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102A, F-Wing, Shastri Bhawan,
New Delhi-110 001
Phone: 23382769
(Email: publication.des-agri@gov.in)

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For article submission see last page.

CONTENTS

From Editor's Desk

This issue of 'Agricultural Situation in India' gives an overview of current agricultural policy initiatives and schemes of the Government in the farm sector, recent agricultural scenario; two academic research articles, one on dynamics of castor production in major states of India; and second on green economics of ashwagandha cultivation in Deccan plateau and an agro-economic research study report on market analysis of bamboo products in Assam.

Important farm sector news shared in this issue are virtual meet on 'Value Chain Creation for Kiwi Fruit-Farm to Fork' organized by the Ministry of Agriculture and Farmers Welfare; interaction of representatives of farmer organizations from Punjab with the Union Ministers; release of interest sub-vented loan from Micro-Irrigation Fund (MIF); Sahakar Pragya unveiled by Union Minister of Agriculture and Farmers Welfare to impart training to primary cooperatives societies in rural areas; inauguration of Honey Farmer Producer Organizations and MSP operations during Kharif Marketing Season 2020-21.

So far as the agricultural scenario is concerned, the Wholesale Price Index (WPI) of pulses, vegetables and paddy increased by 15.93 percent, 25.23 percent and 0.61 percent, respectively, in October, 2020 as compared to that in October, 2019. The 2020 cumulative monsoon season rainfall in the country has been 5 percent lower than the long period average during 1st October, 2020 to 25th November, 2020. Current live storage in 128 major water reservoirs in the country was 139.35 BCM as against 117.53 BCM of normal storage based on the average storage of last 10 years.

In academic column's first article, the authors analyzed the growth and instability in area, production and productivity of castor from 1976-77 to 2017-18 based on the secondary data collected from Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare. For this purpose, compound growth rates (CGRs) of area, production and productivity of castor in India as well as across major castor producing States were calculated using the exponential production function and agricultural instability was calculated using the coefficient of variation (CV), dispersion, Cuddy Della Valle Index (CDV), etc. The analysis reveals that Gujarat and Rajasthan experienced higher growth in area, production and productivity during the last four and half decades. This is mainly due to the release of hybrid castor varieties like GAUCH-1 in 1973 and GCH-2 in 1985. However, Andhra Pradesh, Karnataka and Odisha could not explore the benefits of hybrid/HYV technology. Further, instability in overall study period revealed that, medium instability was found in area and productivity while high instability was found in production. Rajasthan recorded the highest instability. Based on the findings, it has been suggested that Andhra Pradesh, Karnataka and Odisha may focus on further refinement of castor hybrid technology to increase castor cultivation. Since, the world economy is facing the energy crisis and environmental degradation problems, the potential for bio-feed stock like castor oil could be a good source for eco-friendly fuel. This will also increase farm income.

In the second article, authors, Pankaj Choudhary, Mudit Mishra, S.P. Singh, D.K. Verma, R.S. Sharma, R.K Srivastava and Sanjay Kumar, examine the green economics of ashwagandha cultivation in Deccan plateau. The study is primarily based on socio-economic status and profile of resources used, costs and return behavior, input-output relationship and resource use efficiency. The authors' analysis was based on primary data collected from study area. The findings of the study revealed that the Cost-Benefit ratio of ashwagandha crop cultivation was observed 1:3.08. The resource use efficiency of ashwagandha was also estimated using multiple linear regression method. The R^2 value was found 0.967 and the yield of ashwagandha was statistically significant and influenced by all the independent variables except one or two variables like plant protection, etc. The degree of correlation between the yield of ashwagandha and inputs found that the yield of ashwagandha is highly correlated with all inputs used in cultivation of ashwagandha except to irrigation and plant protection. It may be due to the fact that cultivation of ashwagandha is basically in the rain-fed area. Authors suggest the need to address challenges like non-availability of the regulated market, lack of storage facilities and instability in the market price of the produce. Further, focus on encouraging contractual cultivation of ashwagandha cultivation in PPP (public private partnership) mode, establishing new processing units, scientific storage facilities, and arrangement of forward linkage may also be encouraged.

Agro-economic research section brings out a report on market analysis of bamboo products in Assam prepared by Agro-Economic Research Centre for North-East India, Assam Agricultural University, Jorhat. The prime objectives of the report inter-alia, include, study the potentialities of bamboo products in Assam; to study the National Bamboo Mission (NBM) programs in Assam; to find out the marketing channels and to identify the critical issues encountered by the producers in marketing of bamboo products and suggest ameliorative policy measures, etc. For this purpose, both primary and secondary data were collected from two sample districts, Jorhat and Sivasagar. Based on the findings of the study and field observations, the report, inter-alia, suggest promoting campaign to make the artisans educated and aware of various schemes & programmes launched by the Government; to modernize product-process and upgradation of techniques to meet the changing requirements of the customers; to exempt the bamboo products from excise duty and other taxes to promote its export; training the artisans and help them create bamboo-based industries; developing adequate infrastructure and positive environment to attract younger generations, etc.

Promodita Satish

Farm Sector News*

Agriculture Ministry organized a virtual meet on 'Value Chain Creation for Kiwi Fruit – Farm to Fork' to Strengthen Prime Minister's vision of Atmanirbhar Bharat & Vocal for Local

The Ministry of Agriculture along with Central Institute of Horticulture, Nagaland, on 11th November, 2020, organized a virtual meeting on 'Value Chain Creation for Kiwi fruit – Farm to Fork' keeping in mind the popularity of the fruit due to its tremendous commercial potential. The meeting was chaired by the Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar in presence of Minister of State for Agriculture, Shri Parshottam Rupala, Secretary, Department of Agriculture and Farmers Welfare and other officials of the Ministry and State of Nagaland.

Addressing the gathering, the Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar said that the entire north east due to difficult terrain is lagging behind and all ministries including agriculture ministry are working towards ensuring a progressive north east. He said that this lag needs to be removed and can only be done through a comprehensive vision along with stable policy planning and balanced growth across the region as envisioned by Prime Minister Shri Narendra Modi.

Shri Tomar stated that the Himalayan sub-temperature climate is suitable for kiwi production and there is a need to introduce high yielding cultivars. With extensive research and development support, the commercial cultivation of kiwi fruit has been extended from the Sub-Himalayan regions of India to the mid hills of Himachal Pradesh, Sikkim, Meghalaya, Arunachal Pradesh, Nagaland and Nilgiri Hills. Presently, India is producing 13,000 MT of kiwi in an area of about 4,000 ha in Arunachal Pradesh, Nagaland, Mizoram and Himachal Pradesh.

India currently imports 4,000 tonnes of kiwis from New Zealand, Italy and Chile. Shri Tomar said that to strengthen Prime Minister Shri Narendra Modi's vision and mission of creating an Atmanirbhar Bharat, the Ministry of Agriculture is trying to provide handholding support to kiwi farmers across the country. This is also in line with the call of 'Vocal for Local' which will help in reducing dependence on imports and building a sustainable market for locally produced kiwi fruit variants.

The Union Agriculture Minister further said that the entire nation is witness that Prime Minister Shri Narendra Modi has focused on agriculture and allied sector right from the beginning and his leadership has guided all to look threadbare and in-depth into all aspects of agriculture especially the gaps which need to be filled in order to ensure that farmers can reap the benefits of their toil. He said that a new chapter is being introduced in the agricultural history of Nagaland which will be highly beneficial to the kiwi farmers of the State. He said that this programme of kiwi Production enhancement will prove to be a milestone in the years to come.

Shri Tomar also elaborated the problems faced by the farmers in the north-east region namely lack of good planting material, productivity issues, lack of packaging facilities and marketing networks for farmers. Considering the problems faced, he said that centre is working hand in hand with state governments and especially the Central Institute of Horticulture, Nagaland and the Department of Agriculture and Farmers Welfare has taken key steps to ensure proper training and capacity building of farmers in production as well as packaging of kiwi products is done. The government is also ensuring that farmers are connected to the market so that they can reap a fair price for their produce. The institute in Nagaland has also conducted training and exposure visit of farmers from Phek District of Nagaland for helping them understand how to reap good returns through kiwi production. Shri Tomar added that persistent efforts should be made by all to ensure Nagaland can emerge as the 'Kiwi State' of India.

Union Agriculture Minister and Minister of Railways, Consumer affairs, Food and Public Distribution interact with representatives of Farmers Organizations from Punjab in New Delhi

The Agriculture Minister Shri Narendra Singh Tomar, Minister of Railways Shri Piyush Goyal and Shri Som Prakash MoS Ministry of Commerce & Industries interacted with the representatives of

*Source: www.pib.nic.in

farmers organizations of Punjab on 13th November, 2020 in Vigyan Bhavan, New Delhi.

At the outset, the Agriculture Minister cordially welcomed the representatives of farmers organizations of Punjab and briefed about the reforms made in the agriculture sector to empower the farmers. It was emphasized that agriculture is always on the top priority for Government of India to boost rural economy. He mentioned that the Government is taking several measures for the welfare of farmers with a specific focus on 'Aatmnirbhar Bharat'. The new farm acts would not only provide freedom of choice to the farmers to sell their produce at remunerative price but also safeguard the interest of farmers.

During the interaction, the ministers also informed the representatives of farmer organizations that procurement of farm produce on MSP and the Mandi system will continue as before. The new farm act will encourage Mandis to provide better services to the farmers.

The representatives of the farmers' unions expressed their views on new farm acts.The farmer's representatives were also apprised with other initiatives taken by the Government such as Agriculture Infrastructure Fund and formation of 10,000 farmer producer organizations aiming towards income enhancement of farmers and creating employment opportunities for youth in rural areas.

During the interaction various issues related to farmer's welfare were discussed at length. It was assured that the Government of India is always committed to protect the interest of farmers and is always open for discussions for the welfare of farmers. The talks were held in a cordial atmosphere and both sides agreed to continue to hold further discussions.

Release of Interest Sub-vented Loan from Micro-Irrigation Fund (MIF)

Micro Irrigation Fund with a corpus of ₹ 5000 crore created with NABARD was operationalised in 2019-20. The objective of the Fund is to facilitate the states in availing an interest subvented loan for expanding coverage of micro irrigation by taking up special and innovative projects and also for incentivising micro irrigation beyond the provisions available under PMKSY-Per Drop More Crop to encourage farmers to install micro irrigation systems.

Steering Committee of MIF has approved projects for loan of ₹ 3971.31 crore comprising ₹ 764.13 crore for Gujarat, ₹ 1357.93 crore for Tamil Nadu, ₹ 616.13 crore for Andhra Pradesh, ₹ 276.55 crore for West Bengal, ₹ 790.94 crore for Haryana, ₹ 150.00 crore for Punjab and ₹ 15.63 crore for Uttarakhand.

NABARD released loan of ₹ 659.70 crore to Haryana, Tamil Nadu and Gujarat. Thereby a total amount of ₹ 1754.60 crore has been released so far, comprising ₹ 616.13 crore to Andhra Pradesh, ₹ 937.47 crore to Tamil Nadu, ₹ 21.57 crore to Haryana and ₹ 179.43 crore to Gujarat.

Shri Narendra Singh Tomar unveiled Sahakar Pragya

Union Minister of Agriculture and Farmers Welfare, Rural Development, Panchayati Raj and Food Processing Industries, Shri Narendra Singh Tomar, on 24th November, 2020, unveiled Sahakar Pragya. The 45 new training modules of Sahakar Pragya of the National Cooperative Development Corporation (NCDC) will impart training to primary cooperative societies in rural areas of the country along with Lakshmanrao Inamdar National Cooperative Research and Development Academy (LINAC). Sahakar Pragya embodies enhancing NCDC's training capacity by eighteen fold through an elaborate network of 18 regional training centres across the country by the dedicated Laxmanrao Inamdar National Academy for Cooperative Research and Development (LINAC) set up and fully funded by NCDC.

On this occasion, Mr. Tomar called upon the cooperative sector to play a role in making the village-poor-farmers AtmaNirbhar. Shri Tomar said that today India boasts a huge network of over 8.50 lakh cooperative societies with about 290 million members and around 94% of the farmers in India are member of at least one cooperative society. He said that cooperatives have a major role in AtmaNirbhar Bharat and it lends strength to farmers to minimize risks in agriculture and allied sectors and act as shield against exploitation by unscrupulous traders.

Shri Tomar further added that there are more than 2.53 lakh gram panchayats in the country,

through which the Government is working to ensure that every household has access to basic amenities like toilets, electricity, water, cooking gas, etc. He further said that there are 86 percent small farmers in the country, who cannot invest in farming on their own, the government is focusing on developing facilities like cold storage at village level for them, so that farmers are not forced to sell their produce at low prices.

Shri Tomar said that NCDC has emerged as a financial powerhouse giving the client cooperatives a wide range of products and services. So far it has advanced loans to the tunes of ₹ 1.58 lakh crores to cooperative societies of various categories across the country. Sahakar Pragya is the latest in the series of farmer focused steps by NCDC.

These 45 training modules of Sahakar Pragya to be delivered at LINAC and its countrywide network of regional training centres will address the need for training of primary cooperatives, FPO-cooperatives and self-help groups federating. The training programmes will be supported under NCDC schemes, 10000 FPO formation scheme of Government of India, Agri Infra Fund scheme of Government of India, PM-FME scheme of Ministry of Food Processing Industry, Dairy Infrastructure Development Fund scheme of Government of India, Fisheries Infrastructure Development Fund scheme of Government of India, PM Matsya Sampada Yojana of Government of India, Ministry of Rural Development schemes State/UT schemes, other organizations' schemes.

NCDC has been created for the purpose of planning and promoting programmes for the production, processing, marketing, storage, export and import of agricultural produce, foodstuffs, industrial goods, livestock, certain other commodities and services like hospital & healthcare and education, etc., on cooperative principles. It extends financial assistance to cooperatives at all the three tiers, Primary, District and Apex/Multi-State.

Known for hand-holding cooperatives across the country with funding and project ideas, NCDC has been proactive in delivering innovative solutions for the cooperative sector. In the series of initiatives by NCDC had earlier launched the Sahakar Cooptube NCDC Channel with the aim to involve youth in the cooperative movement. Formation of new cooperatives is a prerequisite for bringing new life and dedication in the realm of cooperative movement. NCDC's guidance videos in different languages covering local requirements of 18 States on Sahakar Cooptube strengthens the major initiative of Government of India to promote and form 10,000 FPOs.

Working with the ideals mooted by Prime Minister Shri Narendra Modi for doubling the farmers' income, Stand Up India and Skilling India, NCDC has earlier launched various initiatives and programmes like SAHAKAR-22 to develop cooperatives in Focus 222 districts, including aspirational districts, nurturing primary level cooperatives, SAHAKAR MITRA–scheme on internship programme, YUVA SAHAKAR-Start-up scheme in cooperatives and AYUSHMAN SAHAKAR- for creation of healthcare infrastructure and services.

Union Agriculture Minister inaugurated Honey Farmer Producer Organizations by NAFED

The Honey FPO Programme of National Agricultural Cooperative Marketing Federation of India Limited (NAFED) was inaugurated by Minister of Agriculture and Farmers Welfare Shri Narendra Singh Tomar on 26th November, 2020. The inauguration programme was hosted online and attended by the new Honey FPOs, farmers and FPOs from various parts of the country.

Inaugurating the programme, the Minister stated that "Beekeeping in India is highly predominant in the unorganized sector among the rural and tribal population. Despite having a huge potential of honey production in the country, the beekeeping industry is still underdeveloped. The adoption level of beekeeping is also quite less due to various constraints. NAFED will address these issues by acting as an intermediary and filling up the gaps between the elements of the beekeeping supply chain and also ensure price remuneration to the beekeeping farmers. Through these Honey FPOs, NAFED will also work for promotion of beekeeping as an occupation for unemployed women and tribal populations and uplift their livelihood". Shri Tomar also said that honey beekeeping will change the lifestyle of small and marginal farmers and help in achieving the goal of increasing farmer's income.

Government of India is promoting the creation of FPOs in view of their significant role in fulfilling

the mission of implementing agricultural reforms in the country. Promotion & formation of FPOs is the first step for converting Krishi into Atma Nirbhar Krishi. For this purpose new central sector scheme for formation & promotion of new 10,000 FPOs was launched.

Under the new FPO scheme, so far National Level Project Management Advisory and Fund Sanctioning Committee (N-PMAFSC) had allocated 2200 FPO clusters for 2020-21 to all implementing agencies (IAs). N-PMAFSC allocated 500 FPOs to SFAC, 600 FPOs to NABARD & 500 FPOs to NCDC, 100 FPOs to Watershed Development Department of Karnataka, 50 FPOs to SFAC-Haryana, 50 FPOs to Tamil Nadu SFAC, 50 FPOs to North Eastern Regional Agricultural Marketing Corporation Ltd (NERAMAC), 100 FPOs to NRLM Division of MoRD for the current FY (2020-21). Additionally, specialized FPOs to be formed, 100 Organic FPOs by INM, DAC&FW, 100 Oilseed FPOs by DAC&FW and 50 commodity specific FPOs by NAFED with value chain development.

Implementing agencies had also identified the block wise clusters. FPOs will be developed by specialist 'Cluster Based Business Organizations (CBBOs)' engaged by implementing agencies. NAFED had already empanelled the CBBOs and other IAs is in the process of empanelment of CBBOs.

National Agricultural Cooperative Marketing Federation of India Limited (NAFED) has been appointed as the 4th National Implementing Agency other than SFAC, NABARD and NCDC for the creation of 10,000 FPOs by the Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW). NAFED has recently taken over the national level Federation of Indian FPOs and Aggregators (FIFA) with the aim of creating sustainable small holder institutions to enhance collective capacities, shortening of agri produce value chains for equitable returns to all stakeholders and leveraging technology for enhanced transparency, scale and seamless agri produce trading. Creation of Honey FPOs is one of the thrust areas of FIFA's business plan.

NAFED, through its empanelled Cluster Based Business Organisation (CBBO) Indian Society of Agribusiness Professionals (ISAP) has initiated the formation and promotion of FPOs of beekeepers and honey collectors in 5 states of India. The areas covered under the programme are Sundarbans in West Bengal, East Champaran in Bihar, Mathura in Uttar Pradesh, Morena in Madhya Pradesh and Bharatpur in Rajasthan. The First Honey FPO, Chambal FED Shahad Utpadak Sahakari Samiti, in the state of Madhya Pradesh under National Beekeeping & Honey Mission was registered on 11.11.2020 under the Cooperatives Act. The FPO will cover 5 blocks consisting of about 68 villages in Morena District of the state. The other four FPOs in the state of Bihar, Rajasthan, Uttar Pradesh and West Bengal shall cover 340 villages in these states. Through these 5 FPOs, 4000–5000 beekeepers/honey collectors would be benefitted directly.

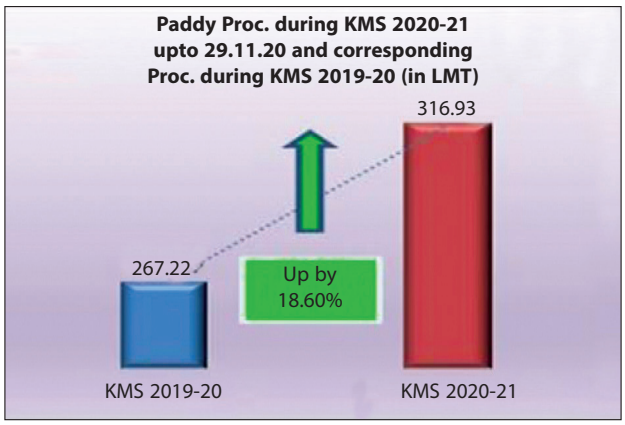
The Honey FPOs made by ISAP under the aegis of National Bee Board (NBB) and NAFED will help its members in not only upgrading their skills in scientific bee keeping but will also help in making its members set up state of the art infrastructural facilities for processing honey and allied beekeeping products like bee's wax, propolis, royal jelly, bee venom, etc., quality control laboratories, collection, storage, bottling and marketing centres. These FPOs will benefit by the schemes of Mini Mission–1 and Mini Mission–2 of National Beekeeping and Honey Mission (NBHM) of National Bee Board. The beekeepers/honey collectors of all the 5 states would be helped in branding and collective marketing of their honey and other allied products of bee keeping through the marketing channels of NAFED. Efforts will also be made to explore the overseas market for improving the returns to the bee keepers and honey collectors.

MSP Operations during Kharif Marketing Season 2020-21

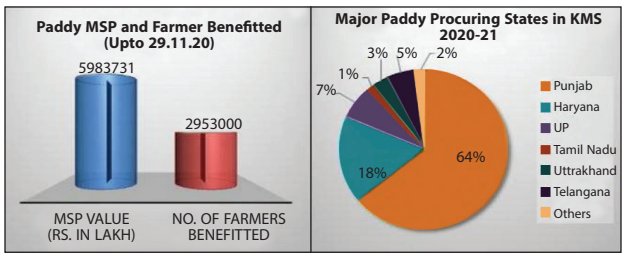
In the ongoing Kharif Marketing Season (KMS) 2020-21, Government continues to procure kharif 2020-21 crops at its MSP from farmers as per its existing MSP Schemes.

Paddy procurement for kharif 2020-21 is continuing smoothly in the procuring States & UTs of Punjab, Haryana, Uttar Pradesh, Telangana, Uttarakhand, Tamil Nadu, Chandigarh, Jammu & Kashmir, Kerala, Gujarat, Andhra Pradesh, Odisha and Maharashtra with purchase of over 316.93 LMTs of paddy up to 29.11.2020 against the last year corresponding purchase of 267.22 LMT showing an increase of 18.60 percent over last year. Out of the total purchase of 316.93 LMT, Punjab alone has

contributed 202.74 LMT which is 63.97 % of total procurement.



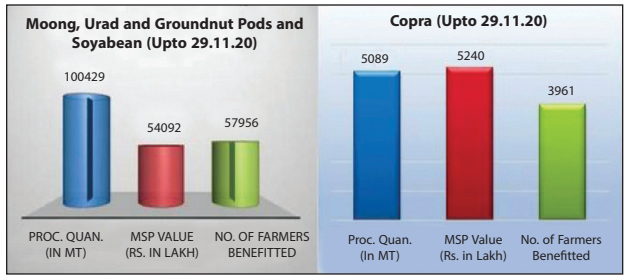
About 29.53 lac farmers have already been benefitted from the ongoing KMS procurement Operations with MSP value of ₹ 59837.31 crore.



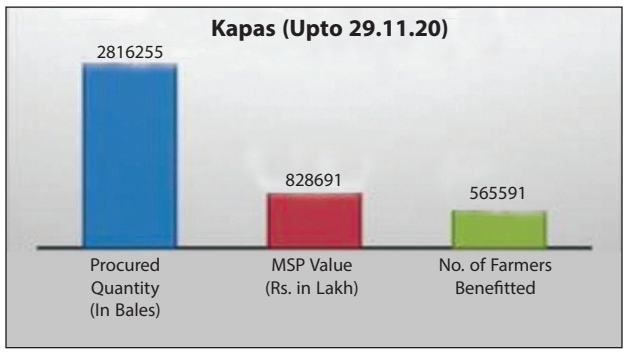
Further, based on the proposal from the states, approval was accorded for procurement of 45.24 LMT of pulse and oilseeds of Kharif Marketing Season 2020 for the States of Tamil Nadu, Karnataka, Maharashtra, Telangana, Gujarat, Haryana, Uttar Pradesh, Odisha, Rajasthan and Andhra Pradesh under Price Support Scheme (PSS). Further, sanction for procurement of 1.23 LMT of copra (the perennial crop) for the States of Andhra Pradesh, Karnataka, Tamil Nadu and Kerala was also given. For other States/UTs, approval will also be accorded on receipt of proposals for procurement of pulses, oilseeds and copra under PSS so that procurement of FAQ grade of these crops can be made at notified MSP for the year 2020-21 directly from the registered farmers, if the market rate goes below MSP during the notified harvesting period in the respective States/UTs by the central nodal agencies through state nominated procuring agencies.

Upto 29.11.2020, the Government through its nodal agencies has procured 100429.81 MT of moong, urad, groundnut pods and soyabean having MSP value of ₹ 540.92 crores benefitting 57956 farmers in Tamil Nadu, Maharashtra, Gujarat, Haryana and Rajasthan.

Similarly, 5089 MT of copra (the perennial crop) having MSP value of ₹ 52.40 crore has been procured benefitting 3961 farmers in Karnataka and Tamil Nadu upto 29.11.2020 as against the last year corresponding purchase of 293.34 MT of copra. In respect of copra and urad, rates are ruling above MSP in most of the major producing states. The respective State/UTs governments are making necessary arrangements for commencement of procurement from the date as decided by the respective states based on the arrivals in respect of kharif pulses and oilseeds.



Procurement operations of seed cotton (kapas) under MSP are going on smoothly in the States of Punjab, Haryana, Rajasthan Madhya Pradesh, Maharashtra, Gujarat, Telangana, Andhra Pradesh, Odisha and Karnataka. Till 29.11.2020 a quantity of 2816255 cotton bales valuing ₹ 8286.91 crore has been procured benefitting 565591 farmers.



General Survey of Agriculture

Trends in Foodgrain Prices

Based on Wholesale Price Index (WPI) (2011-12=100), WPI in case of foodgrains decreased by 1.68 percent in October, 2020 over October, 2019.

Among foodgrains, WPI of pulses and vegetables increased by 15.93 percent and 25.23 percent, respectively and cereals and fruits decreased by 5.24 percent and 3.87 percent in October, 2020 over October, 2019.

Among cereals, WPI for paddy increased by 0.61 percent and WPI of wheat decreased by 8.10 percent in October, 2020 over October, 2019.

Similarly, WPI in case of foodgrains decreased by 0.13 percent in October, 2020 over September, 2020.

Among foodgrains, WPI of vegetables and pulses increased by 9.24 percent and 3.73 percent, WPI of cereals and fruits decreased by 1.02 percent and 1.00 percent in October, 2020 over September, 2020.

Among cereals, WPI for paddy and wheat decreased by 0.43 percent and 1.73 percent in October, 2020 over September, 2020.

Rainfall and Reservoir Situation, Water Storage in Major Reservoirs

Cumulative post-monsoon season, 2020 rainfall for the country as a whole during the period 1st October, 2020 to 25th November, 2020 has been 5% lower 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 18% in Central India but lower than LPA by 52% in North-West India, by 8% in East & North East India and by 5% in South Peninsula.

Out of 36 meteorological sub-divisions, 09 meteorological sub-divisions received large excess/ excess rainfall, 09 meteorological sub-divisions received normal rainfall and 18 meteorological sub-divisions received deficient/large deficient rainfall.

Current live storage in 128 reservoirs (as on 26th November, 2020) monitored by Central Water Commission having Total Live Capacity of 172.13 BCM was 139.35 BCM as against 149.00 BCM on 26.11.2019 (last year) and 117.53 BCM of normal storage (average storage of last 10 years). Current year's storage is 94% of last year's storage and 119% of the normal storage.

Rabi sowing as on 27.11.2020, 348.24 lakh ha area has been sown as compared to 334.78 lakh ha during 2019-20 during the same period.

All India Crop Situation - Rabi (2020-21) as on 27-11-2020

(Area in lakh hectares)

Crop Name	Normal Area	Area sown			Absolute Change
		This Year	% of Normal	Last Year	
Wheat	303.28	151.58	50.0	150.49	1.09
Rice	41.78	8.18	19.6	8.84	-0.66
Jowar	33.40	18.19	54.5	18.69	-0.50
Maize	17.37	4.76	27.4	5.62	-0.86
Barley	6.38	4.06	63.7	4.23	-0.17
Total Coarse Cereals	**57.14**	**27.39**	**47.9**	**28.91**	**-1.52**
Total Cereals	**402.20**	**187.15**	**46.5**	**188.24**	**-1.09**

All India Crop Situation - Rabi (2020-21) as on 27-11-2020-*Contd.*

(Area in lakh hectares)

Crop Name	Normal Area	Area sown			Absolute Change
		This Year	% of Normal	Last Year	
Gram	92.77	69.36	74.8	60.76	8.60
Lentil	14.24	11.47	80.6	10.31	1.16
Peas	8.74	7.70	88.1	6.30	1.40
Kulthi(Horse Gram)	2.14	2.91	136.2	3.18	-0.27
Urad	8.93	2.60	29.1	2.61	-0.01
Moong	9.86	0.63	6.4	0.78	-0.15
Lathyrus	3.98	2.14	53.8	1.74	0.40
Others	4.23	2.64	62.4	2.13	0.51
Total Pulses	**144.88**	**99.45**	**68.6**	**87.80**	**11.65**
Total Foodgrains	**547.07**	**286.60**	**52.4**	**276.04**	**10.56**
Rapeseed & Mustard	59.44	57.44	96.6	53.88	3.56
Groundnut	7.24	1.68	23.2	1.87	-0.19
Safflower	1.15	0.34	29.6	0.23	0.11
Sunflower	2.37	0.46	19.4	0.60	-0.14
Linseed	2.74	1.47	53.6	1.75	-0.28
Total Oilseeds (Nine)	**72.94**	**61.64**	**84.5**	**58.73**	**2.91**
All- Crops	**620.01**	**348.24**	**56.2**	**334.78**	**13.46**

Source: Crops & TMOP Divisions, DAC&FW

Articles

Dynamics of Castor Production and Instability in major States of India

GAJAVALLI SAISRI[1] AND DHANDHALYA M. G.[2]

Abstract

The significance of the Indian castor crop in recent years has increased, as it brings sizeable amount of foreign exchange to the country. In the present study, the dynamics of castor production and instability has been analyzed for different periods ranging from 1976-77 to 2017-18. India achieved high growth rate in area, production and yield of castor during 1986-87 to 1995-96 at the remarkable rate of 3.89, 15.42 and 11.10 percent per annum, respectively, mainly due to the notable performance of Gujarat and Rajasthan. The major reason behind this performance was the release of hybrid castor varieties like GAUCH-1 in 1973 and GCH-2 in 1985. Besides, the release of castor varieties, viz., GCH-6 in 2000 and GCH-7 in 2006 in Gujarat contributed largely in recent production of castor. It is found that during overall study period (1976-77 to 2017-18) at all India level also the growth rate of area, production and yield increased considerably. Moreover, Andhra Pradesh recorded significant growth in production and productivity of castor, but its area declined significantly in recent period. While, Karnataka and Odisha had witnessed deterioration in growth rates both in area and production. Rajasthan recorded the highest instability of 56.90 percent in area, 74.21 percent in production and 33.24 percent in yield during the study period. It is suggested that instability observed in various states during the study period needs to be reduced and yield should be improved by developing wilt resistant, short duration, location specific high yielding varieties of castor. The existence of wide variation in castor yield across growing states due to differences in climatic conditions, infrastructural developments and utilization patterns need to be focused for further improvement in yields.

Keywords: Castor, growth, instability, area, production, productivity.

1. Introduction

Castor (*Ricinus communis* L.) is also known as the "Palm of Christ" or "Palma Christi," that derives from castor oil's reputed ability to heal wounds and cure aliments. Probably native to Eastern Africa and India, this species has become naturalized throughout the tropical world. Castor plants are generally grown for oil yielding seeds. Castor oil has high usage value for biodegradable lubricants, bio-fuel and many other applications, with its emission of gases complying with international environmental standards.

In India during 1950s, castor was a crop of low value and was primarily grown in dry areas of Andhra Pradesh. But over the years, the center of castor production has shifted to Gujarat. Interestingly, at present most of the increase in total castor production contributed from Gujarat, where this crop has become a major cash crop in the farmers' portfolio (Tewari, 2012). Gujarat alone contributes about 85 percent of the total castor seed production in India today. Also, castor yields in Gujarat have remained the highest in the world, since 1970s, even more than twice of the world average (Tewari & Rao, 1991). India is the only country in the world, where hybrid technology was commercially exploited in castor with the release of first hybrid GCH-3 in 1969 from Gujarat. This was followed by a large number of high yielding hybrids with resistance to many biotic threats. High yielding/hybrid varieties coupled with crop production and protection technologies, led to many-folds increased production in India and virtually established India as the leading country in the world, capturing international market.

The area, production and productivity of castor in India have increased steadily from 7.17 lakh ha, 6.53 lakh tonnes and 911 kg/ha in 2001-02 to 8.26 lakh ha, 15.68 lakh tonnes and 1898 kg/ha in 2017-18, respectively. However, in spite of high increase in production of castor at the state and country level,

[1]Post graduate student of College of Agriculture, Junagadh Agricultural University, Junagadh-362001, Gujarat.
[2]Associate Research Scientist, Department of Agricultural Economics, Junagadh Agricultural University, Junagadh-362001, Gujarat.

there exists wide variation in castor yield across castor-growing states due to differences in climatic conditions, infrastructural developments and input utilization patterns. These variations underline the importance of studying the growth performance and instability in castor production at the state as well as at country level. Therefore, the present study was undertaken to analyse the growth and instability in castor area, production and productivity from 1976-77 to 2017-18.

2. Methodology

The present study is based on the secondary data collected from Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare. The time series data on area, production and productivity of castor for five major castor growing states was collected for a period from 1976- 77 to 2017-18. The analysis of growth and instability in area, production and productivity were carried out from year 1976-77 to 2017-18, which further, split into five periods, *viz.*, Period-I (1976-77 to 1985-86), Period-II (1986-87 to 1995-96), Period-III (1996-97 to 2005-06) and Period-IV (2006-07 to 2017-18), and overall Period-V (1976-77 to 2017-18).

Compound growth rate

The compound growth rates (CGRs) of area, production and productivity of castor in India as well as across the major castor producing states were calculated using the exponential function of the following specification,

$$Y_t = ab^t \quad \text{..... (1)}$$

In the log form, the above function (1) was formulated as,

$$\log Y_t = \log a + t \log b \quad \text{..... (2)}$$

Where,

Y_t = Area/production/productivity of castor in the year 't';

t = Time variable in years taking the value of 1, 2, 3, ...n;

a = Intercept;

b = Regression coefficient (1+r); and

r = Compound growth rate.

The value of log b in equation (2) was computed using the formula,

$$\log b = \frac{(\sum t \log Y - (\sum t \sum \log Y / N))}{\sum t^2 - \left(\frac{\sum t^2}{N}\right)} \quad \text{..... (3)}$$

Where,

N = Number of years.

Subsequently, the compound growth rate (%) was computed using the formulation,

$$\text{Compound growth rate (r)} = [(\text{Antilog of log b})-1]*100 \quad \text{..... (4)}$$

Student 't' test was used to determine the significance of the growth rates obtained for which, the following formulation was employed,

$$t = \log b / SE(\log b) \quad \text{..... (5)}$$

$$SE(\log b) = \sqrt{\frac{\sum(Y-\bar{Y})^2 - \log b * (\sum(Y*t) - \sum(Y)*\bar{t})}{(N-2)\sum(t-\bar{t})^2}} \quad \text{..... (6)}$$

The calculated 't' values, from equation (6), was compared with the table 't' values and the significance was tested for 1, 5 and 10 percent probability levels.

Instability indices

In order to study variability in export trade of castor, the instability index was used as a measure of variability. The coefficient of variation (CV) was calculated by using the following formula:

$$CV(\%) = S/\bar{X} * 100 \quad \text{.....(7)}$$

The trend coefficient was tested for its significance. Whenever, the trend coefficient was found to be significant, the variation around the trend rather than variation around mean was used as an index of instability. The formula suggested by Cuddy and Della (1978) was used to compute the degree of variation around the trend.

$$Ix = CV\sqrt{(1 - \bar{R}^2)} \quad \text{..... (8)}$$

Where,

Ix = Instability index;

CV = Coefficient of variation;

$\bar{R}^2$ = Adjusted coefficient of multiple determination;

$\bar{X}$ = Mean value;

S = Standard Deviation.

3. Results and Discussion

3.1. Area, production and productivity of castor

India ranks first in the world in terms of castor production with an annual production of about 15.68 lakh tonnes in 2017-18. Area under castor cultivation is also maximum in India among all castor producing countries. The major castor producing states are Andhra Pradesh, Gujarat, Karnataka, Odisha, Rajasthan and Tamil Nadu (Table 1). During last four decades, Gujarat registered the highest area under castor and highest production and productivity. In the beginning of 1970s the area under castor in Gujarat was just 63 thousand ha which increased to around 7 lakh ha in 2010s. Besides, production and productivity also increased remarkably during last five decades. Rajasthan also witnessed same trends, but Andhra Pradesh, Karnataka, Odisha and Tamil Nadu did not observe such trend. Though, Andhra Pradesh had the highest area (3.06 lakh) under castor in India during triennium ending 1972-73 it declined to around 0.8 lakh ha during triennium ending 2017-18. However, yield increased considerably in Andhra Pradesh. Figure 1 clearly shows that Gujarat had largely contributed in castor production in India, followed by Rajasthan during last four decades.

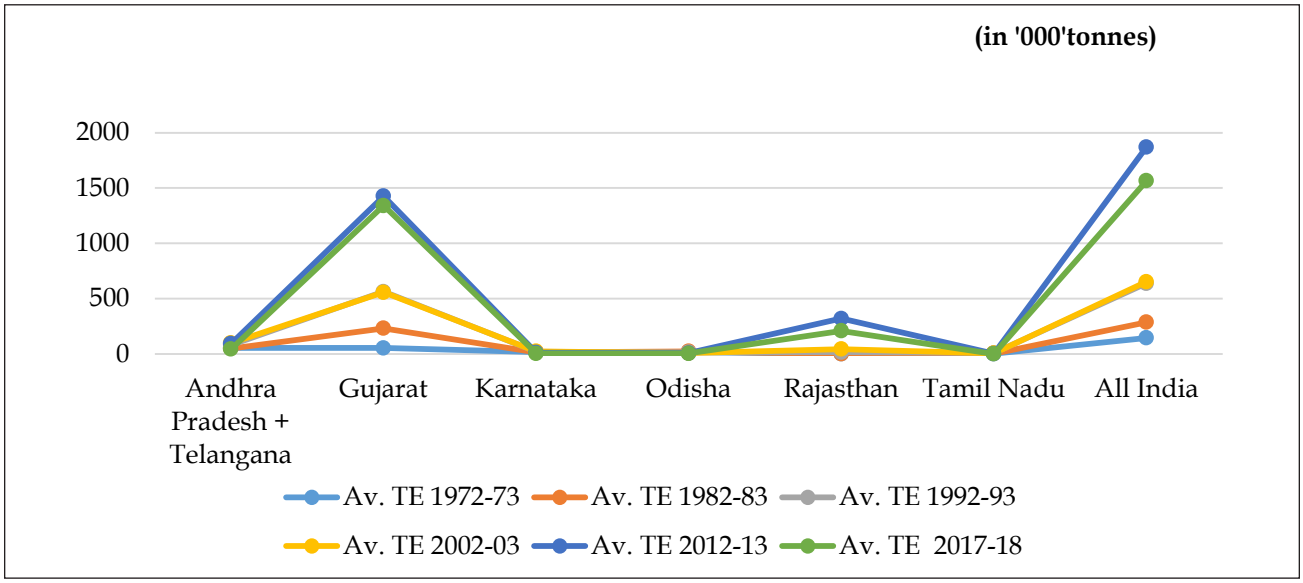
TABLE 1: AREA, PRODUCTION AND YIELD OF CASTOR IN MAJOR STATES OF INDIA

(Area '000' ha, production '000' tonnes & yield kg/ha)

State	Particular	Average TE 1972-73	Average TE 1982-83	Average TE 1992-93	Average TE 2002-03	Average TE 2012-13	Average TE 2017-18
Andhra Pradesh & Telangana	Area	306	277	308	269	217	79
	Production	55	50	82	100	93	45
	Yield	179	182	266	373	427	570
Gujarat	Area	63	194	354	396	706	614
	Production	54	232	563	558	1427	1341
	Yield	865	1191	1593	1410	2021	2184
Karnataka	Area	32	25	24	23	15	8.3
	Production	18	16	20	24	12	4.7
	Yield	563	643	829	1022	804	560
Odisha	Area	25	43	28	17	13	8.1
	Production	19	24	15	7.6	8.4	5.1
	Yield	751	545	544	453	630	624
Rajasthan	Area	2.0	5.1	18	64	221	159
	Production	0.8	1.3	17	45	321	209
	Yield	393	250	991	693	1451	1319
Tamil Nadu	Area	9.3	15	27	24	5.9	4.1
	Production	3.9	4.6	8.2	7.5	1.8	1.4
	Yield	419	309	308	310	310	342
All India	Area	439	545	727	793	1195	898
	Production	145	287	639	653	1870	1565
	Yield	330	526	878	824	1565	1744

Source: Directorate of Economics and Statistics, 2019.

Figure 1: Decadal Shift in Castor Production in major States of India



Source: Based on DES (2019) data.

3.2. Growth performance of castor in major producing states

Table 2 revealed that Andhra Pradesh recorded the highest significant growth rate in Period III in production (12.09%) and productivity (7.06%). But in Period IV, Andhra Pradesh witnessed significant negative growth rates in both area (-9.52%) and production (-8.79%). In overall study period, Andhra Pradesh recorded significant increase in growth rate of production and productivity of castor, but its area under castor crop has significantly declined.

Gujarat has positive and significant growth rates in area, production, in all the periods (Table 2), except in period III, where it showed negative but non-significant growth rates in area, production and productivity. Gujarat achieved the highest significant growth rates in castor area (13.30%), production (22.61%) and productivity (8.22%) in Period II. This is mainly due to the release of hybrid castor varieties like GAUCH-1 in 1973 and GCH-2 in 1985. Besides, the release of castor varieties, *viz.*, GCH-6 in 2000 and GCH-7 in 2006 in Gujarat contributed significantly in increasing area, production and productivity of castor in recent decades.

Rajasthan showed the highest significant growth rates in area (24.68%) and production (46.62%) in Period II among all the major castor growing states in India as indicated in figure 2. Also, in overall study period Rajasthan registered significantly high growth rate in area (11.91%), production (17.72%) and productivity (5.19%). Rajasthan benefited largely by growing the high yielding varieties of Gujarat. This result is similar to that of Mundinamani (1993) which showed that in Karnataka during post-green revolution period, the increase in output of oilseeds in the study area was due to expansion of area, rather than increment in yield.

During the Period III from 1996-97 to 2005-06 there was severe drought condition in most parts of India including Gujarat and Rajasthan during 1999-2000, 2000-01 and 2002-03. Castor being long duration crop required multiple irrigations after withdrawal of monsoon.

Tamil Nadu recorded the highest growth rates in Period II in area (6.07%) and production (5.76%) compared to all other periods of study, while, in Period III, Tamil Nadu showed drastic reduction in growth rates in area (-14.59%) and production (-14.36%). In overall study period also, Tamil Nadu showed significant decrease in growth rates of area (-3.22%), production (-3.38%) and yield (-0.31%).

Besides, uneven distribution of rainfall also affected sowing operations and caused reduction in yield. Solanki *et al.* (2007) reported similar results stated that castor area and production was unstable during 1985-86 to 2003-04 in Rajasthan. Besides,

TABLE 2: PERIOD-WISE GROWTH RATES OF AREA, PRODUCTION AND PRODUCTIVITY OF CASTOR IN MAJOR STATES OF INDIA

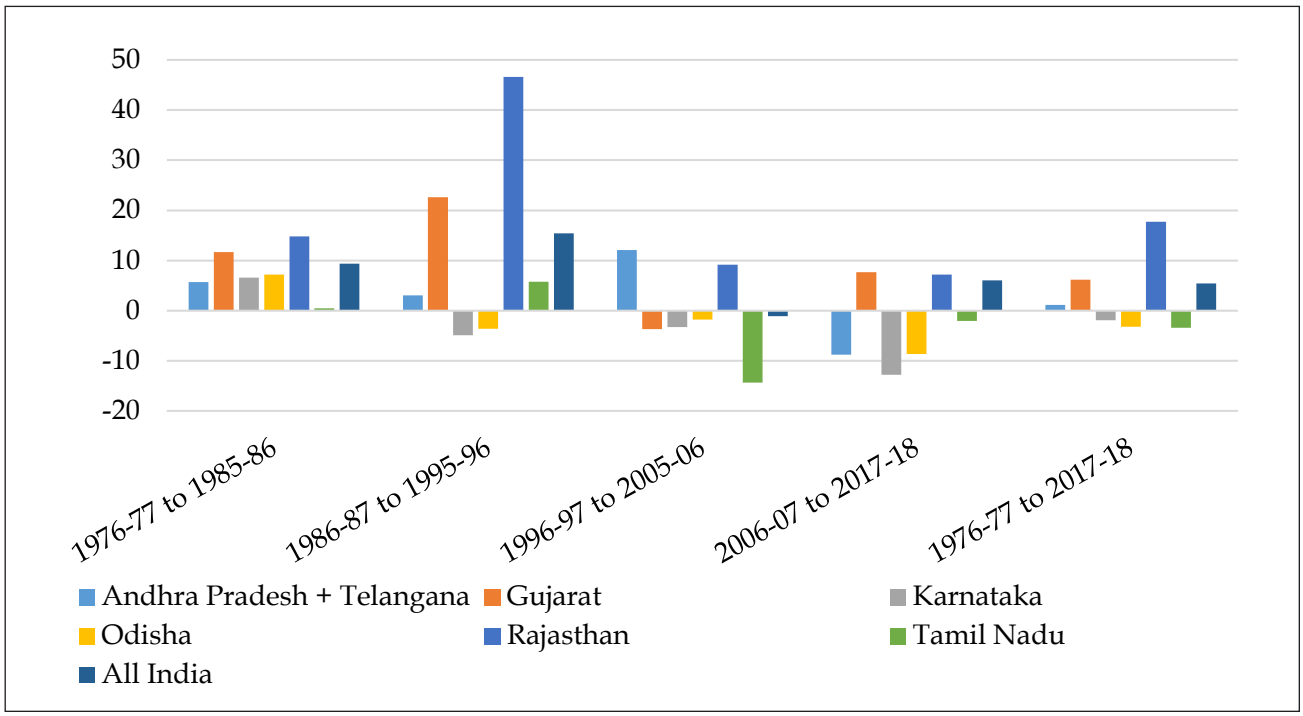
State	Particular	Period 1 (1976-77 to 1985-86)		Period II (1986-87 to 1995-96)		Period III (1996-97 to 2005-06)		Period IV (2006-07 to 2017-18)		Period V (1976-77 to 2017-18)	
		CGR (%)	SE	CGR (%)	SE	CGR (%)	SE	CGR (%)	SE	CGR (%)	SE
Andhra Pradesh & Telangana	Area	2.48	0.166	-2.13	0.121	4.69	0.214	-9.52**	0.327	-2.09***	0.334
	Production	5.73**	0.244	3.05	0.184	12.09***	0.286	-8.79**	0.379	1.11**	0.402
	Yield	3.17	0.265	5.29***	0.103	7.06***	0.136	0.79	0.325	3.27***	0.231
Gujarat	Area	13.22***	0.070	13.30***	0.369	-2.16	0.162	6.58**	0.252	4.29***	0.210
	Production	11.71***	0.202	22.61***	0.429	-3.68	0.273	7.64**	0.252	6.14***	0.382
	Yield	-1.33	0.161	8.22***	0.223	-1.56	0.185	0.97***	0.029	1.77***	0.186
Karnataka	Area	0.54	0.095	-3.26***	0.052	-2.08	0.190	-9.76***	0.118	-2.30***	0.222
	Production	6.60*	0.263	-4.93**	0.172	-3.25	0.298	-12.80***	0.228	-1.91**	0.440
	Yield	6.03**	0.205	-1.72	0.148	-1.20	0.201	-3.51**	0.162	0.39	0.264
Odisha	Area	4.77**	0.156	-3.30***	0.063	-7.27***	0.138	-8.65***	0.162	-3.73***	0.215
	Production	7.19***	0.187	-3.63**	0.114	-1.79	0.173	-8.65***	0.182	-3.19***	0.264
	Yield	2.30*	0.121	-0.33	0.073	5.91**	0.207	0.21	0.016	0.58***	0.163
Rajasthan	Area	20.69***	0.296	24.68***	0.596	9.04	0.485	5.92	0.312	11.91***	0.480
	Production	14.83**	0.437	46.62**	0.992	9.14**	0.456	7.22	0.420	17.72***	0.708
	Yield	-4.85	0.290	17.60*	0.532	0.09	0.502	1.22	0.197	5.19***	0.470
Tamil Nadu	Area	4.22	0.206	6.07***	0.158	-14.59***	0.297	-3.72	0.269	-3.22**	0.621
	Production	0.43	0.216	5.76***	0.161	-14.36***	0.323	-2.08	0.169	-3.38***	0.583
	Yield	-3.63***	0.010	-0.30**	0.010	0.27	0.095	-0.01	0.012	-0.31***	0.086
All India	Area	5.50***	0.094	3.89***	0.117	0.84	0.176	2.49	0.233	1.85***	0.170
	Production	9.38***	0.175	15.42***	0.262	-1.07	0.246	6.06**	0.253	5.44***	0.278
	Yield	3.67*	0.177	11.10***	0.164	-1.90	0.189	3.49***	0.036	3.52***	0.188

Source: Author's calculation from DES (2019) data.
NOTE: *, **and *** indicates significance at 10, 5 and 1 percent levels, respectively.

Sonnad *et al.* (2011) also found that growth rates of area, production and productivity of major oilseed crops in the post-WTO period was less compared to pre-WTO period in India.

In the overall period, *i.e.*, Period V, among all castor growing states in India, positive and significant growth rates of castor area, production and productivity were recorded only in Gujarat and Rajasthan. The growth rates in area, production and productivity were 4.29%, 6.14% and 1.77%, respectively, in Gujarat while, the same in Rajasthan were 11.91%, 17.72%, 5.19%, respectively. At all India level, positive and significant growth rates in area (1.85%), production (5.44%) and productivity (3.52%) were found during the study period. During the overall study period, a significant increase in productivity of castor is found in Andhra Pradesh,

Figure 2: Period-wise Growth Rates of Castor Production in major States of India (CGR %)



Source: Based on DES (2019) data.

Odisha, Gujarat and Rajasthan. Whereas, Karnataka and Odisha had witnessed significantly negative growth rates in both area and production. Odisha recorded significantly positive growth rate only in productivity (0.58%). Tamil Nadu had significantly negative growth rates in area (-3.22%), production (-3.38%) and productivity (-0.31%).

Improved technologies coupled with favourable weather and low insect-pest pressure in major castor growing tracts has enabled this transformation in production and productivity. Similar results were obtained by Kachroo *et al.* (2010) reported that in India castor and coconut oilseeds were the only oilseeds which were showing positive growth trends during past four decades.

3.3. Instability in castor area, production and productivity

The agricultural instability can be measured by different methods, such as the coefficient of variation (CV), dispersion, Cuddy Della Valle Index (CDV), *etc*. The present study applies the CDV Index and CV for measuring the instability. The present study divides the CDV values into three categories, which represent a range of instability (Sihmar, 2014). The ranges of instability are as follows:

Low instability = between 0 to 15

Medium instability = between 15 to 30

High instability = greater than 30

During Period I, castor area in Gujarat (9.16%), Karnataka (9.35%), Odisha (13.62%) and at all India level (8.61%) had shown low instability (Table 3). Whereas, Andhra Pradesh (15.76%) and Tamil Nadu (22.71%) showed medium instability in castor area. During Period I, Rajasthan had recorded high instability in area (48.73%) and highest instability in production (57.87%) and productivity (30.74%). All other states under study and India as a whole showed medium instability in production and productivity in Period I.

During Period II, very low instability in castor area was recorded in Karnataka (5.18%) and Odisha (5.99%). Medium instability in area was recorded in Andhra Pradesh (13.04%), Gujarat (20.22%), Tamil Nadu (12.5%) and at all India level (10.89%). Rajasthan also showed high instability in area (47.71) during Period II. In production of castor Andhra Pradesh (17.14%), Gujarat (20.97%),

Karnataka (16.26%), Odisha (11.74%), Tamil Nadu (13%) and all India (17.71%) showed medium instability. The highest instability in production was seen in Rajasthan (74.01%). During Period II highest instability in productivity was also seen in Rajasthan (44.16%). Whereas, Odisha and Tamil Nadu revealed low instability in productivity during Period II.

During Period-III, production of castor in Gujarat and Odisha shown medium instability. Whereas, Andhra Pradesh, Karnataka, Rajasthan and Tamil Nadu experienced high instability. Odisha and Rajasthan showed high instability in case of production too. Rajasthan and Andhra Pradesh during Period IV showed high instability in production. While, during the same period low instability was recorded in productivity in Gujarat (3.01%), Odisha (1.58%), Tamil Nadu (1.2%) and at all India level (3.47%).

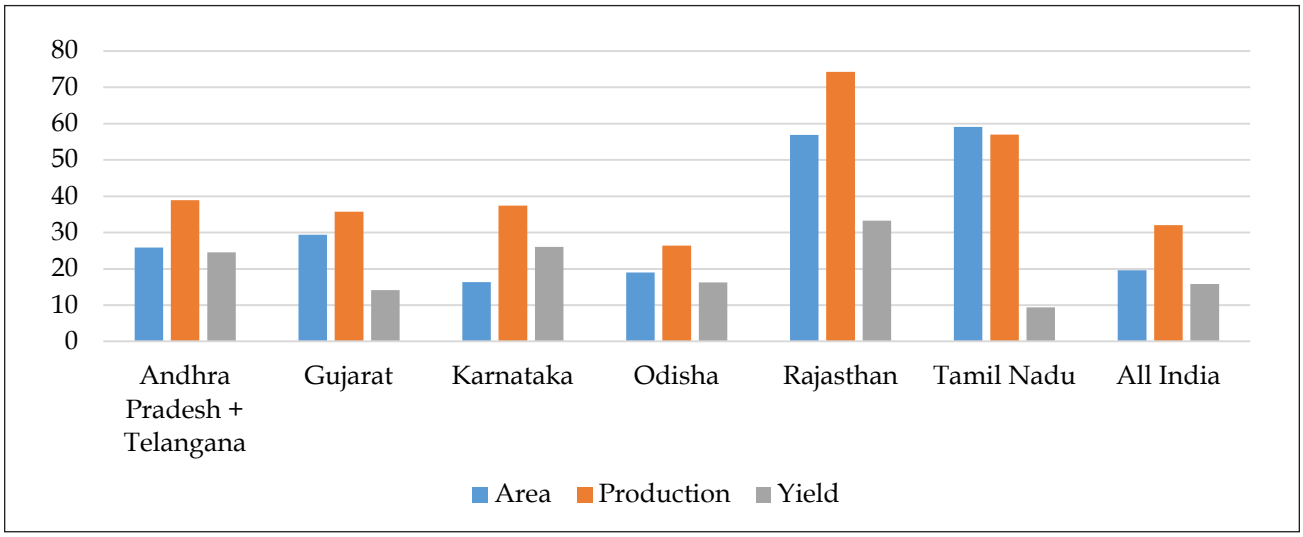
TABLE 3: INSTABILITY ANALYSIS OF CASTOR AREA, PRODUCTION AND PRODUCTIVITY IN MAJOR STATES OF INDIA

State	Particular	Period I (1976-77 to 1985-86)		Period II (1986-87 to 1995-96)		Period III (1996-97 to 2005-06)		Period IV (2006-07 to 2017-18)		Period V (1976-77 to 2017-18)	
		CV (%)	CDV (%)	CV (%)	CDV (%)	CV (%)	CDV (%)	CV (%)	CDV (%)	CV (%)	CDV (%)
Andhra Pradesh & Telangana	Area	16.16	15.76^	13.04	13.04^	24.52	22.23^	39.42	29.53	31.74	25.84
	Production	26.26	21.38	17.97	17.14^	40.80	27.56	44.96	37.97	41.25	38.94
	Yield	22.67	22.44^	17.73	10.05	24.12	13.44	24.28	25.38^	45.65	24.50
Gujarat	Area	37.38	9.16	36.08	20.22	16.73	16.40^	31.24	25.86	54.90	29.35
	Production	41.04	25.25	49.08	20.97	22.85	21.41^	32.62	25.34	71.25	35.74
	Yield	14.64	15.17^	24.33	15.72	16.45	16.74^	4.55	3.01	24.59	14.18
Karnataka	Area	8.94	9.35^	11.31	5.18	18.84	18.96^	36.12	11.02	28.50	16.35
	Production	25.47	21.17	21.21	16.26	30.56	30.91^	46.78	20.25	39.96	37.42
	Yield	22.49	17.35	14.77	14.84^	19.50	20.17^	20.11	16.89	26.11	26.08^
Odisha	Area	17.71	13.62	11.70	5.99	24.70	11.24	29.74	8.29	45.37	19.03
	Production	24.52	16.96	15.33	11.74	16.42	16.32^	29.70	9.74	45.33	26.37
	Yield	12.25	10.87	7.343	7.70^	31.75	26.40	1.671	1.58^	17.66	16.24
Rajasthan	Area	73.78	48.73	67.98	47.71	51.45	47.24^	35.32	32.76^	109.61	56.90
	Production	70.68	57.87	92.40	74.01	51.16	40.16	42.50	39.78^	129.22	74.21
	Yield	32.76	30.74^	52.10	44.16	36.34	38.50^	15.26	15.59^	56.87	33.24
Tamil Nadu	Area	24.66	22.71^	19.96	12.53	43.68	22.95	21.17	19.95^	63.38	59.11
	Production	19.44	20.56^	19.55	13.00	46.50	29.41	15.55	15.02^	62.09	56.97
	Yield	14.95	10.06	1.34	1.04	9.87	10.45^	1.15	1.20^	10.18	9.38
All India	Area	18.00	8.61	14.95	10.89	18.15	19.06^	24.88	24.82^	29.62	19.65
	Production	32.87	19.85	39.37	17.71	19.62	20.69^	30.21	25.67	66.15	32.03
	Yield	19.09	16.92	29.97	11.59	17.73	17.67^	12.62	3.473	42.65	15.82

Source: Author's calculation from DES (2019) data.
NOTE: CV- Coefficient of Variation (%), CDV- Cuddy Della Valle Index (%), ^- Non- significant.

During Period V (the overall period), high instability in area was seen in Rajasthan (56.9%) and Tamil Nadu (59.11%) Figure 3. High instability in production of castor was recorded in Andhra Pradesh (38.94%), Gujarat (35.74%), Karnataka (37.42%), Rajasthan (74.21%), Tamil Nadu (56.97%) and all India (32.03%). Except Odisha (26.37%), all other states under study showed high instability in production.

Figure 3: Instability of Castor Area, Production and Yield in major States of India during 1976-77 to 2017-18 (CDV%)



Source: Based on DES (2019) data.

Instability in productivity was least in Tamil Nadu (9.38%) and highest in Rajasthan (33.24%), in overall period under study. Thus, the Rajasthan indicated higher instability in case of area, production and productivity in all periods under study. This might be due to the fact that Rajasthan has short monsoon period and less availability of irrigation facilities. These results are in line with findings of Mahendradev (1987).

4. Conclusion and Suggestions

The analysis of the growth rate in castor area, production and productivity revealed that Gujarat and Rajasthan experienced higher growth in area, production and productivity during the last four and half decades. The remarkable growth rate in Gujarat and Rajasthan resulted in remarkable increase in the growth rate of castor area, production and yield at the rate of 3.89, 15.42 and 11.10 percent per annum, respectively, at all India level during 1986-87 to 1995-96. This is mainly due to the release of hybrid castor varieties like GAUCH-1 in 1973 and GCH-2 in 1985. At all India level also, the growth rate of area, production and yield increased notably at the rate of 1.85%, 5.4% and 3.52% per annum, respectively, during last four decades. However, Andhra Pradesh, Karnataka and Odisha could not explore the benefits of hybrid/HYV technology.

In India, instability in overall study period revealed that, medium instability was found in area and productivity and high instability was found in production. Rajasthan recorded the highest instability of 56.90 percent in area, 74.21 percent in production during the study period and the highest instability in productivity in 1986-87 to 1995-96. Besides, the higher production instability was observed in all the states during all the period under study.

Based on research done, following suggestions may be given:

i. Andhra Pradesh, Karnataka and Odisha may focus on further refinement of castor hybrid technology to increase castor cultivation.

ii. Instability needs to be reduced and yield may be improved by developing wilt resistant, short duration, location specific, high yielding

varieties of castor.

iii. Presently, the world economy is facing the energy crisis and environmental degradation problems. The potential for bio-feed stock like castor oil could be a good source for eco-friendly fuel, which may also increase farm income.

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Green Economics towards Rural Development: A Study of Ashwagandha Cultivation in Deccan Plateau

PANKAJ CHOUDHARY[1], MUDIT MISHRA[2], S.P. SINGH [3], DEEPAK K. VERMA[4], R. S. SHARMA[5], R K SRIVASTAVA[6] AND SANJAY KUMAR[7]

Abstract

Ashwagandha is an important medicinal plant used in the traditional system of medicine from ancient time. Central Institute of Medicinal and Aromatic Plants (Council of Scientific & Industrial Research) (CSIR-CIMAP) introduced and promoted the Ashwagandha cultivation on large-scale through bio-village mission mode approach in semi-arid tropics of Deccan Plateau. The present study was conducted in Kurnool and Anantapur districts of Andhra Pradesh. The study is based on primary data. The primary information was obtained from 100 farmers through pre-structured interview schedule in order to estimate the socio-economic status of farmers and their resource use structure. About one third of cost of cultivation was accorded to harvesting (31.70%) followed by cost incurred in intercultural operations (19.46%). The Benefit Cost ratio of Ashwagandha crop cultivation was observed as 3.08:1. The resource use efficiency of Ashwagandha crop was also calculated by using multiple linear regression method. R^2 value was found to be very high. The yield of Ashwagandha was positively and significantly influenced by all the independent variables except the plant protection. The correlation between the yield and input use in Ashwagandha shows that cultivation of Ashwagandha is highly correlated with all the variables except irrigation and plant protection due to cultivation in the rainfed area.

Keywords: Socio-economic, Costs and Returns, *Cobb–Douglas* production function, Correlation and regression, Resource use efficiency.

1. Introduction

Ashwagandha (*Withania somnifera)* is an important medicinal plant that has been used in Ayurvedic and indigenous medicine from the ancient time. Ashwagandha is also known as Indian ginseng, and as Indian Winter Cherry, the roots of which have been employed in Indian traditional systems of medicine, Ayurveda and Unani.(Umadevi *et al.*, 2012).

Ashwagandha was first mentioned by sage Punarvasu Atreya over 4000 years ago. Subsequently the medicinal properties of this plant were mentioned in Ayurvedic treatises such as Charaka Samhita, Sushruta Samhita, Astanga Hridaya, Bhava Prakasha Nighantu, etc., to mention a few. Currently around 200 traditional medicinal formulas are prepared in Ayurveda, Siddha and Unani systems using this plant. All the plant parts are credited with medicinal properties (Rao *et al.*, 2012). Ashwagandha is cultivated in different parts of country. It is drought tolerant annual, hence is cultivated under rainfed condition in marginal soils by small and marginal farmers of Madhya Pradesh, Rajasthan, Andhra Pradesh, Karnataka and other states of India.

The cost of cultivation and high price for the roots is attracting farmers for large scale cultivation (Rao *et al.*,). It grows in dry parts in sub-tropical regions like Rajasthan, Madhya Pradesh, Haryana, Gujarat, Maharashtra and Uttar Pradesh states of the country (Directorate of Medicinal and Aromatic Plants Research). The demand of Ashwahgandha roots has increased in domestic market from last decade and in recent years, the demand for ashwagandha alkaloids has also increased in the international as well as the US market for the *Neutraceuticals*. One and half decade before it was mostly collected from forest area to meet out the domestic requirements of Ayurveda industry. The cultivation of Ashwagandha was started in late 90s and in the beginning of the 21st century. CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP) in Deccan plateau introduced the Ashwagandha cultivation one decade before through its Research

[1 &2] Project Assistants, [3] Research Associate, [4] Technical Assistant, [5 & 6] Senior Scientist, [7] Principal Scientist at CSIR- Central Institute of Medicnal and Aromatic Plants (CIMAP), P.O. CIMAP, Lucknow-226015.

Centre situated at Hyderabad.

The two high-yielding varieties of Ashwagandha namely Poshita and NIMTLI-118 were introduced for cultivation at farmer's field in Kurnool and Anantpur districts of Andhra Pradesh. Later it spread in to other adjoining districts of Andhra Pradesh and Telangana. Kurnool and Anantapur districts lie in arid and semi-arid regions of Andhra Pradesh. At present, this crop is being cultivated by 6000 farmers on an area of about 4000 hectares in Deccan plateau. The buyers from Neemuch (Madhya Pradesh) and other parts of the country are purchasing the Ashwagandha roots from farmers through local traders and directly from farmers group.

1.1. Objectives

i) To study the socio-economic status and profile of resources used by Ashwagandha growers.

ii) To estimate the costs and returns of Ashwagandha cultivation

iii) To determine the inputs-output relationship and resource use efficiency

2. Research Methodology

The present study was carried out in Kurnool and Anantapur districts of Andhra Pradesh. The study is based on primary data; collected with regard to the objectives formulated for the research work. Researchers deployed a pre-structured interview schedule. From selected districts, three villages namely Kottala, Belagallu and Lingampally were selected purposively on the basis that CSIR-CIMAP introduced Ashwagandha cultivation in these villages. A pooled list of all Ashwagandha growers was prepared for all three selected villages and thus, the numbers of 100 Ashwagandha growers were selected through Probability Proportionate Method. The data were tabulated, analyzed and interpreted in the light of the objectives by employing statistical tools. The analytical tools of data discussed in the following sections.

i. Descriptive analysis

To meet the first objective, descriptive analysis was applied to the study the socio-economic status of Ashwagandha growers and profile of their farm with respect to average landholding size, occupation, caste, and family size, literacy rate, cropping pattern and farm assets. The simple summation, percentage and average of the values were calculated and have been presented in tabular form for better understanding.

ii. Casts and returns analysis

The cost and returns for Ashwagandha cultivation was worked out based on Commission for Agricultural Costs and Prices (CACP) cost concept by using following various cost such as cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3.

Cost A_1: It is usually considered as the cost for landowner farmer's and generally it includes the following items as wages of hired human labours

i. Imputed value of owned machinery

ii. Charges of hired machinery

iii. Imputed value of owned seeds

iv. Market value of seed

v. Imputed value of owned manures

vi. Market value of manures and fertilizers

vii. Market value of plant protection chemicals

viii. Irrigation charges

ix. Interest on working capital

x. Depreciation charges on farm building, machinery, implements, etc.

xi. Land revenue

xii. Miscellaneous charges

Cost A_2: The cost A_2 is defined for tenant farmer. Mathematically cost A_2 can be expressed as

Cost A_2 = Cost A_1 + Rent paid for leased land

Cost B_1= A_2 + interest on amount of owned capital invested in cultivation of Ashwagandha excluding the value of land

Cost B_2 = Cost B_1 + rental value of owned land- (land revenue +rent paid for leased in land)

Cost C_1 = Cost B_1 + imputed value of family labour

Cost C_2 =Cost B_2 + imputed value of family labour

Cost C_3 = Cost C_2 +10% Cost of C_2 as a managerial service

$$\text{Cost of production} = \frac{\text{Cost } C_3 - \text{Value of by product}}{\text{Yield}}$$

iii. Cobb-Douglas production function

The resource-use efficiency of the inputs used by the Ashwagandha growers was estimated using Cobb-Douglas production function in following form

$$Y= aX_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_6^{b6}X_7^{b7}X_8^{b8}X_9^{b9}X_{10}^{b10}U_t \ldots\ldots 1$$

Where, Y is dependent variable (Roots and Seeds yield of Ashwagandha), a is constant term and b1, b2,.....,b10 are the regression co-efficient of Y with respective explanatory variables X1, X2,..... X10, respectively and Ut is error term.

iv. Regression and correlation analysis

To determine the inputs-output relationship, the multiple linear regression model was used as

$$Y= b0+ b1X1 + b2X2+,...,+ b10X10 +U$$

Where,

Y = dependent variable

b_i = constant term

X_i = explanatory variables

U = error term

The Pearson's correlation coefficient is used to measure the degree or strength of the association between crop yield and inputs application.

3. Result and Discussion

The Socio-economic status of Ashwagandha growers and profile of resource used is presented in Table1. The average size of land holding was found to be 3.43 hectare. The income of Ashwagandha cultivated farmers absolutely depend on agriculture and majority of growers were reported, the agriculture as main source of income and livelihood security. The maximum numbers of Ashwagandha growers were belonged to the schedules caste (51.52%) followed by Other Backward Class (41.41%) and tribal farmers (7.07%). The average family comprises of five family members, which may be considered as a small family. The literacy rate among the Ashwagandha growers was quite high at 84.94%, which indicated that year of schooling of grower's positive influence the adoption of Ashwagandha cultivation as a medicinal crop. In the study area maximum numbers of (57.49%) were cultivating Ashwagandha as medicinal crop followed by traditional crops (42.51%) like cotton, castor, etc. The sampled farmers in the region had average assets of ₹ 1, 52,015.

TABLE 1: SOCIO–ECONOMIC STATUS OF FARMERS AND PROFILE OF RESOURCE USE

Particulars		Value
Average size of landholding (hectare)		3.43
Main occupation		Agriculture
Category (%)	OBC	41.41
	SC	51.52
	ST	7.07
Average family size (number of family members)		5.00
Literacy rate (%)		84.94
Cropping pattern (%)	Traditional crops (cotton, castor, etc.)	42.51
	Medicinal crop's (Ashwagandha)	57.49
Average farm assets (farm building, machinery and equipment (₹)		1,52,015

Source: Primary data collected from farmer's field survey

As evident, from table 2 on overall basis, the average total cost of Ashwagandha cultivation is ₹ 28,747/ha. Among the variable costs, the highest cost is being constituted by harvesting charges (34.26%) followed by intercultural operations (21.19%), land preparation (13.09%), processing and packaging (10.16%) and remaining 21.03 % cost shared by manure & fertilizers, planting material and seed sowing charge and miscellaneous charges. Moreover, Ashwagandha cultivation requires comparatively low irrigation and little threat against

infestation of insect-pest and diseases. It is revealed that only 0.28 % cost incurred in irrigation and plant protection.

The earlier study conducted by (Rao BRR *et al.*)[6] on Ashwagandha cultivation and results revealed that the crop produces 400-1200 kg/ha dried roots and 200-500 kg seeds/ha. The growers sell good quality roots at the price of ₹ 100-150/kg and seeds at ₹ 40-100/kg. The cost of cultivation works out to ₹ 15,000-25,000/ha. The net profit ranges from ₹ 25,000-1,55,000/ha. The growers also earned the additional by selling seeds and leaves.

TABLE 2: COST OF ASHWAGANDHA CULTIVATION (₹ /HA)

Particulars	Amount (₹)	Percentage share
Land preparation	3764	13.09
Planting material	1677	5.83
Seed sowing	142	0.49
Manure & fertilizers	2368	8.24
Irrigation	50	0.17
Intercultural operations	6093	21.19
Plant protection	24	0.08
Harvesting	9849	34.26
Processing & packaging	2921	10.16
Miscellaneous charges (including transportation, etc.)	1861	6.47
Total variable cost	**28749**	**100**
Cost of depreciation of farm building, machinery and small implements (10%)	15202	-
Interest on working capital @ 7%	2012	-
Cost A1	**45963**	**-**

Source: Primary data collected from farmer's field survey

The results of yield (roots and seeds) and profitability of Ashwagandha cultivation is depicted in table 3. The average yield of Ashwagandha roots obtained by growers was 6.91 quintal/ha. and seeds 201.80 kg./ha. By conducting the market survey, the average market price per quintal of dried roots was observed ₹ 14,165 and seed ₹ 96/kg. The net return over total variable cost was found ₹ 88,436 and benefit-cost ratio found to be 3.08:1. It is revealed that the profitability of Ashwagandha cultivation is almost three times the investment. It implies, growers investing ₹ 100 rupees in Ashwagandha cultivation and will earn profit ₹ 308 within 6-7 months.

TABLE 3: YIELD AND PROFITABILITY OF ASHWAGANDHA CULTIVATION

Particular		Amount (₹)
Main cropyield (roots)	Quantity (Quintal/ha.)	6.91
	Average price (₹/quintal)	14,165
Seed yield	Quantity (kg./ha)	201.8
	Average price (₹/kg)	96
Gross return (₹/ha)		1,17,185
Total variable cost (₹/ha)		28,749
Net return over the total variable cost (₹/ha)		88,436
Benefit-cost ratio		3.08:1

Source: Primary data collected from farmer's field survey

Table 4 presents various costs (costs concepts given by CACP). The perusal of the table suggests that cost A_1, which includes costs of 12 different items (as elaborated in 'research methodology section'), found to be ₹ 45,963/ha. Cost B_1 was estimated to be ₹ 48,795. Cost C_1, which includes cost B_1 and imputed value of family labour, was found to be ₹ 49,355 and Cost C_3 was found to be ₹ 68,041. Another fact revealed that the per quintal cost of Ashwagandha production was ₹ 7, 042. The net returns over cost A_1 was found highest ₹ 71, 222/ha; followed by net returns over cost B_1, (₹ 68390/ha), C_1, (₹ 67830/ha) B_2, (₹ 55890) C_2 (₹ 68390/ha) and C_3 (₹ 49144/ha).

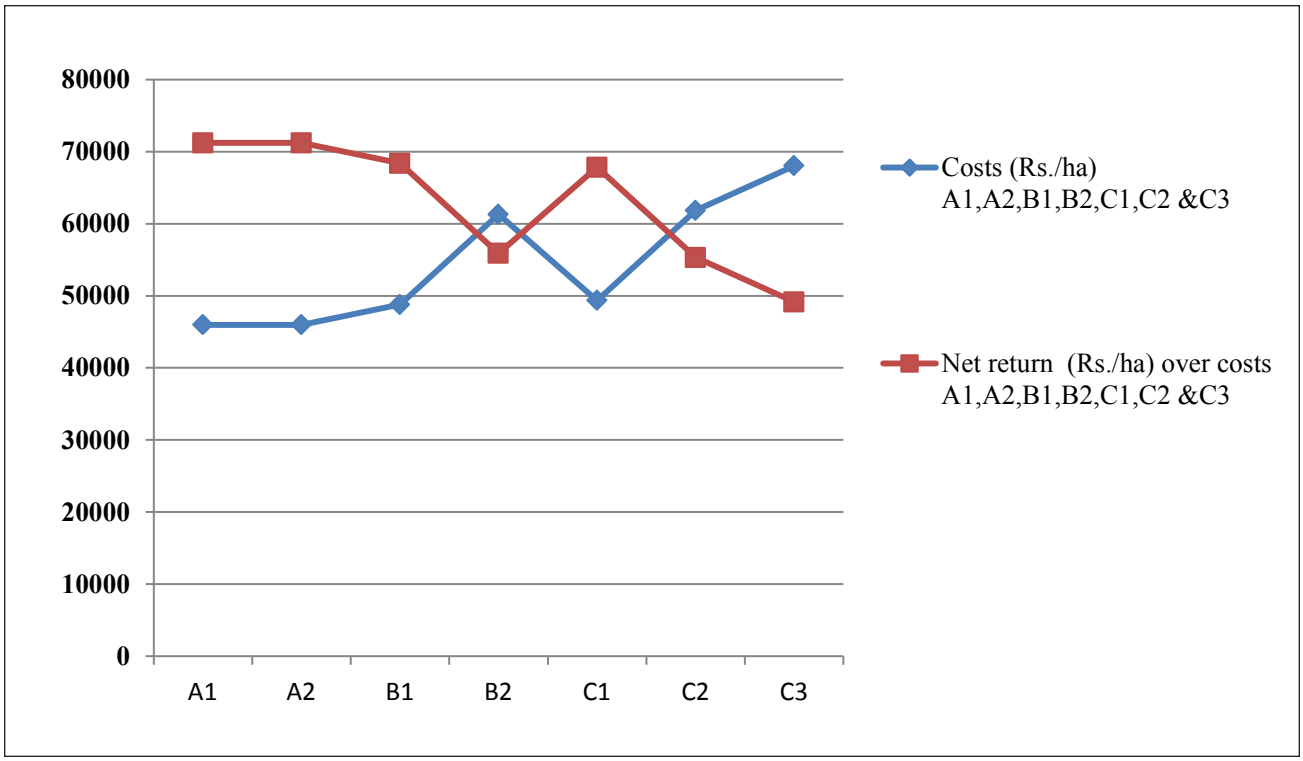
Table 5 revealed that explanatory variable included in the production function explained 96.7 percent variation in Ashwagandha yield. Regression coefficient of land preparation was positive and significant ($P<0.05$). It implies that the growers increase of one percent investment

TABLE 4: COSTS AND RETURNS OF CULTIVATION BASED ON CACP COST CONCEPT (₹/HA)

Costs	Amount (₹/ha)	Net returns over costs A_1, A_2, B_1, B_2, C_1, C_2 & C_3 (₹/ha)
A1	45,963	71,222
Rent paid for leased in- land	0	-
A2	45,963	71,222
Interest on fixed capital @ 7% per annum	2,832	-
B1	48,795	68,390
Rental value of land	12,500	-
B2	61,295	55,890
Imputed value of family labour	560	-
C1 (Cost B1 + Imputed value of family labour)	49,355	67,830
C2 (Cost B2 + Imputed value of family labour)	61,855	55,330
C3 (Cost C2 + 10% managerial cost of cost C2)	68,041	49,144
Value of seed produced	19,378	-
Yield (Quintal)	6.91	-
Cost of Production (₹/per quintal)	7,042	-

Source: Primary data collected from farmer's field survey

Figure 1: Costs and Returns of Ashwagandha Cultivation based on CACP Cost Concept



on land preparation resulted in an increase of 1.3 percent returns. Regression coefficients of investment on planting material, seed sowing, irrigation, intercultural operation, plant protection was also positive and significant at 5% probability level. However, application of manures and fertilizer, harvesting charge and miscellaneous expenditure incurred during production period are negatively related. The remaining inputs used in production process of Ashwagandha are insignificant.

TABLE 5: REGRESSION ANALYSIS OF DEPENDENT VARIABLES ON CULTIVATED OF ASHWAGANDHA

Variables	Coefficients	Standard error
Constant (a)	3941.849	1875.433
Land preparation (X_1)	1.273*	0.321
Planting material (X_2)	6.560*	1.093
Seed sowing (X_3)	2.496*	4.163
Manure & fertilizer (X_4)	-0.185*	0.259
Irrigation (X_5)	1.656*	1.321
Intercultural operation (X_6)	0.880*	0.288
Plant protection (X_7)	1.828*	3.668
Harvesting (X_8)	-0.548*	0.174
Processing & packaging (X_9)	0.746^{NS}	0.495
Miscellaneous charges (including transportation, etc.) (X_{10})	-0.920*	0.481
R^2	0.967	-
N	100	-

Source: Primary data collected from farmer's field survey
NOTE:* denote significant at 5 % level of probability, NS- Not –Significant

The perusal of the table 6 depicted that independent variables like except to X_1, X_2, X_3, X_4, X_6, X_8, X_9 and X_{10}'mentioned in methodology part' are strongly correlated with yield of Ashwagandha it is clearly indicated in table 6. However, independents variables X_5 and X_7 are not significantly correlated with yield. It may be because of the reason that most farmers cultivated Ashwagandha in rainfed condition and infestation of insect-pest and diseases prevalence in Ashwagandha is low.

TABLE 6: DEGREE/STRENGTH RELATIONSHIP BETWEEN YIELD AND DEPLOYED INPUTS

Variables	Coefficient
Land preparation (X_1)	0.905^{**}
Planting material (X_2)	0.934^{**}
Seed sowing (X_3)	0.864^{**}
Manure & fertilizer (X_4)	0.516^{**}
Irrigation (X_5)	0.058
Intercultural operation (X_6)	0.875^{**}
Plant protection (X_7)	-0.0369
Harvesting (X_8)	0.547^{**}
Processing & packaging (X_9)	0.848^{**}
Miscellaneous charges (including transportation, etc. (X_{10})	0.305^{**}

Source: Primary data collected from farmer's field survey
NOTE: ** denote (P<0.05)

4. Suggestions

i) In the study region farmers faced challenges such as non availability of regulated market, lack of storage facilities and instability of market price of the produce. If these issues can be resolved, the cultivation of Ashwagandha may become sustainable means for farmers' livelihood.

ii) Investment in Ashwagandha cultivation found to be economically viable. Farmers may be encouraged to take up cultivation of this crop.

iii) Facilities such as establishment of new processing units; scientific storage facilities and forward linkage in the region to safeguard the interest may add to livelihood and income of farmers.

iv) It is also suggested that contractual cultivation in PPP (Public –Private – Partnership) mode of certain medicinal plants may boost up the availability of the quality raw material for Ayurveda, other related industries. This may also helps farmers to diversify their crops by

introduction of medicinal plants in the country.

5. Conclusions

It can be concluded from present study that cultivation of Ashwagandha is a profitable venture for the farmers of the study area. The profit earned by farmers from Ashwagandha cultivation is much higher than traditional crop varieties. The cultivation may also open up new avenue for agri-entrepreneurship by promoting the processing of Ashwagandha roots in to powder and extraction of chemical alkaloids for export market. The cultivation of Ashwagandha also promotes conservation of natural resources, as it can be easily cultivated in rain-fed condition with limited use of plant protection chemicals.

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Agro-Economic Research

Market Analysis of Bamboo Products in Assam*

DR. (MRS) MOROMI GOGOI

1. Introduction

Bamboo is one of the most important forestry species with wide distribution throughout the country. It makes significant contribution to the rural economy in many of the states of the country. It has been an important source of income for millions of rural people for sustaining their livelihood. This miracle grass has been a major source of livelihood for the poor people for centuries, for which bamboo was always referred to as a poor man's timber. But, gradually it is becoming the rich man's timber as well, and the global bamboo market value has touched $68.80 billion in 2018 and is expected to grow at a CAGR of 5.0% from 2019 to 2025 (Bamboos Market Size & Share, Global Industry Report, 2019-25). There exist ample opportunities to exploit the market potential by increasing its production and ensuring establishment of proper value chain system. Assam with 2.23 million hectares of bamboo plantations in North East India, can certainly open up new vistas for the country.

1.1. Importance of the study

The importance of bamboo products in Assam's economy is very vital and its contribution is increasing steadily day by day. Today, bamboo sector is considered as the second biggest employment-creating sector after agriculture with abundant artisans engaged in craft work on a part-time basis. Bamboo occupies a predominant position in the state's handicraft industry and a sizable section of the population is associated with it. The potential of bamboo handicrafts has not been properly tapped; for instance, ongoing export of some of bamboo products to other countries and its marketing within the country has not received adequate attention. Role of intermediaries in this section has a debilitating effect on the industry. Technological progress is also inadequate because of structural and financial constraints. Thus, the future of this industry largely depends on the resolution of all those vexed issues.

This study is a modest attempt to examine the various socio-economic problems of bamboo handicraft industry in Assam and to suggest strategies for its sustainable development. It is expected that such an intensive study might help in formulation of programs and policies for development of bamboo craftsman of the state.

1.2. Objectives of the study

Keeping in view the importance of the subject, the objectives of the present study has been framed as under:

i. To study the potentialities of bamboo products in Assam

ii. To study the National Bamboo Mission (NBM) programs in Assam

iii. To find out the marketing channels of bamboo products in the sample districts

iv. To identify the critical issues encountered by the producers in marketing of bamboo products and suggest ameliorative policy measures

2. Data and Methodology

The present study is based on both primary and secondary level data. The primary data have been collected from the respondents by using specially designed interview schedules and questionnaires for the study. The study was conducted in two districts of Assam, *viz.*, Jorhat and Sivasagar considering the highest number of artisans commercially involved in bamboo products marketing in consultation with the office of the Commissioner of Handloom and Handicraft, Guwahati. Accordingly, the artisans' lists were collected from the Development Commissioner (Handicraft) office, Jorhat.

In the second stage, from each selected

*Agro-Economic Research Centre for North-East India, Assam Agricultural University, Jorhat (Assam)
NOTE: Detailed report is available on the website of respective Agro-Economic Research Centres

district, two blocks were selected randomly. Then from each selected block, 40 numbers of bamboo artisans involved in bamboo products marketing were interviewed to collect the primary level information. Moreover, 10 numbers of bamboo products wholesalers from each district were also taken to better know the marketing aspects of the bamboo products. Thus, total 160 numbers of sample artisans and 20 bamboo products wholesaler were covered under the study. For collecting secondary level information, the relevant data were collected from the Department of Commerce and Industry, Government of India and Government of Assam, Department of Natural Resource Management, Government of India, National Bamboo Mission Cell, Economic Survey(s) of Assam, Statistical Handbook, Government of Assam and from various published and unpublished sources, research journals, news articles, research articles, etc., and related websites.

The sample artisans have been classified in to four groups based on their annual turnover from the bamboo products marketing. The groups were categorized as below ₹ 1 lakh, ₹ 1 lakh – 2 lakh, ₹ 2 lakh to 3 lakh and ₹ 3 lakh and above income group.

3. Summary of Major Finding of the Study

i. Bamboo is one of the most abundant, environment-friendly and sustainable resource in North Eastern Region (NER). More than 50% of the bamboo species in India are found in this region. The NER states harbour nearly 90 species of bamboos, of which 41 are endemic to thisregion.

ii. Total bamboo area in Assam is about 2.23 million hectares as against India's total area of 15.70 million hectares. Out of 130 bamboo species available in India, 51 species are grown in Assam and they are being used for different purposes, mainly for buildings, furniture and diverseitems.

iii. The importance of bamboo in the NER has been widely recognized by the Government of India through numerous policies and programs. The central government through the National Bamboo Mission (NBM) scheme, is focusing on the development of the complete value chain of bamboo sector. For this purpose the Government of India releasing fund under NBM and Restructured NBM scheme annually since the inception of the scheme (2006-07).

iv. It was observed that the highest percentage of respondents (32.50%) was found in ₹ 1-2 lakh income groups followed by below ₹ 1 lakh (28.12%), ₹ 3 lakh & above (24.38%) and ₹ 2-3 lakh income group (15.00%).

v. Of the total sample respondents, 43.13 percent were found to live in Kutcha houses, 38.74 percent in Semi-pucca houses and 18.13 percent in Pucca houses. The Kutcha houses were found to be more common among the lower income groups.

vi. Of the total 160 sample respondents, 15.37 percent population was below 15 years and 15.88 percent belonged to age group of over 60 years of age. Rest 68.75 percent population was between the age group of 15-60 years.

vii. The total owned land holding was recorded 65.94 hectares with an average size of holding being 0.41 hectare per respondent. The maximum area of land was possessed by ₹ 1-2 income group (21.60 hectares) closely followed by below ₹ 1 lakh (21.58 hectares), ₹ 2-3 lakh (13.26 hectares) and ₹ 3 lakh and above income group (9.50 hectares).

viii. Of the total gross cropped area of 122.61 hectares, the highest area was occupied by the income group of ₹ 1-2 lakh, closely followed by below ₹ 1 lakh, ₹ 2-3 lakh and ₹ 3 lakh and above income group. The overall cropping intensity was recorded at 161.90 percent.

ix. The sample respondents used to grow different crops in both kharif and rabi seasons. Krarif crops grown were paddy, pulses and vegetables while rabi crops included paddy, pulses and vegetables andoilseeds.

x. In the kharif season, the highest performance of HYV paddy with 34.25 quintal per hectare was recorded against the income group of ₹ 1-2 lakh and in case of local paddy the highest yield was found at 24.85 quintal against the income group of below ₹ 1 lakh. The average yield of HYV paddy stood at 33.75 quintal per hectare and that of local paddy was 24.13 quintal perhectare.

xi. In the rabi paddy, the highest yield of 35.86 quintal per hectare was found against the income group of ₹ 1-2 lakh with an overall average of 35.23 quintal per hectare across the incomegroups.

xii. In kharif vegetables, the highest yield rate of 16.80 quintal per hectare was found against the highest income group of ₹ 3 lakh & above and the lowest yield of 15.62 quintal was found against the income group ₹ 2-3 lakh. In rabi vegetables, the highest yield of 18.90 quintal per hectare was recorded against ₹ 1-2 lakh income group and the lowest yield of 16.87 quintal was found in highest income group (₹ 3 lakh & above) with an overall average of 17.98 quintal.

xiii. The overall average income per household from agricultural source was found at ₹ 38,526.88 and from subsidiary occupation, it was found at ₹ 74,320.25. Out of the total income, the share of agricultural income was 31.14 percent for income group below ₹ 1 lakh, 33.26 percent for income group of ₹ 1-2 lakh, 49.00 percent against the income group of ₹ 2-3 lakh and 26.56 percent for the income group of ₹ 3 lakh and above, with an overall average of 34.14 percent. In case of subsidiary source of income, the highest percentage of income was earned by the large income group (73.44 %) and lowest amount of income was obtained by the income group of ₹ 2-3 lakh (51.00%), with an average of 65.56 percent.

xiv. The total material costs was found at ₹ 55,79,885 and average per household material costs was estimated at ₹ 34,874. The per household expenditure was found to be highest in the income group of ₹ 3 lakh & above (₹ 47,034), followed by ₹ 2-3 lakh income group (₹ 42,490), ₹ 1-2 lakh income group (₹ 29,820) and below ₹ 1 lakh income group (₹ 26,115)

xv. Per household cost incurred on different bamboo products by the sample artisans of below ₹ 1 lakh income group was ₹ 73,597, for income group ₹ 1-2 lakh was ₹ 83,496, for ₹ 2-3 lakh income group, it was estimated at ₹ 1,51,796 and for ₹ 3 lakh & above income group, it was recorded at ₹ 1,56,834. The overall average cost was found at ₹ 1,08,833.

xvi. Per household gross return from the bamboo products was found highest against the income group of ₹ 3 lakh & above (₹ 3,05,419) followed by ₹ 2-3 lakh (₹ 2,29,509), ₹ 1-2 lakh (₹ 1,20,913) and below ₹ 1 lakh (₹ 97,053).

xvii. The benefit cost ratio (BCR) were found to be positive in all the income size groups. The BCR were worked out at 1.32:1 for below ₹ 1 lakh income group, 1.45:1 for 1-2 lakh income group, 1.51:1 for 2-3 lakh income group and 1.95:1 for 3 lakh and above income group. The overall BCR was estimated at 1.61:1.

xviii. In the study area, the sample artisans disposed-off their produce through a number of marketing channels. The common and popular marketing channels prevailed in the study area are- (i) Producer – Retailer – Consumer, (ii) Producer – Wholesaler - Retailer – Consumer and (iii) Producer -Commission Agent/Middleman – Wholesaler–Retailer – Consumer.

xix. It was found that maximum volume of bamboo products was traded through channel- III (63.59 %) followed by channel-II (28.24%) and Channel-I (8.17%).

xx. Although the maximum amount of transaction took place through channel-III, yet, channel-I could be the most efficient one because of the fact that the number of market intermediaries was less in channel-I as compared to the other channels and thus producers could earn higher margin in channel-I in the study area.

3.1. Problem areas

Based on the field level observations, the pressing problems as perceived by the sample artisans can be enumerated as follows:

i. Low level of education was perceived to the one of the most important issues, as pointed out by the artisans. Lack of proper education makes it difficult for the artisans to manage inventory, access the opportunities of Government schemes and gain market information and to bargain with traders and middlemen.

ii. Exploitation by the intermediaries was yet another crucial problem faced by the bamboo

artisans in Assam. The middleman/commission agents collected the bamboo products from the producers at a very low price and they usually sold those items at a high price to the consumers. Thus, the producers get very low price for their products & were deprived of their due share.

iii. In the absence of a price mechanism the bamboo artisans were affected adversely. Due to unorganized nature of markets, same products were sold at different prices and it varied from place to place and some of the artisans were compelled to sell their produce at very low price.

iv. Large scale inflows of machine-made items at relatively lower prices competing with the handmade product with higher price tag put the bamboo artisans at a great disadvantageous position. Due to durability and appealing designs, the consumers usually preferred those items to high cost and short durable bamboo products which dampened the spirit of the bamboo artisans.

v. The study revealed that the local artisans are still using simple traditional tools and techniques of production which were very laborious and time-consuming. Availability of modern machines is either not known to them, or they might not have sufficient means to acquire those.

vi. Due to high cost of labour and materials, it became very difficult on the part of the artisans to run their family with this venture alone. Eighty percent of the sample artisans did not get any opportunity for skill development training in order to develop the quality of their products. Only 20 percent of the sample artisans had some short- term exposure training, which they considered to be beneficial.

3.2. Artisans' perceptions

Artisans' perceptions on various issues relating to bamboo products marketing, as emerged from the field investigation are documented below:

i. Most of the sample respondents (90%) used to run their bamboo product business because it was the family activity of their forefathers. Forty percent respondents started the business due to the reason of low investment and 56 percent sample respondents motivated to get involved in the business because of rising demand for bamboo products.

ii. Although the Central and the State Government had taken various measures to develop the bamboo sector with timely initiatives to uplift the bamboo artisans under different components of NBM, hardly 40 percent of the sample respondents were found to aware of the NBM programme and its benefits.

iii. Only 10 percent sample artisans possessed Pehchan Card (Artisan Identity Card) with which they can get some incentives from the Ministry of Textile, Government of India. But, 90 percent of the total respondents were not aware about the benefits of the card. Seventy five percent of the respondents wanted to improve the quality and design of their products while 25 percent were satisfied with the design and quality of their products.

iv. Among the sample artisans, 82 percent took part in national and international exhibition organized by various Government organizations and NGOs and 50 percent of them considered it to be very useful.

v. Nearly 92 percent of the bamboo artisans wanted to continue producing bamboo products to make a good living through commercialization while only 8 percent of the respondents were averse to expansion of their business.

4. Suggestions and Policy implications

Based on the findings of the study and field observations, the following suggestions can be put forward for growth and development of bamboo sector and bamboo product marketing in Assam:

i. Proper promotional campaign should be undertaken to make the artisans educated and aware of various schemes & programmes launched by the Government, extending loan at concessional rates, free tools & implements, dyes and chemical, work shed- cum-housing facilities, training programme, etc.

ii. Continuous research and development efforts

should be undertaken for modernization of product-process and upgradation of techniques to meet the changing requirements of the customers.

iii. State and Central Government should exempt the bamboo products from excise duty and other taxes to promote its export.

iv. The dedicated machinery, like Development Commissioner (Handicrafts), may help the local units to produce various value added items in order to penetrate the local market, and can help in exporting such items to other states of the country and abroad.

v. Facilities may be created to train the artisans so that they can really make a living through bamboo craft.

vi. State Government may arrange for display of the bamboo craft items in various airports, railway stations, bus stands, commercial centers and prominent places to promote the artisans and their products.

vii. Government may promote opening of raw material shop in the vicinity of rural areas whereby the artisans can retrieve the raw materials at reasonable price on time.

viii. Rural artisans should be provided with adequate, timely and cheaper loan facilities for establishment of bamboo-based industries. Benefits of the subsidy policy, if any, also be made known to them.

ix. Adequate infrastructure facilities are prerequisite for any development process. As such, facilities like transport, communication & power supply can give a boost to the livelihood of bamboo artisans as well.

x. Dedicated effort should be made to create a positive environment to attract the younger generation to adopt the traditional handicraft practice as an additional alternative venture for livelihood. For that matter, effective measures may be taken to educate this lot on potentialities and profitability of bamboo & bamboo products.

5. Conclusions

The field study clearly indicates that there lies an immense potentiality of growing bamboo plantation in the state of Assam and so is the future of bamboo products. Activities of the NBM are found to be very limited in the entire north east region despite having vast opportunities. A comprehensive approach with restructured NBM, ably supported by government policy is must for growth and development of this sector. The critical issues as encountered by the bamboo artisans are needed to be addressed through Government intervention. A concerted effort, if made and executed in true sense of the term, it can open up a new vista for bamboo craft in the state of Assam, which in turn will uplift a large chunk of people in terms of income & employment.

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Commodity Reviews

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2020-21 up to 27.11.2020 is 20.82 million tonnes as against 17.52 million 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 2019-20 (up to 27.11.2020) 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

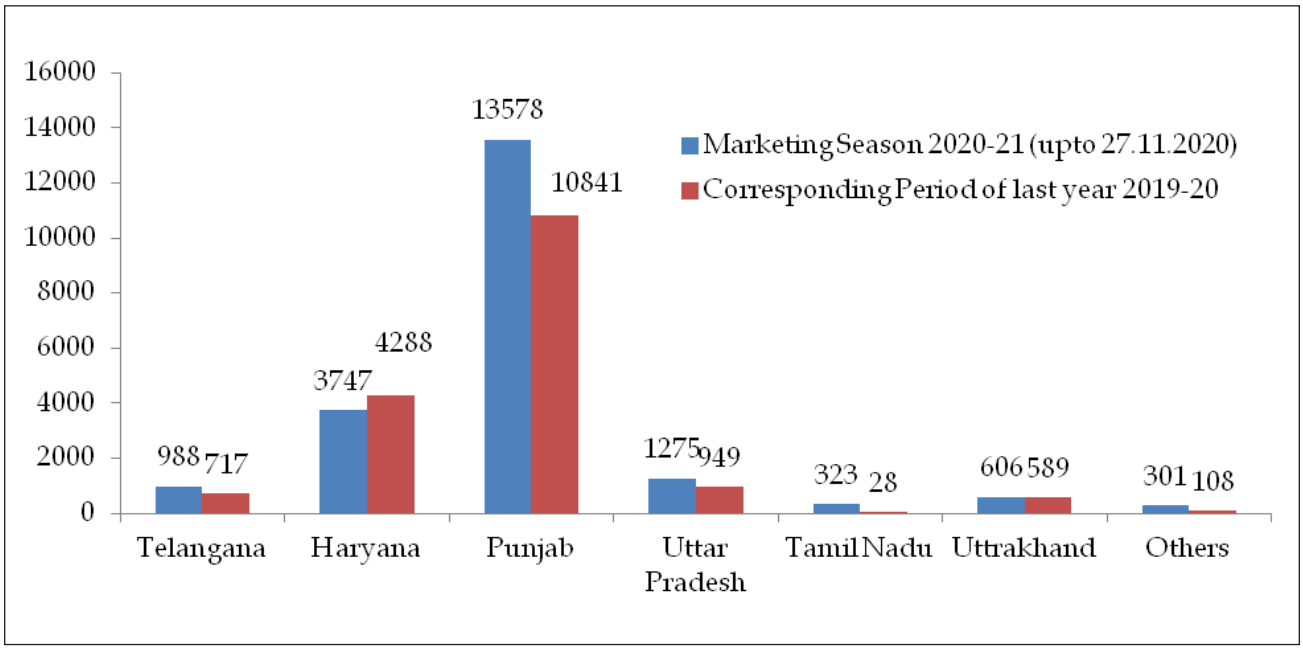
(In thousand tonnes)

State	Marketing Season 2020-21 (upto 27.11.2020)		Corresponding Period of last Year 2019-20	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Telangana	988	4.7	717	4.1
Haryana	3747	18.0	4288	24.5
Punjab	13578	65.2	10841	61.9
Uttar Pradesh	1275	6.1	949	5.4
Tamil Nadu	323	1.6	28	0.2
Uttrakhand	606	2.9	589	3.4
Others	301	1.4	108	0.6
Total	20818	100.0	17520	100.0

Source: Department of Food & Public Distribution.

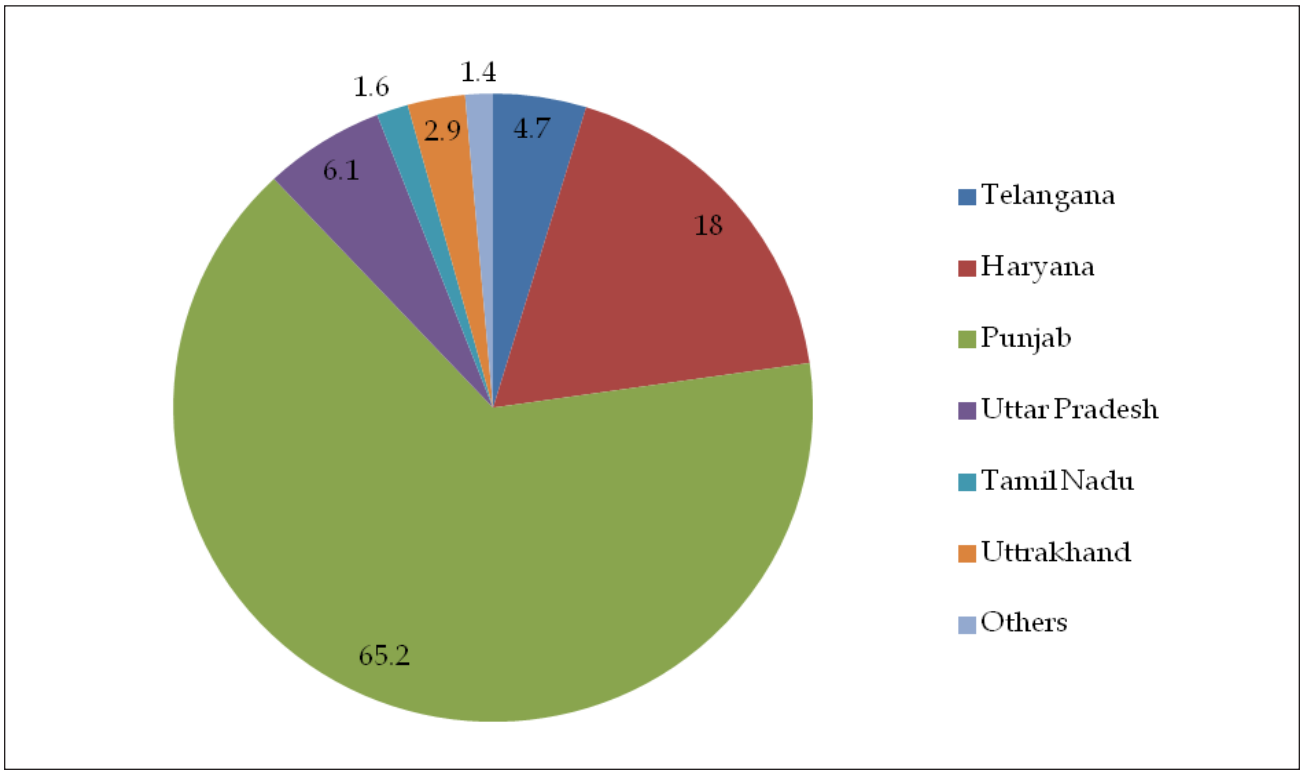
Figure 1: State-wise Procurement of Rice

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 2: Percentage Share of Different States in Procurement of Rice during Marketing Season 2019-20 (up to 27.11.2020)



Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat during rabi marketing season 2020-21 up to 29.09.2020 is 38.99 million tonnes as against 34.79 million tonnes during the corresponding period of last year. The details are given in Table 2. The figure 3 depicts the comparison of procurement of wheat during the marketing season 2020-21 (up to 29.09.2020) 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

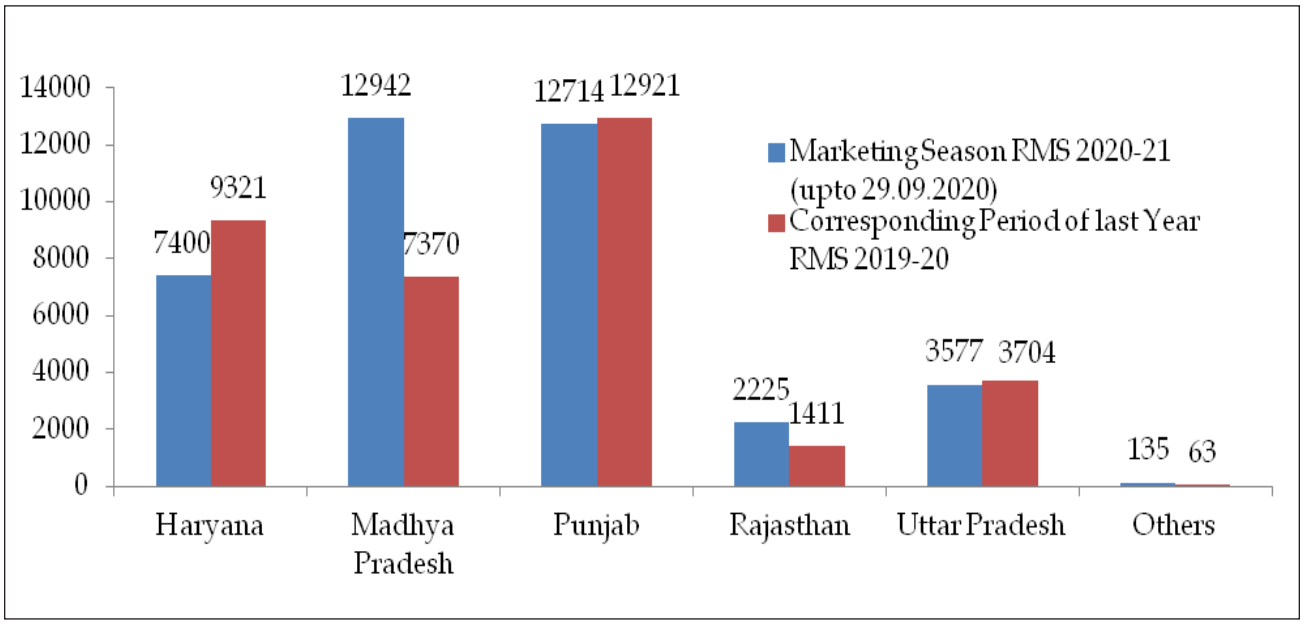
(In thousand tonnes)

State	Marketing Season RMS 2020-21 (upto 29.09.2020)		Corresponding Period of last Year RMS 2019-20	
	Procurement	% to Total	Procurement	% to Total
1	**2**	**3**	**4**	**5**
Haryana	7400	19.0	9321	26.8
Madhya Pradesh	12942	33.2	7370	21.2
Punjab	12714	32.6	12921	37.1
Rajasthan	2225	5.7	1411	4.1
Uttar Pradesh	3577	9.2	3704	10.6
Others	135	0.3	63	0.2
Total	38993	100.0	34790	100.0

Source: Department of Food & Public Distribution.

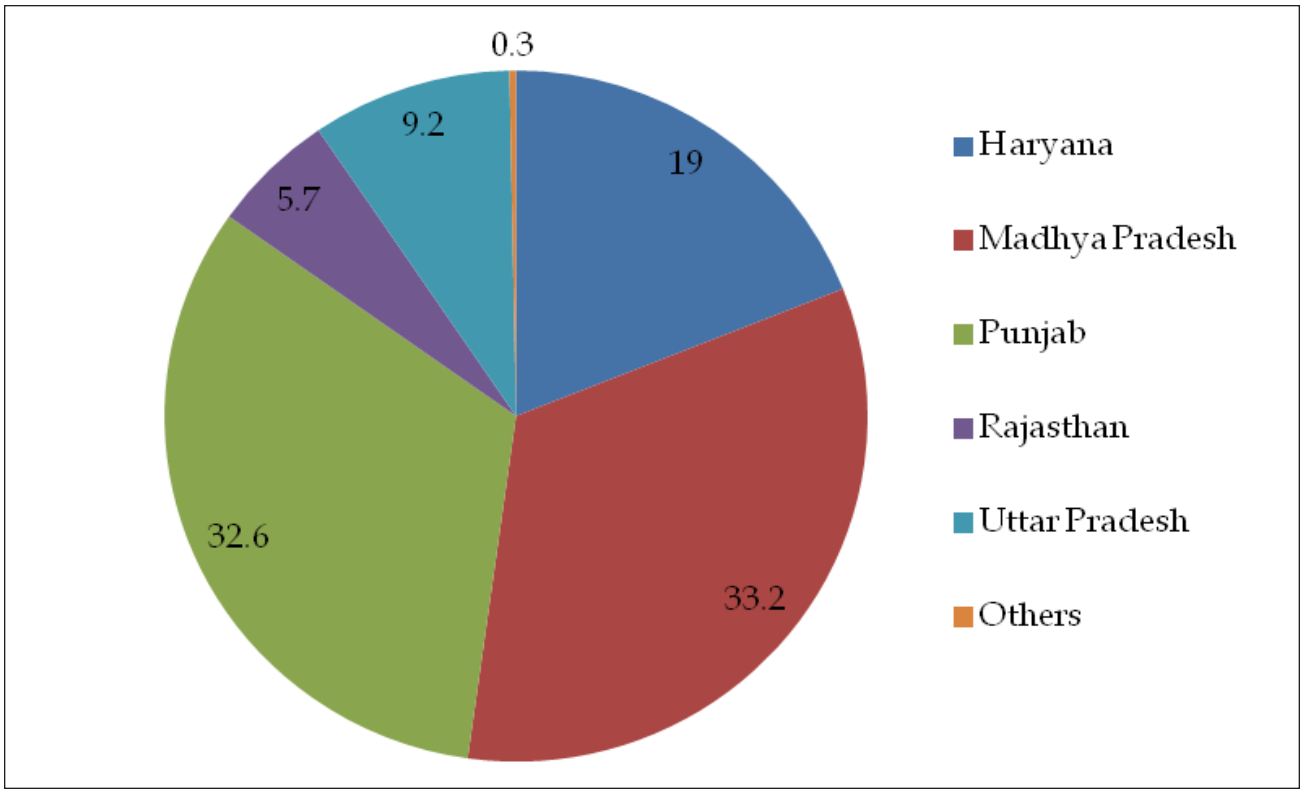
Figure 3: State-wise Procurement of Wheat

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 4: Percentage Share of Different States in Procurement of Wheat during Marketing Season 2020-21 (up to 29.09.2020)



Source: Department of Food & Public Distribution.

Commercial Crops

Oilseeds

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 158 in October, 2020 showing a decrease of 1.61 percent over the previous month and increased by 4.36 percent over the previous year.

The WPI of all individual oilseeds showed a mixed trend. The WPI of rape and mustard seed (1.46 percent), copra (coconut) (2.45 percent), niger seed (0.33 percent), safflower (2.67 percent), sunflower (2.62 percent) and soyabean (2.55 percent) increased over the previous month. However, the WPI of groundnut seed (0.27 percent), cotton seed (0.13 percent), and gingelly seed (sesamum) (3.35 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 140.5 in October, 2020 which shows an increase of 2.78 percent over the previous month. Moreover, it also increased by 20.50 percent over the corresponding months of the previous year. The WPI of mustard oil (4.11 percent), soybean oil (4.47 percent), sunflower oil (3.95 percent), groundnut oil (1.81 percent) castor oil (4.74 percent), rapeseed oil (3.18 percent) copra oil (8.29 percent) and cotton seed oil (4.83 percent) increased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 222.3 in October, 2020 showing an increase of 5.86 percent over previous month and an increase of 14.47 percent over the corresponding month of the previous year.

Potato

The WPI of potato stood at 388.4 in October, 2020 showing an increase of 9.78 percent over the previous month. Moreover, it also increased by 107.70 percent over the corresponding months of the previous year.

Onion

The WPI of onion stood at 387.1 in October, 2020 showing an increase of 72.27 percent over the previous month and an increase of 8.49 percent over the corresponding months of the previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 153 in October, 2020 showing an increase of 2.62 percent over the previous month and an increase of 2.82 percent over the corresponding months of the previous year. The WPI of black pepper decreased by 0.24 percent and turmeric decreased by 1.59 percent, and that of chillies (dry) increased by 9.75 percent over the previous month.

Raw Cotton

The WPI of raw cotton stood at 99.6 in October, 2020 showing a decrease of 7.95 percent over the previous month and a decrease of 12.32 percent over the corresponding months of the previous year.

Raw Jute

The WPI of raw jute stood at 238.5 in October, 2020 showing an increase of 3.43 percent over the previous month and an increase of 19.67 percent over the corresponding months of the previous year.

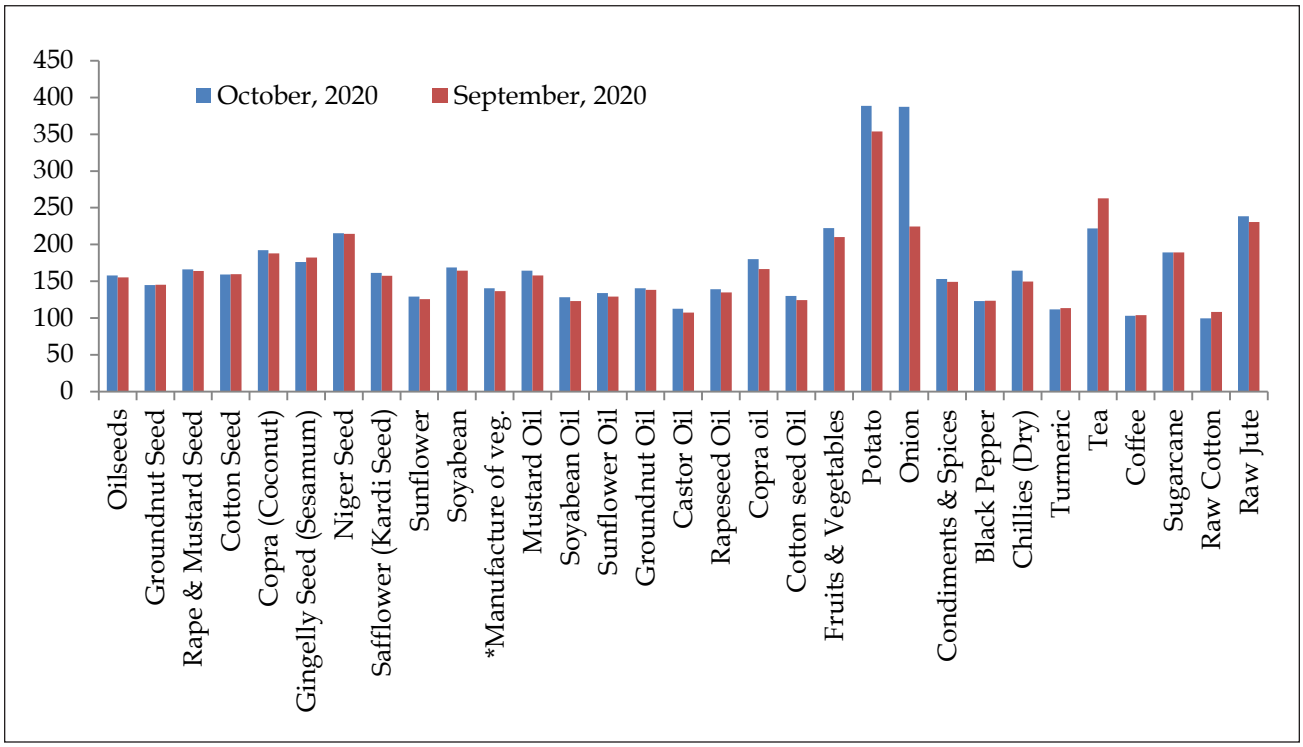
Wholesale Price Index of Commercial Crops is given in Table 3. A graphical comparison of WPI for the period of October, 2020 and September, 2020 is given in figure 5 and the comparison of WPI during the October, 2020 with the corresponding month of last year has been given in figure 6.

TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base Year: 2011-12=100)

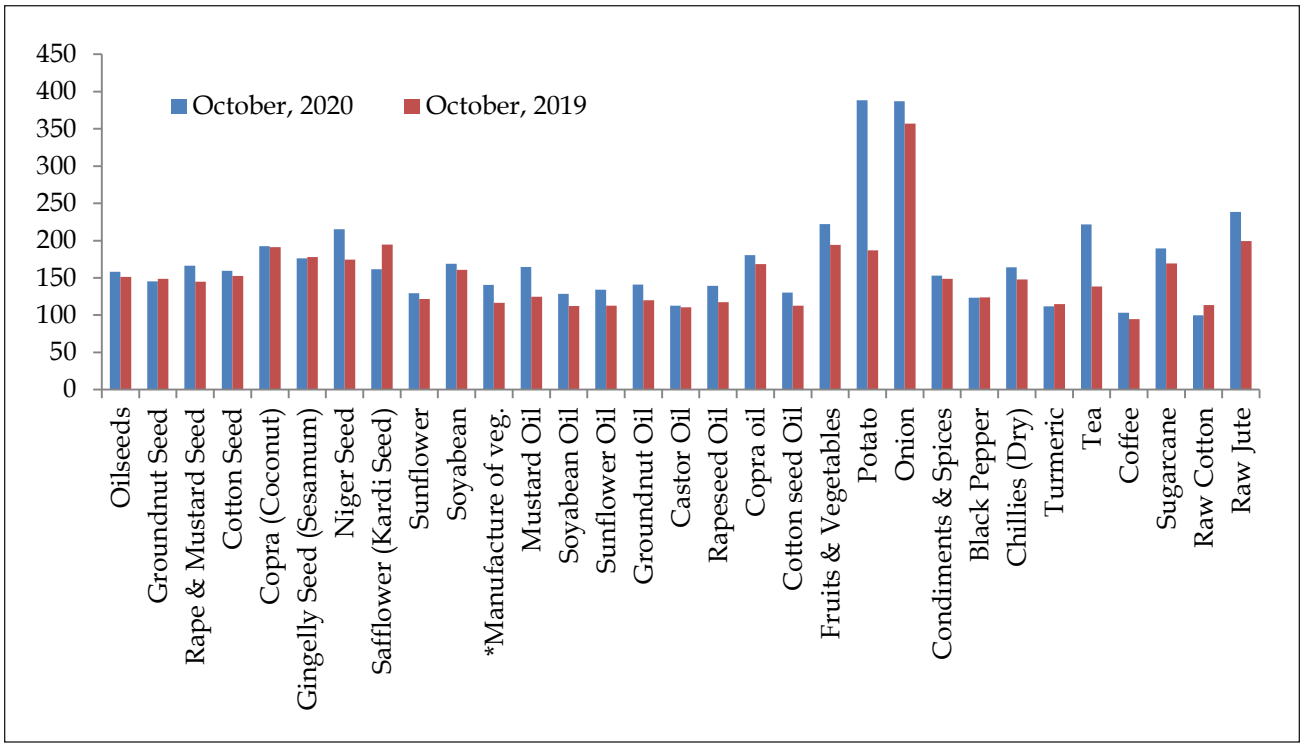
Commodity	Latest October, 2020	Month September, 2020	Year October, 2019	Percentage variation over the	
				month	year
Oilseeds	158	155.5	151.4	1.61	4.36
Groundnut Seed	145.1	145.5	148.8	-0.27	-2.49
Rape & Mustard Seed	166.4	164.0	144.9	1.46	14.84
Cotton Seed	159.5	159.7	152.7	-0.13	4.45
Copra (Coconut)	192.4	187.8	191.2	2.45	0.63
Gingelly Seed (Sesamum)	176.2	182.3	177.8	-3.35	-0.90
Niger Seed	215.2	214.5	174.6	0.33	23.25
Safflower (Kardi Seed)	161.6	157.4	194.8	2.67	-17.04
Sunflower	129.3	126.0	121.6	2.62	6.33
Soyabean	168.7	164.5	160.8	2.55	4.91
Manufacture of vegetable and animal oils and fats	140.5	136.7	116.6	2.78	20.50
Mustard Oil	164.5	158.0	124.7	4.11	31.92
Soyabean Oil	128.6	123.1	112.3	4.47	14.51
Sunflower Oil	134.2	129.1	112.4	3.95	19.40
Groundnut Oil	140.8	138.3	119.7	1.81	17.63
Castor Oil	112.6	107.5	110.6	4.74	1.81
Rapeseed Oil	139.4	135.1	117.2	3.18	18.94
Copra oil	180.3	166.5	168.4	8.29	7.07
Cotton seed Oil	130.3	124.3	112.4	4.83	15.93
Fruits & Vegetables	222.3	210.0	194.2	5.86	14.47
Potato	388.4	353.8	187.0	9.78	107.70
Onion	387.1	224.7	356.8	72.27	8.49
Condiments & Spices	153	149.1	148.8	2.62	2.82
Black Pepper	123.2	123.5	123.8	-0.24	-0.48
Chillies (Dry)	164.3	149.7	147.7	9.75	11.24
Turmeric	111.7	113.5	114.9	-1.59	-2.79
Tea	221.8	262.8	138.2	-15.60	60.49
Coffee	103.3	103.9	94.6	-0.58	9.20
Sugarcane	189.4	189.4	169.5	0.00	11.74
Raw Cotton	99.6	108.2	113.6	-7.95	-12.32
Raw Jute	238.5	230.6	199.3	3.43	19.67

Figure 5: WPI of commercial crops during October, 2020 and September, 2020



*Manufacture of Vegetable, Animal Oils and Fats

Figure 6: WPI of commercial crops during October, 2020 and October, 2019



*Manufacture of Vegetable, Animal Oils and Fats

Statistical Tables

Wages

1. DAILY AGRICULTURAL WAGES IN SOME STATES (CATEGORY-WISE)

Month: September, 2020 (In ₹)

State	District	Centre	Month & Year	Daily Normal Working Hours	Field Labour		Other Agri. Labour		Herdsman		Skilled Labour		
											Carpenter	Black Smith	Cobbler
					M	W	M	W	M	W	M	M	M
Andhra Pradesh	Krishna	Ghantasala	Aug, 20	8	600	400	NA	NA	NA	NA	NA	NA	NA
	Guntur	Tadikonda	Aug, 20	8	400	300	400	NA	350	NA	400	NA	NA
Telangana	Ranga Reddy	Arutala	July, 20	8	800	267	800	NA	NA	NA	NA	500	NA
Karnataka	Bangalore	Harisandra	Dec, 19	8	360	340	300	300	340	330	500	400	NA
	Tumkur	Gidlahali	Dec, 19	8	350	320	350	350	350	320	400	360	NA
Maharashtra	Bhandara	Adyal	June, 20	8	300	200	275	200	275	200	400	350	350
	Chandrapur	Ballarpur	June, 20	8	300	200	300	200	300	NA	350	300	200
Jharkhand	Ranchi	Gaitalsood	June, 19	8	239	239	239	239	239	239	330	330	NA

1. DAILY AGRICULTURAL WAGES IN SOME STATES (CATEGORY-WISE)

Month: October, 2020 (In ₹)

State	District	Centre	Month & Year	Daily Normal Working Hours	Field Labour		Other Agri. Labour		Herdsman		Skilled Labour		
											Carpenter	Black Smith	Cobbler
					M	W	M	W	M	W	M	M	M
Andhra Pradesh	Krishna	Ghantasala	Sep,20	8	550	300	800	500	400	NA	NA	NA	NA
	Guntur	Tadikonda	Sep, 20	8	400	300	400	NA	350	NA	400	NA	NA
Telangana	Ranga Reddy	Arutala	July, 20	8	800	267	800	NA	NA	NA	NA	500	NA
Karnataka	Bangalore	Harisandra	Dec, 19	8	360	340	300	300	340	330	500	400	NA
	Tumkur	Gidlahali	Nov, 19	8	350	320	350	350	350	320	400	360	NA
Maharashtra	Bhandara	Adyal	June, 20	8	300	200	275	200	275	200	400	350	350
	Chandrapur	Kothari	June, 20	8	300	200	300	200	300	NA	350	300	200

1.1. DAILY AGRICULTURAL WAGES IN SOME STATES (OPERATION-WISE)

Month: September, 2020 (In ₹)

State	District	Centre	Month & Year	Type of Labour	Normal Daily WorkingHours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Assam	Barpeta	Howly	Apr, 20	M	8	300	NA	250	250	200	NA	275	280	NA
				W	8	NA	NA	170	170	150	NA	NA	NA	NA
Bihar	Muzaffarpur	Bhalui Rasul	June, 20	M	8	350	400	350	350	400	NA	500	500	NA
				W	8	250	300	250	250	300	NA	NA	NA	NA
	Nawada	Masahi	May, 20	M	8	200	200	200	250	250	NA	450	450	NA
				W	8	NA	200	200	250	250	NA	NA	NA	NA
Chhattisgarh	Dhamtari	Sihava	Feb, 20	M	8	400	NA	NA	NA	180	160	320	300	200
				W	8	NA	NA	NA	NA	160	140	NA	150	NA
Gujarat*	Rajkot	Rajkot	April, 20	M	8	292	292	292	292	272	120	510	483	450
				W	8	NA	292	292	292	272	100	NA	NA	NA
	Dahod	Dahod	April, 20	M	8	300	300	150	150	150	NA	400	350	300
				W	8	NA	250	150	150	150	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	May, 20	M	8	400	400	400	400	400	NA	550	400	NA
				W	8	NA	300	300	350	300	NA	NA	NA	NA
Himachal Pradesh	Mandi	Mandi	Feb, 20	M	8	450	330	330	330	330	330	430	430	300
				W	8	NA	330	330	330	330	330	NA	NA	NA
Kerala	Kozhikode	Koduvally	Apr, 20	M	4-8	1240	850	NA	800	800	NA	950	NA	NA
				W	4-8	NA	NA	700	700	700	NA	NA	NA	NA
	Palakkad	Elappally	Apr, 20	M	4-8	NA	600	NA	600	720	NA	750	NA	NA
				W	4-8	NA	NA	350	350	350	NA	NA	NA	NA

1.1. DAILY AGRICULTURAL WAGES IN SOME STATES (OPERATION-WISE)-*Contd.*

Month: September, 2020 (In ₹)

State	District	Centre	Month & Year	Type of Labour	Normal Daily WorkingHours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Madhya Pradesh	Hoshangabad	Sangarkhera	Aug, 20	M	8	250	250	200	NA	250	150	500	500	NA
				W	8	NA	NA	200	NA	200	NA	NA	NA	NA
	Satna	Kotar	Aug, 20	M	8	300	300	300	300	300	300	500	500	500
				W	8	NA	300	300	300	300	300	NA	NA	NA
	Gwalior	Mohana	Aug, 20	M	8	300	250	250	300	250	250	500	500	500
				W	8	NA	200	200	250	200	200	NA	NA	NA
Odisha	Bhadrak	Chandbali	Feb, 20	M	8	450	400	400	400	400	400	500	400	350
				W	8	NA	300	350	300	300	300	NA	NA	NA
	Ganjam	Aska	Feb, 20	M	8	300	300	300	300	350	250	500	500	500
				W	8	NA	250	250	250	300	220	NA	NA	NA
Punjab	Monga	Nathoke	July, 20	M	8	500	500	NA	NA	500	NA	500	450	NA
				W	8	NA	400	NA	NA	400	NA	NA	NA	NA
Rajasthan	Barmer	Kuseep	May, 20	M	8	NA	NA	400	NA	NA	500	700	500	NA
				W	8	NA	NA	NA	NA	NA	300	NA	300	NA
	Jalore	Sarnau	May, 20	M	8	400	NA	300	300	NA	NA	600	400	NA
				W	8	NA	NA	250	300	NA	NA	NA	350	NA
Tamil Nadu*	Thanjavur	Thanjavur	Aug, 20	M	8	NA	375	NA	NA	397	NA	494	450	NA
				W	8	NA	NA	173	175	177	NA	NA	NA	NA
	Tirunelveli	Tirunelveli	Aug, 20	M	8	NA	447	NA	NA	737	NA	NA	NA	NA
				W	8	NA	211	217	214	NA	NA	NA	NA	NA
Tripura	State Average		Aug, 19	M	8	331	331	297	276	275	275	350	319	NA
				W	8	NA	331	250	229	225	241	NA	NA	NA

1.1. DAILY AGRICULTURAL WAGES IN SOME STATES (OPERATION-WISE)-*Concld.*

Month: September, 2020 (In ₹)

State	District	Centre	Month & Year	Type of Labour	Normal Daily WorkingHours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Uttar Pradesh*	Meerut	Meerut	July, 20	M	8	300	300	300	300	300	NA	500	NA	NA
				W	8	NA	250	250	250	250	NA	NA	NA	NA
	Jhansi	Jhansi	July, 20	M	8	250	250	250	NA	260	NA	420	NA	.NA
				W	8	NA	250	250	NA	250	NA	NA	NA	NA
	Chandauli	Chandauli	July, 20	M	8	NA	NA	NA	NA	300	NA	500	NA	NA
				W	8	NA	300	NA	NA	300	NA	NA	NA	NA

M - Man
W - Woman
NA - Not Available
NR – Not Reported
* The State reported district average daily wage

1.1. DAILY AGRICULTURAL WAGES IN SOME STATES (OPERATION-WISE)

Month: October, 2020 (In ₹)

State	District	Centre	Month & Year	Type of Labour	Normal Daily WorkingHours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Assam	Barpeta	Howly	May, 20	M	8	300	NA	250	250	200	NA	275	280	NA
				W	8	NA	NA	170	170	150	NA	NA	NA	NA
Bihar	Muzaffarpur	Narsinghpur	June, 20	M	8	350	400	350	350	400	NA	500	500	NA
				W	8	250	300	250	250	300	NA	NA	NA	NA
	Shekhpura	Kutaut	May, 20	M	8	200	200	200	250	250	NA	450	450	NA
				W	8	NA	200	200	250	250	NA	NA	NA	NA
Chhattisgarh	Dhamtari	Sihava	Feb,20	M	8	400	NA	NA	NA	180	160	320	300	200
				W	8	NA	NA	NA	NA	160	140	NA	150	NA

1.1. DAILY AGRICULTURAL WAGES IN SOME STATES (OPERATION-WISE)-*Contd.*

Month: October, 2020 (In ₹)

State	District	Centre	Month & Year	Type of Labour	Normal Daily WorkingHours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Gujarat*	Rajkot	Rajkot	April, 20	M	8	292	292	292	292	272	120	510	483	450
				W	8	NA	292	292	292	272	100	NA	NA	NA
	Dahod	Dahod	April , 20	M	8	300	300	150	150	150	NA	400	350	300
				W	8	NA	250	150	150	150	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	June, 20	M	8	400	400	400	400	400	NA	550	400	NA
				W	8	NA	300	300	350	300	NA	NA	NA	NA
Himachal Pradesh	Mandi	Mandi	Feb, 20	M	8	450	330	330	330	330	330	430	430	300
				W	8	NA	330	330	330	330	330	NA	NA	NA
Kerala	Kozhikode	Koduvally	May, 20	M	4-8	1240	850	NA	800	800	NA	950	NA	NA
				W	4-8	NA	NA	700	700	700	NA	NA	NA	NA
	Palakkad	Elappally	May,20	M	4-8	NA	600	NA	600	720	NA	750	NA	NA
				W	4-8	NA	NA	350	350	350	NA	NA	NA	NA
Madhya Pradesh	Hoshangabad	Sangarkhera	Sep,20	M	8	250	NA	200	250	250	150	500	500	NA
				W	8	NA	NA	200	200	200	NA	NA	NA	NA
	Satna	Kotar	Sep,20	M	8	300	300	300	300	300	300	500	500	500
				W	8	NA	300	300	300	300	300	NA	NA	NA
	Gwalior	Mohana	Sep,20	M	8	300	250	250	300	250	250	500	500	500
				W	8	NA	200	200	250	200	200	NA	NA	NA
Odisha	Bhadrak	Chandbali	Feb, 20	M	8	450	400	400	400	400	400	500	400	350
				W	8	NA	300	350	300	300	300	NA	NA	NA
	Ganjam	Aska	Feb, 20	M	8	300	300	300	300	350	250	500	500	500
				W	8	NA	250	250	250	300	220	NA	NA	NA

1.1. DAILY AGRICULTURAL WAGES IN SOME STATES (OPERATION-WISE)-*Concld.*

Month: October, 2020 (In ₹)

State	District	Centre	Month & Year	Type of Labour	Normal Daily WorkingHours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Punjab	Monga	Nathoke	Aug, 20	M	8	500	500	500	500	500	NA	500	460	NA
				W	8	NA	400	NA	400	400	NA	NA	NA	NA
Rajasthan	Barmer	Kuseep	July, 20	M	8	NA	NA	500	400	NA	500	700	500	NA
				W	8	NA	NA	NA	NA	NA	300	NA	300	NA
	Jalore	Sarnau	July, 20	M	8	400	400	350	350	NA	NA	600	450	NA
				W	8	NA	NA	NA	250	NA	NA	NA	350	NA
Tamil Nadu*	Thanjavur	Thanjavur	Aug, 20	M	8	NA	375	NA	NA	397	NA	494	450	NA
				W	8	NA	NA	173	175	177	NA	NA	NA	NA
	Tirunelveli	Tirunelveli	Aug, 20	M	8	NA	447	NA	NA	737	NA	NA	NA	NA
				W	8	NA	211	217	214	NA	NA	NA	NA	NA
Tripura	State Average		Aug, 19	M	8	331	331	297	276	275	275	350	319	NA
				W	8	NA	331	250	229	225	241	NA	NA	NA
Uttar Pradesh*	Meerut	Meerut	Aug, 20	M	8	300	300	300	300	300	NA	500	NA	NA
				W	8	NA	250	250	250	250	NA	NA	NA	NA
	Jhansi	Jhansi	Aug,20	M	8	250	250	250	NA	260	NA	420	NA	.NA
				W	8	NA	250	250	NA	250	NA	NA	NA	NA
	Chandauli	Chandauli	Aug, 20	M	8	NA	NA	300	250	300	NA	500	NA	NA
				W	8	NA	NA	300	250	300	NA	NA	NA	NA

M - Man
W - Woman
NA - Not Available
NR – Not Reported
* The State reported district average daily wage

Prices

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

Commodity	Variety	Unit	State	Centre	Oct-20	Sep-20	Oct-19
Wheat	PBW 343	Quintal	Punjab	Amritsar	1800	1700	2200
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1700	1810	1975
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1820	1751	2090
Jowar	-	Quintal	Maharashtra	Mumbai	3200	3000	3800
Gram	No III	Quintal	Madhya Pradesh	Sehore	4740	4770	4200
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1250	1350	2020
Gram Split	-	Quintal	Bihar	Patna	6200	6150	6020
Gram Split	-	Quintal	Maharashtra	Mumbai	6100	5400	5700
Arhar Split	-	Quintal	Bihar	Patna	9480	8700	8150
Arhar Split	-	Quintal	Maharashtra	Mumbai	8800	8600	7500
Arhar Split	-	Quintal	NCT of Delhi	Delhi	8300	8300	7650
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	10000	9600	8400
Gur	-	Quintal	Maharashtra	Mumbai	4500	4800	4800
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4500	4500	4500
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2900	3400	2850
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4940	4750	3690
Mustard Seed	Black	Quintal	West Bengal	Raniganj	NA	4700	4350
Mustard Seed	-	Quintal	West Bengal	Kolkata	5800	5750	4500
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	4950	5250	4600
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4900	5000	4700
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	2100	1900	2500
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	3000	3000	2800
Castor Seed	-	Quintal	Telangana	Hyderabad	NA	NT	4400
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	8200	9200	9800
Copra	FAQ	Quintal	Kerala	Alleppey	12400	12250	10150
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	5000	5500	6000
Groundnut	-	Quintal	Maharashtra	Mumbai	8500	8000	9300
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1525	1480	1360

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

Commodity	Variety	Unit	State	Centre	Oct-20	Sep-20	Oct-19
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	2050	1900	1400
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	2050	1920	1530
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2500	2350	2120
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1545	1500	1450
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1890	1725	1395
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	2000	1880	1825
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	3320	3200	3500
Coconut Oil	-	15 Kg.	Kerala	Cochin	2565	2535	2175
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2100	1960	1875
Groundnut Cake	-	Quintal	Telangana	Hyderabad	NA	NT	3857
Cotton/Kapas	NH 44	Quintal	Andhra pradesh	Nandyal	5000	4700	5500
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	3900	4200	4400
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	5775	5600	4650
Jute Raw	W 5	Quintal	West Bengal	Kolkata	6275	5900	4700
Oranges	-	100 No	NCT of Delhi	Delhi	NA	NA	708
Oranges	Big	100 No	Tamil Nadu	Chennai	NA	800	900
Banana	-	100 No.	NCT of Delhi	Delhi	375	375	458
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	600	600	700
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	80000	72500	86000
Almonds	-	Quintal	Maharashtra	Mumbai	64000	58000	75000
Walnuts	-	Quintal	Maharashtra	Mumbai	70000	70000	63000
Kishmish	-	Quintal	Maharashtra	Mumbai	21000	18000	18000
Peas Green	-	Quintal	Maharashtra	Mumbai	9500	7800	6200
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	3200	3900	2750
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	2000	3200	1000
Cauliflower	-	100 No.	Tamil Nadu	Chennai	2200	2200	2500
Potato	Red	Quintal	Bihar	Patna	3350	2980	1470
Potato	Desi	Quintal	West Bengal	Kolkata	3200	2740	1500
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	4187	4000	2973

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

Commodity	Variety	Unit	State	Centre	Oct-20	Sep-20	Oct-19
Onion	Pole	Quintal	Maharashtra	Nashik	4550	2700	3100
Turmeric	Nadan	Quintal	Kerala	Cochin	11000	11000	11000
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	9500	10700	11500
Chillies	-	Quintal	Bihar	Patna	14700	13800	10450
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	29000	29000	28500
Ginger	Dry	Quintal	Kerala	Cochin	28000	29000	26000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	100000	110000	124000
Cardamom	Small	Quintal	West Bengal	Kolkata	180000	190000	270000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	6000	6000	6200
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	60030	63365	68701
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	39000	42000	40000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	40500	40350	39000
Fish	Rohu	Quintal	NCT of Delhi	Delhi	9000	16000	16700
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	35000	35000	40000
Eggs	Madras	1000 No.	West Bengal	Kolkata	5476	5145	4120
Tea	-	Quintal	Bihar	Patna	24800	22350	21540
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	NT	NT	42000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	39500	39500	38200
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	29500	29500	26500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	9750	9800	8100
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4800	4600	4100
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13200	13100	13200
Rubber	-	Quintal	Kerala	Kottayam	13900	10800	11800
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	65000	68000	57500

PRICE CORRECTION FOR THE MONTH OF JULY 2020, AUGUST, 2020 AND SEPTEMBER, 2020

Commodity	Variety	Unit	State	Centre	Sep-20	Aug-20	Jul-20
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	63365	70035	70035

Crop Production

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING THE MONTH OF JANUARY, 2021

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

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING THE MONTH OF JANUARY, 2021-*Contd.*

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

(K) — Kharif (R) — Rabi

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Note to Contributors

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d) The title page should contain the title, author name(s) andinstitutional affiliation (s).

e) The text should follow UK English and Number bullets should be used wherever required.

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N.A. — Not Available.
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N.T. — No Transactions.
N.S.—No Supply/No Stock.
R. — Revised.
M.C. — Market Closed.
N.R.—Not Reported.
Neg. — Negligible.
Kg. — Kilogram.
Q. — Quintal.
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