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From Editor's Desk

The current issue of Agricultural Situation in India covers farm sector news, price indices, inflation rates and other statistical data. It also includes two research articles titled "Status and Utilisation Pattern of Farm Tractors in Punjab" and "Growth and Variability in Export of Banana from India" and an Agro-Economic Research study on "Market Imperfections and Farm Profitability in Gujarat" conducted by the AERC, Sardar Patel University, Gujarat under the Agro-Economic Research scheme of Directorate of Economic and Statistics.

The major farm sector news for the month of February are, 60th Convocation of ICAR-IARI held; PM addresses a webinar on positive impact of Union Budget 2022 on agriculture sector; creation of National Agriculture Disaster Management scheme; Integration of e-mandis into e-NAM platform; new varieties developed by JNKVV; EXPO 2020 Dubai, among other news.

For the month of February, 2022, annual inflation stood at 13.11 percent over February, 2021. Annual food inflation increased by 8.47 percent during February, 2022 over February, 2021 whereas on month-on-month basis, it increased by 0.06 percent in February, 2022 over January, 2022, provisionally. The Wholesale Price Index (WPI) of pulses, vegetables, fruits, cereals and wheat increased by 2.72 percent, 26.93 percent, 10.30 percent, 6.07 percent and 11.03 percent, respectively, in February, 2022 as compared to corresponding period of last year. The cumulative winter season rainfall in the country during the period 1st January, 2022 to 23rd February, 2022 has been 50 percent higher than the long period average (LPA). Current live storage in 140 major water reservoirs in the country was 101.21 BCM as against 78.86 BCM of normal storage based on the average storage of last 10 years.

The first article of the section titled "Status and Utilisation Pattern of Farm Tractors in Punjab" examines the distribution and utilisation of tractors in the state of Punjab and finds that to increase both the production and productivity, the Government is focussing on mechanization in agriculture. Tractor is a major farm equipment and forms a basis of usage of other agricultural machinery. Punjab has seen a five-fold increase in the tractor usage since the early sixties. Tractor finds use in tillage, threshing, harvesting, transportation and other activities. However with farm sizes growing smaller, its use is becoming uneconomical. Tractor and other machineries may be rented out through hiring centres. This will help in the reduction of input costs and increase profitability. Thus, the study suggests that more small and marginal farmers can be brought under mechanization.

The article on "Growth and Variability in Export of Banana from India" studies the trend in production and export of banana. The paper finds that over the period of time, there has been an enormous increase in production and productivity of banana which has resulted in India becoming a growing exporter of banana to UAE, Saudi Arabia, Bahrain, Nepal and other countries, and opine that better logistic support, value chain development and diversion of supplies to better price paying countries may help in increasing both the supply quantity as well as value of the export.

The Agro-Economic Research titled "Market Imperfections and Farm Profitability in Gujarat" analyses the economic feasibility of farming in the state of Gujarat by examining the input costs, prices received, access to credit and many other factors. The study points out that the sale of crops is usually done to private traders at lower price than prevalent in the market due to lack of storage facilities which forces the farmers to sell the crop immediately. Also majority of the household are not aware of the Government introduced schemes like crop insurance and Minimum Support Price. Thus the study recommends that there is a need for an efficient marketing system, better credit system, reasonable input prices and storage facilities so that the disadvantaged can be helped out. Dissemination of information and proper publicizing of Government facilities can ensure better support to farmers.

Promodita Sathish

Farm Sector News

Meetings and Events

60th Convocation of ICAR-IARI

Hon'ble Union Minister for Agriculture and Farmers Welfare, Shri Narendra Singh Tomar on 11th February, 2022 handed over awards and degrees to the 284 students, including 8 foreign students, of the Post Graduate School of ICAR-Indian Agriculture Research Institute, New Delhi. On the occasion, Shri Tomar also dedicated 6 varieties of fruits and vegetables to the nation *viz.*, two varieties of mango Pusa Lalima, Pusa Shresth, brinjal variety Pusa Vaibhav, palak variety Pusa Vilayati palak, cucumber variety Pusa Gynoecious Cucumber Hybrid-18 and Pusa Alpana variety of rose. The bio-fertilizer 'PUSA Sampoorn' developed by the division of Microbiology was also released.

Addressing the gathering, Shri Narendra Singh Tomar appealed to all agriculture institutes to focus on producing good farmers. He said Institutes are producing very talented teachers and scientists which is commendable. Because of this, knowledge and technology remain limited to the institutes only. If institutes produce farmers, then they can bring this knowledge to the grassroots level. He also exhorted the students for entrepreneurship development and appealed for taking up farming as a profession.

Highlighting the Government priorities in the field of agricultural research, Shri Tomar said that India is placed among the top 10 Agri products exporting countries. Speaking on implementing the use of drone technology for the benefit of farmers and employment generation for various stakeholders, the Agriculture Minister said that the Government is giving 100% as a grant for the purchase of drones to agriculture institutes so that the technology can be taught in the institutes. He also said that agriculture graduates are also eligible to receive grant support for drone purchases. The Minister advised the new graduates to see this as a huge opportunity in the field of drone technology.

Earlier, the Director of the institute, Dr A.K. Singh presented the significant achievements of the institute and informed that wheat varieties developed by this institute contribute nearly 60 million tonnes of wheat worth Rs. 80,000 crore to the nation's granary annually. Similarly, the basmati varieties developed by the institute predominate basmati cultivation in India, accounting for 90% of the total foreign exchange (Rs. 29524 crore) earned through the export of basmati rice amounting to Rs. 32804 crores. About 48% of the mustard grown area in the country is cultivated with IARI varieties. The total economic surplus generated from Pusa Mustard 25 is estimated at Rs. 14323 crore (at 2018 prices) during the last 9 years.

Impact of Union Budget 2022 on agriculture sector

Hon'ble Prime Minister, Shri Narendra Modi addressed a webinar on 24th February, 2022, on positive impact of Union Budget 2022 on agriculture sector. He discussed the ways in which the Budget will contribute in strengthening the sector. The webinar was focused on 'Smart Agriculture'- Strategies for implementation. Concerned Union Ministers, representatives of State Governments, representatives from industry and academia and farmers through various Krishi Vigyan Kendras were present on the occasion.

The Prime Minister elaborated on the seven ways in which the Budget proposes to make agriculture modern and smart. Firstly, the target is to undertake natural farming on mission mode within 5 kms on both the banks of the Ganges. Secondly, modern technology in agriculture and horticulture will be made available to the farmers. Thirdly, emphasis has been laid on strengthening Mission Oil Palm to reduce the import of edible oil. Fourthly, new logistics arrangements will be made through PM Gati-Shakti plan for the transportation of agricultural products. Fifth solution in the Budget is better organization of agri-waste management and increasing farmers' income through waste to energy solutions. Sixthly, more

than 1.5 lakh post offices will provide services like regular banking so that farmers are not troubled. Seventh, Agri research and education syllabus will be changed as per demands of modern times with regard to skill development and human resource development.

The webinar had an open discussion on five breakout sessions namely Natural Farming and its outreach, Emerging High-Tech and Digital Agri Ecosystem, Bringing Back Glory of Millets; Moving Towards Aatmanirbharta in Edible Oil, Sahkarita Se Samridhi, Financing Investment In Value Chain Infrastructure in Agriculture & Allied Sector with stakeholders of respective fields.

General Agricultural Sector News

Creation of National Agriculture Disaster Management Scheme

Indian Council of Agricultural Research (ICAR), Ministry of Agriculture and Farmers Welfare, Government of India has launched a flagship network project "National Innovations in Climate Resilient Agriculture (NICRA)" aiming at strategic research on adaptation and mitigation, demonstration of technologies on farmers' fields and creating awareness among farmers and other stakeholders. The following steps have been taken in the field of climate smart agriculture:

(i) Developed climate resilient varieties for different abiotic and biotic stresses in major crops. So far, 8 climate resilient varieties have been released in rice, green gram, maize and lentil;

(ii) Developed and popularized 65 location-specific climate resilient/smart technologies for wider adoption among the farming communities;

(iii) Prepared 650 district agricultural contingency plans and sensitized state officials for preparedness through 54 state-level interface meetings;

(iv) Developed, evaluated and commercialized implements (raised bed planter-cum-herbicide applicator, maize harvester, zero till planter, etc.) for small farm mechanization suiting to dryland ecologies;

(v) Climate smart technologies developed involving farmers in risk assessment and adaptation techniques in 151 clusters covering 446 villages, with a footprint of 2,13,421 households, on 2,35,874 hectares of land;

(vi) Capacity building programmes have been taken up comprising of researchers, farmers, entrepreneurs, line department officials, policy makers and NGOs in the field of climate resilient agriculture.

(vii) Further, the climate smart agriculture is promoted under the Central Sector Schemes of Pradhan Mantri Krishi Sinchayee Yojna (PMKSY), Parmparagat Krishi Vikas Yojna (PKVY), Soil Health Mission (SHM), National Bomboo Mission (NBM) and Sub Mission on Agro Forestry (SMAF).

The Government of India has launched the National Mission for Sustainable Agriculture (NMSA), which is one of the eight Missions under the National Action Plan on Climate Change (NAPCC). NAPCC has identified the focus areas on dryland agriculture, risk management, access to information and use of biotechnology under NMSA and are implemented in schemes of Rainfed Area Development, On-Farm Water Management, Soil Health Management and Climate Change and Sustainable Agriculture: Monitoring, Modelling and Networking.

There is no proposal for creation of National Agriculture Disaster Management scheme to tackle the issues of sudden climatic changes and other issues which are becoming more frequent. However, every Ministry/Department is mandated to prepare a Disaster Management plan under Sections 36/37 of Disaster Management (DM) Act, 2005. Accordingly, Department of Agriculture and Farmers Welfare has prepared a National Agriculture Disaster Management Plan (NADMP) to include key aspects of Disaster Risk Reduction (DRR) that address climate change

adaptation and sustainable development goals related to the agriculture sector.

Coverage under drip and micro irrigation

The Government is making all efforts to enhance water use efficiency at farm level through adoption of micro irrigation in all the states of the country and so far, an area of 137.80 lakh ha has been covered under micro irrigation.

The Department of Agriculture and Farmers Welfare (DA&FW) is implementing Per Drop More Crop component of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY-PDMC) from 2015-16 in all the states. The PDMC scheme focuses on enhancing water use efficiency at farm level through micro irrigation *viz.*, drip and sprinkler irrigation systems.

Besides, with the objective of facilitating the states in mobilising resources for expanding coverage of micro irrigation, Micro Irrigation Fund (MIF) has been created with National Bank for Agriculture and Rural Development (NABARD). The major objective of the fund is to facilitate the states in mobilizing the resources for expanding coverage of micro irrigation by taking up special and innovative projects and also for incentivising micro irrigation beyond the provisions available under PDMC scheme to encourage farmers to install micro irrigation systems.

Farmers are encouraged to take advantage of the PDMC scheme by wide publicity through press & print media, publication of leaflets/ booklets, organization of workshops, exhibitions, farmer fairs, information on State/Government of India web portals, etc. In addition, Indian Council of Agricultural Research (ICAR) imparts training and organizes field demonstrations through Krishi Vigyan Kendras (KVKs) to educate farmers for promotion of efficient irrigation techniques/micro irrigation for various crops.

The Government provides financial assistance/subsidy @ 55% of the indicative unit cost to small and marginal farmers and @ 45% to other farmers for encouraging them to install drip and sprinkler irrigation systems under the PDMC scheme to enhance the coverage. In addition, some states provide additional incentives/top up subsidy to reduce farmers' share for adoption of micro irrigation.

Integration of e-mandis into e-NAM platform

Since 31st March, 2018, 415 new mandis have been integrated on National Agriculture Market (e-NAM) platform. As on 31st December, 2021, 1000 mandis of 18 states and 03 Union Territories have been integrated with e-NAM platform. More than 1.72 crore farmers and 2 lakh traders have registered themselves on the platform.

Government provides following support under e-NAM scheme:

(i) e-NAM software is provided to states/UTs free of cost.

(ii) Department gives grant as one-time fixed cost to the states/UTs up to Rs. 75.00 lakh per mandi for purchase of hardware, internet connection, assaying equipment and related infrastructure including cleaning, grading and packaging facilities, and bio-compost unit to make the mandi ready for integration with e-NAM platform.

(iii) A trained staff (Mandi Analyst) is deputed at each mandi, for an initial period of one year to provide day to day hand holding support to stakeholders and train other mandi staff.

(iv) Helpdesk support: A toll free no. (1800-2700-224) and email support (enam. helpdesk@gmail.com) is available to enable stakeholders to raise their query.

(v) Online tutorials are available on www. enam.gov.in

(vi) Regular training of stakeholders (farmers, traders, FPOs, mandi staff, etc.) are

conducted to create awareness and handholding regarding e-NAM portal.

As per the Union Budget Announcement 2020-21, additional 1000 mandis are to be integrated with e-NAM platform. The total budgetary outlay for integration of 1000 e-NAM Mandis since inception is Rs. 1171.93 cr.

Availability of good quality seeds

There is sufficient quantity of certified/quality seed available for all farmers across the country. The details of requirement and availability of seed in the country in last three years is given below:

(Quantity in lakh quintals)

Year	Requirement	Availability	Surplus
2019-20	387.31	431.01	43.70
2020-21	443.16	483.66	40.50
2021-22	465.36	498.83	33.47

In order to make quality seeds affordable to farmers, Government ensures fixation of uniform breeder seed price in consultation with ICAR for minimization of the seed production cost in case of foundation and certified seed. Furthermore, Government provides financial assistance to different states and Government seed producing agencies for production and distribution of seeds and for other interventions related to seed sector *viz.*, National Food Security Mission (NFSM), Mission for Integrated Development of Horticulture (MIDH), Rashtriya Krishi Vikas Yojana (RKVY), Sub-Mission on Seeds and Planting Materials (SMSP), etc. so as to make quality seed affordable and available to the farmers in timely manner.

Because of the programme, a significant production enhancement has been achieved across the crops. There has been 6.07 times production enhancement in food grains, 3.06 times in pulses, 6.98 times in oilseeds, 11.93 times in cotton and 7 times in case of sugarcane over 1950-51 till 2020-21. The collective efforts of ICAR and DA&FW have played a significant role in bringing newly released varieties into seed chain in recent years.

During 2020-21, out of total 115517 quintals breeder seed produced, 44705 quintals (~38.7%) and 66422 quintals (~57.5%) accounts for varieties lesser than five years and ten years old, respectively, some of which are bio-fortified and multiple stress tolerant varieties. All these efforts bolster varietal diversification and productivity augmentation. Furthermore, following steps are being taken up by DA&FW to ensure availability of quality seed to the farmers:-

(1) State Governments have been preparing Seed Rolling Plan for three years in advance to estimate the requirement of seed in their state and distribute seed production targets accordingly to different seed production agencies. This system ensures timely availability of required quantity of seed to the farmers in different states.

(2) State Governments are placing their breeder seed indent in different crops one year in advance for systematic breeder seed production. After production, the breeder seed is allotted to State Governments and seed producing agencies for further multiplication into foundation and certified seed and its distribution to the farmers.

(3) For any unforeseen climatic condition, a National Seed Reserve has been established in different states for creating seed reserve every year which has short, medium duration and stress tolerant variety seeds.

New varieties developed by JNKVV

Jawaharlal Nehru Krishi Vishwavidyalaya (JNKVV) has developed two varieties each of oats and wheat, one of rice and three of niger which were released during the 87th meeting of Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops. All these newly released varieties were tested under various agro-climatic conditions of the state(s) through All India Coordinated Research Projects and based on the superiority over the national/zonal checks, these varieties have been recommended for release and notification.

After notification of a variety, it takes three years to convert breeder seed to certified seed, and certified seed is distributed to the farmers for general cultivation. Various State and Central Seed Production Agencies and private seed companies produce foundation and certified seed.

VARIETIES OF JNKVV RELEASED DURING 87TH MEETING OF CENTRAL SUB-COMMITTEE ON CROP STANDARDS NOTIFICATION AND RELEASE OF VARIETIES FOR AGRICULTURAL CROPS

Crop and the variety name	State of testing & recommendation	Salient features
Oats		
JO 10-506	Assam, Odisha, Jharkhand and eastern Uttar Pradesh	Suitable for rainfed-irrigated under normal fertility conditions, average green fodder yield 219.0 q/ha, maturity 135-145 days, resistant to lodging, moderately resistant to leaf blight and root rot.
JO 05-304 (Multi cut)	Uttar Pradesh, Maharashtra and Gujarat	Suitable for rainfed-irrigated condition under normal fertility conditions, multi-cut variety, average green fodder yield 560.0 q/ha and dry matter yield 114.0 q/ha, maturity 130-140 days, moderately resistance to leaf blight and root rot.
Wheat		
MP (JW) 1358	Maharashtra, Karnataka, Plains of Tamil Nadu	Suitable for restricted irrigation, timely sown condition, average yield 56.1 q/ha, maturity 105 days, biofortified variety rich in protein (12.1%), iron (40.6 ppm); tolerant to heat and drought stresses, resistant to black and brown rust.
MP (JW) 1323	Madhya Pradesh	Suitable for irrigated timely sown condition, average yield 61.5 q/ha, maturity 117 days, higher protein content (14.5%); resistant to brown and black rust.
Rice		
JR 10	Madhya Pradesh	Suitable for early to medium duration planting during kharif season, recommended for entire rice growing areas of MP, average yield 50-55 q/ha, maturity 120 days; farmers can grow lentil/chickpea after the harvest of this variety, moderately tolerant to most of the diseases including blast & blight.
Niger		
JNS 2016-1115	All India	Suitable for rainfed and irrigated condition, average yield 6.5-7.0 q/ha, oil content 39-40%, maturity 96-102 days; tolerant to Cercospora leaf spots, Alternaria leaf spot & powdery mildew diseases, moderately tolerant to aphids, semi-looper and caterpillar.
JNS 2015-9	Madhya Pradesh	Suitable for rainfed as well as irrigated conditions of hills and plains, average yield 5.5-6.0 q/ha, oil content 37-38%, maturity 99-103 days; tolerant to Cercospora and Alternaria leaf spot & powdery mildew diseases and moderately tolerant to aphids, semi-looper and caterpillar.
JNS 521	Madhya Pradesh	Suitable for rainfed as well as irrigated hills and plain condition, average yield 5.5-6.0 q/ha, oil content 37-38%, maturity 99-109 days; tolerant to Alternaria leaf spot & powdery mildew diseases and tolerant to aphids, semi-looper and caterpillar.

Use of electronic media for educating farmers

The Department of Agriculture & Farmers Welfare (DA&FW), Ministry of Agriculture & Farmers Welfare is educating farmers through use of electronic media to upgrade their knowledge on modern agriculture technologies:

(i) The scheme 'Mass Media Support to Agriculture Extension' of 'Sub-Mission on Agriculture Extension' is under implementation to create awareness among the farming community and educate the farmers on improved agriculture technologies. The programmes are telecast through DD Kisan, DD Regional Kendras (18) and broadcast through 96 FM stations of All India Radio. The 'Focused Publicity & Awareness Campaign' is also being undertaken through electronic and print media for creating awareness among the farmers and other stakeholders on technological aspects of agriculture.

(ii) Social media platforms like Twitter, Facebook, Instagram and YouTube are being used to educate farmers.

(iii) The ICAR institutes and KVKs have developed 283 mobile apps on different agriculture commodities for providing advisory to the farmers. ICAR has also created an electronic platform 'Kisan Sarathi' for supporting agriculture at local niche with national perspective to provide a seamless, multimedia, multi-ways connectivity to the farmers with the latest agricultural technologies, knowledge base and the pool of large number of subject matter specialists.

The Government is implementing following schemes and activities to impart training and educate the farmers to adopt modern agriculture techniques:

(i) A Centrally Sponsored Scheme on 'Support to State Extension Programmes for Extension Reforms' popularly known as 'Agriculture Technology Management Agency (ATMA)' is under implementation in 691 districts of 28 states & 5 UTs of the country. The extension activities under ATMA, inter-alia, include farmers' training to upgrade their knowledge and technical skills on modern and innovative agricultural technologies.

(ii) The 'Mission for Integrated Development of Horticulture (MIDH)', a Centrally Sponsored Scheme is under implementation in all states/UTs for holistic growth of the horticulture sector covering fruits, vegetables, root and tuber crops, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo.

(iii) The 'National Food Security Mission (NFSM)' is under implementation in identified districts of 28 states and 2 UTs *viz.*, Ladakh and J&K of the country to increase the production and productivity of rice, wheat, pulses, coarse cereals and nutri-cereals (millets) through area expansion and productivity enhancement.

(iv) Under 'Sub-Mission on Plan Protection & Plant Quarantine', 'Farmer Field Schools (FFSs)' are conducted to educate farmers on various aspects of Integrated Pest Management.

(v) Four Farm Machinery Training & Testing Institutes (FMTTIs) located at Budni (Madhya Pradesh), Hisar (Haryana), Anantapur (Andhra Pradesh) and Biswanath Chariali (Assam) are engaged in imparting training to various categories of trainees including farmers in the field of farm mechanization in agriculture sector.

(vi) Indian Council of Agricultural Research (ICAR) has established a network of 729 Krishi Vigyan Kendras (KVKs) in the country mandated with 'Technology Assessment and Demonstration for its Application and Capacity Development'. KVKs organize demonstrations, training programmes and skill development programmes for the benefit of farmers and farm women, rural youth and in-service extension personnel.

EXPO 2020 Dubai

Additional Secretary, Ministry of Agriculture & Farmers Welfare, Dr. Abhilaksh Likhi inaugurated the 'Food, Agriculture and Livelihood' fortnight at the India Pavilion in EXPO 2020 Dubai on February 17th, 2022. The fortnight showcased India's prowess in sectors like food processing, horticulture, dairy, fisheries, and organic farming and the vast investment opportunities that it offers.

As part of India's efforts to showcase the country's investment-friendly policies and growth opportunities in agriculture and allied sectors at EXPO 2020 Dubai, Dr Abhilaksh Likhi invited startups and FPOs (Farmer Producer Organisations) to submit their proposals to the ministry, and assured them that they would be considered for providing equity grants, management costs, and other available support measures.

During the launch of the 'Millet' theme as part of the 'Food, Agriculture and Livelihood' fortnight at the sector floor at the India Pavilion, the delegation led by Dr Likhi unveiled the Millet Book comprising of nutritious and delightful recipes made using millets. The delegation also launched the first 'Millet food festival' during which the visitors relished the healthy and nutritious delicacies prepared using the millets.

The India Pavilion at EXPO 2020 hosted a seminar – 'India: Millets production and upscaling value chain'. Senior Government officials and sector experts deliberated on opportunities for Indian industry players producing and processing millets, to enhance the export potential of the country during the session.

To project the strength of India's organic agriculture and horticulture products in the global market, India Pavilion hosted a seminar "Indian Organic and Horticulture Sector–Moving Up the Value Chain". In his opening remarks, Shri P.K. Swain, Additional Secretary, Ministry of Agriculture & Farmers Welfare, said, "In 'Rising India', Agriculture is a dominant sector which contributes significantly to the Indian economy. With 15 agro-climatic zones, rich soil, mineral-rich water, and is driving the volume, variety, and quality. India is on its way to becoming the food basket of the world and is offering both food and nutritional security with good agricultural practices to the world."

Applauding the expansion of the sector in the country, Shri Swain said, "India is scripting history with the enchanting growth trajectory of organic horticulture." He also urged the global investors to invest in the agriculture supply chain and take advantage of FDI policies introduced by the Government in the sector.

The 'Food, Agriculture and Livelihood' fortnight will conclude on March 2nd, 2022.

'Meri Policy Mere Hath' - a doorstep distribution drive to deliver crop insurance policies to farmers

The Pradhan Mantri Fasal Bima Yojana (PMFBY) successfully entered its 7th year of implementation with the upcoming Kharif 2022 season, completing 6 years of its implementation since its launch announcement on 18th February, 2016. A flagship scheme of the Government of India, PMFBY aims to provide financial support to farmers suffering crop loss/damage arising out of natural calamities. Over 36 crore farmer applications have been insured under PMFBY, with over INR 1,07,059 crore of claims having already been paid under the scheme as of 4th February, 2022.

The scheme was revamped in 2020 enabling voluntary participation of the farmers. It also made it convenient for the farmer to report crop loss within 72 hours of the occurrence of any event - through Crop Insurance App, CSC Centre or the nearest agriculture officer, with claim benefit transferred electronically into the bank accounts of the eligible farmer.

Integration of land records with the PMFBY's National Crop Insurance Portal (NCIP), Crop Insurance mobile app for easy enrollment of farmers, remittance of farmer premium through NCIP, a subsidy release module and a claim release module through NCIP are some of the key features of the scheme.

Through its State/District Level Grievance Committee's, the scheme also enables farmers to submit their grievances at the grassroots level. This also includes acknowledging and resolving farmer grievances through IEC activities such as Crop Insurance Week which is celebrated twice bi-yearly, PMFBY Paathshaala, social media campaigns, a toll-free helpline and email communication.

The scheme has been able to provide financial assistance to the most vulnerable farmers, as around 85% of the farmers enrolled with the scheme are small and marginal. The recent announcement by Finance Minister of India Smt. Nirmala Sitharaman during her 2022-23 budget speech on the use of drones for crop insurance will further strengthen the integration of technology for smooth implementation of the scheme on the ground.

It is to be noted that the scheme will be launching a doorstep distribution drive to deliver crop insurance policies to the farmers 'Meri Policy Mere Hath' in all implementing states. The campaign aims to ensure all farmers are well aware and equipped with all information on their policies, land records, the process of claim and grievance redressal under PMFBY.

General Survey of Agriculture

Trend in Food Prices

The rate of inflation, based on monthly WPI, stood at 13.11% (Provisional) for the month of February, 2022 (over February, 2021) as compared to 4.83% during the corresponding period of last year.

Based on Wholesale Price Index (WPI) (2011-12=100), WPI of pulses, vegetables, fruits and cereals increased by 2.72 percent, 26.93 percent, 10.30 percent and 6.07 percent, respectively, in February, 2022 over corresponding period of last year.

Among cereals, WPI based rate of inflation for wheat increased by 11.03 percent whereas for paddy, it remained constant in February, 2022 over February, 2021.

The WPI for cereals and fruits increased by 0.36 percent and 3.77 percent, whereas for vegetables and pulses, it decreased by 9.99 percent and 0.29 percent, respectively, in February, 2022 over January, 2022.

Among cereals, WPI for wheat increased by 0.91 percent whereas for paddy it decreased by 0.74 percent in February, 2022 over January, 2022.

WPI food index (Weight 24.38%)

The Food Index consisting of 'Food Articles' from Primary Articles group and 'Food Product' from Manufactured Products group increased from 166.3 in January, 2022 to 166.4 in February, 2022. The rate of inflation based on WPI Food Index decreased from 9.55% in January, 2022 to 8.47% in February, 2022.

Rainfall and Reservoir Situation, Water Storage in Major Reservoirs

Cumulative Winter Season (January-February), 2022 rainfall for the country as a whole during the period 1st January, 2022 to 23rd February, 2022 has been 50% higher than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been higher than LPA by 82% in Central India, by 60% in South Peninsula, by 47% in East & North East India and by 43% in North-West India.

Out of 36 meteorological sub-divisions, 26 meteorological sub-divisions received large excess/excess rainfall, 02 meteorological sub-divisions received normal rainfall and 08 meteorological sub-divisions received deficient/ large deficient rainfall.

Current live storage in 140 reservoirs (as on 24th February, 2022) monitored by Central Water Commission having Total Live Capacity of 175.96 BCM was 101.21 BCM as against 91.37 BCM last year and 78.86 BCM of normal storage (average storage of last 10 years). Current year's storage is 111% of last year's storage and 128% of the normal storage.

As per 2nd Advance Estimates 2021-22, around 106.8% of the normal area under Rabi crops has been sown. During 2021-22, total area sown under Rabi crops in the country has been reported to be 664.20 lakh hectares as compared to 652.55 lakh hectares during 2020-21.

A statement indicating comparative position of area coverage during the current Rabi season 2021-2022 is given in the Annexure-I.

Annexure-I: All-India Crop Situation Rabi (2021-22) (2nd Adv. Est.)

(In lakh ha.)

Crop Name	Normal area for whole Rabi season	Area sown reported			Absolute change
		2nd Adv. Est. 2021-22	% of normal for whole season	Final Est. 2020-21	
Wheat	303.06	309.46	102.1	311.25	-1.79
Rice	42.51	52.02	122.4	54.11	-2.09
Jowar	31.75	23.84	75.1	27.36	-3.51
Maize	18.15	18.60	102.5	21.37	-2.77
Barley	6.14	6.77	110.3	5.93	0.85
Total Coarse Cereals	56.05	49.21	87.8	54.65	-5.44
Total Cereals	401.62	410.69	102.3	420.01	-9.32
Gram	95.66	107.46	112.3	99.96	7.50
Urad	9.07	9.39	103.5	9.30	0.09
Moong	9.98	13.12	131.5	13.08	0.04
Lentil	13.90	16.24	116.8	14.68	1.56
Others	18.06	17.24	95.4	16.51	0.72
Total Pulses	146.67	163.44	111.4	153.53	9.91
Total Foodgrains	548.29	574.13	104.7	573.53	0.60
Rapeseed& Mustard	61.55	78.72	127.9	67.00	11.72
Groundnut	7.05	7.29	103.4	8.44	-1.15
Safflower	0.90	0.59	65.7	0.56	0.03
Sunflower	1.86	1.36	73.2	1.27	0.09
Linseed	2.53	2.11	83.5	1.75	0.36
Total Oilseeds	**73.91**	**90.07**	**121.9**	**79.01**	**11.06**
All- Crops	**622.20**	**664.20**	**106.8**	**652.55**	**11.65**

Source: AS Division, DES.

Articles

Status and Utilisation Pattern of Farm Tractors in Punjab

SANGEET RANGUWAL[1] AND JATINDER SACHDEVA[2]

Abstract

Among different sources of mechanical farm power in Punjab, share of tractors has increased five folds to about 70 percent during 2019 from 14.85 percent in 1961. Keeping this in view, the present study was carried out to study the status of ownership and utilization pattern of tractors at farmers' level in Punjab. Based on data collected by personal interview method from 300 farm households from 30 tehsils spread across the three agro-climatic zones of the state, it was observed that only one-fourth of marginal farmers and 55 percent small farmers owned tractors. The farm power accessibility from tractors showed a positive trend with increase in farm size, while the per hectare power availability exhibited a reverse trend. Annual use of tractors was found more in Rabi season (58.86 %) as compared to Kharif season (41.14%). About 80 percent of the tractor use was made for productive purposes on own farms and rest about 20 percent for custom hiring. Among various farm operations, 52 percent share of owned tractor use was for preparatory tillage only, while for hired tractors it was harvesting and threshing (31%). The own tractor use was found to increase with farm size while that for hired tractor, it declined drastically. The average tractor use per hectare was 14.39 hours and was highest for cereal crops (12.80 hours/Ha) having a share of 77.29 percent. Farm-category wise, tractor use was the highest for marginal farmers (15.99 hours/Ha) and the lowest for large farmers (13.54 hours/Ha). Thus, there is a lot of potential for increasing the penetration of tractors especially for marginal and small farmers through custom hiring of tractors and therefore growing the market size as well as crop diversification opportunities.

Keywords: *Farm operations, ownership, power, tractor, utilization*

1. Introduction

Farm mechanization in agriculture is a catalytic instrument that can facilitate higher output and productivity by converting many erstwhile subsistence farmers working on small holdings using human and animal power into vibrant commercial farmers using mechanized sources of farm power. Despite attainment of remarkable achievements like self-sufficiency through adoption of improved inputs during the Green Revolution, the growing population and related constraints underline the need for a sustainable rise in per unit productivity from an existing piece of farm land and call for increased mechanization. Tractors have the biggest share of India's farm machinery market, contributing about 80 percent of the total farm machinery sold in the country. Domestic sales of tractors have increased from 3 lakh units in FY09 to 7.8 lakh units in FY19, registering a phenomenal CAGR of 10 percent (Industry Reports, 2019). India's farm equipment market is 7 percent of the global market, with more than 80 percent of the value contribution coming from tractors. The Indian tractor market is the largest globally and showed the best performance (+21%) in FY19. Accounting for almost one-third of the world's total tractor production, India is

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the largest tractor manufacturer globally. Further, Punjab is considered to be one of the most mechanized state in the country and accounts for about 11 percent of the total number of tractors in India.

Tractor forms the pivot of agricultural mechanization and the basis for utilization of other machines/equipment for various agricultural activities. Realistic data about the availability of tractors of different power and the types of different operations being carried out would yield patterns and trends on tractor machinery use enabling formulation of appropriate recommendations, which may lead to effective, meaningful and economic use of this costly agricultural input for better crop production in the state.

1.1 Objectives of the study

The present study was undertaken with an objective to explore the existing tractor distribution and utilization pattern for various farm operations carried out in different crops among diverse farm size categories.

2. Data sources and methodology

The cross-section data pertaining to the agricultural year 2018-19 were taken from the data collected under centrally sponsored 'Comprehensive scheme to study the cost of cultivation of principal crops in Punjab' scheme operating in the Department of Economics and Sociology, PAU. The data were collected from a sample of 300 farm households in 30 tehsils spread across the three agro-climatic zones of the Punjab state. From each zone, farmers were selected using three-stage stratified sampling technique with tehsil as stage one, a village/ cluster of villages as stage two and operational holdings within the clusters as stage three. From each cluster, a sample of ten operational holdings *i.e.* marginal (< 1 ha), small (1-2 ha), semi-medium (2-4 ha), medium (4-6 ha) and large (≥ 6 ha) were selected randomly. Requisite information related to availability of tractors, capacity and use for different farm operations in different crops was collected for different farm size groups.

Secondary data collected from published sources like different issues of Statistical Abstract of Punjab, Economic Survey of Punjab was compiled to study the existing tractor population, draught animal population, human labour and other sources of mechanical and electrical farm power over time in the state. Further, the data was analysed using averages, percentages and other tools like tables, charts and diagrams.

3. Results and discussion

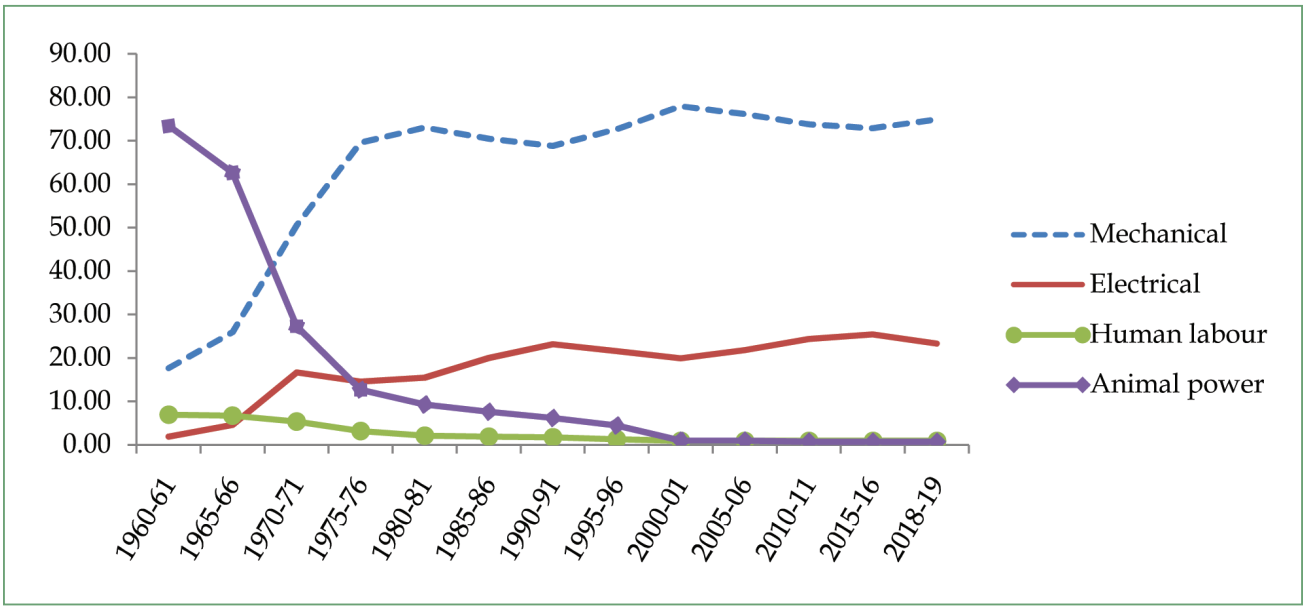
3.1 Sources of power on farm

The status of mechanization is used as a barometer for the state of rural economy in a country and is analyzed by the growth of mechanically power-operated farm equipments over traditional human and animal power operated equipments. With advent of Green Revolution, Punjab witnessed an apparent shift from traditional agriculture practices to more mechanized processes. The share of animal power in agriculture-related activities reduced drastically from 73.49 percent in 1961 to about 1.05 percent in 2000-01 and further to about 0.78 percent in 2018-19 (Fig. 1). Similarly, the share of human power declined from 6.98 percent in 1960-61 to mere 1.04 percent in 2018-19. At the same time, the contribution of mechanical and electrical sources has increased. The share of electrical energy has risen from 1.87 percent to 23.29 percent during 1960-2019 and that for mechanical energy from 17.67 percent in 1960 to about 74.90 percent in 2018-19.

Among different sources of mechanical farm power, tractors had a share of 14.85 percent during 1960-61 which increased five folds to 69.9 percent during 2018-19 (Fig. 2). Thus, the trend for tractor power at farm indicated a fast replacement of human and draught power in farm operations.

Punjab is home to nearly 4.50 lakh tractors *i.e.* about 11 percent of the tractors in the country. Presently, there is one tractor for every 9 hectare of net sown area (NSA), compared with the national average of one per 62 hectares (ha). With time, the area per tractor has reduced from 181.75 ha in 1970-71, to 35.28 ha in 1980-81 and further to 10.43 ha in 2000-01 and to 9.15 ha in Punjab.

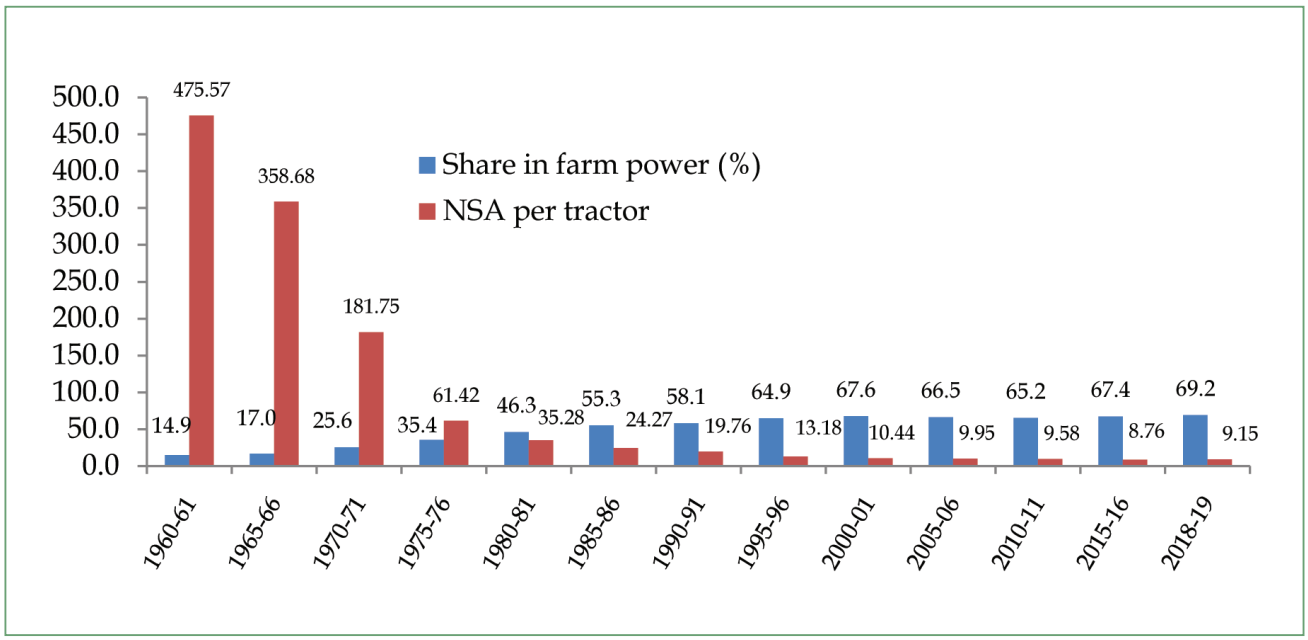
Figure 1: Different Sources of Farm Power in Punjab (% share)



Note: For converting various sources of farm power into comparable yardstick, it is assumed here that one human power is equal to 0.05 kW; one draught animal power equals 0.38 kW; one tractor equals 26.1 kW; one power tiller equals 5.6 kW; one electric motor equals 3.7 kW; and one diesel engine equals 5.6 kW. Among all these forms of farm power, tractors are the most powerful (Singh *et al*., 2014).

Source: Author's calculations using data from Statistical Abstract of Punjab, various issues; Census of India, 2011

Figure 2: Share of Tractors in Farm Power and NSA per Tractor



Source: Statistical Abstract of Punjab, various issues

Average use of tractors is just 450 hours in a year, less than half of the 1,000 hours required for it to be economically viable. Underutilization of farm machinery is leading to higher costs of production and lower net income to farmers, making it economically unviable (ENVIS, 2015). Thus a trend of overcapitalization in farm mechanization and its under utilization due to decreased farm size is there in Punjab's agriculture.

3.2 Distribution pattern of tractor population

In present study it was observed that about 85 percent of the respondents owned tractor (Table 1). Among different farm categories, only one-fourth of marginal farmers and 55 percent small farmers had own tractors. Similar trend has also been observed in other parts of the country as well like Haryana (Yadav and Lohan, 2006), Maharashtra (Shahare, 2012) and Uttar Pradesh (Singh and Indra, 2012). Further, about 93 percent of semi-medium category farmers had own tractors while medium and large category farmers possessed more than one tractor. This pattern of tractor ownership was observed for all the three zones of the state.

TABLE 1: FARM CATEGORY-WISE TRACTOR OWNERSHIP PATTERN AND AREA CULTIVATED

(Area in hectares/tractor)

Farm Category	Zone I	Zone II	Zone III	Overall
Marginal	2.03 (35.00)	5.90 (12.50)	2.18 (31.25)	2.86 (25.00)
Small	2.86 (60.00)	3.15 (50.00)	3.07 (56.25)	3.02 (55.00)
Semi-medium	4.08 (80.00)	3.16 (104.17)*	3.22 (93.75)	3.44 (93.33)
Medium	4.97 (133.33)*	4.04 (133.33)*	4.78 (106.25)*	4.49 (115.00)*
Large	6.64 (130.00)*	6.67 (129.17)*	5.99 (150.00)*	6.46 (135.00)*
Total	**4.76 (81.00)**	**4.57 (85.83)**	**4.45 (87.50)**	**4.60 (84.67)**

Note: Figure in parentheses indicate percent farmers having own tractor, *having more than one tractor

Source: Author's calculation using CCS data, DES

It is also found that the area cultivated by one tractor is about 5 ha which is observed to increase with the farm size. Similar results have been obtained for all the farm categories of the three zones of the state.

According to a study for Punjab state, the penetration of tractors is lower with the small and marginal farmers who own land less than 5 hectares (Chaba, 2020). This segment forms about 67 percent of the land holdings in the state (GoP, 2020). Thus, there is a lot of potential for increasing the penetration and therefore growing the market size.

3.2.1 Power range of tractors

At national level, 83 percent of the market share of tractors in India is represented by 30–50 HP tractors and there is a prevalence of 41-50 HP tractors across major states such as Maharashtra, Tamil Nadu, Punjab, Andhra Pradesh, Uttarakhand, West Bengal, Kerala, etc. (Gulait and Juneja, 2020).

Based on tractor power segmentation, it is observed that the average power/capacity available in the state was 43.46 HP and maximum farmers had tractor power availability of 41-50 HP and these belonged to semi-medium (41.07 HP), medium (44.33 HP) and large (48.96 HP) categories (Table 2). It may be mentioned here that for putting tractor mounted stubble management machines to effective use, tractors with 50 to 60 HP are required in the state (Chaba, 2020).

TABLE 2: FARM CATEGORY-WISE DISTRIBUTION OF TRACTORS ON BASIS OF AVAILABLE POWER OF TRACTORS

(in HP)

Farm Category/Zone	Zone I	Zone II	Zone III	Overall
Marginal	26.43	41.67	39.00	33.67
Small	33.67	39.25	36.89	36.58
Semi-medium	33.375	43.08	45.93	41.07
Medium	42.05	44.22	47.23	44.33
Large	47.19	48.03	52.13	48.96
Total	**39.39**	**44.37**	**46.71**	**43.46**

Source : Author's calculation using CCS data, DES.

It is also observed that contrary to the total power availability, the per hectare power availability exhibited a reverse trend (Table 3). On an average, 7.09 KW of farm power is available from tractors for each hectare of operated land. In all the three zones, same pattern of declining farm power with rising operational land is observed though with a range of 9.75 – 5.33 KW/ha in Zone I, and 13.39-6.53 KW/ha in Zone III for marginal and large farmers, respectively, except 10.21- 5.40 KW/ha for semi-medium to large in Zone II.

TABLE 3: FARM CATEGORY-WISE DISTRIBUTION OF FARM POWER FROM TRACTOR

Average power (KW/ha)

Farm Category	Zone I	Zone II	Zone III	Overall
Marginal	9.75	5.30	13.39	8.84
Small	8.82	9.36	9.02	9.08
Semi-medium	6.14	10.21	10.69	8.95
Medium	6.34	8.21	7.41	7.40
Large	5.33	5.40	6.53	5.69
Total	**6.20**	**7.30**	**7.87**	**7.09**

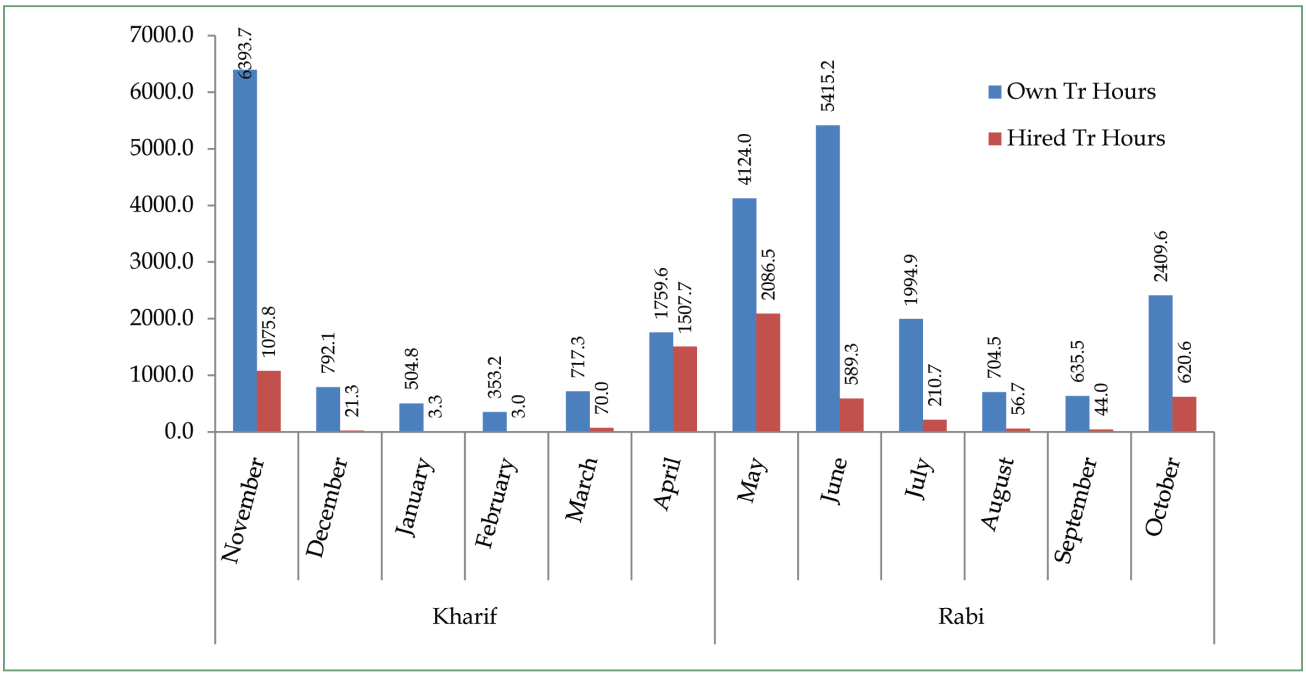
Source : Author's calculation using CCS data, DES

Similar results were obtained in earlier study (Allaie *et al.*, 2018) where the average tractor power availability per hectare of NSA was observed to be the highest for marginal farmers while it was the least for large farmers.

3.3 Utilisation pattern of tractors

Modern tractors are used for almost all the farming operations and accordingly the requirement of tractor is felt throughout the year. Annual use of tractors was found more (58.86%) in Rabi season because the farmers had suitable implements for different operations of Rabi crops. Similar results were found in a study for Haryana also (Yadav and Aggarwal, 2000). The maximum use of the tractor power was observed in month of November mainly because of its use for preparatory tillage for Rabi crops and on-farm transport activities (Fig. 3). Similarly during May and June, because of preparatory tillage and transport operations for the following Kharif crop, the high use of tractor was observed.

Figure 3: Month-wise On-farm Utilisation of Tractor

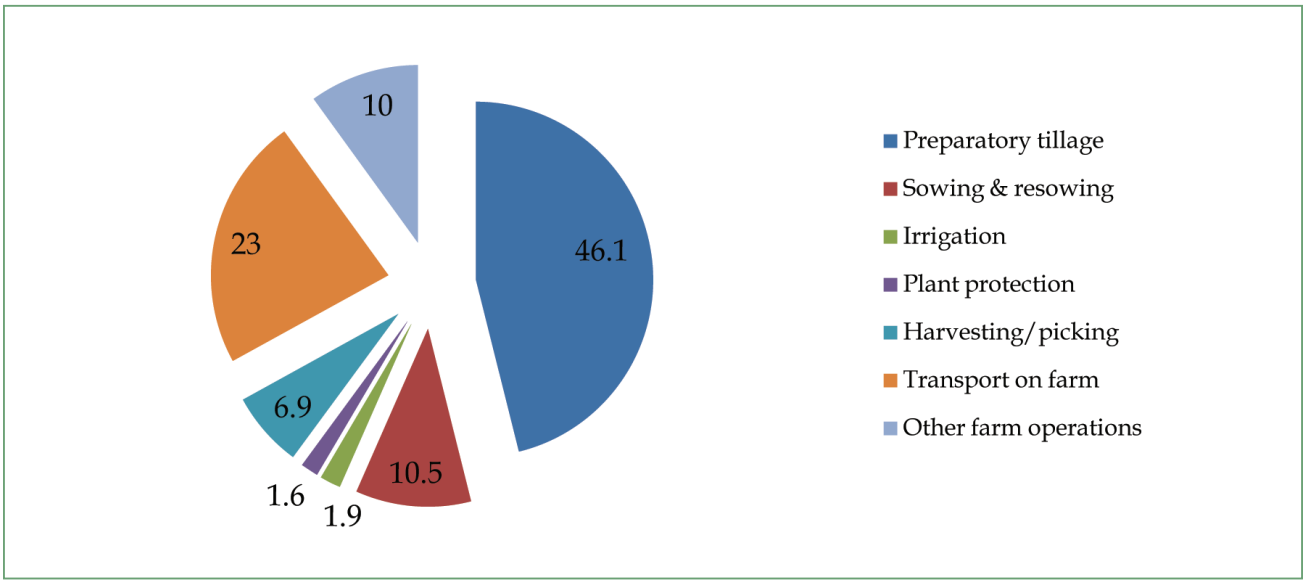


Source : Author's calculation using CCS data, DES

Present study also indicates that about 80 percent of the tractor use *i.e.* 25804.4 hours was made for productive purposes on own farms and rest 20 percent of the total use was there for providing custom hiring services. Another study for Punjab also found that more than 80 percent of tractor use was on own farms with rest 8.09 percent of its total use for custom hiring work and 6.60 percent of its use for social purposes (Singh and Jindal, 1993).

Farm operations-wise analysis indicates that about 46 percent utilisation of tractor is for preparatory tillage alone (Fig. 4) which is maximum during May-June and October-November months as during these months paddy and wheat crops occupying about 82.5 percent of the gross cropped area of the state are sown, respectively. Transport on-farm for transporting various inputs and outputs carried throughout the year occupy about 23 percent of tractor hours followed by sowing operation (11%). For all other operations, the tractor use is below 10 percent and is the least for paddy transplanting (0.002%) as mainly manual transplanting is practised in the state.

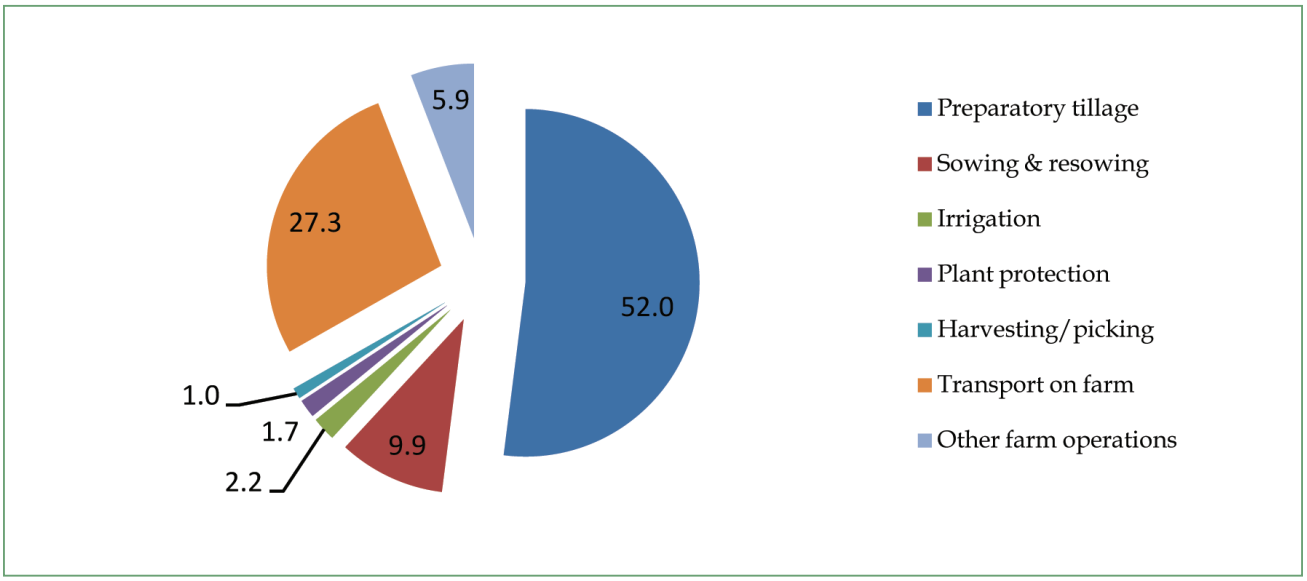
Figure 4: Utilisation of Tractor for Different Farm Operations (% share)



Source : Author's calculation using CCS data, DES

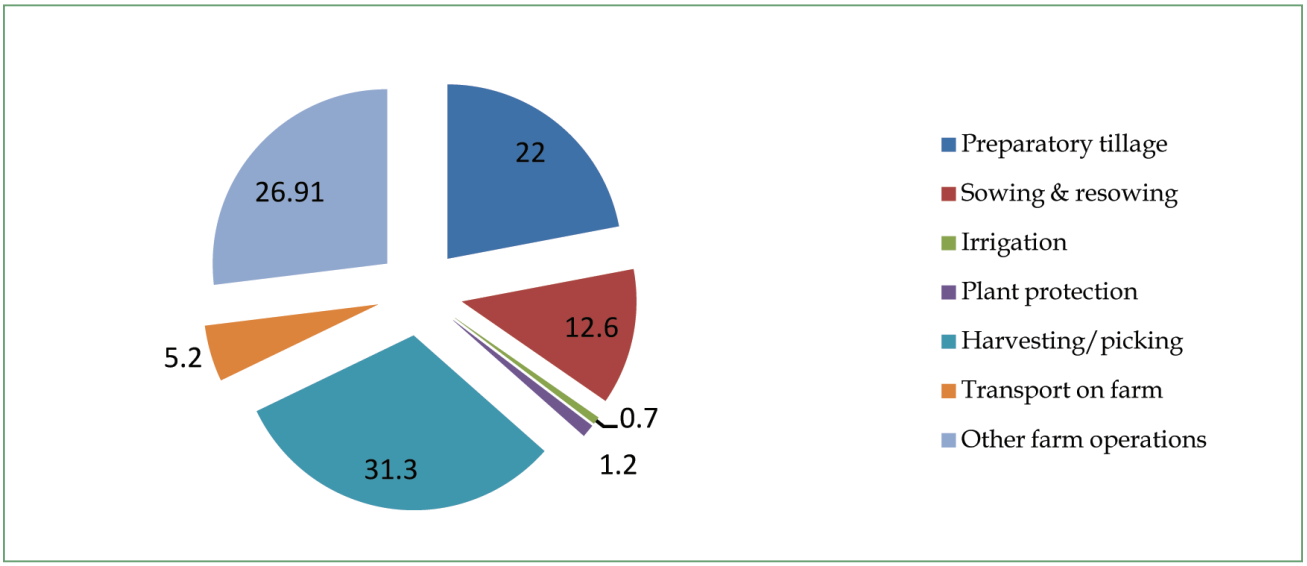
Similar kind of pattern for tractor use was observed in case of owned tractors. The respondents preferred own tractors for preparing the field for next crop. 52 percent share of own tractor use was occupied by the preparatory tillage only, followed by transport on farm (27.33%) and sowing operations (9.9%). For rest of the operations, the share in own tractor use remained below 3 percent (Fig. 5).

Figure 5. Utilisation of Owned Tractor for Different Farm Operations (% share)



Source : Author's calculation using CCS data, DES

Figure 6. Utilisation of Hired Tractor for Different Farm Operations (% share)



Source : Author's calculation using CCS data, DES

In the case of hired tractors, the major operation performed was harvesting, consuming about 31 percent share of total tractor use and this was so as the hired tractors were used mainly for cutting straw in wheat followed by paddy, potato and fodder crops (Fig. 6). Next crop operation in importance was preparatory tillage (22%) for which tractors were mostly hired by the marginal and small farm category for preparing the field. About 13 percent of tractor hours were also hired for sowing operations.

Landholding pattern and farm size are equally important factors while mechanizing farms (Bagal *et al.*, 2016). The smaller the land size, the more difficult it gets to mechanise. The average tractor use per hectare (ha) of cropped area is 14.39 hours for the state. Use of tractor on different farm size categories indicates that the average tractor use per hectare is the highest for marginal farmers (15.99 hours/ha) and the least for large farmers (13.54 hours/ha) (Table 4).

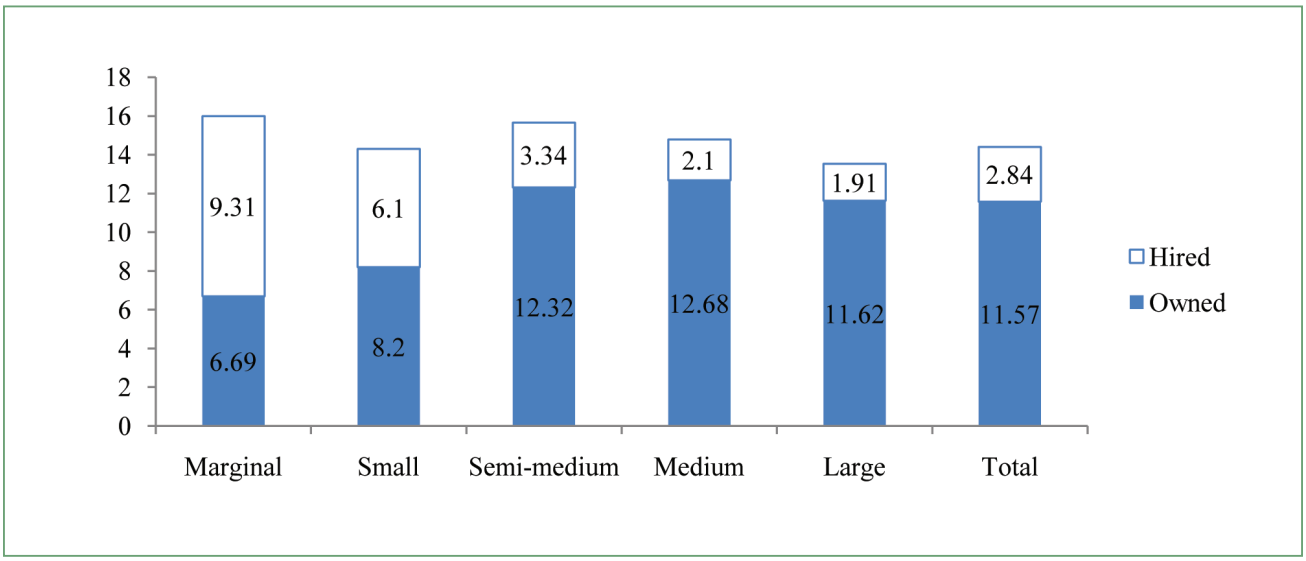
TABLE 4: FARM CATEGORY-WISE UTILISATION OF TRACTOR

(Hours per ha)

Farm Category/ Zone	I	II	III	O	I	II	III	O	I	II	III	O
	Owned				Hired				Total			
Marginal	13.93	1.16	6.34	6.69	9.50	10.08	7.65	9.31	23.44	11.24	13.99	15.99
Small	9.30	6.99	8.42	8.20	5.82	7.40	4.70	6.10	15.12	14.39	13.12	14.30
Semi-medium	14.49	12.09	9.80	12.32	3.78	2.83	3.58	3.34	18.27	14.93	13.38	15.65
Medium	15.43	11.63	11.05	12.68	2.28	1.98	2.06	2.10	17.71	13.61	13.11	14.78
Large	14.44	10.54	10.31	11.62	1.76	2.10	1.80	1.91	16.20	12.64	12.11	13.54
Total	**14.20**	**10.45**	**10.15**	**11.57**	**2.93**	**2.89**	**2.55**	**2.84**	**17.13**	**13.34**	**12.71**	**14.39**

Source : Author's calculation using CCS data, DES

Figure 7: Farm Category-wise Utilisation Pattern of Tractor (hours/Ha)



Source: Pictorial representation of data

It is also observed that the own tractor use increases with farm size (from 6.69 hours/ha for marginal to 11.62 hours/ha for large) (Fig. 7). For hired tractor, it declines drastically with the farm size (9.31 hours/ha for marginal to 1.91 hours/ha) because of preference of large farmers for own tractor use than hired ones.

4. Conclusions and suggestions

Tractors play a crucial role in the mechanization of Punjab agriculture. About 70 percent of the total farm power comes from tractors in the state. Continued shrinkage in average farm size in the state is making individual ownership of agricultural machinery progressively more uneconomical. The various problems faced by the farmers in this process such as uneven distribution of tractors, uniform cropping pattern in the area, social symbol attached to the ownership of tractors, etc. should be further probed into for their minimization.

The penetration of tractors is lower with the small and marginal farmers and this segment forms a major share of the land holdings in the state as well the country. Thus, there is a lot of potential for increasing the penetration of tractors through custom hiring and subsequently growing the market size as well as crop diversification opportunities.

There is a need to innovate custom service or a rental model by institutionalization for high cost farm machinery to reduce the cost of crop production and increase productivity and profitability towards increasing the farmers' income. The farm machinery banks may be established for the machines being manufactured elsewhere in the country to ensure timely availability on custom hiring basis. Financial assistance or procurement subsidy may be provided for the purchase of agriculture machinery and equipment on individual ownership or custom hiring basis.

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Growth and Variability in Export of Banana from India

S.S. BHOSALE[1], M.N. WAGHMARE[2], T. B. DEOKATE[3] AND J.S. KUMBHAR[4]

Abstract

India exported 1.95 lakh metric tonne banana valued at Rs. 660 crore in 2019-20. India's banana export is expected to continue its growth in terms of volume as well as value. The present study was conducted to know the growth and variability in export of banana from India with an objective to understand the direction and destination pattern of banana export. The production and export of banana from India has increased by more than ten times during the period of last 60 years. Bahrain is ranked first in banana import from India and is followed by Saudi Arabia, UAE and Nepal. The annual increase in export of banana from India to Iran, Bahrain, Oman, Saudi Arabia and UAE was relatively more. The biggest gainer among importers of Indian banana was Qatar. Banana exporters may be motivated by extending logistic support and by adopting approaches like value chain development through public private partnership projects for increasing the export of banana to UAE and Saudi Arabia and by diverting the export of banana from Bahrain and Nepal to high price paying countries like Kuwait and Qatar.

Keywords: *Banana, export, CAGR*

1. Introduction

India is the second largest producer of fruits in the world after China with a production of 81.2 million tonnes of fruits from an area of about 6.9 million hectares, with a per capita consumption of 85 grams per day. A large variety of fruits are grown in India of which banana, citrus, guava, grapes, pineapple and apple are the major ones. The major fruit growing states are Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh, Uttar Pradesh and Gujarat.

India is leading the world in the production of banana with 8.84 lakh hectares of land and a corresponding 308.08 lakh tonnes of production in the year 2018. Other major banana producing countries are Brazil, Tanzania, Philippines and China. India's banana export is expected to continue its growth this year in terms of volume as well as value. The latest figure shows an export of 1.95 lakh metric tonne banana valued at Rs. 660 crores in 2019-20. India is the world's leading producer of banana with a share of around 25 percent in total output. Andhra Pradesh, Gujarat, Tamil Nadu, Maharashtra, Kerala, Uttar Pradesh, Bihar and Madhya Pradesh contribute more than 70 percent of the country's banana production. Agricultural and Processed Food Products Export and Development Authority (APEDA) promotes exports of agricultural and processed food products by providing assistance to the exporters under various components of its scheme such as Infrastructure Development, Quality Development and Market Development. In addition, APEDA also conducts international buyer seller meets and virtual trade fairs with importing countries to promote agricultural and processed food products. The major importers of Indian bananas are the UAE, Saudi Arabia, Oman, Bahrain and Nepal.

Trade in fruits has become steadily more important over the last decade. The composition, volume and direction of this trade has changed as incomes and insistence on quality have grown on the demand side, while technology and trade agreements have influenced the supply side.

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It has been argued that India with its integration into the global markets through WTO could benefit substantially from international trade in fresh fruits. In order to take advantage of these opportunities, it is essential to analyze current export performance of fresh fruits. There are some evidences available in respect of export trends in fresh fruits, but not much information is available with respect to export competitiveness of major Indian fresh fruits, direction and magnitude of change in exports. In view of this, the present study entitled 'Growth and Variability in export of banana from India' is an attempt to understand the direction and destination pattern of export of banana from India.

1.1 Objectives of the study

1. To study the country-wise growth and variability in export of banana from India.

2. To study the direction of trade and destination pattern of export of banana from India.

2. Data sources and methodology

The secondary data on country-wise export of banana were obtained from Directorate General of Commerce, Industries and Statistics, Kolkata for the period from 1996-97 to 2019-2020.

2.1 Analysis of data

Compound growth rate

The compound growth rates in country-wise exported quantity of banana from India were worked out by using an exponential form of equation.

$$Y = ab^t$$

where,

Y = country-wise exported quantity of banana from India

a = Constant

b = Trend coefficient

t = Time period

Annual compound growth rate in percentage is calculated as,

CGR (%) = (Antilog of b - 1) x 100

Instability analysis

In order to study the variability in the time series data, coefficient of variation (CV) was used as an index of instability. Wherever the trend coefficients of the series were found significant, the variation around the trend rather than the variation around the mean (CV) was used to measure the instability as an index of instability.

$$CV = (SD/Mean)*100$$

where,

CV = Coefficient of Variation

SD = Standard deviation

Mean = $\Sigma X/N$

X = Country-wise exported quantity of banana from India

N = Number of years

Cuddy-Della Valle index attempts to de-trend CV by using coefficient of determination (R^2). Thus, it is a better measure to capture instability in agricultural production.

where,

CV = Coefficient of variation in percent

R^2 = Coefficient of determination from time trend regression adjusted by the number of degrees of freedom

3. Results and discussion

3.1 Area, production and productivity of banana in India

The information on area, production and productivity of banana in country as a whole during different time periods is presented in Table 1.

The area under banana was 1.65 lakh hectares, productivity was 13.67 tonnes/ha and production of banana was 22.57 lakh tonnes in India during 1960. In 2018, the area under banana was 8.84 lakh hectares, productivity was 34.85 tonnes/ha and production of banana was 308.08 lakh tonnes. The increase in area under banana was five times more during the period of 58 years and in case of production and productivity, it was ten and three times more than base period, respectively.

TABLE 1: AREA, PRODUCTION AND PRODUCTIVITY OF BANANA IN INDIA

Sr. No.	Year	Area ('000'ha)	Production ('000'MT)	Productivity (MT/ha)
1	1960	165.00	2257.00	13.67
2	1965	211.00	3271.00	15.50
3	1970	224.50	2896.80	12.90
4	1975	231.40	3409.00	14.73
5	1980	291.30	4354.00	14.94
6	1985	304.40	5389.80	17.70
7	1990	365.00	7153.00	19.59
8	1995	428.00	10182.00	23.78
9	2000	469.70	14137.30	30.09
10	2005	569.50	18887.80	33.16
11	2010	830.00	29780.00	35.87
12	2015	822.00	29221.00	35.54
13	2018	884.00	30808.00	34.85

Source: National Horticultural Board

3.2 Export of banana from India

India is leading banana producing country and ranked first in banana production in 2018. However, India is exporting banana in very small quantities.

3.2.1 Changes in export of banana from India

Table 2 depicts the change over base year in quantity and value of exported banana. India exported 11,512 tonnes of bananas in 1960 which increased to 1.95 lakh tonnes in 2020. The percent change in the quantity of banana exported was 1600.36 percent indicating an increase in the quantity of banana exported. The price fetched by the banana exported increased from Rs. 252/tonne to Rs. 33,640/tonne. Highest export of banana was noticed in the year 2020. However, the banana exported from India in the year 2015 fetched the highest price of Rs. 40,059/tonne.

TABLE 2: EXPORT OF BANANA FROM INDIA

Sr. No.	Year	Quantity (tonnes)	Value (Rs. Crores)	Price (Rs./tonne)
1	1960	11,512	0.29	252
2	1965	8,131	0.34	425
3	1970	7,087	0.35	498
4	1975	930	0.16	1,712
5	1980	36	0.02	4,803
6	1985	118	0.07	6,080
7	1990	290	0.06	2,172
8	1995	1,744	2.23	12,793
9	2000	8,629	18.02	20,879
10	2005	14,411	23.37	16,215
11	2010	60,813	114.53	18,834
12	2015	80,189	321.23	40,059
13	2020	1,95,746	658.57	33,640

Source: APEDA

3.2.2 Country-wise export of banana from India

The country-wise data on export of banana from India from the year 1997-98 to 2019-20 have been collected and shares of each country in import and price fetched are calculated and shown in Table 3.

India's banana export increased from 7017 tonnes (1997-98) to 1,95,745 tonnes (2019-20). Bahrain ranked first in banana import from India and accounted for 27.34 percent in total banana export from India. Saudi Arabia (27.25%), UAE (13.35%) and Nepal (11.41%) were the other major destinations for the export of Indian banana in 2019-20. These four countries accounts 79.35 percent share in total banana export from India. This indicates more concentred export during this period. Bulk of banana export from India to Bahrain, UAE, Nepal, Iran and Saudi Arabia has shown marked increase. Highest increase has been registered by UAE. However, the proportions of banana exports to Qatar and Kuwait have been declined. Saudi Arabia and Bahrain were major destinations for Indian banana in 1997-98, accounting to 20.09 percent and 8.80 percent share, respectively, which increased to 27.25 percent and 27.34 percent, respectively, in 2019-20.

TABLE 3: COUNTRY-WISE EXPORT OF BANANA FROM INDIA (1997-98 TO 2019-20)

(Quantity in metric tonnes)

Sr. No.	Country	1997-98	2001-02	2007-08	2012-13	2017-18	2019-20
1	UAE	27.14 (0.39)	2430.85 (28.19)	2288.42 (13.73)	14801.7 (29.6)	19073.18 (18.83)	26133.59 (13.35)
2	Saudi Arabia	1409.54 (20.09)	1216.45 (14.11)	1911.81 (11.47)	4403.46 (8.81)	14095.43 (13.91)	53347.91 (27.25)
3	Oman	79.36 (1.13)	641.95 (7.45)	683.49 (4.1)	3924.69 (7.85)	7918.01 (7.82)	9997.58 (5.11)

Sr. No.	Country	1997-98	2001-02	2007-08	2012-13	2017-18	2019-20
4	Nepal	134.56 (1.92)	186.3 (2.16)	4867.29 (29.21)	11206.14 (22.41)	18158.69 (17.92)	22343.45 (11.41)
5	Qatar	488.24 (6.96)	414.84 (4.81)	784.19 (4.71)	2809.15 (5.62)	6120.95 (6.04)	4057.6 (2.07)
6	Bahrain	617.81 (8.8)	484.66 (5.62)	1011.79 (6.07)	2566.36 (5.13)	20915.47 (20.64)	53523.45 (27.34)
7	Kuwait	274.89 (3.92)	513.3 (5.95)	916.21 (5.5)	2219.51 (4.44)	4601.17 (4.54)	3453.29 (1.76)
8	Iran	0.42 (0.01)	0.01 (0.00)	22 (0.13)	790.36 (1.58)	2067.58 (2.04)	2249.45 (1.15)
9	Maldives	50.67 (0.72)	205.47 (2.38)	830.14 (4.98)	644.59 (1.29)	1707.18 (1.69)	2149.99 (1.1)
10	Other	3934.35 (56.07)	2528.17 (29.32)	3347.68 (20.09)	6638.02 (13.27)	6656.71 (6.57)	18489.56 (9.45)
	India	**7017.00 (100.00)**	**8622.00 (100.00)**	**16663.00 (100.00)**	**50004.00 (100.00)**	**101314.37 (100.00)**	**195745.87 (100.00)**

Source: APEDA

3.2.3 Changes in export of banana from India

The percent changes in country-wise data on export of banana from India from the year 2009-10 and 2019-20 have been calculated and are shown in Table 4.

The export of banana from India increased by 260.36 percent and export price by 40.31 percent during 2009-10 to 2019-20. The increase in export of banana was observed relatively more in Bahrain, Saudi Arabia and Oman and it increased by 1751.73 percent, 466.56 percent and 405.69 percent, respectively, during the decade. The export of banana has shown a decline in Iran and Kuwait. The increase in price of exported banana from India to Nepal, Iran, Maldives, UAE and Kuwait has been by 594.97 percent, 137.32 percent, 124.26 percent, 110.67 percent and 101.81 percent, respectively. The decline in export price of banana was observed in Bahrain as highest increase in export to it was noticed during last ten years.

TABLE 4: CHANGES IN COUNTRY-WISE EXPORT OF BANANA FROM INDIA IN LAST DECADE

(Quantity in metric tonnes)

	2009-10			2019-20			Percent Change	
Country	Qty.	% share	Price/Kg	Qty.	% share	Price/Kg	Qty.	Price
UAE	18644	34.32	25.45	26133	13.35	53.61	40.17	110.67
Saudi Arabia	9416	17.33	25.77	53347	27.25	42.44	466.56	64.67
Oman	1977	3.64	26.62	9997	5.11	42.44	405.69	59.46
Nepal	6558	12.07	5.30	22343	11.41	36.80	240.68	594.97
Qatar	2684	4.94	31.42	4057	2.07	52.68	51.16	67.69
Bahrain	2890	5.32	37.04	53523	27.34	8.28	1751.73	-77.65
Kuwait	5551	10.22	29.11	3453	1.76	58.75	-37.80	101.81
Iran	5203	9.58	22.43	2249	1.15	53.22	-56.77	137.32

Country	2009-10			2019-20			Percent Change	
	Qty.	% share	Price/Kg	Qty.	% share	Price/Kg	Qty.	Price
Maldives	648	1.19	16.18	2149	1.10	36.29	231.78	124.26
Other	744	1.37	23.95	18489	9.45	33.35	2382.08	39.28
India	**54319**	**100.00**	**23.98**	**195745**	**100.00**	**33.64**	**260.36**	**40.31**

Source: APEDA

3.3 Growth rates in exported quantity of banana from India

The country-wise annual compound growth rates in exported quantity of banana, export value and price were estimated and results are shown in Table 5.

The country-wise analysis shows that export quantity, value and price increased significantly by 16.84 percent, 21.59 percent and 4.06 percent per annum, respectively, and all growth rates were found significantly positive with exception of export price of Bahrain during the entire period. The annual increase in export of banana in Iran, Bahrain, Oman, Saudi Arabia and UAE was relatively more than other countries during the study period. However, the price increase was found more in Nepal and it was followed by Iran, UAE and Oman.

TABLE 5: COUNTRY-WISE GROWTH RATES OF EXPORT OF BANANA FROM INDIA

(1996-97 to 2019-20)

Sr. No.	Countries	Export Quantity	Export Value	Export Price
1	UAE	19.23 ***	26.4 ***	6.01 ***
2	Saudi Arabia	19.53 ***	24.16 ***	3.88 ***
3	Oman	21.49 ***	27.66 ***	5.08 ***
4	Nepal	36.3 ***	51.96 ***	11.49 ***
5	Qatar	15.1 ***	21.05 ***	5.17 ***
6	Bahrain	23.77 ***	20.81 ***	-2.39 NS
7	Kuwait	15.79 ***	21.7 ***	5.1 ***
8	Iran	62.11 ***	72.37 ***	6.33 ***
9	Maldives	16.7 ***	21.45 ***	4.07 ***
10	Other	8.42 **	11.65 ***	2.98 **
	Total Export	**16.84** ***	**21.59** ***	**4.06** ***

*, **,*** = Significant at 10, 5 and 1 percent significance level

Source: Estimated by author

3.4 Variability in country-wise exported quantity of banana from India

The variability in country-wise export quantity, value and price of banana from India during the period of 24 years has been examined by using instability index and the details are depicted in Table 6.

The magnitudes of coefficient of variation in export quantity, value and price of banana from India were 104.97, 124.19 and 39.23 percent, respectively, during the study period. The maximum variability in export quantity, value and price of banana from India was noticed in Bahrain, Saudi Arabia and Nepal, respectively, by using coefficient of variation and Cuddy-Della Valle index.

Cuddy-Della Valle index attempts to de-trend the CV by using coefficient of determination (R^2). Thus, it is a better measure to capture instability in agricultural export. Also, coefficient of variation is usually used as index of variability. However, since time series data contain a trend component, it is better to use coefficient of variation around the trend instead of simple coefficient of variation. However, the magnitudes of Cuddy-Della Valle index are found less than coefficient of variation. This might be due to less volatility in export within short period of time. The moderate instability was shown by Cuddy-Della Valle indices.

TABLE 6: VARIABILITY IN COUNTRY-WISE EXPORT OF BANANA FROM INDIA (1996-97 TO 2019-20)

Country	Export quantity		Export Value		Export Price	
	CV (%)	Cuddy& Della	CV (%)	Cuddy& Della	CV (%)	Cuddy& Della
UAE	84.04	51.13	108.61	57.46	43.37	16.44
Saudi Arabia	149.12	66.57	173.72	68.08	34.82	20.28
Oman	122.06	42.33	145.26	51.14	41.97	22.83
Nepal	87.34	65.21	167.71	96.69	105.27	68.96
Qatar	113.17	55.14	128.02	52.21	42.07	20.20
Bahrain	174.88	82.38	128.79	44.83	55.79	53.49
Kuwait	88.02	39.88	101.88	36.50	45.96	27.83
Iran	145.99	99.02	120.34	78.35	53.85	36.97
Maldives	89.50	36.46	122.76	28.40	46.71	37.33
Other	127.61	111.51	150.18	119.08	46.19	41.70
India	**104.97**	**24.65**	**124.19**	**35.95**	**39.23**	**28.54**

Source: Estimated by author

4. Conclusions and suggestions

1. The production as well as export of banana from India has increased by more than ten times during the period of last 60 years because of productivity improvement from 13.67 to 34.85 metric tonnes per hectare.

2. Major destinations for the export of Indian banana are UAE, Saudi Arabia, Oman, Nepal, Qatar, Bahrain, Kuwait, Iran and Maldives. Bahrain ranked first in banana import from India followed by Saudi Arabia, UAE and Nepal. These four countries accounts 79.35 percent share in total banana export from India.

3. The annual increase in export of banana from India to Iran, Bahrain, Oman, Saudi Arabia and UAE is relatively more than other countries during the study period. However, the price increase is found more in Nepal and it is followed by Iran, UAE and Oman.

4. The maximum variability in export quantity, value and price of banana from India is noticed in Bahrain, Saudi Arabia and Nepal. Moderate instability is shown by Cuddy-Della Valle instability index.

5. Bahrain and Nepal were found most stable markets among the major importers studied for Indian banana. However, countries like Kuwait, UAE and Oman are as moderately stable. As regards the export value *i.e.* export earnings from banana, Nepal is most stable market and it is followed by UAE, Kuwait, Saudi Arabia and Oman. If price of exported banana is considered, Bahrain

is most stable market and it is followed by Nepal and Saudi Arabia.

6. The maximum gainer among importers of Indian banana is Qatar and it gained from Saudi Arabia, Oman, Bahrain and other countries.

Banana export from India to UAE and Saudi Arabia together was found 40 percent of total export and export price remains above the average export price of banana by Rs. 10/kg while banana export to Bahrain and Nepal together was 40 percent of total banana export and export price remains below the average export price of banana by Rs. 15/kg during last five years. It is recommended to motivate banana exporters by extending logistic support and adopting approaches like value chain development through public private partnership projects for increasing the export of banana to UAE and Saudi Arabia and divert the export of banana from Bahrain and Nepal to high price paying countries like Kuwait and Qatar.

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Agro-Economic Research
Market Imperfections and Farm Profitability in Gujarat

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Abstract

The economic feasibility of farming is the most important parameter for the development of agriculture and allied sectors which primarily depends on input costs, institutional framework and different government policies. Many studies have highlighted the grim situation of income from agriculture and that too unstable due to various reasons, while no study is found focusing on the market imperfection and farm profitability in India. In view of same, this study was undertaken to fill up this gap in literature and also for use in proper policy formulation towards doubling of farmers' income. The study was conducted in the state of Gujarat, covering 800 sample households from total sixteen villages of eight agro-climatic zones. The results indicate that farmers sold almost entire produce immediately after the harvest as they need credit for the next crop and that leads to serious constraints in handling and storage of produce for procurement agencies, particularly in rice and wheat. More than 98 percent of the selected households were unsatisfied with sale of crops due to lower rate than market, followed by delayed payments, deductions for loans borrowed, and faulty weighing and grading. About 99 percent of households reported that income generated from farming is not adequate. Thus, there is a need for an efficient marketing system, access to institutional credit and proper storage at village level, and diffusion of information and innovations on production technologies.

Keywords: *Farm profitability, agriculture income, market imperfection*

1. Introduction

India is still an agricultural economy where more than half of the population is dependent on agriculture. Though the share of agriculture in national income has been decreasing continuously, agriculture continues to be the largest source of employment and livelihood (NSSO, 2019). It provides employment to 54.9 percent of total workforce in the country (Census, 2011), raw material for a large number of industries and contributes 11.90 percent in national exports (2018-19) (GOI, 2020). Besides it is a significant, if not the sole, source of livelihood for the small land holders (<2 ha) who comprise about 86.07 percent of the total number of farm holders during 2015-16 (GOI, 2020). Thus, prosperity of the rural economy is closely linked to growth of agriculture and allied activities (Kalamkar, 2011; 2011a; 2011b).

Profitability is an important economic motivation to the farmers to take up sustainable agricultural practices. As farming in India is characterized by small and fragmented land holdings and high dependence on monsoon rains, operating small land holding is often unviable and thus, farming is not a profitable business or enterprise in India (NABARD, 2018). The economic viability of small and marginal farm depends on input costs, institutional framework and different government policies (like price policy, minimum support prices, etc.). In fact, agriculture sector is marked by large-scale disguised unemployment and unending uncertainties at every stage of farm operations resulting in lower income and agrarian distress in many parts of the country. Agrarian distress is not limited to rainfed areas but has also spread to progressive states like Punjab and Kerala where the new generation of farm households is no longer interested in farming. Therefore, agriculture needs to be made more profitable, attractive and enterprising so that the rural to urban migration is reduced and farmers take pride in their profession, which can only

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happen if bottlenecks are removed. Therefore, understanding of agricultural input and output market is essential for improving agricultural productivity and growth. Development of input and output market is important because farmers are not motivated to increase yield if they are unable to sell their produce. If this occurs, it defeats the objective of intensifying agricultural production as the majority of the population derives its livelihood from agriculture.

Recent efforts to improve farmers' income have been focused on raising Minimum Support Prices (MSPs). Historical evidence shows that MSP does not directly translate into higher income for farmers due to a deficient and ineffective implementation framework. Additionally, high MSPs result in market distortions and render Indian exports uncompetitive in world markets. Realising the need to pay special attention to the plight of farmers, Union Government changed the name of Ministry of Agriculture to Ministry of Agriculture and Farmers Welfare in 2015. Further, goal was set to double farmers' income by 2022-23 to promote farmers' welfare, reduce agrarian distress and bring parity between income of farmers and those working in non-agricultural professions (Chand, 2017). One of the important ways to achieve the GOI's goal of doubling the farmers' income by the year 2022 is through better price realisation for their harvest. This can be achieved through upgrading traditional agricultural produce market to electronic markets (Chand, 2016; Acharya *et al.*, 2012; Athawale, 2014; Reddy, 2016). The current policy focus on doubling farmers' income can also achieve its desired objectives only by improving and vastly redesigning the existing marketing system in the country (Sekhar and Bhatt, 2018). Many studies have highlighted the grim situation of income from agriculture and that too unstable due to various reasons, while no study is found focusing on the market imperfection and farm profitability in Gujarat. Therefore, present study was undertaken in Gujarat to fill up this gap in literature and also for use in proper policy formulation towards doubling of farmers' income.

1.1 Objectives of the study

1. To analyse the product markets (output) including price(s) received (market as well as MSP if any), marketing channels, market structure and bottlenecks;

2. To analyse the input markets including seeds, fertilizer, labour, etc. with particular attention to costs (of the inputs), market structure and problems in accessing the same;

3. To analyse the government support structure including access to credit;

4. To analyse the coping strategies of farmers during economic hardships and their social networks.

2. Data sources and methodology

The study is based on both secondary and primary level statistics. The secondary data were compiled from published sources and the primary data were collected from 800 sample households from total 16 villages of eight agro-climatic zones (ACZ) of Gujarat (Table 1). A multi-stage sampling method was adopted for the selection of sample households. From each ACZ, two villages were selected with sufficient geographic spread. Due care was also taken in selection of villages (not be contiguous in location). From each village, a total sample of 50 farmers was selected using stratified random sampling with PPS method (probability proportional to size) as per land size categories[1] *i.e.* marginal (<1 hectare), small (1-2 hectares), medium (2.1-4 hectares), large (4.1-10 hectares) and very large (>10 hectares). Due care was taken to have farmer household with irrigation, livestock and other related factors (farmer response, etc.) in the selection.

[1]The limitation faced during survey was that the households in the category of large (4.1-10 ha) and very large (>10 ha) were not available in some selected districts. In such cases, households from nearby category were interviewed

TABLE 1: AGRO-CLIMATIC ZONE-WISE SELECTED VILLAGES IN GUJARAT

Agro-Climatic Zones		District	Taluka	Village	Sample number
I	South Gujarat (Heavy Rain Area)	Navsari &Tapi	Khergam & Songadh	Vad & Kikakui	100
II	South Gujarat	Surat & Bharuch	Olpad & Jagadia	Khumbhari & Umalla	100
III	Middle Gujarat	Mahisagar	Khanpur & Balasinor	Limbadiya & Janod	100
IV	North Gujarat	Kheda		Heranj & Savali	100
V	North West Gujarat	Banaskantha	Tharad & Lakhani	Vasana-Vatam & Moti Pavad	100
VI	North Saurashtra	Bhavnagar & Botad	Mahuva & Botad	Otha & Shirvaniya	100
VII	South Saurashtra	Jamnagar	Dhrol & Jamnagar	Haripar & Theba	100
VIII	Bhal & Coastal Area	Ahmedabad	Dholka & Daskroi	Sahij & Vanch	100

Source: Field survey data

3. Results and discussion

3.1 Socio-Economic characteristics of sample households

The social group-wise classification of sample households indicate that at overall level, around 37 percent each of total households belong to General and other backward class group which together account for almost two-third of total selected households. The remaining households belong to Scheduled Caste and Scheduled Tribe population. Almost 70 percent of selected households belongs to marginal and small landholding size group (>2 ha) followed by almost two-fifth of total households from medium size landholder category (2-4 ha). Households from large size holders accounts for about 10 percent of total households of sample. Thus, as at state and national level, dominance of marginal and small holder group was prevalent in sample households also. The average size of landholdings of selected households was estimated to be 2.10 ha. Most of the landholding had irrigation facility except few parcels of large land holders group. More than two-fifth of total households owned milch buffaloes, around three-fifth of the households owned milch cows, and about 15 percent owned bullock. Except for few marginal households, none of the households possessed small ruminants like goats and sheep as well as a poultry farm. About 59 percent of total households had borewell as source of irrigation followed by about 25 percent households having tube wells. One-fourth of total households owned tractor while very few households had thresher. Due to high coverage of land area under irrigation, leased-out tendency was found to be very rare among selected households while leased-in activity was profound among very large land holders group which may be due to the availability of resources with this group as well as high risk bearing capacity.

At overall level, more than 94 percent of households had agriculture as a principal occupation (Table 2). Few of the households from the marginal and small land holders group were self-employed while few were in salaried employment as a principle occupation. The annual household income from various sources across the land holdings category indicate that majority of the income is from crop cultivation followed by income from wage labour. Income from wage labour was prominent source of income for marginal and small

land holders which confirms the NABARD 2018 survey results. It is rather more pertinent to note that more 96 percent of marginal land holders and 73 percent of small landholders were dependent on agriculture labour income which indicates non-remunerative crop cultivation.

TABLE 2: DETAILS ON SELECTED HOUSEHOLDS

Landholding categories	% to total number of HH	Total operational landholding (ha)	Cultivation Principal Occupation (%)	Social group (% to total HH)			
				Gen	OBC	SC	ST
Marginal (M)	39.38	0.61	90.48	26.35	40.32	17.14	16.19
Small (S)	29.88	1.49	94.98	37.66	38.49	9.21	14.64
Medium (MED)	19.50	2.90	98.72	50.00	31.41	6.41	12.18
Large (L)	9.50	5.96	100.00	55.26	27.63	6.58	10.53
Very Large (VL)	1.75	16.08	92.86	71.43	28.57	0.00	0.00
Total (T)	100.00	2.10	94.38	37.88	36.63	11.38	14.13

Source: Field survey data.

3.2 Crop output sale and input market

The crop-wise average area under different crops across the landholdings categories presented in Table 3 indicate that on an average, land covered under crop was relatively higher in case of tobacco growing farmers followed by sugarcane, groundnut and cotton growers. Across groups, marginal farmers covered maximum area under groundnut crop followed by tobacco, while all other preferred to cover maximum area under tobacco crop. In case of productivity (which is relative factor depends on the area under crop and related parameters), mixed trend was observed which was expected as the crops are specific to particular regions and while averaging at state level, high deviation among the yield level across landholding groups can be observed. Besides, one of the reasons for high deviation among these groups was that some of the farmers reported failure of crop during the agriculture year under study.

TABLE 3: AREA UNDER DIFFERENT CROPS AND YIELD LEVEL

Crop	Area (Average Area in ha)						Yield (kg/ha)
	Marginal	Small	Medium	Large	Very Large	Average	
Paddy	0.47	0.92	1.58	3.35	8.03	1.13	4484
Jowar	0.18	0.27	0.82			0.50	857
Bajra	0.54	0.94	1.16	2.28	4.77	1.17	1087
Maize	0.39	0.60	1.65	1.20		0.59	1314
Wheat	0.48	0.87	1.45	2.72	3.60	1.03	2554
Gram	0.16		1.56	0.85		0.62	697
Tur	0.35	0.46	0.86	1.83		0.61	450
Other pulses	0.10	0.57	0.64			0.35	439
Sugarcane	0.52	0.75	1.37	2.87	4.08	1.28	31491
Cumin seed		0.81	1.02	1.79	1.20	1.24	1050
Other Condiments & spices	0.15	0.20	1.13	1.60	3.00	0.90	1591
Mangoes	0.25	0.41	1.06	2.88		0.59	2751

Crop	Area (Average Area in ha)						Yield (kg/ha)
	Marginal	Small	Medium	Large	Very Large	Average	
Other fruits	0.56	0.93	0.93	1.14	3.20	1.05	5841
Onion		0.43	0.24	1.48	0.32	0.68	13191
Other vegetables	0.20	0.32	0.84	0.96		0.40	4814
Groundnut	0.60	0.69	1.12	1.91	4.12	1.14	1370
Castor seed	0.40	0.72	1.39	2.06		0.80	2011
Sesamum	0.28	0.65	1.01	1.48	5.50	1.00	646
Rapeseed & Mustard	0.48	0.98	1.37	2.01	3.70	1.10	1314
Cotton	0.59	1.07	1.78	3.66	9.43	1.88	1505
Tobacco	0.57	1.04	1.93	4.77	12.95	1.85	2456
Guar	0.40	0.69	0.61			0.62	1333
Other fodder crops	0.28	0.56	0.68	1.00	1.38	0.59	12607
Isabgol				1.00		1.00	240
Other non-food crops	0.40			0.48		0.44	7503

Source: Field survey data.

In case of sale of output, it was estimated that out of the total quantity produced, around 15 percent was reported unsold or kept at home and 85 percent of total produce was sold. Across land holding groups, lower the land holding size more the share of total produce retained at home trend was found which may be due to less marketable surplus with marginal and small land holder farmers. The majority of the portion of the quantity produced was sold during the first attempt only (96.5%) to local private trader followed by sale in nearby mandi (Table 4). More than 98 percent of the selected households reported unsatisfied (sale of crops) due to receipt of lower rate than market, delayed payments, deductions for loans borrowed and faulty weighing and grading system (Table 4).

TABLE 4: AGENCY THROUGH WHICH REPORTED CROPS WERE SOLD & REASONS FOR DISSATISFACTION

Landholding categories	Agency through which reported crops were sold (Percentage)							Reasons for dissatisfaction (Percentage)					
	Local Pvt	Mandi	Input dealers	Cooperative & Govt. Agency	Processor	Others	Total	Lower than Market Price	Delayed Payments	Deductions for Loans Borrowed	Faulty Weighing & Grading	Others	Total
First Disposal													
Marginal	67.5	17.9	1.9	6.9	4.8	0.0	99.0	100.0	99.1	100.0	100.0	100.0	99.3
Small	58.0	24.3	2.8	3.7	8.1	0.0	96.9	96.7	96.8	100.0	100.0	100.0	96.9
Medium	51.7	27.6	3.5	3.8	7.6	0.0	94.2	100.0	93.1	100.0	85.7	100.0	94.2
Large	51.9	30.4	2.2	2.8	5.5	0.6	93.4	100.0	91.8	100.0	100.0	-	93.4
Very Large	52.8	33.3	0.0	5.6	2.8	0.0	94.4	100.0	93.3	-	-	-	94.4
Total	**58.4**	**24.2**	**2.6**	**4.6**	**6.5**	**0.1**	**96.4**	**98.7**	**95.9**	**100.0**	**95.0**	**100.0**	**96.4**

Landholding categories	Agency through which reported crops were sold (Percentage)							Reasons for dissatisfaction (Percentage)					
	Local Pvt	Mandi	Input dealers	Cooperative & Govt. Agency	Processor	Others	Total	Lower than Market Price	Delayed Payments	Deductions for Loans Borrowed	Faulty Weighing & Grading	Others	Total
Second Disposal													
Marginal	0.0	0.7	0.0	0.0	0.2	0.0	1.0	0.0	0.9	0.0	0.0	0.0	0.7
Small	0.7	0.2	0.0	0.0	1.3	0.0	2.2	2.2	2.3	0.0	0.0	0.0	2.2
Medium	0.3	1.7	0.0	0.0	2.3	0.0	4.4	0.0	5.1	0.0	14.3	0.0	4.4
Large	1.7	2.2	0.0	0.0	1.7	0.0	5.5	0.0	6.8	0.0	0.0	-	5.5
Very Large	5.6	0.0	0.0	0.0	0.0	0.0	5.6	0.0	6.7	-	-	-	5.6
Total	**0.6**	**1.0**	**0.0**	**0.0**	**1.3**	**0.0**	**2.9**	**0.9**	**3.2**	**0.0**	**5.0**	**0.0**	**2.8**
Third Disposal													
Marginal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Small	0.0	0.2	0.0	0.0	0.7	0.0	0.9	1.1	0.9	0.0	0.0	0.0	0.9
Medium	0.0	0.0	0.0	0.0	1.5	0.0	1.5	0.0	1.8	0.0	0.0	0.0	1.5
Large	0.0	0.0	0.0	0.0	1.1	0.0	1.1	0.0	1.4	0.0	0.0	-	1.1
Very Large	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	0.0
Total	**0.0**	**0.1**	**0.0**	**0.0**	**0.7**	**0.0**	**0.8**	**0.4**	**0.9**	**0.0**	**0.0**	**0.0**	**0.8**
All													
Marginal	67.5	18.6	1.9	6.9	5.0	0.0	100	100	100	100	100	100	100
Small	58.6	24.7	2.8	3.7	10.1	0.0	100	100	100	100	100	100	100
Medium	52.0	29.4	3.5	3.8	11.3	0.0	100	100	100	100	100	100	100
Large	53.6	32.6	2.2	2.8	8.3	0.6	100	100	100	100	100	-	100
Very Large	58.3	33.3	0.0	5.6	2.8	0.0	100	100	100	-	-	-	100
Total	**59.0**	**25.3**	**2.6**	**4.6**	**8.5**	**0.1**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Field survey data.

As crop cultivation is shifting from subsistence to commercialised farming, use of off-farm inputs have increased to a large extent. In most of the cases, off-farm inputs are used on large scale which are purchased from the market or in few cases, borrowed from others (Table 5). Less than 10 percent of households used farm saved seed. The input dealer and the local private trader were two important sources for purchase of seed. The labours were mostly family members. The total expenditure incurred on purchase of inputs reported by the selected households is estimated to be higher in case of marginal farmer group and lowest in case of very large farm holdings group, which indicates that higher the land size lower the expenses on inputs. More than 85 percent of the selected households reported that price paid for the seed input was high and thus was not reasonable. The prices paid for off-farm inputs such as fertilisers, plant protection, diesel are reported to be high and very high while in case of manure, it was reported reasonable. The labour rate were reported at very high level. Thus, at overall level, all the inputs were categorised under high to very high cost/rate category and thus were not reasonable.

TABLE 5: DETAILS ON USE OF MAJOR INPUTS IN CROP PRODUCTION

(percent to total)

Farmers Groups	Seed used						Fertiliser						Plant protection chemicals						Irrigation					
	Farm Saved	Exchange	Purchase	Borrowed	Others	No Use	Farm Saved	Exchange	Purchase	Borrowed	Others	No Use	Farm Saved	Exchange	Purchase	Borrowed	Others	No Use	Farm	Exchange	Purchase	Borrowed	Others	No Use
Marginal	9.6	0.0	89.1	0.9	0.2	0.0	0.0	0.0	98.7	0.3	0.0	1.0	0.0	0.0	57.8	0.3	0.0	41.9	10.2	0.0	46.0	0.0	0.0	44.1
Small	8.3	0.0	95.1	0.2	0.0	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0	0.0	75.7	0.0	0.0	24.3	6.3	0.0	34.3	0.0	0.0	60.3
Medium	5.8	0.2	66.1	0.4	0.0	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0	0.0	89.1	0.0	0.0	10.9	7.7	0.0	19.9	0.0	0.0	73.7
Large	3.6	0.0	34.7	0.0	0.0	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0	0.0	93.4	0.0	0.0	6.6	5.3	0.0	18.4	0.0	0.0	77.6
Very Large	0.4	0.0	7.5	0.0	0.0	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0	0.0	100	0.0	0.0	0.0	0.0	0.0	21.4	0.0	0.0	78.6
Average	31.1	32.3	22.4	11.8	2.5	0.0	0.0	0.0	99.5	0.1	0.0	0.4	0.0	0.0	73.4	0.1	0.0	26.5	7.9	0.0	34.4	0.0	0.0	58.5

Note: 'No Use' are the households who have not used the particular input (*i.e.* out of total HH)
Source: Field survey data.

3.3 Sale of produce of animal husbandry and input market

In case of animal produce, more than 86 percent of total milk produced was sold in village, of which more than half of total produce was sold to local traders followed by more than one-third of total produce being directly sold to households in village in the first disposal itself (Table 6). The remaining produce was sold during second disposal to same agencies. The highest share of households of marginal group reported sale of milk to cooperative and government agencies during first disposal. The majority of produce disposal was mainly during first attempt only. Major reason for the dissatisfaction over sale of animal produce reported by sample households was realisation of lower price than market. Very few buyers and collusion of private buyers were the major reasons for the unreasonable prices received from the buyers.

TABLE 6: AGENCY THROUGH WHICH PRODUCE FROM ANIMAL HUSBANDRY WAS SOLD & REASONS FOR DISSATISFACTION

Land-holding Categories	Agency											
	Milk (Percentage of households)						Wool (Percentage of households)					
	Directly to other Household	Local Trader	Commission Agent	Cooperative & Govt Agency	Processor	Others	Directly to other Household	Local Trader	Commission Agent	Cooperative & Govt Agency	Processor	Others
First Disposal												
Marginal	2.96	8.89	0.00	80.00	3.70	0.00	0.0	100.0	0.0	0.0	0.0	0.0
Small	6.00	2.67	0.00	72.67	6.00	0.67	0.0	0.0	0.0	0.0	0.0	0.0
Medium	7.84	1.96	0.00	69.61	6.86	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Large	5.26	1.75	0.00	73.68	7.02	1.75	0.0	0.0	0.0	0.0	0.0	0.0
Very Large	11.11	0.00	0.00	66.67	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Total	**5.52**	**4.19**	**0.00**	**74.17**	**5.52**	**0.44**	**0.0**	**100.0**	**0.0**	**0.0**	**0.0**	**0.0**

Second Disposal												
Marginal	0.74	0.00	0.00	0.74	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Small	0.67	0.00	0.00	1.33	0.00	1.33	0.0	0.0	0.0	0.0	0.0	0.0
Medium	0.00	0.00	0.00	0.98	0.00	2.94	0.0	0.0	0.0	0.0	0.0	0.0
Large	0.00	0.00	0.00	3.51	1.75	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Very Large	0.00	0.00	0.00	0.00	11.11	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Total	**0.44**	**0.00**	**0.00**	**1.32**	**0.44**	**1.10**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total Disposal												
Marginal	3.70	8.89	0.00	80.74	3.70	0.00	0.0	100.0	0.0	0.0	0.0	0.0
Small	6.67	2.67	0.00	74.00	6.00	2.00	0.0	0.0	0.0	0.0	0.0	0.0
Medium	7.84	1.96	0.00	70.59	6.86	2.94	0.0	0.0	0.0	0.0	0.0	0.0
Large	5.26	1.75	0.00	77.19	8.77	1.75	0.0	0.0	0.0	0.0	0.0	0.0
Very Large	11.11	0.00	0.00	66.67	11.11	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Total	**5.96**	**4.19**	**0.00**	**75.50**	**5.96**	**1.55**	**0.0**	**100.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total Disposal												
Marginal	3.70	8.89	0.00	80.74	3.70	0.00	0.0	100.0	0.0	0.0	0.0	0.0
Small	6.67	2.67	0.00	74.00	6.00	2.00	0.0	0.0	0.0	0.0	0.0	0.0
Medium	7.84	1.96	0.00	70.59	6.86	2.94	0.0	0.0	0.0	0.0	0.0	0.0
Large	5.26	1.75	0.00	77.19	8.77	1.75	0.0	0.0	0.0	0.0	0.0	0.0
Very Large	11.11	0.00	0.00	66.67	11.11	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Total	**5.96**	**4.19**	**0.00**	**75.50**	**5.96**	**1.55**	**0.0**	**100.0**	**0.0**	**0.0**	**0.0**	**0.0**

Land-holding Categories	**Reasons for dissatisfaction**						**Reasons for unreasonable prices received**					
	Lower than Market Price	**Delayed Payments**	**Deductions for Loans Borrowed**	**Faulty Weighing and Grading**	**Other**		**Very Few Buyers**	**No Govt. Purchase**	**Pvt Buyers Collude**	**No Minimum Price**	**All of the Above**	**Others**
Marginal	47.4	0.0	0.0	0.0	0.0		34.1	0.0	31.0	2.3	14.0	0.0
Small	55.3	3.3	0.0	0.0	0.0		22.0	0.8	18.2	3.0	40.9	0.0
Medium	58.8	1.0	0.0	0.0	1.0		27.3	2.3	25.0	3.4	38.6	0.0
Large	50.9	0.0	0.0	0.0	0.0		19.6	0.0	15.7	0.0	33.3	0.0
Very Large	55.6	0.0	0.0	0.0	11.1		14.3	0.0	14.3	0.0	57.1	0.0
Total	**53.2**	**1.3**	**0.0**	**0.0**	**0.4**		**26.5**	**0.7**	**23.3**	**2.5**	**31.2**	**0.0**

Source: Field survey data.

Private input dealer followed by cooperative and government agency were major input procurement stations for cattle and buffalo farmers while for small ruminants, inputs were taken from own farm. The expenses incurred for the purchase of inputs related to animal husbandry showed that expenditure per households for rearing the livestock was reported the lowest by the medium land holders followed by small and large landholding groups. As such, one cannot compare it as per landholding group as possession of livestock is different across the groups.

3.4 Labour use

In case of labour use, on an average, five family members along with two farm servants were employed for farming and livestock operations. The average number of hours worked by each of the worker either from any category was around 6-7 hours per day. The average wage rate paid to farm servant were worked out to be Rs. 220 per day for male and Rs. 180 per day for female, while in case of casual labour, wage rate was same in both cases (Rs. 196 per day). Almost two-third of selected households opined that wage rate paid was high while one-third of total households reported same as very high. Thus, altogether more than 88 percent of households have reported high wages rates for labour. Limited labour supply in study area was the main reason for same. The availability of work under MGNREGA as well as control of labour contractor on labour supply has created wage rate hike in the study area. Most of the engagement of wage labour was up to nine months in a year and the wage rate prevailing for farm and MGNREGA work was reported to be Rs. 266 per day and Rs. 185 per day, respectively.

3.5 Credit market

More than half of the total households had taken some kind of loan. It is very surprising to note that all the farmers from very large farm holding group had borrowed money and the lowest ratio was reported in case of marginal land holder group. Thus, incidence of loan increases with the land holding size. The major sources of the money borrowing by the sample households were formal agencies such as government bank and cooperative society. On an average, Rs. 191885 was borrowed to meet capital expenditure in farm business and to meet day to day working expenditure in farm business. The average rate of interest charged by the formal lending agencies such as banks, cooperative society and SHGs ranged between 6.2 to 7.1 percent per year. It was very strange to note that input dealers and commission agents were also lending loan at lower rate of interest of 7.1 percent as compared to very high rate of 24 percent charged by the private money lenders. About two-third of total households had repaid the loans. The reasons cited for non-repayments were payment would be done after harvesting, due to medical expenses, income is less than the expectation and expecting the loan waiver.

3.6 Sources of information, awareness of MSP and benefits of schemes availed

Newspaper/radio/television followed by nearby progressive farmer and gram sevak as well as extension officer of the respective area were the sources of information for selected households (Table 7). Higher the land size, more was the access to sources of technical advice. The need-based contact was the major reason in most of the cases. The advice given by the Krishi Vigyan Kendra and private commercial agents was adopted on cent percent basis, while adoption of advice given by the veterinary department was at lower side than other sources. The major reasons for non-adoption of technical advice received were mostly lack of technical advice follow up and lack of financial resources. Majority of households reported that advice was useful. The intensity of usefulness was highest in case of advice received from agricultural university or college while same was lowest in case of progressive farmers. The impact of adoption of advice was reported beneficial (put together moderately beneficial and beneficial) in all cases. None of the advice was reported harmful.

It has been cited by many reports that awareness among farmers about the minimum support prices declared by the Government of India is very poor. It was observed in present study that hardly 38 percent of selected farmer households were aware about the MSP. Of those who were aware, majority did not knew about the procurement agencies for the crop. Across the land groups, hardly one-fourth of the marginal famers were aware about the MSP while more than one half of the large farmers were aware about the same. Very few households reported the sale of produce to agencies nominated by the Government. Sale of produce being highest in case of very large farmers group may be due to their approach and more marketable surplus. The crops sold at MSP to stipulated agency were groundnut, rapeseed and mustard, and cotton and the rate received by them was equal or higher than MSP. None of the farmer reported receipt of deficiency payment

under BBY or PM AASHA which indicates the poor reach and coverage under these schemes. Under the PM KISAN scheme of the Government of India, around 78 percent of selected farmers received assistance which took almost 5-6 months to realise the same in their account.

TABLE 7: SOURCES OF TECHNICAL ADVICE ACCESSED FOR CROPS GROWN

(percentage)

Land-holding categories	Sources of Technical Advice accessed for Crops grown								Awareness of MSP
	Extension agents/ Gram Sevak	Krishi Vigyan Kendra	Agri. University/ college	Pvt. Commercial agents	Progressive farmer	Radio/Tv/ Newspaper/internet	Veterinary dept.	NGO	
Marginal	16.5	1.0	4.1	8.9	23.8	37.8	0.6	1.9	25.4
Small	23.0	1.7	3.3	25.1	41.8	54.0	0.4	4.6	35.9
Medium	35.9	3.8	7.7	35.9	52.6	58.3	1.3	9.0	49
Large	52.6	3.9	14.5	39.5	56.6	65.8	1.3	6.6	53.9
Very large	71.4	0.0	21.4	64.3	78.6	85.7	0.0	28.6	50
Total	**26.6**	**2.0**	**5.9**	**22.9**	**38.9**	**50.1**	**0.8**	**5.0**	**38**

Source: Field survey data.

3.7 Crop loss and insurance

Most of the sample households reported that their crops were insured as they had taken loan from bank, while they were not aware about the amount of premium deducted from their loan amount towards insurance of their crop. Around 36 percent of sample households mentioned that their crop was insured. As expected, mostly medium to very large land holder farmers were eligible for more loan as per their land availability and thus the coverage under insurance scheme was reported higher in those cases only. In fact, large land holder farmers have more risk averting capacity than marginal and small famers, while coverage of insurance was the lowest for this vulnerable group of farmers. This is serious concern for doubling the farmer's income as appealed and targeted by the Government.

More than two-third of the selected households put together were either not aware or not interested about the crop insurance (Table 8). More than half of the selected households reported crop loss that to cent percent in case of large farmer group which was very strange to note. The major cause of crop loss was inadequate rainfall/drought like situation during the agriculture year under study. Those who have reported crop loss and had taken insurance reported that about 86 percent of households did not receive claim amount, while 9.2 percent received after some time (delayed) and remaining received amount in time (Table 9). Thus, hardly 14 percent of claims were settled by insurance company. The claim amount received varies from crop to crop and group to group. On an average, total claim amount received was estimated to be Rs. 28457/- per household.

TABLE 8: GROUP-WISE REASONS FOR NOT INSURING THE REPORTED CROP

(Percentage of households)

Land-holding Categories	Not Aware	Not Aware About the Availability of Facility	Not Interested	No Need	Insurance Facility Not Available	Lack of Resources for Premium Payment	Not Satisfied with Terms & Conditions	Nearest Bank at a Long Distance	Complex Procedures	Delay in Claim Payment	Others
Marginal	44.7	26.1	13.5	2.9	3.1	0.0	0.0	0.4	0.0	2.5	6.7
Small	36.0	40.3	8.6	1.4	5.1	0.0	0.0	0.0	0.0	2.9	5.7
Medium	32.2	30.8	15.4	1.4	12.1	0.0	0.5	0.0	0.0	3.7	3.7
Large	25.4	45.6	13.2	4.4	7.0	0.0	1.8	0.0	0.0	0.9	1.8
Very Large	57.1	9.5	14.3	4.8	14.3	0.0	0.0	0.0	0.0	0.0	0.0
Total	**38.0**	**33.0**	**12.3**	**2.4**	**6.0**	**0.0**	**0.3**	**0.2**	**0.0**	**2.6**	**5.2**

Source: Field survey data.

TABLE 9: WHETHER EXPERIENCED CROP LOSS BY THE LAND HOLDING CATEGORIES

Landholding Categories	% of HH reported cross loss (out of total sample HH)	Whether claim amount was received		
		Received in Time	Received but Delayed	Not Received
Marginal	28.6	1.1	13.3	85.6
Small	51.0	5.7	8.2	86.1
Medium	71.8	5.4	5.4	89.3
Large	82.9	7.9	9.5	82.5
Very Large	100.0	6.3	18.8	75.0
Total	**50.4**	**5.0**	**9.2**	**85.9**

Source: Field survey data.

3.8 Problems in Farming

There were various types of problems encountered by the farmer households while performing various operations on field as well as in marketing of produce. The cumulative impact of same has been seen in terms of income generated from crop cultivation keeping in view cost on crop cultivation. About 99 percent of households reported that income generated from farming is not adequate (Table 10). All the households from marginal group have reported the same. The five major reasons for inadequate income from agriculture reported are problem of pest/diseases; nuisance of animals; insufficient irrigation; non-remunerative prices and labour shortage. The small size of holding is one of the major problems for marginal farmers which make farming uneconomical. The economic risks faced reported by the sample households were lack of finance/capital, lack of access to inputs, sharp fluctuations in input prices, sharp fluctuations in output prices, lack of demand/inability to sell agricultural products, lack of demand/inability to sell non-agri products and seasonal unemployment. Sample households have adopted coping strategies such as borrowed money from friends/relatives, worked as wage labour in the village, borrowed money from bank, borrowed money from moneylenders, reduced household consumption expenditure, deferred social & family functions and started petty business/shops. Specifically, majority of marginal and small farmer households had to work as wage labour in the village as well as they have borrowed loan from friend/relatives to cope up with economic risk faced.

TABLE 10: WHETHER INCOME FROM FARMING IS ADEQUATE

Landholding Categories	Percentage of Households	
	Yes	No
Marginal	0.0	100.0
Small	1.3	98.7
Medium	1.3	98.7
Large	3.9	96.1
Very Large	0.0	100.0
Total	**1.0**	**99.0**

Source: Field survey data.

4. Conclusions and policy implications

The study found that on an average, marketed surplus was 85 percent of crop produced and majority of the portion of the quantity produced was sold during the first attempt (96.5%) to local private trader mostly at lower rate than market price. This indicates that farmers prefer to sell the produce to local trader to meet the need of requirement of next crop cultivation and home expenditures. Therefore, access to institutional credit and proper storage at village level will play an important role in increasing marketable surplus and reduce distress sale. In most of the cases, off-farm inputs are used on large scale which were purchased from the market or in few cases were borrowed from others. Therefore, there is a need to ensure timely availability of adequate quantity of quality seed and fertiliser and other inputs at reasonable price. More than half of the total households had taken some kind of loan. The reasons to borrow loan are to meet capital expenditure and day to day working expenditure in farm business. It is therefore needed to narrow the gap in financial inclusion for farmers.

Market information and extension services play a significant role in increasing productivity and market participation of small farmers. The major sources of information for selected households are newspaper/radio/television followed by nearby progressive farmer and gram sevak as well as extension officer of the respective area. More than two-third of the selected households put together are either not aware or not interested about the crop insurance which once again highlights the poor reach of crop insurance scheme. Hardly 38 percent of selected farmer households were aware about the MSP and majority of them were not aware about the procurement agencies for the crops. Hence, there is a need to strengthen dissemination of market intelligence/information so that farmers can make appropriate decision.

At overall level, more than 98 percent of the selected households reported as being unsatisfied with sale of crops due to lower rate than market, followed by delayed payments, deductions for loans borrowed and faulty weighing and grading. Thus, there is a need for efficient marketing system and diffusion of information and innovations on production technologies. About 99 percent of households reported that income generated from farming is not adequate with the major reasons being problem of pest/diseases; nuisance of animals; insufficient irrigation; non remunerative prices and labour shortage. Small and marginal farmers are forced to sell their produce just after harvest at lower prices. Sometimes farmers may want to sell it later when prices are higher but feel constrained by, among other things, lack of storage facilities and access to credit. Therefore, a competitive market combined with storage facilities can ensure better prices to small farmers by allowing them to have greater flexibility in the timing and location of their sales.

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Commodity Review

Foodgrains

Procurement of Rice

The total procurement of rice during Kharif Marketing Season 2021-22 up to 28.02.2022 is 47.47 million tonnes as against 44.62 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 2021-22 (up to 28.02.2022) and the corresponding period of last year is given in figure 1. The percentage share of different states in procurement of rice has been given in figure 2.

TABLE 1: PROCUREMENT OF RICE IN MAJOR STATES

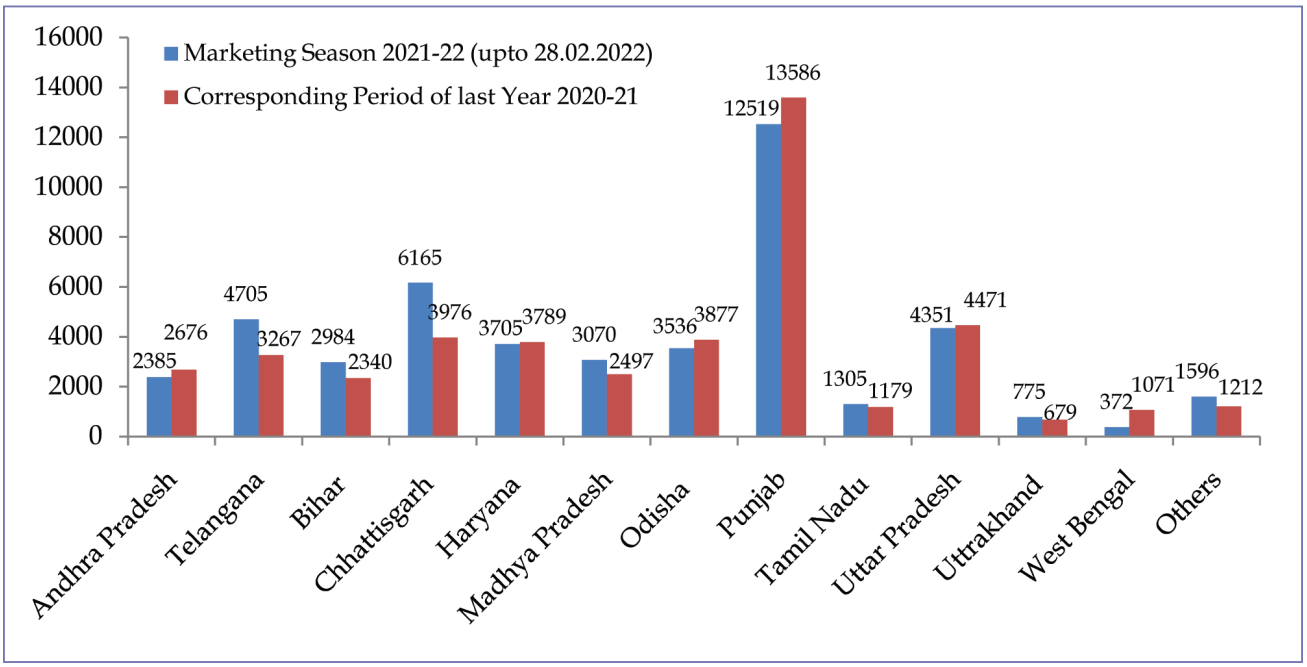
(In thousand tonnes)

State	Marketing Season 2021-22 (upto 28.02.2022)		Corresponding Period of last Year 2020-21	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Andhra Pradesh	2385	5.0	2676	6.0
Telangana	4705	9.9	3267	7.3
Bihar	2984	6.3	2340	5.2
Chhattisgarh	6165	13.0	3976	8.9
Haryana	3705	7.8	3789	8.5
Madhya Pradesh	3070	6.5	2497	5.6
Odisha	3536	7.4	3877	8.7
Punjab	12519	26.4	13586	30.4
Tamilnadu	1305	2.7	1179	2.6
Uttar Pradesh	4351	9.2	4471	10.0
Uttrakhand	775	1.6	679	1.5
West Bengal	372	0.8	1071	2.4
Others	1596	3.4	1212	2.7
All India Total	47468	100	44620	100

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

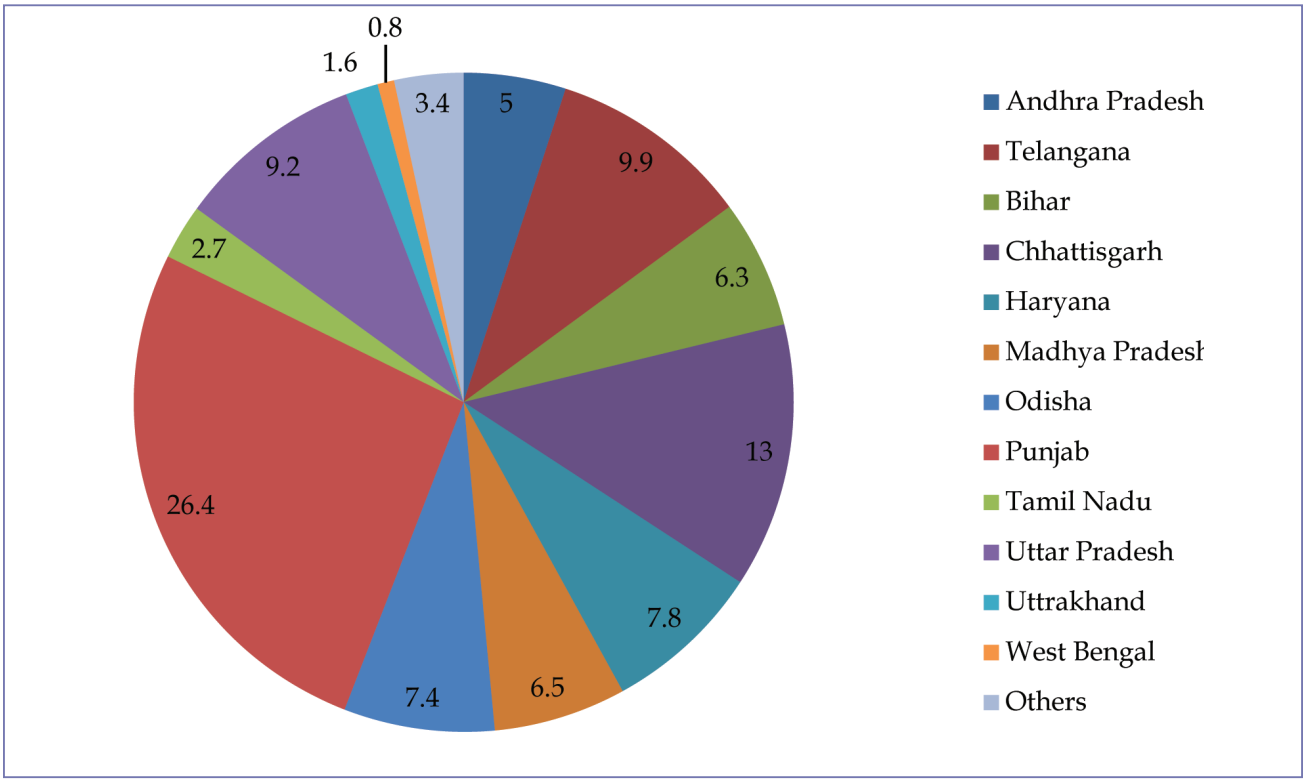
Figure 1: Procurement of Rice in major States

(In thousand tonnes)



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

Figure 2: Percentage Share of Different States in Procurement of Rice during Marketing Season 2021-22(up to 28.02.2022)



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

Procurement of wheat

The total procurement of wheat during Rabi Marketing Season 2021-22 up to 18.08.2021 is 43.34 million tonnes as against 38.99 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 2021-22 (up to 18.08.2021) with the corresponding period of last year. The percentage share of different states in procurement of wheat has been given in figure 4.

TABLE 2: Procurement of Wheat in major States

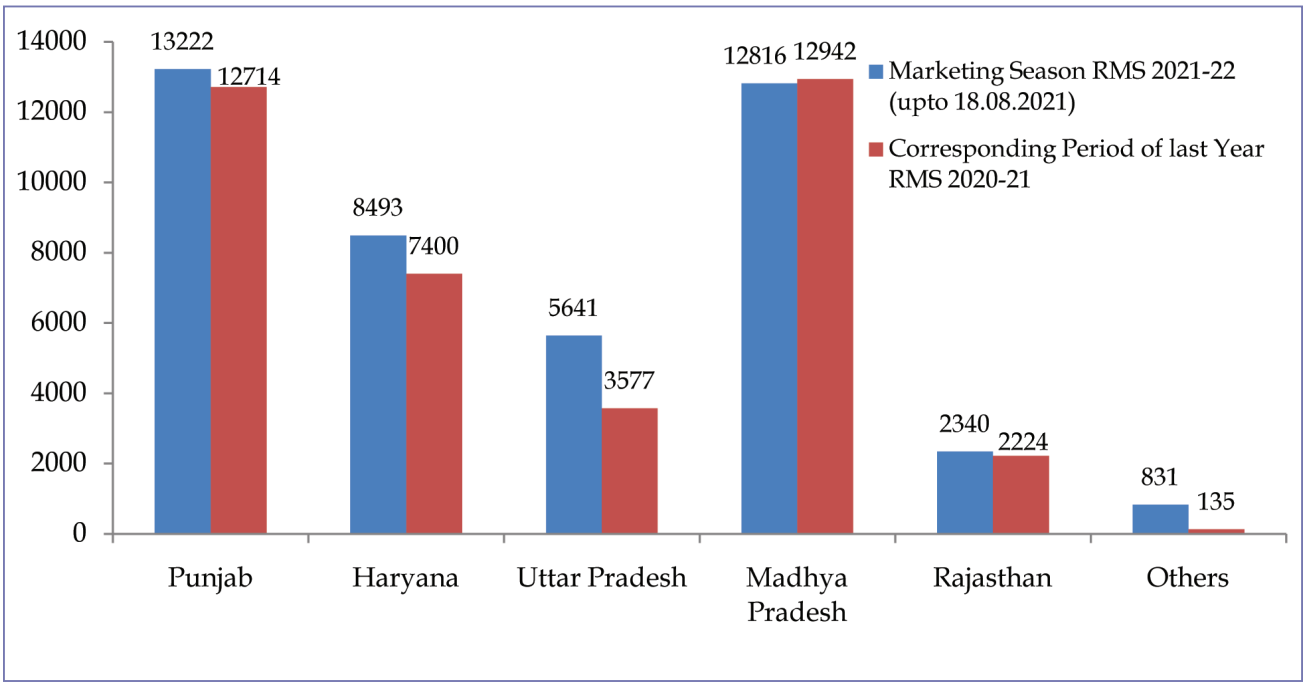
(In thousand tonnes)

State	Marketing Season RMS 2021-22 (upto 18.08.2021)		Corresponding Period of last Year RMS 2020-21	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Punjab	13222	30.5	12714	32.6
Haryana	8493	19.6	7400	19.0
Uttar Pradesh	5641	13.0	3577	9.2
Madhya Pradesh	12816	29.6	12942	33.2
Rajasthan	2340	5.4	2224	5.7
Others	831	1.9	135	0.3
All India	43343	100.0	38992	100.0

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

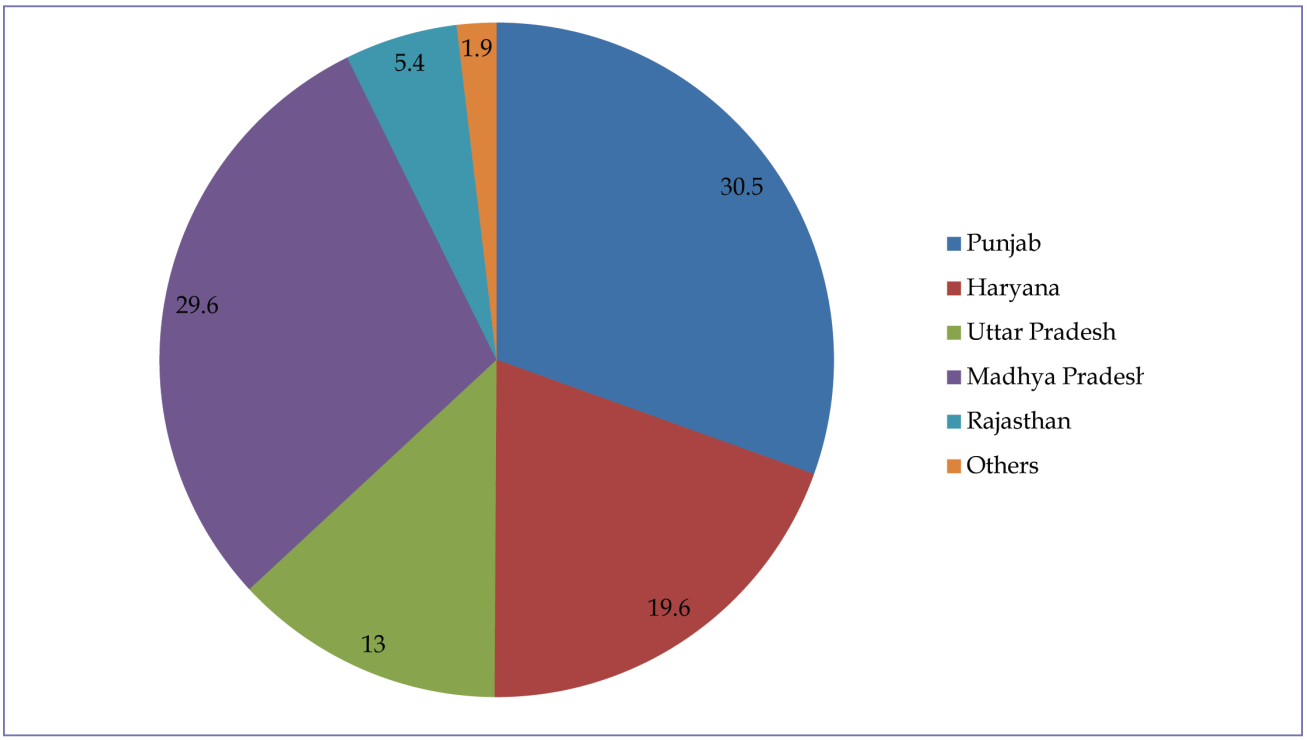
Figure 3: Procurement of Wheat in major States

(In thousand tonnes)



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

Figure 4: Percentage Share of Different States in Procurement of Wheat during Marketing Season 2021-22(up to 18.08.2021)



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

Commercial Crops

Oilseeds

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 215.4 in February, 2022 showing an increase of 2.18 percent over the previous month and increase of 22.88 percent over the corresponding month of the previous year.

The WPI of all individual oilseeds showed a mixed trend. The WPI of cotton seed (3.36 percent), niger seed (0.94 percent), sunflower (7.73 percent) and soyabean (4.55 percent) increased over the previous month. However, the WPI of groundnut seed (0.96 percent), rape & mustard seed (0.09 percent), copra (coconut) (0.39 percent), gingelly seed (sesamum) (0.05 percent) and safflower (3.54 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 188.9 in February, 2022 which shows an increase of 4.42 percent over the previous month. Moreover, it is increased by 14.90 percent over the corresponding month of the previous year. The WPI of mustard oil (0.22 percent), soybean oil (4.17 percent), sunflower oil (2.50 percent), groundnut oil (2.73 percent), rapeseed oil (1.71 percent), copra oil (0.42 percent) and cotton seed oil (8.10 percent) increased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 192.1 in February, 2022 showing a decrease of 4.90 percent over previous month and an increase of 19.69 percent over the corresponding month of the previous year.

Potato

The WPI of potato stood at 169.3 in February, 2022 showing a decrease of 1.40 percent over the previous month. Moreover, it increased by 14.78 percent over the corresponding month of the previous year.

Onion

The WPI of onion stood at 267 in February, 2022 showing an increase of 0.56 percent over the previous month and a decrease of 26.37 percent over the corresponding month of the previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 170.2 in February, 2022 showing an increase of 0.95 percent over the previous month and an increase of 12.34 percent over the corresponding month of the previous year. The WPI of black pepper increased by 0.48 percent, chillies (dry) increased by 3 percent and turmeric decreased by 0.16 percent over the previous month.

Tea

The WPI of tea stood at 152.3 in February, 2022 showing a decrease of 1.68 percent over the previous month and a decrease of 13.37 percent over the corresponding month of the previous year.

Coffee

The WPI of coffee stood at 128.6 in February, 2022 showing no change over the previous month. However, there is an increase of 35.37 percent over the corresponding month of the previous year.

Sugarcane

The WPI of sugarcane stood at 199.8 in February, 2022 showing no change over the previous month. However, there is an increase of 1.78 percent over the corresponding month of the previous year.

Raw Cotton

The WPI of raw cotton stood at 173.3 in February, 2022 showing an increase of 8.93 percent over the previous month and an increase of 52.15 percent over the corresponding month of the previous year.

Raw Jute

The WPI of raw jute stood at 291.7 in February, 2022 showing an increase of 0.79 percent over the previous month and an increase of 10.91 percent over the corresponding month of the previous year.

Wholesale Price Index of Commercial Crops is given in Table 3. A graphical comparison of WPI for the period of February, 2022 and January, 2022 is given in figure 5 and the comparison of WPI during the February, 2022 with the corresponding month of last year has been given in figure 6.

TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

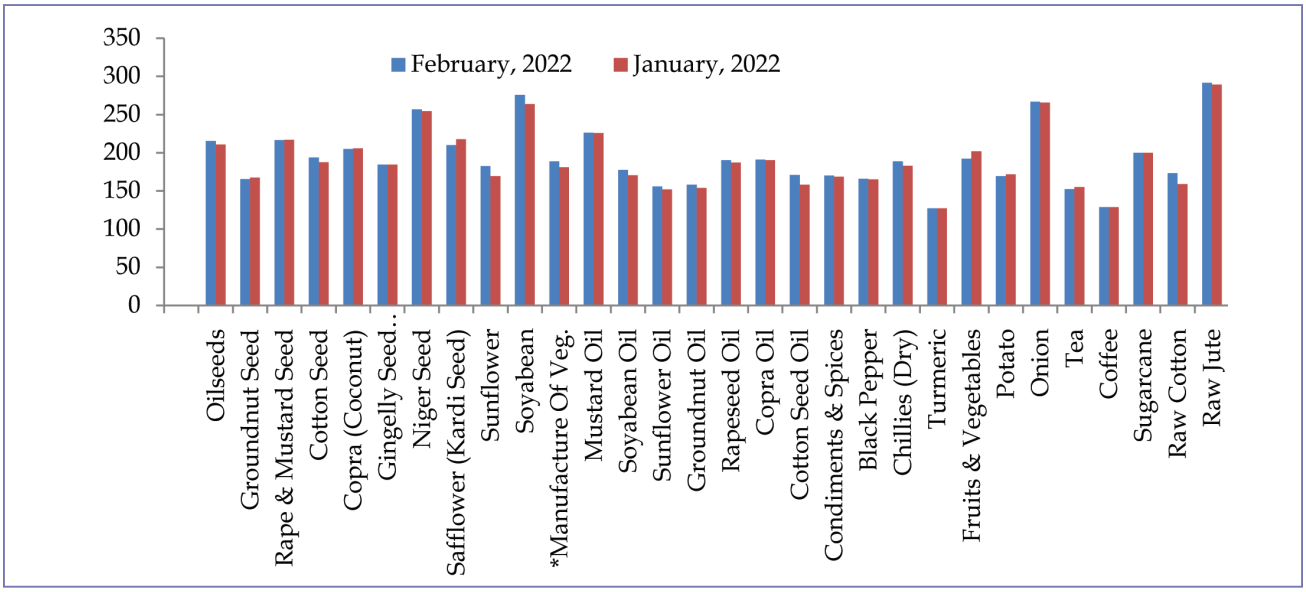
(Base Year: 2011-12)

Commodity	February, 2022	January, 2022	February, 2021	Percentage various over the	
				Month	Year
Oilseeds	215.4	210.8	175.3	2.18	22.88
Groundnut Seed	165.7	167.3	162.1	-0.96	2.22
Rape & Mustard Seed	216.6	216.8	178.9	-0.09	21.07
Cotton Seed	193.8	187.5	159.7	3.36	21.35
Copra (Coconut)	204.9	205.7	210.2	-0.39	-2.52
Gingelly Seed (Sesamum)	184.4	184.5	174.1	-0.05	5.92
Niger Seed	256.9	254.5	204.4	0.94	25.68
Safflower (Kardi Seed)	209.9	217.6	169.4	-3.54	23.91
Sunflower	182.6	169.5	161.5	7.73	13.07
Soyabean	275.7	263.7	194.4	4.55	41.82
Manufacture Of Vegetable And Animal Oils And Fats	188.9	180.9	164.4	4.42	14.90
Mustard Oil	226.4	225.9	175.9	0.22	28.71
Soyabean Oil	177.5	170.4	153.5	4.17	15.64
Sunflower Oil	155.9	152.1	157.6	2.50	-1.08
Groundnut Oil	158.2	154.0	159.0	2.73	-0.50
Rapeseed Oil	190.4	187.2	140.8	1.71	35.23
Copra Oil	191.0	190.2	194.5	0.42	-1.80
Cotton Seed Oil	170.9	158.1	150.4	8.10	13.63
Condiments & Spices	170.2	168.6	151.5	0.95	12.34
Black Pepper	165.9	165.1	121.5	0.48	36.54
Chillies (Dry)	188.6	183.1	159.2	3.00	18.47
Turmeric	127.2	127.4	118.6	-0.16	7.25
Fruits & Vegetables	192.1	202.0	160.5	-4.90	19.69
Potato	169.3	171.7	147.5	-1.40	14.78
Onion	267.0	265.5	362.6	0.56	-26.37
Tea	152.3	154.9	175.8	-1.68	-13.37
Coffee	128.6	128.6	95.0	0.00	35.37

Commodity	February, 2022	January, 2022	February, 2021	Percentage various over the	
				Month	Year
Sugarcane	199.8	199.8	196.3	0.00	1.78
Raw Cotton	173.3	159.1	113.9	8.93	52.15
Raw Jute	291.7	289.4	263.0	0.79	10.91

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

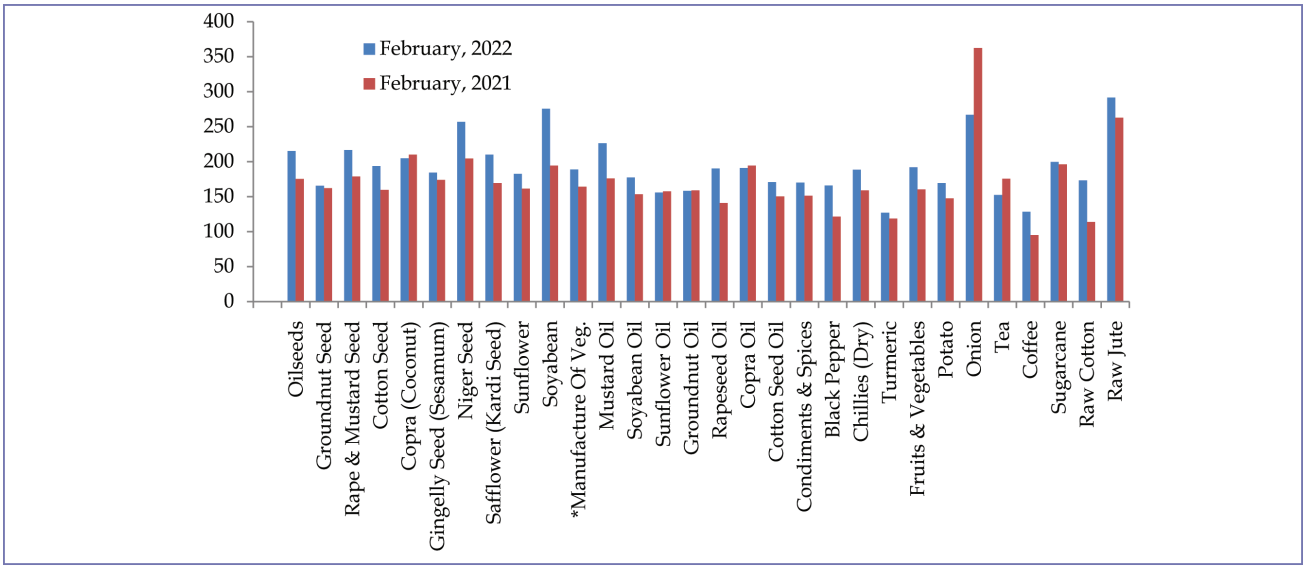
Figure 5: WPI of Commercial Crops during February, 2022 and January, 2022



*Manufacture of Vegetable And Animal Oils And Fats.

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

Figure 6: WPI of Commercial Crops during February, 2022 and February, 2021



*Manufacture of Vegetable And Animal Oils And Fats.

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

Prices

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

Commodity	Variety	Unit	State	Centre	Feb-22	Jan-22	Feb-21
Wheat	PBW 343	Quintal	Punjab	Amritsar	2230	2100	1900
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1970	1970	1725
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1989	1933	1789
Jowar	-	Quintal	Maharashtra	Mumbai	2900	3500	3650
Gram	No III	Quintal	Madhya Pradesh	Sehore	4480	4700	4749
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1800	1680	1600
Gram Split	-	Quintal	Bihar	Patna	6440	6570	6240
Gram Split	-	Quintal	Maharashtra	Mumbai	6100	6300	6100
Arhar Split	-	Quintal	Bihar	Patna	9380	9430	9560
Arhar Split	-	Quintal	Maharashtra	Mumbai	8900	8500	8800
Arhar Split	-	Quintal	NCT of Delhi	Delhi	9700	9700	10000
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	8300	8500	8400
Gur	-	Quintal	Maharashtra	Mumbai	3800	3900	4500
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	5000	5000	4500
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2800	2730	2580
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	6850	6650	5465
Mustard Seed	Black	Quintal	West Bengal	Raniganj	6400	6100	NA
Mustard Seed	-	Quintal	West Bengal	Kolkata	8000	8400	6400
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	7900	8000	5500
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	7850	8100	5400
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	3500	3500	2400
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	4250	4500	3000
Castor Seed	-	Quintal	Telangana	Hyderabad	NT	NT	NT
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	9500	9700	9300
Copra	FAQ	Quintal	Kerala	Alleppey	9100	9050	13950
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	7000	6500	6000
Groundnut	-	Quintal	Maharashtra	Mumbai	9700	9100	9000

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

Commodity	Variety	Unit	State	Centre	Feb-22	Jan-22	Feb-21
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	2385	2380	1830
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	2700	2722	2100
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	2170	2010	2310
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2400	2500	2250
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	2330	2315	1790
Castor Oil	-	15 Kg.	Telangana	Hyderabad	2100	2175	1875
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	2700	2750	2050
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	3200	3100	3150
Coconut Oil	-	15 Kg.	Kerala	Cochin	2220	2235	3158
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2850	2860	2365
Groundnut Cake	-	Quintal	Telangana	Hyderabad	NT	NT	NT
Cotton/Kapas	NH 44	Quintal	Andhra pradesh	Nandyal	9550	9350	6300
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	9500	9500	5700
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	6500	6500	7000
Jute Raw	W 5	Quintal	West Bengal	Kolkata	6650	6650	7300
Oranges	Big	100 No	Tamil Nadu	Chennai	1800	1400	600
Oranges	Nagpuri	100 No	West Bengal	Kolkata	750	750	900
Banana	-	100 No.	NCT of Delhi	Delhi	333	333	375
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	570	580	600
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	75000	75000	100000
Almonds	-	Quintal	Maharashtra	Mumbai	74000	65000	65000
Walnuts	-	Quintal	Maharashtra	Mumbai	95000	95000	70000
Kishmish	-	Quintal	Maharashtra	Mumbai	24500	22500	25000
Peas Green	-	Quintal	Maharashtra	Mumbai	8200	8200	9500
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	1150	1250	900
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	2000	3000	3000
Cauliflower	-	100 No.	Tamil Nadu	Chennai	2000	1500	1500
Potato	Red	Quintal	Bihar	Patna	960	980	950

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

Commodity	Variety	Unit	State	Centre	Feb-22	Jan-22	Feb-21
Potato	Desi	Quintal	West Bengal	Kolkata	1450	1100	580
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	3278	4538	2904
Onion	Pole	Quintal	Maharashtra	Nashik	2050	1650	3250
Turmeric	Nadan	Quintal	Kerala	Cochin	11500	11000	11000
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	12500	12500	11000
Chillies	-	Quintal	Bihar	Patna	13800	13800	14600
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	49500	46000	31000
Ginger	Dry	Quintal	Kerala	Cochin	16500	17500	22500
Cardamom	Major	Quintal	NCT of Delhi	Delhi	57300	57300	56000
Cardamom	Small	Quintal	West Bengal	Kolkata	135000	120000	190000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	6000	6000	6000
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	58666	58667	59363
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	41000	40000	42000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	40600	40300	40600
Fish	Rohu	Quintal	NCT of Delhi	Delhi	13000	13000	10000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	54000	55000	40000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4430	4900	4670
Tea	-	Quintal	Bihar	Patna	26500	26500	25800
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	10792	11005	NT
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	40000	39000	32000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	22500	21500	23000
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	8800	8700	8600
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4200	4100	4150
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13400	13200	13100
Rubber	-	Quintal	Kerala	Kottayam	15700	15300	14200
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	87000	85000	66000

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

Crop Production

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING MARCH, 2022

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

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING THE MONTH OF March, 2022

Contd.

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

(K) – Kharif (R) – Rabi

Note to Contributors

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

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