AGRICULTURAL SITUATION IN INDIA

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Editorial Desk

The March issue of "Agricultural Situation in India" focuses on farm sector news, shares data on agricultural production and procurement of foodgrains, price indices, inflation rates, etc. This issue also includes two research articles, one on "Economic Analysis of Organic Chickpea Production at Organic Farming Research and Training Center, MPKV, Rahuri" and second on "Price Deviation and its Impact on Major Kharif Crops in Maharashtra". In addition to this, an Agro-Economic Research study titled "Estimating and Bridging the Yield Gaps in Oilseeds for Atma Nirbhar Bharat" conducted by the Agricultural Economics Research Centre, Delhi under the Agro-Economic Research scheme of Economics, Statistics and Evaluation Division, DA&FW is part of this edition.

The major farm sector news covered are on events like Indian Seed Congress of National Seed Association; Bamboo Exhibition at the National Workshop of Bamboo Sector Development; Global Millets (Shree Anna) Conference; 2nd Agriculture Deputies Meeting. Other covered news inter-alia; include Cabinet approval for MSP for raw jute for 2023-24 season, approval for setting up of three Centers of Excellence for Horticultural crops under MIDH and launch of DigiClaim module.

The annual rate of inflation based on all-India WPI has decreased from 14.63 percent in March, 2022 to 1.34 percent (provisional) in the month of March, 2023. The annual food inflation rate increased by 2.32 percent in the month March, 2023 (provisional) over March, 2022, whereas on month-on-month basis, the food inflation rate increased by 0.47 percent in March, 2023 over February, 2023, provisionally. The cumulative pre-monsoon season rainfall in the country during the period 1st March, 2023 to 29th March, 2023 has been 26 percent higher than the long period average (LPA). Current live storage in 146 major water reservoirs in the country is 76.06 BCM, as against the average storage of last 10 years, 64.53 BCM.

The article on "Economic Analysis of Organic Chickpea Production at Organic Farming Research and Training Center, MPKV, Rahuri" attempts to estimate the resource use, costs incurred and returns generated in cultivation of organic chickpea at the selected center in the state of Maharashtra. The study finds neem oil (biopesticide) cost, and expenses on use of machine power, seed, manure, hired human labour and plant protection as the major contributors to the input cost in the production of organic chickpea. The benefit cost ratio greater than one indicates the profitability in organic chickpea cultivation, while the lack of funds, unestablished markets, absence of MSP mechanism for organic produce are some of the constraints faced by the organic growers. The paper suggests standardization of package of practices for organic chickpea cultivation, transparency in the issue of organic certificate and branding of organic produce as some of the ways in which organic cultivators may be encouraged and supported.

The article on "Price Deviation and its Impact on Major Kharif Crops in Maharashtra" aims to estimate the support prices, farm harvest prices and wholesale prices of selected crops such as soybean, tur, jowar and paddy; the gap in these prices & the impact of these prices on area, production and productivity of the selected crops. The study finds that the rate of growth of support price is higher than that of wholesale price for all the crops under study and higher than growth rate of farm harvest price for majority of the crops. The impact of support prices, farm harvest prices and wholesale prices on area of kharif paddy and production and productivity of soybean crop is found to be very small.

The Agro-Economic Research study on "Estimating and Bridging the Yield Gaps in Oilseeds for Atma Nirbhar Bharat" attempts to analyse the yield variations in major oilseeds crops across India and identify the major factors which are affecting the oilseeds yield. The study finds India to be a major oilseed producer and also among the consumer of edible oils, however the yield is found to be very low as compared to most of the producer countries. Even the states and districts with high yield area share are witnessing low yield. The yield is found to be stagnated for major oilseed areas across different regions and states of India. Also there are high gaps in the yield when compared between the farmer's plot and demonstration stage. The study points out less exposure to formal and technical education, limited resources, small land holding of farmers as some of the factors which are affecting oilseed yield. The study recommends focussing on regions with high oilseed area and high yield gaps and ensuring timely supply of inputs, increasing irrigation coverage, promoting high yielding varieties and understanding region specific factors to help increase oilseed area and yield.

Promodita Sathish

Farm Sector News

Meetings and Events

Crop prospects assessed by the DA&FW Monitoring Committee

A meeting of the Committee constituted by the Department of Agriculture & Farmers' Welfare (DA&FW) to monitor the situation of wheat crop was held on 2nd March, 2023 at ICAR- Indian Institute of Wheat and Barley Research, Karnal. Experts from IMD, ICAR, State Agricultural Universities (SAUs), major wheat growing states and the senior state government officials attended the meeting along with the officials from DA&FW. The condition of wheat crop was presented and discussed in detail by the states of Punjab, Haryana, Uttar Pradesh, Rajasthan and Madhya Pradesh, which account for more than 85% of wheat acreage. The Committee assessed that as on date, the wheat crop condition is normal in all major wheat growing states. Also, about 75% area is under early and timely sowing conditions in Haryana and Punjab and therefore, the crop area with early sowing, will not be affected by heat conditions in the month of March. It was also decided that all extension agencies from Central and State Governments along with ICAR/ SAUs should visit the farmers' fields regularly and provide timely advisories to the farmers, wherever heat stress conditions occur.

Indian Seed Congress of National Seed Association

In a two-day Indian Seed Congress organized by the National Seed Association of India in New Delhi on 4th March, 2023, the Hon'ble Union Agriculture and Farmers Welfare Minister, Shri Narendra Singh Tomar said that to ensure the availability of good quality seeds to our farmers, the Government will soon launch the Seed Traceability System which will curb the pilferage in the seed trade sector. He informed that suggestions have been taken from the concerned parties on the Seed Traceability System. Farmers will benefit with its launch, as well as it will help the people doing good work in the seeds sector and ensure that the seed sector works properly.

Shri Tomar said that India is in the leading position in Agriculture. But in some areas like oilseeds and cotton we are yet to be self-sufficient. Therefore, the stakeholders of the seeds sector should also contribute to make the country AatmaNirbhar by reducing imports. In this direction, the seeds industry need to prepare a roadmap and implement it. The Union Minister said that India has taken rapid steps through 'Make in India', while the PM Gati Shakti program is going to strengthen the foundation of a developed India in the coming times. It is the responsibility of all of us who are working in the field of agriculture to be ready to meet the expected needs of the country and the world, keeping in mind the increasing population by the year 2050, as well as facing the challenges of climate change and bringing the country to the leading position while solving problems. This should also be included in our roadmap. Shri Tomar also appreciated the contribution of scientists of all the institutes affiliated to the Indian Council of Agricultural Research (ICAR) in developing climate friendly and biofortified varieties as well as other superior varieties of seeds. On this occasion, Shri Tomar unveiled the 'Seeds for Global Unity' Wall.

Bamboo Exhibition at the National Workshop of Bamboo Sector Development

Additional Secretary, Ministry of Agriculture and Farmers Welfare, Dr. Abhilaksh Likhi inaugurated the Bamboo Exhibition at the National Workshop on Bamboo Sector Development in New Delhi on 9th March, 2023. The Additional Secretary, along with Joint Secretary (Horticulture), Shri Priya Ranjan and Horticulture Commissioner, Dr. Prabhat Kumar visited all 58 stalls at the event and interacted with State Bamboo Mission officials, State Department officials, artisans, bamboo experts and entrepreneurs.

The exhibition saw participation from State Bamboo Missions including Tripura, Telangana, Madhya Pradesh, Arunachal Pradesh, Manipur,

Uttarakhand, Uttar Pradesh, Meghalaya, Himachal Pradesh and Sikkim. Institutes like Bamboo and Cane Development Institute, Phoenix Foundation, Northeast Cane and Bamboo Development Council, Foundation of MSME Clusters along with startups and new age companies like Epitome (Mutha Industries), BioCraftBiomize, Bamboo India, ESES Biowealth Pvt Limited, Corner Art Store and organizations like Maharashtra Bamboo Board, Handicraft Sectorial Council and Bamboo FPOs under NAFED also participated in the event.

National Bamboo Mission (NBM) conducted "The National Workshop of Bamboo Sector Development" in New Delhi on 10th March 2023 which was inaugurated by Dr. Likhi. The inaugural session was graced by the Ambassador of Myanmar, Mr. Moe Kyaw Aung, Ambassador Serbia, Mr. Sinisa Pavic, Ms. Nita Pokhrel Aryal, Minister Economics, Nepal & Dr Prabhat Kumar, Horticulture Commissioner, Department of Agriculture & Farmers Welfare. The inaugural session witnessed the launch of bamboo information website (https://www.bambooinfo.in/default.asp) by Bamboo Technical Support Group South Zone, Kerala Forest Research Institute (BTSG-KFRI). This is an exclusive website for bamboo information including bamboo species, cultivation, activities of BTSG-KFRI, and a database of artisans, researchers, farmers, plantations and nurseries. This was followed by the launch of a book "Different Eco-friendly Bamboo Products and Business Opportunities" authored by the Foundation for MSME clusters and a short film by NBM showcasing the scope of the Indian Bamboo Sector. To elaborate further on the discussion, 5 technical sessions were conducted which included presentations from experts in the bamboo industry as well as interactive discussions with the delegates.

Global Millets (Shree Anna) Conference

The Hon'ble Prime Minister, Shri Narendra Modi inaugurated the 'Global Millets (Shree Anna) Conference' in New Delhi on 17th March, 2023. During the inaugural ceremony, Prime Minister unveiled a Commemorative Stamp and Coin on IYM 2023. He digitally launched a Book on Millets (Shree Anna) Standards. The Prime Minister also declared ICAR-Indian Institute of Millets Research as a Global Centre for Excellence.

Video messages from the Heads of State of Ethiopia and Guyana were played during the inaugural ceremony. In the message from Guyana, Dr Irfaan Ali offered 200 acres of land in his country for exclusive production of millets in honour of the United Nations declaring the year 2023 as the International Year of Millet (IYOM). He said that India in exchange will provide technology and technical support for enhancing the farm production and productivity of this wonder food. In another video address, the President of Ethiopia, Ms Sahle-Work Zewde said that the Global Conference on Millets will galvanize the Governments of the world and the policy makers for promotion and production of miracle millets. Ms Sahle-Work Zewde said that millets will only address the food security challenges of Sub-Saharan country like Ethiopia but also the entire African Continent and the world. She said that the ideas from this Conference will also help shape the Sustainable Development Goals of 2030.

Union Agriculture Minister, Shri Narendra Singh Tomar in his address said the International Year of Millets (IYM) – 2023 will provide an opportunity to increase global production, efficient processing and better use of crop rotation and promote millets as a major component of the food basket.

Ministerial Round Table of Millets was held post-inaugural session of the Global Millets (Shree Anna) Conference on 18th March, 2023. Ministers from Guyana, Mauritius, Sri Lanka, Sudan, Suriname & Zambia; Permanent Secretary, Agriculture of Gambia & Maldives and Director General, Millets Initiative, Nigeria participated in the meeting. In his opening remarks at the Ministerial Round Table, Shri Narendra Singh Tomar highlighted India's role in Shree Anna promotion, being the largest producer and second largest exporter of millets in the world. During last 5

years, India produced millets in the range of 13.71 to 18.02 million tonnes. In order to promote millets and meet the additional demand of millets, the Department of Agriculture and Farmers Welfare (DA&FW) is implementing a Sub-Mission on Nutri-Cereals (Millets) under National Food Security Mission (NFSM) in 212 districts of 14 States since 2018-19. India exported 1,04,146 metric tonnes of millets during the export year 2022-23 (April to November) worth Rs. 365.85 crore. This export is bound to increase post-IYM celebration.

The visiting ministers from major millets producing countries shared the experience of their respective countries in promoting production, consumption and branding of millets. All leaders appreciated the lead role of India in bringing millets to world food table and looked forward to India for technological support. They all favoured closer linkage among major millets producing countries. All countries desired that India should provide good seed of improved varieties of millets, help in establishing small scale mechanization and capacity building. All Ministers supported promotion of indigenous millet crops in their countries to free people from wheat addiction. They suggested that millets should be declared priority crops and set agenda in all the international meetings. Some countries like Guyana which are not traditional millets growing have shifted to millets cultivation due to awareness created by International Year of Millets. India assured these countries to provide all knowledge, technology and capacity building.

'AgLive 2023 – The Millet Challenge,' aimed at making an impact by increasing interaction amongst millet-based innovators/entrepreneurs, investors and other stakeholders was also held as part of the Global Shree Anna Conference. Young entrepreneurs and innovators pitched their millet based innovative products and technologies before a distinguished jury, comprising of business leaders, incubators and investors to mobilize funding and secure potential incubation opportunities.

During the global conference, a MoU between World Food Programme (WFP) of the United Nations and the Government of India for cooperation between 2023-2027 was signed in the presence of Agriculture Minister Shri Tomar. The MoU will be jointly implemented by the Department of Food and Public Distribution, Ministry of Agriculture and Farmers Welfare, Ministry of Women and Child Development, Ministry of Rural Development and the Ministry of Environment, Forest & Climate Change. Shri Tomar lauded the work of WFP in promoting food self-sufficiency and supporting governmental and global efforts to ensure long-term solutions to the challenge of hunger.

2nd Agriculture Deputies Meeting

The 2nd Agriculture Deputies Meeting (ADM) of Agriculture Working Group (AWG) under India's G20 Presidency was organized on 29th March, 2023 at Chandigarh. The day was dedicated to the Rapid Response Forum (RRF) of Agricultural Market Information System (AMIS) and started with a welcome remark by Shri Arun Kumar, Senior Economic and Statistical Adviser, Government of India. Shri Kumar spoke about the timely evidence-based policy making as the need of the hour to address the concern of high food prices. In his opening remarks, Dr. Abhilaksh Likhi, Additional Secretary, MoA&FW mentioned that the main objective of G20 is to build consensus on current challenge of food security and nutrition, sustainable agriculture with a climate smart approach, inclusive agricultural value chains and food systems, and digitalization for agricultural transformation. Dr. Likhi further emphasized PM Modi's vision of Mission LiFE through which everyone can contribute in the fight against climate change.

The RRF was chaired by Mr. Seth Meyer, Chairperson, AMIS wherein he spoke about the current situation on global food security and contribution of AMIS on the same. Dr. Pramod Kumar Meherda, Additional Secretary, MoA&FW giving examples from India, spoke on the need for digital public infrastructure

architecture that is standardized and non-proprietary. This would help AMIS in obtaining credible and real time information on production estimates, supplies and consumption for countries to respond quickly to shocks and volatility in food markets. Sessions of AMIS on 'Food Market Situation and Outlook', which was based on providing the current situation on global food markets and an outlook for 2023; and session on the status and development of AMIS highlighting their notable achievements in 2022 and any new developments for 2023 were conducted. Third session was focused on the vision for the future evolution of the AMIS initiative and fourth session was based on identifying capacity building needs and strategies. Fifth session was centered around Asia's role in regional and global food security and the sixth session discussion was on the impact of financial factors on importing countries.

On the final day, two consecutive sessions focused on drafting the Communiqué by the member countries of G20 and was marked by elaborate discussions. Delegates from other invited countries and international organizations also put forth their viewpoints during the session and contributed towards an inclusive discussion on the Communiqué drafting exercise.

Secretary, DA&FW, Shri Manoj Ahuja addressed the press briefing and said that he hopes discussion on the Draft Communiqué and the deliberations will pave way for agreement on focus areas, which include food security and nutrition, climate smart agriculture, inclusive agriculture value chains and food systems and digitalization for agricultural transformation, keeping the spirit of 'One Earth, One Family and One Future'.

Cabinet Decisions and Announcements

Cabinet approves Minimum Support Price (MSP) for Raw Jute for 2023-24 season

The Cabinet Committee on Economic Affairs, chaired by the Hon'ble Prime Minister, Shri Narendra Modi gave its approval for the Minimum Support Price (MSP) for Raw Jute for 2023-24 season. The approval is based on recommendations of the Commission for Agricultural Costs and Prices (CACP).

The MSP of raw jute (TD-3 equivalent to earlier TD-5 grade) has been fixed at Rs. 5050/- per quintal for 2023-24 season. This would ensure a return of 63.20 percent over the all-India weighted average cost of production. The announced MSP of raw jute for 2023-24 season is in line with the principle of fixing the MSP at a level of at least 1.5 times of all-India weighted average cost of production as announced by the Government in the Budget 2018-19. The Jute Corporation of India (JCI) will continue as Central Government nodal agency to undertake price support operations and the losses incurred, if any, in such operations, will be fully reimbursed by the Central Government.

General Agricultural Sector News

Promotion of Nano Fertilisers

Secretary, Department of Agriculture & Farmers Welfare & Secretary, Department of Fertiliser co-chaired a meeting on 01st March, 2023 with representatives of ICAR and State Governments. The efforts of Government of India to promote integrated nutrient management for improving soil health and increased productivity were highlighted and the States were advised to promote judicious mix of chemical, organic & bio fertilisers and other innovative fertilisers based on the recommendation of soil health card. States were advised to encourage the use of nano fertilizer and other innovative fertilisers such as Sulphur coated Urea, Triple Super Phosphate (TSP), Potash Derived from Molasses (PDM), Bio-fertilizers, etc. ADG, ICAR emphasized that the nano-fertilizers have shown promise for application in plant nourishment because of the size-dependent qualities, high surface-volume ratio, and unique optical properties. ICAR has conducted bio-efficacy trials in respect of nano-fertilisers in a number of crops at multi locations with different doses and is in the process of preparing

Package of Practice for application of nano urea which would help farmers to make a shift to these fertilisers. Some States also informed that farmers have got good results in terms of yield and quality with the application of nano-fertilisers and were making efforts for integrated nutrient management and use of nano urea.

Millets Giveaway

Millets Giveaway is a special marketing campaign being undertaken by Small Farmers' Agri-Business Consortium (SFAC), a Society promoted by Ministry of Agriculture and Farmers Welfare, Govt. of India. Under the campaign, SFAC aims to promote buying directly from FPO (Farmer Producer Organisation) farmers with the aim of supporting small & marginal farmers of the country.

Dr. Maninder Kaur Dwivedi, Managing Director, SFAC, Ministry of Agriculture and Farmers Welfare said that citizens are being encouraged to buy directly from FPOs selling millets via ONDC's My Store, the connected marketplace built in India for Indian sellers. The Giveaway campaign supports three main areas –

- Motivates general public to buy directly from FPO farmers. The buyers get pure and authentic produce and with their purchase, they support livelihoods of the small & marginal farmers.
- Buyers get to experience how easy it is to use the ONDC's My Store platform.
- Millets being the focus for the year with #IYM2023, this campaign motivates more people to adopt #Shree Anna

Three Centers of Excellence for horticultural crops approved under MIDH

Mission for Integrated Development of Horticulture (MIDH), Ministry of Agriculture & Farmers Welfare has approved 3 more CoEs (49 in total).

(I) CoE for Kamlam (dragon fruit) by Indian Institute of Horticultural Research (IIHR), Bengaluru, Karnataka at Experimental station, Hirehalli, Bengaluru, Karnataka. The vision of this Centre is to develop latest production technology as per the international standard & off-season production and demonstration of these technologies for high yield production. The Centre will aim to achieve self-sustenance in Kamlam fruit production, value addition and enhancing economic development of the farming community.

The Centre will focus to develop high performance variety with improved yield, nutrient use efficiency, nutritional quality, tolerance against biotic & abiotic stresses, standardization of propagation techniques, distribution of quality planting material through public participatory approach, development of protocol for post-harvesting handling and storage to reduce post-harvest losses and promote export to distant markets, development of value-added products and processes for product diversification & higher revenue realization, dissemination of developed technologies to the farmers & other stakeholders through training, field visits, etc.

(ii) CoE for Mango and Vegetables under Indo-Israel Action Plan at Panikoili, Jajpur district, Odisha. The vision of Centre is to generate knowledge in nursery management, cultivation practices, production of high quality & large quantity of planting material of mango and vegetable crops. The Centre will also focus on demonstration of new varieties, Israeli Agro technology in irrigation, fertigation & plant protection technologies along with precision agriculture and post-harvest management technology. The Centre will prepare a training model based on the focused areas such as irrigation, fertigation, nursery, canopy & value chain for the benefit of farmers.

(iii) CoE for Vegetables and Flowers under Indo-Israel Action Plan at Govt. Agricultural Farm, Codar, Khandepar, Ponda, South Goa, Goa. The Centre will focus on demonstration of hi-tech nursery management system with advanced production technology through automated irrigation and fertigation system for production of disease-free and healthy vegetable

seedlings of improved varieties of vegetables and flowers suitable for Goa. The Centre will also strengthen infrastructure for promotion of pre & post-harvest management of quality produce and develop protocols/guidelines tailored to the local conditions in the CoE & farmer's field as well.

Simplified process for filing and approval of applications under subsidy schemes

The National Horticulture Board (NHB) under the Ministry of Agriculture and Farmers Welfare operates back-ended capital investment subsidy schemes for promotion of commercial horticulture and cold chain infrastructure in the country. Under these schemes, subsidy from 35 to 50 percent is provided for various components as per prescribed cost norms.

Considering the demand of farming community to simplify the documentation and sanctioning process under the schemes of NHB, the matter has been reviewed by Ministry of Agriculture and Farmers Welfare and based on the recommendations of a duly constituted committee, the scheme design, documentation and sanctioning process has been simplified.

The new scheme design would be effective from 15.03.2023. The salient features of the simplified scheme design are as under:-

i. NHB has now done away with two stage system of In-Principle Approval (IPA) and Grant of Clearance (GoC). IPA will not be needed now and applicant will apply straightaway for Grant of Clearance to NHB after sanction of term loan by bank. The term loan sanctioned within 3 months from the date of online application to NHB shall be treated valid.

ii. IPA system has been replaced with Letter of Comfort (LoC) to the desirous applicants to facilitate them to get the term loan sanctioned from the banks/Fls for their proposed project. However, LoC is not mandatory unlike IPA and it will be issued to only those who so desire as a facility letter to get his/her term loan sanctioned from the banks/Fls for the proposed project.

iii. Minimum documents are now required for seeking LoC/GoC.

iv. The processing of LoC/GoC application will be completely digital, including examination and sanction of applications. The platform has been augmented with the timeline monitoring systems, so that every step can be monitored as per the pre-set target timelines and alerts can be sent to the processing officer/applicant at regular intervals and escalation matrix has been put in place based on ageing analysis of pendency at officer level.

v. Applicant will be free to apply for LoC/GoC either at AIF or NHB portal. In case loan is sanctioned under AIF, the entire data will be captured as such from AIF portal through API and additional minimum required details, if any, would be filled by the applicant online and saved at NHB portal.

vi. NHB will follow short templates for DPR and bank appraisal note as prepared by NHB after taking into account the template available on AIF. After application is submitted, automatically an email will be sent to the applicant along with a reply/confirmation link to the financing bank. Concerned bank needs to confirm the authenticity of documents online. Based on the confirmation of documents by the bank, NHB will issue GoC.

vii. The stage of inspection of the location for GoC has been replaced with a mobile app based self-inspection. Queries on GoC applications, if any, will be communicated to the applicant/bank automatically by system/email. Subsidy claim

documents will also be submitted by bank/ applicant online.

The new system will cut down the present time for sanction of GoC from 6-8 months to less than 100 days.

DigiClaim launched

Hon'ble Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar launched National Crop Insurance Portal's digitized claim settlement module, namely *DigiClaim* under the ambit of Pradhan Mantri Fasal Bima Yojana (PMFBY) on 23rd March, 2023 at Krishi Bhawan, New Delhi. With the launch of the module, claims will be disbursed electronically which will benefit the respective farmers of six states. Now, the automated claim settlement process will be an ongoing activity to ease all insured farmers' lives and provide them with a sustainable financial flow and support. With this, now farmers' claims will be processed directly to their respective bank accounts in a transparent and accountable manner. This technology has been enabled through the integration of National Crop Insurance Portal (NCIP) and Public Finance Management System (PFMS). This would directly impact the claim reversal ratio, which is expected to go down with DigiClaim. Another noteworthy feature of this digital advancement is that farmers would be able to track the claim settlement process on their mobile phones in real-time and avail the scheme's benefits.

With the launch of a DigiClaim Module, insurance claims totaling Rs. 1260.35 crore were disbursed on March 23, 2023 to insured farmers in the states of Rajasthan, Uttar Pradesh, Himachal Pradesh, Chhattisgarh, Uttarakhand and Haryana with the click of a button, and the process will continue as and when the claims are released. The Union Minister took special note of 'Meri Policy, Mere Haath' ongoing campaign and observed that the campaign has been monumental in enhancing the awareness around PMFBY at the grassroot levels.

General Survey of Agriculture

Trend in Food Prices

The rate of inflation, based on all-India WPI, stood at 1.34% (Provisional) for the month of March, 2023 as compared to 14.63% 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 have increased from 171.3 in February, 2023 to 172.1 in March, 2023. The rate of inflation based on WPI Food Index decreased from 2.76% in February, 2023 to 2.32% in March, 2023.

Based on Wholesale Price Index (WPI) (2011-12=100), the WPI of pulses, cereals and fruits increased by 3.03 percent, 9.48 percent and 4.89 percent, respectively, and for vegetables, it decreased by 2.22% in March, 2023 over corresponding period of last year. Whereas, On month-on-month basis, the WPI for cereals, vegetables, pulses and fruits increased by 1.87 percent, 5.45 percent, 1.35 percent and 3.78 percent, respectively, in March, 2023 over February, 2023.

Among cereals, the WPI based rate of inflation for wheat and paddy increased by 9.16 percent and 7.54 percent, respectively, in March, 2023 over March, 2022 while on month-on-month basis, the WPI for paddy and wheat decreased by 0.11 percent and 4.98 percent, respectively, in March, 2023 over February, 2023.

Rainfall and Reservoir Situation, Water Storage in Major Reservoirs

Cumulative Pre-Monsoon Season, 2023 rainfall for the country as a whole during the period 1st March, 2023 to 29th March, 2023 has been 26% higher than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been higher than LPA by 202% in Central India, by 113% in South Peninsula, by 18% in East & North East India but lower than LPA by 18% in North-West India.

Out of 36 meteorological sub-divisions, 24 meteorological sub-divisions received large excess/ excess rainfall, 05 meteorological sub-divisions received normal rainfall, 07 meteorological sub-divisions received deficient/large deficient rainfall and 03 meteorological sub-divisions received no rainfall.

Current live storage in 146 reservoirs (as on 31st March, 2023) monitored by Central Water Commission having Total Live Capacity of 178.19 BCM was 76.06 BCM as against 81.19 BCM on 31.03.2022 (last year) and 64.53 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

Economic Analysis of Organic Chickpea Production at Organic Farming Research and Training Center, MPKV, Rahuri

C.M.GULAVE[1], KAMBLE B.T.[2] AND DORGE J.T.[3]

Abstract

In India, organic farmers use an array of cultural and biological practices to build soil health, manage weeds and pests, and increase biodiversity. As per the available statistics, India ranks 8th in terms of world's organic agricultural land and 1st in terms of total number of producers. Total area under organic certification process registered under National Programme for Organic Production (NPOP) is 43.39 million ha (2020-21). The economic analysis of organic chickpea was carried out by simple tabular method. The maximum per hectare cost involved was in the use of Heliokill followed by neem oil. The per hectare cost of cultivation i.e. cost 'C' worked out to Rs. 85182.67 and Rs. 92958.31 for the year 2019-20 and 2020-21 for organic cultivation chickpea, respectively. Machine power, seed, manure, hired human labour and plant protection were major items contributing to the total cost for the production of organic chickpea. The major constraints in production and marketing of organic chickpea were lack of funds and markets not being well established.

Keywords: *Cost of cultivation, organic farming, organic chickpea.*

1. Introduction

Organic farming starts with the soil. Organic agricultural practices maintain, replenish and balance soil fertility to produce healthy and better quality crops. Organic farmers use an array of cultural and biological practices to build soil health, manage weeds and pests, and increase biodiversity. As per FAO, "Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health including biodiversity, biological cycles and soil biological activity. It emphasises the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system."

India is bestowed with a lot of potential to produce all varieties of organic products due to its various agro-climatic conditions. In several parts of the country, the inherited tradition of organic farming is an added advantage. This holds promise for the organic producers to tap the market which is growing steadily in the domestic and export sector. As per the available statistics, India ranks 8th in terms of world's organic agricultural land and 1st in terms of total number of producers (FIBL & IFOAM Year Book, 2020).

Total area under organic certification process registered under National Programme for Organic Production (NPOP) is 43.39 million ha (2020-21). This includes 26.57 million ha cultivable area and another 16.82 million ha for wild harvest collection. Among all the states, Madhya Pradesh has covered largest area under organic certification followed by Rajasthan, Maharashtra, Chhattisgarh, Himachal Pradesh, Jammu & Kashmir and Karnataka. During 2016, Sikkim achieved a remarkable distinction of converting its entire cultivable land (more than 75000 ha) under

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organic certification (www.apeda.gov.in).

With the increase in population, our compulsion would be not only to stabilize agricultural production but to increase it further in sustainable manner. The scientists have realized that the 'Green Revolution' with high input use has reached a plateau and is now sustained with diminishing return of falling dividends. Thus, a natural balance needs to be maintained at all cost for existence of life and property. The obvious choice for that would be more relevant in the present era, when these agrochemicals, which are produced from fossil fuel and are not renewable, are diminishing in availability. It may also cost heavily on our foreign exchange in future.

Organic farming consists of differenet components *viz*., manures, green leaf manuring, crop rotation, biological management, animal husbandary, biofertilizers and vermicompost.

The Organic Farming Research and Training Center, MPKV, Rahuri was started 2018 but the actual cultivation of organic crops started in the year 2019-20 on operational holding of 16 ha and duly certified from Karnatka State Organic Certification Agency (KSOCA), Benguluru (Karnatka). The OFRTC farm is divided into 11 plots. OFRTC has a diversified cropping pattern which includes kharif, rabi, summer crops and fruit crops, namely custard apple, guava and mango. Soybean-chickpea, soybean-wheat and soybean-onion are major cropping sequences. OFRTC, Rahuri has collection of about 208 germplasm.

1.1 Objectives of the study

The present study was undertaken to analyze the cost and return structure of organic chickpea production with the following specific objectives.

1. To examine the nature and use of organic inputs for organic chickpea production.
2. To estimate the resource use levels, costs and returns structure of organic chickpea production.
3. To examine resource use pattern of for organic chickpea production.
4. To study the constraints in production and marketing of organic chickpea production.

2. Data sources and methodology

2.1 Sampling

2.1.1 Study area: The Organic Farming Research and Training Center has been selected for the study which was established in the year 2018-19 at MPKV, Rahuri.

2.1.2 Collection of data: A specially designed questaionnaire was prepared and survey method was used for collecting the data on cost of cultivation, farm assets, marketing, etc. from the official records of research unit.

2.2 Data analysis: The analysis has been carried out by simple tabular method. The averages, percentages and standard cost concepts were used for estimating cost 'A', cost 'B' and cost 'C'.

2.3 Soil status

It is necessary to check the soil status before cultivating crops under organic farming. Soil status is required for getting the certificate of organic farming. The soil status of an organically cultivated chickpea plot at OFRTC, MPKV, Rahuri is as below:

2018-19	
pH = 7.54	K = 683.20 (kg ha-1)
EC = 0.14 (dSm-1)	Fe = 0.98 (mg kg-1)
OC = 1.05 (%)	Mn = 12.21 (mg kg-1)
N = 161.70 (kg ha-1)	Zn = 0.98 (mg kg-1)
P = 18.45 (kg ha-1)	Cu = 4.32 (mg kg-1)

Source: Primary data
Note: EC is Electrical Conductivity, OC is Organic Carbon

2.4 Organic certification

Organic certificate is essential for marketing of the agricultural produce as an organic produce. Organic certificate agencies provide certificate for 3 consecutive years (free from agro-chemicals). The OFRTC, MPKV, Rahuri obtained certificate from Karnataka State Organic Certification Agency (KSOCA), Benguluru (Karnataka).

3. Results and discussion

3.1 Nature and extent of use of organic inputs

The nature and extent of use of organic inputs and its cost involed in organic cultivation of chickpea is presented in Table 1.

The maximum per hectare cost involved was in the use of Heliokill followed by neem oil, Trichoderma and Rhizobium for 2019-20. Same trend was observed for the year 2020-21 except that cost of neem oil (Rs. 3160) exceeded Heliokill (Rs. 1600) for organic cultivation of chickpea.

TABLE 1: NATURE AND EXTENT OF ORGANIC INPUT USE IN ORGANIC CHICKPEA PRODUCTION

(per ha)

Sr. No.	Particulars	Organic chickpea			
		2019-20		2020-21	
		Quantity	Cost (Rs.)	Quantity	Cost (Rs.)
A		Biofertilizers			
1.	Rhizobium	2 kg	160	2 kg	160
2.	Trichoderma	1 kg	200	1 kg	200
B		Biopesticides			
1.	Neem oil	1 lit	1540	2 lit	3160
2.	Helio kill 2% AS	1 lit	1600	1 lit	1600

Source: Primary data

3.2 Cost of cultivation

The detailed cost of cultivation of organic chickpea for the year 2019-20 and 2020-21 is depicted in Table 2.

TABLE 2: PER HECTARE COST OF CULTIVATION OF ORGANIC CHICKPEA

(Rs./ha)

Sr. No.	Cost items	2019-20		2020-21	
		Cost	Percent	Cost	Percent
1.	Hired human labour				
	a. Male	3312.64	3.89	3570.00	3.84
	b. Female	7246.40	8.51	8190.00	8.81
2.	Bullock power	0.00	0.00	0.00	0.00
3.	Machine power	14292.00	16.78	15244.00	16.40
4.	Seed	8124.00	9.54	8124.00	8.74

Sr. No.	Cost items	2019-20		2020-21	
		Cost	Percent	Cost	Percent
5.	Manures	20000.00	23.48	20000.00	21.52
6.	Fertilizer				
	a. Nitrogen (N)	0.00	0.00	0.00	0.00
	b. Phosphorous (P)	0.00	0.00	0.00	0.00
	c. Potash (K)	0.00	0.00	0.00	0.00
7.	Irrigation charges	1412.50	1.66	2127.73	2.29
8.	Bio-fertilizers/Micronutrients	360.00	0.42	360.00	0.39
	1. Rhizobium				
	2. Trichoderma				
9.	Plant protection charges	3140.00	3.69	4760.00	5.12
	1. Neem oil				
	2. Helio kill				
10.	Incidental charges	1168.05	1.37	1421.51	1.53
11.	Repairs on farm implements	850.20	1.00	1830.60	1.97
12.	Insurance premium	0.00	0.00	0.00	0.00
13.	Raw material	0.00	0.00	0.00	0.00
14.	Weedicide	0.00	0.00	0.00	0.00
15.	Working capital (1 to 14)	59905.79	70.33	65627.84	70.60
16.	Interest on working capital @ 6%	3594.35	4.22	3937.67	4.24
17.	Depreciation on farm implements	2825.84	3.32	2416.40	2.60
18.	Land revenue & other taxes	27.24	0.03	30.65	0.03
19.	**Cost - 'A' Rs. (15 to 18)**	**66353.22**	**77.90**	**72012.56**	**77.47**
20.	Rental value of land	16050.00	18.84	18700.00	20.12
21.	Interest on fixed capital @ 10%	2779.45	3.26	2245.75	2.42
22.	**Cost – 'B' (19 + 20 + 21 + 22)**	**85182.67**	**100.00**	**92958.31**	**100.00**
23.	Family labour				
	a. Male	0.00	0.00	0.00	0.00
	b. Female	0.00	0.00	0.00	0.00
24.	**Cost – 'C' (23 + 24)**	**85182.67**	**100.00**	**92958.31**	**100.00**
25.	Output (Rs.)				

Sr. No.	Cost items	2019-20		2020-21	
		Cost	Percent	Cost	Percent
	Main produce	93500.00		106925.00	
	By produce	2800.00		3000.00	
	Gross returns	96300.00		109925.00	
26.	**Per quintal cost**	**3871.93**		**3955.67**	

Source: Primary data

It is revealed from Table 2 that per hectare cost of cultivation, *i.e.* cost 'C' worked out to Rs. 85182.67 and Rs. 92958.31 for the year 2019-20 and 2020-21, respectively, for organic cultivation of chickpea. Among the different paid out costs, manure, machine power, seed, female labour, plant protection charges were the major cost items. These items contribute more than 50 percent to the total cost.

3.3 Cost, returns and profitability of organic chickpea production

The per ha cost, returns and profitability of organic chickpea is presented in Table 3.

TABLE 3: COSTS AND PROFITABILITY OF ORGANIC CHICKPEA PRODUCTION

Sr. No.	Particulars	2019-20	2020-21
1.	Total cost (Rs./ha)	85182.67	92958.31
2.	Main produce (qtl/ha)	22.00	23.50
3.	Rate of main produce (Rs./qtl.)	4250.00	4550.00
4.	Gross return (Rs./ha)	96300.00	109925.00
5.	Net profit (Rs./ha)	11117.00	16967.00
6.	B:C ratio	1.13	1.18
7.	Per quintal cost (Rs./qtls)	3871.93	3955.67

Source: Primary data

It is obeserved from Table 3 that per quintal cost for production of organic chickpea were Rs. 3871.93 and Rs. 3955.67 for the year 2019-20 and 2020-21, respectively. The net profit received was Rs. 11117.00 per hectare for the year 2019-20 which is less than the 2020-21 (Rs. 16967.00 pr hectare). The benefit cost ratio for organic chickpea production was 1.13 for the year 2019-20 and 1.18 for the year 2020-21.

3.4 Contraints in production and marketing of organic chickpea

3.4.1 Technical

1. Complexity in the use of different inputs of organic farming.
2. Difficulty in obtaining the recommended levels of nutrients through organics.
3. Lack of references to utilize organic waste properly as source of organic nutrients.

3.4.2 Economical

1. High cost of vermicompost and biopesticides for crop production.

3.4.3 Administrative

1. Complicated and expensive procedure of issuing certificate for organically produced crops.
2. Lengthy process of inspection of organically produced crops.
3. Construction of office building, cattle shed, poultry shed and sale counter is in progress.

3.4.4 General

1. Dependent for cattle dung on dairy department as cattle shed construction is in progress.

3.4.5 Marketing

1. Markets for organic produce are not well established.
2. There is no MSP mechanism for organic produced agricultural produce/products.
3. Supply of organic produce is less as compared to the demand.
4. Sale counter construction is in progress.

4. Conclusions

1. The per hectare cost involved for organic inputs was maximum in the use of neem oil followed by helio kill.
2. Machine power, seed, manure, hired human labour and plant protection were major items contributing more than 60 percent of the total cost for the production of organic chickpea.
3. The benefit and cost ratio for organically produced chickpea for the year 2019-20 and 2020-21 was 1.13 and 1.18, respectively.
4. The major problems faced by the OFRTC, MPKV, Rahuri was lack of funds from Government.

5. Suggestions

1. Standardization of package of practices for organic chickpea cultivation.
2. Transparancy in the issue of organic certificate need to be maintanied.
3. There should be separate auctioning for organically produced cereals,pulses and oilseeds.
4. Efficient and effective marketing policy should be framed.
5. Perfect branding of organic produce should be carried out through extension.

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Price Deviation and its Impact on Major Kharif Crops in Maharashtra

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Abstract

The present study was conducted to study the effect of prices and its impact on area, production and productivity of major kharif crops in Maharashtra. The study is based on secondary data for 31 years from 1990-91 to 2020-21. The study reveals that the compound growth rates of MSP were slightly higher than WSP and significant positive growth rates were observed for FHP and MSP for all the selected crops. The adjusted difference (positive) between MSP and FHP is above 90 percent of the MSP in kharif jowar and kharif paddy crops and the negative difference was very low. All selected major crops experience negative deviation many times during the study period. The impact of MSP on area is higher except for kharif paddy crop but there is lower impact of MSP on productivity of major crops.

Keywords: *Minimum Support Price, Farm Harvest Price, Wholesale Price, Maharashtra.*

1. Introduction

Agriculture remains an important sector in the Indian economy and key pillar for food security. In a developing country like India where the emphasis is being laid on planned development of economy, agricultural price policy plays an important role in achieving growth and equity in the Indian economy in general and the agriculture sector in particular.

The Agricultural Prices Commission (APC) was set up in India in 1965 to advise the Government on evolving a balanced and integrated price structure. The policy framework was modified in 1980, when the emphasis shifted on to the balance between demand and supply of foodgrain. Minimum Support Price (MSP) is a form of market intervention by the Government of India to insure agricultural producers against any sharp fall in farm prices. The minimum support prices are announced by the Government at the beginning of the sowing season for certain crops on the basis of the recommendation of the CACP and are a guarantee price for their produce from the Government. If there is a fall in the prices of the crops after a bumper harvest, the Government purchases at MSP. Such minimum MSP are fixed at incentive level, so as to induce the farmers to make capital investment for the improvement of their farm and to motivate them to adopt improved crop production technologies to step up their production and thereby income. In the absence of such a guaranteed price, there is a concern that farmer may shift to other crops causing shortage in these commodities.

The Farm Harvest Price (FHP) is the price which prevails during six to eight weeks immediately after the harvesting period while the wholesale prices are those which prevail in the wholesale markets. It can be stated as the rate at which a relatively large transaction, generally for further sale, is affected. On comparison of farm harvest prices and wholesale/general prices, a pattern of Support Price < Farm Harvest Price < Wholesale Price is observed. However, there are some years in between when the wholesale prices have fallen below FHP. Price policy for agri-produce is to set remunerative prices with a view to encourage higher investment and production. In recent years, the MSP policy has been criticized by both farmers and proponents of free trade. Farmers' always demand a substantial hike in MSP, whereas pro free agricultural trade thinkers feel that, most of the times, MSP is in line with the international prices as well as domestic demand and supply situation. This brings distortions and inefficiency in production pattern.

The agricultural price policy (MSP) has outlived its utility and is being used more as a political tool than an economic tool. Therefore it becomes imperative to

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examine the effectiveness of MSP and impact of prices in Maharashtra as well as its contribution towards growth.

1.1 Objectives of the study

1. To estimate the growth of MSP, FHP and WSP of selected kharif crops in Maharashtra.
2. To study the gap between FHP and MSP, WSP and MSP of selected kharif crops in Maharashtra.
3. To examine impact of MSP, FHP and WSP on area, production and productivity of selected kharif crops in Maharashtra.

2. Data sources and methodology

The present study is based on secondary data for 31 years, *i.e.* 1990-91 to 2020-21. The time series data on MSP, FHP, WSP, area, production and productivity of soybean, kharif jowar, tur and kharif paddy for the kharif season were collected from various official sources like Commission for Agricultural Prices and Costs (CACP); Directorate of Economics and Statistics, DA&FW, Ministry of Agriculture and Farmers Welfare and online sources like agmarknet.nic.in, www.agricopp.nic.in, www.ends.dcnet.nic.in, etc. The data were compiled and analysed using standard statistical tools.

2.1 Statistical tools

2.1.1 Computation of growth rate

$Y = ab^t$

$\log Y = \log a + t \log b$

where,

Y = area/ production /productivity

a = intercept

b = regression coefficient

t = time period in year

Compound growth rate (%) = {Antilog (log b)-1}*100

2.1.2 Gap between FHP/WSP and MSP of major crops in Maharashtra

To study the effectiveness of price policy during the harvest periods and wholesale prices periods, the deviations of farm harvest prices from minimum support prices were worked out and divided into positive and negative deviations to examine where market prices ruled higher or lower over the minimum support prices. The negative deviation reflected ineffectiveness of MSP policy for producers. The formulae used for the mean absolute negative/positive deviation are as follows:

MAPD or MAND = 1/n [FHP/WSP – MSP]

If,

FHP/WSP > MSP = Positive deviation (PD)

FHP/WSP< MSP = Negative deviation (ND)

where,

MAPD = Mean Absolute Positive Deviation,

MAND = Mean Absolute Negative Deviation,

FHP = Farm Harvest Prices

WSP = Wholesale Prices

MSP = Minimum Support Price and

n = Frequency of positive or negative deviation

These deviations were adjusted with MSP in order to examine the degree of their deviation from MSP. The formulae used for the adjusted mean negative/positive deviation are as follows:

AMPD or AMND = $1/n\ ([FHP_i/\ WSP_i - MSP_i]/MSP_i)*100$

If

FHP/WSP > MSP = Positive deviation (PD)

FHP/ WSP < MSP = Negative deviation (ND)

where,

AMPD = Adjusted Mean Positive Deviation

AMND = Adjusted Mean Negative Deviation

where,

$\bar{x}$ = mean of FHP of size n_x

$\bar{y}$ = mean of MSP of size n_y

s^2= Pooled variance

$$s^2 = \frac{(n_x - 1)s_x^2 + (n_y - 1)s_y^2}{(n_x - 1) - (n_y - 1)}$$

where,

n_x and n_y = Number of samples

u_x and u_y = Error term

s, s_x and s_y = Variance and pooled variance

2.1.3 Impact of MSPs on major food crops in Maharashtra during 1990-2020

To study the impact of lagged minimum support prices (MSPs) on the acreage allocation, production, and productivity of food crops in Maharashtra, linear and logarithmic forms of equations have been fitted. The food crops include soybean, tur, kharif jowar and kharif paddy for study purpose. The previous year's MSPs generally influence the producer farmer's decision on acreage allocation for the current year. The linear type of equation has been used as:

$$A_t = a + b\ p^{t-1}$$

$$P_t = a + b\ p^{t-1}$$

$$Y_t = a + b\ p^{t-1}$$

The logarithmic type of equation has been used as:

$$\text{Log } A_t = \log a + b\ P^{t-1}$$

$$\text{Log } P_t = \log a + b\ P^{t-1}$$

$$\text{Log } Y_t = \log a + b\ P^{t-1}$$

where,

A_t = Area of food crops at $(t)^{th}$ period,

P_t = Production of food crops at $(t)^{th}$ period,

Y_t = Productivity of food crops at $(t)^{th}$ period,

a = Intercept

b = regression coefficient

P^{t-1} = Minimum support prices of food crops taken in per quintal at $(t-1)^{th}$ period

Linear type of function is found to be a better fit than logarithmic function.

3. Results and discussion

Keeping in view the objectives of the study, the data were analysed using suitable techniques. The results obtained from this study have been presented and discussed.

TABLE 1: GROWTH RATES OF WSP AND MSP FOR THE PERIOD 1990-91 TO 2020-21

Crops	WSP CV (%)	MSP CV (%)	CGR of WSP	CGR of MSP
Soybean	60.91	68.88	6.62**	7.36**
Kh. jowar	78.71	81.26	8.91**	8.92**
Tur	79.43	77.17	6.62**	7.36**
Kh. paddy	59.86	62.54	6.54**	7.34**

Source: Computed by author
Note: ** denotes significance at 1% level of significance.

3.1 Growth of MSP, FHP and WSP of selected major kharif crops in Maharashtra

The growth rates and variability in WSPs and MSPs of the selected crops are presented in Table 1. From the table it is observed that the variability in WSPs of the selected crops ranged between 79.43 percent to 59.86 percent. As the variability in WSPs is high in almost all the selected crops of the study, it denotes that all the crops were volatile in terms of prices. The variability in MSP of the selected crops ranged between 81.26 percent to 62.54 percent. Therefore, it can be concluded that large variability in MSP was observed for the selected crops during study period.

The compound growth rates of WSP and MSP increased significantly for all the crops over a period of study, but the compound growth rates of MSP were slightly higher than WSP for the selected crops.

TABLE 2: GROWTH RATES OF FHP AND MSP FOR THE PERIOD 1990-91 TO 2020-21

Crops	FHP CV (%)	MSP CV (%)	CGR of FHP	CGR of MSP
Soybean	74.31	68.88	8.36**	7.36**
Kh. jowar	71.63	81.26	7.87**	8.92**
Tur	54.94	77.17	5.45**	7.36**
Kh. paddy	65.18	62.54	7.19**	7.34**

Source: Computed by author
Note: ** denotes significance at 1% level of significance.

The growth rates and variability in FHP and MSP of the selected crops are presented in Table 2. From the table it is seen that the coefficient of variation (CV) value of FHP for the selected crops ranges between 74.31 percent to 54.94 percent while on the other hand, CV value of MSP range between 81.26 percent to 62.54 percent. Significant positive growth rates were observed for FHP and MSP of all the selected crops. Except soybean, the growth rates of MSP for the other selected crops were higher than the growth rates of FHP.

The gap between Farm Harvest Price and Minimum Support Price of soybean and tur crop has been worked out in Table 3. From the table it is observed that about 14 and 8 times, the farm harvest price is less than minimum support price while 17 and 23 times, it was observed to be above the MSP. The gap between FHP and MSP for soybean and tur is presented in Figure 1 and 2.

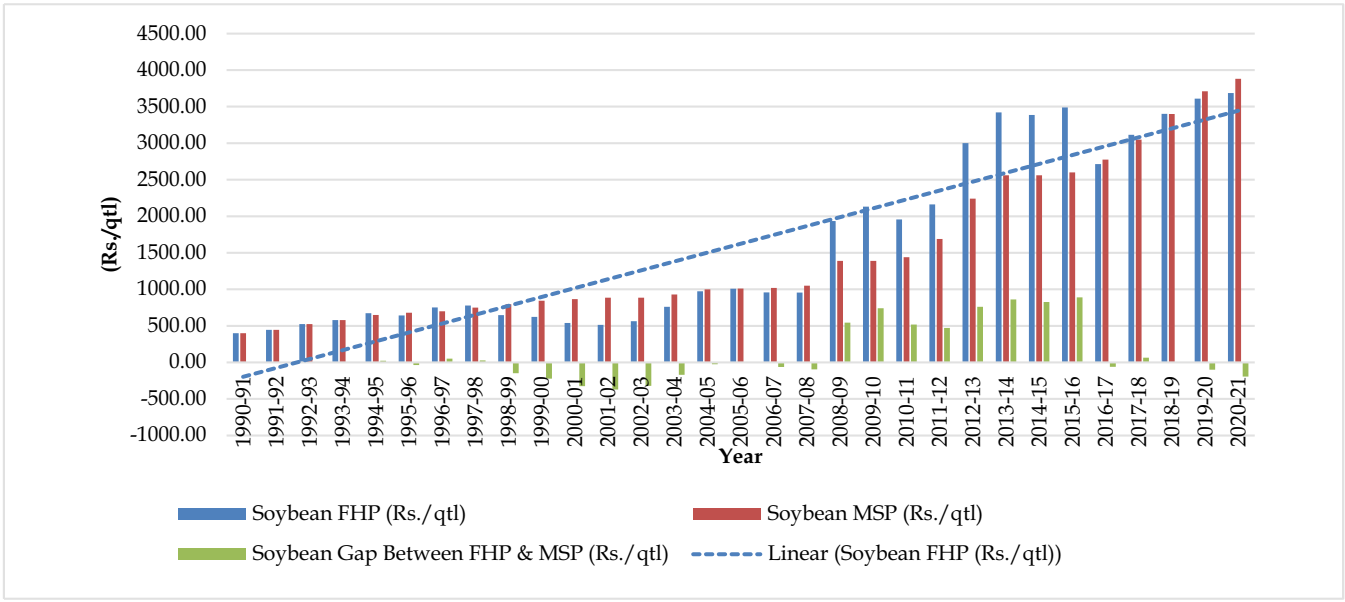
TABLE 3: GAP BETWEEN FHP AND MSP OF SOYBEAN AND TUR DURING 1990-2020

Year	Soybean			Tur		
	FHP (Rs./qtl)	MSP (Rs./qtl)	Gap between FHP & MSP (Rs./qtl)	FHP (Rs./qtl)	MSP (Rs./qtl)	Gap between FHP & MSP (Rs./qtl)
1990-91	400.00	400.00	0.00	934.20	480.00	454.20
1991-92	445.00	445.00	0.00	1206.95	545.00	661.95
1992-93	525.00	525.00	0.00	1174.00	640.00	534.00
1993-94	580.00	580.00	0.00	1158.00	700.00	458.00
1994-95	672.85	650.00	22.85	1611.00	760.00	851.00
1995-96	643.54	680.00	-36.46	1657.00	800.00	857.00
1996-97	752.39	700.00	52.39	1639.00	840.00	799.00
1997-98	777.51	750.00	27.51	2145.25	900.00	1245.25
1998-99	647.73	795.00	-147.27	1993.75	960.00	1033.75
1999-00	622.61	845.00	-222.39	1991.60	1105.00	886.60
2000-01	538.88	865.00	-326.12	2024.76	1200.00	824.76
2001-02	513.76	885.00	-371.24	2015.00	1320.00	695.00

Year	Soybean			Tur		
	FHP (Rs./qtl)	MSP (Rs./qtl)	Gap between FHP & MSP (Rs./qtl)	FHP (Rs./qtl)	MSP (Rs./qtl)	Gap between FHP & MSP (Rs./qtl)
2002-03	564.00	885.00	-321.00	1999.00	1320.00	679.00
2003-04	760.77	930.00	-169.23	1983.00	1360.00	623.00
2004-05	974.00	1000.00	-26.00	1971.00	1390.00	581.00
2005-06	1008.00	1010.00	-2.00	1916.00	1400.00	516.00
2006-07	957.00	1020.00	-63.00	1882.00	1410.00	472.00
2007-08	955.00	1050.00	-95.00	1917.00	1550.00	367.00
2008-09	1934.00	1390.00	544.00	2684.00	2000.00	684.00
2009-10	2132.00	1390.00	742.00	3878.00	2300.00	1578.00
2010-11	1957.00	1440.00	517.00	3569.00	3000.00	569.00
2011-12	2162.00	1690.00	472.00	3070.00	3200.00	-130.00
2012-13	3000.00	2240.00	760.00	3526.00	3850.00	-324.00
2013-14	3422.00	2560.00	862.00	3994.00	4300.00	-306.00
2014-15	3387.00	2560.00	827.00	4634.00	4350.00	284.00
2015-16	3490.00	2600.00	890.00	7741.00	4625.00	3116.00
2016-17	2714.00	2775.00	-61.00	4297.00	5050.00	-753.00
2017-18	3115.00	3050.00	65.00	3846.00	5450.00	-1604.00
2018-19	3401.00	3399.00	2.00	4873.00	5675.00	-802.00
2019-20	3610.00	3710.00	-100.00	4987.00	5800.00	-813.00
2020-21	3686.00	3880.00	-194.00	5087.00	6000.00	-913.00

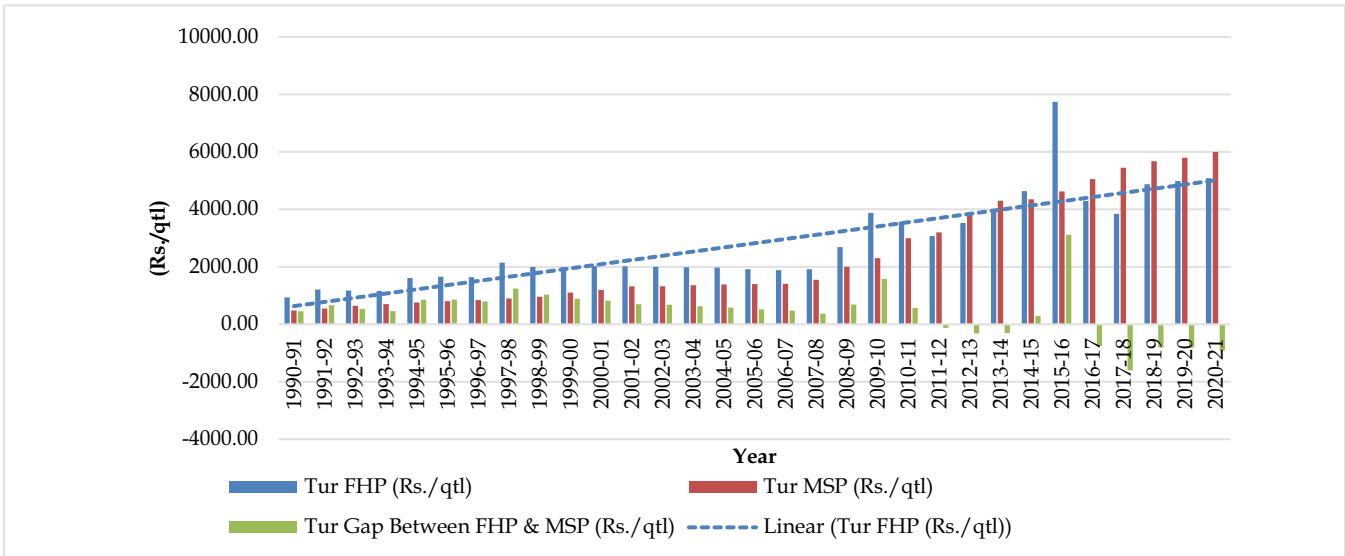
Source: Computed by author from secondary data.

Figure 1: FHP and MSP of Soybean Crop



Source: Representation from Table 3.

Figure 2: FHP and MSP of Tur Crop



Source: Representation from Table 3

Similarly, the gap between Farm Harvest Price and Minimum Support Price of kharif jowar and kharif paddy crops has been worked out. It has been observed that farm harvest price is less than minimum support price on 3 occasions while on 28 occasions, FHP is observed to be more than MSP (Table 3). The gap between FHP and MSP for kharif jowar and kharif paddy crops is presented in Figure 3 and 4.

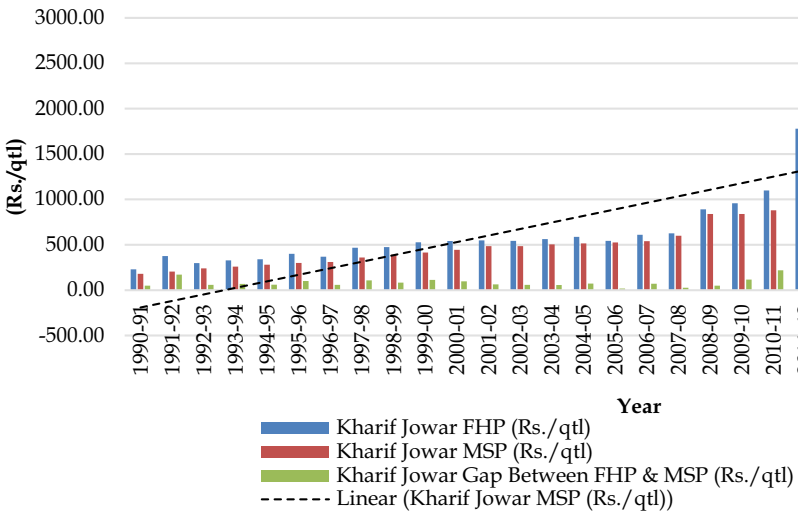
TABLE 4: GAP BETWEEN FHP AND MSP OF KHARIF JOWAR AND KHARIF PADDY DURING 1990-2020

Year	Kharif jowar			Kharif paddy		
	FHP (Rs./qtl)	MSP (Rs./qtl)	Gap between FHP & MSP (Rs./qtl)	FHP (Rs./qtl)	MSP (Rs./qtl)	Gap between FHP & MSP (Rs./qtl)
1990-91	228.75	180.00	48.75	264.00	205.00	59.00
1991-92	375.80	205.00	170.80	356.90	230.00	126.90
1992-93	299.00	240.00	59.00	361.00	270.00	91.00
1993-94	329.00	260.00	69.00	373.00	310.00	63.00
1994-95	340.00	280.00	60.00	386.00	340.00	46.00
1995-96	400.00	300.00	100.00	413.00	360.00	53.00
1996-97	369.00	310.00	59.00	430.00	380.00	50.00
1997-98	468.00	360.00	108.00	468.00	415.00	53.00
1998-99	473.65	390.00	83.65	475.00	440.00	35.00
1999-00	527.66	415.00	112.66	499.28	490.00	9.28
2000-01	542.19	445.00	97.19	512.87	510.00	2.87
2001-02	548.00	485.00	63.00	512.00	530.00	-18.00
2002-03	543.00	485.00	58.00	538.00	530.00	8.00
2003-04	562.00	505.00	57.00	516.00	550.00	-34.00
2004-05	587.00	515.00	72.00	565.00	560.00	5.00
2005-06	543.00	525.00	18.00	561.00	570.00	-9.00
2006-07	611.00	540.00	71.00	649.00	580.00	69.00
2007-08	627.00	600.00	27.00	649.00	645.00	4.00
2008-09	890.00	840.00	50.00	867.00	850.00	17.00
2009-10	957.00	840.00	117.00	1012.00	950.00	62.00
2010-11	1099.00	880.00	219.00	1153.00	1000.00	153.00
2011-12	1779.00	980.00	799.00	1564.00	1080.00	484.00
2012-13	1538.00	1500.00	38.00	1508.00	1250.00	258.00
2013-14	1507.00	1500.00	7.00	1596.00	1310.00	286.00
2014-15	1755.00	1530.00	225.00	1649.00	1360.00	289.00
2015-16	1763.00	1570.00	193.00	1660.00	1410.00	250.00
2016-17	1877.00	1625.00	252.00	1709.00	1470.00	239.00
2017-18	1690.00	1700.00	-10.00	1741.00	1550.00	191.00

Year	Kharif jowar			Kharif paddy		
	FHP (Rs./qtl)	MSP (Rs./qtl)	Gap between FHP & MSP (Rs./qtl)	FHP (Rs./qtl)	MSP (Rs./qtl)	Gap between FHP & MSP (Rs./qtl)
2018-19	2447.00	2430.00	17.00	1944.00	1750.00	194.00
2019-20	2345.00	2550.00	-205.00	2021.00	1815.00	206.00
2020-21	2404.00	2620.00	-216.00	2179.00	1868.00	311.00

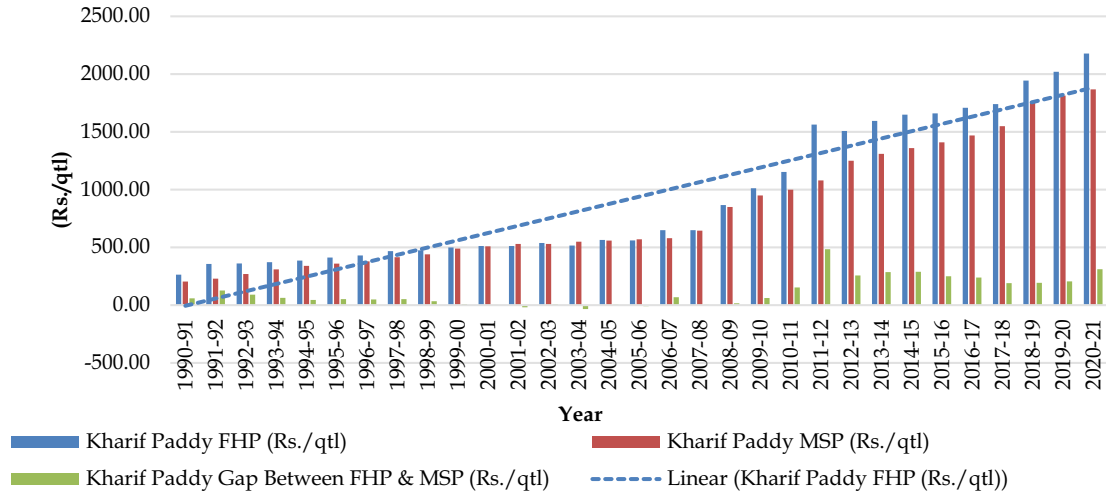
Source: Computed by author from secondary data.

Figure 3: FHP and MSP of Kharif Jowar Crop



Source: Representation from Table 4

Figure 4: FHP and MSP of Kharif Paddy Crop



Source : Representation from Table 4

The gap between Wholesale Prices and Minimum Support Price of soybean and tur crops has been calculated over the study period (Table 5). It is observed that wholesale price is 5 times and 13 times less than minimum support price for soybean and tur crop, respectively, while on 26 and 18 occasions, it is observed to be greater than MSP for both the crops. The gap between WSP and MSP of soybean and tur crop is presented in Figure 5 and 6.

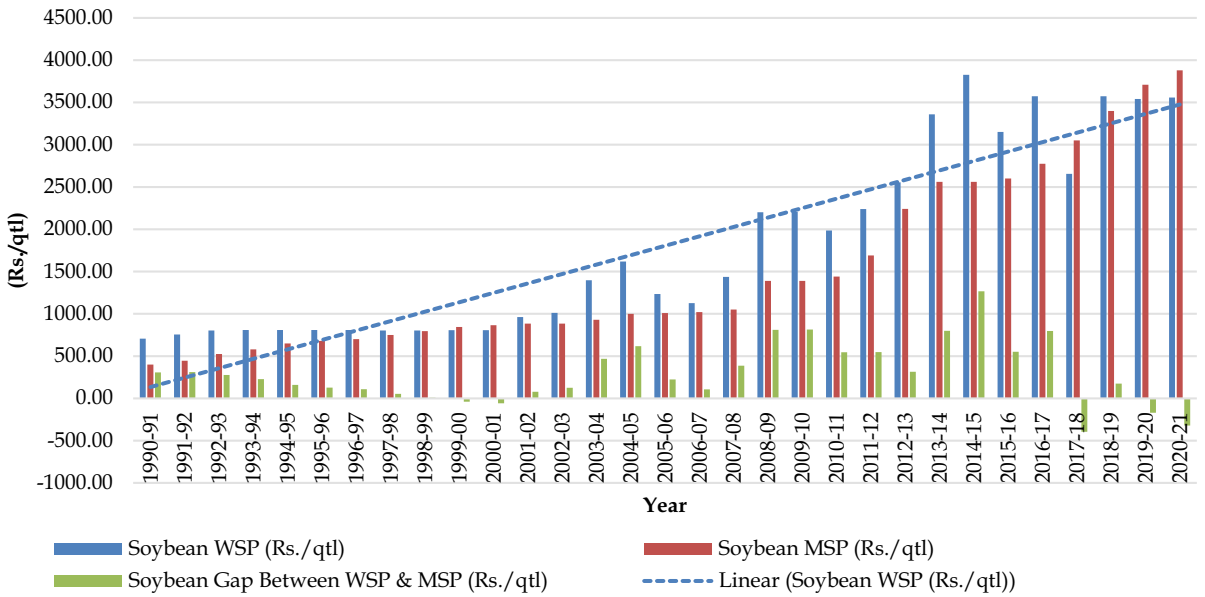
TABLE 5: GAP BETWEEN WSP AND MSP OF SOYBEAN AND TUR DURING 1990-2020

Year	Soybean			Tur		
	WSP (Rs./qtl)	MSP (Rs./qtl)	Gap between WSP & MSP (Rs./qtl)	WSP (Rs./qtl)	MSP (Rs./qtl)	Gap between WSP & MSP (Rs./qtl)
1990-91	706.79	400.00	306.79	892.30	480.00	412.30
1991-92	756.48	445.00	311.48	907.42	545.00	362.42
1992-93	802.32	525.00	277.32	948.78	640.00	308.78
1993-94	808.01	580.00	228.01	946.68	700.00	246.68
1994-95	809.11	650.00	159.11	946.81	760.00	186.81
1995-96	807.83	680.00	127.83	952.84	800.00	152.84
1996-97	808.56	700.00	108.56	946.21	840.00	106.21
1997-98	802.64	750.00	52.64	946.84	900.00	46.84
1998-99	802.87	795.00	7.87	950.38	960.00	-9.62
1999-00	806.33	845.00	-38.67	953.48	1105.00	-151.52
2000-01	807.10	865.00	-57.90	957.74	1200.00	-242.26
2001-02	962.45	885.00	77.45	953.87	1320.00	-366.13
2002-03	1010.60	885.00	125.60	1350.00	1320.00	30.00
2003-04	1397.30	930.00	467.30	1382.00	1360.00	22.00
2004-05	1618.08	1000.00	618.08	1787.50	1390.00	397.50
2005-06	1234.08	1010.00	224.08	1930.10	1400.00	530.10
2006-07	1126.21	1020.00	106.21	2150.00	1410.00	740.00
2007-08	1437.35	1050.00	387.35	1900.00	1550.00	350.00
2008-09	2201.32	1390.00	811.32	2325.00	2000.00	325.00
2009-10	2204.38	1390.00	814.38	2301.00	2300.00	1.00
2010-11	1984.61	1440.00	544.61	2154.00	3000.00	-846.00
2011-12	2238.31	1690.00	548.31	2750.00	3200.00	-450.00
2012-13	2554.68	2240.00	314.68	3837.94	3850.00	-12.06
2013-14	3359.06	2560.00	799.06	4212.74	4300.00	-87.26
2014-15	3826.10	2560.00	1266.10	4244.17	4350.00	-105.83

Year	Soybean			Tur		
	WSP (Rs./qtl)	MSP (Rs./qtl)	Gap between WSP & MSP (Rs./qtl)	WSP (Rs./qtl)	MSP (Rs./qtl)	Gap between WSP & MSP (Rs./qtl)
2015-16	3151.01	2600.00	551.01	6788.41	4625.00	2163.41
2016-17	3573.01	2775.00	798.01	8794.36	5050.00	3744.36
2017-18	2655.83	3050.00	-394.17	3877.82	5450.00	-1572.18
2018-19	3573.09	3399.00	174.09	3544.90	5675.00	-2130.10
2019-20	3540.04	3710.00	-169.96	5240.86	5800.00	-559.14
2020-21	3558.41	3880.00	-321.59	5261.31	6000.00	-738.69

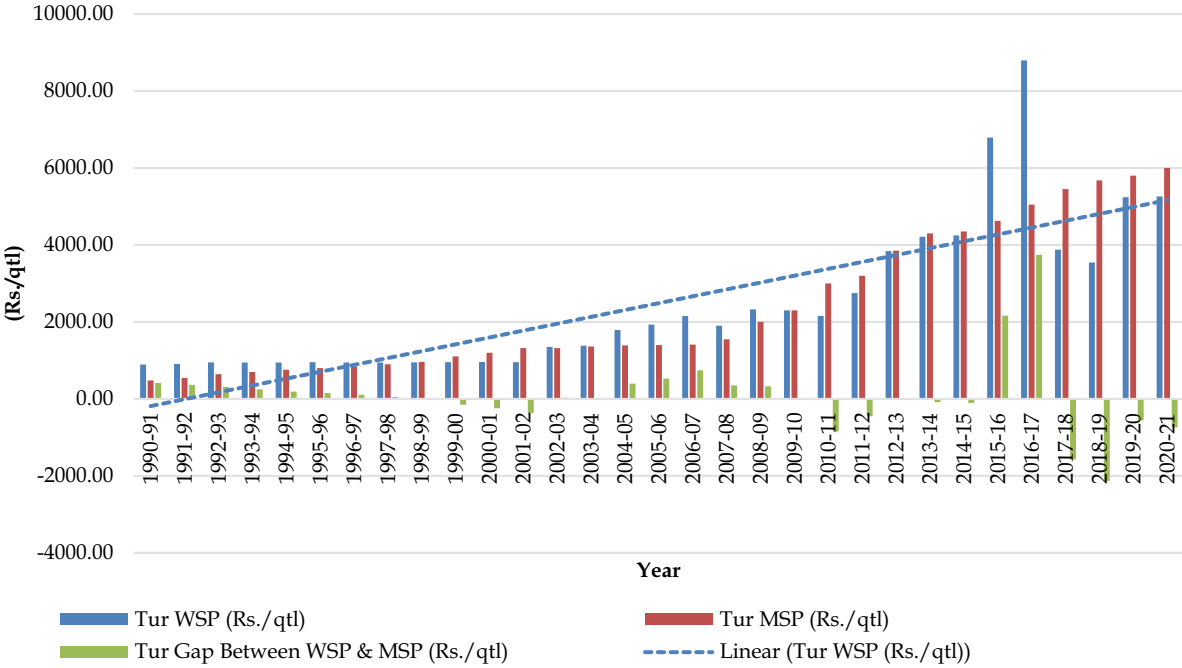
Source: Computed by author from secondary data.

Figure 5: WSP and MSP of Soybean Crop



Source: Computed by author from secondary data.

Figure 6: WSP and MSP of Tur Crop



Source: Representation from Table 5

Table 6 presents the gap between Wholesale Prices and Minimum Support Price of kharif jowar and kharif paddy crops across the study period. It is observed that on 5 occasions, the WSP was less than MSP for kharif jowar while for kharif paddy, the WSP was less than MSP on 4 occasions for over the study period. The wholesale prices were observed to be more than minimum support prices in 26 and 27 cases for kharif jowar and kharif paddy, respectively. The gap between WSP and MSP for kharif jowar and kharif paddy is presented in Figure 7 and 8.

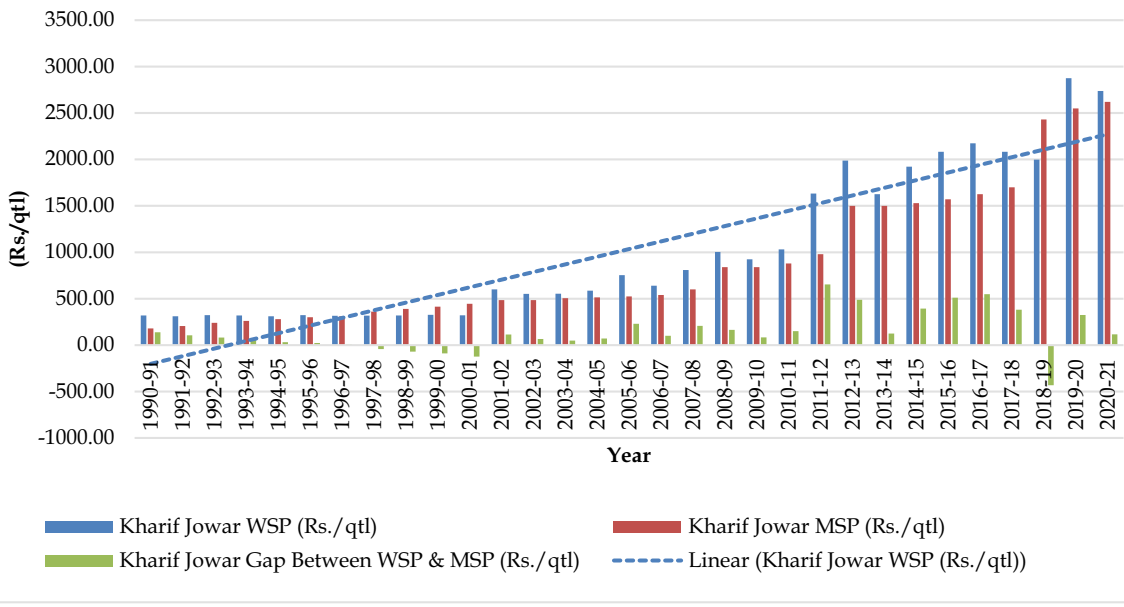
TABLE 6: GAP BETWEEN WSP AND MSP OF KHARIF JOWAR AND KHARIF PADDY DURING 1990-2020

Year	Kharif jowar			Kharif paddy		
	WSP (Rs./qtl)	MSP (Rs./qtl)	Gap between WSP & MSP (Rs./qtl)	WSP (Rs./qtl)	MSP (Rs./qtl)	Gap between WSP & MSP (Rs./qtl)
1990-91	318.73	180.00	138.73	395.35	205.00	190.35
1991-92	310.98	205.00	105.98	394.86	230.00	164.86
1992-93	322.37	240.00	82.37	397.08	270.00	127.08
1993-94	318.73	260.00	58.73	399.00	310.00	89.00
1994-95	310.98	280.00	30.98	397.88	340.00	57.88
1995-96	322.37	300.00	22.37	399.06	360.00	39.06
1996-97	316.08	310.00	6.08	398.86	380.00	18.86

Year	Kharif jowar			Kharif paddy		
	WSP (Rs./qtl)	MSP (Rs./qtl)	Gap between WSP & MSP (Rs./qtl)	WSP (Rs./qtl)	MSP (Rs./qtl)	Gap between WSP & MSP (Rs./qtl)
1997-98	318.39	360.00	-41.61	396.12	415.00	-18.88
1998-99	319.78	390.00	-70.22	399.06	440.00	-40.94
1999-00	325.53	415.00	-89.47	928.30	490.00	438.30
2000-01	321.35	445.00	-123.65	983.10	510.00	473.10
2001-02	600.00	485.00	115.00	996.00	530.00	466.00
2002-03	551.45	485.00	66.45	750.00	530.00	220.00
2003-04	554.14	505.00	49.14	741.89	550.00	191.89
2004-05	587.00	515.00	72.00	592.29	560.00	32.29
2005-06	754.31	525.00	229.31	685.00	570.00	115.00
2006-07	640.47	540.00	100.47	740.17	580.00	160.17
2007-08	808.18	600.00	208.18	568.81	645.00	-76.19
2008-09	1003.63	840.00	163.63	733.80	850.00	-116.20
2009-10	923.63	840.00	83.63	1275.47	950.00	325.47
2010-11	1030.62	880.00	150.62	1220.92	1000.00	220.92
2011-12	1633.39	980.00	653.39	1193.63	1080.00	113.63
2012-13	1988.12	1500.00	488.12	1373.21	1250.00	123.21
2013-14	1625.02	1500.00	125.02	1855.75	1310.00	545.75
2014-15	1922.72	1530.00	392.72	1612.15	1360.00	252.15
2015-16	2081.45	1570.00	511.45	1614.15	1410.00	204.15
2016-17	2174.44	1625.00	549.44	1859.51	1470.00	389.51
2017-18	2081.78	1700.00	381.78	2016.92	1550.00	466.92
2018-19	1998.26	2430.00	-431.74	2208.63	1750.00	458.63
2019-20	2874.23	2550.00	324.23	2059.47	1815.00	244.47
2020-21	2736.85	2620.00	116.85	2028.10	1868.00	160.10

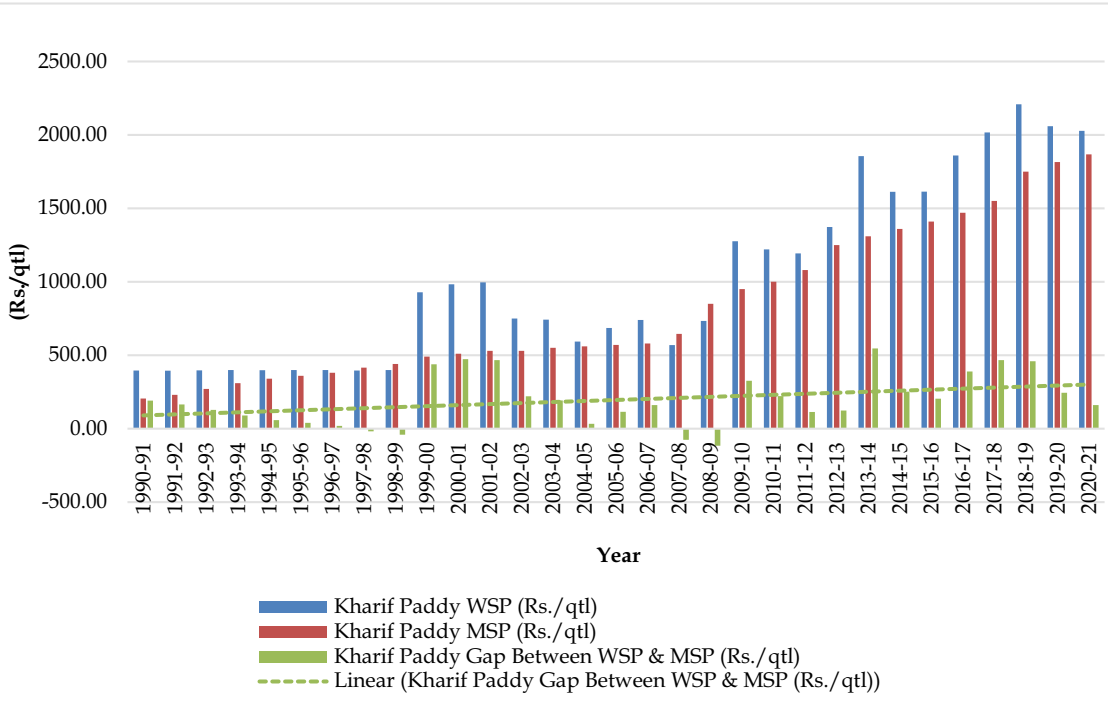
Source: Computed by author from secondary data.

Figure 7: WSP and MSP of Kharif Jowar Crop



Source: Representation from Table 6

Figure 8: WSP and MSP of Kharif Paddy Crop



Source: Representation from Table 6

3.2 Deviation of FHPs from MSPs of major food crops in Maharashtra from 1990-2020

To examine the effectiveness of MSP policy of major crops in Maharashtra, difference between its FHP and MSP was calculated for the study period (Table 3, 4). Kharif jowar and kharif paddy each experience positive deviation 28 times. This means that the average FHP was very near to or ruled higher than MSP in 28 times out of 31 years. The adjusted difference (positive) between MSP and FHP is above 90 percent of the MSP in kharif jowar and kharif paddy crops and the negative difference was very low (Table 7). Tur and soybean experienced positive deviation 23 and 17 times, respectively, and negative deviation 8 and 14 times during the study period. This means that the average FHP was very near to or ruled higher than MSP in 23 and 17 times, respectively, and lower than MSP in 8 and 14 times out of 31 years. All selected major crops experience negative deviation many times in 31 years during 1990-2020.

TABLE 7: DEVIATION OF FHPS VIS-À-VIS MSPS OF MAJOR KHARIF CROPS IN MAHARASHTRA

Crops	Negative deviation					Positive deviation				
	Frequency	MAND (Rs./qtl)	Range (Rs./qtl)	AMND (Rs./qtl)	%	Frequency	MAPD (Rs./qtl)	Range (Rs./qtl)	AMPD (Rs./qtl)	%
Soybean	14	-147.84	(-2)-(-371.24)	-15.01	45.16	17	340.22	2-890	18.08	54.84
Tur	8	-705.63	(-130) - (-1604)	-13.41	25.81	23	816.07	284-3116	67.63	74.19
Kharif jowar	3	-143.67	(-10) - (-216)	-5.62	9.68	28	116.11	7-799	20.7	90.32
Kharif paddy	3	-20.33	(-9)- (-34)	-3.72	9.68	28	129.11	4-484	15.54	90.32

Source: Computed by author
Note: * Zero deviation (FHP=MSP) were consider positive deviation indicating success of the MSP policy; Average = Average of the different of FHP from MSP (+ve or -ve) and % = Percentage of average positive or negative deviation over MSP.

3.3 Deviation of WSPs from MSPs of major food crops in Maharashtra from 1990-2020

To examine the effectiveness of MSP policy of major crops in Maharashtra, difference between its WSP and MSP was calculated for the study period (Table 5, 6). Soybean, kharif jowar and kharif paddy experience positive deviation at 26, 26 and 27 times, respectively. This means that the average WSP was very near to or ruled higher than MSP in 26, 26 and 27 times out of 31 years during 1990-2020. The adjusted difference (positive) between MSP and WSP was above 83 percent of the MSP of major selected crops and the negative difference was very low, *i.e.* below 20 percent. Tur crop experienced positive deviation 18 times and negative deviation 13 times during the study period. This means that the average WSP was very near to or ruled higher than MSP on 18 occasions and was lower than MSP at 13 times out of 31 years. The adjusted difference (positive) between MSP and WSP was above 58 percent of MSP and the negative difference was observed to be 41 percent in tur crop. All selected major crops experience negative deviation many times in 31 years during 1990-2020.

TABLE 8: DEVIATION OF WSPS VIS-À-VIS MSPS OF MAJOR KHARIF CROPS IN MAHARASHTRA

Crops	Negative deviation					Positive deviation				
	Freq-uency	MAND (Rs./qtl)	Range (Rs./qtl)	AMND (Rs./qtl)	%	Freq-uency	MAPD (Rs./qtl)	Range (Rs./qtl)	AMPD (Rs./qtl)	%
Soybean	5	-196.46	(-38.67)-(-394.17)	-7.4	16.13	26	392.59	7.87-1266.10	32.58	83.87
Tur	13	-559.29	(-9.62) - (-2130.10)	-15.23	41.94	18	562.57	1-3744.36	32.22	58.06

Crops	Negative deviation					Positive deviation				
	Freq-uency	MAND (Rs./qtl)	Range (Rs./qtl)	AMND (Rs./qtl)	%	Freq-uency	MAPD (Rs./qtl)	Range (Rs./qtl)	AMPD (Rs./qtl)	%
Kharif jowar	5	-151.34	(-41.61) - (-431.74)	-19.34	16.13	26	201.03	6.08-653.39	25.00	83.87
Kharif paddy	4	-63.05	(-18.88)- (-116.20)	-9.83	12.90	27	232.92	32.29-545.75	32.43	87.10

Source: Computed by author
Note: * Zero deviation (WSP=MSP) were consider positive deviation indicating success of the MSP policy Average =Average of the different of WSP from MSP (+ve or –ve) and % = Percentage of average positive or negative deviation over MSP.

3.4 Impact of MSP, FHP and WSP on major crops in Maharashtra during 1990-2020

To study the impact of lagged MSP, FHP and WSP on the acreage allocation, production and productivity, linear and logarithmic form of equations have been fitted. As linear type of function is found to be a better fit than logarithmic function, the former had been presented here. Previous year MSP, FHP and WSP have been used since these prices generally influence the farmer's decision on acreage allocation for the current year.

3.4.1 Impact of MSP on area of major crops in Maharashtra during 1990-2020

Impact of MSP on area of major crops in Maharashtra is presented in Table 9. The numerical values of the linear function of major crops indicates that R^2 is significant at 1 percent level and supports the results that variation in area of major crops is explained by the explanatory variables, *i.e.* previous year's Minimum Support Prices (MSPs) of the major crops. The result reveal that 81 percent variation in area of soybean, 72 percent variation in area of tur, 75 percent variation in area of kharif jowar and 0.5 percent variation in area of kharif paddy is explained by independent variable, *i.e.* lagged MSP. The elasticity for these variables is significant at 1 percent in case of area of major crops except the area of kharif paddy and kharif jowar crops due to negative elasticity observed of these two crops. The value of elasticity has found as 1.253, 0.058, -0.948 and -0.005 percent indicating thereby that previous year price influences current years area of major crops (like soybean, tur, kharif jowar, and kharif paddy).

TABLE 9: IMPACT OF MSP ON AREA OF MAJOR CROPS IN MAHARASHTRA

Crops	R^2	S.E. of R	Linear regression equation
Soybean	0.81	592.78	y = 434.08 + 1.253x
Tur	0.72	64.23	y = 1002.19 + 0.058x
Kharif jowar	0.75	366.26	y = 2196.30 + (-0.948)x
Kharif paddy	0.005	36.44	y = 1449.39 + (-0.005)x

Source: Computed by author
Note: y = area & x = MSP

3.4.2 Impact of MSP on production of major crops in Maharashtra during 1990-2020

Impact of MSP on production of major crops in Maharashtra is presented in Table 10. The numerical values of the linear function of major crops indicates that R^2 is significant at 1 percent level and supports the results that variation in production of major crops is explained by the explanatory variables, *i.e.* previous year's Minimum Support Prices (MSPs) of the major crops. The result revealed that 0.6 percent variation in production of soybean, 27 percent variation in production of tur, 66 percent variation in production of kharif jowar and 43 percent variation in production of kharif paddy was explained by independent variable, *i.e.* lagged MSP. The elasticity for these variables is significant at 1 percent in case of production of major

crops except the production of soybean and kharif jowar crops due to negative elasticity observed in these two crops. The value of elasticity has been found to be -0.002, 0.102, -1.438 and 0.512 percent indicating thereby that previous year price influences current year's production of major crops.

TABLE 10: IMPACT OF MSP ON PRODUCTION OF MAJOR CROPS IN MAHARASHTRA

Crops	R^2	S.E. of R	Linear regression equation
Soybean	0.006	285.53	y = 1164.67 + (-0.002)x
Tur	0.27	297.39	y = 598.20 + 0.102x
Kharif jowar	0.66	690.34	y = 3030.11 + (-1.438)x
Kharif paddy	0.43	290.99	y = 2152.86 + 0.512x

Source: Computed by author
y = production & x = MSP

3.4.3 Impact of MSP on productivity of major crops in Maharashtra during 1990-2020

Impact of MSP on productivity of major crops in Maharashtra is presented in Table 11. The numerical values of the linear function of major crops indicates that R^2 is significant at 1 percent level and supports the results that variation in productivity of major crops is explained by the explanatory variables, *i.e.* previous years Minimum Support Prices (MSPs) of the major crops. The result reveal that 0.6 percent variation in productivity of soybean, 14 percent variation in productivity of tur, 36 percent variation in productivity of kharif jowar and 19 percent variation in productivity of kharif paddy was explained by independent variable, *i.e.* lagged MSP. The elasticity for these variables is significant at 1 percent in case of productivity of major crops except the productivity of soybean and kharif jowar crops due to negative elasticity observed of these two crops. The value of elasticity has been found to be -0.022, 0.050, -0.264 and 0.290 percent indicating thereby that previous year price influences current years productivity of major crops.

TABLE 11: IMPACT OF MSP ON PRODUCTIVITY OF MAJOR CROPS IN MAHARASHTRA

Crops	R^2	S.E. of R	Linear regression equation
Soybean	0.006	285.53	y = 1164.67 + (-0.022)x
Tur	0.14	217.7	y = 600.57 + 0.050x
Kharif jowar	0.36	235.8	y = 1452.62 + (-0.264)x
Kharif paddy	0.19	294.83	y = 1525.19 + 0.290x

Source: Computed by author
y = Productivity & x = MSP

3.4.4 Impact of FHP on area of major crops in Maharashtra during 1990-2020

Impact of FHP on area of major crops in Maharashtra is presented in Table 12. The numerical values of the linear function of major crops indicates that R^2 is significant at 1 percent level and supports the results that variation in area of major crops is explained by the explanatory variables, *i.e.* previous year's Farm Harvest prices

(FHPs). 81 percent variation in area of soybean, 10 percent variation in area of tur, 76 percent variation in area of kharif jowar and 0.1 percent variation in area of kharif paddy was explained by independent variable, *i.e.* lagged FHP. The elasticity for these variables is significant at 1 percent in case of area of major crops except the area of kharif paddy and kharif jowar crops due to negative elasticity observed of these two crops. The value of elasticity has been found to be 1.033, 0.071, -0.950 and -0.002 percent indicating thereby that previous year's price influences current year's area of major crops.

TABLE 12: IMPACT OF FHP ON AREA OF MAJOR CROPS IN MAHARASHTRA

Crops	R^2	S.E. of R	Linear regression equation
Soybean	0.81	582.21	y = 614.08 + 1.033x
Tur	0.10	53.28	y = 939.07 + 0.071x
Kharif jowar	0.76	357.47	y = 2294.95 + (-0.950)x
Kharif paddy	0.001	36.53	y = 1491.67 + (-0.002)x

Source: Computed by author
y = area & x = FHP

3.4.5 Impact of FHP on production of major crops in Maharashtra during 1990-2020

Impact of FHP on production of major crops in Maharashtra is presented in Table 13. The numerical values of the linear function of major crops indicates that R^2 is significant at 1 percent level and supports the results that variation in production of major crops is explained by the explanatory variables, *i.e.* previous years Farm Harvest Prices (FHPs). 2 percent variation in production of soybean, 51 percent variation in area of tur, 65 percent variation in production of kharif jowar and 48 percent variation in production of kharif paddy was explained by independent variable, *i.e.* lagged FHP. The elasticity for these variables is significant at 1 percent in case of production of major crops except the production of soybean and kharif jowar crops due to negative elasticity observed for these two crops. The value of elasticity is found to be -0.034, 0.162, -1.424 and 0.453 percent indicating thereby that previous year's price influences current year's production of major crops.

TABLE 13: IMPACT OF FHP ON PRODUCTION OF MAJOR CROPS IN MAHARASHTRA

Crops	R^2	S.E. of R	Linear regression equation
Soybean	0.02	283.45	y = 1186.39 + (-0.034)x
Tur	0.51	243.05	y = 385.815 + 0.162x
Kharif jowar	0.65	679.29	y = 3162.42 + (-1.424)x
Kharif paddy	0.48	279.31	y = 2150.33 + 0.453x

Source: Computed by author
y = production & x = FHP

3.4.6 Impact of FHP on productivity of major crops in Maharashtra during 1990-2020

Impact of FHP on productivity of major crops in Maharashtra is presented in Table 14. The numerical values of the linear function of major crops indicates that R^2 is significant at 1 percent level and supports the results that variation in productivity of major crops is explained by the explanatory variables, *i.e.* previous

years Farm Harvest Prices (FHPs) of the major crops. 2 percent variation in productivity of soybean, 32 percent variation in productivity of tur, 33 percent variation in productivity of kharif jowar and 21 percent variation in productivity of kharif paddy was explained by independent variable *i.e.* lagged FHP. The elasticity for these variables is significant at 1 percent in case of productivity of major crops expect the area of soybean and kharif jowar crops due to negative elasticity observed of these two crops. The value of elasticity has found as -0.034, 0.086, -0.249 and 0.254 percent indicating thereby that previous year price influences current year's productivity of major crops (like soybean, tur, kharif jowar and kharif paddy).

TABLE 14: IMPACT OF FHP ON PRODUCTIVITY OF MAJOR CROPS IN MAHARASHTRA

Crops	R^2	S.E. of R	Linear regression equation
Soybean	0.02	283.45	y = 1186.39 + (-0.034)x
Tur	0.32	193.79	y = 477.09 + 0.086x
Kharif jowar	0.33	242.13	y = 1466.02 + (-0.249)x
Kharif paddy	0.21	290.75	y = 1522.18 + 0.254x

Source: Computed by author
y = productivity & x = FHP

3.4.7 Impact of WSP on area of major crops in Maharashtra during 1990-2020

Impact of WSP on area of major crops in Maharashtra is presented in Table 15. The numerical values of the linear function of major crops indicates that R^2 is significant at 1 percent level and supports the results that variation in area of major crops is explained by the explanatory variables, *i.e.* previous year's Wholesale Prices (WSPs). 89 percent variation in area of soybean, 73 percent variation in area of tur, 77 percent variation in area of kharif jowar and 0.4 percent variation in area of kharif paddy was explained by independent variable, *i.e.* lagged WSP. The elasticity for these variables is significant at 1 percent in case of area of major crops except the area of kharif paddy and kharif jowar crops due to negative elasticity observed of these two crops. The value of elasticity is found to be 1.137, 0.053,-0.828 and -0.004 percent indicating thereby that previous year's price influences current year's area of major crops.

TABLE 15: IMPACT OF WSP ON AREA OF MAJOR CROPS IN MAHARASHTRA

Crops	R^2	S.E. of R	Linear regression equation
Soybean	0.89	560.73	y = 238.01 + 1.137x
Tur	0.73	63.39	y = 1008.00 + 0.053x
Kharif jowar	0.77	352.98	y = 2217.07 + (-0.828)x
Kharif paddy	0.004	36.47	y = 1493.92 + (-0.004)x

Source: Computed by author
y = area & x = WSP

3.4.8 Impact of WSP on production of major crops in Maharashtra during 1990-2020

Impact of WSP on production of major crops in Maharashtra is presented in Table 16. The numerical values of the linear function of major crops indicates that R^2 is significant at 1 percent level and supports the results that variation in production of major crops is explained by the explanatory variables, *i.e.* previous

year's Wholesale Prices (WSPs). 5 percent variation in production of soybean, 39 percent variation in production of tur, 68 percent variation in production of kharif jowar and 34 percent variation in production of kharif paddy was explained by independent variable, *i.e.* lagged WSP. The elasticity for these variables is significant at 1 percent in case of production of major crops except the production of soybean and kharif jowar due to negative elasticity observed for these two crops. The value of elasticity is found to be -0.058, 0.109, -1.255 and 0.375 percent indicating thereby that previous year's price influences current year's production of major crops.

TABLE 16: IMPACT OF WSP ON PRODUCTION OF MAJOR CROPS IN MAHARASHTRA

Crops	R^2	S.E. of R	Linear regression equation
Soybean	0.05	279.27	y = 1234.78 + (-0.058)x
Tur	0.39	272.91	y = 567.18 + 0.109x
Kharif jowar	0.68	675.98	y = 3060.09 + (-1.255)x
Kharif paddy	0.34	312.94	y = 2187.20 + 0.375x

Source: Computed by author
y = production & x = WSP

3.4.9 Impact of WSP on productivity of major crops in Maharashtra during 1990-2020

Impact of WSP on productivity of major crops in Maharashtra is presented in Table 17. The numerical values of the linear function of major crops indicates that R^2 is significant at 1 percent level and supports the results that variation in productivity of major crops is explained by the explanatory variables, *i.e.* previous year's Wholesale Prices (WSPs). 5 percent variation in productivity of soybean, 22 percent variation in productivity of tur, 31 percent variation in productivity of kharif jowar and 13 percent variation in productivity of kharif paddy was explained by independent variable, *i.e.* lagged WSP. The elasticity for these variables is significant at 1 percent in case of productivity of major crops but negative elasticity was recorded in soybean and kharif jowar. The value of elasticity is found to be -0.058, 0.056, -0.209 and 0.198 percent indicating thereby that previous year price influences current year's productivity of major crops.

TABLE 17: IMPACT OF WSP ON PRODUCTIVITY OF MAJOR CROPS IN MAHARASHTRA

Crops	R^2	S.E. of R	Linear regression equation
Soybean	0.05	279.27	y = 1234.77 + (-0.058)x
Tur	0.22	207.22	y = 579.09 + 0.056x
Kharif jowar	0.31	245.71	y = 1438.12 + (-0.209)x
Kharif paddy	0.13	304.5	y = 1555.54 + 0.198x

Source: Computed by author
y = productivity & x = WSP

4. Conclusion

1. The compound growth rates of MSP were slightly higher than WSP for the selected crops.
2. Significant positive growth rates were observed for FHP and MSP of all the selected crops. Except soybean, the growth rates of MSP for the other selected crops were higher than the growth rates of FHP.
3. From the deviation of FHPs vis-à-vis MSPs, it was observed that negative deviation occurred 14, 8, 3

and 3 times while positive deviation was 17, 23,28 and 28 times for soybean, tur, kharif jowar and kharif paddy, respectively.

4. All selected major crops experience negative deviation many times in 31 years during study period.

5. The impact of MSP, FHP and WSP on area of kharif paddy and production and productivity of soybean crops is found to be very small.

6. The impact of MSP on area is higher except for kharif paddy but there is lower impact of MSP on productivity of major crops.

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Agro-Economic Research

Estimating and Bridging the Yield Gaps in Oilseeds for Atma Nirbhar Bharat

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Abstract

India is a major oilseed producer country in the world, especially from field-based oilseed crops. However, the country is witnessing a very low yield of many of the oilseeds produced. This study highlights the status of global and Indian oilseed production. The yield gaps are studied in India and compared to major producer countries. The study attempts to analyse the yield variations and yield gaps of major oilseed crops across major regions and states and finds the reasons for such variations and low yield. It also tries to identify the constraints in harnessing the potential yields of different oilseed crops. Farmer's responses on the oilseed production are recorded and analysed. The study suggests focusing on increasing yield in regions with high oilseed area and with higher yield gaps.

Keywords: *Oilseeds, yield gap, oilseed production*

1. Introduction

The diverse agro-ecological conditions in the country are favourable for growing nine oilseed crops, which include edible oilseeds such as groundnut, rapeseed & mustard, soybean, sunflower, sesame, safflower and niger and two non-edible oilseeds, castor and linseed. In addition, oilseeds of tree and forest origin, which grow mostly in tribal inhabited areas, contribute significantly as minor source of oil, including coconut and oil palm. Among the non-conventional oils, rice bran oil, cotton seed and corn oil also have unexplored potential.

The country is lagging to meet the edible oils demand. India has made phenomenal progress in oilseeds production in the past with the production increasing from 5.16 million tonnes in 1950-51 to 32.26 million tonnes in 2018-19. This has been majorly due to yield expansion from 481 kg/ha to 1285 kg/ha during the same periods. But the per capita consumption of oilseeds has also increased. The unmet demand has caused a surge in imports. Efficiently augmenting yield levels of oilseeds crops is essential for India to become self-reliant in oilseed production. India imports edible oils in huge quantity from different crop sources, majorly in the crude and refined form. Many oilseed crops are grown in unirrigated or less irrigated regions. In terms of yield, India lags behind many major growing countries. Also, there is a lot of variation in oilseed yield among the major producer states and among the districts within the growing states.

Many researchers have attempted to analyse the issues related to oilseed production and suggest measures to increase yield. Analysing oilseed production during 1930 to 1980 period, Chhattrapati (1980) insisted on increasing irrigation facilities and making crops more remunerative. Ninan (1989) suggested technology factor as the main constraint for increasing oilseeds production. Gulati and Sharma (1997) suggested promoting resource use efficiency in cropping and freeing up agricultural trade. Chandel and Ramarao (2003) highlighted priorities on resource allocation for investment in oilseeds research and focusing on groundnut and soybean crops for greater profitability. Bhatia *et al.* (2008) recommended use of drought resistant varieties and insisted on rainwater harvesting during excess rain. Considering India's high import dependency and global price volatility, Chand *et al.* (2004) cautioned on lowering import tariffs under

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WTO to tackle protection of domestic oilseeds industry and suggested high need to encourage domestic competitiveness in the oilseed sector. Jha *et al.* (2012) outlined the demand and supply of edible oilseeds in India and suggested high-risk cultivation area due to uncertainty of returns on the investments as the reason for lower average oilseeds yields. Sharma (2014) suggested remunerative and attractive prices to farmers, better market access, technology and other infrastructure facilities. The study highlights lack of suitable varieties, high-costs and timely availability of inputs, incidence of diseases and insect pests, low and fluctuating prices, shortage of human labour, poor irrigation facilities, weak linkages between oilseed producers and processors as the major reasons for low yield and higher yield gaps.

1.1 Objectives of the study

1. Highlight India's oilseed production and compare oilseed yield at global level.
2. Analyze the yield variations and yield gaps of major oilseed crops across different states.
3. Identify constraints in harnessing the potential yields of different oilseed crops.

2. Data sources and methodology

The study mainly utilises secondary data, supplemented by the primary data. The secondary data has been collected from various data sources majorly - 'Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare (MoA&FW) for state and district level data on area, production and yield; FAOSTAT database for global production and trends; KVK stations database, etc. Household level data collected by MoA&FW for the Comprehensive Cost of Cultivation Scheme is also used to apply the Stochastic Frontier Analysis (SFA). Global level data has been collected from 1961 while the state data has been collected from 1966 onwards to 2019-20. The district level data has been collected and analysed from 1997 onwards till 2018-19. The data on oilseed trade has been analysed from 2000 onward to the latest available time, 2020-21. Broadly, the following analytical approaches are employed:

i. Yield and acreage growth rates of important oilseeds have been analysed at the global, national, and state level for different time phases.

ii. Yield variations and gaps have been analysed for major oilseed crops across the regions and states, and also at the demonstration stage, and compared to the yield at farmer's plot.

iii. Identification of the factors impacting oilseed yield.

The primary data has been collected by conducting a field survey using a detailed questionnaire. The field survey was conducted at the end of year 2021. Three of the major oilseed crops, namely soybean, groundnut and rapeseed & mustard covering 91% of the nine-oilseed produced, and four major states - Rajasthan, Gujarat, Madhya Pradesh and Maharashtra covering 75% of the total oilseed production in the country have been considered. A multi-stage stratified sampling approach was adopted to select a total of 900 oilseeds producing farmers covering three major oilseed crops in five study states. The detailed sampling approach is as follow:

i. Stage 1: For each oilseed crop, four strata of districts were formed using the following criteria: (i) high yield-high area districts, (ii) low yield-high area districts, (iii) high yield-low area districts, and (iv) low yield-low area districts.

ii. Stage 2: Out of the four strata, only two were considered from the two categories, namely high yield-high area, and low yield-high area, for selecting the districts. For each of the selected state, two districts were chosen from category (i) and (ii), *i.e.* one district from each category, based on the higher area share among all districts.

iii. Stage 3: Three villages from each of the district were selected randomly.

iv. Stage 4: From each village, a sample of 30 oilseed crop growing farmers was surveyed. For selecting farmers of different holding size, probability proportionate criteria were used.

3. Results and discussion

3.1 Oilseed yield at global level

The average yield of selected edible oilseed crops at the global level has increased by about 2.7 times in 2019 from the historical levels of 1961. It took about four decades for oilseed yield to get doubled and additional two decades to reach at this level. The oilseed acreage also increased by about 3.3 times during this period. Major field-based oilseeds grown in the world include soybean (63.7% production share as of 2019), rapeseed & mustard (13.6%), sunflower seed (10.7%), groundnut (9.3%) and sesame seeds (1.3%). This excludes tree-based palm oil seed production. Indonesia is the largest producing country of palm fruits, holding 60% of global production under palm cultivation, followed by Malaysia and other minor producing countries like Thailand, Nigeria and Colombia. The highest proportionate change in average global yield is witnessed for 'rapeseed & mustard' crops with the yield increasing from 0.6 tonnes/hectare in 1961 to above 2 tonnes/hectare in 2019 (about 2.6 times). Similarly, the yield of soybean increased by 1.5 times and yield of sunflower doubled during this period. The average yield of groundnut and sesame has still not doubled during this six-decade period. The production of palm oil from the fruit tree is measured in fruit bunches and yields about 14.5 tonnes per hectare. In the decade 2011 to 2019, the yield of palm, groundnut, sesame seed, mustard and castor seed witnessed stagnation or decline.

India stands 5th in the global oilseed production from field-based crops with 6% production share as of 2019 from close to 11% of global acreage share (3rd in global acreage share). Brazil is the largest producing country of oilseeds, holding about 22% of total oilseed production, followed by USA, Argentina and China. Palm fruit and oil production in India is negligible as compared to other producing countries. India is among the top producing country in the world of many edible oilseeds and is also among the top consumer of edible oils. The Global Market Analysis report (USDA) for January-2022 suggests that the domestic consumption of major selected vegetable oils in India is close to 10.7% of the world consumption. India also accounts for about 17.2% import of these selected major vegetable oils. For these field-based oilseed crops, India is world's largest producing country of non-edible castor seed, the second largest producing country of groundnut, third largest producing country of rapeseeds and sesame seeds, fifth largest producing country of soybean and sixth largest producing country of safflower seeds and linseeds in the world as of year 2019 (Table 1).

TABLE 1: INDIA'S SHARE AND RANK IN THE WORLD OILSEED PRODUCTION

Oilseed crop	Share (%) 2019		Yield growth rates in India			India's rank	Countries ahead
	Area	Prod.	Phase-I	Phase-II	Phase-III		
Soybean	9.2	4.0	-2.9	1.9	-0.9	5	Brazil, USA, Argentina, China
Groundnut	16.0	13.8	1.1	0.7	3.8	2	China
Rapeseed	18.0	13.1	1.8	1.4	1.9	3	Canada, China
Sunflower seed	1.0	0.4	-2.7	1.4	2.1	21	Russia, Ukraine & 18 other
Safflower seed	7.0	4.2	6.8	-0.1	-0.2	6	Kazak., USA & 3 other
Sesame seed	11.1	10.5	1.7	2.2	1.9	3	Sudan, Myanmar
Castor oil seed	64.8	85.0	4.7	3.7	2.9	1	N.A.
Linseed	5.4	3.2	1.1	1.7	3.7	6	Kazak., Russia & 3 other

Source: Author's computations from FAOSTAT database India's edible oil status
Note: Rank is based on production share in 2019.

India is witnessing a very low yield of many of the oilseeds produced as compared to most of the major producing countries. Soybean yield in India is just about 35.8% as compared to the 'highest yield' country - Argentina and just about 37.4% compared to Brazil, the largest producing country of soybean. Similarly, the yield of groundnut in India is much less than, just about one-third, the yield in the largest producing country - China and highest yield reporter country - USA. The yield of rapeseed, sunflower, linseed, safflower and sesame in India is almost at the lowest level among the major producing countries except a few cases. The yield gap for soybean in India is 2.1 tonnes/hectare than the yield of soybean in Argentina. The yield is 3 tonnes/hectare less than the yield of groundnut in U.S.A., 1.7 tonnes/hectare less than the yield of rapeseed in France, 2 tonnes/hectare less than the yield of sunflower in China, 0.33 tonnes/hectare less than the yield of sesame seed in Nigeria (in general a low yield oilseed crop), 0.9 tonnes/hectare less than the yield of linseed in Canada, 1.3 tonnes/hectare less than the yield of safflower seed in Mexico. These reflect the worrying signs but also the huge potential of improvement in crops yield.

India produced about 116.3 lakh tonnes of edible oil from primary and secondary sources in 2019. The edible oil production in India witnessed an annual growth of about 2.2% since 1995-96 till 2019-20. This growth was majorly contributed from secondary sources (3.3% per annum), holding about 68% oil production share, compared to primary sources (1.8% per annum). The share of secondary/alternative edible oils in India's edible oil basket is increasing over time. On the consumption side, the demand for edible oil in 2019-20 was about 241 lakh tonnes which is much higher than the total production. The per capita availability of edible oil increased from 3.2 kg per person per year in 1960-61 to about 19.2 kg per person per year in 2019-20 which reflects the shift towards edible oils due to increased demand in India over time.

In India, soybean held about 34% production share in 2019-20, followed by groundnut (30%), rapeseed-mustard (27.5%), castor seed (5.5%), sesame seeds (2%), sunflower (0.6%), linseed (0.4%), safflower (0.1%) and niger seeds (0.1%) among the selected field-based oilseed crops. As of 2019-20, Rajasthan holds the highest production share of these oilseeds (about 20.4%), followed by Gujarat (20%), Madhya Pradesh (19.4%) and Maharashtra (15.6%). There is about 16.3% of area under nine-oilseeds of the total area shown in 2020-21 under the major food groups.

3.2 Yield growth, volatility and gaps for major oilseeds

In general, the yield of most of the oilseed crops has improved over time. The growth rates of yield were analyzed for three phases - phase I (from 1966 to 1985), phase II (from 1986 to 2004) and phase III (from 2005 to 2019). For most of the oilseed crops, the growth during three phases witness positive side except a few cases – soybean and safflower during phase I & III, sunflower during phase I and niger seed during phase II. Groundnut, sunflower and linseed witnessed a positive yield rate over the phases while safflower and castor seed reflected a positive but declining rate over the periods, mainly due to high initial growth. Rapeseed & mustard and sesame witnessed stagnating growth while soybean and niger seed reflected no clear direction of growth over the study phases. In general, for most of the oilseed crops, the yield volatility ranged from 10% to 20% except few cases of high yield variability such as safflower and castor seed during phase I and phase II; and groundnut and niger seed during phase III. Considering the top 10 major producing states, for groundnut and rapeseed & mustard, there is a clear increasing trend in average crop yield but the volatility in yield is increasing for groundnut and is stabilized for rapeseed & mustard. There is slight improvement in yield of soybean but no visible trend in yield variations.

The decomposition analysis of these three phases reflects that on the overall basis, the change in production of oilseed crops during phase I and phase III is mainly contributed due to increase in yield of

different oilseed crops but during the phase II, change in area and yield equally contributed to the production increase which is also reflected through the combined interaction effect. For soybean, the change in production is mainly driven by the area effect during all the three phases. Contrary to this, for groundnut and rapeseed & mustard, with less clarity, the change is driven mainly due to the change (increase) in yield, especially during phase I and III.

The yield of soybean is highest in Telangana at 1.7 tonnes per hectare in 2019-20 with 1% of the area share under soybean in the country. This is followed by Maharashtra, Karnataka and Madhya Pradesh with the crop yield of just above 1 tonne per hectare. Soybean yield in major producing states like Maharashtra and Rajasthan has witnessed a decline or stagnation. In Madhya Pradesh, the largest producing state, the yield has not shown much growth and stagnated in the range of 0.8 to 1.2 tonnes per hectare. The yield of groundnut is highest in Tamil Nadu at 2.9 tonnes per hectare. Gujarat, the largest producing state, stands second in terms of yield at 2.2 tonnes per hectare, followed by Rajasthan at 2.1 tonne per hectare. In the other two major producing states - Andhra Pradesh and Karnataka, holding about 24% of country's area share, the yield is much lower at around 1 tonne per hectare which is nearly 2.5 times to 3 times lower than Tamil Nadu. The yield of rapeseed and mustard is highest in Haryana at about 2 tonnes per hectare and is followed by Rajasthan, Madhya Pradesh and Uttar Pradesh with yield of about 1.5 tonnes per hectare. West Bengal holding about 9% of area share has witnessed a comparatively slower growth in yield than other major states. The yield of sesame in Uttar Pradesh and Rajasthan, which holds about 39% of the area share, is much lower at around 0.3 tonnes per hectare. Sunflower is majorly grown in Karnataka (56% area share) but has a very low productivity of about 0.7 tonne per hectare. Haryana, holding just 4% of country's area share, reported the highest yield at 1.9 tonnes per hectare. Karnataka (area share of 50%) and Maharashtra (42%) together hold nearly 92% area share of safflower with Karnataka having with Karnataka having highest productivity at 0.8 tonnes per hectare. The safflower yield performance in the major producing states is worsening over time. The linseed yield in Chhattisgarh is just 0.26 tonnes per hectare. Niger seed is mainly grown in Odisha and Chhattisgarh but the yield is very low, around 0.2 to 0.4 tonnes per hectare. The three-year moving average yield of major oilseed crops is reported in Figure 1. Also, the high and low yield regions and states for the major oilseed crops are reported in Table 2.

Figure 1: Yield of Major Oilseeds in India

(3 YMA, in tonnes/hectare)

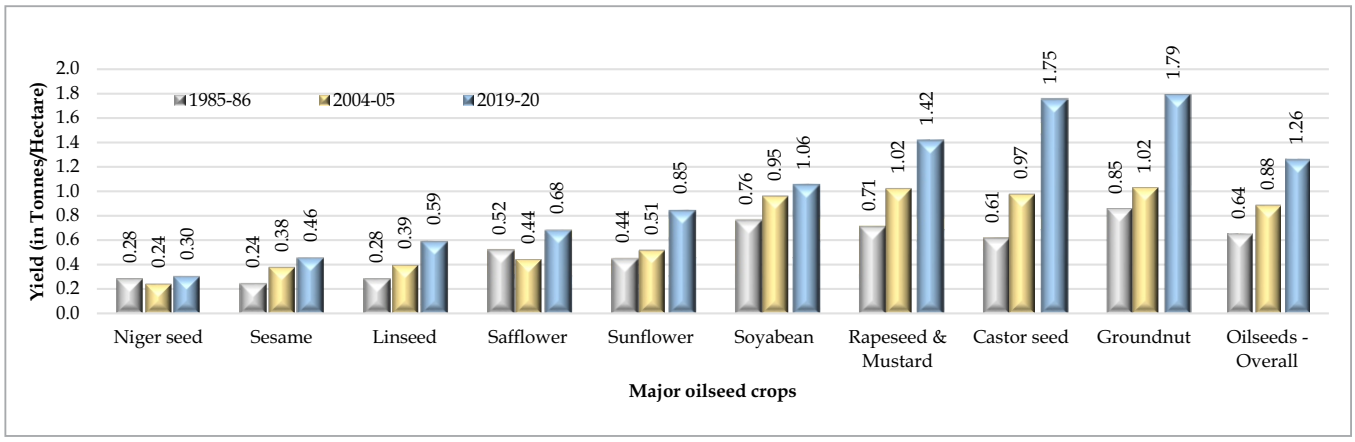

TABLE 2: LOW YIELD REGION AND STATES FOR MAJOR OILSEED CROPS

Crop	Region	Major states	Yield status
Soybean	West, Central	Rajasthan, Maharashtra, Madhya Pradesh	States hold 95% area share. Yield stagnated around 0.8 to 1.2 T/ha.
Groundnut	South	Andhra Pradesh, Karnataka	States hold 24% area share. Nearly 2.5 times to 3 times lower yield w.r.t. high yield states
Rapeseed & Mustard	Central, West, East	West Bengal, Rajasthan, Madhya Pradesh, Uttar Pradesh	States hold 75% area share, Yield improved but not much, 0.66 to 1.56 T/ha.
Sesame	North, West, Central	Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujarat	States hold 65% area share, yield stagnated around 0.1 to 0.6 T/ha.
Sunflower	South, West, East	Maharashtra, Karnataka and Andhra Pradesh	States hold 72-73% area share, yield stagnated around 0.4 to 1 T/ha.
Safflower	Central, South, West	Andhra Pradesh, Jharkhand and Maharashtra	States hold 44% area share, low yield, yield stagnated around 0.3 to 0.6 T/ha
Castor	South, West	Maharashtra, Telangana and Andhra Pradesh	States hold 7 -8% area share, low yield, yield stagnated around 0.2 to 1 T/ha
Linseed	Central, East	Chhattisgarh, Jharkhand, Odisha	States hold 36 -37% area share, low yield stagnated around 0.3 to 0.6 T/ha
Niger seed	Central, East, West	Maharashtra, Madhya Pradesh, Chhattisgarh, Odisha	States hold 87% area share, low yield stagnated around 0.2 to 0.4 T/ha

The oilseed crop yields at the 'farmer's plot' and at the 'demonstration' stage is reported by KVKs for major oilseed crops. At the KVKs level, the 'yield gap', the gap between the yields at the demonstration level with respect to yield reported at the farmer's plot is analyzed. The district level responses from the KVK stations are arranged altogether to reach aggregate state level results. There is at least 16% to 45% higher yield across the major and minor producing states of three major oilseed crops during the demonstration phases as compared to the actual implementation at the farmer's plot. The yield gaps range from at least 11% to 87% across the varieties during these two phases for major states. In the major soybean producing states, the yield is 26%-28% (in Rajasthan and Maharashtra) to 37% (in Madhya Pradesh) high during demonstration phase than at the farmer's plot. The groundnut yield is at least 18% (in Rajasthan) to 44% (in Karnataka) high during demonstration phase than at the farmer's plot. For mustard, Haryana is the only major producing state which witnessed highest yield during both the phases. At the variety level, the results reflect wide yield gaps across the varieties and for the same varieties at the farmer's plot compared to demonstration phases. The technical efficiency score based on the Stochastic Frontier Analysis (SFA) applied on CoC datasets during 2001 to 2017 suggests that up to 32% yield enhancement is achievable through better combinations of various inputs.

3.3 Farmer's responses and factors affecting the oilseeds' yield

The analysis of farmer's responses on oilseed production includes demographic profiling of the farmer households, their cropping details and acreage under oilseed crop, marketing of oilseeds; various input cost related factors influencing the crop productivity such as – labour and machine used, operational cost variables; and the perception of the farmer households on yield enhancement.

The farmers mostly grow oilseed crops on own land. The average yield is very low in Rajgarh district in Madhya Pradesh. The groundnut yield is high in Rajasthan, on an average about 11.7 quintals per acre whereas it is just above 6.3 quintals per acre in study districts in Gujarat. Bikaner district in Rajasthan

reported the highest yield at 13.4 quintal per acre. The average land under groundnut by the farmers is very high in Bikaner district as compared to Jodhpur. The average yield of rapeseed & mustard is above 8 quintals per acre. Alwar reported higher yield than Tonk district. The large variation in crop yield is also reflected due to wide range of varieties used. Ground water is the major source of irrigation in three out of five cases – for groundnut growers (in Rajasthan and Gujarat) and for soybean farmers (in Madhya Pradesh), and covers nearly 89.9% acreage under oilseed crops. Rest about 10% of covered land under selected oilseed crops is irrigated through canals. In Maharashtra, only 32.1% cropped area under soybean is irrigated. In Rajasthan, nearly 10% cropped area under groundnut is unirrigated. Nearly half of the farmers surveyed were not satisfied with the yield they were getting, *i.e.* they themselves were aware that the yield of the oilseed crops is low and can be improved with timely availability and using correct doses of various inputs used (Table 3). Only few were able to get improved subsidized seeds and trainings about oilseed production. Less exposure to formal and technical education, limited resources, small land holding of farmers to take risk are some major setbacks. There is need to improve the availability of weedicides and fungicides/seed treatment facilities. Farmers reported unawareness about input use as they were also not aware about the effective doses of these inputs.

TABLE 3: FARMER'S RESPONSES AND FACTORS AFFECTING OILSEEDS' YIELD

(yes %)

Perception	Soybean		Groundnut		R & M
	Madhya P.	Maharashtra	Rajasthan	Gujarat	Rajasthan
1. Perception on oilseed yield					
Satisfied with the yield?	23.3	38.9	80.6	42.2	62.8
Think yield can be further improved?	86.1	90.6	100.0	100.0	100.0
Oilseed crops profitable than other crops?	88.9	90.0	100.0	50.0	100.0
Got improved subsidized seed for oilseed?	66.1	7.8	0.0	63.3	82.8
Got any training on oilseed crop production?	0.0	18.3	0.0	56.1	82.8
Cover the oilseed crop for insurance?	92.8	92.2	47.2	53.9	70.6
Soil testing ever performed on your field?	34.4	18.3	61.7	95.6	80.6
- If yes, using fertilizers as recommend	75.8	21.2	45.0	57.0	6.2
Faced draught during last 5 years?	-	91.1	60.0	2.2	-
Adopted any post-harvest practice for oilseeds?	-	38.3	81.7	50.0	73.9
2. Factors impacting oilseed yield					
Climate	100.0	90.6	51.1	88.3	10.6
Seed quality	54.4	57.2	85.6	54.4	91.1
Soil quality	40.0	46.1	51.7	65.0	86.1
Fertilizers	57.8	52.8	50.0	40.0	92.8
Irrigation	2.8	38.9	99.4	39.4	96.7

Perception		Soybean		Groundnut		R & M
		Madhya P.	Maharashtra	Rajasthan	Gujarat	Rajasthan
3. Satisfaction and awareness on input uses						
Inputs easily available?	Seed	97.2	77.8	99.4	100.0	100.0
	Seed treatment/Fungicide	73.3	85.0	-	-	100.0
	Fertilizer	35.6	68.9	87.8	76.1	97.8
	Weedicide	95.0	82.8	-	-	97.8
	Pesticides	97.2	86.7	99.4	100.0	97.8
	Manure	30.0	37.8	100.0	100.0	95.6
	Irrigation	99.4	42.2	50.0	100.0	50.0
Satisfied with prices?	Seed	76.7	24.4	37.8	10.0	40.0
	Seed Treatment/Fungicide	47.8	22.8	-	-	100.0
	Fertilizer	6.1	11.1	-	9.4	3.3
	Weedicide	94.4	16.1	-	-	5.6
	Pesticides	25.0	13.3	-	33.3	0.6
	Manure	84.4	21.7	50.0	100.0	3.3
	Irrigation	98.9	33.3	-	34.4	20.0
Aware about doses/use?	Seed	4.4	85.6	75.6	99.4	100.0
	Seed Treatment/Fungicide	73.3	69.4	-	-	100.0
	Fertilizer	82.8	72.2	100.0	99.4	95.6
	Weedicide	88.9	67.8	-	-	95.6
	Pesticides	92.2	68.9	99.4	98.9	95.6
	Manure	47.2	85.0	100.0	100.0	95.6
	Irrigation	100.0	72.2	99.4	100.0	100.0

The factors impacting oilseed yield were analysed using OLS regression which suggests that for soybean, yield in Madhya Pradesh is impacted by positive and significant effect of pest, manure and weedicide quantity use; whereas, higher seed, manure and weedicide cost impact the soybean yield in Madhya Pradesh. Similarly, in Maharashtra, higher the fertilizer use, seed use and machine cost, higher the crop yield, but the cost of fertilizers, fungicides and pesticides impacted the yield, negatively. For rapeseed & mustard, seed and fertilizer use, higher machine hours and farming experience have positive effect on crop yield in Rajasthan, whereas the increasing machine and irrigation cost impacts the crop yield. In Gujarat, the farmers who used higher fertilizers, seeds and labours do not get higher yield of groundnut but the farmers who invested more on labour, seed, fertilizer and irrigation charges (as proxy to higher irrigation with uniform applicable rates) got higher groundnut yield in the state. In Rajasthan, except the increasing machine and pesticide cost, all other factors such as – higher labour, machine and fertilizer use, higher cost incurred on seed and irrigation helped farmers to get better groundnut yield.

4. Conclusion and policy suggestions

There is low yield of most of the oilseed crops in India compared to other major producer countries, especially for minor oilseed crops. Many of the states and districts with high area share also witness very low crop yield. Farmers are not much aware about the precise and wise use of inputs and technology. Limited access to quality

education, basic farming techniques, land and financial resources limits them. Therefore, theoretical trainings, technological demonstration to farmers and timely availability of inputs and machinery may help them get better yield. They also need awareness on the composition, doses, timings and actual requirements of inputs to the soil. Quite often they are influenced by the local venders on inputs use. Ensuring supply of good quality, improved and hybrid seed varieties, encouraging efficient water use practices and techniques, enhancing mechanized farming practices are some other ways to enhance yield and to sustain the diminishing natural resources. Some of the policy suggestions are:

i. Focussing to increase oilseed yield in states with high oilseed area but low yield and higher yield gaps at the farmer's plot compared to demonstration phase.

ii. Ensuring timely supply of inputs to farmers, increasing seasonal irrigation coverage under oilseeds, promoting pest-resistant and high yielding varieties.

iii. Priority to understand region-specific or local factors to increase yield, investment in low-cost technology, promotion, training and demonstrations to farmers.

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Commodity Review

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2022-23 up to 31.03.2023 is 51472 thousand metric tonnes as against 57588 thousand metric tonnes during the corresponding period of last year. The details are given in Table 1. A comparative analysis of procurement of rice for the period of marketing season 2022-23 (up to 31.03.2023) 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

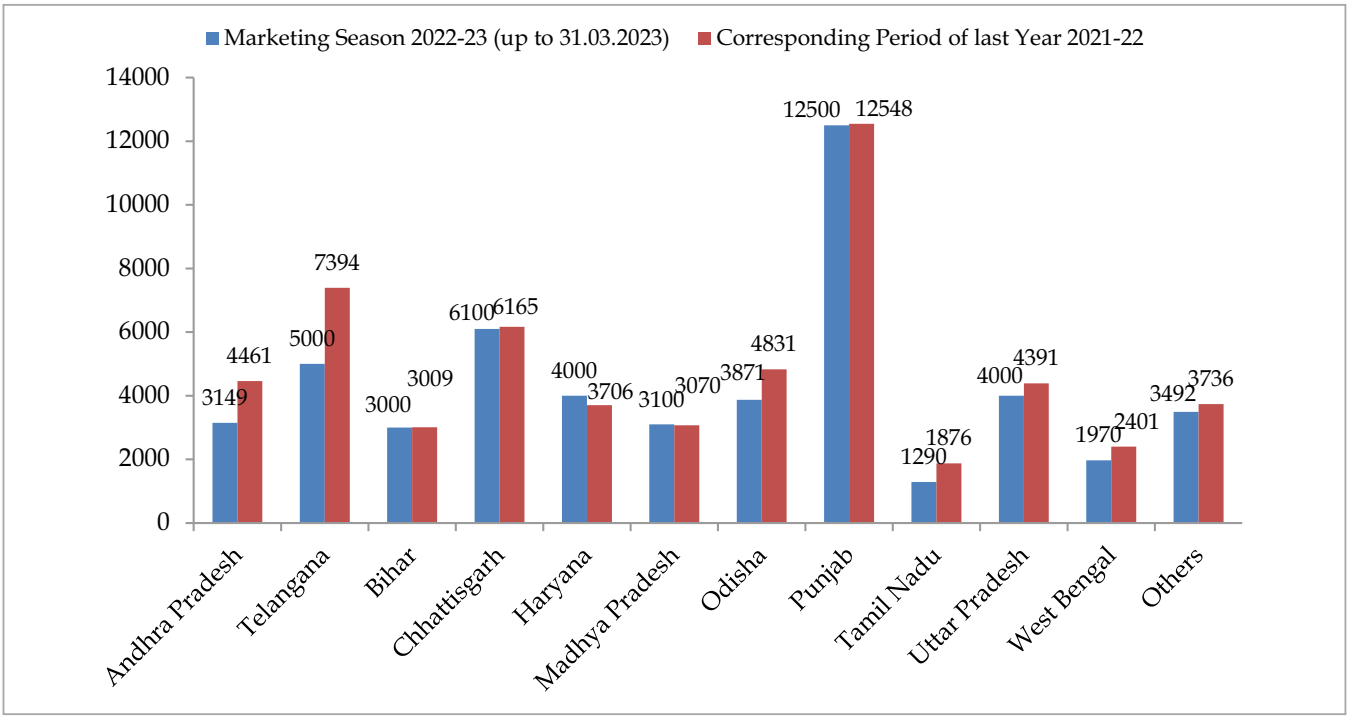
(In thousand metric tonnes)

State	Marketing Season 2022-23 (up to 31.03.2023)		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	3070	5.3
Odisha	3871	7.5	4831	8.4
Punjab	12500	24.3	12548	21.8
Tamil Nadu	1290	2.5	1876	3.3
Uttar Pradesh	4000	7.8	4391	7.6
West Bengal	1970	3.8	2401	4.2
Others	3492	6.8	3736	6.5
All-India Total	**51472**	**100**	**57588**	**100**

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

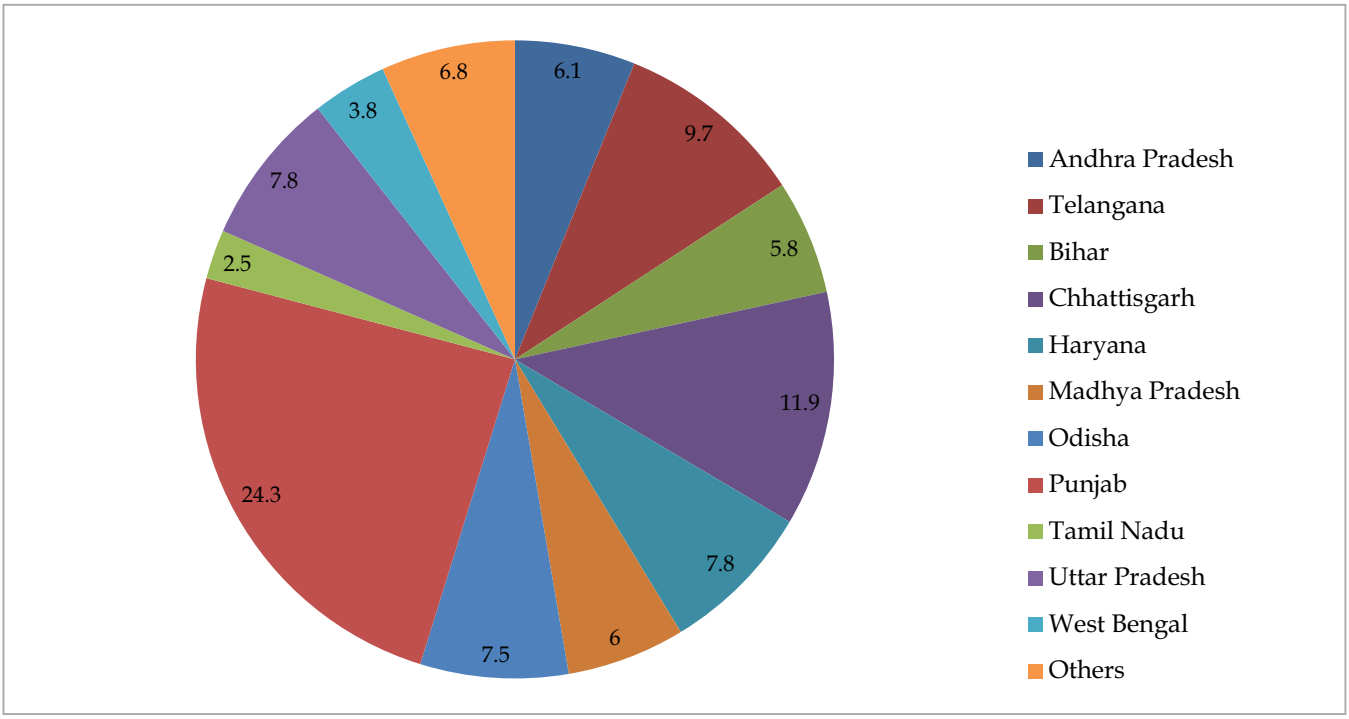
Figure 1: Procurement of Rice in major States

(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 31.03.2023)



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 is 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

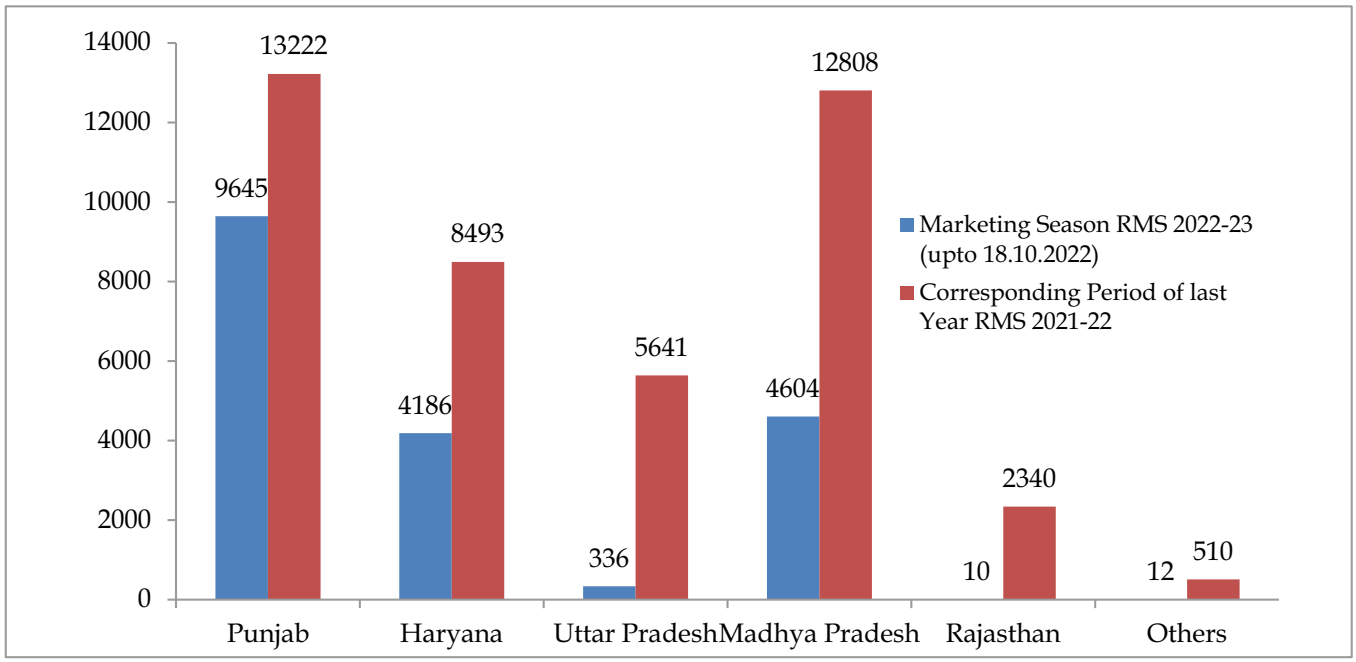
(In thousand metric tonnes)

State	Marketing Season RMS 2022-23 (upto 18.10.2022)		Corresponding period of last year 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

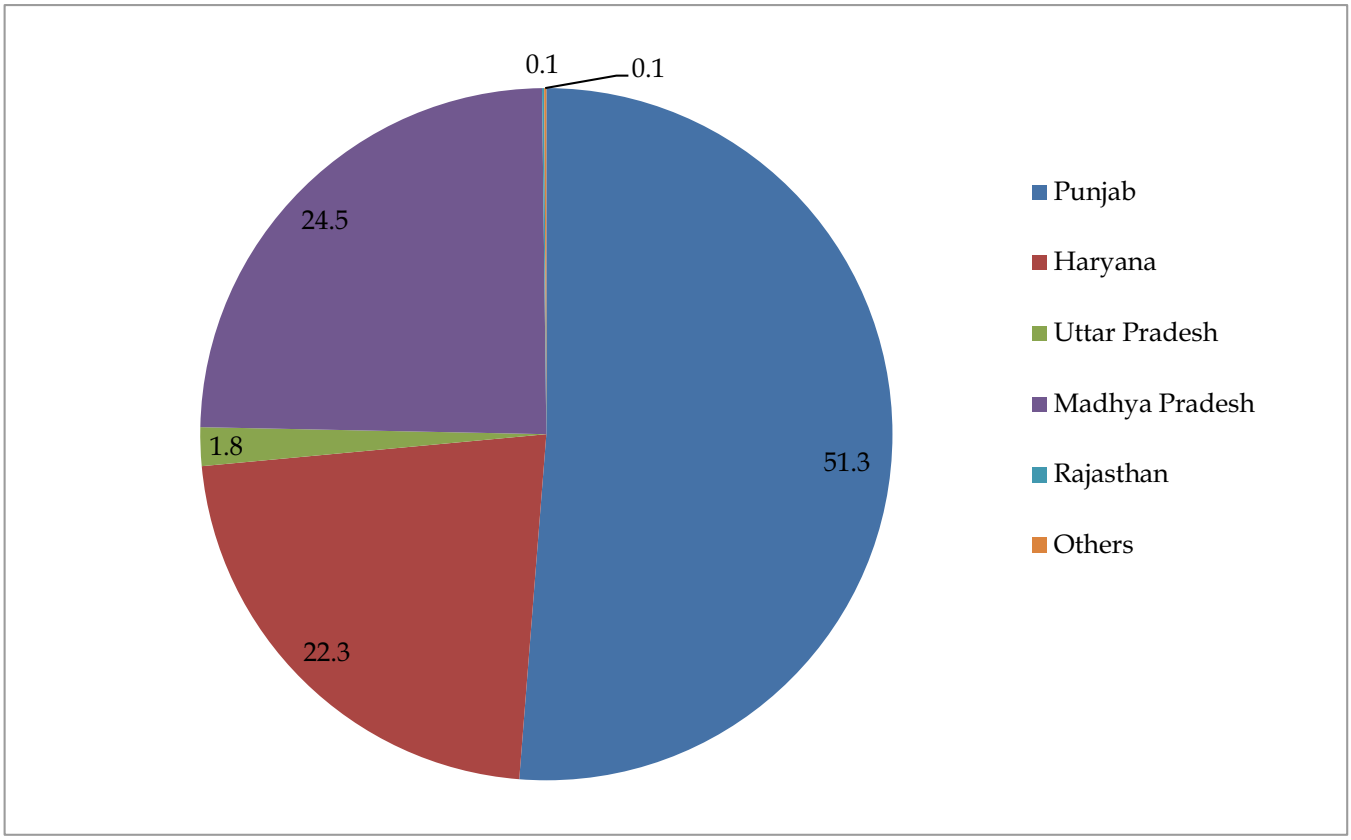
Figure 3: Procurement of Wheat in major States

(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 192.5 in March, 2023 showing a decrease of 3.51 percent over the previous month and a decrease by 15.05 percent over the corresponding month of previous year.

The WPI of all individual oilseeds showed a mixed trend. The WPI of niger seed (6.90 percent) increased over the previous month. However, the WPI of groundnut seed (0.45 percent), rape & mustard seed (5.22 percent), cotton seed (3.97 percent), copra (coconut) (4.23 percent), gingelly seed (sesamum) (1.28 percent), safflower (1.92 percent), sunflower (7.78 percent) and soybean (3.75 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 159.3 in March, 2023 which shows a decrease of 2.57 percent over the previous month. Moreover, it decreased by 21.33 percent over the corresponding month of the previous year. The WPI of groundnut oil (1.25 percent) increased over the previous month. However, the WPI of mustard oil (7.24 percent), soybean oil (5.67 percent), sunflower oil (2.92 percent), rapeseed oil (1.91 percent), copra oil (0.06 percent), cotton seed oil (3.46 percent) decreased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 180.9 in March, 2023 showing an increase of 4.69 percent over previous month and an increase of 1.06 percent over the corresponding month of previous year.

Potato

The WPI of potato stood at 138.7 in March, 2023 showing a decrease of 5.13 percent over the previous month. Moreover, it decreased by 23.67 percent over the corresponding month of previous year.

Onion

The WPI of onion stood at 138.1 in March, 2023 showing a decrease of 13.53 percent over the previous month and a decrease of 36.83 percent over the corresponding month of previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 192.9 in March, 2023 showing an increase of 0.68 percent over the previous month and an increase of 11.57 percent over the corresponding month of previous year. The WPI of chillies (dry) increased by 0.08 percent and turmeric increased by 0.61 percent over the previous month. However, the WPI of black pepper decreased by 1.02 percent over the previous month.

Tea

The WPI of tea stood at 159.1 in March, 2023 showing a decrease of 1.55 percent over the previous month and an increase of 15.79 percent over the corresponding month of previous year.

Coffee

The WPI of coffee stood at 145.7 in March, 2023 showing a decrease of 5.45 percent over the previous month. However, there is an increase of 2.68 percent over the corresponding month of previous year.

Sugarcane

The WPI of sugarcane stood at 210.1 in March, 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 169.3 in March, 2023 showing a decrease of 1.05 percent over the previous month and a decrease of 8.49 percent over the corresponding month of previous year.

Raw Jute

The WPI of raw jute stood at 255.6 in March, 2023 showing a decrease of 0.54 percent over the previous month and a decrease of 12.35 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 March, 2023 and February, 2023 is given in figure 5 and the comparison of WPI during the March, 2023 with the corresponding month of last year has been given in figure 6.

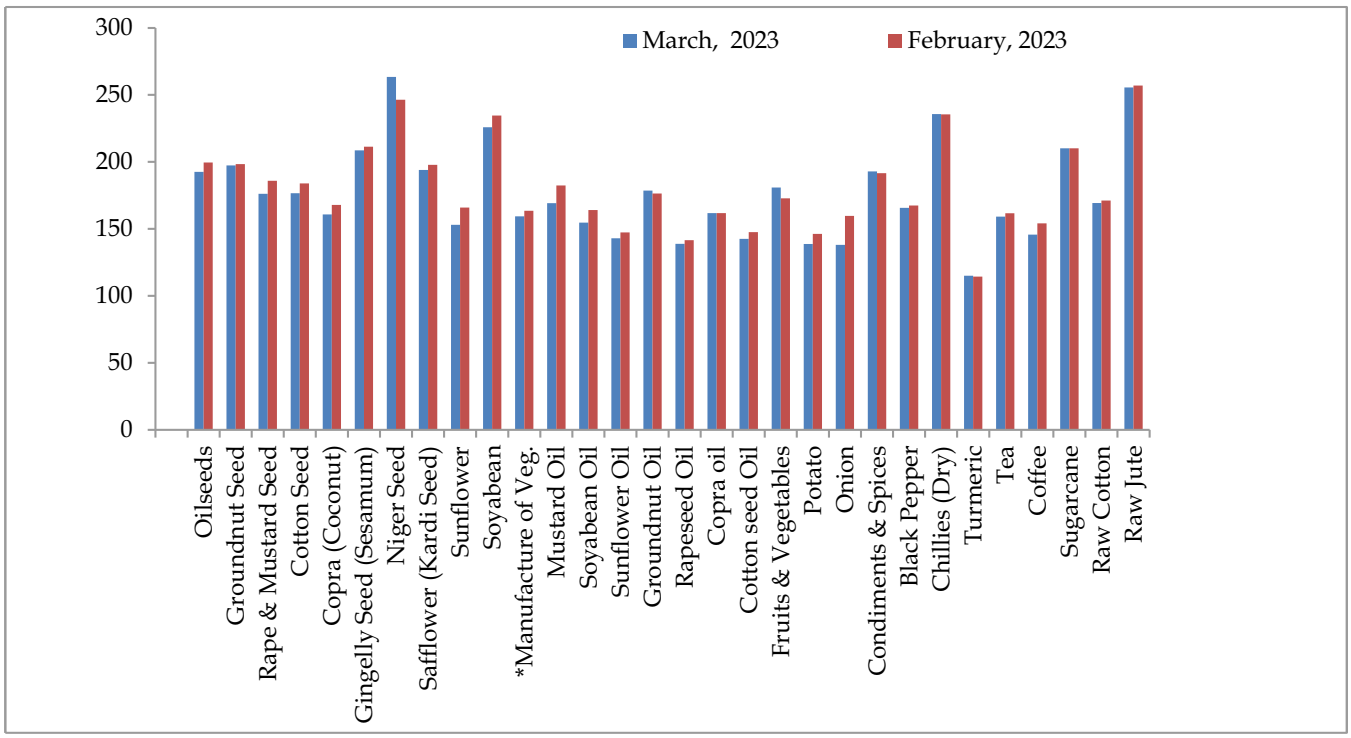
TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base Year: 2011-12)

Commodity	March, 2023	February, 2023	March, 2022	Percentage variation over the	
				Month	Year
Oilseeds	192.5	199.5	226.6	-3.51	-15.05
Groundnut Seed	197.4	198.3	169.1	-0.45	16.74
Rape & Mustard Seed	176.2	185.9	210.9	-5.22	-16.45
Cotton Seed	176.6	183.9	192.9	-3.97	-8.45
Copra (Coconut)	160.8	167.9	202.6	-4.23	-20.63
Gingelly Seed (Sesamum)	208.6	211.3	186.3	-1.28	11.97
Niger Seed	263.4	246.4	259.9	6.90	1.35
Safflower (Kardi Seed)	194.0	197.8	225.4	-1.92	-13.93
Sunflower	153.0	165.9	202.6	-7.78	-24.48
Soyabean	225.8	234.6	308.2	-3.75	-26.74
Manufacture of Vegetable and Animal Oils and Fats	159.3	163.5	202.5	-2.57	-21.33
Mustard Oil	169.2	182.4	218.3	-7.24	-22.49
Soyabean Oil	154.7	164.0	196.1	-5.67	-21.11
Sunflower Oil	143.0	147.3	173.0	-2.92	-17.34
Groundnut Oil	178.6	176.4	169.7	1.25	5.24
Rapeseed Oil	138.8	141.5	186.9	-1.91	-25.74
Copra oil	161.7	161.8	187.6	-0.06	-13.81
Cotton seed Oil	142.5	147.6	187.4	-3.46	-23.96
Fruits & Vegetables	180.9	172.8	179.0	4.69	1.06
Potato	138.7	146.2	181.7	-5.13	-23.67
Onion	138.1	159.7	218.6	-13.53	-36.83
Condiments & Spices	192.9	191.6	172.9	0.68	11.57
Black Pepper	165.7	167.4	167.9	-1.02	-1.31
Chillies (Dry)	235.7	235.5	199.5	0.08	18.15
Turmeric	115.0	114.3	126.6	0.61	-9.16
Tea	159.1	161.6	137.4	-1.55	15.79
Coffee	145.7	154.1	141.9	-5.45	2.68
Sugarcane	210.1	210.1	199.8	0.00	5.16
Raw Cotton	169.3	171.1	185.0	-1.05	-8.49
Raw Jute	255.6	257.0	291.6	-0.54	-12.35

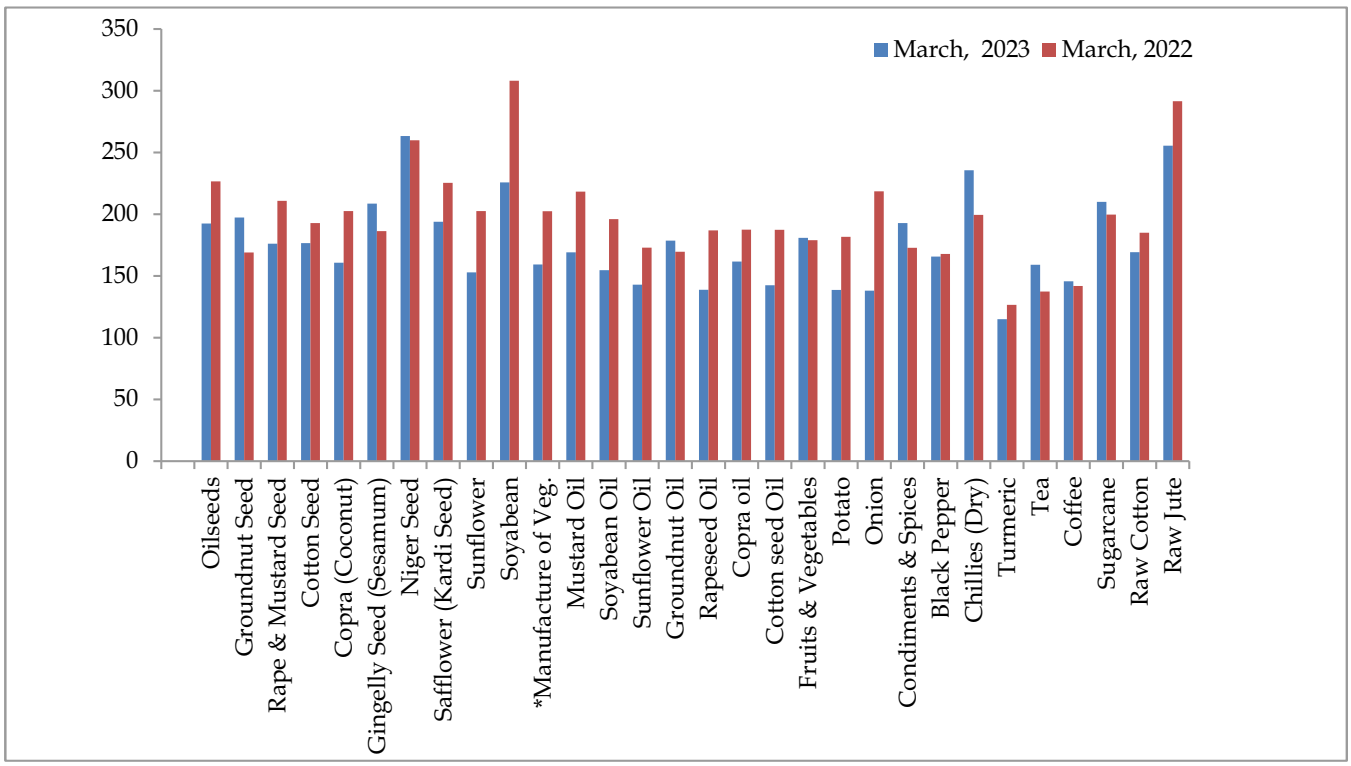
Source: Office of the Economic Adviser, DPIIT, Ministry of Commerce, Govt. of India.

Figure 5: WPI of Commercial Crops during March, 2023 and February, 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 March, 2023 and March, 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	Feb, 23	8	390	345	358	320	357	315	374	-	378	336	464	-			552	525	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	Sep, 22	8	309	NR	262	254	249	247	257	253	203	203	382	-			504	501	501
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,22	8	290	265	270	249	278	242	274	NR	256	238			Not Required		408	434	NR
10	Karnataka	June, 22	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	Feb, 23	8	685	-	634	327	677	335	706	331	658	354	850	-			798	716	852
18	Telangana	Sep, 22	8	Not Required								470	NR			452	239		NR	
19	Tripura	Dec, 22	8	407	NR	354	302	348	303	345	281	303	251	472				448	371	351
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	Dec, 22	8	453	316	346	309	337	297	361	311	381	269					508	477	517

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	Mar-23	Feb-23	Mar-22
Wheat	PBW 343	Quintal	Punjab	Amritsar	NA	NA	2380
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	2200	2590	2060
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	2270	2281	2050
Jowar	-	Quintal	Maharashtra	Mumbai	4200	3900	2700
Gram	No III	Quintal	Madhya Pradesh	Sehore	4890	4550	4616
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	2250	2350	1840
Gram Split	-	Quintal	Bihar	Patna	6940	6500	6450
Gram Split	-	Quintal	Maharashtra	Mumbai	6000	6200	6000
Arhar Split	-	Quintal	Bihar	Patna	11300	10500	9420
Arhar Split	-	Quintal	Maharashtra	Mumbai	10500	9800	9500
Arhar Split	-	Quintal	NCT of Delhi	Delhi	10400	10400	9600
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	9800	9000	8200
Gur	-	Quintal	Maharashtra	Mumbai	4650	4600	4600
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4800	4800	4800
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2900	2970	2850
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	5350	5800	6650
Mustard Seed	Black	Quintal	West Bengal	Raniganj	6500	6500	6650
Mustard Seed	-	Quintal	West Bengal	Kolkata	6000	6100	7600
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	5600	6400	7800
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	5300	6400	7750
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	3500	3500	3500
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	4125	4100	4250
Castor Seed	-	Quintal	Telangana	Hyderabad	NT	NT	NT
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	13500	13400	9500
Copra	FAQ	Quintal	Kerala	Alleppey	8550	8550	9350
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	6500	6300	6300
Groundnut	-	Quintal	Maharashtra	Mumbai	11000	12000	9500
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	2260	2400	2475
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1898	2025	2475
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	2530	2550	2380
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2950	2850	2750
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	2315	2425	2360
Castor Oil	-	15 Kg.	Telangana	Hyderabad	2250	2400	2625
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	2400	2600	2700
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	4000	4050	3350
Coconut Oil	-	15 Kg.	Kerala	Cochin	1950	1965	2265
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2750	2950	2900
Groundnut Cake	-	Quintal	Telangana	Hyderabad	NT	NT	NT
Cotton/Kapas	NH 44	Quintal	Andhra pradesh	Nandyal	7000	7300	10250

Commodity	Variety	Unit	State	Centre	Mar-23	Feb-23	Mar-22
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	6200	8200	9300
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	5750	5750	6500
Jute Raw	W 5	Quintal	West Bengal	Kolkata	5750	5750	6650
Oranges	Big	100 No	Tamil Nadu	Chennai	1800	2200	1800
Oranges	Nagpuri	100 No	West Bengal	Kolkata	1300	850	800
Banana	-	100 No.	NCT of Delhi	Delhi	666	500	375
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	590	590	580
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	60000	60000	74500
Almonds	-	Quintal	Maharashtra	Mumbai	75000	75000	85000
Walnuts	-	Quintal	Maharashtra	Mumbai	80000	80000	93000
Kishmish	-	Quintal	Maharashtra	Mumbai	24000	26000	22500
Peas Green	-	Quintal	Maharashtra	Mumbai	7200	7200	8200
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	1000	825	1160
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	2500	5000	1500
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1500	1600	1000
Potato	Red	Quintal	Bihar	Patna	870	790	1080
Potato	Desi	Quintal	West Bengal	Kolkata	1000	800	1700
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	2308	3285	3200
Onion	Pole	Quintal	Maharashtra	Nashik	750	600	850
Turmeric	Nadan	Quintal	Kerala	Cochin	11000	11000	11500
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	10800	11500	12500
Chillies	-	Quintal	Bihar	Patna	21400	21600	15700
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	48100	47800	47500
Ginger	Dry	Quintal	Kerala	Cochin	21500	19000	17000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	57500	57750	57300
Cardamom	Small	Quintal	West Bengal	Kolkata	190000	180000	135000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	7500	7500	6500
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	61698	61698	58696
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	80000	75000	40000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	47000	48750	41000
Fish	Rohu	Quintal	NCT of Delhi	Delhi	12000	13500	13000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	65000	66000	49000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4730	4480	4470
Tea	-	Quintal	Bihar	Patna	25600	25600	27800
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	11911	12844	9884
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	44000	44000	40000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	25000	24500	22500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	9600	9700	8750
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4600	4700	4100
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13300	13300	13200
Rubber	-	Quintal	Kerala	Kottayam	13400	12900	16200
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	92000	89000	85000

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

Crop Production

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING APRIL, 2023

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

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

(K)- Kharif (R)- Rabi

Note to Contributors

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