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FARM SECTOR NEWS

GENERAL SURVEY OF AGRICULTURE

ARTICLES

Organic Farming in Different
Crops in Wet and Dry
Land in Tamil Nadu

Determinants of Black
Pepper Trade in India:
A Post Globalisation Scenario

AGRO - ECONOMIC RESEARCH

Jhuming to Mainstream
Farming as an Alternative
Way of Livelihood amongst the
Tribal Farmers of Tripura

COMMODITY REVIEWS
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For article submission see last page.

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CONTENTS

PRICES

FARM SECTOR NEWS

1

GENERAL SURVEY OF AGRICULTURE

15

ARTICLES

Organic Farming in Wet and Dry Land in
Tamil Nadu for Different Crops - *D. Murugan
and N. Prasanna.* 20

Determinants of Black Pepper Trade in India:
A Post Globalisation Scenario - *Pushia K.P.* 29

AGRO-ECONOMIC RESEARCH

Jhuming to Mainstream Farming as an
Alternative Way of Livelihood amongst the
Tribal Farmers of Tripura- *Dr. Anup Kumar
Das and Dr. Jotin Bordoloi- Agro-Economic
Research Centre for North-East India, Assam
Agricultural University, Jorhat.* 33

COMMODITY REVIEWS

Foodgrains 43

Commercial Crops 47

STATISTICAL TABLES

WAGES

1. Daily Agricultural Wages in Some
States- Category-wise. 50

1.1. Daily Agricultural Wages in Some
States-Operation-wise. 50

PRICES

2. Wholesale Prices of Certain Important
Agricultural Commodities and Animal
Husbandry Products at Selected Centres
in India. 53

CROP PRODUCTION

Sowing and Harvesting Operations Normally
in Progress during April, 2020. 55

The 'Agricultural Situation in India' this month talks about the Government's different farm-oriented policy schemes; recent updates on the general agricultural scenario; two academic research articles, on organic farming in wet and dry land in Tamil Nadu for different crops; and determinants of black pepper trade in India: a post globalization scenario; and an agro-economic research study on jhuming to mainstream farming as an alternative way of livelihood amongst the tribal farmers of Tripura.

The major initiatives and releases by the Government shared in the farm sector news are: the budget provision of Rs 2.83 lakh crore for agriculture allied sectors, irrigation & rural development; release of classical swine fever (CSF) vaccine developed by ICAR-Indian Veterinary Research Institute (IVRI); assessment of crop insurance claims; promotion of traditional / organic farming through the scheme Parampragat Krishi Vikas Yojana (PKVY); success story of soil health card scheme; promotion of private investment in agriculture and agro-processing industries through public private partnership in the areas of agriculture marketing, soil health card, micro irrigation, etc.; promotion of Custom Hiring Centres (CHC) through a dedicated scheme Sub Mission on Agricultural Mechanization (SMAM) to make available costly and bigger advance farm machinery at the door steps of the farmers on rent basis; Celebration of UN World Pulses Day in New Delhi; revamping and addressing the challenges in ongoing schemes like crop insurance schemes, kisan credit card, etc.; promotion and formation of ten thousand new Farmers Producers Organizations (FPOs) to ensure economies of scale for farmers; steps taken to resolve the issues like dependency on monsoon, locust control operations, low farmers income, etc.; 91st annual general meeting of ICAR Society; inauguration of the 11th National Krishi Vigyan Kendra (KVK) conference; and implementation of Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA) to ensure Minimum Support Price (MSP) to farmers of notified oilseeds and pulses qualifying Fair Average Quality (FAQ) norms.

So far as the agricultural scenario is concerned, the Wholesale Price Index (WPI) of foodgrains, pulses, cereals, wheat, paddy and oilseeds increased by 8.63 percent, 12.81 percent, 7.73 percent, 8.91 percent, 4.17 percent and 9.02 percent, respectively, in January, 2020 as compared to that in January, 2019. The cumulative winter season, 2020 rainfall in the country has been 1 percent lower than the long period average during 1st January, 2020 to 26th February, 2020. Current live storage in 123 major water reservoirs in the country was 101.87 BCM as against 68.37 BCM of normal storage based on the average storage of last 10 years.

In academic perspective, this issue offers two insightful research papers related to comparative economic analysis of organic farming and inorganic farming under wet land and dry land in Tamil Nadu; and a study of major determinants of production and export of black pepper in India. The first article analyzes the sustainability of organic farming and inorganic farming under wet and dry land in Nagapattinam and Erode districts of Tamil Nadu. The study is based on the primary data collected for the period of from the Nagapattinam and Erode districts of Tamil Nadu on the basis of multi-stage (districts-blocks-villages-households)

sampling method by using a well structured questionnaire framed for this purpose. The study reveals that net returns from black gram and green gram are higher in organic farming compared to that of inorganic farming. It is due to the fact that when the organic manures, like panchagavya, amirthakaraisal, farmyard manure and vermicompost are applied in the main crop, it leads to an increase in micro organism in the soil which increases fertility of soil. It is suggested that the Government should take adequate measures to disseminate organic farming which will help in shifting more and more farmers from inorganic farming to organic farming; Government should take steps to provide organic certification to the farmers who are practicing organic farming and should also provide extension services, like training to farmers on how to prepare organic inputs. In the second article, the author made an attempt to find out the post-globalization experience of international trade in spices, specifically in black pepper. The primary objectives of the study are to discern the CAGR analysis for trade of pepper in India during pre and post globalization period to identify major economic determinants in pepper trade and to bring out an appropriate strategy to increase its exports. To meet these objectives, secondary data was obtained from several sources, such as the spices statistics, spices export review of spices board, Directorate of Economics, Statistics and Intelligence, FAO trade database, UNCTAD trade reports, etc. Various statistical tools, such as mean, coefficient of variance, compound annual growth rate and multiple regression models were used to analyze the data. The study reveals a negative growth rate in terms of production and export of black pepper in India during the post-globalization period. The analysis also describes that factors such as area, production, export, exchange rate and globalization are statistically significant in affecting the trade of pepper. Moreover, the author suggests that there is a need to develop price stability mechanisms both in domestic and international markets to prevent fall in prices, and incentives should be given to farmers to halt their shift to other crops.

The agro economic research shared in this issue is the findings of study report on jhuming to mainstream farming as an alternative way of livelihood amongst the tribal farmers of Tripura prepared by Agro-Economic Research Centre for North-East India, Assam Agricultural University, Jorhat. The main objectives of this report are: to study the development trend of major agriculture & allied sectors, *viz.*, agriculture, horticulture and piggery; to study the comparative economics of Jhum and settled cultivation with piggery in terms of costs and returns; and to examine the problems in replacement of the existing production patterns, etc. Statistical tools such as linear growth model, ordinary least square model, compound annual growth rate were applied to meet the objectives. Based on the findings, the study emphasizes on an urgent need to encourage and inspire the jhuming farmers to get involved in settled cultivation without hurting their cultural ethos. The study also suggests that the Government should come forward with innovative technology package together with the institutional and policy support to address the twin challenges of poverty eradication (of Jhumias) and environmental protection, and massive awareness programme and trainings should be organized for capacity building of the farmers.

Farm Sector News*

Rs.2.83 lakh crore earmarked for Agriculture allied sectors, irrigation & rural development

Shri Narendra Singh Tomar, Union Minister of Agriculture & Farmers Welfare, Rural Development and Panchayati Raj, hailed the Government's Budget 2020-21 on 1st February, 2020, saying the Government led by the Prime Minister Shri Narendra Modi has given priority to the common man besides farmers and the rural population. He said the first budget of the new decade would pave the way for laying a network of infrastructure leading to overall development and help achieve the target of \$5 trillion economy by 2024-25. A 16 point plan has been unveiled reiterating the promise to double farmers' income by the year 2022. The budget has provisioned Rs. 1.60 lakh crore for Agriculture and Farmers Welfare and Rs. 1.23 lakh crore towards Rural Development Ministry.

Shri Tomar specially thanked the Prime Minister Shri Narendra Modi and Finance Minister Smt. Nirmala Sitharaman for making adequate provision for the Ministries of Agriculture & Farmers Welfare, Rural Development and Panchayati Raj. Shri Tomar said that the Government has already been giving special attention to villages, the poor and peasants by allocating more funds for this purpose and more schemes. It has been proven that the Modi Government is committed to the goal of "Sabka Saath, Sabka Vikas, Sabka Vishwas". Budget provisions offer a glimpse of "Ek Bharat, Shresht Bharat". The budget is a relief to all sections of society, including the women and middle class. Government has paid equal attention to vital sectors such as health, education, skill development and safe drinking water.

Presenting the first budget of the third decade of the 21st century, Finance Minister Smt. Nirmala Sitharaman on 1st February, 2020, rolled out several reforms to reach out to the remote regions, the objective of which is to energize Indian economy in the short term, medium and long terms. The Union Budget has been drafted with the prime objective of "Ease of Livelihood".

Shri Tomar said that the Central Government is implementing several schemes in the interest of crores of farmers and more funds have been allocated

in the financial year 2020-21. A total sum of Rs. 2.83 lakh crore would be spent on agriculture and allied sectors, irrigation and rural development, reinforcing the Modi Government's pro-farmer priority. Farmers have gained a lot out of the 'Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)'. The Union Government would transform our food producers to energy producers by further promoting the setting up of solar power plants besides solar powered pump sets in arid lands. For this purpose, the government would help 20 lakh farmers to set up solar pumps. Another 15 lakh farmers would be provided with grid connection pumps. Solar energy would be promoted. Those farmers who have vacant farmlands or arid lands would be able to set up solar energy generation units and sell off the generated power.

State governments would be encouraged to adopt the model laws drafted by the Central Government towards reforms in agriculture sector. The government is also focused on improving irrigation facilities. Budget has laid emphasis on the ease of farmers' livelihood; special attention has been paid on how farmers' produce reaches the market soon. The Railways would start Kisan Trains for transportation of milk, meat and fish. This would boost agriculture in the Northeast and tribal areas.

The government has introduced a new scheme for creating clusters in horticulture sector and promoting a product each in all districts. Provision has been made to more than double the milk production capacity by 2025. The scope of NABARD's refinance scheme would be expanded. Budget has provisioned Rs. 15 lakh crore for agriculture credit. More allocation has been made for interest subsidy so that no farmer faces any difficulty.

IVRI releases live attenuated Classical Swine Fever (CSF) cell culture vaccine (Indigenous strain)

Dr. Trilochan Mohapatra, Secretary, Department of Agricultural Research and Education (DARE) and Director General, Indian Council of Agricultural Research (ICAR), and Shri Atul Chaturvedi, Secretary, Department of Animal Husbandry and Dairying (DAHD), on 3rd February, 2020, released the live attenuated Classical Swine Fever Vaccine (IVRI-CSF-BS) Technology developed by ICAR -Indian Veterinary Research Institute (IVRI), Izatnagar.

*Source: www.pib.nic.in

CSF is one of the most important diseases of pigs causing high mortality with annual loss of approx. Rs.4.299 billion. A lapinized CSF vaccine (Weybridge strain, UK) is being used in India since 1964 for controlling the disease. The vaccine is produced by sacrificing large number of rabbits for each batch.

Shri Chaturvedi said that the country's total requirements is 22 million doses per year and hardly 1.2 million doses are produced per year by the lapinized vaccine, as only 50 doses are produced from a single rabbit spleen.

In order to do away sacrificing of rabbits and increase the productivity, IVRI had earlier developed a cell culture CSF vaccine by adapting the lapinized vaccine virus in cell culture. The technology has been transferred to M/s Indian Immunologicals, Hyderabad and Government of Punjab during 2016 and 2018, respectively.

Director, IVRI, Dr. RK Singh said that since the cell culture vaccine is from a foreign strain (Weybridge Strain, UK), IVRI has further developed a new CSF Cell Culture Vaccine by attenuating an indigenous virulent CSF virus in cell culture. The vaccine virus has very high titre and lakhs of doses can be produced very easily in cell culture and country's requirement can be easily fulfilled using this new vaccine.

The new vaccine is ready for release and commercial production would be completed in less than a year. The vaccine would be the best choice for use in the CSF Control Programme (CSF-CP) already launched by DAHD (CSF-CP). Shri Chaturvedi said that the new vaccine would be part of the Government's One Health Initiative and may result in huge savings as it would nip the spread of the virus at animal stage so that it does not pass on to the human population.

Dr. Mohaptra said that there is a huge demand of this vaccine technology from various State Governments and Private manufacturers and the vaccine has huge export potential, especially in Nepal. Due to very high titre of vaccine virus, this vaccine would be the most economical CSF vaccine costing around less than Rs 2/- per dose as against Rs 15-25/- of lapinized CSF vaccine and Rs.30/dose (approx) for an imported Korean vaccine being used in the country. Besides, the new vaccine gives

immunity for two years as compared to 3 to 6 months protection under the vaccines currently being used, he added.

The vaccine is safe, potent, does not revert to virulence and provide protective immunity from day 14 of the vaccination till 24 months studied so far. The vaccine has been tested on around 500 pigs at multiple locations.

The new vaccine has been developed by a team of IVRI scientists consisting of Dr Pronab Dhar, Dr Ashok Kumar Tiwari, Dr M Manu, Dr Vikramaditya Upmanyu, Dr Richa Pachauri and Dr Raj Kumar Singh and a patent application has already been submitted for the new invention.

Assessment of Crop Insurance Claims

Pradhan Mantri Fasal Bima Yojana (PMFBY) encourages the use of technology for better implementation of the scheme. Accordingly, National Crop Insurance Portal (NCIP) has been developed for ensuring better administration, co-ordination, transparency, dissemination of information and delivery of services including uploading/obtaining details of individual insured farmers for better monitoring and to ensure transfer of claim amount electronically to the individual farmers' bank account. To ensure timely payment of claims, scheme envisages mandatory use of smartphone/CCE-Agri App for real time transfer of data on national crop insurance portal. Farmers app has also been launched, on which farmers can track their crop insurance application and get all information about it.

Further, the Department of Agriculture, Cooperation and Farmers Welfare, through Mahalanobis National Crop Forecast Centre (MNCFC) had carried out pilot studies for Smart Sampling Technique/Optimization of Crop Cutting Experiments (CCEs) using Remote Sensing/Satellite data in various States involving 8 agencies/organizations during kharif 2018 and rabi 2018-19 under PMFBY. The review of these pilot studies was carried out by High Level Committee constituted for the purpose.

Accordingly, based on these results and the technologies which were verified during the pilot studies, the Government rolled out Smart Sampling Technique (CCE location selection using satellite

data) and optimization of CCEs, in 96 districts of 9 States, for rice crop during Kharif, 2019. Around 1 lakh CCEs for rice crop were conducted, during kharif 2019, using Smart Sampling Technique.

Pilot studies have been undertaken for estimation of yield at Gram Panchayat level, during kharif 2019, through 12 agencies, by use of technology (Satellite data, Unmanned Aerial Vehicle (UAV), Artificial Intelligence, Machine Learning, etc.). As soon as statistically sound methodology for yield estimation through technology is established for the crop, the same may be adopted.

A provision for payment of 12% penal interest by concerned insurance company to farmer, if the company failed to settle the claims within stipulated period of two months subject to certain conditions, has been made in the revised operational guidelines of PMFBY.

Government has imposed interest penalty of Rs. 3.30 crore, Rs. 0.09 crore, Rs. 0.51 crore, Rs. 0.15 crore and Rs. 0.16 crore on Agriculture Insurance Company of India Ltd., Cholamandalam-MS General Insurance Company Ltd., ICICI-Lombard General Insurance Company Ltd., New India Assurance Company Ltd. and SBI General Insurance Company Ltd., respectively, vide letter dated 25th September, 2019. In reply they have submitted their explanations requesting for review. A meeting has been called to discuss the explanations submitted by the insurance companies.

Apart from this, State Governments have been advised to impose penalties on insurance companies themselves. Accordingly, some State governments like Uttar Pradesh, Gujarat and Haryana have also imposed penalty on insurance companies for non-performance of certain provisions of the scheme and have deducted the penalty from State share of premium subsidy to insurance companies.

Society for Welfare Schemes

A National Farmer's Welfare Programme Implementation Society has been registered on 23rd December, 2019, to operate certain Central Sector Schemes related to farmers' welfare.

The Department regularly monitors the progress of schemes through meetings with concerned officers of the State Governments/UTs, visits of nodal

officers of the Department to the States/UTs, video conferencing, Rabi and Kharif Conferences, etc. Besides the beneficiary, details of different schemes of the Department are uploaded in the Direct Benefit Transfer (DBT) portal for monitoring and tracking of beneficiaries, etc. Further, financial assistance extended to the beneficiary is directly credited into their bank accounts through the DBT mode.

Promotion of Traditional Farming

Government has been encouraging the farmers for traditional /organic farming in the country through the Scheme of Parampragat Krishi Vikas Yojana (PKVY). Enough flexibility has been given to the States to adopt any model of traditional/organic farming including Zero Budget Natural Farming (ZBNF) depending on farmers' choice. Assistance of Rs 50000/ ha/3 year is provided for organic inputs, certification, labeling, packing, transportation and marketing of organic produce under Parampragat Krishi Vikas Yojana (PKVY).

Organic farming of niche crops of North East Region for exports is also being supported under Mission Organic Value Chain Development (MOVCDNER), where as Farmer Producer Organisations (FPOs) are supported for organic inputs, post harvest management practices including infrastructure creation, marketing in a value chain mode.

ICAR has developed Integrated Organic Farming System models and identified suitable crop species/ varieties for traditional/ organic farming. Government is disseminating information for the traditional farming by organizing training and awareness campaign/workshop and educating the farmers about traditional/ organic farming practices.

Low Agricultural Income

The average income of agricultural households in the country is estimated by National Statistical Office (NSO) through the 'Situation Assessment Survey of Agricultural Households' conducted from time to time. The first such survey was conducted in rural parts of the country during National Sample Survey (NSS) 59th round (January, 2003- December, 2003). Thereafter, a re-survey was conducted during NSS 70th round (January 2013- December 2013). As per the Survey results, which although not strictly comparable, the average monthly income

per agricultural household from various sources is estimated to have increased from Rs. 2115 in 2003 to Rs. 6426 in 2013.

The Survey report has not mentioned the reasons for low level of income of agricultural households in the country. However, predominance of small and marginal operational holdings, low irrigation coverage, poor soil health, inadequate marketing facilities and post-harvest supporting services and lack of focus on the allied sectors of agriculture, etc., may be attributed as main reasons for low level growth in income of people engaged in the agriculture sector.

Growth rate of Gross Value Added (GVA) in agriculture and allied sector is directly and indirectly affected by various factors, including changes in income of agricultural households. With a view to make agriculture more remunerative, various Schemes are implemented by the Government, *viz.*, Pradhan Mantri Krishi Sinchayee Yojana (PMKSY); Soil Health Card (SHC) Scheme; National Agriculture Market Scheme (e-NAM); Pradhan Mantri Fasal Bima Yojana (PMFBY); National Food Security Mission (NFSM); Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA); Mission for Integrated Development of Horticulture (MIDH); and Rashtriya Krishi Vikas Yojana (RKVY). Besides, Government has adopted the principle of fixing Minimum Support Price (MSP) at a level of 50 percent over the all-India weighted average cost of production of crops.

Moreover, with a view to provide income support to all farmers families across the country, the Central Government has started a new Central Sector Scheme, namely, the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN). The Scheme aims to provide a payment of Rs. 6000/- per year, in three installments of Rs. 2000/- each to the farmer families, subject to certain exclusions relating to higher income groups.

Government has also focused on the aggregation of small and marginal farmers into groups for overcoming market imperfections and to realize better prices for their produce.

Soil Health Card Scheme: A success story

The Soil Health Card Scheme launched by the Modi Government during the financial year 2014-15 with a view to address the decline of soil nutrients, has started reaping fruit. In the second phase of the

scheme, 11.69 crore Soil Health Cards have been distributed to farmers in the last two years.

Under the guidance of Hon'ble Prime Minister Shri Narendra Modi and directions of the Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar, the Ministry is issuing the Soil Health Cards. This has enabled the farmers to understand the soil health parameters and improve its productivity by judicious application of soil nutrients.

A study conducted by the National Productivity Council (NPC) says that the application of Soil Health Card recommendations has led to a decline of 8-10% in use of chemical fertilizers and also raised productivity by 5-6%.

Under the Central Government's Soil Health Card Scheme Phase-I (Years 2015 to 2017), 10.74 crore cards were distributed, while under the Phase-II, 11.69 crore cards have been distributed during the period 2017-19.

In the current financial year, a pilot project "Development of Model Villages" is being implemented under which the sampling and testing of cultivable soil is being encouraged in partnership with the farmers. Under the project, a model village has been selected for aggregation of soil samples and analysis of each agricultural holding. As part of the scheme 13.53 lakh Soil Health Cards have been distributed during the year 2019-20.

For setting up Soil Health Laboratories under the scheme, the states have been sanctioned 429 static labs, 102 new mobile labs, 8,752 mini labs, 1,562 village-level laboratories and strengthening of 800 existing labs.

The scheme provides for the analysis of soil composition by the State Governments once in every two years so that remedial steps can be taken to improve soil nutrients. Farmers can track their soil samples and also obtain their Soil Health Card report.

While the Soil Health Management Scheme has turned out to be a blessing for the farmers, it is also creating jobs for the agrarian youth. Under the scheme, village youth and farmers up to 40 years of age are eligible to set up Soil Health Laboratories and undertake testing. A laboratory costs up to Rupees Five Lakhs, 75% of which can

be funded by the Central and State Governments. The same provisions apply to Self Help Groups, Farmers' Cooperative Societies, Farmers Groups and Agricultural Producing Organisations.

Interested youth farmers and Organisations can submit their proposals either in person to the Deputy Director (Agriculture) / Joint Secretary (Agriculture) or in their offices in respective districts. For details, one may visit websites agricoop.nic.in or soilhealth.dac.gov.in or dial Kisan Call Centre (1800-180-1551).

Private Investment in Agriculture and Agro-processing Industry

The Government has been promoting private investments in agriculture through Public Private Partnership through schemes in the areas of agriculture marketing, soil health card, micro irrigation, etc. The Government of India has also circulated a Model Act-Agriculture Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017 and Model Act-Agriculture Produce & Livestock Contract Farming and Services (Promotion & Facilitation) Act, 2018, with the aim to encourage more investment in agriculture. This Ministry has also incorporated a "Framework for Supporting Public Private Partnership for Integrated Agricultural Development (PPPIAD)" under the Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RKVYRAFTAAR) in the scheme guidelines to facilitate integrated projects led by private sector players in the agriculture and allied sectors, with a view to aggregating farmers, providing additional income and integrating the agriculture supply chain.

To promote food processing industries and attract investment into the sector, the Government has taken various steps/measures/policy initiatives. It includes permission to 100% Foreign Direct Investment (FDI) through the automatic route in manufacturing of food products and 100% FDI under Government approval route for retail trading, including through e-commerce for food products produced and/or manufactured in India, creation of a special fund of Rs.2000 crore in National Bank for Agriculture and Rural Development (NABARD) to provide affordable credit to food processing projects/units, bringing food & agro-based processing units, cold storage units/cold storage chains under the ambit of Priority Sector Lending (PSL), allowing 100 percent income tax exemption from profit derived

from activities such as post-harvest value addition to agriculture by FPOs' having annual turnover up to Rs.100 crore, 100% income tax exemption for new food processing units for a period of five years and lower income tax rate for subsequent five years, 100% deduction for capital expenditure incurred on setting up and operating of cold chain facility, concessional import duty for plant and machinery under project imports benefit scheme, import duty exemption on import of raw material under advance authorization, etc.

The Government is implementing a scheme called the Pradhan Mantri Kisan Sampada Yojana (PMKSY) with the following scheme components, viz., (i) Mega Food Parks, (ii) Integrated Cold Chain and Value Addition Infrastructure, (iii) Infrastructure for Agro-processing Clusters, (iv) Creation of Backward and Forward Linkages, (v) Creation / Expansion of Food Processing & Preservation Capacities, (vi) Food Safety and Quality Assurance Infrastructure, and (vii) Human Resources and Institutions with the objectives, inter alia, to create modern infrastructure and efficient value/supply chain with a view to encourage and facilitate food processing industries for preservation and processing of all agro and marine produce. The Government is also implementing the scheme "Operation Greens" for integrated development of value/supply chain of tomato, onion and potato (TOP) crops in selected States on pilot basis from November, 2018. Under this schemes, financial assistance is provided as capital subsidy in the form of grants-in-aid to individuals, farmers, entrepreneurs, organizations such as Central and State PSUs/Joint Ventures/Farmer Producer Organizations (FPOs)/NGOs/Cooperatives/SHGs/ Public and Private Companies, etc., for setting up of food processing industries/units/projects.

Affordable access to Technology at the doorsteps of the farmers

To make available costly and bigger advance farm machinery at the door steps of the farmers on rent basis, Custom Hiring Centres (CHC) are promoted through a dedicated scheme Sub Mission on Agricultural Mechanization (SMAM), under which subsidy is provided at the rate of 40% of the project cost to individual farmer upto a project cost of Rs.60 lakh and 80% to the group of farmers up to a project cost of Rs. 10 lakh. A special consideration for the farmers of North Eastern Region (NER) is

available. 95% subsidy upto a project cost of Rs. 10 lakh is provided to a group of NER farmers for establishment of Custom Hiring Centres. For establishment of Hi-tech and Hi-value agricultural machinery CHC, assistance at the rate of 40% of the project cost to individual farmer upto a project cost of Rs.250 lakh is provided.

To address air pollution due to crop burning, a new Central Sector Scheme on 'Promotion of Agricultural Mechanization for In Situ Management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi' (CRM) for the period from 2018-19 to 2019-20 has been launched. Under the scheme to establish Custom Hiring of in situ crop residue management machinery a financial assistance at the rate 80% of the project cost is provided to the farmers.

The Government has developed and launched Multi lingual Mobile App "CHC- Farm Machinery" which helps the farmers in getting rented farm machinery and implements through Custom Hiring Service Centers in their area. As of now, 44,607 CHCs with 1,39,319 Agricultural machinery for renting out are registered on this Mobile app. Total 1,14,461 farmers as users are registered on this Mobile App.

Measures adopted for MSP for Crops

This Ministry implements Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA) to ensure Minimum Support Price (MSP) to farmers of notified oilseeds and pulses qualifying Fair Average Quality (FAQ) norms. PM-AASHA is an umbrella scheme comprising of Price Support Scheme (PSS), Price Deficiency Payment Scheme (PDPS) and Private Procurement & Stockist Scheme (PPSS). These schemes are implemented at the request of the State Governments / Union Territories. PSS is implemented for procurement of pulses, oilseeds and copra at MSP, whereas PDPS is implemented for oilseeds. However, States/UTs may choose either PSS or PDPS in a given procurement season with respect to a particular oilseed crop for the entire State. PDPS does not involve any physical procurement but envisages direct payment of the difference between the MSP and the selling / modal price to pre-registered farmers selling oilseeds of prescribed FAQ norms within the stipulated period in the notified market yard through a transparent auction process. Besides, PPSS is also implemented for oilseeds on pilot basis and States have the option

for implementation of PPSS in district/selected Agricultural Produce Market Committee (APMCs) of district involving the participation of private stockist. However, if farmers gets better price in comparison to MSP, they are free to sell their produce in open market.

Steps to reduce Dependency on Monsoon

The Water Resources Projects are planned, funded, executed and maintained by the State Governments themselves, as per their own resources and priority. In order to supplement their efforts, Government of India provides technical and financial assistance to State Governments to encourage sustainable development and efficient management of water resources through various schemes and programmes such as, Accelerated Irrigation Benefits Programme (AIBP) under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), etc.

During 2016-17, ninety-nine (99) on-going Major/Medium irrigation projects under PMKSY-AIBP, having ultimate irrigation potential of 76.03 lakh hectares at an estimated cost of Rs. 77595 crore (Central Assistance component of Rs. 31342 Crore) have been prioritized in consultation with states, for completion in phases up to December, 2019, along with their Command Area Development & Water Management (CADWM) works. Funding mechanism through NABARD has been approved by the Government for both Central and State Shares.

Ministry of Agriculture and Farmers Welfare through ICAR-Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad, has prepared detailed Crop Contingency Plans for 650 districts. States have been advised for preparing, updating, and fine-tuning Contingency Plans for each district in consultation with CRIDA-ICAR and the State Agriculture Universities and to prepare location specific remedial measures based on these contingency plans in the event of late arrival of monsoon, long dry spells, scanty rainfall, drought conditions, tying up availability of seeds and other inputs for implementing the Contingency Plans.

To mitigate the advance impact of drought, State Governments are advised to initiate advance remedial action, e.g., constructing water harvesting structures under MGNREGA and other such schemes, promoting agronomic practices for moisture conservation, promoting cultivation of

less water consuming crops and restoring irrigation infrastructure by desilting canals, energizing tube-wells and replacing/repairing faulty pumps. Further, the States are also advised to carry out periodic assessment of preparation for kharif crops, particularly contingency crops.

States have been advised to keep aside about 5 to 10% of fund allocated under Rashtriya Krishi Vikas Yojana (RKVY) for undertaking appropriate interventions, if the situation so warrants, to minimize the adverse impact of an aberrant monsoon on the agriculture sector. The Central Government implements Centrally Sponsored Schemes (CSS) / Central Sector (CS) Schemes such as Pradhan Mantri Krishi Sinchai Yojana (PMKSY), the Rainfed Area Development Programme (RADP), National Rural Drinking Water Programme (NRDWP), etc., which contribute towards drought proofing. Twenty five percent of total outlay for all CSS Schemes (except for schemes, which emanate from a legislation, e.g., MGNREGA), can be used as flexi funds to enable mitigation/ restoration activities in cases of natural calamities.

Kisan Portal subsumes all mobile based initiatives in the field of agriculture and allied sector. Officers, Scientists and Experts from all organizations and departments of the Government of India and State Governments {including State Agricultural Universities (SAUs), Krishi Vigyan Kendras(KVKs) and Agro- Meteorological Field Units (AMFUs)} are using this portal for disseminating information (giving topical & seasonal advisories and providing services through SMS to farmers in their local languages) on various agricultural activities to registered farmers.

The Department of Land Resources (DoLR) has sanctioned 8214 watershed development projects in 28 States (except Goa) from 2009-10 to 2014-15, covering an area of about 39.07 million hectares under the Integrated Watershed Management Programme (IWMP). IWMP was amalgamated as the Watershed Development Component (WDC) of the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) in 2015-16. An amount of Rs.18429.37 crore has been released to the concerned States as Central Share from 2009-10 to 2019-20 (upto 31.12.2019) under WDC-PMKSY. The activities being undertaken, inter alia, include ridge area treatment, drainage line treatment, soil and moisture conservation, rain water harvesting, nursery raising, afforestation, horticulture, pasture

development, livelihoods for asset less persons, etc.

As per information provided by the States, since 2014-15 (upto 31.12.2019), 6.15 lakh water harvesting structures have been created/rejuvenated. An additional 13.84 lakh hectare area has been brought under protective irrigation. An advisory has been issued to the States in May, 2019 to take necessary steps for intensive Water Conservation and Water Harvesting efforts under WDC-PMKSY.

Financial assistance is provided to the farmers in the form of input subsidy, where crop loss is 33% and above, in the event of notified natural calamities. The assistance provided is different for different categories of cultivated lands, as detailed below:

(a) For agriculture crops, horticulture crops and annual plantation crops	(a) (i) Rs. 6800/- per hectare in rainfed areas and restricted to sown areas. (ii) Rs. 13,500/- per hectare in assured irrigated areas, subject to minimum assistance not less than Rs. 1000/- and restricted to sown areas.
(b) Perennial crops	(b) Rs. 18,000/- per hectare for all types of perennial crops, subject to minimum assistance not less than Rs. 2000/- and restricted to sown areas.
(c) Sericulture	(c) Rs. 4800/- per hectare for Eri, Mulberry, Tussar. Rs. 6000/- per hectare for Muga.

India hosts the UN World Pulses Day celebrations in New Delhi

Inaugurating the UN World Pulses Day celebrations in New Delhi on 10th February, 2020, Union Minister for Agriculture & Farmers Welfare, Shri Narendra Singh Tomar said that initiatives of the Government in increasing pulses production in the country yielded positive results and Government is committed to provide remunerative prices to farmers for the produce. Government's aim is to make India a surplus country in terms of pulses production. The Minister added that Government's primary focus given to the sector can be seen from the budgetary allocations made for the agriculture and rural development sectors, which is about Rs. 3 lakh crore. While the Agriculture sector budget was Rs. 27 thousand crore couple of years ago, the

Government has allocated over Rs. 1.5 lakh crore in FY 2020-21, he added.

Shri Tomar said after having achieved surplus foodgrains production, the country has turned self-sufficient in Pulses cultivation since 2016-17 with the combined efforts of all stakeholders following the directions of the Prime Minister Shri Narendra Modi. In the crop year 2018-19 India produced 22 million tonnes of pulses and for the next year a target of 26.30 million tonnes is projected.

The Minister said that in order to ensure proper value for the produce, Government has raised the MSP by one-and-a-half times based on recommendations of the Swaminathan Committee. eNAM has been strengthened with a view of One Nation One Market which has provided farmers access to better and wider market area ensuring a fair price. Already 585 Mandis have joined the eNAM portal and another 400 Mandis would be added soon. To strengthen the logistics associated with the Agriculture sector, a new Kisan Rail has been announced in this budget which would benefit both the Agriculture and Horticulture sectors. To promote exports of fruits from the North-East, the Kisan Udan Yojana has been announced in the budget, he added.

Congratulating NAFED for taking a lead in organizing the World Pulses Day event, Shri Tomar said that the Government has procured 63 lakh tonnes of pulses in the last five years, benefitting lakhs of farmers.

Dr. Ramesh Chand, Member NITI Aayog, while addressing the event, said that the biggest role in increasing pulses production is to be played by country's R&D, as technology is the major driving force in increased production than the price factor. Citing cerealization of Indian diet post-Green Revolution for several nutritional issues in the country, Dr. Chand said that in order to address these concerns we need to look into the past of pulses cultivation and consumption patterns.

The United Nations General Assembly has designated February 10 of each year since 2019 as "UN World Pulses Day". The event was organized this year by NAFED in collaboration with Global Pulse Confederation (GPC). Shri. Manoj Kanti Deb, Minister for Food, Civil Supplies and Consumer Affairs (Tripura), Ms. Cindy Brown, Global Pulses

Confederation Chairperson, NAFED Chairman Dr. Bijender Singh and representatives from various countries and officials of Central and State Governments and people associated with pulses production and sales were present in large numbers during the event.

On the occasion, the Minister launched the 'Family pack of NAFED pulses and NAFED Organic pulses. A NAFED Coffee Table Book, recording its journey since inception on 2nd October, 1958 to the present and an FAO publication "Global Economy of Pulses" were also launched. The inaugural session was followed by four sessions devoted to the need of enhanced production and consumption of pulses for nutrition, investment in the supply chain of pulses and the need of value addition as well as the outlook of pulses globally with emphasis on India.

The National Agricultural Cooperative Federation of India Ltd. (NAFED) is the Central Nodal agency of Government of India for procurement of Pulses & Oilseeds, Copra and Cotton under PM Aasha at Minimum Support Price (MSP), in every crop season.

The Global Pulse Confederation (GPC), established in 1963 in France, is now headquartered at Dubai since 2009. It is a non-profit Confederation to promote production, consumption, awareness and trade of pulses, representing every component of supply chain related to the pulse industry such as growers, traders, government bodies, trade promotion entities, processors and consumers. It is the Confederation of 26 national associations and thousands of corporates engaged in pulses trade in over 50 countries.

Kisan Credit Card (KCC) Saturation drive for PM-KISAN beneficiaries started from 10th February, 2020 and would be carried out for a period of 15 days

To enable universal access to Concessional Institutional credit, Government of India has initiated a drive in Mission Mode for saturating all PM-KISAN beneficiaries with Kisan Credit Card (KCC). This would help all such farmers to get short term loan for crop & animal/fish rearing at a maximum interest of 4% on timely repayment.

This drive has started from 10th February, 2020 and would be carried out for a period of 15 days.

Detailed instructions in this regard have been issued to all the State/UT Governments, MDs of all banks and Chairman NABARD, detailing the procedure to be followed for coverage of PM-KISAN beneficiaries under KCC.

State/UT Governments and banks have been advised to prepare a list of all PM-KISAN beneficiaries who do not have KCC and approach them through line departments of the State/UT Government including Departments of Agriculture, Animal husbandry, Panchayat & Rural Development and Panchayat Secretaries. Bank Sakhis under the NRLM scheme would also be used for motivating PM KISAN beneficiaries to visit the concerned bank branches for the purpose.

As the KCC along with benefit of Interest Subvention to agricultural farmers has now been extended to animal husbandry and fisheries farmers also. State/UT Governments have also been requested to focus on such farmers and facilitate sanction of additional credit limit/issue fresh KCC to them.

To ensure ease of application, the following steps have been taken -

- a. A simple one page form has been developed such that the basic data would be obtained from the bank's record under PM KISAN and only a copy of the land record along with details of crop sown would need to be filled in.
- b. The one page form shall be available along with an advertisement being published in all leading newspapers across the country and the same can be cut and filled by the beneficiaries.
- c. The form can also be downloaded from websites of all Scheduled Commercial Banks (SCBs) as well as website of Department of Agriculture, Cooperation & Farmers Welfare, Government of India (www.agricoop.gov.in) and PM-KISAN portal (www.pmkisan.gov.in).
- d. Common Service Centres (CSC) have also been authorised to fill up the form and transmit the same to the concerned bank branches.

All banks have been advised to have separate counters for handling such applications and ensure issue of fresh KCC or enhancement of the existing KCC limit or activation of inoperative KCC account

within the shortest possible time not exceeding 14 days from date of submission of application.

Progress of this drive would be monitored on a daily basis by the State/UT Government activities under saturation drive in a district would be led by the District Collector with full support of the Lead District Manager and DDM, NABARD.

In addition to the KCC, with a view to provide social security to the PM KISAN beneficiaries, eligible farmers would also be enrolled for the Pradhan Mantri Suraksha BimaYojana (PMSBY) and Pradhan Mantri Jeevan Jyoti BeemaYojana (PMJJBY), after obtaining their consent. These schemes provide accident insurance and life insurance, at a premium of Rs.12/- and Rs.330/-, respectively, for an insured value of Rs.2 lakh in each case.

Steps to Increase Farmers Income

Commission for Agricultural Costs and Prices (CACP) uses crop-wise and state-wise cost estimates provided by the Directorate of Economics & Statistics (DES), DAC&FW compiled under 'Comprehensive Scheme (CS) for Studying the Cost of Cultivation (CoC) of Principal Crops in India'. Since CS data is generally available with a time lag of two to three years given the imperative of recommending pricing policy for ensuing season, cost estimates need to be projected for the crop season under consideration. Based on CS data, the Commission projects crop-wise, state-wise CoC of mandated crops for the subsequent season. Composite Input Price Indices (CIPIs) based on latest prices of major inputs like human labour, bullock labour, machine labour, fertilizers, manures, seeds, pesticides and irrigation is constructed, costs of interest on working capital, miscellaneous charges, rental value of owned land, rent paid for leased-in land, land revenue, taxes & cesses, depreciation on implements & farm buildings and interest on fixed capital are also included in the cost.

Based on the latest data available from different sources like Labour Bureau, Ministry of Labour and Employment, State Governments and Office of Economic Adviser, Ministry of Commerce and Industry and CIPIs thus constructed, the Commission projects crop-wise, state-wise cost of production (CoP) A2, A2+FL and C2, from these projected CoCs using projected yield. Subsequently, all-India estimates of CoP A2, A2+FL, C2 are derived based on crop-

wise, state-wise projected CoPs and their production shares. These projected all-India estimates of CoP are considered by the Commission while formulating national level price policy recommendations & MSP.

The procurement policy of Government of India (GOI) is open ended, under which paddy and wheat offered by farmers all over the country within the stipulated period (conforming to specifications prescribed in advance by GOI) are purchased for Central Pool at Minimum Support Price (MSP) by Food Corporation of India (FCI)/State Governments/State Government Agencies to help farmers get remunerative price and prevent distress cell. However, if any producer/farmer gets better price in comparison to MSP, he/she is free to sell his/her produce in open market. Coarse grains are procured at MSP by State Government as per the procurement plan prepared in consultation with FCI and approved by the Central Government.

A Price Support Scheme (PSS) for procurement of oilseeds, pulses and cotton is implemented by DAC&FW through Central Nodal Agencies at the Minimum Support Price (MSP) declared by the Government subject to certain conditions being met by the State Governments. Losses, if any, are reimbursed by the Government of India to the Central Nodal Agencies. Market Intervention Scheme (MIS) is implemented to protect the growers of crops not covered under MSP scheme from making distress sale.

CCEA approves scheme for “Formation and Promotion of Farmer Producer Organizations (FPOs)” to form and promote 10,000 new FPOs

The Cabinet Committee on Economic Affairs, chaired by the Hon’ble Prime Minister Shri Narendra Modi, has given its approval for 10,000 FPOs to be formed in five years period from 2019-20 to 2023-24 to ensure economies of scale for farmers. Support to each FPO be continued for 5 years from its year of inception.

Benefits

Small and marginal farmers do not have economic strength to apply production technology, services and marketing including value addition. Through formation of FPOs, farmers would have better collective strength for better access to quality input,

technology, credit and better marketing access through economies of scale for better realization of income.

Brief of the Scheme

- i. A new Central Sector Scheme titled “Formation and Promotion of Farmer Produce Organizations (FPOs)” to form and promote 10,000 new FPOs with a total budgetary provision of Rs. 4496.00 crore for five years (2019-20 to 2023-24) with a further committed liability of Rs. 2369.00 crore for period from 2024-25 to 2027-28 towards handholding of each FPO for five years from its aggregation and formation.
- ii. Initially there would be three implementing Agencies to form and promote FPOs, namely Small Farmers Agri-business Consortium (SFAC), National Cooperative Development Corporation (NCDC) and National Bank for Agriculture and Rural Development (NABARD). States may also, if so desire, nominate their Implementing Agency in consultation with DAC&FW.
- iii. DAC&FW would allocate cluster/states to Implementing Agencies which in turn would form the Cluster Based Business Organization (CBBO) in the States.
- iv. FPOs would be formed and promoted through CBBOs engaged at the State/Cluster level by implementing agencies. The CBBOs would have five categories of specialists from the domain of crop husbandry, agri-marketing / value addition and processing, social mobilisation, law & accounts and IT/MIS. These CBBOs would be platform for an end to end knowledge for all issues in FPO promotion.
- v. There would be a National Project Management Agency (NPMA) at SFAC for providing overall project guidance, data compilation and maintenance through integrated portal and information management and monitoring.
- vi. Initially the minimum number of members in FPO would be 300 in plain area and 100 in North East & hilly areas. However, DAC&FW may revise the minimum number of membership based on experience/need with approval of Union Agriculture Minister.

- vii. Priority would be given for formation of FPOs in aspirational districts in the country with at least one FPO in each block of aspirational districts.
- viii. FPOs would be promoted under “One District One Product” cluster to promote specialization and better processing, marketing, branding & export by FPOs.
- ix. There would be a provision of Equity Grant for strengthening equity base of FPOs.
- x. There would be a Credit Guarantee Fund of up to Rs. 1,000.00 crore in NABARD with equal contribution by DAC&FW and NABARD and Credit Guarantee Fund of Rs.500.00 crore in National Cooperative development Corporation (NCDC) with equal contribution by DAC&FW and NCDC for providing suitable credit guarantee cover to accelerate flow of institutional credit to FPOs by minimizing the risk of financial institutions for granting loan to FPOs.
- xi. States/UTs would be allowed to avail loan at prescribed concessional rate of interest under Agri-Market Infrastructure Fund (AMIF) approved for set up in NABARD for developing agriculture marketing and allied infrastructure, by making marketing & allied infrastructure including Common Facilitation Centre / Custom Hiring Centre for FPOs as eligible category for providing assistance to States / UTs.
- xii. Adequate training and handholding would be provided to FPOs. CBBOs would provide initial training. Professional training of CEO/ Board of Directors / Accountant of FPOs would be provided in organizational training, resource planning, Accounting / management, marketing, processing, etc., in reputed National/ Regional training Institutes.

Cabinet approves Revamping of “Pradhan Mantri Fasal Bima Yojana (PMFBY)” and “Restructured Weather Based Crop Insurance Scheme (RWBCIS)” to address the existing challenges in implementation of Crop Insurance Schemes

The Union Cabinet, chaired by the Prime Minister, Shri Narendra Modi has approved revamping of

“Pradhan Mantri Fasal Bima Yojana (PMFBY)” and “Restructured Weather Based Crop Insurance Scheme (RWBCIS)” to address the existing challenges in implementation of Crop Insurance Schemes.

It is proposed to modify certain parameters/provisions of ongoing schemes of PMFBY and RWBCIS as under:

- a. Allocation of business to Insurance Companies for three years (Both PMFBY/RWBCIS).
- b. Option shall be given to States/UTs to choose Scale of Finance or district level Value of Notional Average Yield (NAY), i.e., Minimum Support Price (MSP) as sum insured for any district crop combination (Both PMFBY/RWBCIS). Farm gate price would be considered for the other crops for which MSP is not declared.
- c. Central Subsidy under PMFBY/RWBCIS to be limited for premium rates upto 30% for unirrigated areas/crops and 25% for irrigated areas/crops. Districts having 50% or more irrigated area would be considered as irrigated area/district (Both PMFBY/RWBCIS).
- d. Flexibility to States/UTs to implement the Scheme with option to select any or many of additional risk covers/features like prevented sowing, localised calamity, mid-season adversity, and post-harvest losses. Further, States/UT can offer specific single peril risk/insurance covers, like hailstorm, etc., under PMFBY even with or without opting for base cover (Both PMFBY/RWBCIS).
- e. States not to be allowed to implement the Scheme in subsequent Seasons in case of considerable delay by States in release of requisite premium subsidy to concerned Insurance Companies beyond a prescribed time limit. Cut-off dates for invoking this provision for Kharif and Rabi seasons would be 31st March and 30th September of successive years, respectively (Both PMFBY/RWBCIS).
- f. For estimation of crop losses/admissible claims, two-step process to be adopted based on defined deviation matrix using specific triggers like weather indicators, satellite indicators, etc., for each area along with normal ranges

and deviation ranges. Only areas with deviations would be subject to Crop Cutting Experiments (CCEs) for assessment of yield loss (PMFBY).

- g. Technology solutions like Smart Sampling Technique (SST) and optimization of number of CCEs to be adopted in conducting CCEs (PMFBY).
- h. In case of non-provision of yield data beyond cut-off date by the States to implementing Insurance Companies, claims to be settled based on yield arrived through use of technology solution (PMFBY alone).
- i. Enrolment under the Scheme to be made voluntary for all farmers (Both PMFBY/RWBCIS).
- j. Central Share in Premium Subsidy to be increased to 90% for North Eastern States from the existing sharing pattern of 50:50 (Both PMFBY/RWBCIS).
- k. Provisioning of at least 3% of the total allocation for the Scheme to be made by Government of India and Implementing State Governments for administrative expenses. This shall be subject to an upper cap fixed by DAC&FW for each State (Both PMFBY/RWBCIS).
- l. Besides above, Department of Agriculture, Cooperation and Farmers Welfare in consultation with other stakeholders/agencies would prepare/develop State specific, alternative risk mitigation programme for crops/areas having high rate of premium. Further, as the scheme is being made voluntary for all farmers, therefore, to provide financial support and effective risk mitigation tools through crop insurance especially to 151 districts which are highly water stressed including 29 which are doubly stressed because of low income of farmers and drought, a separate, scheme in this regard would also be prepared.
- m. The concerned provisions/parameters of scheme and operational guidelines of the PMFBY and RWBCIS shall be modified to incorporate the above said modifications and shall be made operational from Kharif 2020 season.

Benefits

With these changes it is expected that farmers would be able to manage risk in agriculture production in a better way and would succeed in stabilizing the farm income. Further, it would increase coverage in north eastern region enabling farmers of NER to manage their agricultural risk in a better way. These changes would also enable quick and accurate yield estimation leading to faster claims settlement.

Shri Sanjay Agarwal, Agriculture Secretary, reviews locust control operations at high-level meeting

As per the directions of the Union Minister of Agriculture, Shri Sanjay Agarwal, Secretary, Department of Agriculture, Cooperation & Farmers Welfare, chaired a high-level meeting on 25th February, 2020 on Desert Locust Control. Senior Officers from the State Governments of Rajasthan, Gujarat, Punjab and Haryana, officers from Ministry of External Affairs, Ministry of Home Affairs, National Disaster Management Authority and CMD of HIL (India) Limited, Special Secretary, DAC&FW, Agriculture Commissioner and other officers of DAC&FW participated in the meeting.

During the presentation, the locust control operations done from May 2019 to February 2020, challenges faced and its achievements were discussed. Losses caused by locust attack in Rajasthan and Gujarat, and status of support under SDRF/NDRF were discussed. It was informed that inter-ministerial teams had visited both Rajasthan & Gujarat to assess the crop loss so that additional funds, if required, may be issued from NDRF as per norms.

Control Operations were reviewed and Secretary, DAC&FW appreciated the excellent cooperation and coordination between State Governments and Central Government Departments. Next year's plan was discussed in detail as per the inputs from different stakeholders. It was planned that Central Government would conduct awareness campaigns/training for State Government Officials/BSF personnel/Revenue Department officials/farmers at village level. Shri Agarwal directed officials to organize training and awareness programmes in all four states (Rajasthan, Gujarat, Punjab and Haryana) during March-April.

Report of Senior Locust Forecasting Officer of FAO, who visited India on January 16-17, 2020

was discussed. He has appreciated India's efforts, noting "swarms would be present in Haryana and Punjab, moving east towards Bangladesh similar to that in 1950 when there were devastating plagues that lasted up to 14 consecutive years."

Keeping in view this year's experiences, Secretary, DAC&FW advised to strengthen joint coordinated efforts with Locust Warning Organization, State Agriculture Department, BSF and Farmers. Agriculture Secretary assured that all required assistance would be provided to State Governments for locust control.

For next year, it is proposed to strengthen the control capabilities, logistics (pesticide, vehicle, tractors, etc.) both in States and Central level and Capacity building programmes would also be conducted.

The Secretary said that the Coordination Group Meeting of neighbouring countries namely, India, Pakistan, Afghanistan, Iran and Bangladesh may be convened. He appreciated this year's outstanding work in locust control and thanked all the participants and expected better efforts in future.

Shri Narendra Singh Tomar chaired 91st Annual General Meeting of ICAR Society

The Union Minister for Agriculture & Farmers Welfare, Rural Development & Panchayati Raj, Shri Narendra Singh Tomar, who is also the President of the ICAR Society, while addressing the 91st Annual General Meeting of the ICAR Society on 27th February, 2020, said that under the directions of the Prime Minister Shri Narendra Modi, an ambitious nationwide scheme has been launched to vaccinate 53 crore cattle and goats under mission mode. Besides, target has been set for doubling fisheries harvesting and export and milk production, he said.

The Minister also called for wider dissemination of Government schemes so that the benefits percolate down to the lowest level among the farmers. For instance, under the Pradhan Mantri Fasal Bima Yojana (PMFBY), he said, there were apprehensions that Insurance companies gained more than the farmers, besides reports of malpractices at lower level during inspection. With a view to alleviating such concerns, the crop insurance scheme has been turned voluntary now and premium also remains the same, between one-and-a-half percent to 2%, he said.

Shri Tomar said 58% of those who availed PMFBY crop cover were farmers who had availed crop loans. However, the fact is, as against the total sum of Rs.13,000 crore premium collected by insurance companies, a total of Rs.58,000 crore insurance benefits have been paid to farmers, he added.

Shri Tomar said Agriculture is among the top priority sectors accorded by the Prime Minister Shri Narendra Modi. The challenge is to strengthen agriculture and rural economy, increase production and productivity, make farming a profitable venture and raise farmers and rural incomes. The Prime Minister has set the target of doubling farmers' income by 2022, added Shri Tomar.

Speaking on the occasion, the Union Minister of Railways and Commerce & Industry, Shri Piyush Goyal called for synergy between the various R&D institutions under the Indian Council of Agricultural Research (ICAR), Council of Scientific and Industrial Research (CSIR) and Defence Research and Development Organisation (DRDO), Universities and academia, PSUs and Industry so that the huge investments being made by each of them yields bigger returns. The Prime Minister has aimed to make India a \$5 trillion economy in five years, said Shri Goyal, adding agricultural output and productivity would be a big factor towards achieving the goal. More R&D in agriculture, timely availability of farm credit, mechanised farming and automation would be critical to boost rural economy, he added.

Shri Goyal called upon agricultural scientists to work towards a stage when our agriculture breaks free of the vagaries of nature. He said the Kisan Rail has been announced in this year's budget and the train with frozen containers would be a big step in transportation and marketing of agriproducts.

In his address, Rao Inderjit Singh, Minister of State (I/C), Statistics & Programme Implementation and MoS (I/C) Planning, also underlined the need to avoid duplication of R&D. Considering climate change, he called for developing crops that can grow in less water.

Addressing the gathering, Shri Parshottam Rupala, MoS for Agriculture and Farmers Welfare, called for increased digitization for targeted agriculture subsidies and rural schemes. He also called for scaling up PPP model with ICAR R&D Extension programme. Shri Rupala said more capital

is required in actual R&D since at least 70% share of ICAR Budget goes towards salaries and allowances.

Calling for more food processing industries to boost farmers income, Shri Pratap Chandra Sarangi, MoS for Micro, Small and Medium Enterprises and Fisheries, Animal Husbandry and Dairying, said the agricultural laboratories should be made common property with the participation of all concerned including students and farmers.

Underlining the role of agriculture sector in India's economy, Shri Kailash Choudhary, MoS for Agriculture and Farmers Welfare, also called for concerted efforts towards fulfilling the Prime Minister's goal of doubling farmers' income.

Dr. Trilochan Mohapatra, Secretary, Department of Agricultural Research and Education (DARE) & Director General, ICAR gave an overview of the organisation's activities. 229 varieties of new crops were released in last one year, including 189 climate resilient crops.

On the occasion, Shri Tomar and other dignitaries released a number of ICAR publications and various kits and Mobile Apps developed by the ICAR.

Shri Narendra Singh Tomar inaugurates the 11th National Krishi Vigyan Kendra (KVK) Conference

Shri Narendra Singh Tomar, the Union Minister for Agriculture & Farmers Welfare, Rural Development & Panchayati Raj, has urged the agricultural scientists in the field to reach out to the marginalised farmers. Inaugurating the 11th National Krishi Vigyan Kendra (KVK) Conference -2020 on 28th February, 2020, he said the KVKs should serve not only the affluent, resourceful and progressive farmers but also focus on the small and deprived farmers. KVKs have a great responsibility by taking the fruition of the laboratories to the field. He said enough R&D has been done in agriculture sector, *viz.*, superior crop varieties released, 171 mobile apps developed for farmers and more than three lakh Common Service Centres (CSCs) opened, but now this must percolate down to the poorest of poor farmers. This is crucial in fulfilling the target set by the Prime Minister Shri

Narendra Modi for doubling farmers' income by 2022.

Shri Tomar said the eNAM portal has been created so that the farmer gets better price for his produce. Already 585 Mandis have boarded the eNAM platform and another 415 Mandis would be added in due course. More than Rs.91,000 crore of eVyapar (e-trade) has been performed on the eNAM, he said. Shri Tomar said the share of agriculture & allied sector to India's GDP is itself low, but it is matter of concern that within this sector, the contribution of agriculture alone is lower than that of horticulture, fisheries and even animal husbandry. He said the Government aims to set up at least two Farmer Producer Organisations (FPOs) in each block. There are three factors that have contributed to surplus foodgrains, primarily the farmers' labour, secondly the role of agricultural scientists, labs and universities and thirdly the central and state governments' farmer welfare policies, schemes and incentives. "We have to create an ideal situation where agriculture sector becomes lucrative. Let the farmer not only leave behind for his inheritors the piece of land but also the legacy of agriculture as a profession," said Shri Tomar.

Underlining the crucial role of KVKs as a bridge between the laboratories and farmland, Shri Kailash Choudhary, MoS for Agriculture and Farmers Welfare, said since the creation of the first KVK at Puducherry in 1974, now there are 717 KVKs spread across the country today. Calling for strengthening KVKs, he said we have to ensure the farmer getting superior and resilient seeds, irrigation and fertilizers for growing healthy crops, mechanised harvesting and a market providing the best price for his produce.

In his address, Dr. Trilochan Mohapatra, Secretary, Department of Agricultural Research and Education (DARE) & Director General, ICAR, called for updating the farmers' database in each KVK. He said the KVKs should provide single window service to meet the farmers' various needs.

On the occasion, Shri Tomar and other dignitaries released a number of KVK publications and various products developed by the KVKs.

General Survey of Agriculture

Trends in Foodgrain Prices

Based on Wholesale Price Index (WPI) (2011-12=100), WPI in case of foodgrains increased by 8.63 percent in January, 2020 over January, 2019.

Among foodgrains, WPI of pulses, cereals and oilseeds increased by 12.81 percent, 7.73 percent, and 9.02 percent, respectively, in January, 2020 over January, 2019.

Among cereals, WPI for wheat and paddy increased by 8.91 percent and 4.17 percent, respectively, in January, 2020 over January, 2019.

Similarly, WPI in case of foodgrains increased by 0.92 percent in January, 2020 over December, 2019.

Among foodgrains, WPI of pulses, cereals and oilseeds increased by 0.33 percent, 1.03 percent and 2.75 percent in January, 2020 over December, 2019.

Among cereals, WPI for paddy decreased by 0.19 percent and wheat increased by 1.75 percent in January, 2020 over December, 2019.

Rainfall and Reservoir Situation, Water Storage in Major Reservoirs:

Cumulative winter season, 2020 rainfall for the country as a whole during the period 1st January, 2020 to 26th February, 2020 has been 1% 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 94% in Central India but lower than LPA by 36% in South Peninsula, by 13 % in North-West India and by 12% in East & North East India.

Out of 36 meteorological sub-divisions, 10 meteorological sub-divisions received large excess/excess rainfall, 08 met sub-divisions received normal rainfall, 15 meteorological sub-divisions received deficient/large deficient rainfall and 03 meteorological sub-divisions received no rainfall.

Current live storage in 123 reservoirs (as on 27th February, 2020) monitored by Central Water Commission having Total Live Capacity of 171.09 BCM was 101.87 BCM as against 65.15 BCM on

27.02.2019 (last year) and 68.37 BCM of normal storage (average storage of last 10 years). Current year's storage is 156% of last year's storage and 149% of the normal storage.

Production Scenario 2019-20 (As per Second Advance Estimates)

1. As per Second Advance Estimates for 2019-20, total foodgrain production in the country is estimated at record 291.95 million tonnes which is higher by 6.74 million tonnes than the production of foodgrain of 285.21 million tonnes achieved during 2018-19. However, the production during 2019-20 is higher by 26.20 million tonnes than the previous five years' (2013-14 to 2017-18) average production of foodgrain.
2. Total production of rice during 2019-20 is estimated at record 117.47 million tonnes. It is higher by 9.67 million tonnes than the five years' average production of 107.80 million tonnes.
3. Production of wheat during 2019-20 is estimated at record 106.21 million tonnes. It is higher by 2.61 million tonnes as compared to wheat production during 2018-19 and is higher by 11.60 million tonnes than the average wheat production of 94.61 million tonnes.
4. Production of nutri / coarse cereals estimated at 45.24 million tonnes, which is higher by 2.18 million tonnes than the production of 43.06 million tonnes achieved during 2018-19. Further, it is also higher by 2.16 million tonnes than the average production.
5. Total pulses production during 2019-20 is estimated at 23.02 million tonnes which is higher by 2.76 million tonnes than the Five years' average production of 20.26 million tonnes.
6. Total oilseeds production in the country during 2019-20 is estimated at 34.19 million tonnes which is higher by 2.67 million tonnes than the production of 31.52 million tonnes during 2018-19. Further, the production of oilseeds during

2019-20 is higher by 4.54 million tonnes than the average oilseeds production.

7. Total production of sugarcane in the country during 2019-20 is estimated at 353.85 million tonnes. The production of sugarcane during 2019-20 is higher by 4.07 million tonnes than the average sugarcane production of 349.78 million tonnes.
8. Production of cotton is estimated at 34.89 million bales (of 170 kg each) is higher by 6.85 million bales than the production of 28.04 million bales during 2018-19. Production of jute

& mesta is estimated at 9.81 million bales (of 180 kg each).

As per 2nd Advance Estimates 2019-20, total area sown under Rabi crops in the country has been reported to be 625.23 lakh hectares as compared to 595.33 lakh hectares during the Final estimates of 2018-19.

A statement indicating comparative position of area coverage under major crops during current Rabi season *vis-a-vis* the coverage during the corresponding period of last year is given in the Table 1.

TABLE 1: ALL INDIA RABI CROP SITUATION - 2nd ADV. EST. (2019-20) VIS-A-VIS FINAL EST. (2018-19)

(Area in lakh hectares)

Crop Name	Normal Area	Absolute sown			Area Change over (+/-)	% Change over
		2 nd Adv. Est. (2019-20)	% of Normal	Final Est. (2018-19)	Last Year	Last Year
Wheat	305.58	310.49	101.6	293.19	17.3	5.9
Rice	42.77	44.72	104.6	41.92	2.8	6.7
Jo war	35.75	27.94	78.1	23.39	4.6	19.5
Maize	17.49	15.54	88.9	16.97	-1.4	-8.4
Barley	6.57	6.96	105.8	5.76	1.2	20.8
Total Coarse Cereals	59.81	50.44	84.3	46.11	4.3	9.4
Total Cereals	408.17	405.65	99.4	381.22	24.4	6.4
Gram	93.53	102.97	110.1	95.47	7.5	7.9
Urad	8.61	7.01	81.4	8.77	-1.8	-20.0
Moong	10.10	8.30	82.2	9.23	-0.9	-10.0
Lentil	14.19	13.68	96.4	13.63	0.0	0.4
Others	19.56	15.26	78.0	16.17	-0.9	-5.6
Total Pulses	146.00	147.23	100.8	143.26	4.0	2.8
Total Foodgrains	554.16	552.88	99.8	524.48	28.4	5.4
Rapeseed & Mustard	60.48	60.66	100.3	61.24	-0.6	-0.9
Groundnut	7.76	6.89	88.8	5.99	0.9	15.0
Safflower	1.41	0.47	33.0	0.46	0.0	1.7
Sunflower	2.92	1.81	62.0	1.44	0.4	25.5
Linseed	2.99	2.52	84.5	1.73	0.8	46.1
Total Oilseeds (Nine)	78.82	72.35	91.8	70.85	1.5	2.1
All- Crops	632.98	625.23	98.8	595.33	29.9	5.0

Economic Growth

Global Growth

As per IMF's World Economic Outlook (WEO) Update, January, 2020, the global economic activity remained weak with growth for 2019 downgraded to 2.9 percent, which is the slowest since the global financial crisis.

The subdued growth is a result of trade policy uncertainty, geopolitical tensions, weather-related disasters, and idiosyncratic stress in key emerging market economies.

India's Economic Growth in 2019-20

Real GDP in 2019-20 is estimated to grow at 5.0 percent (2nd advance estimates), lower than 6.1

percent in 2018-19(1st revised estimates) (Table 2). The real Gross Value Added (GVA) is estimated to grow at 4.9 percent in 2019-20 (2nd advance estimates) as compared to 6.0 percent in 2018-19 (1st revised estimates) (Table 2). The growth of real GDP was 4.7 percent for the third quarter (Q3) of 2019-20, as compared to the growth of 5.6 percent and 5.1 percent in first quarter (Q1) and second quarter (Q2) respectively, of 2019-20 (Table 3).

Agriculture and Food Management

All India production of foodgrains

As per the 2nd Advance Estimates for 2019-20, the total production of food-grains during 2019-20 is estimated at 292.0 million tonnes compared to 285.2 million tonnes in 2018-19 (Table 4).

TABLE 2: GROWTH OF GVA AT BASIC PRICES BY ECONOMIC ACTIVITY AND GDP AT MARKET PRICES (PERCENT)

Sectors	Growth rate at constant (2011-12) prices (percent)			Share in GVA at current prices (percent)		
	2017-18 2 nd RE	2018-19 1 st RE	2019-20 2 nd AE	2017-18 2 nd RE	2018-19 1 st RE	2019-20 2 nd AE
Agriculture, forestry & fishing	5.9	2.4	3.7	18.0	17.1	17.6
Industry	6.3	4.9	1.8	29.2	28.9	27.4
Mining & quarrying	4.9	-5.8	2.8	2.3	2.3	2.1
Manufacturing	6.6	5.7	0.9	16.4	16.1	15.1
Electricity, gas, water supply & other utility services	11.2	8.2	4.6	2.7	2.7	2.6
Construction	5.0	6.1	3.0	7.7	7.8	7.6
Services	6.9	7.7	7.0	52.8	54.0	55.0
Trade, hotel, transport storage	7.6	7.7	5.6	18.1	18.3	18.3
Financial , real estate & prof. services	4.7	6.8	7.3	20.7	21.1	21.3
Public administration, defence and other services	9.9	9.4	8.8	14.0	14.6	15.4
GVA at basic prices	6.6	6.0	4.9	100.0	100.0	100.0
GDP at market prices	7.0	6.1	5.0	—	—	—

Source: National Statistical Office (NSO).

NOTES: 2nd RE: Second Revised Estimates, 1st RE: First Revised Estimates, 2nd AE: Second Advance Estimates.

TABLE 3: QUARTER-WISE GROWTH OF GVA AND GDP AT CONSTANT (2011-12) PRICES (PERCENT)

Sectors	2017-18			2018-19			2019-20		
	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3
Agriculture, forestry & fishing	5.9	6.2	5.7	3.8	2.5	2.0	2.8	3.1	3.5
Industry	0.5	6.7	7.7	7.5	4.8	5.0	3.8	0.8	0.1
Mining & quarrying	2.6	11.9	5.2	-7.3	-7.0	-4.4	4.7	0.2	3.2
Manufacturing	-0.9	7.8	9.3	10.7	5.6	5.2	2.2	-0.4	-0.2
Electricity, gas, water supply & other utility services	11.2	11.8	10.1	7.9	9.9	9.5	8.8	3.9	-0.7
Construction	0.0	1.3	4.6	6.4	5.2	6.6	5.5	2.9	0.3
Services	8.4	5.8	7.5	7.4	7.4	7.4	6.9	7.3	7.4
Trade, hotel, transport, communication and services related to broadcasting	8.1	8.2	8.2	8.5	7.8	7.8	5.7	5.8	5.9
Financial, real estate & professional services	5.9	2.9	5.7	6.0	6.5	6.5	6.9	7.1	7.3
Public administration, defence and other services	14.5	8.7	9.1	8.8	8.9	8.1	8.7	10.1	9.7
GVA at basic price	5.5	6.1	7.2	6.9	6.1	5.6	5.4	4.8	4.5
GDP at market prices	5.1	7.3	8.7	7.1	6.2	5.6	5.6	5.1	4.7

Source: National Statistical Office (NSO).

TABLE 4: PRODUCTION OF MAJOR AGRICULTURAL CROPS (2ND ADVANCE ESTIMATES)

Crops	Production (Million Tonnes)					
	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20 (2 nd AE)
Total Food-grains	252.0	251.6	275.1	285.0	285.2	292.0
Rice	105.5	104.4	109.7	112.8	116.5	117.5
Wheat	86.5	92.3	98.5	99.9	103.6	106.2
Total Coarse Cereals	42.9	38.5	43.8	47.0	43.0	45.2
Total Pulses	17.2	16.4	23.1	25.4	22.1	23.0
Total Oilseeds	27.5	25.3	31.3	31.5	31.5	34.2
Sugarcane	362.3	348.4	306.1	379.9	405.4	353.9
Cotton#	34.8	30.0	32.6	32.8	28.0	34.9

Source: DES, DAC&FW, M/o Agriculture & Farmers Welfare.

NOTE: 2nd AE: 2nd Advance Estimates, # Million bales of 170 kgs. each as on 18.02.2020.

Procurement

Procurement of rice as on 31st January, 2020 during kharif marketing season (KMS) 2019-20 was 33.6 million tonnes while procurement in the previous marketing season (KMS 2018-19) during

corresponding period was 44.4 million tonnes (Table 5). Procurement of Wheat during the Rabi Marketing Season 2019-20 was 34.1 million tonnes while procurement in the previous marketing season (RMS 2018-19) during corresponding period was 35.8 million tonnes.

TABLE 5: PROCUREMENT OF CROPS (MILLION TONNES)

Crops	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20*
Rice#	31.8	32.0	34.2	38.1	38.2	44.4	33.6
Wheat@	25.1	28.0	28.1	23.0	30.8	35.8	34.1
Total	56.9	60.2	62.3	61.1	69.0	80.2	67.7

Source: FCI and DFPD, M/o Consumer Affairs, Food and Public Distribution.

* Procurement of rice as on 31.01.2020.

#Kharif Marketing Season (October-September), @ - Rabi Marketing Season (April-March).

Off-take

The off-take of rice, all schemes during the month of December, 2019 has been 25.5 lakh tonnes. This comprises 23.7 lakh tonnes under NFSA (off-take against the allocation for the month of December, 2019) and 1.8 lakh tonnes under other schemes. In

respect of wheat, the total off-take has been 24.1 lakh tonnes comprising of 17.4 lakh tonnes under NFSA (off-take against the allocation for the month of January, 2020) and 6.8 lakh tonnes under other schemes. The cumulative off-take of foodgrains during 2019-20 is 49.5 million tonnes (Table 6).

TABLE 6: OFF-TAKE OF FOODGRAINS (MILLION TONNES)

Crops	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20*
Rice	30.7	31.8	32.8	35.0	34.4	28.3
Wheat	25.2	31.8	29.1	25.3	31.5	21.2
Total (Rice & Wheat)	55.9	63.6	61.9	60.3	65.9	49.5

Source: DFPD, M/o Consumer Affairs, Food and Public Distribution.

* up to December 2019.

Stocks

The total stocks of rice and wheat held by FCI as on

1st February, 2020 was 75.3 million tonnes compared to 64.6 million tonnes as on 1st February, 2019 (Table 7).

TABLE 7: STOCKS OF FOODGRAINS (MILLION TONNES)

Crops	1 st February, 2019	1 st February, 2020
1. Rice	22.8	27.5
2. Unmilled Paddy#	26.7	25.9
3. Converted Unmilled Paddy in terms of Rice	17.9	17.4
4. Wheat	23.9	30.4
Total (Rice & Wheat)(1+3+4)	64.6	75.3

Source: FCI.

#Since September, 2013, FCI gives separate figures for rice and unmilled paddy lying with FCI & state agencies in terms of rice.

Articles

Organic Farming in Wet and Dry Land in Tamil Nadu for Different Crops

D. MURUGAN* AND N. PRASANNA**

Abstract

In this study, an attempt has been made to analyze the sustainability of organic farming and inorganic farming in wet and dry land in Nagapattinam and Erode districts of Tamil Nadu. Further, it has taken into account the organic and inorganic farming under different sizes of land holding, viz., marginal, small, medium and large farms. About 612 farm households have been selected and interviewed for the present study. Among them, 311 farm households have been interviewed from Erode district and 301 farm households have been interviewed from Nagapattinam district. Out of 301 households from Nagapattinam district, 143 are organic farmers and 158 are inorganic farmers. Similarly, out of 311 farm households from Erode district, 153 are organic farmers and 158 are inorganic farmers. It is found that the average net return from paddy is significant from organic farming during samba season in both Nagapattinam district and Erode district as compared to kuruvai season. The average return per acre from paddy, sugarcane, groundnut, gingilly, black gram, green gram, foxtail millet and small millet is higher in organic farming as compared to inorganic farming during the samba season in wet land. Considering this, it may be suggested that the Government should take adequate measures to disseminate the organic farming practices in other districts of Tamil Nadu as well as in other states also through an extensive training on the awareness of organic farming, organic input preparation, enriching fertility of soil, value addition to the organic agricultural products and importance of animal rearing in producing organic manure for organic farming. As the farmers lack proper network for organic market, the role of the Government also becomes vital in creating proper network for marketing of organic agricultural products in Tamil Nadu state.

Keywords: Tamil Nadu, organic farming, inorganic farming.

1. Introduction

The adoption of a new agricultural technology (NAT) in Indian agriculture in the mid sixties paved the way for important technological changes that resulted in increased production and productivity. As the high yielding varieties are responsive to modern chemical inputs, the chemical inputs were applied by the farmers beyond the recommended level suggested by the agricultural scientist. By and large, the adoption of green revolution in Indian agriculture is posing a serious concern over receding level of ground water in many agriculturally predominant areas, deterioration of soil fertility, decline in factor productivity, low diversity of production system and increasing cost of production (Anandraj, 2019; Murugan & Sathiyaraj, 2019). It is pertinent to point out that indiscriminate use of chemical pesticides to control various insect pests and crop diseases over the years has destroyed so much of agricultural land and it resulted in an imbalance in farm ecology (Das, 2017; Kesavan & Swaminathan, 2018).

The occurrences of multi-nutrient deficiencies and overall decline in the productive capacity of the soil have been widely reported due to non-judicious use of fertilizer (Murugan & Chithirarajan, 2015). An important observation is that after the adoption of the NAT, the Indian farmers are not only experiencing loss in agricultural production and productivity but also they have lost the traditional indigenous knowledge of cultivation practice (Bhattacharya & Chakraborty, 2005; Dhir, 2008; Ramesh *et al.*, 2007). With these backdrops, the modern-day agriculture gave birth to organic farming (Murugan *et al.*, 2014). It is a farming system which avoids using synthetic chemical inputs such as fertilizer and pesticides. The practice of organic farming solely depends on the use of on-farm and off-farm crop residues, organic wastes, animal manures, green manures and crop rotations (Fuoka, 1978; Howard, 1940). It mainly incorporates legumes and is highly helpful for biological pest control to maintain soil productivity (Willer & Julia, 2019; Carie, 2018; Steefen, 2018). It is a means of giving back to the nature the same what

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has been taken from it. By and large, the term organic refers to the farm as living organisms (Jermy, 2017; Kaushik, 1997; Ramesh *et al.*, 2010).

It is noticed that at global level, 24 million hectare land is under organic farming. Currently, a major part of this area is found in Australia, containing 10 million hectares under organic farming, followed by Argentina with 3 million hectares and 1.2 million hectares in Italy (Chonkar, 2003; Chonkar, 2005; Ghosh, 2004). In Asia, the countries like China, India and Japan are the largest organic producers. Regarding India's experience in organic farming, one should note that there is 37050 hectares land under organic farming and this area under organic farming is currently on increase (Pandey & Singh, 2012; Singh, 2006). It is seen that India produces a wide variety of organic crops such as grains, tea, coffee, soy, honey, spices, cereals, fruits and vegetables. Similarly, it may be observed that Tamil Nadu is one of the agriculturally predominant states and it has a congenial agro-climatic condition. The practice of organic farming is also coming up in the state as an alternate to NAT.

A large number of organic inputs are used in the practice of organic farming, *viz.*, farmyard manure, vermicompost, green manures, neem cake, cow dung, poultry manure, wood ashes, groundnut husk, paddy husk, sugarcane trash, molassis, cluster bean, oil cake, other manures, etc. In view of this, it could be noticed that a large number of studies are emerging in the area of organic farming, such as future prospects of organic farming (Ramesh, 2008), strategies for organic farming (Ramesh *et al.*, 2005), scope of organic farming in India (Sikka, 2005), the relevance of organic farming and cost and return structure of organic farming in Indian context (Murugan *et al.*, 2014). In this context, the present study deviates from the previous studies in the domain of organic farming by making a comparative economic analysis of organic farming and inorganic farming under wet land and dry land in Nagapattinam district of Tamil Nadu.

1.1. Objectives of the study

- i. To explore whether there exists any variation in the average return from different crops in organic farming between the two seasons (samba and kuruvai) in the study regions.
- ii. To compare the return from different crops in

wet land and dry land between the two districts (Nagapattinam and Erode) under organic farming and inorganic farming.

2. Methodology

Survey design of the study is based on multi-stage sampling method and it consists four stages in order to elicit adequate and accurate information by field of enquiry in Tamil Nadu: (i) selection of two districts in Tamil Nadu, (ii) selection of blocks in each of the selected districts, (iii) selection of a few villages in the selected blocks, and (iv) selection of organic and inorganic farm households among the villages identified in each of the blocks selected.

At the first stage, two districts have been selected, *viz.*, Erode district and Nagapattinam district. The rationale behind the selection of these districts is the prevalence of organic farming practice and the number of farmers practicing it. Detailed information about the organic farmers has been obtained from the agency CIKS (Centre for Indian Knowledge System) which is functioning in Nagapattinam district, and on the basis of this information, the organic farmers have been identified and interviewed for the present study. Similarly, in Erode district, the information related to organic farmers have been obtained from KVK (Krishi Vigyan Kendra), and on the basis of this information, organic farm respondents have been identified and interviewed for the present study.

It is to be noted that, the agro-climatic conditions differ between Erode district and Nagapattinam district and the farmers are practicing organic farming under wet and dry lands under these different agro-climatic conditions.

In the second stage of the survey design, three blocks have been selected from Nagapattinam district, *viz.*, Sirkazhi block, Mayavaram block and Vedaranyam block. Among the three blocks, Sirkazhi and Mayavaram blocks are wet blocks, while, Vedaranyam block is a dry block. Moreover, a large number of farmers are practicing organic agriculture in wet and dry lands.

Similarly, from Erode district, four blocks have been selected, *viz.*, Gobichettipalayam block, Anthiyur block, Bhavani block and Sathyamangalam block. The rationale behind the selection of these four blocks is that these blocks represent the whole organic

farming scenario under wet and dry land agriculture. Out of the four blocks, Gobichettipalayam, Bhavani, and Sathyamangalam are wet blocks, while, Anthiyur is a dry block.

The third stage is to select a few villages in each of the identified blocks. As mentioned earlier, on the basis of number of farmers who are practicing organic agriculture under wet and dry lands, a few villages have been selected from the study blocks.

The fourth stage is the crucial stage as it is related to selection of organic and inorganic farm households. About 612 farm households have been interviewed for the present study. In which, 301 farm households have been selected from Nagapattinam district and 311 farm households have been interviewed from Erode district. Out of 301 farm households in Nagapattinam district, 143 are organic farmers and the remaining 158 are inorganic farmers. Similarly, out of 311 farm households in Erode district, 153 are organic farm households and the remaining 158 are inorganic farm households.

Further, the farmers selected as respondents for the present study are practicing organic farming in wet and dry land and they fall under four categories, *viz.*, marginal, small, medium and large. The primary data has been collected from organic and inorganic farm households by using a well structured questionnaire framed for the present study. The primary data of the study relate to socio and demographic particulars, such as community, family size, age, and education. In addition, the primary data related to organic inputs and inorganic inputs has also been collected. The period of the study is confined to one agricultural year starting from 1st July, 2018 to 30th June, 2019.

3. Results and Discussion

3.1. Return from different crops under organic farming in wet and dry land

In order to compare the per acre average return of different crops, *viz.*, paddy, black gram, green gram, gingelly, groundnut, sugarcane, plantain, cotton, turmeric, thinai, maize, ragi and samai in organic farming under wet and dry land, the test for equality of means, *viz.*, Students 't' test has been carried out and the results are given in table 1. Further, on the basis of computed 't' values, it is found that in the case of paddy cultivation in samba season, the 't' test

value is 1.31 with $p = 0$. It means that the average per acre return differs significantly between wet and dry land in organic farming. It is due to the fact that during the samba season, the rainfall is more conducive for the paddy along with canal irrigation. In addition, the application of organic manure in such irrigation facilities causes difference in average yield per acre between wet and dry land. Further, in the case of dry land, the only source of irrigation is rainfall and when the rainfall is not adequate, the average yield per acre is lower than that of wet land. At the same time, there is sustainability of crop and no crop failure even in the case of dry land under organic farming. It is also observed that the moisture capacity in crops is higher in the case of organic farming in dry land.

But in the case of paddy cultivation in kuruvai season, the 't' test value is 0.812 with corresponding $p = 0.063$. Hence, the difference is not significant there, it implies that the average return per acre does not differ significantly in kuruvai season. It is because that during the kuruvai season, the cultivation of paddy depends on bore-well and rainfall for irrigation in wet and dry land.

With regard to pulses, per acre average return from black gram and green gram shows a significant difference under organic farming between wet and dry land. It is due to the fact that the application of organic manure in the cultivation of black gram and green gram, such as farmyard manure, amirthakaraisal brings higher return per acre on average from black gram and green gram. But at the same time the per acre average yield from black gram is higher as compared to green gram.

With regard to gingelly, it may be observed that there exists a significant difference in the average return per acre between wet land and dry land in organic farming. It implies the fact that in addition to organic manure application in the crop, irrigation plays a vital role in the cultivation of gingelly and it brings a higher return in wet land as compared to the dry land.

Similarly, in the case of sugarcane, plantain and cotton there is a significant difference in per acre return between wet and dry land in organic farming and the same trend has been observed in the case of foxtail millet, maize and little millet. It is because irrigation and the fertility of soil play a vital role in higher return in wet land as compared to dry land

TABLE 1: RETURN PER ACRE COMPARISON BETWEEN WET AND DRY LAND IN INTER-DISTRICTS UNDER ORGANIC FARMING

Cropping pattern	T-test	Level of significance	Result
Paddy			
Kuruvai	0.812	.063	Non-significant
Samba	1.310	.000	Significant
Pulses			
Black gram	4.497	.000	Significant
Green gram	0.234	.016	Significant
Oil seeds			
Gingelly	1.396	.041	Significant
Groundnut	2.051	.167	Non-significant
Cash crops			
Sugarcane	2.505	.013	Significant
Plantain	0.305	.021	Significant
Non-food crops			
Cotton	1.948	.032	Significant
Turmeric	1.297	.196	Non-significant
Millets			
Foxtail millet	3.100	.002	Significant
Maize	1.040	.029	Significant
Finger millet	1.339	.182	Non-significant
Little millet	0.767	.044	Significant

Source: Computed

under organic farming. But the average return from other crops such as groundnut, turmeric and finger millet does not show any difference between wet and dry land. It can be attributed to the fact that these crops are suitable for cultivation under both wet and dry land in organic farming.

3.2. Return from different crops under inorganic farming in wet and dry land

Table 2 exhibits the average return per acre from paddy, black gram, green gram, gingelly, groundnut, sugarcane, plantain, cotton, turmeric, foxtail millet, maize, finger millet and little millet in inorganic farming under wet and dry land in the selected

districts. It is seen that in the case of paddy crop during samba season, the average return per acre significantly differs between wet and dry land in inorganic farming. A similar trend is observed in other crops, such as black gram, groundnut, cotton, turmeric, foxtail millet and finger millet. It is noticed that these crops bring higher return because of irrigation facility in wet land as compared to dry land under inorganic farming. With regard to the average per acre return from other crops, such as paddy under kuruvai season, green gram, gingelly, sugarcane, plantain, maize, and little millet no significant difference observed between wet and dry land under inorganic farming.

TABLE 2: RETURN PER ACRE COMPARISON BETWEEN WET AND DRY LAND IN INTER-DISTRICTS UNDER IN-ORGANIC FARMING

Cropping pattern	T-test	Level of significance	Result
Paddy			
Kuruvai	3.766	.142	Non-significant
Samba	3.318	.001	Significant
Pulses			
Black gram	0.855	.003	Significant
Green gram	0.352	.725	Non-significant
Oil seeds			
Gingelly	2.195	.029	Non-significant
Groundnut	2.398	.017	Significant
Cash crops			
Sugarcane	1.890	.060	Non-significant
Plantain	0.238	.812	Non-significant
Non-food crops			
Cotton	2.250	.025	Significant
Turmeric	0.100	.021	Significant
Millets			
Foxtail millet	0.194	.046	Significant
Maize	0.654	.513	Non-significant
Finger millet	0.687	.030	Significant
Little millet	1.353	.177	Non-significant

Source: Computed.

3.3. Comparative analysis of organic and inorganic return per acre under wet land

Table 3 exhibits the average per acre return from different crops, *viz.*, paddy, black gram, green gram, gingelly, groundnut, sugarcane, plantain, cotton, turmeric, foxtail millet, maize, finger millet and little millet under organic farming and inorganic farming in the study region. It is seen that the average per acre return from various crops differs between organic farming and inorganic farming. It is found that the average return per acre from paddy, black gram, gingelly, groundnut, sugarcane, cotton, turmeric,

foxtail millet, maize and finger millet is higher in organic farming as compared to inorganic farming. In the case of other crops such as green gram, plantain, and little millet no significant difference found in the average return per acre between organic farming and inorganic farming. It is due to the fact that the practice of organic farming started in recent years, so it is expected that the average per acre return from other crops will increase in the near future. It is important to note that many of the farmers, who practice organic farming, have shifted from inorganic farming to organic farming in recent years.

TABLE 3: RETURN PER ACRE COMPARISON BETWEEN ORGANIC AND INORGANIC FARMING IN INTER-DISTRICTS UNDER WET LAND

Cropping pattern	T-test	Level of significance	Result
Paddy			
Kuruvai	2.647	.009	Significant
Samba	4.361	.000	Significant
Pulses			
Black gram	3.752	.000	Significant
Green gram	1.304	.193	Non-significant
Oil seeds			
Gingelly	0.921	.038	Significant
Groundnut	1.767	.021	Significant
Cash crops			
Sugarcane	4.018	.000	Significant
Plantain	1.218	.225	Non-significant
Non-food crops			
Cotton	1.197	.014	Significant
Turmeric	1.844	.038	Significant
Millets			
Foxtail millet	0.910	.035	Significant
Maize	0.997	.021	Significant
Finger millet	0.118	.006	Significant
Little millet	1.031	.304	Non-significant

Source: Computed.

3.4. Comparative analysis of organic and inorganic return per acre under dry land

Table 4 depicts the average return per acre from different crops under organic farming and inorganic farming in dry land in the study region. It may be observed from the results that there is difference in the average return per acre in paddy cultivation between organic farming and inorganic farming in dry land cultivation. A similar trend has been observed in the case of black gram, green gram, gingelly, sugarcane, plantain, cotton, turmeric, foxtail

millet, maize, finger millet and little millet. It is to be noted that the sustainability of farming is higher in dry land organic farming as compared to the cultivation of these crops under inorganic farming. In case of the groundnut cultivation, the average return per acre does not differ significantly between dry land organic farming and inorganic farming. But at the same time, it may be observed that the sustainability of the groundnut crop is higher under dry land organic farming as compared to dry land inorganic farming.

TABLE 4: RETURN PER ACRE COMPARISON BETWEEN ORGANIC AND INORGANIC FARMING IN INTER-DISTRICTS UNDER DRY LAND

Cropping pattern	T-test	Level of significance	Result
Paddy			
Kuruvai	1.805	.002	Significant
Samba	0.256	.003	Significant
Pulses			
Black gram	0.025	.080	Significant
Green gram	0.445	.046	Significant
Oil seeds			
Gingelly	2.826	.005	Significant
Groundnut	1.933	.054	Non-significant
Cash crops			
Sugarcane	5.427	.000	Significant
Plantain	1.852	.015	Significant
Non-food crops			
Cotton	2.396	.017	Significant
Turmeric	0.711	.038	Significant
Millets			
Foxtail millet	4.365	.000	Significant
Maize	1.726	.035	Significant
Finger millet	0.903	.027	Significant
Little millet	0.962	.037	Significant

Source: Computed.

4. Conclusion and Policy Implications

While comparing the economic sustainability in terms of net returns from different crops between organic farming and inorganic farming in Nagapattinam and Erode districts together, the average net return from paddy is found to be higher from organic farming during the samba season. But, the net return from paddy during kuruvai season shows a slight variation between organic farming and inorganic farming. It is highly encouraging to note that the net return from black gram and green gram is found to be higher in organic farming compared to that of inorganic farming. It is due to the fact that when the organic manures, like panchagavya, amirthakaraisal,

farmyard manure and vermicompost are applied in the main crop, it leads to an increase in micro organism in the soil which increases fertility of soil. As a result, the net return from black gram and green gram is found to be higher in organic farming than inorganic farming. In the case of net return from other crops, *viz.*, gingelly, groundnut, sugarcane, plantain, finger millet, and little millet, the net return from such crops is higher in inorganic farming as compared to organic farming. It is due to the fact that the farmers started cultivating all these crops using organic farming techniques recently, it will take time to bring a higher net return from such crops under organic farming.

Based on research done, following suggestions may be given:

- i. An important preliminary component of organic farming is dissemination of organic farming practice among the farmers in Nagapattinam and Erode districts. It is brought out that the measures to disseminate the organic farming is lacking. In this context, the Government should take adequate measures to disseminate organic farming. It will result in shifting of more and more farmers from inorganic farming to organic farming.
- ii. In both Nagapattinam district and Erode district, the organic farmers are struggling to get organic certification. In this context, it is suggested that steps should be taken to provide organic certification to the farmers who are practicing organic farming.
- iii. It is noticed that many farmers are lacking knowledge to produce organic inputs such as vermicompost, amirthakaraisal, panchagavya, etc. Hence, Government should provide extension services, like training on how to prepare organic inputs.

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Determinants of Black Pepper Trade in India: A Post Globalisation Scenario

PUSHIA K.P.*

Abstract

Black pepper is known as the 'king of spices' because of its premier position in India's total production and exports. However, India from its superlative position of the largest producer and exporter of pepper has slid down to the third place. Hence, the main intention of this study is to discern the growth of trade in terms of production and export of pepper and to find out the determinants that affect the pepper trade. This study uses compound annual growth rate (CAGR) and multiple regression approach to analyse the growth and determinants of Indian pepper trade flow. The study indicates a negative growth rate in terms of production and export of black pepper in India during the post-globalisation period. The analysis also reveals factors such as area, production, export, exchange rate and globalisation are statistically significant affecting trade in pepper. Export and production have positive effect on the trade in pepper; whereas exchange rate and globalisation has negative effect on it. The policy suggestions are: incorporating price stability mechanisms both in domestic and international markets; and offering proper incentives to farmers to halt their shift to other crops.

Keywords: *Black pepper, export, production, trade flow.*

1. Introduction

The concept of globalisation has become inextricably linked with the process of transformation touching upon every aspect of social, political and economic development in the world. It can be seen as a process by which the population of the world is increasingly bonded into a single society. Globalisation added a new dimension in the spices trade and also resulted in more competitiveness. This study deals with international trade in black pepper in post globalisation scenario.

India has a natural comparative advantage in the international trade in spices which finds it a place of policy focus sector in the government policy for ensuring achieving rapid growth in its trade in the post-globalised arena. Though India had dominant position in the pepper production, in the recent years she has lost her position and at present Vietnam tops in pepper production. The International Pepper Community (IPC) countries now accounts for 80 percent of the global trade in black pepper. Vietnam has emerged as the leading producer and exporter of pepper in the world market from the early 2000's. The average annual production of Vietnam was approximately three times higher than that of India. India ranked third after Vietnam and Indonesia in

total pepper production with 55,000 tonnes in 2016, whereas, it was 2,16,432 tonnes and 82,167 tonnes, respectively, for Vietnam and Indonesia. However, with the emergence of competition from other pepper producing countries, such as Vietnam, Brazil, Indonesia and Sri Lanka, India is missing out on the opportunity to make the most of the fast-growing international pepper market (Koizumi, 1999). In 2015-16, India's share was just 12 percent in world production and 17 percent in world exports. India is losing its comparative advantage in world pepper market, especially after the trade liberalisation under the WTO regime due to competitive disadvantage in the production and export of pepper in India.

1.1. Objectives of the study

- i. To discern the CAGR analysis for trade in pepper in India during pre and post globalization period.
- ii. To identify major economic determinants in pepper trade with special reference to production and exports.
- iii. To bring out an appropriate strategy to increase the export of Indian pepper in the international market.

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1.2. Literature review

The research studies and writings so far reveal that endurance of the Indian spices industry in general, and pepper economy, in particular, depends on how India is able to withstand this competition (Sivaraman *et al.*, 2002). Pepper is facing instabilities in the productivity and stiff competition from the other crops, like cardamom, coffee, rubber, in terms of production, area and yield (Jerome, 1994). The productivity of India's pepper is lowest in the world mainly due to poor fertilizer application and improper pest control (Raju, 2001). At the same time, the trend in the production also influences the export of pepper. In addition to this, demand-supply factors, domestic and foreign price fluctuations also influence the pepper exports (Mukundan & Indira devi, 2000). The literature review brings out that low productivity, low competitiveness and high international quality standards are the major challenges before Indian pepper trade.

2. Methodology

2.1. Type and sources of data

This study uses secondary time series data. The number of observational period for the time series data is 40 years from 1975 to 2015. The required data is obtained from several sources, such as the spices statistics, spices export review of spices board, Directorate of Economics, Statistics and Intelligence, FAO trade database, UNCTAD trade reports for the period for 1975 to 2015.

2.2. Data analysis

The data collected was analysed using different analytical tools and mathematical softwares, like Excel and Gretl.

CAGR is used to measure the performance of economic variables, not to predict, but to describe the trends invariability over the time and also to measure production growth and export growth of black pepper. The growth rate of production, area and productivity for 40 years was computed using CAGR analysis. For comparing the growth rate between pre-globalisation and post-globalisation, the total period was divided into two sub periods: (i) 1975 to 1995 and (ii) 1995 to 2015.

$$\text{CAGR} = \left(\frac{\text{Ending Value}}{\text{Beginning Value}} \right)^{\left(\frac{1}{\text{No. of Years}} \right)} - 1$$

The multiple regression model is used to analyse the factors that affect the production and export of major spices. It is given as,

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + U$$

In the model, Y (dependent variable) stands for production of pepper. Independent variables, such as X_1 stands for area, X_2 stands for productivity, X_3 shows quantity exported, X_4 indicates for globalisation. To identify the factors affecting the exports of major spices, multiple regression model was used by replacing export quantity as dependent variable (Y) and independent variables, such as X_1 stands for domestic price, X_2 stands for export price, X_3 shows the exchange rate, X_4 indicates for production, X_5 as globalisation in the above model.

3. Results and Discussion

The CAGR of the area, production, export and productivity of major spices in India during the period from 1975 to 2015 was computed and presented in table 1 in the three sub-periods. The overall growth rate of area is 0.36 percent. Growth rate of area is lower in post-globalisation period (2.26 percent) than pre-globalisation period (2.92 percent). In pre-globalisation period, production showed a growth rate of 4.66 percent, while, a negative growth rate of 0.44 percent was observed during post-globalisation period. In the case of productivity, growth rate was observed at 1.69 percent in pre-globalisation period, which increased by 1.87 percent in the post-globalisation period. Pepper shows negative growth in export quantity in overall period with -0.31 per cent, it had registered a positive growth rate in pre-globalisation period (2.29 percent) while, in post-globalisation period a negative growth rate (-1.06 percent) was registered.

Pepper showed a negative growth rate in terms of production and exports in India during the post-globalisation period. Major reasons attributed for the negative growth rate of production was unfavourable weather conditions, price crisis situation, and phytophthoracapsicisince disease caused by pepper vines led to a massive destruction of pepper production. Productivity showed very low

TABLE 1: CAGR OF PEPPER PRODUCTION IN INDIA

Period	Area	Production	Exports	Productivity
Overall	0.36%	2.40%	-0.31%	2.04%
Pre-globalisation	2.92%	4.66%	2.29%	1.69%
Post-globalisation	2.26%	- 0.44%	-1.06%	1.87%

Source: Computed from the data by the researcher.

positive growth rate in comparison to the negative growth rates of production. The negative growth rate of pepper exports from India was mainly because of the stiff competition from other exporting countries.

The trade determinants of Indian pepper were analysed to explain the effect of economic and non-economic variables on the trade flows of Indian pepper in the international market. The results of the multiple regression analysis of pepper trade can be seen in tables 2 and 3.

The R² of the model showed that 97.1 percent of the variations in the production (table 2) and 56.4

percent of the variations in the export (table 3) can be explained by the independent variables. Table 2 shows that black pepper production was mainly depended on area, productivity and exports. The coefficient of multiple determination (R²) indicates that 97.1 percent of the variations in the production of pepper is explained by the variables included in the function. The analysis revealed that the effect of both areas (<0.00001) and productivity (<0.00001) were positive and statistically significant. Further, globalisation (0.01618) and quantity exports of pepper (0.04) showed a significant and positive effect on its production.

TABLE 2: ECONOMIC DETERMINANTS OF THE BLACK PEPPER PRODUCTION

Variable	Coefficient	Standard error	t-ratio	p-value	Level of significance
Const	-5854.17	5727.32	-1.0221	0.31438	
Globalisation	16005.8	7623.45	2.0996	0.04374	**
Area	4.75014	0.297585	15.9623	<0.00001	***
Productivity	129325	8302.3	15.5770	<0.00001	***
Quantity_Exported	-1.24337	0.489738	-2.5389	0.01618	**
R-squared	0.971835		Adjusted R-squared		0.966554
F(6, 32)	184.0245		P-value(F)		2.27e-23
Rho	0.195405		Durbin-Watson		1.533062

Source: Computed from data using GRETL.

NOTE: **, *** denotes significance level at 90 percent and 99 percent, respectively.

In table 3, the coefficient of multiple determination (R²) indicates that 56.4 percent of the variations in the export of pepper are explained by the variables included in the function. The analysis revealed that the effect of the export price (.01787) and domestic price (<0.00002) was positive and statistically significant. Export of pepper is highly influenced by the domestic price. Further, the globalisation (0.81139) had shown a positive effect on the export of pepper but not statistically significant.

4. Conclusion and Suggestions

This study aims to find out the post globalisation experience of international trade in spices, specifically in black pepper. From the discussions, it emerged that pepper experienced a negative growth rate in terms of production and exports of India during the post-globalisation period. It is also suggests that though pepper trade plays a crucial role in determining the spices trade, its share is low which

TABLE 3: ECONOMIC DETERMINANTS OF BLACK PEPPER EXPORTS

Variable	Coefficient	Standard error	t-ratio	p-value	Level of significance
Const	646.386	1613.99	0.4005	0.69154	
Globalisation	-559.234	2323.64	-0.2407	0.81139	
Domestic Price	0.489284	0.0971053	5.0387	0.00002	***
Export price	-114.083	45.6115	-2.5012	0.01787	**
Exchange_Rate_1	-118.063	456.846	-0.2584	0.79778	
Production	-0.032203	0.124814	-0.2580	0.79811	
Sum squared resid	1.34e+09		S.E. of regression		6571.059
R-squared	0.564610		Adjusted R-squared		0.466296
F(7, 31)	5.742926		P-value(F)		0.000253
Durbin-Watson	2.637317				

Source: Computed from data using GRETL.

NOTE: **, *** denotes significance level at 90 percent and 99 percent, respectively.

makes its trade less competent. What this suggest is that in order to compete in the international market, India must increase its production and export. By increasing production and export, India can expand its market from its existing traditional market base. Since Indian pepper as a high priced commodity has lost its market, and in a globalised economy a country can survive, only if it is able to sell the best quality produce at the most competitive price. Price fluctuations have an adverse effect on pepper trade. Hence, an effective price stability mechanism is crucial for overall pepper trade stability of the country.

Based on research done, following suggestions may be given:

- i. Price stability mechanisms should be incorporated both in domestic and international markets.
- ii. Pepper supply should be structured in order to prevent fall in prices.
- iii. Proper incentives should be given to farmers to halt their shift to other crops.

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Agro-Economic Research

Jhuming to Mainstream Farming as an Alternative Way of Livelihood amongst the Tribal Farmers of Tripura*

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1. Introduction

Traditionally, most of the indigenous hill tribes in the North Eastern region practice Jhum or shifting, a method of slash-and-burn cultivation. This practice is mainly followed by the hill tribes as they do not possess much of plain lands for extensive cultivation. They do consider it as their traditional custom, for which they continue the practice over the years in spite of a number of formidable constraints.

In Tripura, over 16,511 ha (about 1.57 % of the total geographical area of the State) of land are under the Jhum cultivation. Due to erosion of top soil on account of rain and wind, Jhum cultivation, over time has become un-remunerative. With ever-rising population, the Jhum cycle in most of the areas of Tripura has come down to 2- 3 years only. As a result, the output- input ratio of Jhum cultivation has become very low, for which Jhumias of the state are still living a sub-standard life.

It has been observed that in recent time, a large number of tribal farmers have come forward successfully to adopt piggyery as an alternative way of livelihood in Tripura. Besides, the state has much potential in growing horticultural crops, as substantiated by the available literature and database. Records indicate that the economic status of the settled farmers is much better than that of the Jhumias.

Under the circumstances, it was felt necessary to highlight some of the success stories from the state itself in order to motivate the farmers (Jhumias) to go for replacing Jhum cultivation and also for adoption of modern technology in their own farming system as an alternative way of livelihood.

1.1. Objectives

In this backdrop, the present study was designed with the following objectives:

- i. To study the trend in development of major agriculture & allied sectors, viz., agriculture, horticulture and piggyery.
- ii. To identify the success stories in the field of agriculture & allied activities in the selected districts as an alternative livelihood option among the Jhumias.
- iii. To study the comparative economics of Jhum and settled cultivation with piggyery in terms of costs and returns.
- iv. To see the status of empowerment of tribal women.
- v. To examine the problems in replacement of the existing production patterns.

2. Methodology

The study is based on both primary and secondary level data. The information on successful farmers of Agriculture, Horticulture and Animal Husbandry (Piggyery) sectors in Tripura, were collected from various Annual Reports of the Line Departments, internet pages, newspaper clips, journals, various reports and working papers. Primary data were collected from three different groups of samples, viz., the Jhumias practicing agriculture & piggyery, the settled farmers practicing agriculture and horticulture and the farmers practicing agriculture and piggyery. The study relates to the year 2016-17.

The present study covers two Jhum-dominated districts, namely, Dhalai and Gomati in Tripura. From each district, two blocks were selected on random basis, which included Ambassa and Salema blocks in Dhalai district and Matabari and Killa blocks in Gomati district.

Thereafter, from a cluster of 2 to 3 villages under each of the blocks, 20 sample farmers practicing Jhum

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NOTE: Detailed report is available on the website of respective AERC.

& piggery, 20 settled farmers raising agriculture & horticultural crops and 20 sample farmers having piggery & agriculture were drawn randomly. With

this sampling design, altogether 240 samples were drawn from 2 sample districts. Detailed sample distribution is presented in Table-1.

TABLE 1: DISTRICT AND BLOCK-WISE DISTRIBUTION OF SAMPLE FARMERS

Particulars of sample	Dhalai district		Gomati district		Total
	Salema Block	Ambassa Block	Matabari Block	Killa Block	
Jhum and Piggery	20	20	20	20	80
Agric. and Horticulture	20	20	20	20	80
Piggery and Agric.	20	20	20	20	80
Total	60	60	60	60	240

Source: Based on primary data source.

An attempt has also been made to draw statistical inference on the trend of development of agricultural sector in the State. The trend of agriculture and allied sectors was calculated by using the following linear growth model

$$Y = a + bt$$

Here, Y= Yield /ha

t= Time, i.e., Year.

Applying Ordinary Least Square (OLS) method, the following two normal equations were obtained:

$$EY = na + bEt$$

$$EtY = aEt + bEt^2$$

To work out the Compound Annual Growth Rate (CAGR) in area, production and productivity, the following equation was used

$$Y = ab^t e \tag{1}$$

Where, Y= Dependent variable for which growth to be estimated

a = Intercept

b = regression coefficient

t = time variable

e = error-term

The compound growth was obtained by taking log of the equation (1)

$$\ln Y = \ln a + t \ln b + \ln e \tag{2}$$

The percent of growth rate was derived by using the relationship (3)

$$CAGR = (\text{Anti log of } b - 1) * 100 \tag{3}$$

To test the significance of CAGR (r), standard error was estimated with the formula given in equation (4) as-

$$\frac{100 b}{\log_{10} e} \sqrt{\frac{\left[\sum (\log Y)^2 - \frac{(\sum \log Y)^2}{n} \right] - \left[\sum x^2 - \frac{(\sum x)^2}{n} \right] (\log b)^2}{(n-2) \left[\sum x^2 - \frac{(\sum x)^2}{n} \right]}} \tag{4}$$

Where,

$$\log_{10} e = 0.43429$$

And, the 't' value was estimated as-

$$t = \frac{r}{S.E.(r)} \tag{5}$$

3. Results and Discussion

3.1. Trend of development in agriculture & allied sectors

It is observed from the secondary level data that the area under foodgrains in Tripura had increased from 2.62 lakh hectares in 2005-06 to 3.03 lakh hectares

in 2015-16 with a CAGR of 1.19 percent. Similarly, there had been an increase of about 1.95 lakhs metric tons of foodgrains during last 10 years, registering a CAGR of 2.63 percent, while yield rate had increased from 2400 kg/ha in 2005-06 to 2720 kg/ha in 2015-16 with a CAGR of 1.52 percent (all these three CAGRs were found significant in 1% probability level).

The area under rice had increased by 2.24 lakh hectares during 2005-06 to 2015-16 with a CAGR of 0.38 percent (found insignificant) while the production of rice had increased to 1.89 lakh metric tons with a CAGR of 2.50 percent during the reference period. The yield rate had increased from 2,172 kg/ha in 2005-06 to 2,937 kg/ha in 2015-16 with a CAGR of 2.40 percent (both production and productivity were found significant at 1% probability level).

3.2. Horticulture

Among the important horticultural crops, pineapple grown in Tripura is widely acclaimed as the best in the country. The State continues to be the largest producer of True Potato Seed in the country and is surplus in several other vegetable crops.

The area under major fruits increased from 33.18 thousand hectares in 2005-06 to 75.69 thousand hectares in 2015-16 with a CAGR of 9.61 percent. The production increased from 5.23 lakh metric tons in 2005-06 to 8.58 lakh metric tons in 2015-16 and in case of productivity, it declined from 15.76 metric tons/ha to 11.33 metric tons/ha during the same period (all these three CAGRs were found significant at 1% level). In the hilly terrain, erosion of fertile top soil is a common problem. Therefore, application of external soil nutrients is a must to increase the productivity. But the poor farmers cannot afford to apply required doses of nutrients in their crop field, for which, the productivity of fruit crops might have declined.

The trend of production of pineapple was found to increase along with increase in area. The CAGR was recorded at 14.54 percent and 8.26 percent in case of area and production, respectively (both CAGRs were found significant at 1% level). But the productivity of pineapple had shown a declining trend from 17.44 MT/ha in 2005-06 to 14.30 MT/ha in 2015-16 with a negative CAGR of 5.55 percent and found insignificant. This may be due to washing away of natural soil nutrients through erosion in hilly

tracts or non-application of soil nutrients externally.

The State is surplus in vegetable production. The area under vegetables has gone up substantially with the increase in per capita consumption (<500 gms). The area under vegetable had shown an increasing trend from 26.09 thousand hectares in 2005-06 to 40.30 thousand hectares in 2015-16 with a CAGR of 6.09 percent during the reference period, while the production increased from 2.89 lakh MT in 2005-06 to 6.69 lakh MT in 2015-16 with a CAGR of 11.08 percent. The productivity of vegetables had also shown an increasing trend from 11.08 MT/ha to 16.47 MT/ha during the reference period with a CAGR of 4.66 percent (all were significant at 1% level).

3.3. Piggery development

Pig rearing is the most popular economic activity in Tripura. The number of Cross-bred (CB) pigs was 2.14 lakh in 2012-13 which increased to 2.44 lakh by the end of 2016-17 with a CAGR of 3.38 percent. Although the number Non-descript (ND) pigs were less than that of CB pigs in the reference years, it showed an increasing trend with a CAGR of 2.10 percent. The CAGRs of CB pigs & ND pigs were found significant at 1% level which was found in case of total pigs as well.

3.4. Jhum cultivation

In Tripura, area under Jhum cultivation was recorded at 16,843 hectares in the year 2016-17 (provisional) against an average production of 18,190 MT. The average yield per hectare was found at 1,080 kg. Evidently, the productivity of paddy under Jhum was much lower than that of the settled paddy cultivation. The area under Jhum cultivation had shown an increasing trend with a CAGR of 1.75 percent (significant at 10% level), and production was found to increase with a CAGR 2.60 percent (significant at 5% level) while the productivity recorded a marginal growth of 0.85 percent (significant at 1% level).

As per report of the Economic Survey of Tripura, it is evident (Table -2) that the growth of area under Jhum, total foodgrains and paddy did not show any significant growth but the growth of area under fruits and vegetables had shown significant growth at 5 percent and 10 percent level, respectively. On the other hand, the growth of production under

Jhum, total foodgrains, fruits and vegetables were found significant at 5 percent and 1 percent level, respectively. In case of growth in productivity, paddy and fruits had shown significant growth at 5 percent and 1 percent level of significance, respectively. However, all the crops grown by the sample farmers had shown increasing trend in area, production

and productivity except for vegetable crops. As the number of families are on rise due to increase in family size of Jhumias and non-Jhumias, the demand for food is increasing and for this reason, they have no option in hand but to increase the area under cultivation.

TABLE 2: DEVELOPMENT OF AGRICULTURE AND ALLIED SECTORS IN TRIPURA (2005-06-2015-16)

(In Percentage)

Particulars	Area	Production	Yield
Jhum	1.88	2.53**	0.86
Total Foodgrains	1.06	3.03**	1.78
Paddy	0.38	1.97	3.85**
Fruits	8.35*	4.17*	8.38*
Vegetables	8.63*	20.95*	-0.36

Source: Economic Survey of Tripura.

NOTE: * Significant at 1 percent, ** significant at 5 percent, *** significant at 10 percent

3.5. Pig rearing pattern with production, productivity and price

Pig rearing is a traditional practice for almost all the farm households. Most of the settled cultivators reared cross bred (CB) pigs and Jhumias reared non-descript (ND) pigs. The average number of pigs and piglets per household for both types of pig & piglets (CB & ND) across the blocks stood at 5 each. The overall production of meat per pig was recorded at 101.35 kg in case of CB pigs while it was only 30.22 kg for ND pigs. The growth in terms of size of CB pigs was also found to be at much higher side as compared to ND pigs. As far as price was concerned, it was little higher (Rs.283/kg) for ND pigs as compared to CB pigs (Rs.262/kg).

Block-wise per farm area, production, productivity and price of the crops

The highest productivity of Aman paddy with 5,219 kg per hectare was recorded against the Ambassa block followed by Salema block (5,155 kg/ha), Matabari block (4,030 kg/ha.) and Killa block (3,892 kg/ha). The cultivation of Boro paddy was found in Killa block of Gomati District only, with a productivity of 5,255 kg/ha. The productivity of pineapple ranged between 28,840 and 18,872 in number per hectare across three blocks, namely, Salema, Ambassa and Matabari. The highest

productivity of brinjal was recorded at 4,210 kg/ha in Killa block followed by Ambassa block with 3,903 kg/ha and Salema block with 1,938 kg/ha. Potato cultivation was found in Killa block only with a productivity of 25,375 kg/ha. Chilli (raw) was grown in Salema and Matabari blocks only, registering a productivity of 2,491 kg/ha and 3,257 kg/ha, respectively. Cultivation of pumpkin was found only in Matabari block with 5,030 kg/ha productivity. As against this, Jhum cultivation is a traditional practice for all the hill tribes of Tripura and is basically community cultivation. The per hectare yield of Jhum paddy was found to be much lower than that of the settled area paddy. The highest yield of Jhum paddy with 2,874 kg/ha was recorded in Ambassa block followed by 2,832 kg/ha in Killa block, 2,615 kg/ha in Salema block and 1,645 kg/ha in Matabari block. The estimated yield of pulses in Jhum area were in between 243 kg/ha and 351 kg/ha across all the blocks. The estimated yield of pulses in Jhum area were in between 181 kg/ha and 151 kg/ha while that of mixed vegetables ranged between 360 kg/ha and 254 kg/ha across the blocks.

Block-wise benefits from settled farming, Jhum cultivation and pig rearing

During the field survey, it was observed that all the settled crops, viz., Aman paddy, Boro paddy, pineapple, brinjal, potato, chilli and pumpkin were

profitable, but crops under Jhum, *viz.*, paddy, maize, pulses and mixed vegetables did not reflect due returns. It might be due to low productivity of crops under Jhum cultivation. The average per hectare cost of cultivation, gross returns and net returns from all settled crops and Jhum crops across the selected blocks of Dhalai and Gomati districts, were also worked out to see the economics of settled crops and Jhum crops in terms of Benefit Cost Ratio (BCR).

In case of overall Jhum cultivation, the BCR stood at 1.02:1 under Salema block and 1.09:1 under Ambassa block of Dhalai District while the BCR was recorded at 1.05:1 in Matabari block and 1.03:1 in Killa block of Gomati district.

The overall BCR of settled cultivation was 1.35:1 against Salema block, 1.74 :1 for Ambassa block, 1.46 :1 for Matabari block and 1.66 :1 for Killa block. Thus, it can readily be concluded that the settled cultivation yielded better productivity and better profit as compared to Jhum cultivation.

In case of pig rearing, the BCR stood at 1.09:1 against CB pig and 1.31:1 against ND pigs in Salema block, while in Ambassa block, it was recorded at 1.38:1 against the CB pig and 1.16:1 against ND pigs. In Matabari block, the BCR stood at 1.44:1 against CB pigs and 1.15:1 against ND pigs while in Killa block, the BCR were recorded at 1.85:1 against CB pig and 1.23:1 against ND pigs. Thus, the selected blocks under both the districts indicated higher BCR for CB pigs as compared to ND pigs.

Block-wise employment generation in Dhalai and Gomati district

The employment pattern usually depended on the average size of operational holding per household and size of pig and piglets farms. Combining both the blocks of Dhalai district, the number of man-days per household was worked out at 78 days for settled cultivation and 107 man-days for Jhum cultivation while combining both the blocks of Gomati districts, per household man-days stood at 90 days for settled cultivation and 95 man-days for Jhum cultivation. Similarly, in case of CB pigs reared by the settled cultivators across the overall block, total man-days stood at 63 days per farm household and 40 man-days for ND pigs reared by the Jhumias in Dhalai district while the overall block total man-days stood at 59 for CB pigs reared by the settled cultivators and 39 man-days for ND pigs reared by the Jhumias in

Gomati district.

Finally, per farm net returns from settled cultivation vis-à-vis Jhum cultivation and also from pig rearing for all the sample farmers across the selected blocks were computed, compiled and presented. In case of settled farmers of Dhalai district, the percentage contribution of settled farming to the total net returns was estimated at 56.29 percent and the remaining 43.71 percent was contributed by CB Pig rearing. But in Gomati district, of the total net returns, 86.59 percent was contributed by CB pig rearing and the rest 13.41 percent was from crop cultivation. Combining both the districts, the overall net returns from CB pig rearing stood at 76.28 percent of the total net returns. In case of Jhum farmers, combining both the districts, the overall per farm net returns from ND pig rearing stood at 58.26, while the contribution of Jhum cultivation was estimated at 41.74 percent.

Further, the net return from settled cultivation was 1.56 times more than that of Jhum cultivation. The CB pig rearing in the study area was 4.90 times more profitable than ND pig rearing. In overall analysis, the total net returns from settled farming with CB pig rearing was found to be 3.51 times more profitable than that of Jhum farming with ND pig rearing. Thus, piggery, in general, is a profitable venture in the study area.

From the analysis, it can be concluded that the average net returns per farm for settled farmers was significantly higher than that of Jhum farmers of Tripura. Therefore, the findings of the study are to be highlighted and constant efforts should be made by the Government and other agencies to educate the Jhum farmers to go for settled cultivation together with pig farming, particularly CB piggeries in order to attain better livelihood options.

Empowerment of women

It has been observed that in the event of adoption of settled cultivation/CB piggeries, the level of education among the womenfolk had improved substantially, as reported by 87 and 66 percent of the respondents in Salema and Ambassa block, respectively, while it was 93 percent in Matabari block and 87 percent in Killa block.

Further, it has been observed that 20 percent of the women in Salema block, 13 percent of the

TABLE 3: OVERALL PER FARM NET RETURNS FROM SETTLED *vis a vis* JHUM CULTIVATION AND PER FARM NET RETURNS FROM (CB & ND) PIG REARING

Particulars	Net Return (in Rs.)					
	Settled Farmers			Jhum farmers		
	Settle Cultivation	CB Pig	Settled + CB Pig	Jhum Cultivation	ND Pig	Jhum + ND Pig
Salema Block	3,238	6,384	9,622	1,288	3,316	4,604
Ambassa Block	6,723	1,350	8,073	3,134	2,100	5,234
Dhalai Ditric (percent to total NR)	4,980 (56.29)	3,867 (43.71)	8,847 (100.00)	2,211 (44.95)	2,708 (55.05)	4,919 (100.00)
Matabari Block	4,030	17,257	21,287	1,545	2,600	4,145
Killa Block	3,467	31,157	34,624	848	1,497	2,345
Gomati District (percent to total NR)	3,749 (13.41)	24,207 (86.59)	27,956 (100.00)	1,197 (36.87)	2,049 (63.13)	3,245 (100.00)
Over all Net Returns (percent to total NR)	4,365 (23.72)	14,037 (76.28)	18,402 (100.00)	1,704 (41.74)	2,378 (58.26)	4,082 (100.00)
Overall proportion of increase in net returns of Settled farmers over the Jhum farmers	1.56	4.90	3.51	-	-	-

Source: Primary Data.

women in Ambassa block, 26 percent of the women in Matabari block and 27 percent of the women in Killa block had political affiliation/membership. About 66 percent of the womenfolk in the study area were registered with some NGO or SHG in both the blocks of Dhalai district and about 87 percent of women in Matabari block and 66 percent in Killa block of Gomati district were registered with the NGOs or SHGs. About 80 percent of the women in Salema block, 40 percent in Ambassa block, 66 percent in Matabari block and 80 percent of the women in Killa block had undergone some kind of training programmes organized by various Government Departments of the State.

Nearly, 53 percent of the respondents in Salema block, 87 percent in Ambassa block, 60 percent in Matabari block and 53 percent of the respondents in Killa block reported that both men and women participated in the decision making process.

The day-to-day household works were

performed by both man and woman in all the blocks, as reported by 28 percent of the respondents in Salema block, 20 percent in Ambassa block, 13 percent in Matabari block and 20 percent of the respondents in Killa block. As against this, as high as 73 percent of the respondents in Salema block, 80 percent in Ambassa block, 87 percent in Matabari block and 80 percent of the respondents in Killa block independently handled the day-to-day household works. This indicates that a larger percentage of women in the study area had to manage the household jobs, with prolonged work pressure on them.

An improved level of education among the women had resulted in getting government employment to the extent of 27 and 20 percent in Matabari and Killa blocks, respectively. Twenty six percent women in Matabari block and 40 percent women in Killa block were reported to be engaged in government organizations. Another 34 percent of women in Salema block, 30 percent in Ambassa

block, 26 percent in Matabari block and 34 percent of women in Killa block were engaged in private organizations.

Further, 53 percent of the women in Salema block, 87 percent in Ambassa block, 60 percent of the women in Matabari block and 53 percent the womenfolk in Killa block, took active part in decision-making together with their male counterparts particularly on family matters.

Thus, the above observations clearly indicate that with the replacement of Jhum cultivation by that of settled one, the tribal women of the study area became really empowered socially, politically and economically.

3.6. Observations on farmers' problem areas

The problems confronted by the Jhum cultivators as well as settled farmers were ascertained by asking specific questions at the time of interview. The Garrett Ranking Technique (Garrett, 1969) was used for ranking of the problems faced by the farmers:

Problem areas and view points of the Jhumias

On the basis of the opinion of the Jhum farmers, the following observations were made

- i. Eighty seven to 100 percent farmers opined that shrinkage of Jhum cycle had led to low productivity of crops under Jhuming.
- ii. Only a small segment of the Jhum cultivators, *i.e.*, 7 to 27 percent were not aware of the harmful effect of Jhum cultivation on the flora and fauna of the locality.
- iii. Thirteen percent of the farmers in the district of Dhalai were of the opinion that they were continuing with the Jhum cultivation due to non-availability of plain land.

The Garrett rankings for the problems of Jhumias

The Garrett ranking for the problems confronted by the Jhum cultivators were worked out to draw inference on the magnitude of the problems.

It is clear from the Garrett Ranking that :

- i. Jhumias were not at all using HYV seeds and

hence it was ranked 1, in the problem list.

- ii. The Jhumias also considered the practice to be the least risky method of cultivation for which they wanted to continue with the Jhum cultivation. This attitude was considered to be the 2nd severe problem.
- iii. Shrinkage of Jhum cycle led to low productivity of crops grown under Jhuming was ranked third severe problem.
- iv. Shrinkage of Jhum cycle was due to increase in Jhumia population was yet another problem, ranked fourth.
- v. Fifth problem with the Jhumias was that they were not ready to leave the practice of Jhum cultivation as majority of them considered Jhuming as their identity or tradition.
- vi. Non-availability of plain land to go ahead with settled cultivation was identified as yet another problem with rank 6.
- vii. The seventh important problem faced by the Jhumias was that they did not even realize the fact that this method of cultivation could destroy the flora and fauna of the State.

Problem areas and viewpoints of the settled cultivators

- i. About 20 to 27 percent of the settled farmers in both the districts considered shortage of family laborers to be a problem of high intensity; nearly 53 to 80 percent considered it to be a moderate problem and about 7 to 27 percent of the farmers deemed it to be a problem with low intensity.
- ii. The prevailing wage rate in both the districts was found to be high, as pointed out by 87 to 100 percent of the sample farmers; only 7 to 13 percent found it to be a moderate problem,
- iii. High input cost was another problem to reckon with, as expressed by 73 to 100 percent of the sample farmers across the blocks. Another 20 to 27 percent respondents considered input cost to be moderate.
- iv. Pests and diseases attack was high, as reported

by 40 (Salema Block) to 47 (Ambassa Block) percent of the sample farmers of Dhalai district. This attack was reported to be moderate in both the blocks according to 53 percent of the respondents. In case of Gomati district, pest and disease attack was reported to be high as pointed out by 13 and 47 percent of the respondents in Matabari and Killa blocks, respectively.

- v. The irrigation facility was found to be inadequate in all the blocks under study and was considered to be a severe problem, as reported by 58 to 93 percent of the sample farmers.

The Garrett rankings for the problems of settled cultivators

The Garrett Rankings for the problems of settled cultivators were worked out and it is clear from the Garrett Rankings that:

- i. Higher wage rate stood as the most severe problem of the settled cultivators with rank 1
- ii. High input cost occupied rank 2
- iii. The third rank was secured by shortage of quality seeds
- iv. Shortage of hired laborers in peak period of agricultural operations was yet another difficult problem with rank 4
- v. Inadequate irrigation facilities occupied rank 5 across the blocks
- vi. Low price of produces as compared to its cost of cultivation was ranked 6
- vii. Attack of pests and diseases during the plant growth period was ranked 7
- viii. Shortage of inputs at the time of requirement secured rank 8 and
- ix. Shortage of family worker was ranked 9

Problems of raising horticultural crops

- i. About 60 to 93 percent of the horticultural farmers in both the districts noted the existence

of wide gap between demand and supply of crops during peak harvesting season across the blocks.

- ii. Almost all the sample farmers (87 to 100 percent) from both the districts identified post-harvest losses to be the most serious problem of growing horticultural crops.
- iii. In Dhalai district, nearly 57 to 87 percent sample farmers assigned high priority on acute shortage of cold storage facilities while in Gomati district, 87 to 100 percent farmers opined likewise.

The Garrett rankings on the problems of farmers growing horticultural crops

- i. Shortage of processing facilities for fruits and vegetables was the most serious problem of Tripura with rank 1
- ii. Post-harvest losses of fruits and vegetables were very high and was ranked 2nd.
- iii. The acute shortage of cold storage facilities was identified as the third most serious problem of the farmers growing horticultural crops in the State.
- iv. Ever widening gap between demand and supply of output in peak harvesting season compelled the producers to sell their produces at lower prices and hence was identified as the fourth most important problem of the farmers.
- v. Intervention of the State and private traders for marketing of surplus products in the study area was far from satisfactory level and was therefore identified as yet another problem with rank 5.

Major problems faced by the sample farmers involved in rearing of CB pigs

The problems encountered by the sample farmers involved in CB pig rearing, as reported, were in the following order, in terms of intensity, from high to low:

- i. Price of product was low
- ii. Wage rate of laborer was very high

- iii. Price of medicine for treatment of CB pig was high
- iv. Shortage of own capital
- v. Low subsidy
- vi. Poor quality feeds and high price of feed
- vii. Shortage of cold storage facilities

Major problems faced by the sample farmers involved in rearing of ND pigs

The major problems encountered by this category of farmers, in descending order included

- i. Shortage and high price of piglets
- ii. Price of matured pig was determined by the middle-man
- iii. High price of feed
- iv. Shortage of cash capital to increase the numbers of piglets
- v. Non-availability of cross bred piglets and difficulty in obtaining semen for artificial insemination.

Observation on Jhum cultivation

Replacement of Jhum cultivation is possible only when Jhumias realize the comparative benefits of settled cultivation with improved packages over the shifting cultivation. Also, there is a need for policy changes under a different perspective to address the biases against the shifting cultivation. Results of the investigation clearly indicate that adoption of settled cultivation could fetch handsome profits to the Jhumias per hectare along with CB pig rearing.

4. Conclusion and Suggestions

4.1. Conclusion

Shifting cultivation is interwoven into the culture and tradition of near about 19 tribes inhabiting in the hilly terrain of Tripura. However, it is not going to be tenable for a longer period of time in view of a number of limitations. Lack of settled agricultural land and irrigation facilities, remoteness, high cost

of labour, energy and inputs and in the absence of other viable alternatives, the tribal population of the state still continue to practice Jhum cultivation for their livelihood. There is an urgent need to encourage and inspire this chunk of population to get involved in settled cultivation without hurting their cultural ethos. And for this to happen, the Government should come forward with innovative technology package together with the institutional and policy support to address the twin challenges of poverty eradication (of Jhumias) and environmental protection.

4.2. Suggestions for improvement of pig farms

The tribal farmers of the state are well experienced in rearing of pigs by tradition and if supported by the Government appropriately, it would definitely change the livelihood status of the farmers involved in settled and Jhum cultivation as well. The following suggestions can be put forward for improvement of pig farming on the basis of interaction with the farmers.

- i. The production of meat per CB pig was much higher than that of ND pigs
- ii. Labour cost for rearing CB pig is also on higher side than that of ND pig
- iii. Price of medicine for treatment of pigs may be subsidized or may be distributed free of cost.
- iv. Visits of veterinary doctors at regular interval may be ensured in order to improve the health and growth of pigs/ piglets..
- v. Slaughtering of animal should be made more scientific and hygienic.
- vi. Cold storage facilities may be created nearby the market yard.
- vii. Market place need to be made hygienic.
- viii. Extension machinery needs to be strengthened for creating awareness about scientific pig farming.
- ix. Scientific interventions for utilization of non-conventional feed resources, capacity building in health care services, adoption of scientific breeding, use of artificial insemination and

generation of trained manpower (entrepreneur) for medium to large scale production and proper use of pig by-products could transform the traditional subsistence pig farming to a healthy enterprise.

- x. The non-availability of cross bred piglets and difficulty in obtaining semen for artificial insemination may be mitigated by establishing more number of breeding farms to supply upgraded piglets in the remote areas.

4.3. Suggestions for improvement of agriculture/horticulture

Following few suggestions were drawn from the interactions with the sample farmers for overall improvement of agriculture/horticulture in the study area

- i. Transport costs of the agricultural produce may be subsidized by the Government.
- ii. Private parties need to be encouraged for establishment of more cold storage and fruit processing units in the tribal areas.
- iii. Small sheds for selling of agricultural produce on the roadside and market areas may be

constructed. Also, private entrepreneurs may be supported to make mobile fruit stalls in selective areas.

- iv. Participatory soil and water conservation measures need to be adopted.
- v. The drip and sprinkler irrigation need to be introduced in tilla areas, particularly for horticultural crops.
- vi. Permanent "Tong Houses" in the vicinity of Jhum field may be constructed for settlement of the Jhumias in selected locations.
- vii. Front line demonstration need to be arranged for the Jhumias to introduce newly developed varieties.
- viii. Capacity building through massive awareness programme and training
- ix. The rubber cultivation is profitable but not environment friendly. Moreover, gestation period for production of rubber is 6-7 years. Therefore, Government should encourage seasonal crops, horticulture crops and piggery farming in lieu of rubber plantation.

Commodity Reviews

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2019-20 up to 31.01.2020 is 33.61 million tonnes as against 32.37 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 31.01.2020) 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

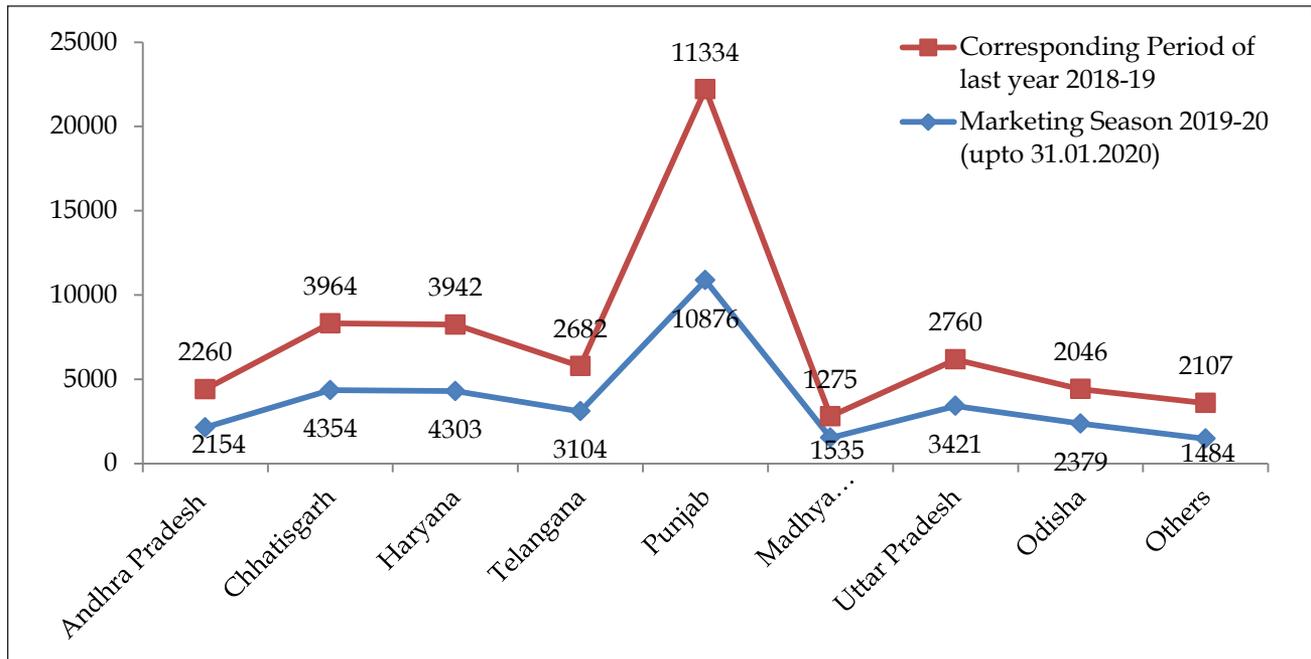
(In thousand tonnes)

State	Marketing Season 2019-20 (upto 31.01.2020)		Corresponding Period of last Year 2018-19	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Andhra Pradesh	2154	6.4	2260	7.0
Chhatisgarh	4354	13.0	3964	12.2
Haryana	4303	12.8	3942	12.2
Telangana	3104	9.2	2682	8.3
Punjab	10876	32.4	11334	35.0
Madhya Pradesh	1535	4.6	1275	3.9
Uttar Pradesh	3421	10.2	2760	8.5
Odisha	2379	7.1	2046	6.3
Others	1484	4.4	2107	6.5
Total	33610	100.0	32370	100.0

Source: Department of Food & Public Distribution.

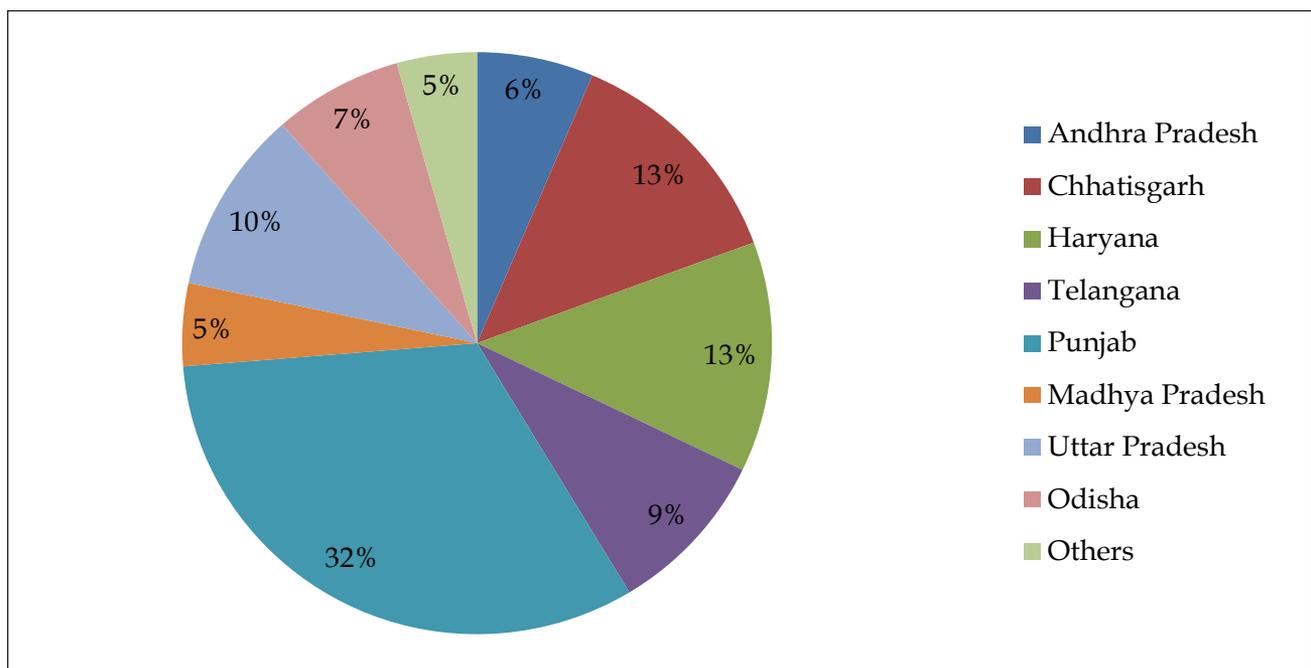
Figure 1: State-wise Procurement of Rice

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 2: Percentage Share of Different States in Procurement of Rice during Marketing Season 2018-19 (up to 31.01.2020).



Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat during rabi marketing season 2019-20 up to 04.07.2019 is 34.13 million tonnes as against 35.37 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 2019-20 (up to 04.07.2019) 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

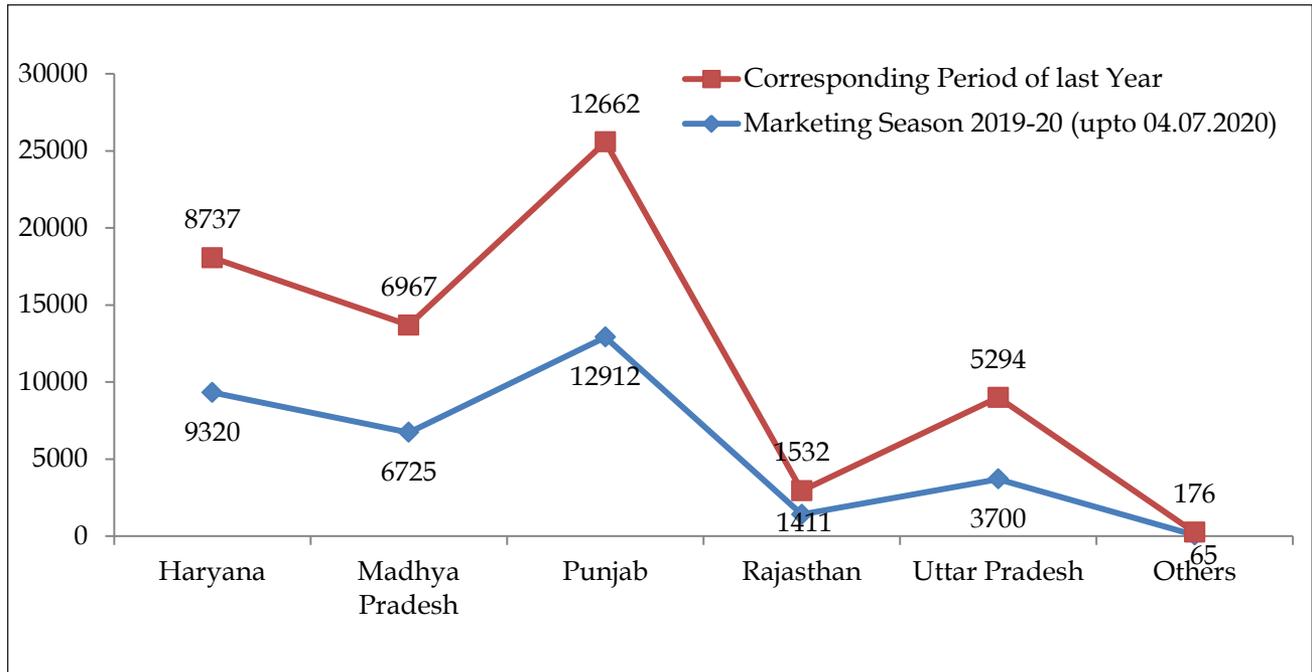
(In thousand tonnes)

State	Marketing Season 2019-20 (upto 04.07.2019)		Corresponding Period of last Year 2018-19	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Haryana	9320	27.3	8737	24.7
Madhya Pradesh	6725	19.7	6967	19.7
Punjab	12912	37.8	12662	35.8
Rajasthan	1411	4.1	1532	4.3
Uttar Pradesh	3700	10.8	5294	15.0
Others	65	0.2	176	0.5
Total	34133	100.0	35368	100.0

Source: Department of Food & Public Distribution.

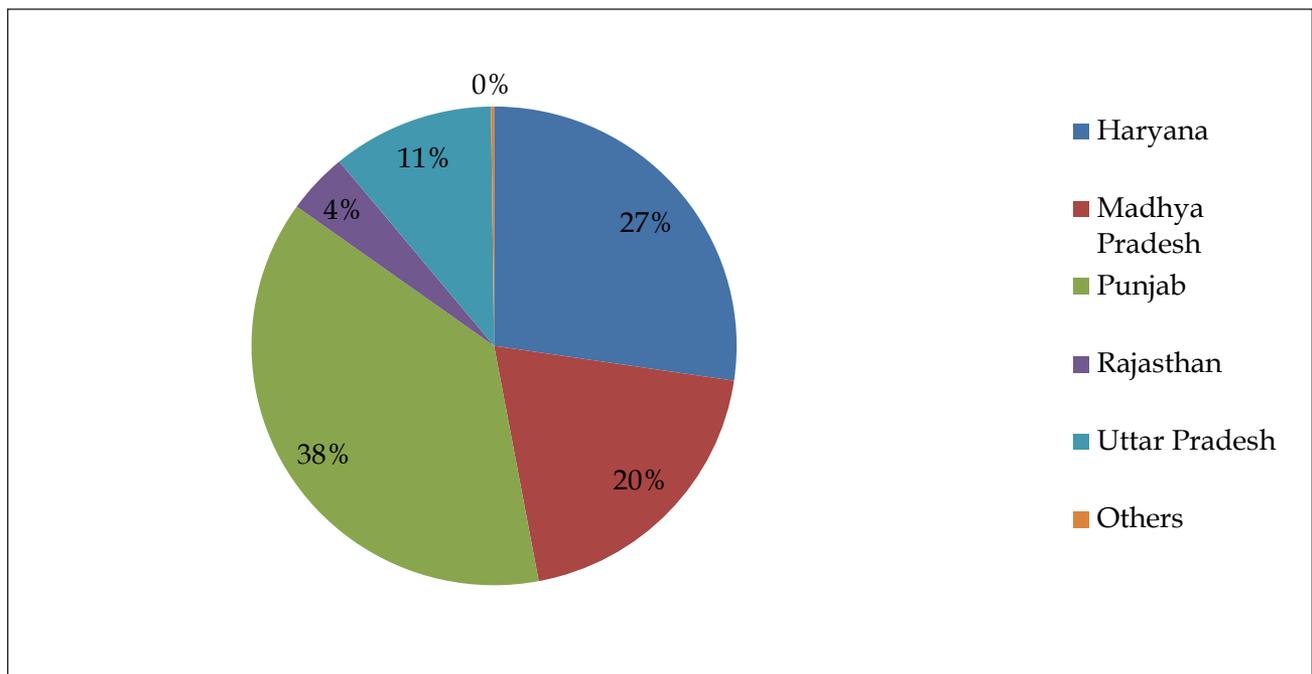
Figure 3: State-wise Procurement of Wheat

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 4: Percentage Share of Different States in Procurement of Wheat during Marketing Season 2019-20 (up to 04.07.2019).



Source: Department of Food & Public Distribution.

Commercial Crops

Oilseeds

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 157.1 in January, 2020 showing an increase of 2.75 percent over the previous month and increased by 9.02 percent over the previous year.

The WPI of all individual oilseeds showed a mixed trend. The WPI of groundnut seed (1.24 percent), rape and mustard seed (1.87 percent), gingelly seed (sesamum) (1.48 percent), niger seed (1.24 percent), safflower (2.04 percent) and soyabean (5.39 percent) increased over the previous month. However, the WPI of cotton seed (0.27 percent), copra (0.21 percent) and sunflower (0.08 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 131.1 in January, 2020 which shows an increase of 4.96 percent over the previous month. Moreover, it also increased by 14.20 percent over the corresponding months of the previous year. The WPI of mustard oil (0.30 percent), soyabean oil (3.93 percent), sunflower oil (0.43 percent), groundnut oil (0.40 percent), rapeseed oil (6.69 percent) and cotton seed oil (3.22 percent) increased over the previous month. However, the WPI of copra oil (0.29 percent) decreased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 183.6 in January, 2020 showing a decrease of 6.61 percent over previous month and an increase of 30.68 percent over the corresponding month of the previous year.

Potato

The WPI of potato stood at 265.6 in January, 2020

showing an increase of 9.71 percent over the previous month. Moreover, it also increased by 87.84 percent over the corresponding months of the previous year.

Onion

The WPI of onion stood at 468.5 in January, 2020 showing a decrease of 35.80 percent over the previous month and an increase of 293.37 percent over the corresponding months of the previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 156.9 in January, 2020 showing an increase of 1.82 percent over the previous month and an increase of 21.53 percent over the corresponding months of the previous year. The WPI of chillies (dry) increased by 8.18 percent. However, the WPI of black pepper decreased by 1.34 percent and turmeric decreased by 2.83 percent, respectively, over the previous month.

Raw Cotton

The WPI of raw cotton stood at 109 in January, 2020 showing an increase of 0.09 percent over the previous month and a decrease of 5.63 percent over the corresponding months of the previous year.

Raw Jute

The WPI of raw jute stood at 207.1 in January, 2020 showing an increase of 1.82 percent over the previous month and an increase of 4.33 percent over the corresponding months of the previous year.

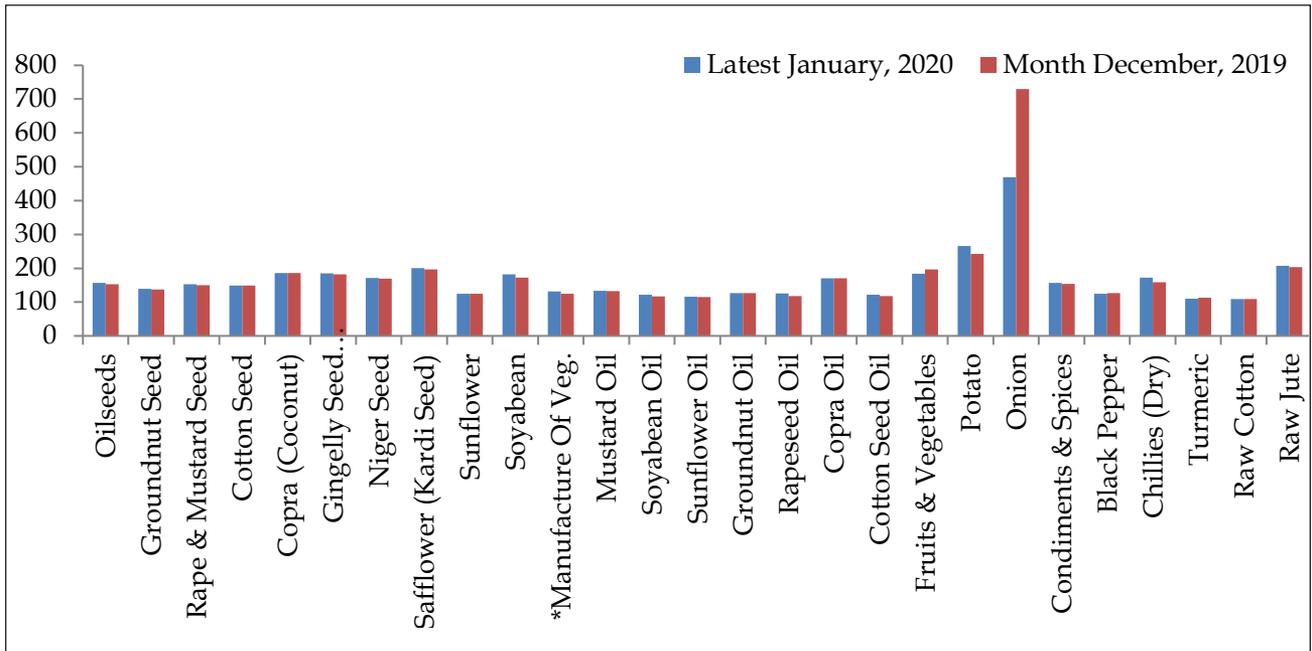
Wholesale Price Index of commercial crops is given in Table 3. A graphical comparison of WPI for the period of January, 2020 and December, 2019 is given in figure 5 and the comparison of WPI during the January, 2020 with the corresponding month of last year has been given in figure 6.

TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base year: 2011-12=100)

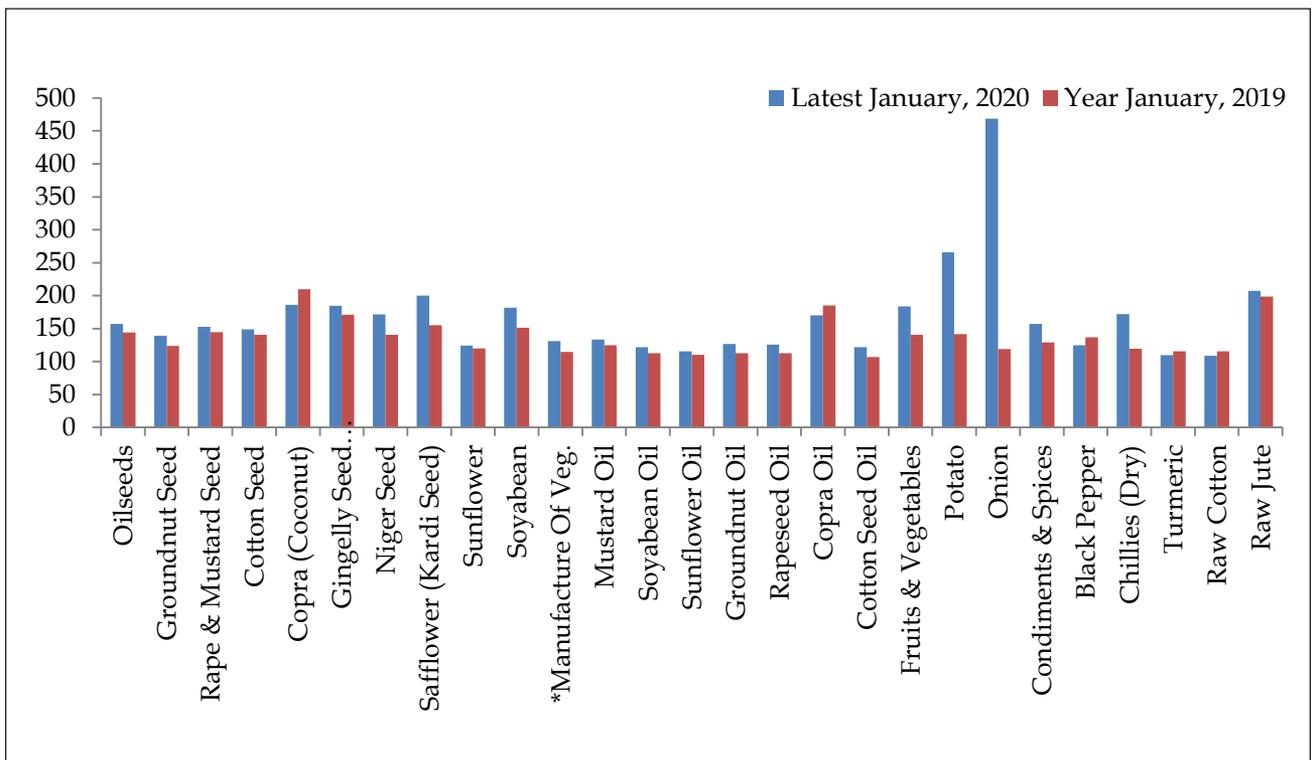
Commodity	Latest January, 2020	Month December, 2019	Year January, 2019	% Variation over the	
				Month	Year
Oilseeds	157.1	152.9	144.1	2.75	9.02
Groundnut Seed	139.0	137.3	123.8	1.24	12.28
Rape & Mustard Seed	152.9	150.1	144.5	1.87	5.81
Cotton Seed	149.0	149.4	140.8	-0.27	5.82
Copra (Coconut)	186.0	186.4	209.6	-0.21	-11.26
Gingelly Seed (Sesamum)	184.7	182.0	171.0	1.48	8.01
Niger Seed	171.5	169.4	140.8	1.24	21.80
Safflower (Kardi Seed)	200.3	196.3	155.3	2.04	28.98
Sunflower	124.2	124.3	119.7	-0.08	3.76
Soyabean	181.8	172.5	151.5	5.39	20.00
Manufacture of Vegetable and Animal Oils and Fats	131.1	124.9	114.8	4.96	14.20
Mustard Oil	133.2	132.8	124.7	0.30	6.82
Soyabean Oil	121.7	117.1	112.7	3.93	7.99
Sunflower Oil	115.6	115.1	110.4	0.43	4.71
Groundnut Oil	126.8	126.3	112.6	0.40	12.61
Rapeseed Oil	125.9	118.0	112.6	6.69	11.81
Copra Oil	170.2	170.7	185.0	-0.29	-8.00
Cotton Seed Oil	121.7	117.9	106.7	3.22	14.06
Fruits & Vegetables	183.6	196.6	140.5	-6.61	30.68
Potato	265.6	242.1	141.4	9.71	87.84
Onion	468.5	729.8	119.1	-35.80	293.37
Condiments & Spices	156.9	154.1	129.1	1.82	21.53
Black Pepper	124.8	126.5	136.6	-1.34	-8.64
Chillies (Dry)	171.9	158.9	119.3	8.18	44.09
Turmeric	109.7	112.9	115.6	-2.83	-5.10
Raw Cotton	109.0	108.9	115.5	0.09	-5.63
Raw Jute	207.1	203.4	198.5	1.82	4.33

Figure 5: WPI of Commercial Crops during January, 2020 and December, 2019



* Manufacture of Vegetable, Animal Oils and Fats

Figure 6: WPI of Commercial Crops during January, 2020 and January, 2019



* Manufacture of Vegetable, Animal Oils and Fats

Statistical Tables

Wages

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

(In Rs.)

State	District	Centre	Moht & Year	Daily Normal Working Hours	Field Labour		Other Agri. Labour		Herdsman		Skilled Labour		
					M	W	M	W	M	W	Carpenter	Black Smith	Cobbler
					M	M	M	M	M	M	M		
Andhra Pradesh	Krishna	Ghantasala	Aug, 2019	8	500	300	300	NA	NA	NA	NA	NA	NA
	Guntur	Tadikonda	Aug, 2019	8	383	350	400	NA	325	NA	NA	500	NA
Telangana	Ranga Reddy	Arutala	Dec, 2019	8	425	320	NA	NA	NA	NA	NA	NA	NA
Karnataka	Bangalore	Harisandra	Nov, 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	Dec, 19	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chandrapur	Ballarpur	Dec, 19	8	300	200	300	200	300	NA	500	400	250
Jharkhand	Ranchi	Gaitalsood	June, 19	8	239	239	239	239	239	239	330	330	NA

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

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily Working Hours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Assam	Barpeta	Howly	May, 19	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, 19	M	8	300	300	300	300	300	300	450	450	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Shekhpura	Kutaut	June, 19	M	8	NA	NA	NA	NA	NA	NA	500	500	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chhattisgarh	Dhamtari	Sihava	Nov, 19	M	8	250	200	NA	180	180	200	300	200	200
				W	8	NA	175	NA	150	150	170	NA	150	NA

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

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily Working Hours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Gujarat*	Rajkot	Rajkot	Nov, 19	M	8	256	256	260	256	238	200	481	481	469
				W	8	300	300	260	250	238	196	NA	NA	NA
	Dahod	Dahod	Nov, 19	M	8	294	294	163	163	163	NA	400	350	300
				W	8	NA	250	163	163	163	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	May, 19	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	June, 18	M	8	350	300	300	300	300	300	400	400	250
				W	8	NA	300	300	300	300	300	NA	NA	NA
Kerala	Kozhikode	Koduvally	Aug, 19	M	4-8	960	850	NA	800	980	NA	900	NA	NA
				W	4-8	NA	NA	650	650	700	NA	NA	NA	NA
	Palakkad	Elappally	Aug, 19	M	4-8	NA	600	NA	600	700	NA	750	NA	NA
				W	4-8	NA	NA	300	300	300	NA	NA	NA	NA
Madhya Pradesh	Hoshangabad	Sangarkhera	Aug, 19	M	8	250	NA	200	NA	250	150	400	400	NA
				W	8	NA	NA	200	NA	200	NA	NA	NA	NA
	Satna	Kotar	Aug, 19	M	8	300	300	300	300	300	300	500	500	500
				W	8	NA	300	300	300	300	300	NA	NA	NA
Shyampurkala	Vijaypur	Aug, 19	M	8	NA	300	NA	NA	NA	300	400	400	NA	
			W	8	NA	300	NA	NA	NA	300	NA	NA	NA	
Odisha	Bhadrak	Chandbali	June, 19	M	8	350	350	350	350	383	300	500	400	400
				W	8	NA	300	300	300	308	250	NA	NA	NA
	Ganjam	Aska	June, 19	M	8	300	250	250	300	325	250	500	500	500
				W	8	NA	220	220	250	267	220	NA	NA	NA
Punjab	Ludhiyana	Pakhowal	Nov, 19	M	8	450	450	NA	NA	400	NA	480	480	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rajasthan	Barmer	Kuseep	Oct, 19	M	8	500	500	NA	300	NA	500	700	500	NA
				W	8	NA	NA	NA	300	NA	300	NA	300	NA
	Jalore	Sarnau	Oct, 19	M	8	400	NA	NA	300	NA	NA	550	350	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	350	NA

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

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily Working Hours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Tamil Nadu*	Thanjavur	Pulvarnatham	Oct, 19	M	8	NA	346	NA	350	397	NA	540	450	NA
				W	8	NA	NA	158	150	126	NA	NA	NA	NA
	Tirunelveli	Malayakulam	Oct, 19	M	8	NA	NA	NA	500	610	NA	400	400	NA
				W	8	NA	200	200	187	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	Ganeshpur	Nov, 19	M	8	300	300	300	300	300	NA	500	NA	NA
				W	8	NA	250	250	250	250	NA	NA	NA	NA
	Auraiya	Auraiya	Nov, 19	M	8	NA	300	NA	300	300	NA	500	NA	NA
				W	8	NA	300	NA	NA	300	NA	NA	NA	NA
	Chandauli	Chandauli	Nov, 19	M	8	NA	NA	NA	NA	300	NA	500	NA	NA
				W	8	NA	NA	NA	NA	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	Jan-20	Dec-19	Jan-19
Wheat	PBW 343	Quintal	Punjab	Amritsar	2200	2200	1900
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	2090	2025	1875
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	2300	2145	2030
Jowar	-	Quintal	Maharashtra	Mumbai	4000	4000	3400
Gram	No III	Quintal	Madhya Pradesh	Sehore	3726	4102	3850
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	2060	1850	1860
Gram Split	-	Quintal	Bihar	Patna	6200	6050	5780
Gram Split	-	Quintal	Maharashtra	Mumbai	5600	5800	6000
Arhar Split	-	Quintal	Bihar	Patna	8360	8350	6580
Arhar Split	-	Quintal	Maharashtra	Mumbai	8400	8400	6500
Arhar Split	-	Quintal	NCT of Delhi	Delhi	8000	8200	5900
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	8200	8500	6900
Gur	-	Quintal	Maharashtra	Mumbai	5050	4900	4100
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4500	4500	5500
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2550	2500	2280
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4100	4100	3800
Mustard Seed	Black	Quintal	West Bengal	Raniganj	4350	4300	4400
Mustard Seed	-	Quintal	West Bengal	Kolkata	4600	4900	4300
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	5160	5150	4150
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4880	4780	4120
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	1800	2300	1550
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	3000	3000	2700
Castor Seed	-	Quintal	Telangana	Hyderabad	3800	3900	4950
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	9750	9650	11100
Copra	FAQ	Quintal	Kerala	Alleppey	10900	10400	11850
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	6000	4800	5200
Groundnut	-	Quintal	Maharashtra	Mumbai	8200	8000	5950
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1370	1365	1375
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1475	1552	1450
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1700	1750	1460
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2190	2050	1880
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1430	1400	1405
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1245	1290	1650
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1830	1830	1770
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2800	2800	3500
Coconut Oil	-	15 Kg.	Kerala	Cochin	2295	2220	2475
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2165	2020	1850
Groundnut Cake	-	Quintal	Telangana	Hyderabad	3572	4000	3143
Cotton/Kapas	NH 44	Quintal	Andhra pradesh	Nandyal	5200	5000	5350
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	4700	3600	5150

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

Commodity	Variety	Unit	State	Centre	Jan-20	Dec-19	Jan-19
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	4950	4750	4800
Jute Raw	W 5	Quintal	West Bengal	Kolkata	5000	4800	4850
Oranges	-	100 No	NCT of Delhi	Delhi	708	708	583
Oranges	Big	100 No	Tamil Nadu	Chennai	500	500	540
Banana	-	100 No.	NCT of Delhi	Delhi	458	458	417
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	700	700	570
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	85000	94000	95000
Almonds	-	Quintal	Maharashtra	Mumbai	72000	73000	63000
Walnuts	-	Quintal	Maharashtra	Mumbai	62000	70000	68000
Kishmish	-	Quintal	Maharashtra	Mumbai	19000	20500	27000
Peas Green	-	Quintal	Maharashtra	Mumbai	6700	6100	6000
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	1050	1280	635
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	2500	2500	3000
Cauliflower	-	100 No.	Tamil Nadu	Chennai	2500	2500	1500
Potato	Red	Quintal	Bihar	Patna	1700	1800	980
Potato	Desi	Quintal	West Bengal	Kolkata	1700	2050	500
Potato	Sort I	Quintal	Tamil Nadu	Mettupalayam	2963	3557	2083
Onion	Pole	Quintal	Maharashtra	Nashik	2100	5500	550
Turmeric	Nadan	Quintal	Kerala	Cochin	11500	11000	12000
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	10000	11000	10500
Chillies	-	Quintal	Bihar	Patna	12650	11480	9850
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	28500	30000	31000
Ginger	Dry	Quintal	Kerala	Cochin	27500	26500	24500
Cardamom	Major	Quintal	NCT of Delhi	Delhi	1E+05	1E+05	1E+05
Cardamom	Small	Quintal	West Bengal	Kolkata	4E+05	4E+05	1E+05
Milk	Buffalo	100 Liters	West Bengal	Kolkata	5200	5200	5200
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	70000	70000	76705
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	40000	42000	42000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	38870	39600	39650
Fish	Rohu	Quintal	NCT of Delhi	Delhi	17500	17500	16500
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	42000	50000	40000
Eggs	Madras	1000 No.	West Bengal	Kolkata	5000	5300	4762
Tea	-	Quintal	Bihar	Patna	21950	21720	21350
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	NT	NT	39000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	40000	40000	25000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	29500	29000	17500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	7750	7800	4300
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4750	4800	2600
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13400	13200	13200
Rubber	-	Quintal	Kerala	Kottayam	11500	11300	10800
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	61000	59000	61200

Crop Production

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING APRIL, 2020

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

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING APRIL, 2020-CONTD.

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

(K)–Kharif (R)– Rabi

The journal is brought out by the Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, it aims at presenting an integrated picture of the food and agricultural situation in India on month to month basis. The views expressed are not necessarily those of the Government of India.

Note to Contributors

Articles on the State of Indian Agriculture and allied sectors are accepted for publication in the Directorate of Economics & Statistics, Department of Agriculture, Cooperation & Farmers Welfare's monthly Journal "Agricultural Situation in India". The Journal aims to provide a forum for scholarly work and disseminate knowledge; provide a learned reference in the field; and provide platform for communication between academic and research experts, policy makers. Articles in Hard Copy as well as Soft Copy (publication.des-agri@gov.in) in MS Word may be sent in duplicate to the Editor, Publication Division, Directorate of Economics & Statistics, M/o Agriculture, Cooperation & Farmers Welfare, 102A, F-Wing, Shastri Bhawan, New Delhi-110001 along with a declaration by the author (s) that the article has neither been published or submitted for publication elsewhere. The author (s) should furnish their email address, Phone No. and their permanent address only on the forwarding letter so as to maintain anonymity of the author while seeking comments of the referees on the suitability of the article for publication. The Article should be prepared according to the following guidelines:

- a) Articles should not exceed five thousand words (including footnotes), typed in double space on one side of foolscap paper in Times New Roman font size 12.
- b) Typescript should be arranged in the following order: title, abstract, introduction, data or methodology, text, conclusions, policy suggestions, and references.
- c) Abstract (with keywords) is required and should not exceed 300 words in length.
- d) The title page should contain the title, author name(s) and institutional affiliation (s).
- e) The text should follow UK English and Number bullets should be used wherever required.
- f) Reference List should be given in alphabetical order of surname. The American Psychological Association (APA) style for reference lists should be followed. For example:

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Author A surname, author A Initial., & Author

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Abbreviations used

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

Plus (+) indicates surplus or increase.

Minus (-) indicates deficit or decrease.

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