AGRICULTURAL SITUATION IN INDIA

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Editorial Desk

The current issue of "Agricultural Situation in India" includes news pertaining to the farm sector, information on production and procurement of food grains, price indices and related statistical data along with two research articles, one on "Profitability of Farming Systems in Hills of Himachal Pradesh" and the second on "Formation and Functioning of Primary Producers Societies of Small Tea Growers are the Panacea to cope with the Crisis of Price Shock?" In addition, an Agro-Economic Research study titled "Farmers' Perceptions towards Production and Marketing of Quality Seed in Madhya Pradesh", conducted by the Agricultural Economics Research Centre, JNKV, Jabalpur under the Agro-Economic Research scheme of Economics, Statistics and Evaluation Division, DA&FW is part of this edition.

The major farm sector news for the month of February covers the events of workshops on Agricultural Infrastructure Fund, MP Farm Gate App; 2nd Indian Rice Congress; 1st Agriculture Deputies Meeting of Agriculture Working Group; National Conference on Agriculture for Zaid Campaign-2023; and International Conference on Trade and Marketing of Coconut Products. The other news include information on MoU between India and Chile for cooperation in the field of Agriculture and Allied Sectors; MoU between Dept. of Agriculture and Farmers Welfare and Development Innovation Lab; Second Advance Estimates of production of major crops.

The annual rate of inflation based on all-India WPI has decreased from 13.43 percent in February, 2022 to 3.85 percent (provisional) in the month of February, 2023. The annual food inflation rate increased by 2.76 percent in the month February, 2023 (provisional) over February, 2022, whereas on month-on-month basis, the food inflation rate increased by 0.06 percent in February, 2023 over January, 2023, provisionally. The cumulative winter season rainfall in the country during the period 1st January, 2023 to 22nd February, 2023 has been 40 percent lower than the long period average (LPA). Current live storage in 143 major water reservoirs in the country is 96.59 BCM, as against the average storage of last 10 years, 81.64 BCM.

The research article on "Profitability of Farming Systems in Hills of Himachal Pradesh" tries to identify the various farming systems in the state of Himachal Pradesh and analyze the profitability of these systems. The study concludes that the farmers in the state practice six major farming systems which include crops, vegetables, fruits and dairy. However, not all farming systems are prevalent in each zone. The profitability of Crops+Vegetables+Fruits+Dairy farm system is found to be highest at the state as well as district level. The study suggests that farmers should cultivate more enterprises on their farms as this will supplement there income. Also, following location-specific farming strategies would help in utilization of agricultural potential of the state.

The article on "Formation and Functioning of Primary Producers Societies of Small Tea Growers are the Panacea to cope with the Crisis of Price Shock?" makes an attempt to ascertain the role which the primary producer societies can play to tackle the issue of fall in prices of green leaf tea. Rising costs and fall in profitability have resulted in reduced profitability of the growers. Mechanization is one way in which the production costs can be reduced and as the members of societies share machinery among themselves on hiring basis, the production cost can be reduced. Also, formation of societies by growers helps them avail financial assistance in form of subsidies. Many societies are involved in production of specialty teas and direct market linkage with export market helps them insulate against price shock. The study recommends approaches like value addition, product diversification and creation of own trademarks for effective functioning of societies which will protect the producers from falling prices and increasing costs.

The Agro-Economic Research study on "Farmers' Perceptions towards Production and Marketing of Quality Seed in Madhya Pradesh" examines the organisational and functional structure of seed societies, their effectiveness as well as the profitability of seed production over grain production of the selected crops. The study finds that there are multiple seed producing cooperative societies in the study area which are related to the producers of different crops. All these societies were involved in quality seed production and made use of advance technologies. Cultivation of quality seed over grain production of selected crops was found to be profitable, although the cost of production of quality seed was more compared to grains. The respondents and producer societies flagged issues like unavailability of seed reports on time, insufficient seed quantity, unavailability of desired type of seed, etc. as major constraints faced in quality seed production. The study suggests measures like timely release of subsidies, payment for procured seeds on time, making available the reports of seed quality testing before sowing of crops, low rate of interest on credit which will help the seed producers as well as strengthen the producer societies.

Anil Kumar Sharma

Farm Sector News

Cabinet Decisions and Announcements

MoU between India and Chile for cooperation in the field of Agriculture and Allied Sectors

The Union Cabinet, chaired by the Hon'ble Prime Minister, Shri Narendra Modi has approved the signing of Memorandum of Understanding (MoU) between the Government of the Republic of India and the Government of the Republic of Chile for cooperation in the field of Agriculture and Allied sectors.

The MoU provides for cooperation in the field of agriculture and allied sectors. The main areas of cooperation envisaged are agricultural policies for development of modern agriculture; organic agriculture to facilitate the bilateral trade of organic products, as well as promote the exchange of policies aimed to develop organic production in both countries; science and innovation to explore partnerships to promote innovation in the agricultural sector among Indian institutes and Chilean institutes as well as collaborate to confront common challenges.

Under the MoU, a Chile-India Agricultural Working Group will be constituted which will be responsible for the supervision, review and assessment of the implementation of this MoU as well as for establishing frequent communication and coordination. The meetings of the Agricultural Working Group will be held once a year alternatively in Chile and India. The MoU shall enter into force upon its signature and shall remain in force for a period of five years from the date of execution after which it shall be automatically renewed for a further period of 5 years.

Meetings and Events

2nd Indian Rice Congress

The 2nd Indian Rice Congress-2023 was inaugurated in Cuttack on 11th February, 2023 by the Hon'ble President, Smt. Draupadi Murmu in the presence of Odisha Governor, Prof. Ganeshi Lal, Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar and Odisha Minister of Agriculture and Farmers Empowerment, Fisheries and Animal Resource Development, Shri Ranendra Pratap Swain. Speaking on the occasion, the President said that rice is the basis of food security in India.

Addressing the grand ceremony at the National Rice Research Institute, the President Smt. Murmu said that today India is the leading consumer and exporter of rice, for which a lot of credit goes to this institute, but when the country became independent, the situation was different. In those days we were unable to meet our food requirements and were dependent upon imports to fulfill our needs. The President said that as irrigation facilities expanded in the last century, rice was grown in new places and found new consumers. Paddy crop requires large amounts of water, but many parts of the world are facing severe water scarcity due to climate change. Droughts, floods, cyclones are more frequent now, making rice cultivation more vulnerable. She said that even though rice is being grown on new land, there are places where traditional varieties are facing challenges. Today we have to find a middle way, on the one hand we have to preserve the traditional varieties and on the other, maintain the ecological balance. There is a need to reduce the dependence on chemical fertilizers to keep the soil healthy. She expressed confidence that scientists are working to develop eco-friendly rice production systems.

The President said that rice is the basis of our food security, so its nutritional aspects should also be considered. A large section of low-income groups depend on rice, which is often their only source of daily nutrition, so providing protein, vitamins and essential micronutrients through rice can help combat malnutrition. On the development of country's first high protein rice by NRRI, she said that development of such bio-fortified varieties is ideal and expressed confidence that the scientific community of the country will be able to meet the challenge.

1st Agriculture Deputies Meeting (ADM) of Agriculture Working Group (AWG)

The 1st ADM, a three-day event, was held at Indore during 13-15 February, 2023. Around hundred delegates from G20 member countries, guest countries and International Organizations participated in the meeting.

Chief Minister of Madhya Pradesh, Shri Shivraj Singh Chouhan inaugurated the exhibition on the first day of the three-day meeting. Shri Chouhan stressed upon adoption of technology that is eco-friendly. Shri Chouhan also inaugurated an exhibition that showcased the potential, achievements and progress made by Agriculture and Allied Sectors with special emphasis on millets.

Thereafter, two side events namely: Stock taking of G20 initiatives and Global Forum on Climate Smart Agriculture on Food Security, were held on the first day of the three-day meeting. Along with participation of the delegates, side events also witnessed the presence of various organizations and individuals of repute.

The second day of 1st ADM was inaugurated by the Civil Aviation Minister, Shri Jyotiraditya M. Scindia. During his opening address of the inaugural session, Shri Scindia spoke about the 3S template for development in agriculture sector- smart, serve all and sustainable. He also highlighted the importance of drones in India's agriculture growth story.

The final day of the event started with technical theme-wise sessions wherein deliberations were held on four themes covering: food security and nutrition, sustainable agriculture with climate smart approach, inclusive agricultural value chains and food systems, and digitalization for agricultural transformation. During each theme-based technical session, there was an open house discussion involving intellectually rich exchange of ideas, suggestions and observations. Insightful presentations paved way for agricultural transformation and importance of digitalization in agriculture with a special emphasis on smallholder farmers.

National Conference on Agriculture for Zaid Campaign-2023

Hon'ble Union Agriculture and Farmers Welfare Minister, Shri Narendra Singh Tomar chaired the National Conference on Agriculture for Zaid (Summer) Campaign-2023 in New Delhi on 20th February, 2023. On this occasion, Shri Tomar said that India is in a very good position in terms of food grains production with the Advance Estimates showing record breaking agricultural production (323 million tonnes). Shri Tomar urged to consider adopting other available alternatives to chemical fertilizers like nano urea, biofertilizer.

It was informed during the conference that there is no shortage of fertilizers anywhere in the country; the number of Kisan Samridhi Kendras has increased to 12,000; PM-PRANAM scheme is running smoothly, which aims to reduce the usage of chemical urea. It was also informed that Seed Traceability system is being introduced by the Centre, which will ensure availability of quality seeds. Pesticide Management System will also be implemented.

International Conference on Trade and Marketing of Coconut Products

Coconut Development Board (Ministry of Agriculture and Farmers Welfare, Government of India) in association with International Coconut Community (ICC) organised a two-day International Conference on Trade and Marketing of Coconut Products in Hyderabad on 27th February, 2023.

In her opening remarks, Dr. Vijayalakshmi Nadendla, Chief Executive Officer, CDB said that as per 2020 statistics of ICC, India is the largest coconut producing country in the world, with 30.93% share of global production, followed by Indonesia and Philippines. India ranks second in terms of productivity (9,346 nuts per ha) next to Vietnam (10,547 nuts per ha).

The coconut crop contributes around Rs. 307,956 million to the country's GDP and earns export revenue of around Rs. 75,768.80 million. Exports of coconut products during 2021-22 were valued at Rs. 3236.83 crore as against Rs. 2294.81 crore in 2020-21, registering a positive growth of 40.09% over the previous year. She also pointed out that CDB started a novel extension approach to organize farmers by formation of three-tier Farmer Collectives with Coconut Producers' Societies (CPS) at primary level and integrate them to form Coconut Producers' Federation (CPF) at intermediate level and Coconut Producers' Company (CPC) at apex level. So far, 9787 CPSs, 747 CPFs and 68 CPCs have been formed in the country.

The two day International conference covered 4 sessions, on International Outlook for Coconut Products; Moving towards Sustainable Coconut Sourcing; Global Market Prospects and Growth Prospects for Coconut Products; and Innovative Industry Practices and Application of Technology in Coconut Sector, wherein 20 technical papers were presented.

In this conference, more than 450 delegates joined virtually across the globe and 26 international delegates participated physically.

On this occasion, the Diamond Jubilee issue of Indian Coconut Journal of CDB was released and an MOU was signed between CDB and National Institute of Agricultural Extension and Management (MANAGE) and National Institute of Agricultural Marketing (NIAM) for carrying out activities in the areas of start ups, market driven projects, research, training programmes and FPOs.

General Agricultural Sector News

Key provisions for agriculture and farmers welfare in the budget

Many key provisions have been made for agriculture and farmers' welfare in the budget for the financial year 2023-24. Union Agriculture Minister, Shri Tomar said that the total budget of the Ministry of Agriculture and Farmers Welfare, including Agricultural Education and Research, is about Rs. 1.25 lakh crore this time. Out of this, provision of Rs. 60,000 crore has been made for Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) scheme. There are about 86 percent small farmers in the country who have been greatly benefited through the Kisan Credit Card (KCC). This time, Rs. 23,000 crore has been allocated for this to enable them to continue to avail its benefit. Focusing on animal husbandry, dairy and fisheries, the agricultural loan target has been increased to Rs. 20 lakh crore. Provision of Rs. 450 crore has been made for the Digital Agriculture Mission and about Rs. 600 crore has been allocated for the promotion of Agriculture sector through technology.

Shri Tomar said that a provision of Rs. 459 crore has been made for natural farming. In 3 years, 1 crore farmers would be supported for natural farming for which 10,000 Bio Input Research Centers would be opened. While organizing small and medium farmers through FPOs, a target has been set to provide them all facilities related to agriculture for which 10,000 new FPOs are being constituted. A budget provision of Rs. 955 crore has been earmarked for the formation of new FPOs this year, while the Agriculture Infra Fund and Pradhan Mantri Fasal Bima Yojana are also being promoted. Food and nutritional security is one of the priorities of the Union Government for which the budget has been hiked to Rs. 1,623 crore. Shri Tomar said that priority will be given to startups related to agriculture. The Agriculture Accelerator Fund will be set up to encourage agri - startups by young entrepreneurs for which Rs. 500 crore has been allocated over a period of 5 years. Millets will now be known as Sri Anna. India is at the forefront of programmes to popularize Sri Anna. The Indian Millets Research Centre, Hyderabad will be promoted as a Center of Excellence so that it can excel at the global level as well. For the development of Horticulture sector, the budget has been increased to Rs. 2,200 crore.

Crop area coverage during Rabi season

Rabi sowing was being monitored since beginning of the season and the final figures has shown that momentum gained in sowing of Rabi crops continued till end of the season. Total area sown under Rabi crops has increased by 3.25% from 697.98 lakh hectares in 2021-22 to 720.68 lakh hectares in 2022-23. This is 22.71 lakh hectares more this year compared to corresponding period of 2021-22. Comparing with normal sown area (average area of last 5 years), the increase is to the tune of 13.71%, from 633.80 to 720.68 lakh hectares.

The increase in area is across all crops, highest being in rice. Out of 22.71 lakh hectares increase in all Rabi crops, increase in rice area is 11.20 lakh hectares, *i.e.* from 35.05 lakh hectares in 2021-22 to 46.25 lakh hectares in 2022-23. However, this is lower than normal sown area of 47.71 lakh hectares. Maximum increase in area under rice is in the states of Telangana and West Bengal. Area from rice is being diverted to other low water consuming oilseeds, pulses and nutri-cereal crops.

Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar said that the Government's focus is on increasing oilseeds production to reduce import dependency in edible oils. In 2021-22, country had to import 142 lakh tonnes of edible oils at a cost of Rs. 1.41 lakh crore. Due to renewed focus on oilseeds, area under oilseeds increased by 7.31%, from 102.36 lakh hectares during 2021-22 to 109.84 lakh hectares this year. This is a quantum jump of 31.03 lakh hectares over normal sown area of 78.81 lakh hectares. The increase in area under oilseeds at the rate of 7.31% is more than double the rate of increase of 3.25% in all crops together. Rajasthan, Madhya Pradesh and Chhattisgarh accounted for major expansion in area of oilseeds.

Rapeseed & mustard contributed maximum in increasing oilseeds area during this Rabi season. Mustard area increased by 6.77 lakh hectares, from 91.25 lakh hectares in 2021-22 to 98.02 lakh hectares in 2022-23. Thus, out of 7.49 lakh hectares increase in area under oilseeds, rapeseed & mustard alone accounted for 6.44 lakh hectares. Area brought under cultivation of rapeseed & mustard is markedly higher by 54.51% than normal sown area of 63.46 lakh hectares. Major area expansion has been attained due to implementation of Special Mustard Mission for last 2 years. During Rabi 2022-23, 26.50 lakh seed minikits of HYV, having yield potential of more than 20 quintals per hectare, were distributed to the farmers in 301 districts of 18 States under the National Food Security Mission- Oilseeds. Latest varieties having yield potential in the range of 2500-4000 quintals per hectare were distributed. The higher area and productivity will bring quantum jump in oilseeds production and bring down demand for imported edible oils.

Pulse production is being focused to make country self-sufficient in these commodities. Special programme (NFSM 'TMU370') under National Food Security Mission has been launched with aim of increasing productivity of 370 districts having less than state average yields of pulses due to lack of good seed and technological interventions. Area under pulses increased by 0.56 lakh hectares, from 167.31 to 167.86 lakh hectares. Mung bean and lentil accounted for increase in area under pulses. About 4.04 lakh seed minikits of HYVs were distributed under 'TMU370' to farmers free of cost for lentil. States like Maharashtra, Odisha, Rajasthan and Karnataka took lead in increasing area under pulse cultivation. In order to meet the growing demand of millets around the world, the Government is promoting millet production through the NFSM-Nutri Cereals component of National Food Security Mission (NFMS) programme in 212 districts of 14 states. Coarse cum nutri-cereals saw an increase of 2.08 lakh hectares in area under cultivation from 51.42 lakh hectares in 2021-22 to 53.49 lakh hectares in 2022-23. India is poised to become the global hub for the millets. Besides supporting sustainable production, Ministry of Agriculture and Farmers Welfare is creating awareness for higher consumption, developing markets and value chain and funding research and

development activities. Telangana, Rajasthan, Bihar and Uttar Pradesh are at the forefront in increasing area under millets.

MoU between DA&FW and Development Innovation Lab (DIL)

Department of Agriculture and Farmers Welfare (DA&FW) under the Ministry of Agriculture and Farmers Welfare, Government of India has entered into a partnership with The Development Innovation Lab (DIL) at the University of Chicago, in New Delhi on 3rd February, 2023 to explore the opportunities to harness innovation to improve food security, address climate change and allow farmers to increase their incomes. The DIL, founded by Nobel Laureate Dr. Michael Kremer, University Professor in Economics at the University of Chicago, and 2019 co-recipient of the Sveriges Riksbank Prize in Economic Sciences in memory of Alfred Nobel, was represented by the University of Chicago Trust in India during the signing of the Memorandum of Understanding (MoU).

The partnership will look into innovation opportunities related to agriculture and food security in the context of climate change, in the present scenario of experiencing a rise in extreme temperatures, floods, and droughts, as well as changes to the monsoon system. Innovations in digital services, weather forecasts, and soil health management could help farmers adapt to these shocks and improve their livelihoods, while improving environmental sustainability of agriculture. DIL will assist DA&FW in its efforts to identify, develop, test, and refine innovations in these and other priority areas to support India's small holder farmers.

MoU for developing a National Interactive Digital Platform to strengthen extension system

The Ministry of Agriculture & Farmers Welfare, Government of India signed a Memorandum of Understanding in New Delhi on 6th February, 2023 with Digital Green under public private partnership framework to build a national level digital extension platform. The platform will host a digital library of curated multi-format multi-lingual content, help extension workers access and deliver curated content to farmers on time and upskill the vast network of extension workers for agriculture, horticulture, fisheries, livestock and rural livelihood missions through certified online courses.

There are over 200,000 extension workers in India in agriculture, livelihood and allied sectors. This ambitious initiative will converge the outreach efforts of Departments of agriculture, horticulture, livestock, dairy, fisheries and rural livelihoods under a single digital platform through a decentralised content creation and targeted dissemination. To be launched within six months, the platform will have the portal and capabilities to serve the entire farming community in India and catalyse Agtech and other market actors with newer and higher value proposition.

NCAER Report on Farm Machinery Industry in India

The National Council of Applied Economic Research's (NCAER) latest report on "Making India a Global Power House on Farm Machinery Industry" was released by the Union Minister of State for Agriculture and Farmer's Welfare, Ms. Shobha Karandlaje in New Delhi on 7th February, 2023. NCAER is one of India's premier economic policy research think tanks. This study was sponsored by Mahindra & Mahindra.

NCAER analyzed the non-tractor farm machinery industry from both demand and supply side perspectives, bringing out the challenges in the sector, and recommending measures & reforms by benchmarking global practices in their report. The report, amongst other things, stresses that India needs a vision for the next 15 years to convert itself into a production and export hub for non-tractor farm machinery.

Participating in the roundtable, Ms. Shobha Karandlaje said that the Ministry of Agriculture & Farmers Welfare is already promoting farm mechanization through various schemes and programmes like SMAM, CRM, and drone promotion.

Training and testing by FMTTIs of agricultural machines including tractors, power tillers, combine harvesters, etc. is equally noteworthy. The institutes have done commendable work in testing and training and have provided a pool of more than 2.3 lakh of skilled professionals in the area of farm mechanization.

Second Advance Estimates of production of major crops released

Second Advance Estimates of production of major crops for agricultural year 2022-23 were released by the Ministry of Agriculture and Farmers Welfare. The Hon'ble Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar said that food grain production of 3235.54 lakh tonnes is estimated in the current agricultural year.

As per Second Advance Estimates, the estimated production of major crops for 2022-23 is as under:

- Food grains – 3235.54 lakh tonnes (Record)
- Rice – 1308.37 lakh tonnes (Record)
- Wheat – 1121.82 lakh tonnes (Record)
- Nutri/Coarse cereals – 527.26 lakh tonnes
- Maize – 346.13 lakh tonnes (Record)
- Barley – 22.04 lakh tonnes (Record)
- Total Pulses – 278.10 lakh tonnes (Record)
- Gram – 136.32 lakh tonnes (Record)
- Moong – 35.45 lakh tonnes (Record)
- Oilseeds – 400.01 lakh tonnes (Record)
- Groundnut – 100.56 lakh tonnes
- Soybean – 139.75 lakh tonnes
- Rapeseed & Mustard – 128.18 lakh tonnes (Record)
- Cotton – 337.23 lakh bales (of 170 kg each)
- Sugarcane – 4687.89 lakh tonnes (Record)
- Jute & Mesta –100.49 (of 180 kg each)

(in lakh tonnes)

Crop	Production (2022-2023)	Production (2021-22)
Food grains	**3235. 54**	**3156.16**
Rice	1308.37	1294.72
Wheat	1121.82	1077.42
Maize	346.13	337.3
Nutri/Coarse cereals	527.26	511.01
Moong	35.45	31.65
Total pulses	**278.10**	**273.02**
Soybean	139.75	129.86
Rapeseed & Mustard	128.18	119.63
Oilseeds	400.01	379.63
Sugarcane	4687.89	4394.25

Source: E,S& E Division, MoA&FW, Govt. of India

General Survey of Agriculture

Trend in Food Prices

The rate of inflation, based on all-India WPI, stood at 3.85% (Provisional) for the month of February, 2023 as compared to 13.43% 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 171.2 in January, 2023 to 171.3 in February, 2023. The rate of inflation based on WPI Food Index decreased from 2.95% in January, 2023 to 2.76% in February, 2023.

Based on Wholesale Price Index (WPI) (2011-12=100), the WPI of pulses, cereals and fruits increased by 2.59 percent, 13.95 percent and 7.02 percent, respectively, while for vegetables, it decreased by 21.53 percent in February, 2023 over corresponding period of last year. On month-on-month basis, the WPI for cereals, vegetables and pulses decreased by 0.95 percent, 3.80 percent and 0.11 percent, respectively, while for fruits, it increased by 6.71 percent in February, 2023 over January, 2023.

Among cereals, the WPI based rate of inflation for wheat and paddy increased by 18.54 percent and 8.60 percent, respectively, in February, 2023 over February, 2022 while on month-on-month basis, the WPI for paddy increased by 0.57 percent and decreased for wheat by 3.24 percent in February, 2023 over January, 2023.

Rainfall and Reservoir Situation, Water Storage in Major Reservoirs

Cumulative Winter Season (January-February), 2023 rainfall for the country as a whole during the period 1st January, 2023 to 22nd February, 2023 has been 40% 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 86% in Central India, by 66% in East & North East India, by 56% in South Peninsula and by 20% in North-West India. Out of 36 met sub-divisions, 03 met sub-divisions received large excess/excess rainfall, 03 met sub-divisions received normal rainfall, 27 met sub-divisions received deficient/large deficient rainfall and 03 met sub-divisions received no rainfall.

Current live storage in 143 reservoirs (as on 23rd February, 2023) monitored by Central Water Commission having Total Live Capacity of 177.46 BCM was 96.59 BCM as against 102.52 BCM on 23.02.2022 (last year) and 81.64 BCM of normal storage (average storage of last 10 years). Current year's storage is 94% of last year's storage and 118% of the normal storage.

Articles

Profitability of Farming Systems in Hills of Himachal Pradesh

SANJEEV KUMAR[1] and RAVINDER SHARMA[2]

Abstract

The farming system approach improves the economic conditions of the individual farm by increasing productivity and profitability through the incorporation of appropriate sequence of enterprises and production techniques. In this study, the profitability of farming systems in the hills of Himachal Pradesh has been estimated using gross margin and net farm income estimates. Primary data from a total of 240 sample households were collected using a stratified multistage random sampling technique. The results revealed that the farmers in the study area practice six major farming systems viz., Crops + Vegetables + Fruits + Dairy (C+V+F+D), Crops + Fruits + Dairy (C+F+D), Crops + Vegetables + Dairy (C+V+D), Vegetables + Fruits + Dairy (V+F+D), Crops + Dairy (C+D) and Fruits + Dairy (F+D). The profitability of the Crops + Vegetables + Fruits + Dairy (C+V+F+D) farming system was highest at the overall level as well as in selected districts. The variation in the gross margin and net farm income was also estimated and the results indicated that there is non-uniformity in the per farm net income of the sampled households.

Keywords: *Farming system, profitability, gross margin, net farm income*

1. Introduction

Agriculture is a dominant activity in the hills of India as the majority of the households in the hills depend upon agriculture for their principal means of livelihood. The designated area under hills in India is about 6.91 lakh sq. km and the farmers in these regions sustain largely on subsistence farming (Kumar *et al.*, 2017). The diverse agro-climatic conditions of hills enable the farmers to grow a wide range of fruits, vegetables, pulses and other cash crops on which native people rely for their food and nutritional security (Kumar *et al.*, 2018a). A large number of crops and enterprises can be cultivated in these regions, but there is a disadvantage of small land holdings. The average size of the operational holding in the country has declined to 1.08 ha in 2015-16 from 2.28 ha in 1970-71 and due to the increasing trend of population growth in India, the average size of holding would further reduce to 0.32 ha in 2030 (Khan *et al.*, 2015). Like the whole country, Himachal Pradesh, one of the most popular hilly states in India, too has almost reached a plateau as far as cultivable land is concerned. About 87.95 percent of the total holdings in Himachal Pradesh are marginal and small and the average land holding size in the state is only about 0.95 hectares (Agriculture Census, 2015-16). As a result, it will become difficult in the future to produce enough food for meeting the requirements of the growing population. Moreover, the major constraints faced by the farmers of Himachal Pradesh *viz.*, the problem of stray animals, labour scarcity, high cost of inputs and high transportation charges also make it difficult to improve the livelihood status of farmers unless agriculture is supplemented by other farm components (Kumar *et al.*, 2018b; Kumar and Sharma., 2019 and Kumar *et al.*, 2021).

Agriculture provides direct employment to about 71 percent of the total population living in Himachal Pradesh, hence, the emphasis has to be on increasing productivity levels besides, diversification towards high-value crops. With a rising population and

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declining land-man ratio, the income from cropping alone is hardly sufficient to sustain the farmer's family. The smaller share of agriculture in national GDP is getting distributed among a larger number of people who depend on agriculture for their livelihood. To address this issue, the farming system approach has been seen as a potential way of raising and stabilizing the productivity and profitability levels of farmers. This approach requires proper planning and management to get higher productivity, more profitability and sustainability on the agricultural farm. Since there is no scope for horizontal expansion of land, the focus has to be on making farming more cost-effective and reliable. The farming system approach is one of the important solutions to face this peculiar situation because in this approach, the different enterprises are carefully undertaken. It refers to a crop combination or enterprise mix of elements containing crops, dairy, poultry, fish, sericulture, vermicompost, sheep and goats which interact among themselves and protects the natural resources by recycling of the crop residues as the products and/or by-products of one enterprise are served as the input for the production of other enterprises.

1.1 Objectives of the study

1. To identify the existing farming systems in the hills of Himachal Pradesh.
2. To analyze the profitability of existing farming systems.

2. Data sources and methodology

2.1 Study area

The study was carried out in Himachal Pradesh which is located between 30°22'40'' to 33°12'40'' North latitudes and 75°45'55'' to 79°04'20'' East longitudes. A stratified multistage random sampling technique was used to select the sample households. The entire state was divided into four strata according to all four agro-climatic zones of the state. In the first stage of sampling, one district from each agro-climatic zone *viz.*, Una district from Zone-I, Mandi district from Zone-II, Shimla district from Zone-III and Kinnaur district from Zone-IV was selected based on the maximum cultivated area in that particular zone. In the second stage of sampling, two blocks from each selected district were selected based on the maximum cultivated area. Further, from each selected block, three gram panchayats were selected randomly in the third stage of sampling and finally, ten farmers from each gram panchayat were randomly selected in the final stage of sampling to constitute a total sample of 240 farmers in total. The primary data were collected from the farmers on a well-designed pre-tested schedule. The required secondary information was collected from various publications, Government departments, journals, the package of practices, books, different websites, etc.

2.2 Data analysis

2.2.1 Socio-economic characteristics of the farmers

The primary data collected were tabulated to examine the socio-economic status of sample households. The literacy rate, literacy index and dependency ratio were calculated using following formulae;

1. Literacy rate (%) $= \frac{\text{Total no.of literate person}}{\text{Total population}} X100$
2. Literacy index $= \frac{\Sigma WiXi}{\Sigma Xi}$

where,

Wi = weights 0, 1, 2, 3, 4 and 5 are for illiterate, primary, middle, matriculate, intermediate and graduation & above, respectively, and Xi = number of persons in respective category.

3. Dependency ratio w.r.t. total workers = (No. of dependents in a family)/Total workers

2.2.2 Identification of farming systems

To identify the existing farming systems in the study area, data collected from sampled households were post-classified into different groups based on the number of farmers practicing a particular farming system. The farming systems were identified for each selected district as well as for overall study area.

2.2.3 Profitability analysis

The profitability of different farming systems was measured using gross margin and net farm income analysis in whole farm budget (Adegeye *et al.*, 1985 and Adeoti & Adeoti, 2008) as given below:

$$GM = P_i Y_i - r_i c_i \qquad (i = 1, 2, ..., n)$$

where,

GM is Gross Margin; P_i is farm gate price of the i^{th} product; Y_i is output of the i^{th} enterprise producing i^{th} product; r_i is market price of variable input; c_i is variable cost and n is number of enterprises.

The net farm income was calculated by deducting fixed cost from gross margin as follows:

Net farm income = Gross margin - Fixed cost.

Further, the variation in gross margin and net farm income was also measured for different farming systems using coefficient of variation (CV) estimates as given below:

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

where,

σ is standard deviation and X? is mean value

3. Results and discussion

3.1 Socio-economic characteristics of the sampled households in the study area

Family size and educational status are important parameters to determine the economic well-being of a family and the overall development of society. The findings on the socio-economic profile of the sampled households (Table 1) showed that at the overall level, the average family size was 5.39 persons per household, out of which 51.91 percent were males and 48.09 percent were females. Among the selected districts of respective zones, the average family size ranged between 5.20 persons per household in Mandi district of Zone-II to 5.78 persons per household in Shimla district of Zone-III. The proportion of males was higher than the female counterparts in all the selected districts. The literacy rate varied between 83.33 to 90.00 percent among selected districts with an overall literacy rate of 87.08 percent. The literacy index was highest (2.90) in Shimla and lowest (2.30) in Kinnaur with an overall literacy index of 2.72 in the State. This reveals that although the literacy rate was higher in the study area, the quality of education was low. The dependency ratio to total workers was highest (0.58) in Shimla district of Zone-III, followed by Kinnaur (0.53), Mandi (0.51) and Una (0.49) districts of Zone-IV, II and I, respectively. The overall dependency ratio in the study area was 0.53.

TABLE 1: SOCIO-ECONOMIC CHARACTERISTICS OF SAMPLED HOUSEHOLDS

Particulars	Una (Zone-I)	Mandi (Zone-II)	Shimla (Zone-III)	Kinnaur (Zone-IV)	Overall (HP)
Average size of family (No.)	5.23	5.20	5.78	5.33	5.39
Number of males (%)	50.67	51.92	51.01	54.03	51.91
Number of females (%)	49.33	48.08	48.99	45.97	48.09
Literacy rate (%)	88.33	86.67	90.00	83.33	87.08
Literacy index	2.88	2.80	2.90	2.30	2.72
Average no. of workers	3.50	3.45	3.65	3.48	3.52
Average no. of dependents (<14 years &>60 years)	1.73	1.75	2.13	1.85	1.87
Dependency ratio w.r.t. total workers	0.49	0.51	0.58	0.53	0.53

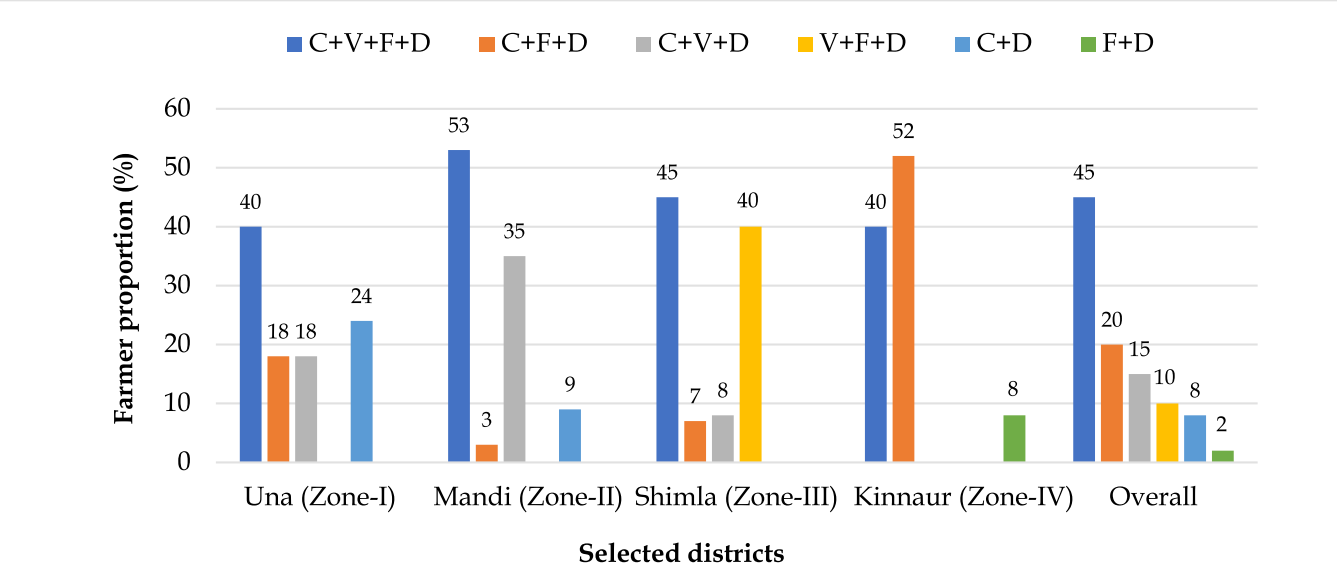
Source: Primary survey

3.2 Existing farming systems in the study area

Figure 1 shows the details of farming systems followed by the sampled farmers in the study area. The various components of farming systems included crops (C), vegetables (V), fruits (F) and dairy (D). The results revealed that the farmers in the study area practice six major farming systems. Crops + Vegetables + Fruits + Dairy (C+V+F+D) farming system existed in all the selected districts and was the major farming system practiced by the farmers of Una (40%), Mandi (53%) and

Shimla (45%) districts of Zone-I, II and III, respectively. The Crops + Fruits + Dairy (C+F+D) farming system was also found in all the selected districts and was a major farming system in Kinnaur district of Zone-IV as 52 percent of the farmers were practicing the same followed by Crops + Vegetables + Fruits + Dairy (40%). Further, in Una district of Zone-I, 24 percent farmers were practicing Crops + Dairy farming system followed by Crops + Vegetables + Dairy (18%) and Crops + Fruits + Dairy (18%). Similarly, in Mandi district of Zone-II, 35 percent of farmers were practicing Crops + Vegetables + Dairy (C+V+D) followed by Crops + Dairy (9%) and Crops + Fruits + Dairy (3%) farming system. It was also found that Vegetables + Fruits + Dairy (V+F+D) and Fruits + Dairy (F+D) farming systems were practiced only in Shimla (40%) and Kinnaur (8%) districts, respectively. Overall, the major farming system in the study area was C+V+F+D practiced by 45 percent of the total farmers followed by C+F+D (20%), C+V+D (15%), V+F+D (10%), C+D (8%) and F+D (2%), respectively.

Figure 1: Percentage of Farmers following existing Farming Systems in the Study Area



Source: Primary survey

3.3 Profitability of existing farming systems

The perusal of the results presented in Table 2 depict per farm average gross margin and net farm income estimates based on cost C_2, *i.e.* by neglecting managerial cost on the farm (Ugwumba *et al.*, 2010). The results reveal that the farming systems in the study area are viable as shown by positive net farm income estimates for all the farming systems. It was found that at the overall level, per farm gross margin and net farm income was highest under C+V+F+D farming system with estimated values of Rs. 176705 and Rs. 132685, respectively, and minimum under C+D farming system with respective estimated values of Rs. 54609 and Rs. 46387. The variations in gross margin and net farm income at overall level was highest in C+V+F+D farming system and minimum in V+F+D farming system as indicated by their respective coefficients of variations. Further, in Una district of Zone-I, highest variation in gross margin (73.98%) and net farm income (83.50%) was under C+D farming system and minimum variation was under C+V+F+D farming system. Similarly, in Mandi district of Zone-II, maximum and minimum variation in gross margin and net farm income was under C+D and C+V+F+D farming systems, respectively. In Shimla and Kinnaur districts, the farming systems with minimum variation in gross margin and net farm income were C+F+D and F+D, respectively.

TABLE 2: GROSS MARGIN AND NET FARM INCOME ESTIMATES OF EXISTING FARMING SYSTEMS IN THE STUDY AREA

(Rs./farm)

Area	Farming systems											
	C+V+F+D		C+F+D		C+V+D		C+D		V+F+D		F+D	
	Gross margin	Net farm income	Gross margin	Net farm income	Gross margin	Net farm income	Gross margin	Net farm income	Gross margin	Net farm income	Gross margin	Net farm income
Una (Zone-I)	79301 (52.68)	60127 (57.01)	56117 (63.77)	45554 (74.33)	55764 (54.54)	43002 (69.30)	57471 (73.98)	48988 (83.50)	-	-	-	
Mandi (Zone-II)	100690 (40.61)	78339 (44.25)	55192 (72.76)	45811 (84.17)	64205 (52.09)	52175 (62.27)	46596 (79.85)	39105 (93.12)	-	-	-	-
Shimla (Zone-III)	214599 (43.08)	160801 (43.71)	172535 (37.98)	132594 (40.71)	61947 (54.75)	49905 (65.84)	-	-	141558 (45.55)	109844 (50.86)	-	-
Kinnaur (Zone-IV)	332828 (77.61)	246072 (75.52)	188557 (62.99)	140924 (65.40)	-	-	-	-	-	-	110811 (57.60)	85021 (58.43)
Overall (HP)	176705 (93.37)	132685 (90.78)	151314 (75.51)	114412 (76.62)	61391 (52.03)	49142 (63.38)	54609 (74.10)	46387 (84.13)	141558 (45.55)	109844 (50.86)	110811 (57.60)	85021 (58.43)

Source: Primary survey

Note: Figures in parentheses are coefficients of variations of respective estimated values; C= Crops (Cereals, Pulses &Fodder crops), V= Vegetables, F= Fruits, D= Dairy

4. Conclusion and policy implications

The study highlighted that the farmers of the study area practice six major farming systems; out of which, per farm gross margin and net farm income were highest under Crops + Vegetables + Fruits + Dairy (C+V+F+D) farming system and minimum under Crops + Dairy (C+D) farming system at the overall level. This means that the farmers who are cultivating more enterprises on their farms are earning more. The estimates of variation in per farm gross margin and net farm income indicate the non-uniformity in per farm net income; hence, the focus of policymakers should be on those policies which would enhance the stability in per farm income. The study suggested that

1. Farmers should cultivate more enterprises on their farms to increase their income and well-being. In this regard, the government must take the lead in introducing and distributing new technology to the farmers.

2. The location-specific farming strategies should be followed to fully harness the agricultural potential of the state.

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Formation and Functioning of Primary Producers Societies of Small Tea Growers are the Panacea to cope with the Crisis of Price Shock?

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Abstract

Increasing cost of production of tea in small tea growing sector coupled with fall in productivity has put downward pressure on profitability and income as the market prices for tea have been falling continuously. To overcome the price crisis, more than 130 societies have been formed in the last one-and-a-half decades in South India and many of them of were registered as Primary Producer's Societies (PPSs) under the Tamil Nadu Societies Registration Act, 1975 (Tamil Nadu Act 27 of 1975). Though many such societies are functioning effectively but the expected outcome from such societies is not encouraging for various reasons pertaining to weaknesses in organizational, functional, and operational activities. The present study was conducted covering 40 Primary Producer Societies (PPSs) of Small Tea Growers (STGs) of performing and non performing societies and data were collected relating to organizational, functional, and operational activities. Focus Group Discussion (FGD) was also conducted to elicit information from members of various societies. Discussions were also had with officials and data were gathered from various published sources. The study found no strong correlation between the period of establishment, members' enrolment, membership fee collection, and area coverage and performance of the societies. Production of specialty tea, direct market linkages with export market were the key strategies adopted to insulate the price shock. Machine harvesting of green tea leaves, subsidies availed for collection shed and transport vehicle and quality enforcement were the insulating factors for the performing societies. Estimation of relative risk shows that there is 88% probability that machine harvesting by members ensures better performance of the societies. Lack of cooperation among the society members, improper payment by leaf buying factories, improper maintenance of accounts, not conducting meetings regularly and lack of funds and not availing the subsidies from Tea Board of India (TBI) were the major reason cited for non performance of the societies.

Keywords: *Primary Producers Societies (PPSs), Small Tea Growers (STGs), Logit Regression and Relative Risk.*

1. Introduction

About 1.5 to 2 percent decline in demand for Indian tea in the global market and competitive global players like Kenya has led to dramatic fall in prices of green leaf tea, significantly affecting the small tea growers in India, particularly South India. Increasing cost of production of tea in small tea growing tea sector coupled with fall in productivity has put downward pressure on profitability and income as the market prices for tea have been falling continuously. The small tea farming sector contributed around 65 percent to the total global tea production and Indian Small Tea Growers (STGs) contributed about 36 percent of national production during 2014 (www.cec-india.org) whose share in 2022 touched 51.91 percent (Bhattacharjee, 2022). As a global level initiative, Small Tea Growers formed a common platform of 'Confederation of International Tea Small Holders (CITES)' to boost productivity and quality of tea production. Similarly, at national and state levels, Self-Help Groups (SHGs), STGs Associations, Farmer Producers Organizations (FPOs) and Primary Producers Societies (PPSs) were established to overcome the crisis. The farmers are encouraged to conglomerate to form groups with at least 30 members in each to avail various assistance/subsidies from the

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Tea Board of India (TBI). In South India, more than 130 such groups have been formed in the last one and a half decades and many of them of were registered as Primary Producer's Societies (PPSs) under the Tamil Nadu Societies Registration Act, 1975 (Tamil Nadu Act 27 of 1975). Though many such societies are functioning effectively but the expected outcome from such societies is not encouraging for various reasons pertaining to weaknesses in organizational, functional, and operational activities. Consequently, the members of the societies are not benefitted and purpose for which these societies were formed is lost. However, some societies are functioning effectively and adopting selective strategies in order to cope with the price crisis.

1.1 Objectives of the study

The research paper is aimed at understanding the reasons and factors (socio-economic and organizational including institutional) responsible for the success and failures of the PPSs and the strategies adopted by the PPSs to insulate the members from price shock.

2. Data sources and methodology

2.1 Sources and nature of data

In the proposed study, 20 effectively performing and 20 non-performing PPSs were chosen across various blocks of the Nilgiris district of Tamil Nadu in consultation with the Rural Development Organization (RDO) Trust and Small Tea Growers Association of Southern India (STASI). Stakeholders' meeting and Focus Group Discussion (FGD) were also conducted with PPSs office bearers, RDO Trust officials and progressive farmers at RDO Trust, Coonoor. Field survey was conducted using structured questionnaire to collect the data. The criteria for selection of PPSs as performing and non-performing were based on their current functioning. The PPSs which were functioning regularly were taken as performing PPSs and the PPSs which had stopped their operation and are not functioning were taken as non-performing PPSs. Thus, a total of 40 PPSs (20 each, *i.e.* functioning and non-functioning presently regardless of date of formation) were surveyed personally and data were elicited. Data pertaining to year of establishment, members enrolment at the time of inception, enrolment of membership over the period of time, membership capital, delivery of various services like credit, machineries, collection of green leaf teas and transportation, area coverage, present value chain including cost, margin and price realization, organizational structure, promotional strategies and functions, etc. were gathered from the both the categories of PPSs.

2.2 Factors delineating the performance: Estimation of Odds Ratios/Marginal Effect by Logistic Function Approach

The performing and non performing PPSs were classified as binary response coding with one for performing and zero for non-performing and specified as:

$Y_i = 1$ for performing PPS and 0 for non-performing PPS; Y_i can take the probability values of p_i for 1 and $1- p_i$ for zero, respectively.

Strata package was used to estimate the model. Logistic Regression is part of a larger class of algorithms known as Generalized Linear Model (glm). Odd ratio is the ratio of probability of success (p_i) to probability of failure ($1- p_i$). Odd ratio ranges from zero (if p_i is 0) to infinity (if $1- p_i = 0$). Taking ln (odd) gives log odd which range between – infinity to + infinity. If the probability of success is 50% than the odd ratio become 1 and the log odd become 0. So, the negative log odd ratio indicates less than 50 percent chance and vice versa.

The fundamental equation of generalized linear model is:

$$g(E(y)) = \alpha + \beta_1 x_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Here, g() is the link function, E(y) is the expectation of target variable and $\alpha + \beta_i X_i$ is the linear predictor (α, β_i to be predicted). The role of link function is to 'link' the expectation of y to linear predictor.

$$P_i/1-P_i = E(y)$$

X_1 = 1 if subsidy availed for construction of collection shed; 0 for otherwise.

X_2 = 1 if subsidy availed for vehicle for transport of green leaves from collection centers to tea factories; 0 otherwise.

X_3 = 1 if the membership enrollment increased since inception; 0 otherwise.

X_4 = 1 if the PPS was started prior to 2010; 0 otherwise.

X_5 = 1 if the PPS used harvesting machine for green leave plucking; 0 otherwise.

X_6 = 1 if the PPS enforced quality enforcement through deduction in weights and price; 0 otherwise.

The estimation of marginal effect indicate the increase in probability for success for every one unit change in the continuous variable, while for dummy variable it give the amount of probability change over D=1. The independent predictor variables can be a mix of continuous, dichotomous or dummy variables (ordinal or categorical) in the logistic regression. However, all the independent variables have been used as dummy since many empirical evidences show that encoding all the independent variables as dummy variables allows easy interpretation and calculation of the odds ratios, and increases the stability and significance of the coefficients.

3. Results and discussion

3.1 Importance of STGs in the Nilgiris district

If a person cultivates tea in area up to 25 acres, he is considered as a STG by TBI to extend various services to STGs. However, most of the STGs own less than 2 acres of land, which are highly scattered. The remoteness and scattered holdings force them to market their green leaves through various exploitative trade channels. Even though the emergence of small tea growers in the country has changed the tea industry considerably, small tea growers are facing several challenges related to profitability, availability of finance, sustaining production, processing and marketing of tea leaves. India has altogether around 2.5 lakh small tea growers and according to Tea Board data, 1,278.07 million kilo tea was produced in India from January to November 2022, in which the small tea sector contributed 660.73 million kilos, around 52 percent of the total (Biggs *et al*., 2018). The STGs in Nilgiris contribute to 14 percent of the total South Indian tea production while their percentage of contribution to all-India tea production is around 3 percent. Nilgiris tea which constitutes about 23 percent of India's total tea production is characterized by small holdings (Table 1).

As per the 1980 techno economic survey of Nilgiris Tea Industry of Tea Board, a little over 6,000 small tea gardens in the Nilgiris were registered with the Tea Board, covering an area of over 7,000 hectares against an all-India figure of 12,000 with an area of nearly 13,000 hectares. Area from the small tea sector constituted 70.48 percent in 2004 and that of production was 66.02 percent. Tea was grown in nearly 70 percent of the cultivated area covering 55420 ha during 2013-14, while it was 55504 ha during 2012-13. Number of STG estates increased from 6375 during 1971 to 55601 during 1999 and presently the figures say it is close to 50,000. Consequently, area under STGs increased from 7237 ha during 1971 to 36774 ha during 1999 and presently, it is close to 40,000 ha (www.teaboard.org). According to Tea World - an initiative of KKHSOU, in Tamil Nadu, almost 62 percent production comes from the small grower's sector. There are about 61,980 number of small tea growers and more than 98 percent of the plantations are located in Nilgiris district. Presently, the share of area under STGS is 32 percent at all-India level and in Tamil Nadu, it is 54 percent (Table 2). This emphasizes on the need for empowering the STGs in Tamil Nadu, particularly in the Nilgiris district, where the whole economy is dependent on tea cultivation.

TABLE 1: SHARE OF SMALL TEA GROWERS IN TEA PRODUCTION (2017-18)

(in m.kg)

State	Organized sector	Small growers sector	Total
Assam	391.07 (55.59)	285.24 (45.89)	676.31 (51.04)
Arunachal Pradesh	3.53 (0.50)	7.63 (1.23)	11.16 (0.84)
Bihar	0.81 (0.12)	3.84 (0.62)	4.65 (0.35)
Himachal Pradesh	0.37 (0.05)	0.48 (0.08)	0.85 (0.06)
Karnataka	5.1 (0.73)	0.27 (0.04)	5.37 (0.41)
Kerala	52.53 (7.47)	11.35 (1.83)	63.88 (4.82)
Meghalaya	0.09 (0.01)	0.38 (0.06)	0.47 (0.04)
Nagaland	0 0.00	1.24 (0.20)	1.24 (0.09)
Tamil Nadu	63.42 (9.02)	100.98 (16.24)	164.4 (12.41)
Tripura	6.64 (0.94)	2.08 (0.33)	8.72 (0.66)
West Bengal	179.74 (25.55)	208.12 (33.48)	387.86 (29.27)
Total	**703.44** **(100.00)**	**621.61** **(100.00)**	**1325.05** **(100.00)**

Source: www.telegraphindia.com; Authors' calculations
Note: Figures in parenthesis indicate percentage to total

TABLE 2: SHARE OF SMALL TEA GROWERS IN AREA UNDER TEA

State	Organised sector		Enumerated STG as on 31/03/2022		Total	
	No. of tea gardens	Area (ha)	No. of STGs	Area (ha)	Growers	Area (ha)
Assam	762 (0.62)	232961.73 (66.98)	122415 (99.38)	114848 (33.02)	123177 (100.00)	347809.73 (100.00)
West Bengal	449 (1.20)	114479.37 (82.54)	36559 (98.79)	24212 (17.46)	37008 (100.00)	138691.37 (100.00)
Other North India	116 (0.71)	12115.93 (38.32)	16148 (99.29)	19500 (61.68)	16264 (100.00)	31615.93 (100.00)

State	Organised sector		Enumerated STG as on 31/03/2022		Total	
	No. of tea gardens	Area (ha)	No. of STGs	Area (ha)	Growers	Area (Ha)
North India	1327 (0.75)	359557.03 (69.40)	175122 (99.25)	158560 (30.60)	176449 (100.00)	518117.03 (100.00)
Tamil Nadu	129 (0.28)	29503.85 (46.16)	46481 (99.72)	34409 (53.84)	46610 (100.00)	63912.85 (100.00)
Kerala	95 (1.18)	30306.82 (85.01)	7923 (98.82)	5344 (14.99)	8018 (100.00)	35650.82 (100.00)
Karnataka	16 (100.00)	2093 (100.00)	-	-	16 (100.00)	2093 (100.00)
South India	240 (0.43)	61903.67 (60.89)	54404 (99.56)	39753 (39.11)	54644 (100.00)	101656.67 (100.00)
All-India	**1567 (0.68)**	**421460.70 (68.00)**	**229526 (99.32)**	**198313 (32.00)**	**231093 (100.00)**	**619773.70 (100.00)**

Source: www.teaboard.gov.in; Authors' calculations

3.2 Price shock and collectivization

India is globally the second largest producer of tea, after China and also a major consumer. Domestic consumption has increased consistently throughout the years and during the fiscal 2020-21, India consumed 89.24 percent of its tea production (1,145 million kg), showing an increase of 2.60 percent over the previous period (Table 3). Indian tea market is expected to grow annually at the rate of 4.2 percent between 2021 and 2026. Of the total tea production in India, about 15 to 20 percent is exported to various countries. With the rise in the economic growth of the country, along with the growing middle class population, the tea market in India is growing, owing to the increasing preference for premium brands. According to the United Planters Association of Southern India (www.upasi.org) report, 56 percent of the tea produced in Nigiris is consumed domestically and the surplus is exported to over 100 countries. The traditional markets of Indian tea like USSR and UK have drastically reduced the import of tea from India, and competition between producing countries (presently 36 countries of the world produce tea and many of them are big producers) are the major causes of falling price of Indian tea (Table 4).

TABLE 3: SHARE OF EXPORTS IN DOMESTIC PRODUCTION

(in M.kg)

Year	Production	Imports	Exports	Estimated consumption
2016-17	1250.49 (100.00)	21.60	227.63 (18.20)	973
2017-18	1325.05 (100.00)	20.59	256.57 (19.36)	1066
2018-19	1350.04 (100.00)	24.22	254.50 (18.85)	1090
2019-20	1360.81 (100.00)	15.54	241.34 (17.73)	1116

Year	Production	Imports	Exports	Estimated consumption
2020-21	1283.03 (100.00)	27.75	203.79 (15.88)	1145
2021-22	1344.40 (100.00)	25.97	200.79 (14.94)	1168

Source: www.teaboard.gov.in; Authors' calculations

TABLE 4: EXPORT SHARE OF VARIOUS COUNTRIES

(Qty in M.kg)

Country	2017	2018	2019	2020	2021
Kenya	415.72 (23.13)	474.86 (24.43)	496.76 (26.02)	518.92 (28.34)	558.93 (28.98)
China	355.26 (19.77)	364.71 (19.53)	366.55 (19.20)	348.82 (19.05)	369.36 (19.15)
Sri Lanka	278.20 (15.48)	271.78 (14.55)	289.59 (15.17)	262.73 (14.35)	282.84 (14.66)
India	251.91 (14.02)	256.06 (13.71)	252.15 (13.21)	209.72 (11.45)	196.54 (10.19)
Vietnam	140.00 (7.79)	130.00 (6.96)	134.91 (7.06)	130.00 (7.10)	145.00 (7.52)
Others	355.92 (19.80)	369.96 (19.81)	369.38 (19.35)	361.02 (19.71)	376.22 (19.50)
Total	1797.01 (100.00)	1867.37 (100.00)	1909.34 (100.00)	1831.21 (100.00)	1928.89 (100.00)

Source: www.teaboard.gov.in; Authors' calculations
Note: Figures in parentheses are percentages

India was earlier exporting about 50 million kg tea to Russia and 60 percent of it was from South. However, in the last few years, India's exports have declined to 40 million kg but, there is scope to bring it to back to 50 million kg. Russia imports almost 160 million kg of tea annually, with Sri Lanka, India and Kenya being the three major exporters and with Kenya's share of exports increasing (Preetha, 2015). Literatures claim that the defects in auction system, poor price realization, defective market structure and increase in cost of production also attributed factors for the crisis (John, 2020). A paradoxical situation is that large tea companies are benefiting from fall in auction prices and rise in retail prices for tea. This widening gap between consumer and auction prices is cutting into the margins realized by the tea producers but is not being passed on to the consumer in the form of lowered tea prices. Average price for medium quality tea sold in Indian market increased from Rs. 85-90 per kg in 1999 to Rs. 120-140 per kg in 2005 and it continues to rise.

Dramatic fall in prices of green leaf tea with high variability (Table 5) is one of the most significant causes of the crisis in the tea industry. This is due to decline in demand for Indian tea in the global market, which was estimated at 1.5-2 percent per annum (Tea Board Annual Reports, 2014-15). The price received by Nilgiris tea growers per kg of tea in the year 1998 was Rs. 69 which drastically reduced to Rs. 57 and Rs. 38 per kg in the year 1999 and 2000, respectively. In the year 2002, the price received by the Nilgiris tea growers was Rs. 42.

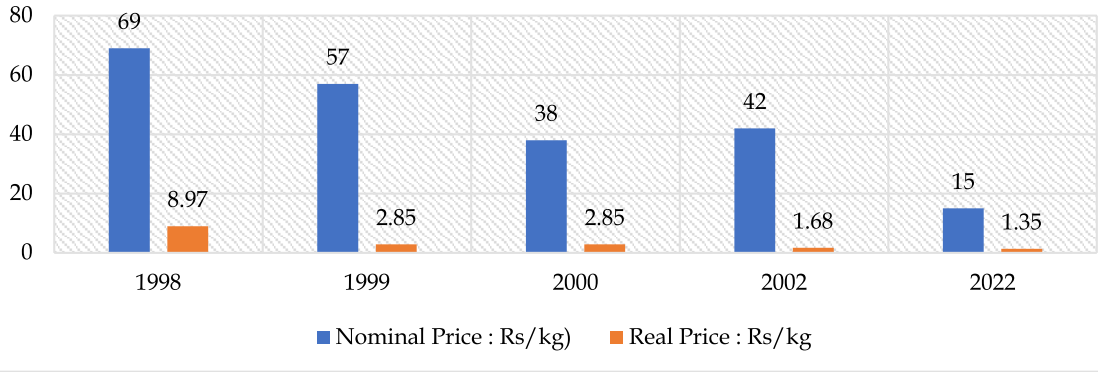
The green leaf tea prices for the last one decade are hovering around Rs. 8.00 to 15.00 per kg, which is less than the cost of production (Kumar, 2022, The Hindu Business Line, 2016). Price fall has been drastic in real terms as evident from the Figure 1 (Selvaraj, 2022). According to a survey done by Indian Institute of Plantation Management (IIPM) Bangalore, the minimum cost of production of green leaf tea would be around Rs.17 and 50 percent of that would be added as social cost for the farmer, which means the minimum support price should be between Rs. 25 to Rs. 27 (Thiagarajan, 2014). Many are of the opinion that unbridled growth of small tea growers has resulted in oversupply of teas which at times are not of good quality, thereby impacting the overall market (Vijayabaskar and Viswanathan, 2019).

TABLE 5: PRICE VARIATION AND VARIABILITY OF MADE TEA IN VARIOUS AUCTION CENTERS

Year	Kolkata		Guwahati		Siliguri		Cochin		Coonoor		Coimbatore	
	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV	Mean	CV
2008	94.88	14.94	87.72	15.93	83.70	14.37	69.31	18.94	62.89	15.31	63.55	16.17
2011	121.43	11.80	109.04	13.96	104.20	14.62	79.86	6.96	63.82	9.15	66.04	8.72
2019	152.76	13.54	145.35	10.03	136.29	8.97	117.17	5.08	89.12	9.93	99.95	7.62
2021	201.59	12.76	185.47	13.05	181.04	11.01	136.52	13.73	105.76	15.93	114.32	14.72
2022	187.79	20.45	174.19	28.49	176.21	25.69	137.61	2.52	95.89	5.79	105.76	5.71

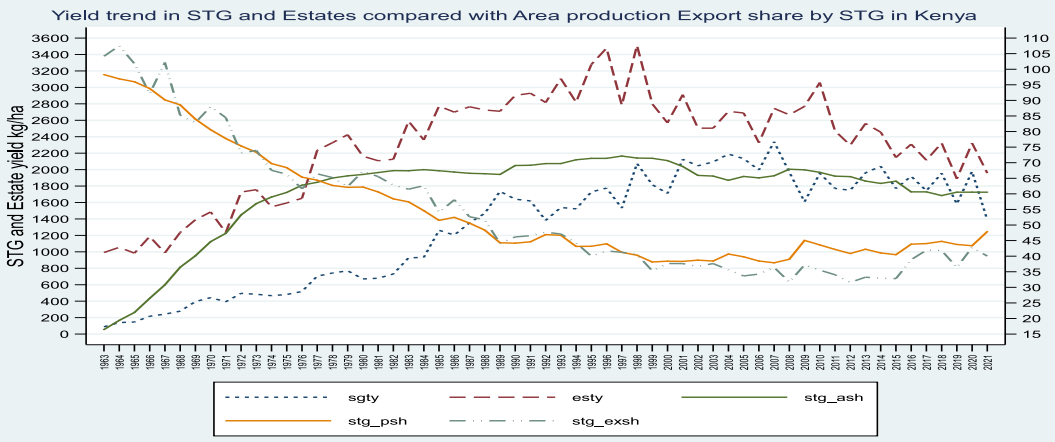
Source : www.teaboard.gov.in. Authors' calculations

Figure 1: Green Leaf Tea: Price Fall



Fall in prices both domestically and internationally and increase in cost of production are the most significant causes for poor maintenance of tea gardens. Literature says more than 30 percent of the tea grown areas are above the economic threshold age limit (Pallavi and Liby, 2012; Tea Board, 1980) which has led to decline in productivity and affecting farmers' livelihood. However, estimated technical efficiencies of the studies found that STGs are technically efficient and further scope exists to improve the productivity (Karabi and Dbarshi, 2020). As Kenya is one of the competitors for India, we try to understand the role of STGs in terms of their share in production and export and their yield performance. Graphical lines indicate that the productivity and area under STGs tea sector increased over the period with fluctuations. The policy like export floor price adopted by the Kenyan tea sector helped the STGs to expand their area and improve the level of productivity (Figure 2).

Figure 2: Comparative Productivity Trends of Green Leaves Tea



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

Note: sgty – STGs sector yield, esty- estate sector yield. stg_psh- STGs sector production share, stg_ash - STGs sector area share, Stg_exsh- STGs sector export share

3.3 Organizational structural impact of PPS

Organizational impact is the effect any organization has on its members. Every organization has an impact, no matter how big or small it is. About 52 percent of the PPSs were formed before 10 years, while 48 percent of the PPSs were established within 10 years. Sri Lakshimi Narayana STGs Society at Karaikorai and T Manihatty Women STG Society at T Manihatty were found to be old societies which were established during 2006. Subsequently every year, two or three societies were established till current year. It was observed that some non-performing societies became defunct within a short spell of time (after two years of establishment) and few of them became defunct after six years of establishment. It was found that the period of establishment has no significant effect on functioning of PPS and there is no strong correlation between the period of establishment and performance of the societies. The observation is that more than 30 percent of the performing societies were formed prior to 2010 and remaining 70 percent of the societies were formed after 2010. On the contrary, it was found that there were 17 non-performing societies which were established after 2010 and they became defunction within a short period of time due to various reasons (Table 6).

TABLE 6: STRUCTURAL PATTERN OF PPS OF STGS

Particulars	Performing	Non-Performing
Year of establishment before 2010 (No.)	6	3
Year of establishment after 2010 (No.)	14	17
Membership enrolment (No.)	15-400	20-100
Membership fee (Rs./member)	10 - 2000	100 - 1200
No of villages covered	1-4	1-2
Operational area (acre)	0.94 – 6.67	2-5

Source: Field survey; Authors' calculation

The reasons were elicited during the opinion survey and FGDs, and are furnished in Table 7. All of the non- performing societies were of the opinion that lack of cooperation among the members of the society is one the major reasons for the failure. Mahindapala (2020) found that individual factors and group dynamics have a bearing on the performance of the TSDS (Tea Small holding Development Societies (TSDS). Since most of the unsuccessful societies are dependent on exploitative trade channels to sell their produce, unfair price of green leaves adds to their vulnerability and affects their success and access to other services. Many of the non-performing societies reported that improper payment by the buying leaf factories is one of the causes for dysfunction (90%) and such improper payment led to disinterest among the members to continue as member of the society. Consequently, many members supplied green leaves either directly to the factories of their choice or to the tea agents depending upon the quantity and location of the farm. Other reasons cited by most of the members of societies for the organizational failures are improper maintenance of accounts, not conducting meetings regularly, lack of funds and not availing the subsidies from TBI. Since the meetings were not conducted on regular basis, members have low levels of technical knowledge and business skills and they lack awareness about government support and face shortage of funds.

TABLE 7: OPINIONS ELICITED FROM PERFORMING AND NON-PERFORMING SOCIETIES

(% of members of the societies reported)

Factors	Performing	Non-performing
Lack cooperation	-	100
Improper payment by tea factories	-	85
Proper of maintenance of records and auditing	-	30
Conduct of regular meetings	100	40
Quality enforcement in tea leave plucking by various means	100	25
Availing subsidy and assistance	80	30
Dividend sharing	100	25
Credit to members	75	20
Availing credit from other sources	60	15

Source: Field survey; Authors' calculation

The other reasons cited by the members during FDG were deduction in quantity of tea leaves per bag both for margin and other purposes like quality of leaves and moisture content by the tea factories. As a result, the societies were not able to have margin and provide a cost-effective price to the members. Labour shortage, increase in labour wages, lack of awareness about subsidies, non-availability of factories in the vicinity and own shed for collection of tea leaves, lack of training and capacity building programs were the common reasons cited for failure. Members' enrolment ranged from 15 to more than 400 and the membership fee collected from each member also varied across the societies. A minimum membership fee of Rs. 10 per member was collected in the case of Mahatma Gandhi STGs Society at Kagguchi village to maximum of Rs. 2000. PPSs which were established in the later years collected reasonably higher membership fee than those established in the early years. Any relationship between the membership fee collection and their success and failures could not be established. The average area covered by each PPS ranged between 0.94 acre and 6.67 acres in the case performing society and in the range of 2-5 acres in the case of non-performing societies. The

maximum villages covered by each society was 4 (Mahatma Gandhi STG society) and there was no correlation existing between the performing and non-performing societies in terms of their members enrolment, membership fee collection and area coverage.

Continuous fall in prices and escalating cost of production of green tea leaves has affected the functioning of societies since the societies prefer to choose various value chains for marketing of green tea leaves and the prolonged crisis has led to disinterest among the members. Even though in some societies the member numbers swelled, due to remoteness and scattered nature of existence, they lack organization and bargaining capacity. In the case of Panbari Small Tea Growers Society at West Bengal, the members enrollment decreased by 12% after a year of establishment and production declined at the rate of 6% every year. However, production of orthodox tea with own brand for export helped to succeed (Saha, 2020; Abdul Hannan, 2019). Studies by Katuwal (2020) and Karki, et al. (2011) also demonstrated that membership enrollment, credit and targeting specialty tea markets are vital for success of the societies.

3.4 Operational impact of PPS

It was found that the cost of production is increasing consistently, both in the nominal and real terms, thus widening the gap between the product price and the cost since the product price is declining, as a result the parity is lost. Among various costs, labor cost accounts for around 85 percent of the unit cost of production and of the total labour cost, cost of plucking accounts for 55 to 75 percent, which is the major factor bringing down the profit margin. Further hikes in every other essential input including fertilizer, herbicides and pest control chemicals are reducing earnings and holding back investments in quality at a time when only good quality teas are competitive. Hike in cost of labour in tea manufacturing industries had a negative impact on STGs as it was estimated that an additional Rs. 4.12 per kg for manufactured tea in NE Region of India and Rs. 3.44 per kg in South India had to be met in the last two decades, resulting in downward impact on prices of green tea leaves (Pallavi and Liby, 2012).

The estimated green leave production per year was 5031 kg per acre in the case of performing societies, while it was 4500 kg per acre in the case of non-performing societies (Table 8). Members of performing societies obtained 12% higher yield when compared to their counterparts, mainly due to strict quality enforcement particularly the number of plucking per month and method of plucking. For example, the Eswarar Society is one of the prominent and awarded societies in the Nilgiris district, which is enforcing various quality parameters among the farmers for quality tea production. The members are supplied with soil health card to assess the status of the soil for optimum allocation of fertilizer inputs.

TABLE 8: COST OF PRODUCTION AND PRICE REALIZATION OF GREEN LEAVES

Particulars	Performing	Non-Performing
Production kg/ac/annum	5031.30	4500.00
Cost of production Rs./kg	10.70	12.00
Maximum Price realized (Rs./kg)	29.30	28.90
Minimum price realized (Rs./kg)	12.40	11.40
Net Profit realized/acre/annum	17608.00	450.00
Poverty Level Income (PLI)	9855.00	9855.00

Source: Field survey; Authors 'calculations

Since tea cultivation is labour intensive, particularly plucking, cost cutting measures would significantly reduce the cost of production and mechanization is one of the effective alternatives that can reduce costs. Functioning of Backward Bending Supply Curve (as real wages increase beyond a certain level, people will substitute leisure for paid work time and so higher wages lead to a decrease in the labour

supply) is compelling the STGs to resort to mechanization of their small tea gardens. Several initiatives on mechanization by Tea Board have been undertaken to reduce the cost of labour. Field survey estimates based on the Front-Line Demonstration by KVK- UPSAI (Ramamoorthy and Shanmugam, 2013) show that average harvesting cost by mechanical harvester was lower and two workers operating a mechanical harvester for a day can bring in the equivalent of leaf of 15 workers hand-plucking tea. Mechanically harvested tea bested hand plucked tea and tea obtained by shear-harvesting from a continuously sheared field over a prolonged period was found to be superior. On an average, members of performing society incurred cost of Rs. 10.70 per kg of green leave production, while it was Rs. 12 per kg in the case non-performing societies. The difference in cost of production between the two categories of societies is due to mechanization of harvesting in the case of performing societies. One of the reasons for better performance of the PPSs is sharing of harvesting machines among the members on custom hiring basis with nominal cost. As a result, the members of the performing societies realized higher productivity with lesser cost. Members of the performing societies realized a maximum price Rs. 29.3 per kg of green leaves and minimum price of Rs. 12.4 per kg. On the other hand, the members of the non-performing societies received a maximum price Rs. 28.9 per kg and minimum price Rs. 11.4 per kg.

Collection of green leaves from each farm adds to cost of production and cutting down the margins for the members due to high transportation cost as STGs are scattered. Availing subsidy from Tea Board for purchase of vehicle is critical for their success as cost of transportation of green leaves from the collection centre to factories sharply reduces marketing cost, thereby the society can provide a better price for the members. Through the survey, it was found that 80 percent of the performing societies have their own vehicle for transportation of green leaves by availing 50 percent subsidy from Tea Board. On the contrary, only 40 percent of the non-performing societies availed subsidy for purchase of own vehicle (Table 9). Similarly, performing societies benefitted more from various subsidies provided by Tea Board compared to non-performing societies.

TABLE 9: VARIOUS SUBSIDES AVAILED BY PERFORMING AND NON-PERFORMING SOCIETIES

(% of societies)

Particulars	Performing	Non-performing
Weighing scale	45	15
Vehicle	80	40
Nylon bags	55	40
Shed	10	
Pruning Machine	10	15
Harvester	10	-
Inputs	30	-
Other funds from tea board	15	25

Source: Field Survey and Authors' calculation

3.5 Functional impact

The demand for the packaged varieties of the beverage in urban as well as rural areas is rising owing to the lesser chances of adulteration, superior quality, and convenient storage. The people are willing to experiment with more tea blends, further providing an impetus for the growth of segments such as herbal, fruit, and other specialty varieties. The green tea segment is predicted to have a robust growth due to its vast consumption among health conscious people and the urban population. Tea Board of India is giving a big push to organic tea production by providing 25% more subsidy than the normal subsidy of 30% and also 50% of the cost of certification will be paid as subsidy. Further, the Government of India under Participatory Guarantee System (PGS) implemented the organic tea cultivation program in 100 acres of tea gardens comprising of 100 Small Tea Growers (STG) through Department of Horticulture. These initiatives are helping the farmers to practice organic tea cultivation in order to improve income by realizing premium price. Improvement in the maintenance of quality standard in tea plucking, production of specialized tea by the small tea growers, etc. would lead to a better price fetching mechanism and also better product demand. Collectiveness helped in production of specialty tea like white teas by availing various subsidies provided by the Tea Board of India under various categories. Direct market linkages with export market for packed tea with a trade mark have also been established by the few societies.

The Kundhai STG Society, which was registered during 2010, had 25 members and presently the society has more 80 members due to its active functioning. The society is enforcing the quality parameters among the members including organic farming. Shivalinga and Sairam Small Tea Growers Societies, registered during January 2016, are successfully functioning and helping members to adopt organic tea cultivation (Selvaraj and Ganesh, 2017). The Eswarar Society is one of the prominent and awarded societies in the Nilgiris district, which is enforcing various quality parameters among the farmers for quality tea production.

3.6 Factors delineating the Performance – Logistic Regression Approach

The estimated odds ratios are greater than 1 which indicates that the event (performance of PPSs) is more likely as the predictor increases. Further, the estimated odds ratios are positive which indicate that the event (performance of PPSs) is more likely at that level of the predictor than at the reference level of the factor (Tables 10 and 11). Predictability of the model is 84.21% for Y=1, and 80.95% for Y=0. The margin values for all the variables are higher for 1 compared to zero. Estimation of relative risk (the ratio between margin values for zero and 1) shows that there is 88% probability that machine harvesting by members ensures the better performance of the societies. Since machine harvesting is insisted for regular plucking with equal intervals, quality of tea leaves is assured. Mechanical harvester with ceiling limit of Rs. 40,000 per harvester (double man operating) with 10 ha tea command area and Rs. 25000 for single man operating with 5 ha of tea command area are provided to reduce the cost of harvesting. Since most of the performing societies availed subsidies for purchase of harvesting machine, they were able to enforce quality leaf plucking for better price. Similarly, estimated relative risk values for subsidies (collection shed) is 74, followed by 66 (subsidies for vehicle), 56 for year of establishment, 53 for members enrollment and 47 for quality enforcement. The PPSs with own leaf collection shed store leaves and are able to minimize the cost as renting of collection shed costs their profitability. There are a number of private commission agents in every village who collect green tea leaves from the producers and transport to tea factories as STGs are scattered and there is low volume of production. In such cases, the cost of transport and incidental charges are levied on STGs by the tea agents. As a result, the STGs are not able to get assured minimum monthly prices. Logit results reconfirm that subsidies availed, especially for collection shed and vehicle, are significant factors determining the performance of the PPSs.

TABLE 10: ESTIMATED ODDS RATIOS OF LOGISTIC REGRESSION FOR THE FACTORS DELINEATING THE PERFORMANCE OF PPSs OF STGs

Variable	Odds Ratio	Std. Error	z	P>|z|
Subsidy (Vehicle)	6.59	10.83	1.15	0.25
Subsidy (Collection shed)	4.95	6.06	1.30	0.19
Membership enrollment	12.86	20.65	1.59	0.11
Year of establishment	10.99	19.70	1.34	0.18
Machine harvesting	15.78	27.39	1.59	0.11
Quality enforcement	0.0008	.002	-2.99	0.003

Source: Authors' calculations

Log likelihood = -12.085884 Prob > chi^2 = 0.0000

Number of observations: 40 Pseudo R^2 = 0.5641

LR chi^2 = 31.28

TABLE 11: ESTIMATED MARGINAL EFFECTS OF LOGISTIC REGRESSION FOR THE FACTORS DELINEATING THE PERFORMANCE OF PPSs OF STGs

Variable	Margin	SE	z	P>|z|
Subsidy (Vehicle)				
0	0.40	0.10	4.05	0.0000
1	0.60	0.11	5.39	0.0000
Subsidy (Collection shed)				
0	0.42	0.07	6.09	0.0000
1	0.57	0.07	7.93	0.0000
Membership enrollment				
0	0.35	0.12	2.83	0.0050
1	0.66	0.11	6.11	0.0000
Year of establishment				
0	0.33	0.16	2.06	0.0400
1	0.59	0.08	7.84	0.0000
Machine harvesting				
0	0.46	0.09	5.05	0.0000
1	0.52	0.06	8.08	0.0000
Quality enforcement				
0	0.29	0.15	1.99	0.0470
1	0.62	0.09	6.88	0.0000

Source: Authors 'calculations

4. Conclusions and suggestions

There are many factors delineating the performance of the PPSs. The performing societies were able to adopt various strategies to insulate from price shock, while the continued non-performance of many societies led to their closure and their members were affected by price shock. The price received by the Nilgiris tea growers per kg of green leaf in the year 1998 was Rs. 69 which drastically reduced to Rs. 57 and Rs. 38 per kg in the year 1999 and 2000, respectively. In the year 2002, the price received by the Nilgiris tea growers was Rs. 42 per kg. The green leaf price for the last one decade is hovering around Rs. 8.00 to 15.00 per kg, which is less than the cost of production. Even the district average price, fixed to ensure remunerative prices for the famers, is always lower than the cost of production. It was found that there is no strong correlation between the period of establishment, members' enrolment, membership fee collection, and area coverage and performance of the societies. Production of specialty tea like white tea and direct market linkages with export market for packed tea with a trademark were the key strategies adopted to insulate the price shock and were observed only among few performing societies. However, machine harvesting of green tea leaves, subsidies availed for collection shed and transport vehicle and quality enforcement were the insulating factors for the performing societies. All the non-performing societies believed lack of cooperation among the members of the society is one the major reasons for the failure and reported that improper payment by the leaf buying factories is one of cause for dysfunction (90%) and such improper payment led to disinterest among the members to continue as members of the society. Improper maintenance of accounts, not conducting meetings regularly, lack of funds and not availing the subsidies form Tea Board of India (TBI) were the other cited reasons. Estimation of relative risk shows that there is 88% probability that machine harvesting by members ensures better performance of the societies. Similarly estimated relative risk values for subsidies (collection shed) is 74, followed by 66 (subsidies for vehicle), 56 for year of establishment, 53 for members enrollment and 47 for quality enforcement. Thus, the strategic approaches like value addition, product diversification, integration of services and collective practices through members' cooperation are vital for effective functioning of the non-performing societies for which support from TBI/Rural Development Organization (RDO) Trust/Small Tea Growers Association of Southern India (STASI) is critical. Targeting specialty tea markets for price premiums and creating awareness and resorting to formal certification in case of organic tea cultivation to compete in the global market even by performing societies are warranted. The successful societies with higher coverage can resort to their own value addition by establishing micro and mini tea factories and creating their own trade mark and marketing.

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Agro-Economic Research

Farmers' Perceptions towards Production and Marketing of Quality Seed in Madhya Pradesh

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1. Introduction

Seed is the most basic, critical and vital input for sustainable growth in agricultural production. It is estimated that the direct contribution of quality seed alone to the total production is about 15-20%, depending upon the crop, and it can be further raised up to 45% with efficient management of other inputs. Every farmer should able to access healthy seeds which are genetically pure, with high seed vigour and good germination percentage. Timely availability of good quality seeds at reasonable price ensures good yield and profit to the farmers. The seeds play a vital role in agriculture and act as a carrier of the genetic potential of varieties. Quality seed production which follows efficient certification procedures plays a major role in the increase of food production of our country.

In the current scenario, the demand for good quality certified seeds far exceed the availability in the market. Seed sector in India is of two types, namely formal and informal. Informal sector is the one where farmers produce seeds without following certification procedures and exchange it amongst themselves. The formal type of seed sector follows seed certification procedures and standards to produce a particular variety of seed.

Indian seed industry is one of the biggest seed market in the world and it involves various institutions and organizations like Government institutions, public sector organizations, research and academic laboratories and institutions, and private sector. Ministry of Agriculture and the Department of Seed Certification, Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAU), National Seeds Corporation (NSC), State Farm Corporation of India (SFCI), 15 State Seed Corporations (SSCs), 22 State Seed Certification Centers and 104 notified Seed Testing Laboratories are major players in the seed industry. Nearly 150 large private seed companies nationwide are involved in seed production.

In 1966-67, the seed production programme for wheat and maize was started and after a year (1967-68), rice crop was also included. After review and recommendation, on 2nd October 1969, Indian Seed Act came into force in India. Indian Seed Act, 1966 is an act to provide measures for regulating the quality of certain seeds for sale and for matters connected therewith. Some highlights of this act are (i) constitution of Central Seed Committee by Government of India to advise Central and State Governments regarding the Act, (ii) establishment of Central Seed Laboratory, (iii) establishment of State Seed Lab for seed quality analysis, (iv) provision of notification of varieties by Government of India, (v) minimum limits of germination and purity of seeds and compulsory label fixing, (vi) notified seed standard fixed, (vii) identifiable as seed of the variety it claims, (viii) must have minimum prescribed purity & germination, (ix) seed container must bear labels containing correct particulars of the seed, (x) establishment of Seed Certification Agency, (xi) establishment of Central Seed Certification Board to advise the Government of India and State Government on all matters relating to certification, (xii) appointment of Seed Analyst for seed analysis in State Seed Laboratory, (xiii) appointment of Seed Inspector to collect seed samples of notified kind being offered, and (xiv) forfeiture of property (seeds) belonging to any person convicted under this act due to contravention of the procedures under this act. Further, first turning point in shaping an organized seed industry was through National Seed Project (NSP) Phase-I (1977-78) which initiated the establishment of

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State Farms Corporation of India (SFCI), 4 State Seeds Development Corporations (SSDCs) and Breeder Seed Production (BSP) units. In the Phase-II of NSP (1985), 13 additional SSDCs and 19 state seed certification agencies were established for quality seed production. After 10 years (1988-89), a New Seed Development Policy was formulated which gave access to the private individuals with strong R&D base for product development.

To achieve the food grain demand in future, it was felt that the Seed Replacement Rate (SRR) of various crops needs to be enhanced. This would require a major increase in the production of quality seeds with the involvement of both public and private sector. To safeguard the interests of Indian farmers and agro-biodiversity conservation, and to guard the exploitation of farmers by unscrupulous elements, the National Seed Policy (2002), a regulatory system, was formed. Later for regulating the production, distribution, quality of seeds for sale, import, export and to facilitate production and supply of quality of seeds and for matters connected therewith or incidental thereto, a Seed Bill (2004) was proposed. The Government proposed new amendments to the bill in April, 2010 and November, 2010, accepting most of the recommendations given by the Standing Committee. Few highlights of the Seed Bill (2004) are (i) all type of seeds for sale have to be registered, (ii) the seeds are required to meet minimum standards, (iii) transgenic varieties only be registered after clearance certificate as per the Environment (Protection) Act, 1986, (iv) exemption of farmers from the requirement of compulsory registration (v) farmers are allowed to sow, exchange or sell their own seed and planting material without any formalities required by registered seeds but, farmers cannot sell seed under a brand name, and (vi) provision for claim of compensation in case a registered variety of seed fails to perform to expected standards.

The national seed requirement is taken care through formal seed system (FSS) and informal seed system (ISS). Formal seed system is characterized by large scale production of seed of officially released varieties with strict quality assurance mechanism. This system is well organized and systematic and usually starts with development of different types of varieties/hybrids. The principles in the FSS are to maintain varietal identity, purity and to produce seed of optimal physical, physiological and sanitary quality (Reddy *et al.*, 2007). Formal seed system is managed by Government bodies (Government institutions, State Government farms, University farms & KVKs) and registered seed growers (NGOs, private companies) whereas ISS is managed by farmers and sometimes private seed growers.

The policy gave access to Indian farmers of the best of seed and planting material available anywhere in the world. The policy stimulated appreciable investments by private individuals, Indian corporate and MNCs in the Indian seed sector with strong R&D base for product development in each of the seed companies with more emphasis on high value hybrids of cereals and vegetables and hi-tech products such as Bt. Cotton. As a result, farmer has a wide product choice and seed industry today is set to work with a 'farmer centric' approach and is market driven. However, there is an urgent need for the State Seed Corporations to transform themselves in tune with the industry in terms of infrastructure, technologies, approach and the management culture to be able to survive in the competitive market and to enhance their contribution in the national endeavour of increasing food production to attain food and nutritional security.

The M.P. seed certification agency issues tags on the seeds which met the standards of seed certification prescribed in the Indian Minimum Seeds Certification Standards. These tags are stitched on the gunny bags of standard sizes in which seeds are packed. The standard sizes of packing are 30 kgs, 40 kgs, 100 kgs, etc. The gunny bags are procured from private institutions, through tendering process. The lot number, variety, stage, etc. details are printed on the bags and tags are stitched. The final tagged and bagged seed is distributed to the farmers of Madhya Pradesh at a rate which is decided by the State Government. The seeds are distributed through various cooperative societies and centres of MP Rajya Beej Evam Farm Vikash Nigam like LAMPS, PACS, co-operative societies, DMO,

DDAs, cash sale, etc. Similarly, seed storage is needed to store the seed during the period from receipt of seed at the plant till it is supplied to the dealer/farmer for sale. In the past three years, Nigam has undertaken massive infrastructure development especially in storage facilities like building new godowns (https://mpssfdc.mp.gov.in). The Nigam produces about 3 lakh quintals of foundation and certified seeds in two seasons, *i.e.* Kharif & Rabi. The Beej Nigam has 54 processing centers located at different districts across the State. Seed processing plants are equipped with new grading machines needed for successful cleaning and grading operations.

1.1 Objectives of the study

a) To analyze organizational and functional structure of seed societies and its effectiveness in operations and governance.

b) To analyze profitability of seed production over grain production of selected crops.

c) To analyze farmers perception of quality seed production and identify various constraints related to efficient production and marketing of quality seed production.

2. Data sources and methodology

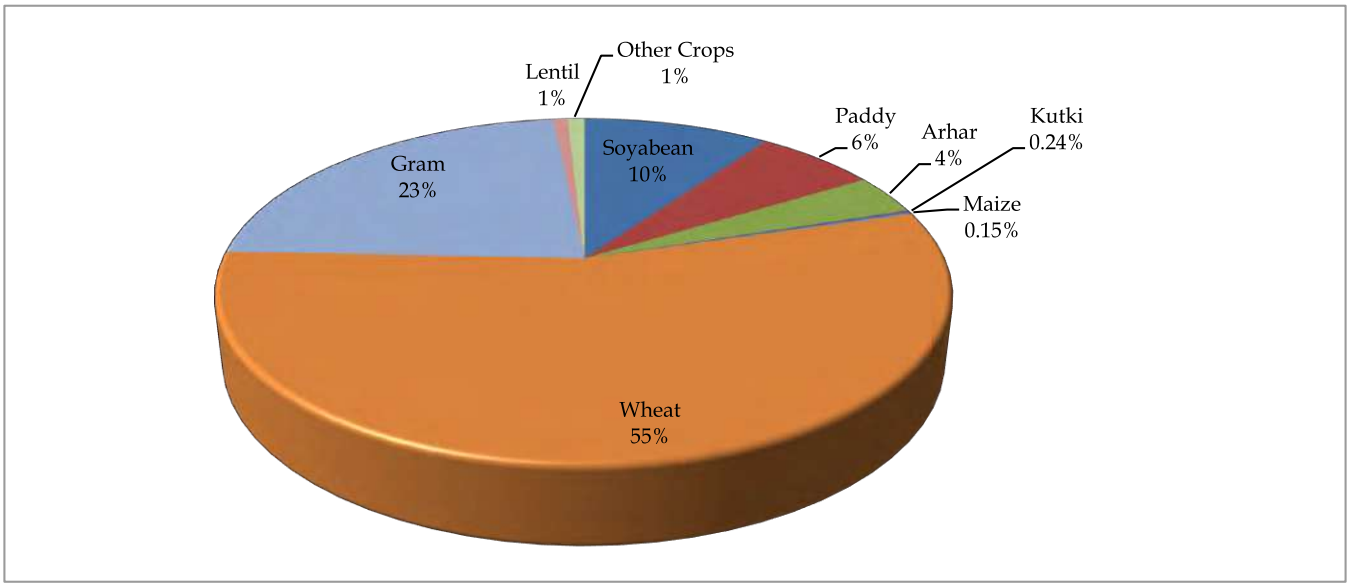
Hoshangabad, Dewas and Ujjain districts were selected purposively as per maximum seed distributed under wheat (55%), gram (23%) and soybean (10%), respectively, through MP Rajya Beej Evam Farm Vikash Nigam across district of Madhya Pradesh (Figure 1). A list of all the seed distribution societies in the selected districts was prepared and top two seed distribution societies in each district were selected for collection of data. Further, a list of producer members of each selected seed society was prepared and a sample of 20 beneficiaries from each society was selected randomly through proportionate random sampling method. Thus, the total size of sample constitute 20 (beneficiaries) x 2 (seed society) x 3 (districts) = 120 respondents of Madhya Pradesh (Table 2).

TABLE 1: DISTRIBUTION OF QUALITY SEED THROUGH MADHYA PRADESH SEED CERTIFICATION AGENCY

S. No.	Crop	Quantity in Qtl · (2021)	Percentage to grand total
1.	**Soybean**	**9827**	**9.88**
2.	Paddy	6384	6.42
3.	Arhar	3737	3.76
4.	Kutki	235	0.24
5.	Maize	145	0.15
6.	Other crops	98	0.1
Total Kharif		**20426**	**20.54**
1.	**Wheat**	**54895**	**55.2**
2.	**Gram**	**22601**	**22.73**
3.	Lentil	744	0.75
4.	Other crops	774	0.78
Total Rabi		**79014**	**79.46**
Grand total		**99440**	**100**

Source: http://mpssfdc.mp.gov.in/Modules/Web/performance.aspx

Figure 1: Distribution of Quality Seed of Crops through MP Rajya Beej Evam Farm Vikash Nigam (2021)



Source: Representation of data from table 1

TABLE 2: SELECTED PRODUCER MEMBERS FROM EACH SELECTED DISTRICT

Name of district	Name of societies	No. of villages covered	HHs
Ujjain	Sairam Beej Utpadak Sahkari Sanstha	4	19 (47.5)
	Shree Sanwariya Kishan Beej Utpadak Sahkari Sanstha	7	21 (52.5)
	Total	**11**	**40 (100)**
Hoshangabad	Narmada Beej Utpadak Sahakari Samiti, Babai	15	22 (55)
	Shri Krishna Beej Utpadak samitee	9	18 (45)
	Total	**24**	**40 (100)**
Dewas	Harnawada Beej Samitee	3	21 (52.5)
	Shanti Beej Utpadak Sahkari Sanstha	7	19 (47.5)
	Total	**10**	**40 (100)**
	Grand total	**45**	**120 (100)**

Source: Primary data

Both primary and secondary data were collected for the study. The primary data were collected from producer members with the help of pre-tested interview scheduled for agriculture year 2021-22.

3. Results and discussion

The organizational and governing body structure, inputs used, quality parameter and technological adoption for quality seed production, purchased seed, cost incured in cultivation, profitability of seed production, farmer preferences and constraints faced by producer members in production and marketing of quality seed under selected crops, *viz*. wheat, gram and soybean in Madhya Pradesh are presented in following sub-heads.

3.1 Organizational and governing body

Amongst various selected Seed Producer Cooperative Societies (SPCS) of wheat, gram and soybean, Narmada Beej Utpadak Sahkari Samiti, Babai, Hoshangabad and OM Beej Pacodh Utpadak Evam Kroya Vikracy Sahkari Samiti, Seoni – Malwa , Hoshangabad were related to wheat producers and registered during the year 2002 and 2008, respectively, with an initial membership of 11 and covering 1 and 6 villages in its vicinity. At present, the membership was found to have increased to 50 and 21, respectively. Shanti Beej Utpadak Sahkari Samiti, Dewas and Harnawada Beej Utpadak Evam Krishi Vikash Sahakari Sanstha Maryadit, Harnawada, Dewas were found to be related to gram producers and were registered during the year 2009 and 2003, respectively, with initial membership of 21 & 166 and covering 6 and 30 villages in its vicinity. At present, the membership was found to have increased to 60 in case of Shanti Beej Utpadak Sahkari Samiti, Dewas and to 140 in case of Harnawada Beej Utpadakevm Krishi Vikash Sahakari Sanstha Maryadit, Harnawada, Dewas.

Shree Sanwariya Kisan Beej Utpadaksahkari Sanstha Maryadit, Mahidpur, Ujjain and Sairam Beej Utpadak Sahkari Samiti, Badnagar, Ujjain were related to soybean producers and registered during the year 2019 and 2003 with initial membership of 21 & 11 and covering 2 to 8 villages, respectively, in its vicinity. At present, the membership was found to have increased in case of Sairam Beej Utpadak Sahkari Samiti, Badnagar, Ujjain from 11 to 97, while in case of Shri Sanwliya Kisan Beej Utpadak Sahkari Sanstha Maryadit, Mahidpur, Ujjain, it was found to have remained same (21). In all the selected SPCSs, the membership as well as villages covered was found to be more in case of Harnawada Beej Utpadakevm Krishi Vikash Sahakari Sanstha Maryadit, Harnawada, Dewas. The membership of all the selected SPCSs was found to have increased in the current year as compared to initial year except Harnawada Beej Utpadakevm Krishi Vikash Sahakari Sanstha Maryadit, Harnawada, Dewas.

The governing body of selected SPCSs consist of President, Vice-President and producer members. A society was found to have on an average 1 President, 1 Vice-President and 7 to 10 governing body producer members.

Cent percent registered producers members related to Narmada Beej Utpadak Sahkari Samiti, Babai, Hoshangabad; OM Beej Pacodh Utpadak Evam Kroya Vikracy Sahkari Samiti, Seoni – Malwa, Hoshangabad; Harnawada Beej Utpadakevm Krishi Vikash Sahakari Sanstha Maryadit, Harnawada, Dewas, and Shri Sanwariya Kisan Beej Utpadak Sahkari Sanstha Maryadit, Mahidpur, Ujjain SPCSs were found to be involved in seed production, while 40 percent and 6.19 percent more seed producers than registered producer members related to Shanti Beej Utpadak Sahkari Samiti, Dewas and Sairam Beej Utpadak Sahkari Samiti, Badnagar, Ujjain were found to be involved in seed production of gram and soybean, respectively.

All the selected SPCSs were found to have convergence with 5 to 7 institutions related to procurement, certification and selling of seed. On an average, a SPCS was found to have maximum convergence for purchase of seed only, while the convergence with other institutes was found to be with only one institution, *i.e.* Department of Farmer Welfare and Agriculture Development (Department of Agriculture) for selling of seed.

In total, these selected societies were found to purchase and distribute 142.40 q of seeds of wheat,

gram and soybean to producer members during the year 2021, in which the share of breeder seed (62.08%) was found to be more than foundation seed. On an average, a society was found to earn profit of Rs. 223/q and Rs. 200/q on breeder and foundation seed, respectively, in distribution of seed to producer members.

3.2 Quality of seed procured

The type of seed and variety procured by the SPCSs for quality seed producers is presented in Table 3. SPCSs were found to introduce seed of recent developed varieties, viz. GW 322, GW 451, HI 1634 and Tejas HI 8759 of wheat to their 52.5 percent, 40 percent, 2.5 percent and 15 percent of producer members, respectively. An average producer of wheat was found to consume 17.55 kg, 12.35 kg, 2.00 kg and 5.83 kg breeder seeds of these varieties, respectively, for cultivation of wheat seed production on his farm. RVG 202 was found to be a recently developed variety of gram distributed amongst all the gram growers by the SPCSs for production of quality seed of gram in the area under study. An average gram producer was found to consume only 3.42 kg breeder seed of RVG 202 on his farm (Table 3).

TABLE 3: SEED PURCHASED BY THE RESPONDENTS

Type of seed	Variety	Total number of HHs	Quantity (kg)/ Respondent
Wheat			
Breeder	GW 322	21 (52.5)	17.55
	GW 451	16 (40)	12.35
	HI 1634	1 (2.5)	2.00
	Tejas HI 8759	6 (15)	5.83
Gram			
Breeder	RVG 202	40 (100)	3.42
Soybean			
Breeder	RVS 104	1 (2.5)	3.00
	JS 2029	1(2.5)	1.20
	JS 9560	1(2.5)	3.20
Foundation	JS 9560	28 (70)	3.45
	RVS 2011-04	4 (10)	6.83
	JS 2034	5 (12.5)	3.70
	JS 9305	2 (5)	4

Source: Primary data
Note: Figure in parenthesis show percentage to total (40)

In case of soybean, breeder seed of varieties RVS 104, JS 2029 and JS 9560 as well as foundation seeds of varieties JS 9560, RVS 2011-04, JS 2034 and JS 9305 (recently developed varieties) were found to be distributed amongst the producer members. 2.5 percent of breeder seed of each variety was found to be distributed amongst the producer members. As regards to foundation seed, the maximum seed of variety JS 9560 (70%) followed by JS 2034 (12.5%), RVS 2011-04 (10%) and JS 9305 (5%) was found to be distributed by the SPCSs. The quantity of these varieties distributed to seed producer ranged between 1.20 (JS 2029) to 6.83 (RVS 2011-04) kg per soybean seed producer (Table 3).

3.3 Economic analysis

In economic analysis, cost incurred and return received in cultivation of quality seed over the grain production of selected crops, *viz*. wheat, gram and soybean was observed for the study and presented in Table 4.

It is observed from the data that an average wheat, gram and soybean seed producer was found to invest 10.42, 14.02 and 18.14 percent more and earned 50.62 percent, 2.00 percent and 54.88 percent more return over the grain through production of quality seed of wheat, gram and soybean, respectively. An average seed producer was found to have an additional return of Rs. 8.81, Rs. 1.17 and Rs. 1.51 over the additional cost of Rs. 1.00 through production of quality seed over grain production. An average quality seed producer was found to invest more in cultivation of quality seed production over the grain production except expenditure on manure and fertilizer (in case of wheat and gram) and fertilizer and plant protection (in case of soybean). An average seed producer was found to invest more in cultivation of soybean as compared to wheat and gram. Amongst the different items of paid out cost incurred in production of quality seed production, the highest expenditure was found to have incurred in human labour followed by machinery, seed, manure & fertilizers and electricity for all the selected crops (Table 4).

TABLE 4: COST INCURRED AND RETURN OBTAINED IN CULTIVATION OF MAJOR CROPS IN SEED PRODUCTION OVER GRAIN

(Rs./acre)

Particulars	Wheat			Gram			Soybean		
	Value of seed production	Value of grain production	% change over grain	Value of seed production	Value of grain production	% change over grain	Value of seed production	Value of grain production	% change over grain
Total paid-outcost									
Seed (Kg)	2403	1934	24.21	2722	1469	85.33	1679	1602	4.78
Manure (qtl.)	2030	2870	-29.27	1235	1008	22.58	1702	777	119.05
Fertilizers –urea (Kg)	330	407	-18.88	95	125	-24.49	110	127	-13.17
DAP/12:32:16 (Kg)	1430	1700	-15.89	1359	2018	-32.68	1529	1426	7.24
Plant protection chemical (l.)	32	25	25.00	510	354	44.26	1122	1169	-4.05
Herbicide/ weedicide (l.)	308	227	35.71	488	422	15.79	1909	1771	7.79
Diesel for irrigation (l.)	1680	1440	16.67	360	320	12.50	-	-	-
Electricity	2600	2600	0.00	2400	2400	0.00	4700	4700	0.00
Human Labour days	8400	6300	33.33	7200	6300	14.29	8400	6300	33.33
Machinery hrs	3400	2975	14.29	2975	2550	16.67	2975	2550	16.67
Total cost	22612	20479	10.42	19344	16965	14.02	24127	20423	18.14
Return									
Yield (q/acre) Main product	56240	34710	62.03	32944	30420	8.30	25368	19362	31.02
By-product	15960	18690	-14.61	6390	6143	4.03	4077	4495	-9.29

Particulars	Wheat			Gram			Soybean		
	Value of seed production	Value of grain production	% change over grain	Value of seed production	Value of grain production	% change over grain	Value of seed production	Value of grain production	% change over grain
Gross income	72200	53400	35.21	39334	36563	7.58	29445	23857	23.42
Net income	49588	32921	50.62	19990	19598	2.00	5318	3434	54.88
Cost of production	1488	1150	29.31	3406	2900	17.43	5326	4430	20.22
Per rupees return	3.19	2.61	-	2.03	2.16	-	1.22	1.17	-
Additional cost over grain		2134			2379			3704	
Additional profit over grain		18800			2772			5588	
Additional net return		16666			393			1884	
Additional per rupee return		8.81			1.17			1.51	

Source: Primary data

3.4 Technological adoption

Majority of quality seed producers were found to use line sowing method of cultivation (95.83%), treated their seed with fungicide (93.33%), maintained row to row and plant to plant distance (84.17%), maintained proper depth of sowing (86.67%), performed rouging & weeding (81.67%). It is also noticed that 35.00 percent HHs got subsidy for quality seed production and 86.67% performed timely sowing in cultivation of these crops.

TABLE 5: TECHNOLOGICAL ADOPTION REGARDING QUALITY SEED (% HHs)

Particulars		Sample HHs
Sowing time	Early sowing	15 (12.5)
	Timely sowing	104 (86.67)
	Late sowing	1 (0.83)
Sowing method	Ridge farrow	5 (4.17)
	Ridge bed	0 (0)
	Line sowing	115 (95.83)
Row to row distance		101 (84.17)
Plant to plant distance		101 (84.17)
Depth of sowing		104 (86.67)
Seed treatment with fungicide		112 (93.33)
Rouging and weeding		98 (81.67)
Subsidy on seed		42 (35)

Source: Primary data
Note: Figure in parenthesis shows % to total HHs (120)

3.5 Parameters for quality seed production

As for the parameters followed for quality seed production by the producers, majority of them reported that they maintained moisture content at the time of storage (84.77%) and at the time of harvesting (90%). 52.50 percent of the HHs reported that they supplied sample for soil testing, 24.17 percent received SHC before sowing while 18.33 percent adopted recommended doses of fertilizers for cultivation of crops. 52.50 percent and 38.33 percent HHs reported that they maintained isolation distance and performed germination test before sowing of seed for cultivation of quality seed production. Only 6.67 percent HHs reported that their seed lot was rejected for the next three years (Table 6).

TABLE 6: QUALITY PARAMETER REGARDING QUALITY SEED PRODUCTION

Activities	Sample HHs
Soil testing	
Sample supplied for testing	63 (52.5)
Received SHC	29 (24.17)
Adoption of recommended doses of fertilizers	22 (18.33)
Adoption of processor of quality seed production	
Maintain of isolation distance	63 (52.5)
Testing of seed germination	46 (38.33)
Rejection of seed lot for next 3 year	8 (6.67)
Maintain of moisture content at the time harvesting	108 (90)
Maintain of moisture content at the time storage	101 (84.17)

Source: Primary data
Note: Figure in parenthesis show percentage to total number of sample respondents (n=120)

3.6 Supervision by different agencies

Out of total respondents, majority of them reported that the elected SPCSs officials visited at the time of flowering (89.17%) and maturity (69.17%) stages of crop production. As regards to supervision by the assistant seed certification officer, majority of HHs reported that they visited at time of flowering (86.67%) and maturity (79.17%) stages for cultivation of quality seed production. Only 31.67 percent and 35.83 percent of HHs reported that the elected member of SPCSs and Assistant Seed Certification Officer supervised the performance of crop at the time of harvesting, respectively. Only 17.5 percent and 5.83 percent HHs reported that they also supervised the field at the time of sowing (Table 7).

TABLE 7: SUPERVISION BY DIFFERENT AGENCY OFFICERS

Activities	Sample HHs
By elected members of SPCSs	
Sowing	21 (17.5)
Flowering	107 (89.17)
Maturity	83 (69.17)
Harvesting	38 (31.67)
By Assistant Seed Certification Officer	
Sowing	7 (5.83)
Flowering	104 (86.67)
Maturity	95 (79.17)
Harvesting	43 (35.83)

Source: Primary survey

3.7 Farmers' perceptions

More than 90 percent respondents were found to strongly agree with the opinion that it is better to cultivate quality seed over the grain as it provides high price, high yield. Majority of the HHs strongly agreed that there is an easy availability of seed of latest improved varieties for the current and next year, there is easy availability of critical inputs as per requirement from the SPCSs, seed of latest improved varities at the time of sowing are available at free of cost, there is ease in marketing of produce, latest technological knowledge of the crops for which seed programme is taken as well as other crops is easily accessable and timely payment of produce by the SPCSs. Apart from this, the majority of respondents also reported that they can also have additional benefits along with the seed programme such as maintainance of soil health, technological knowlwdge of growing of different crops is gained, drudgery is reduced with the help of various machine and equipment provided by the societies, etc. (Table 8).

TABLE 8: FARMER' PERCEPTIONS REGARDING QUALITY SEED PRODUCTION (%)

Particulars	Strongly agree	Agree	Indifferent/ Neutral	Disagree	Strongly disagree	Average
	1	2	3	4	5	
High price realization	93.33	6.67	0.00	0.00	0.00	4.93
Easy availability of seed of latest improved varieties at the time of sowing at free of cost	71.67	18.33	3.33	3.33	3.33	4.52

Particulars	Strongly agree	Agree	Indifferent/ Neutral	Disagree	Strongly disagree	Average
	1	2	3	4	5	
Availability of latest improved varieties of seed for next season	75.00	13.33	1.67	3.33	6.67	4.47
High yield realization	90.00	8.33	1.67	0.00	0.00	4.88
Latest improved variety of seeds are easily available	81.67	11.67	3.33	1.67	1.67	4.70
Latest technology is available for main as well as other crops	68.33	25.00	1.67	1.67	3.33	4.53
Inputs for cultivating seed by the society as per requirements are easily available	73.33	21.67	1.67	1.67	1.67	4.63
Soil h ealth is maintained as per Soil Health Card by the society	63.33	20.00	5.00	6.67	5.00	4.30
Ease in marketing	70.00	16.67	5.00	5.00	3.33	4.45
Timely payment of produce (Seed)	66.67	15.00	1.67	8.33	8.33	4.23
Reduce in drudgery due to use of machinery and equipment	68.33	25.00	1.67	1.67	3.33	4.53

Source: Primary survey

3.8 Constraints

Majority of the respondents reported several constraints towards efficient production and marketing of quality seed. The major ones are - unavailability of seed testing report on time, *i.e.* before sowing (100%); insufficient quantity of seed as per requirement (98%); unavailability of desired type (Breeder/Foundation) of improved HYVs of seeds (95%); unavailability of desired improved HYVs (92%); unavailability of subsidy for quality seed production (87%); refusal of undersize seed and return to producers after selling to the SPCSs (78%); low germination as compared to that reported in the bag (77%); unavailability of skilled labours at the time of peak operational periods (75%); lack of awareness of isolation distance maintained for quality seed production (71%), and mechanical impurity existed in production of quality seed (65%) as reported by majority of farmers (Table 9).

TABLE 9: CONSTRAINTS FACED BY PRODUCER MEMBERS AND SPCSS IN QUALITY SEED PRODUCTION

S. No.	Particulars	%
	Related to Producer members	
1	Unavailability of desired type (Breeder/Foundation) of improved HYVs of seed	95
2	Unavailability of desired improved HYVs of seed	92
3	Unavailability of skilled labour at the time of peak operational period	75
4	Insufficient quantity of seed as per requirement	98
5	Unavailability of seed testing report on time, *i.e.* before sowing from Department of Agriculture	100
6	Lack of awareness about isolation distance maintained for quality seed production	71
7	Low germination as compared to reported in the bag	77
8	Mechanical impurity in production of quality seed	65

S. No.	Particulars	%
	Related to Producer members	
9	Unavailability of subsidy for quality seed production on time	87
10	Refusal of undersize seed after selling to the SPCSs and return to seed producers	78
	Related to SPCSs	
1	Lack of coordination with state seed supply institutions regarding distribution of quality seed	83
2	Complicated process for formation of society (more documentation, renewal of society every year, time consuming, etc.)	67
3	Boundation of sale of seed within the district	67
4	Breach of promise by Agricultural Department on holding of seed in the society	67
5	Unavailability of subsidy for quality seed production from last 3 years	83
6	Breach of promise by Primary Agriculture Marketing Society on return quality seed to SPCSs, if not sold by them	50
7	If market price is more than procurement price, producers bound to sell the quality seed in open market	33
8	Delay in payment of seed procured by Department of Agriculture	67

Source: Primary survey

Lack of coordination between SPCSs and state seed supply institutions (83%), unavailability of subsidy for quality seed production from last 3 years (83%), complicated process for formation of society (more documentation, renewal of society every year, time consuming etc.) (67%), boundation of sale of seed with in the district (67%), breach of promise by Agricultural Department on holding of seed in the society (67%), delay in payment of seed procured by Department of Agriculture (67%), breach of promise by Primary Agriculture Marketing Society on return quality seed to SPCSs, if not sold by them (50%) and if market price is more than procurement price, producers bound to sell the quality seed in open market (33%) were found to be the major constraints faced by the SPCSs in procurement and marketing of quality seed.

4. Conclusions and policy implications

The cultivation of quality seed production of wheat was found to be more profitable as compared to gram and soybean as quality seed producers obtained maximum per Rs. return over the investment of Rs. 1.00 which was found to be more in case of wheat (3.19) as compared to gram (2.03) and soybean (1.22). The cost of production of quality seed was found to be more in case of seed as compared to grain by 29.31 percent, 17.43 percent and 20.22 percent in case of wheat, gram and soybean, respectively. The majority of quality seed producers adopted all the advance technologies, *viz*. timely sowing (>80%), line sowing (>90%), maintained plant geometry (row to row-plant to plant distance and depth of sowing) (>75%), seed treatment with fungicide (>87.5%) and rouging & weeding (>72.5%) in cultivation of wheat, gram and soybean. Majority of quality seed producers also maintained moisture at the time of harvesting and storage (>70%), while isolation distance, testing of seed germination were found to be adopted by more than 40 percent and 22 percent quality seed producers, respectively. The seed lot of more than 93 percent quality seed producers was never found to be rejected by the Seed Certification Agency.

The supervision is being carried out by the elected members of SPCSs and Seed Certification Officers at sowing, flowering, maturity and harvesting stage of the crops. The majority of quality seed producers reported that supervision was done very frequently at the time of flowering and maturity as compared to sowing and harvesting stage of cultivation of crops.

It seems that there is lack of coordination between seed producing institutions (SAU, KVK, ZARS, RARS, Agricultural Department, farms, etc.) and SPCSs due to

which the desired type of seed (Breeder, Foundation and Certified) and HYVs of crops are not available in sufficient quantity as per requirement of the member farmers. At the same time, very precious input, *i.e.* seed was found to be sold in the open market as the prices of different type of seed are not fixed by the State Government. Sometimes when the price of grain was more than the market price of seed, it was found that the producer sold out seed as a grain in the open market. Inspite of investing in research for good cultivars, it is not being distributed amongst the farmers who are in need. The distribution efficiency is also found to be lacking and technology is not being penetrated vertically as well as horizontally due to which the diffusion of technology is lagging behind without exploiting its fullest potential level.

Therefore, it become imperative to bring radical changes for bringing harmony in production, procurement and distribution of quality seed across all the stakeholders while ensuring proper diffusion of technology at minimum possible time. The policy initiatives which emerged from the conclusions of the study are as follows:-

1. The web portal on production, procurement and distribution of seed involving all the stakeholders which covers all the information of seed, varieties, quantity available, sources, price, type and availability of seeds along with ensuring door step delivery is required to be launched in the State.

2. It was found during the investigation that at the time of procurement the price of different type of seeds (Foundation-I, Foundation-II, Certified-I, Certified–II, etc.) of different varieties of crops remain almost same. There is no discrimination across various types of seed. Hence, it is required to fix price of different type of seed by the State Government before sowing of the crops.

3. Looking at the breach of promises by the Department of Agriculture and Primary Agriculture Marketing Society with SPCSs, there is a problem in distribution of seed. Therefore some legal framework should be developed to ensure existence of these societies for the development of agriculture and farming communities.

4. Although subsidy was being provided for production of quality seed but it was not available on time. Hence, the subsidy on quality seed to the farmer as well as SPCS should be ensured at the time of procurement with signing of legal documents between the societies and Department of Agriculture.

5. It was also found that the seed quality testing is performed by two agencies, *i.e.* i) Seed certification agencies and ii) Department of Agriculture. However, seed quality testing report from the Department of Agriculture is generally made available after sowing of the crops which creates hindrance in the quality seed production. Therefore, the report of seed quality testing should be made available before sowing of crops.

6. Seed are very precious input which is required on continuous basis. Therefore, the payment of seed procured by the Agriculture Department from the SPCSs should be done on priority basis.

7. Credit should be made available at low rate of interest for creation of infrastructure facilities (grading, packaging, warehousing, etc.) and to strengthen the SPCSs for their long term viability.

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Commodity Review

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2022-23 up to 28.02.2023 is 51472 thousand metric tonnes as against 57588 thousand metric tonnes during the corresponding period of last year. A comparative analysis of procurement of rice for the period of marketing season 2022-23 (up to 28.02.2023) 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

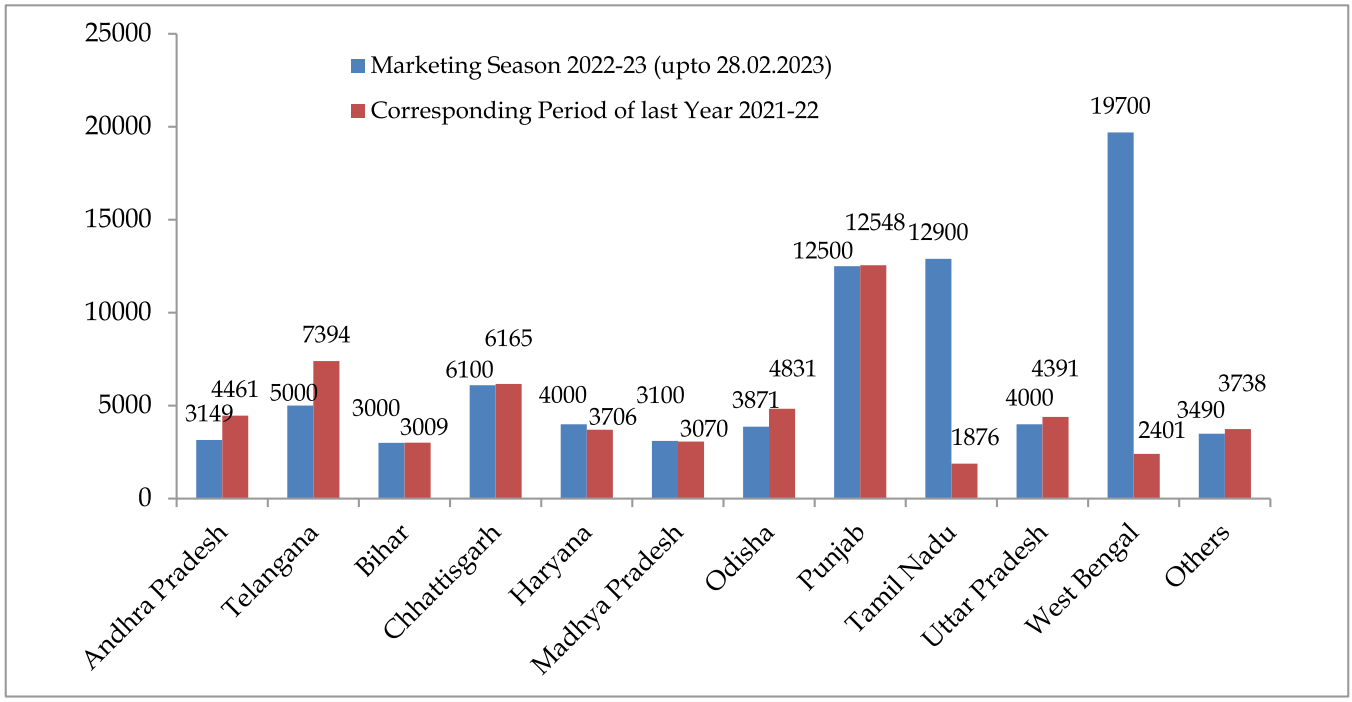
(In thousand metric tonnes)

State	Marketing Season 2022-23 (upto 28.02.2023)		Corresponding period of last year 2021-22	
	Procurement	Percentage to total	Procurement	Percentage to total
1	2	3	4	5
Andhra Pradesh	3149	6.1	4461	7.7
Telangana	5000	9.7	7394	12.8
Bihar	3000	5.8	3009	5.2
Chhattisgarh	6100	11.9	6165	10.7
Haryana	4000	7.8	3706	6.4
Madhya Pradesh	3100	6.0	3070	5.3
Odisha	3871	7.5	4831	8.4
Punjab	12500	24.3	12548	21.8
Tamil Nadu	12900	2.5	1876	3.3
Uttar Pradesh	4000	7.8	4391	7.6
West Bengal	19700	3.8	2401	4.2
Others	3490	6.8	3738	6.5
All-India total	51472	100.0	57588	100.0

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

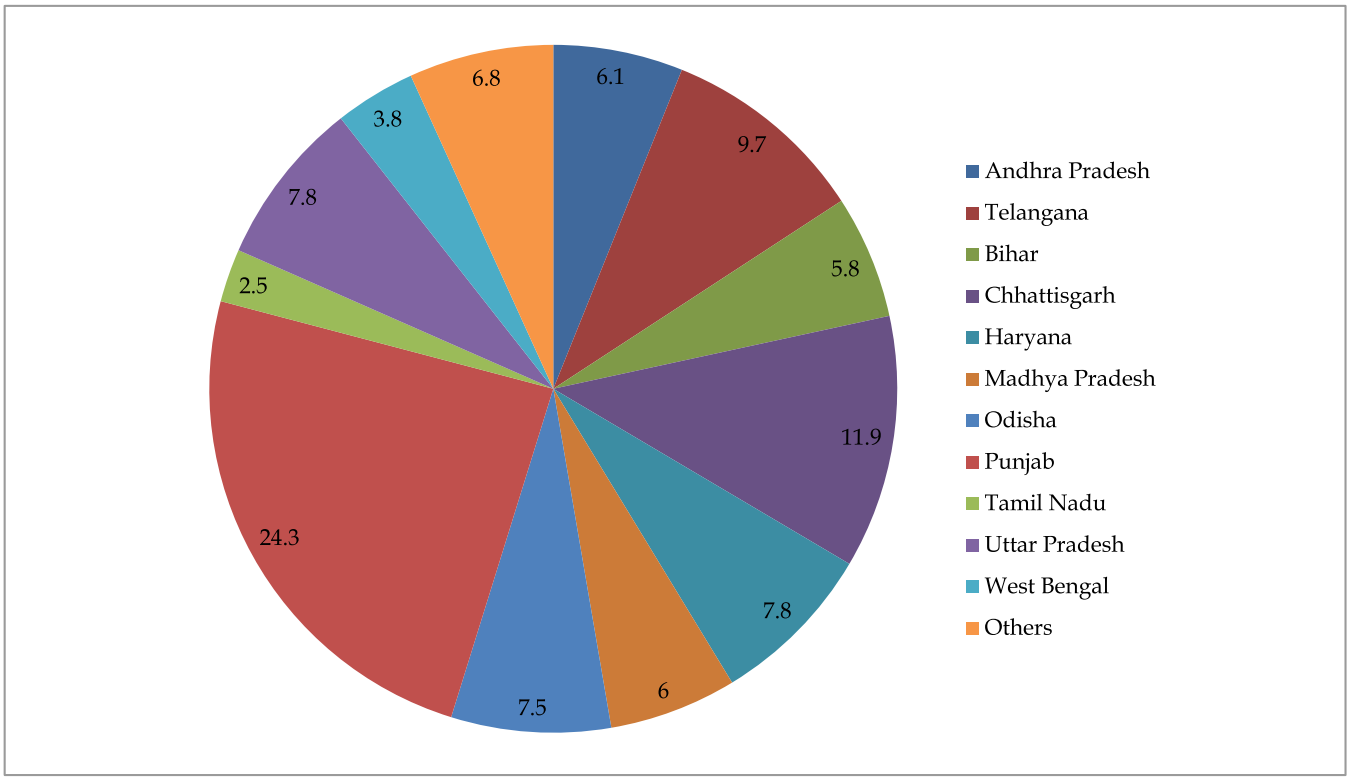
Figure 1: Procurement of Rice in major States

(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 2022-23 (up to 28.02.2023)



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

Procurement of Wheat

The total procurement of wheat during rabi marketing season 2022-23 up to 18.10.2022 was 18792 thousand metric tonnes as against 43014 thousand metric tonnes during the corresponding period of last year. The details are given in Table 2. Figure 3 depicts the comparison of procurement of wheat during the marketing season 2022-23 (up to 18.10.2022) 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

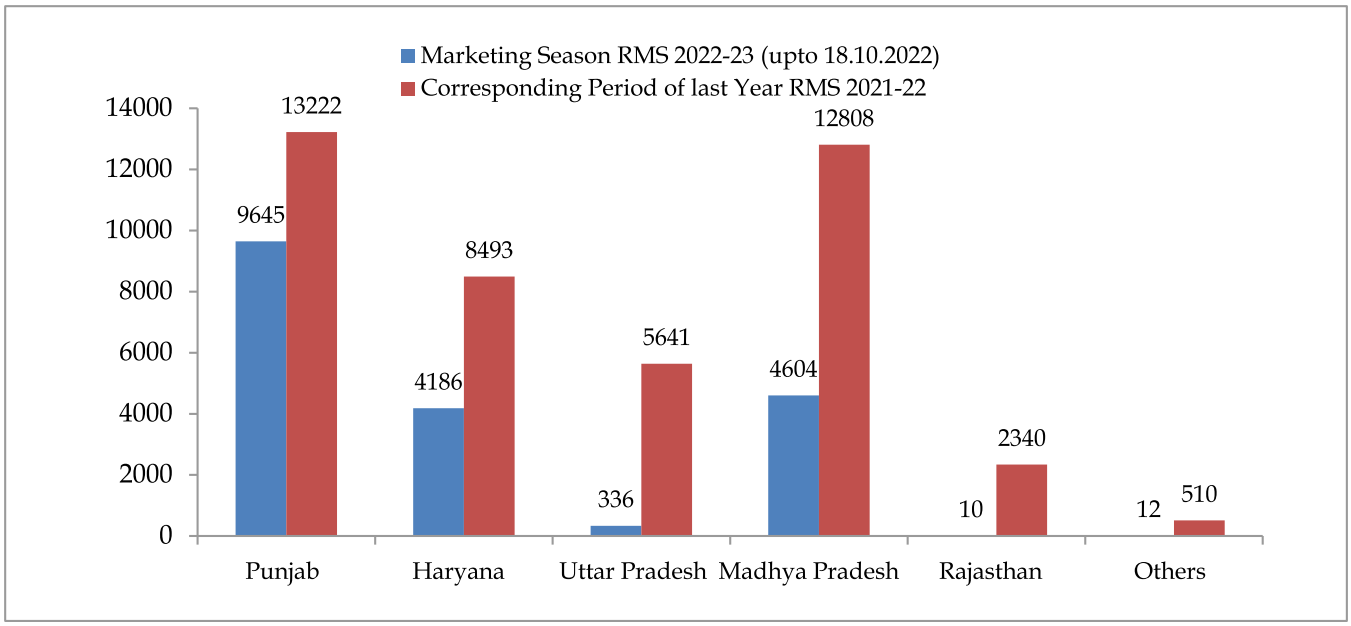
(in thousand metric tonnes)

State	Marketing Season RMS 2022-23		Corresponding period of lastyear RMS 2021-22	
	Procurement	Percentage to total	Procurement	Percentage to total
1	2	3	4	5
Punjab	9645	51.3	13222	30.7
Haryana	4186	22.3	8493	19.7
Uttar Pradesh	336	1.8	5641	13.1
Madhya Pradesh	4604	24.5	12808	29.8
Rajasthan	10	0.1	2340	5.4
Others	12	0.1	510	1.2
All-India total	18792	100.0	43014	100.0

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

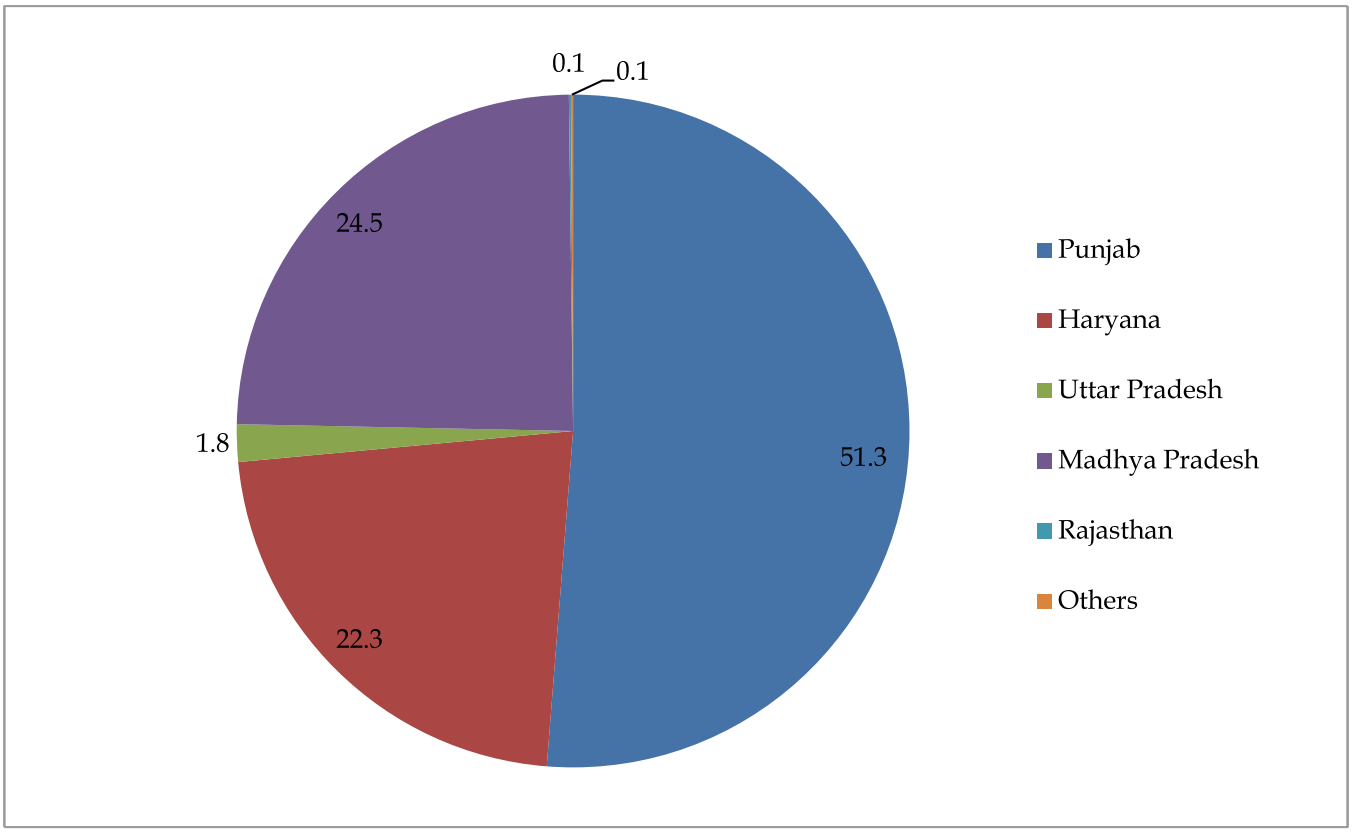
Figure 3: Procurement of Wheat in major States

(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 2022-23 (up to 18.10.2022)



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 199.5 in February, 2023 showing a decrease of 1.19 percent over the previous month and a decrease of 7.38 percent over the corresponding month of the previous year.

The WPI of all individual oilseeds showed a mixed trend. The WPI of groundnut seed (4.53 percent), cotton seed (0.88 percent), gingelly seed (sesamum) (5.07 percent) and sunflower (0.67 percent) increased over the previous month. However, the WPI of rape & mustard seed (5.25 percent), copra (coconut) (6.10 percent), niger seed (0.69 percent), safflower (5.00 percent) and soybean (1.39 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 163.5 in February, 2023 which shows a decrease of 1.92 percent over the previous month. Moreover, it decreased by 13.99 percent over the corresponding month of previous year. The WPI of groundnut oil (0.86 percent) increased over the previous month. However, the WPI of mustard oil (4.50 percent), soybean oil (4.82 percent), sunflower oil (5.33 percent), rapeseed oil (9.70 percent), copra oil (0.37 percent) and cotton seed oil (4.84 percent) decreased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 172.8 in February, 2023, showing an increase of 0.93 percent over previous month and a decrease of 10.05 percent over the corresponding month of previous year.

Potato

The WPI of potato stood at 146.2 in February, 2023, showing a decrease of 22.44 percent over the previous month. Moreover, it decreased by 14.30 percent over the corresponding month of previous year.

Onion

The WPI of onion stood at 159.7 in February, 2023, showing a decrease of 19.59 percent over the previous month and a decrease of 40.14 percent over the corresponding month of previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 191.6 in February, 2023, showing a decrease of 2.10 percent over the previous month and an increase of 12.51 percent over the corresponding month of the previous year. The WPI of black pepper decreased by 0.30 percent, chillies (dry) decreased by 5.57 percent and turmeric decreased by 1.97 percent over the previous month.

Tea

The WPI of tea stood at 161.6 in February, 2023, showing a decrease of 0.12 percent over the previous month and an increase of 10.08 percent over the corresponding month of previous year.

Coffee

The WPI of coffee stood at 154.1 in February, 2023, showing no change over the previous month. However, there is an increase of 11.42 percent over the corresponding month of previous year.

Sugarcane

The WPI of sugarcane stood at 210.1 in February, 2023, showing no change over the previous month. However, there is an increase of 5.16 percent over the corresponding month of previous year.

Raw Cotton

The WPI of raw cotton stood at 171.1 in February, 2023, showing a decrease of 0.93 percent over the previous month and a decrease of 1.27 percent over the corresponding month of previous year.

Raw Jute

The WPI of raw jute stood at 257 in February, 2023, showing a decrease of 0.12 percent over the previous month and a decrease of 11.74 percent over the corresponding month of previous year.

Wholesale Price Index of commercial crops is given in Table 3. A graphical comparison of WPI for the period of February, 2023 and January, 2023 is given in figure 5 and the comparison of WPI for February, 2023 with the corresponding month of last year is given in figure 6.

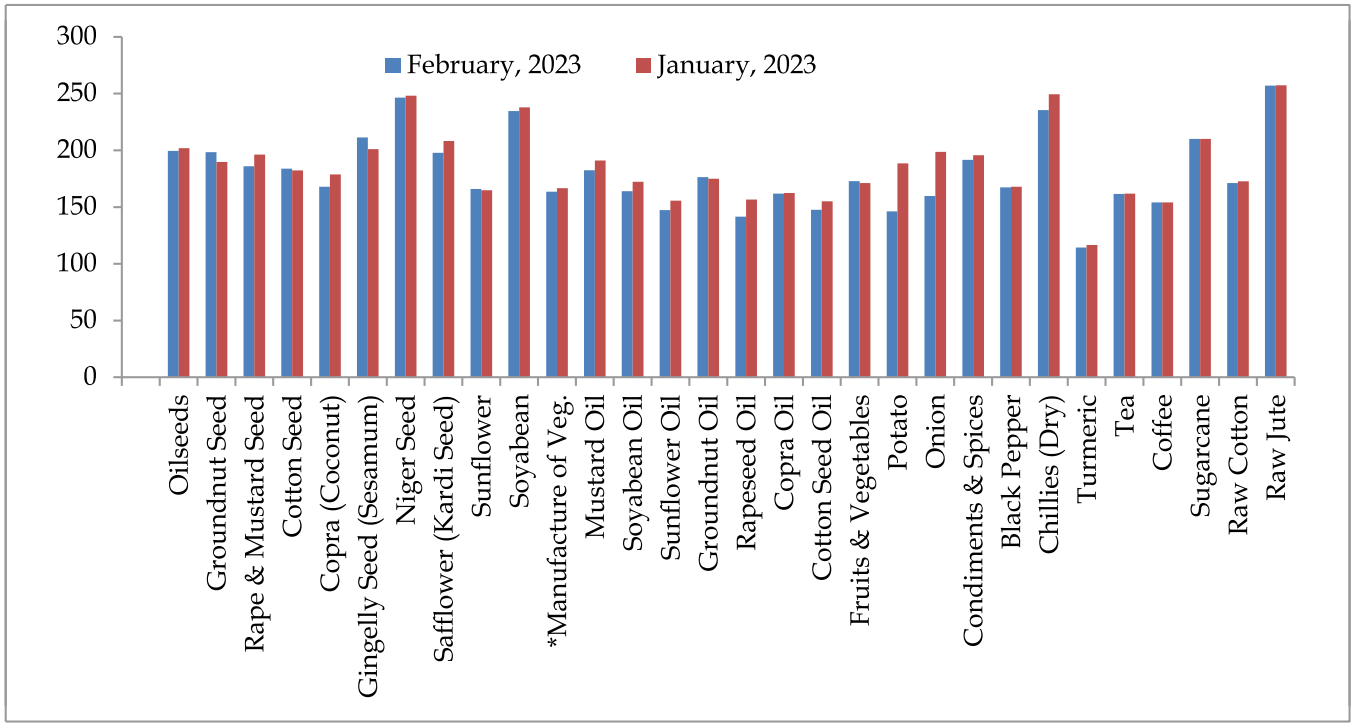
TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base Year: 2011-12)

Commodity	February, 2023	January, 2023	February, 2022	Percentage variation over the	
				Month	Year
Oilseeds	**199.5**	**201.9**	**215.4**	**-1.19**	**-7.38**
Groundnut Seed	198.3	189.7	165.7	4.53	19.67
Rape & Mustard Seed	185.9	196.2	216.6	-5.25	-14.17
Cotton Seed	183.9	182.3	193.8	0.88	-5.11
Copra (Coconut)	167.9	178.8	204.9	-6.10	-18.06
Gingelly Seed (Sesamum)	211.3	201.1	184.4	5.07	14.59
Niger Seed	246.4	248.1	256.9	-0.69	-4.09
Safflower (Kardi Seed)	197.8	208.2	209.9	-5.00	-5.76
Sunflower	165.9	164.8	182.6	0.67	-9.15
Soyabean	234.6	237.9	275.7	-1.39	-14.91
Manufacture of Vegetable and Animal Oils and Fats	**163.5**	**166.7**	**190.1**	**-1.92**	**-13.99**
Mustard Oil	182.4	191.0	223.4	-4.50	-18.35
Soyabean Oil	164.0	172.3	178.1	-4.82	-7.92
Sunflower Oil	147.3	155.6	156.4	-5.33	-5.82
Groundnut Oil	176.4	174.9	158.4	0.86	11.36
Rapeseed Oil	141.5	156.7	191.6	-9.70	-26.15
Copra Oil	161.8	162.4	189.8	-0.37	-14.75
Cotton Seed Oil	147.6	155.1	173.9	-4.84	-15.12
Fruits & Vegetables	**172.8**	**171.2**	**192.1**	**0.93**	**-10.05**
Potato	146.2	188.5	170.6	-22.44	-14.30
Onion	159.7	198.6	266.8	-19.59	-40.14
Condiments & Spices	**191.6**	**195.7**	**170.3**	**-2.10**	**12.51**
Black Pepper	167.4	167.9	166.1	-0.30	0.78
Chillies (Dry)	235.5	249.4	188.6	-5.57	24.87
Turmeric	114.3	116.6	127.2	-1.97	-10.14
Tea	161.6	161.8	146.8	-0.12	10.08
Coffee	154.1	154.1	138.3	0.00	11.42
Sugarcane	210.1	210.1	199.8	0.00	5.16
Raw Cotton	171.1	172.7	173.3	-0.93	-1.27
Raw Jute	257.0	257.3	291.2	-0.12	-11.74

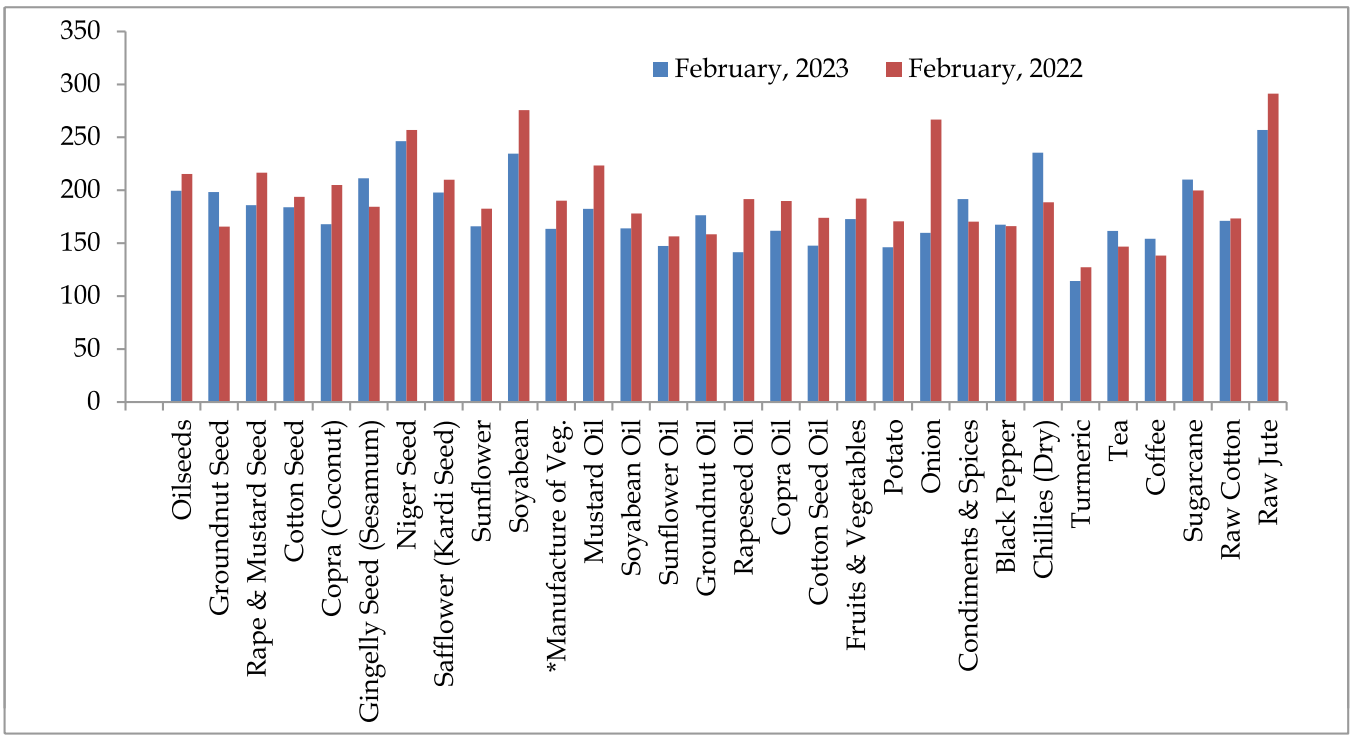
Source: Office of the Economic Adviser, DPIIT, Ministry of Commerce, Govt. of India.

Figure 5: WPI of Commercial Crops during February, 2023 and January, 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 February, 2023 and February, 2022



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

Statistical Tables

Wages

1. State-Wise Prevailing Average Daily Wages

(Value in Rs)

Sr. No.	State	Month & Year	Normal Working Hours	Field Labour								Other Agri. Labour		Tractor Driver		* Field Labour		Non-Agri. Occupation		
				Ploughing		Sowing		Weeding		Reaping & Harvesting								Carpenter	Blacksmith	Mason
				M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	M	M
1	Andhra Pradesh	Nov, 22	8	Not Required								624	343	NR		522	372	602	495	NR
2	Assam	Dec, 22	8	390	358	377	333	363	356	399	331	381	339	484	-			531	438	496
3	Bihar	Jan, 23	8	387	347	356	318	357	315	370	-	376	342	466	-			553	528	530
4	Chhattisgarh	Aug, 22	8	363	180	223	194	200	181	231	194	231	191	406	-			416	334	406
5	Goa	June, 22	8	700	400	683	405	NR	NR	NR	300	650	362	1225	-			1069	800	866
6	Gujarat	Aug, 22	8	309	NR	261	254	249	247	259	255	200	200	382	-			505	502	502
7	Haryana	Nov, 22	8	609	500	539	463	507	453	527	480	493	455	603	-			705	665	771
8	Himachal Pradesh	Sep, 22	8	491	491	343	343	339	339	339	339	339	339	535	-			529	533	533
9	Jharkhand	June,21	8	290	265	270	249	278	242	274	NR	256	238			Not Required		408	434	NR
10	Karnataka	June, 21	8	437	312	401	293	344	267	352	260	411	304	NR				545	498	NR
11	Kerala	May, 22	8	947	NR	NR	609	NR	592	744	609	731	632					986	973	986
12	Madhya Pradesh	Jan, 23	8	368	282	323	269	292	265	323	285	337	289	438	-			490	475	501
13	Maharashtra (P*)	June, 22	8	406	283	381	256	356	244	490	NR	378	244	607	-			500	450	472
14	Odisha	June, 22	8	412	373	366	324	353	307	363	NR	379	313	513	-			577	529	590
15	Punjab	Dec, 22	8	509	443	489	429	453	405	489	NR	468	407	501	-			600	591	598
16	Rajasthan	Oct, 22	8	439	314	442	314	351	316	378	328	384	274	488	-			522	471	583
17	Tamil Nadu	Jan, 23	8	793	-	635	326	662	330	709	338	655	342	865	-			797	716	864
18	Telangana	June, 22	8	Not Required								397	NR			470	312		NR	
19	Tripura	Dec, 21	8	315	NR	363	180	337	243	263	180	233	173					340	NR	NR
20	Uttar Pradesh	Nov, 22	8	339	343	324	308	319	303	331	305	323	308	NR		Not Required		543	600	573
21	Uttarakhand	Nov, 22	8	691	NR	462	412	425	390	441	403	485	428					694	NR	718
22	West Bengal	June, 22	8	417	313	324	301	315	286	343	298	314	275					465	485	NR

Source: State Governments

Note: 1 Other agricultural labour include field watering, carrying load, well diggers, cleaning silt from waterways and embankment, etc.

2. * States of Andhra Pradesh and Telangana do not give operation–wise details as they furnish data for the group"

3. P* - Provisional as the State has not furnished data for its all districts.

4. NR: Not Reported

Statistical Tables

Prices

2. WHOLESALE PRICES OF CERTAIN AGRICULTURAL COMMODITIES AND ANIMAL HUSBANDRY PRODUCTS AT SELECTED CENTRES IN INDIA

(All Prices in Rupees)

Commodity	Variety	Unit	State	Centre	Feb-23	Jan-23	Feb-22
Wheat	PBW 343	Quintal	Punjab	Amritsar	NA	NA	2230
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	2590	2780	1970
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	2281	2818	1989
Jowar	-	Quintal	Maharashtra	Mumbai	3900	4000	2900
Gram	No III	Quintal	Madhya Pradesh	Sehore	4550	4400	4480
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	2350	2500	1800
Gram Split	-	Quintal	Bihar	Patna	6500	6530	6440
Gram Split	_	Quintal	Maharashtra	Mumbai	6200	6200	6100
Arhar Split	-	Quintal	Bihar	Patna	10500	10050	9380
Arhar Split	-	Quintal	Maharashtra	Mumbai	9800	10100	8900
Arhar Split	-	Quintal	NCT of Delhi	Delhi	10400	10500	9700
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	9000	9000	8300
Gur	-	Quintal	Maharashtra	Mumbai	4600	4850	3800
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4800	4800	5000
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2970	2850	2800
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	5800	6600	6850
Mustard Seed	Black	Quintal	West Bengal	Raniganj	6500	6500	6500
Mustard Seed	-	Quintal	West Bengal	Kolkata	6100	6750	8000
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	6400	6600	7900
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	6400	6750	7850
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	3500	3400	3500
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	4100	4100	4250
Castor Seed	-	Quintal	Telangana	Hyderabad	NT	NT	NT
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	13400	12800	9500
Copra	FAQ	Quintal	Kerala	Alleppey	8550	8650	9100
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	6300	6300	7000
Groundnut	-	Quintal	Maharashtra	Mumbai	12000	12000	9700
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	2400	2470	2385
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	2025	2100	2700
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	2550	2400	2170
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2850	2500	2400
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	2425	2455	2330
Castor Oil	-	15 Kg.	Telangana	Hyderabad	2400	2625	2100
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	2600	2550	2700
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	4050	3800	3200

2. WHOLESALE PRICES OF CERTAIN AGRICULTURAL COMMODITIES AND ANIMAL HUSBANDRY PRODUCTS AT SELECTED CENTRES IN INDIA

Commodity	Variety	Unit	State	Centre	Feb-23	Jan-23	Feb-22
Coconut Oil	-	15 Kg.	Kerala	Cochin	1965	1965	2220
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2950	3225	2850
Groundnut Cake	-	Quintal	Telangana	Hyderabad	NT	NT	NT
Cotton/Kapas	NH 44	Quintal	Andhra pradesh	Nandyal	7300	8300	9550
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	8200	8000	9500
Jute Raw	W 5	Quintal	West Bengal	Kolkata	5750	5800	6650
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	5750	5800	6500
Oranges	Big	100 No	Tamil Nadu	Chennai	2200	2100	1800
Oranges	Nagpuri	100 No	West Bengal	Kolkata	850	850	750
Banana	-	100 No.	NCT of Delhi	Delhi	500	417	333
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	590	610	570
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	60000	55000	75000
Almonds	-	Quintal	Maharashtra	Mumbai	75000	75000	74000
Walnuts	-	Quintal	Maharashtra	Mumbai	80000	80000	95000
Kishmish	-	Quintal	Maharashtra	Mumbai	26000	23000	24500
Peas Green	-	Quintal	Maharashtra	Mumbai	7200	7000	8200
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	825	850	1150
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	5000	7000	2000
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1600	2000	2000
Potato	Red	Quintal	Bihar	Patna	790	920	960
Potato	Desi	Quintal	West Bengal	Kolkata	800	640	1450
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	3285	3297	3278
Onion	Pole	Quintal	Maharashtra	Nashik	600	1250	2050
Turmeric	Nadan	Quintal	Kerala	Cochin	11000	11000	11500
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	11500	11800	12500
Chillies	-	Quintal	Bihar	Patna	21600	22000	13800
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	47800	48600	49500
Ginger	Dry	Quintal	Kerala	Cochin	19000	17500	16500
Cardamom	Major	Quintal	NCT of Delhi	Delhi	57750	57750	57300
Cardamom	Small	Quintal	West Bengal	Kolkata	180000	143000	135000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	7500	7500	6000
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	61698	61698	58666
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	75000	70000	41000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	48750	48700	40600
Fish	Rohu	Quintal	NCT of Delhi	Delhi	13500	13000	13000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	66000	58000	54000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4480	5580	4430
Tea	-	Quintal	Bihar	Patna	25600	25200	26500
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	12844	12743	10792
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	44000	40000	40000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	24500	20000	22500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	9700	9650	8800
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4700	4725	4200
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13300	13200	13400
Rubber	-	Quintal	Kerala	Kottayam	12900	13300	15700
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	89000	90000	87000

Source: DPIIT, Ministry of Commerce and Industry, Govt. of India.

Crop Production

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING MARCH, 2023

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Summer Rice, Ragi (R), Sugarcane	Winter Rice, Summer Rice, Jowar (K), Maize (R), Ragi (R), Wheat, Barley, Small Millets (R), Gram, Tur (K), Other Kharif Pulses, Urad (R), Mung (R), Other Rabi Pulses, Sugarcane, Chillies (Dry), Castor seed, Linseed, Cotton, Turmeric, Onion (2nd Crop), Tapioca.
Assam	Small Millets (R), Summer Potato (Hills), Jute, Mesta	Wheat, Gram, Tur (K), Urad (R), Tobacco, Rapeseed & Mustard, Linseed, Cotton.
Bihar	Jute	Wheat, Barley, Gram, Tur (K), Winter Potato (Plain), Sugarcane, Rapeseed & Mustard, Linseed.
Gujarat	Sugarcane	Wheat, Barley, Gram, Tur (K), Winter Potato, Sugarcane, Chillies (Dry), Castor seed, Rapeseed & Mustard, Cotton, Onion.
Himachal Pradesh	Sugarcane, Cotton	Rapeseed & Mustard, Linseed.
Karnataka	Sugarcane	Winter Rice, Jower (R), Wheat, Gram, Urad (R), Mung (R), Summer Potato (Plains), Sugarcane, Linseed, Cotton, Turmeric, Cardiseed, Onion.
Kerala	Sugarcane, Sesamum (1st Crop), Tapioca (2nd Crop)	Summer Rice, Sesamum (3rd Crop), Cotton, Sweet Potato.
Madhya Pradesh	Sugarcane, Onion, Linseed	Jowar (R), Wheat, Barley, Small Millets (R), Gram, Tur, Urad (R), Mung (R), Other Rabi Pulse s, Winter Potato, Sugarcane, Chillies (Dry), Tobacco, Castor seed, Rapeseed & Mustard, Linseed, Sunn hemp, Cardiseed, Onion.
Maharashtra	Sugarcane	Jowar (R), Maize (R), Wheat, Barley, Gram, Tur (K), Other Rabi Pulses, Chillies (Dry), Tobacco, Castor seed, Rapeseed & Mustard, Linseed, Cotton, Cardiseed, Onion.
Manipur	Maize, Jute	Wheat, Gram, Castor seed, Rapeseed & Mustard, Linseed.
Orissa	Sugarcane	Bajra, Ragi, Wheat, Barley, Urad (R), Mung (R), Rapeseed & Mustard.

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING MARCH, 2023

State	Sowing	Harvesting
(1)	(2)	(3)
Punjab and Haryana	Winter Potato (Hills), Summer Potato (Hills), Sugarcane, Ginger, Chillies (Dry), Tobacco, Turmeric, Onion	Gram, Tur (K), Summer Potato, Sugarcane, Castor seed, Rapeseed & Mustard, Linseed, Turmeric.
Rajasthan	Small Millets (K), Sugarcane	Wheat, Barley, Gram, Tur (K), Urad (R), Mung (R), Other Rabi Pulses , Winter Potato (Plains), Castor seed, Rapeseed & Mustard, Linseed.
Tamil Nadu	Summer Rice, Jowar (R), Sugarcane, Groundnut (Early), Sesamum, Onion,	Winter Rice, Jowar (R), Bajra, Ragi, Small Millets (K), Tur (R), Urad (K) Mung (K), Other Rabi Pulses (Kulthi), Winter Potato, Sugarcane, Tobacco, Castor seed, Sesamum (Late), Cotton, Onion.
Tripura	Autumn Rice, Sugarcane, Sesamum, Cotton, Jute	Summer Rice, Urad (R), Mung (R), Other Rabi Pulses, Winter Potato (Plains), Sugarcane, Chillies (Dry), Rapeseed & Mustard.
Uttar Pradesh	Small Millets (R), Sugarcane, Ginger, Jute, Mesta, Tapioca	Wheat, Barley, Small Millets (R), Gram, Tur (K), Winter Potato (Hills), Ginger, Tobacco, Castor seed, Rapeseed & Mustard, Linseeed, Sweet Potato, Onion, Chillies (Dry).
West Bengal	Autumn Rice, Sugarcane, Ginger, Sesamum, Jute	Wheat, Barley, Gram, Tur (k), Ur ad (R), Other Rabi Pulses, Winter Potato (Plains), Sugarcane, Ginger, Tobacco, Sesamum, Rapeseed & Mustard , Chillies (Dry).
Delhi	Sugarcane, Tobacco, Jute	Barley, Gram, Sugarcane, Tobacco.

(K)- Kharif (R)- Rabi

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Note to Contributors

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N.A. –	Not Available.
N.Q. –	Not Quoted.
N.T. –	No Transactions.
N.S. –	No Supply/No Stock.
R. –	Revised.
M.C. –	Market Closed.
N.R. –	Not Reported.
Neg. –	Negligible.
Kg. –	Kilogram.
Q. –	Quintal.
(P) –	Provisional.

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