dry).
Tamil Nadu	Winter Rice, Jowar (R), Sugarcane, Tur (R), Tobacco, Groundnut, Sesamum, Onion, Bajra (R)	Rice, Jowar (K), Bajra (K), Ragi, Small Millets (K) Gram, Tur (K) Urad (K) Mung (K), Other Kharif Pulses Winter Potato (Hills), Sugarcane, Black Pepper, Groundnut, Castorseed, Sesamum, Cotton, Turmeric, Onion.
Tripura	Summer Rice	Winter Rice Gram, Winter Potato (Plains), Sugarcane, Rapeseed & Mustard, Sweet Potato.
Uttar Pradesh	Summer Rice, Sugarcane, Jute Onion Tobacco (Late).	Tur (K), Winter Potato (Plains), Sugarcane, Tobacco (Early), Castorseed Rapeseed & Mustard, Cotton, Sweet, Potato, Turmeric, Tapioca.
West Bengal	Summer Rice, Sugarcane.	Tur (K), Urad (R), Mung (R) Other Rabi Pulses, Winter Potato (Plains), Sugarcane, Ginger, Chillies (Dry), Sesamum, Rapeseed & Mustard.
Delhi	Winter Potato (Plains) Onion	Summer Potato (Plains), Sugarcane, Chillies (Dry), Onion.
Andaman & Nicobar Inlands	—	Winter Rice.

(K) — Kharif (R) — Rabi

Note to Contributors

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