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From Editor's Desk

This issue of 'Agricultural Situation in India' manifests the policies/schemes of the Government of India for making agricultural sector more viable and includes two academic research articles; one on consumption of milk and milk products in urban areas in Himachal Pradesh; and second on the dynamics of Indian oilseed sector in the past decade (2010-2020) and way forward, and an agro-economic research study on impact of hail protection mechanism on apple crop in Himachal Pradesh - a case study of Shimla district.

The major farm sector news in focus are: MoU between India and Fiji for cooperation in the field of Agriculture and Allied Sectors; first anniversary of "Formation & Promotion of 10,000 Farmer Producer Organizations (FPOs)"; Ministry of Agriculture and Farmers Welfare signs MoU with Central Silk Board for promotion of Agroforestry in silk sector; release of Final Estimates of 2019-20 and First Advance Estimates of 2020-21 of area and production of horticultural crops; Indian Council of Agricultural Research (ICAR) receives King Bhumibol World Soil Day - 2020 award by FAO; use of satellite imagery-based yield and crop health estimation; agricultural mechanization for in-situ management of crop residue among other news.

For the month of February, 2021, food inflation stood at 4.17%. The Wholesale Price Index (WPI) of pulses and fruits increased by 10.25 percent and 9.48 percent, respectively, whereas for foodgrains, cereals, vegetables, paddy and wheat, it decreased by 3.67 percent, 6.58 percent, 2.90 percent, 0.37 percent and 10.64 percent, respectively, in February, 2021 as compared to corresponding period of last year. The 2021 cumulative pre-monsoon season rainfall in the country has been 41 percent lower than the long period average during 1st March, 2021 to 24th March, 2021. Current live storage in 130 major water reservoirs in the country was 76.37 BCM as against 62.75 BCM of normal storage based on the average storage of last 10 years.

In the academic column's first article, the authors attempt to study the consumption of milk and milk products in urban areas of Himachal Pradesh. It is based on a survey of 90 households from two districts, with the respondents distributed over different income groups. The study shows that the current supplies of fresh milk will not be able to cater to the requirements of the ever increasing population of the state. Secondly, based on the present consumption trends, Himachal Pradesh will remain a milk deficit state in future also, unless a system to improve the quality and quantity of milk is introduced. Thus, the state needs to plan out ways to develop dairy sector so as to meet its own consumption needs and to also help state's economy.

The second article explores the dynamics of Indian oilseed sector pertaining to 2010-2020 period with major emphasis on the area, production and productivity swings in the oilseed sector. The study divulges that India is a major contributor in world production for castor and groundnut with contribution in sesame and rapeseed mustard being noteworthy. But over the years, the area under the oilseed plantation is declining which is getting reflected in their production values also. The worst affected among all is the sunflower seed. The major reason for this is the shift of farmers towards other short duration crops. Government intervention is a major requirement considering the current scenario of the oilseed sector. Government needs to promote research and development so as to produce hybrid seeds of better quality and also encourage cultivation in non-traditional areas.

Agro-economic research segment tries to determine the impact of hail protection mechanism on apple crop in Himachal Pradesh. Apple production plays a major role in economic development of Himachal Pradesh with the livelihood of many people dependent on this crop. Over the years, hailstorms have been the biggest cause of destruction of the apple crop. So, the protection mechanism in the form of anti-hail nets and anti-hail cannons; and their actual impact on crop protection is of great interest. The research finds out that anti-hail nets and anti-hail cannons have been effective in protecting the apple crop against the damage caused by the hailstorms with the users reporting lower losses and better crop compared to non-users.

Though the government provides subsidy on anti-hail nets, but its reinstallation every year is very troublesome with the unavailability of trained professionals. Setting up of anti-hails guns requires more financial involvement of the government to make it practicable for its users.

Promodita Sathish

Farm Sector News

Cabinet Decisions and Announcements

Cabinet approves MoU between India and Fiji for cooperation in the field of Agriculture and Allied Sectors

The Union Cabinet chaired by the Prime Minister, Shri Narendra Modi has approved the signing of a Memorandum of Understanding (MoU) between the Ministry of Agriculture and Farmers' Welfare of the Republic of India and Ministry of Agriculture of the Republic of Fiji for cooperation in the field of agriculture and allied sectors.

The MoU between India and Fiji provides for cooperation in the following areas:

- Exchange of research personnel, scientific experts, specialists and technical trainees;
- Enhancement and transfer of technology;
- Development of infrastructure for agriculture development;
- Development of human resources through training of officers and farmers by conducting seminars and workshops;
- Promotion of joint ventures between private sectors of both countries;
- Promotion of investment in marketing and value addition/downstream processing of agricultural commodities;
- Promote capacity development in all areas of agriculture;
- Promotion of direct trade of agriculture products through market access;
- Joint planning and development of research proposals and execution of research projects and programmes;
- Establishment of Indo - Fiji Working Group for dealing phytosanitary issues, and any other form of cooperation which will be mutually agreed by the parties.

Under the MoU, a Joint Working Group (JWG) will be constituted to set down procedures and plan, and recommend programs of cooperation towards achieving its aims through the executing agencies of the two countries. The JWG will hold its meeting alternately in India and Fiji once in every two years. This MoU will come into effect on the date of its signing and will remain in force for a period of 5(five) years.

Meetings and Events

First anniversary of the Central Sector Scheme on "Formation & Promotion of 10,000 Farmer Producer Organizations (FPOs)"

Union Ministers of State for Agriculture and Farmers' Welfare Shri Parshottam Rupala and Shri Kailash Choudhary inaugurated professional training programmes designed and developed for CEOs, Board of Directors and Accountants of FPOs on the occasion of the anniversary of the central sector scheme titled 'Formation and Promotion of 10,000 Farmer Produce Organizations (FPOs)'. The scheme was launched by the Prime Minister on 29th February, 2020 at Chitrakoot (Uttar Pradesh) with a budgetary provision of Rs. 6865 crores. Shri Rupala also distributed certificates of registration issued by the Ministry of Corporate Affairs to new FPOs.

There are well-defined training structures in the scheme and the institutions like Bankers Institute of Rural Development (BIRD), Lucknow and Laxmanrao Inamdar National Academy for Co-operative Research & Development (LINAC), Gurugram have been chosen as the lead training institutes for capacity development & training of FPOs. Training & skill development modules have been developed to further strengthen FPOs.

More than 2200 FPOs produce clusters have been allocated for the formation of FPOs in the current year, of which 100 FPOs are for specialized organic produce, 100 FPOs for oilseeds & 50 commodity-specific FPOs with value chain development will be formed. In addition to SFAC, NABARD & NCDC, 06 more implementing agencies have been approved for the formation and promotion of FPOs.

Implementing Agencies (IAs) are engaging Cluster-Based Business Organizations (CBBOs) to aggregate, register and provide professional handholding support to each FPO for a period of 5 years. CBBOs will be the platform for an end to end knowledge for all issues related to FPO promotion. FPOs are already being registered in the UT of Kashmir, Rajasthan, Maharashtra, Madhya Pradesh, Odisha, Bihar, West Bengal, Uttar Pradesh, Tamil Nadu and also in north eastern state of Arunachal Pradesh. In other states, it is in progress. Registered FPOs are dealing with apple, almond, honey, tea, groundnut, cotton, soybean, linseed, sugarcane, vegetables, etc.

FPOs will be provided financial assistance up to Rs. 18.00 lakh per FPO for a period of 03 years. In addition to this, provision has been made for matching equity grant up to Rs. 2,000 per farmer member of FPO with a limit of Rs. 15.00 lakh per FPO and a credit guarantee facility up to Rs. 2 crores of project loan per FPO from the eligible lending institution to ensure institutional credit accessibility to FPOs.

At the national level, National Project Management Agency (NPMA) as a professional organization has been engaged for providing overall project guidance, coordination, compilation of information relating to FPOs, maintenance of MIS and monitoring purpose.

FPOs are to be developed in produce clusters, wherein agricultural and horticultural produces are grown/cultivated for leveraging economies of scale and improving market access for members. "One District One Product" cluster will promote specialization and better processing, marketing, branding and export. Further, agriculture value chain organizations are forming FPOs and are facilitating 60 percent of market linkages for members produce.

This formation of 10,000 FPOs will promote the selling of farmers produce from the farm gate thereby enhancing farmers' income. This will shorten the supply chain and accordingly, marketing cost will get reduced, resulting in better income for farmers. It will accelerate more investment in marketing and value addition infrastructure near to farm gate creating more employment opportunities for rural youth. The e-NAM (National Agricultural Market) also facilitates Farmer Producer Organisations (FPOs) to get access to large number of buyers for selling their produce to increase the income of their farmer members. So far, 1820 Farmer Producer Organisations (FPOs) from various states have been on-boarded in the e-NAM platform.

Furthermore, in order to facilitate export facility for FPOs, the Agricultural and Processed Food Products Export Development Authority (APEDA) has taken an initiative to develop a Farmer Connect Portal, *viz*. providing a platform for FPOs/FPCs, cooperatives to connect with exporters with the key objective to facilitate and integrate the activities of farmers and aggregators in the form of FPOs with exporters through the assistance of ICT platform. Around 2360 FPO/ FPCs and 2324 exporters have been registered in the portal so far.

Contribution of women farmers is pivotal in making Indian Agriculture AtmaNirbhar: Shri Parshottam Rupala

The Indian Council of Agricultural Research, New Delhi virtually celebrated the "International Women's Day - 2021" on 8th March, 2021. Shri Parshottam Rupala, Union Minister of State for Agriculture & Farmers' Welfare accentuated that the International Women's Day is to celebrate the significant contributions of women on various fronts of human life. He also highlighted the Central Government's various schemes that are aimed at empowering the women in every aspect of life. In all the spheres of life science, politics, engineering, medicines, arts, games, education, agriculture and army, etc., "#Naari

Shakti" is working shoulder-to-shoulder with men.

To build-up women leadership in the farming and agricultural sectors, the Government of India has established ICAR-Central Institute for Women in Agriculture, at Bhuvneshwar, Odisha under the Indian Council of Agricultural Research, New Delhi to address the problems and issues of the women in agriculture. The institute undertakes research on Women in Agriculture and to identify gender issues in agriculture and suggest interventions to address the same. A total 704 number of capacity building programmes for farm women were conducted by ICAR-CIWA and All India Coordinated Research Project (AICRP) on Home Science covering 31,626 farm women during 2015-20.

Also the guidelines of the various beneficiary oriented schemes of the Department of Agriculture & Cooperation and Farmers Welfare (DAC&FW) provide that states and other implementing agencies to incur atleast 30% expenditure on women farmers.

ICAR receives King Bhumibol World Soil Day - 2020 Award by FAO

Ms. Suchitra Durai, Ambassador of India to the Kingdom of Thailand received the prestigious "King Bhumibol World Soil Day - 2020 Award" of FAO on the behalf of the Indian Council of Agricultural Research on 10th March, 2021. Dr. Chalermchai Srion, Minister of Agriculture and Cooperatives of the Kingdom of Thailand conferred the award in a ceremony held at Bangkok, Thailand.

The international recognition was announced by the FAO, Rome on the eve of World Soil Day - 2020 in view of the ICAR's excellent contributions in "Soil Health Awareness" on the theme "Stop soil erosion, save our future" during the last year.

The ICAR-Indian Institute of Soil Science, Bhopal, Madhya Pradesh organized a wide array of programmes with great fervor and enthusiasm for the school students, farming community and general public. The Institute organized a massive awareness campaign for preserving "SOIL - Our Mother Earth" to commemorate the World Soil Day including march-past and distribution of promotional materials on soil health to the participants.

General Agriculture Sector News

Ministry of Agriculture and Farmers Welfare signs MoU with Central Silk Board, Ministry of Textiles for promotion of Agroforestry in silk sector

The Ministry of Agriculture and Farmers' Welfare on 7th March, 2021 signed a Memorandum of Understanding (MoU) with the Central Silk Board under the Ministry of Textiles on a convergence model for the implementation of agroforestry in the silk sector under the ongoing Sub-Mission on Agroforestry (SMAF) scheme.

The signing of this MoU aims to incentivize the farmers to take up sericulture based agroforestry models, thereby contributing to the Make in India and Make for the World vision of the Prime Minister. This linkage will add another dimension to agroforestry for faster returns to the growers as well as support the production of the range of silks that India is famous for. The Central Silk Board (CSB), Ministry of Textiles, Government of India will act as a catalyst to promote agroforestry in the silk sector.

The Department of Agriculture, Cooperation and Farmers' Welfare (DAC&FW) has been implementing the Sub-Mission on Agroforestry (SMAF) since 2016-17 as part of the recommendation of the National Agroforestry Policy 2014. India was the first country to have such a comprehensive policy which was launched at the World Agroforestry Congress held in Delhi in February, 2014. At present, the scheme is being implemented in 20 states and 2 UTs.

SMAF aims to encourage farmers to plant multi-purpose trees together with the agriculture crops for climate resilience and an additional source of income to the farmers, as well as enhanced feedstock to inter alia wood-based and herbal industry. Hence there is a concerted

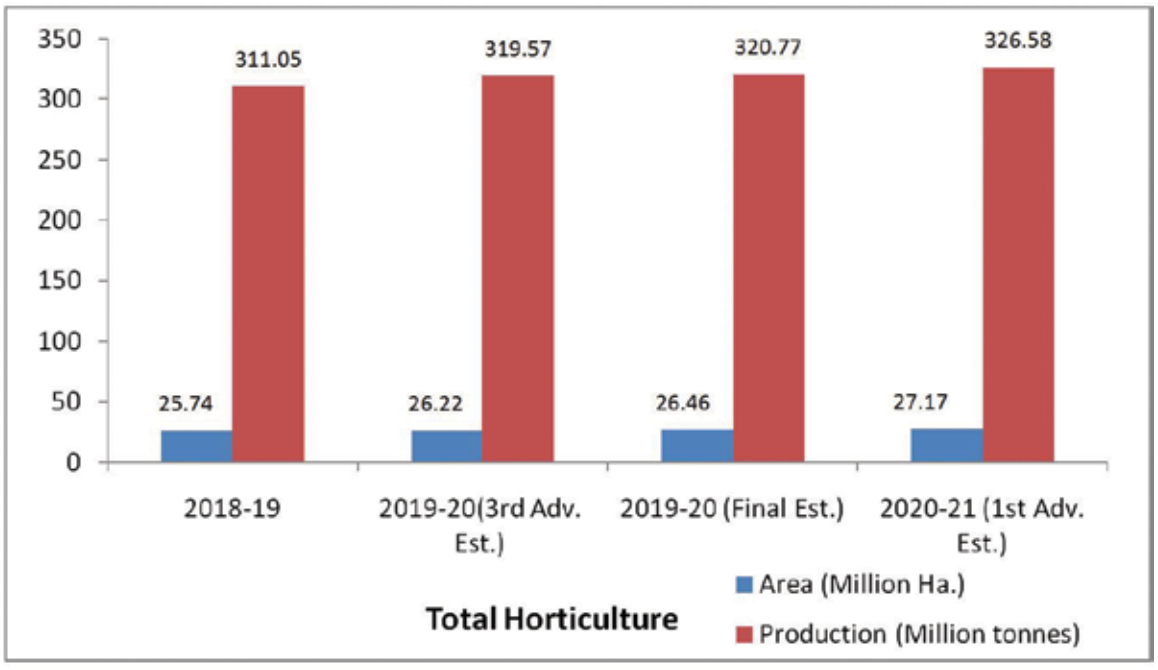
effort to include medicinal, fruits, fodder, tree-borne oilseeds, lac host, etc. in addition to the longer rotation timber species. The initiative of formalizing the collaboration in the sericulture sector is especially targeted for augmentation of sericulture host plants *e.g.* mulberry, asan, arjuna, som, soalu, kesseru, bada kesseru, phanat, etc. to be cultivated both as block plantations and border or peripheral plantations on farmlands. Planting sericulture based tree species on the farm bunds and rearing silkworms has the potential of creating additional income opportunities for farmers besides their regular source of income from agriculture activities.

Release of Final Estimates of 2019-20 and First Advance Estimates of 2020-21 of Area and Production of Horticultural Crops

Department of Agriculture, Cooperation and Farmers' Welfare has released the Final Estimates of 2019-20 and First Advance Estimates of 2020-21 of area and production of various horticultural crops. These are based on the information received from states and other source agencies.

(Area in Million Ha, Production in million tonnes)

Total Horticulture	2018-19	2019-20 (3rd Adv. Est.)	2019-20 (Final Est.)	2020-21 (1st Adv. Est.)
Area	25.74	26.22	26.46	27.17
Production	311.05	319.57	320.77	326.58



Highlights of 2019-20 (Final Estimates)

- Total horticulture production in 2019-20 is estimated to be 3.12% higher than 2018-19.
- Increase in production of fruits, vegetables, flowers and spices is seen whereas decrease in plantation crops and aromatics & medicinal plants is registered over 2018-19.
- The fruits production is estimated to be 102.03 million tonnes compared to 97.97 million tonnes in 2018-19.
- The production of vegetables is estimated to be 188.91 million tonnes, against 183.17 million tonnes in 2018-19.

- Onion production is estimated to be 26.09 million tonnes, against 22.82 million tonnes reported in 2018-19.

- Potato production is estimated to be 48.56 million tonnes, compared to 501.90 million tonnes in 2018-19.

Highlights of 2020-21 (First Advance Estimates)

- Total horticulture production in 2020-21 is estimated to be 326.58 million tonnes, an increase of about 5.81 million tonnes (increase of 1.81%) over 2019-20.

- Increase in production of fruits, vegetables, aromatics & medicinal plants and plantation crops, while decrease in spices and flowers over previous year is envisaged.

- The fruits production is estimated to be 103.23 million tonnes compared to 102.03 million tonnes in 2019-20.

- The production of vegetables is estimated to be 193.61 million tonnes, compared to 188.91 million tonnes in 2019-20.

- Onion production is estimated to be 26.29 million tonnes, compared to 26.09 million tonnes in 2019-20.

- Potato production is estimated to be 53.11 million tonnes, against production of 48.56 million tonnes in 2019-20.

Promotion of Indigenous Varieties of Rice

Indigenous varieties of rice are being promoted through various programmes. A total of 574 indigenous varieties of rice have been propagated and tested at more than 10,000 farmers' fields, involving state agricultural universities, KVKs and NGOs through a project entitled "Mainstreaming agricultural biodiversity conservation and utilization of the agriculture sector to ensure ecosystem services and reduce vulnerability". Nutritional profiling of 300 selected rice varieties has been done for market linkage and better price to the farmers. Farmers are also being trained on conservation, improvement and use of traditional/ indigenous varieties through participatory variety selection. Further, for access to seeds of these indigenous varieties, community seed banks have been established at community level involving KVKs and Self Help Groups in remote and tribal areas of the country and a total of 26 community seed banks conserving more than 4000 native landraces and farmers' varieties of different food crops including rice have been strengthened and established.

Communities and farmers conserving and promoting indigenous rice varieties have been conferred with Genome Savour awards by Protection of Plant Varieties Protection and Farmers' Rights Authority (PPV&FRA). The following awards have been given since 2009-10:

a. Plant Genome Saviour Community award (Rs. 10 lakh each)- 13

b. Plant Genome Saviour Farmer rewards (Rs. 1.5 lakh each)- 12

c. Plant Genome Saviour Farmer Recognitions (Rs. 1.0 lakh each)- 19

Rice varieties are also being promoted under National Food Security Mission in 193 districts of 24 States and Union Territories. Similarly, "Bringing Green Revolution to Eastern India (BGREI)" a sub scheme of Rashtriya Krishi Vikas Yojana is implemented in seven eastern states *viz*., Assam, Bihar, Chhattisgarh, Jharkhand, Odisha, Eastern Uttar Pradesh and West Bengal to address the constraints limiting the productivity of "rice based cropping systems" in Eastern India.

Five rice varieties *viz*., Lalat and Improved Lalat (GI value: 54) as low GI and Swarna, Sambha Mahsuri and Shaktiman (GI value <60) as intermediate GI have been identified and all these varieties are in seed chain and are being cultivated by the farmers. There is no certification for GI (Glycemic Index) in rice.

Total rice germplasm conserved at National Gene Bank: 1,09,834 including traditional varieties (6,707), land races (38400) and varieties released and notified (1190).

Varieties registered with PPV&FRA: Total 2047 varieties have been registered which include 1645 farmers' varieties.

Agriculture Voltage Technology

Agri-voltaic system of 105 KW capacity was developed by ICAR-Central Arid Zone Research Institute, Jodhpur. This technology can increase the income of farmers by generation of electricity and growing of cash crops simultaneously on the same piece of land. Under component-I of KUSUM (Kisan Urja Suraksha Utthan Mahabhiyan) scheme, there is a provision for installation of agri-voltaic system in farmers' fields with a capacity ranging from 500 KW to 2 MW. Moreover, National Solar Energy Federation of India (NSEFI) has also documented 13 operational agri-voltaic systems in the country managed by different solar PV functionaries and public institutes.

Features of Organic Farming

Organic farming is a sustainable agriculture system that excludes the use of synthetic inputs in farming and relies on on-farm inputs such as crop residues, farm yard manure, enriched composts, vermi-compost, oil cakes, bio-fertilizers, etc. for nutrient management of crops. Similarly, pests and diseases are managed by eco-friendly farming practices of crop rotation, trap crops, bio-pesticides like neem-based formulations, bio control agents, mechanical traps, stale seed bed, etc. Adoption of organic farming practices produces safe food, reduces cost of production, improves soil health and helps in mitigating the climate change and global warming by reducing dependence on chemical fertilizers.

Government of India has been promoting organic farming in the country through dedicated schemes namely Paramparagat Krishi Vikas Yojana (PKVY) and Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) since 2015-16 to cater to the needs of domestic and export markets, respectively. Both the schemes stress on end to end support to organic farmers, *i.e.,* from production to certification and marketing. Post harvest management support including processing, packing, marketing is made integral part of these schemes to encourage organic farmers.

Under PKVY, farmers are provided financial assistance of Rs. 50,000 per hectare/3 years, out of which Rs. 31,000 (61%) is provided directly through DBT for inputs like bio-fertilisers, bio-pesticides, organic manure, compost, vermi-compost, botanical extracts, etc.

In Rajasthan, since 2015-16, a total of Rs. 97.60 crores has been released for 6150 clusters for 1.23 lakh ha area and 3.07 lakh farmers have been benefited. An amount of Rs. 23.81 crore has been released to Assam for 220 clusters benefitting 11,000 farmers for 4,400 ha area taken up in 2015-16 under this scheme. As of now, North Eastern Region is not part of PKVY, since a dedicated scheme, Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) was launched. Farmers are given assistance of Rs. 25000/ha/3 years for organic inputs including organic manure and bio-fertilizers, etc. for NE states including the state of Assam. In Assam, since 2015-16, a total of Rs. 56.12 crores has been released. Total 6,926 ha area has been covered benefiting 10,165 farmers and 18 FPC has been formed against the target of 10,000 ha area and 20 Farmers Producers Company (FPC).

The demand of organic farming has increased in domestic market during last few years. According to the joint study of ASSOCHAM –EY, the domestic organic market is growing at a rate of 17% and the projected demand of organic food market is likely to cross 87.1 crores by 2021 from Rs. 53.3 crores in 2016. The demand in international market has also increased in last 3 years.

Small Farmers' Agri-Business Consortium (SFAC)

Government of India through Small Farmers' Agribusiness Consortium (SFAC), a registered society under Department of Agriculture, Cooperation & Farmers' Welfare, Government of India, is promoting Farmer Producer Organisations (FPOs) by mobilizing the farmers and helping them in registering as companies and providing them with handholding support and training for their sustainability. SFAC has undertaken various FPO promotion programmes in the country such as through Vegetable Initiative for Urban Cluster (VIUC), Mission Organic Value Chain Development (MOVCD), National Food for

Security Mission (NFSM), Mission for Integrated Development of Horticulture (MIDH), etc. SFAC has promoted 910 FPOs in the country out of which 58 FPOs are from Uttar Pradesh.

Training for Multi-Layer Farming

ICAR-Indian Institute of Farming Systems Research, Modipuram is undertaking research (on-station) and technology validation through farmers' participatory research (on-farm research) on Integrated Farming Systems and Cropping Systems under AICRP-Integrated Farming Systems (AICRP-IFS) in 24 states and 1 Union Territory with the participation of 34 states Agricultural Universities, 6 ICAR institutes and 1 Central University. At selected locations of on-station (Port Blair in A&N Islands, Karamana in Kerala, Modipuram in Uttar Pradesh, Kalyani in West Bengal) and on-farm (Pathinamthitta and Thiruvananthapuram districts of Kerala), location specific multi-layer farming involving crops of different heights have been experimented. Awareness among farmers and other stakeholders on multi-layer farming and advantages thereof in these states are also being conducted.

In addition to this, a centrally sponsored scheme, "Support to State Extension Programs for Extension Reforms" popularly known as ATMA scheme is already under implementation since 2005. Presently, the scheme is being implemented in 691 districts of 28 states & 5 UTs in the country. The scheme promotes decentralized farmer-friendly extension system in the country. Under the scheme, grants-in-aid is released to the State Governments with an objective to support State Government's efforts to make available the latest agricultural technologies and good agricultural practices in different thematic areas of agriculture and allied areas to farmers including training for multi-layer farming. Training of farmers is one of the eligible activities of ATMA scheme.

During last one year, the Krishi Vigyan Kendras (KVKs) conducted 4221 training programmes on various themes related to Multi-Layer Farming with participation of 136391 farmers.

Natural Farming System

Bhartiya Prakritik Krishi Padhati (BPKP) is introduced as a sub scheme of Paramparagat Krishi Vikas Yojana (PKVY) since 2020-21 for the promotion of traditional indigenous practices including natural farming. The scheme mainly emphasises on exclusion of all synthetic chemical inputs and promotes on-farm biomass recycling with major stress on biomass mulching; use of cow dung-urine formulations; plant based preparations and time to time working of soil for aeration. Under BPKP, financial assistance of Rs. 12,200/ha for 3 years is provided for cluster formation, capacity building and continuous handholding by trained personnel, certification and residue analysis.

Until now, under natural farming, an area of 4.09 lakh ha area has been covered and a total fund of Rs. 4587.17 lakh has been released in 8 states across the country including the state of Tamil Nadu

THE STATE WISE DETAILS OF FUNDS RELEASED UNDER BPKP

Sl. No	States	Area in Ha	Amount released (Rs. in lakh)
1.	Andhra Pradesh	100000	750.00
2.	Chhattisgarh	85000	1352.52
3.	Kerala	84000	1336.60
4.	Himachal Pradesh	12000	286.42
5	Jharkhand	3400	54.10
6.	Odisha	24000	381.89
7.	Madhya Pradesh	99000	393.82
8.	Tamil Nadu	2000	31.82
Total		**409400**	**4587.17**

Farmers enrolled on e-NAM

Government of India through CCS National Institute of Agricultural Marketing (NIAM), an autonomous organization of Department of Agriculture, Cooperation & Farmers' Welfare, has carried out the assessment of the National Agriculture Market (e-NAM) scheme, with report titled "Performance Evaluation of e-National Agriculture Market" (October, 2020).

As mentioned in the aforesaid report, as on 15th May, 2020, 1000 wholesale mandis of 18 states and 03 Union Territories (UTs) have been integrated with e-NAM platform. Further, it has been mentioned that e-NAM has registered a user base of 1.66 crore farmers, 1012 Farmer Producer Organizations (FPOs) and 1.31 lakh traders on e-NAM platform and 175 commodities including food grains, oilseeds, fruits & vegetables are traded on e-NAM platform. It further mentions that as on 14th May, 2020, farmers have transacted over Rs. 1 lakh crore on the e-NAM platform with a trade volume of 3.43 crore tonnes of commodities and 38.16 lakh bamboo and coconuts. The numbers of cultivators is estimated through decennial Census by office of the Registrar General & Census Commissioner, Government of India.

The farmers are free to sell their wholesale produce in any APMC markets. Also APMCs help farmers in registering as sellers in e-NAM. As per registration in the e-NAM portal, more than 1.69 crore farmers as sellers have been registered as farmers.

Implementation of PMFBY across the country

The Pradhan Mantri Fasal Bima Yojana (PMFBY) introduced from kharif 2016 season is voluntary for states since its inception. States are free to take decision regarding implementing the scheme or not. Further, the scheme has also been made voluntary for farmers *w.e.f.* kharif 2020 season. Therefore, the scheme is available for all farmers for crops and areas notified by the concerned State Government.

As per Agri-Census 2015-16, the total number of operational land holdings with operated area measuring five acres or below is 1260.60 lakh.

STATE-UT-WISE DETAILS OF BENEFICIARIES DURING 2019-20 UNDER PRADHAN MANTRI FASAL BIMA YOJANA (PMFBY) (AS ON 01.03.2021)

State/UT Name	Total Farmers Applications Insured (Lakh)	Farmer Applications Benefitted (Lakh)
A & N Islands	0.001	-
Andhra Pradesh	27.9	14.7
Assam	10.4	*
Chhattisgarh	40.3	14.8
Goa	0.01	0.001
Gujarat	24.8	0.9*
Haryana	17.0	5.3
Himachal Pradesh	2.8	0.9
Jharkhand	10.9	*
Karnataka	21.6	5.2
Kerala	0.6	0.2
Madhya Pradesh	78.0	27.7
Maharashtra	145.6	87.3

Manipur	0.03	0.03
Meghalaya	0.01	0.01
Odisha	48.8	12.0
Puducherry	0.1	-
Rajasthan	86.0	24.4
Sikkim	0.0002	-
Tamil Nadu	38.6	13.2
Telangana	10.1	*
Tripura	0.3	0.1
Uttar Pradesh	47.2	9.7
Uttarakhand	2.1	0.9
Total	**613.3**	**217.6**

* Admissible claims/applications benefitted not reported/approved by the concerned insurance company as requisite State share of premium subsidy not released to them.

Judicial Intervention in New Agricultural Laws

The new farm laws *viz.*, "The Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act, 2020", "The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Act, 2020", are intended to protect the interest of farmers including that of small and marginal farmers through a simple, accessible, quick and cost effective dispute resolution mechanism prescribed at local sub-divisional level for which deterring penal provisions have also been made against traders for any contravention of the act by them. As such, it enables the farmers to get their disputes resolved through Conciliation Board represented by their nominee in 30 days from the date of constitution of board, failing which they can approach concerned Sub-Divisional Authority (SDM) with provision of appeal to Collector or the Additional Collector. The executive officers at Sub Divisional level and District Collectors perform the functions relating to land revenue including maintaining land records and resolving the disputes relating to crops and land. Thus, they have field experiences relating to agriculture & land disputes as well as judicial. In view of the above, they are well equipped to adjudicate on all legal and contractual disputes emanating from these farm legislations.

The new farm laws aim at facilitating direct buying from farmers in trade area by traders, processors, exporters, Farmer Producer Organizations (FPOs), agriculture co-operative societies, etc., so as to facilitate farmers with better price realization due to reduction in supply chain and marketing cost to enhance their income.

Further, "The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Act, 2020", stipulates that the produce must be purchased at a price provided for in the farming agreement. The price may be linked to market price and in such case, a minimum guaranteed price be specified. Similarly, the method of determining payment above the minimum guaranteed price and a clear price reference must be provided in the agreement.

Premium Subsidy on Crop Insurance

To address the issue of high premium rates for few crops/areas due to adverse selection, inconsistencies in the cultivation of crops as per the suitability of the climate, inconsistencies in collection of yield data, etc. under Pradhan Mantri Fasal Bima Yojana (PMFBY) and Restructured Weather Based Crop Insurance Scheme (RWBCIS), the requisite central share of premium subsidy

(*i.e.* 90 : 10 for North Eastern states and 50 : 50 for remaining states) will be provided for areas/crops having gross premium rate upto 25% for irrigated areas/crops and upto 30% for un-irrigated areas/crops from kharif 2020 season. Though this may affect the State Governments liabilities, but will help/encourage them to examine the reasons/causes of such high premium rates and make suitable corrective measures in collection of yield data, issue weather advisory, advice crop diversification to the farmers, etc. More freedom has been given to the states to choose the risk including single peril based on prevailing climate conditions, etc. to cover more and more crops under the scheme by the State Governments.

Further, National Rainfed Area Authority (NRAA) has also been requested to study operational issues in implementation of PMFBY and to recommend effective implementation strategies for most vulnerable districts. Based on the requests/representations received from various quarters including farmer organizations, states, etc. by the Government and to give choice to the farmers to assess their risk profile and accordingly decide on the issue of crop insurance, these schemes have been made voluntary for farmers *w.e.f.* kharif 2020 season.

Use of Satellite Imagery-Based Yield and Crop Health Estimation

The Dr. P. K. Mishra Committee was constituted in September, 2013 to review the implementation of crop insurance schemes in India. The Committee submitted its report in May, 2014 recommending the use of satellite remote sensing data for various applications related to yield and crop health estimation for crop insurance. In this regard, several activities have been carried out, such as:

(*i*) Use of satellite remote sensing derived yield values for smart sampling and optimization of Crop Cutting Experiments (CCEs) being conducted under Pradhan Mantri Fasal Bima Yojana (PMFBY).

(*ii*) Use of satellite remote sensing to assess the discrepancy between the actual sown area and the insurance area and compute the Areas Correction Factor (ACF).

(*iii*) Use of satellite imagery for resolving disputes between the state governments and insurance companies related to crop yield estimates.

(*iv*) Yield data quality checking using remote sensing.

(*v*) Qualitative crop loss and health assessment using satellite remote sensing.

(*vi*) Use of satellite remote sensing for assessing the areas of preventive sowing or failure of crop emergence.

(*vii*) Use of long-term satellite remote data for risk assessment which have been used for clustering of districts.

Agricultural Mechanization for In-Situ Management of Crop Residue

As per the Agricultural Statistics 2019-20, the contribution of the states of Punjab, Haryana and Uttar Pradesh in total paddy production of India was 9.91 percent, 4.06 percent and 13.05 percent, respectively.

Paddy stubble burning is mainly practiced in Indo-Gangetic plains of the states of Punjab, Haryana and Uttar Pradesh to clear the fields for rabi crop sowing. To support the efforts of the Governments of Punjab, Haryana, Uttar Pradesh and NCT of Delhi to address air pollution and to subsidize machinery required for in-situ management of crop residue, a central sector scheme on 'Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi' is being implemented from 2018-19. Under this scheme, financial assistance at 50% of the cost of machinery is provided to the farmers for purchase of crop residue management machinery and financial assistance at 80% of the project cost is provided to the cooperative societies of farmers, Farmers Producers Organization (FPOs),

registered farmers societies and panchayats for establishment of Custom Hiring Centres of crop residue management machinery. The available central funds under the scheme are allocated to the states based on annual action plans of the states duly approved by the State Level Executive Committee and funds utilization status of the state. Under this scheme, during the period from 2018-19 to 2020-21, 30,961 Custom Hiring Centres (CHCs) have been established and a total of more than 1.5 lakh crop residue management machines have been supplied to these CHCs and individual farmers of these four states.

The Department of Agriculture, Cooperation and Farmers' Welfare is implementing Sub-Mission on Agricultural Mechanization (SMAM) in all the states and the machines identified for crop residue management *viz*. Super Straw Management System (SMS) for combine harvesters, happy seeders, hydraulically reversible MB plough, paddy straw chopper/shredder, mulcher, shrub master, rotary slasher, zero till seed drill, rotavator, super seeder, crop reaper/reaper binder, straw baler and rakes are also included for financial assistance under SMAM.

Doorstep Delivery of Seeds

States are primarily responsible to ensure production, availability and distribution/ supply of quality seeds to the farmers through its Department of Agriculture, state farms, State Seeds Corporation, State Agricultural Universities (SAUs), cooperatives and private seed companies. The Government of India supplements the efforts of the State Governments by providing breeder seeds for seed chain and coordinating seeds requirement and availability through the mechanism of Zonal Seeds Review Meetings prior to each sowing season and weekly video conferences.

As reported by states, 483.66 lakh qtls. of certified/quality seed is available against the requirement of 443.16 lakh qtls. during the year 2020-21.

The steps taken/being taken for making available quality seeds to the farmers are as under:

(*i*) The Government of India is providing financial assistance for production and distribution of seeds of High Yielding Varieties (HYVs) of different crops to the states and implementing agencies through various ongoing crop development programmes/schemes *viz*. National Food Security Mission (NFSM), Bringing Green Revolution in Eastern India (BGREI), Rashtriya Krishi Vikas Yojana (RKVY), Sub-Mission on Seeds & Planting Material (SMSP), etc.

(*ii*) The states are encouraged by the Department of Agriculture, Cooperation & Farmers' Welfare (DAC&FW) to develop a Seed Rolling Plan in advance as per the estimated requirement of seeds in their state, so that the seeds of required variety could be made available at right time to the farmers. DAC&FW also ensures fixation of uniform breeder seeds price in consultation with Indian Council of Agricultural Research (ICAR) for minimization of foundation and certified seed costs.

(*iii*) Indian Institute of Seed Science, ICAR is also coordinating the production of quality seed in the country through the network of 63 cooperating centres under National Seed Project of ICAR. Single window system for effective planning and implementation of seed production programme and computerized seed sale outlets has been established to guarantee ease in accessibility of quality seeds to farmers at all centres.

In some states, quality seed is being made available at every village within the reach of farmers and farmer is facilitated to purchase seed of choice from the desired outlets. Similarly, procurements centres at villages have been established to facilitate procurement by the marketing department. Moreover, some states have well established mandis and generally the seed dealers and other agri-input dealers also have shops in these mandis avoiding involvement of middlemen.

NAFED e- Kisan Mandis

NAFED e-Kisan mandis (NeKM) is electronic trading platform with physical infrastructure at each proposed location in partnership with local Farmer Producer Organisations to be integrated with a national level digital marketing platform. The mandi has both physical and virtual infrastructure and it is based on spoke & hub model. The physical infrastructure will include digital platform with auctioning facility, pack-house (including sorting-grading, packing and pre-cooling facilities), warehouse and cold storages if required. FPOs will get funding support through Agriculture Infra-structure Fund (AIF) and subsidies available under various Central and State Government schemes. The mandis are made at farm gate bringing buyers to farmers.

LOCATIONS OF NEKMS IN WHICH NAFED HAS ENTERED INTO AGREEMENT WITH FPOS:

Sl. No.	Place of Mandi	State
1	Vashi	Maharashtra
2	Kachrod	Madhya Pradesh
3	Morbi	Gujarat
4	Dholbare	Maharashtra
5	Gultekdi	Maharashtra

NAFED shall take up more mandis based on performance/success of above mentioned mandis.

General Survey of Agriculture

Trend in Food Prices

The rate of inflation, based on monthly WPI, stood at 4.17% (Provisional) for the month of February, 2021 as compared to 2.26% during the corresponding period of last year.

Based on Wholesale Price Index (WPI) (2011-12=100), WPI in case of foodgrains decreased by 3.67 percent in February, 2021 over February, 2020.

Among foodgrains, WPI of pulses and fruits increased by 10.25 percent and 9.48 percent, respectively, whereas for cereals and vegetables decreased by 6.58 percent and 2.90 percent in February, 2021 over corresponding period of last year.

Among cereals, WPI for paddy and wheat decreased by 0.37 percent and 10.64 percent in February, 2021 over February, 2020.

The WPI in case of foodgrains increased by 0.13 percent in February, 2021 over January, 2021.

Among foodgrains, WPI for fruits and pulses increased by 5.90 percent and 1.56 percent, respectively, whereas for vegetables and cereals decreased by 2.05 percent and 0.26 percent in February, 2021 over January, 2021.

Among cereals, WPI for paddy decreased by 0.25 percent whereas for wheat increased by 0.27 percent in February, 2021 over January, 2021.

WPI Food Index (Weight 24.38%)

The Food Index consisting of 'Food Articles' from Primary Articles group and 'Food Products' from Manufactured Products group have increased from 151.8 in January, 2021 to 153.0 in February, 2021. The rate of inflation based on WPI Food Index increased from -0.26% in January, 2021 to 3.31% in February, 2021.

Food-vs.-Non-Food Inflation

The Inflation rate for non-food items increased by 0.93% (from 3.64% in January, 2021 to 4.57% in February, 2021) while the inflation rate of food items increased by 3.57% (from -0.26% in January, 2021 to 3.31% in February, 2021) resulting an increase in WPI based inflation rate for all commodities from 2.03% in January, 2021 to 4.17% in February, 2021.

The Consumer Price Index (CPI) based inflation rate has increased to 5.03% in February, 2021 on point to point basis (*i.e.* February, 2021 over February, 2020) as it was a month ago at 4.06%, according to data released by the Central Statistics Office (CSO) on 12th March, 2021. The Consumer Food Price Index (CFPI) for All-India Combined has increased to 3.87% in February, 2021 from 1.96% in January, 2021.

Rainfall and Reservoir Situation, Water Storage in Major Reservoirs

Cumulative Pre-Monsoon Season (March-May), 2021 rainfall for the country as a whole during the period 1st March, 2021 to 24th March, 2021 has been 41% lower than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been lower than LPA by 67% in South Peninsula, by 45% in East & North East India, by 37% in North-West India and by 24% in Central India.

Out of 36 meteorological sub-divisions, 07 meteorological sub-divisions received large excess/excess rainfall, 01 meteorological sub-division received normal rainfall, 25 meteorological sub-divisions received deficient/large deficient rainfall and 03 meteorological sub-divisions received no rainfall.

Current live storage in 130 reservoirs (as on 25th March, 2021) monitored by Central Water Commission having Total Live Capacity of 174.23 BCM was 76.37 BCM as against 89.16 BCM on 25.03.2020 (last year) and 62.75 BCM of normal storage (average storage of last 10 years). Current year's storage is 86% of last year's storage and 122% of the normal storage.

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

Annexure I: All India Progressive Rabi Crop Sowing - 2020-21 (2nd Adv. Est.) *vis-à-vis* 2019-20 (4th Adv. Est.)

(In lakh ha)

Crop Name	Normal Area for whole Rabi Season	Area sown reported			Absolute Change
		This Year 2020-21	% of Normal for whole season	Last Year 2019	
Wheat	303.28	315.77	104.1	313.57	2.20
Rice	41.78	45.32	108.5	46.49	–1.17
Jowar	33.40	25.55	76.5	30.69	–5.14
Maize	17.37	16.75	96.5	20.16	–3.41
Barley	6.38	6.92	108.5	5.90	1.02
Total Coarse Cereals	**57.14**	**49.22**	**86.1**	**56.74**	**–7.52**
Total Cereals	**402.20**	**410.31**	**102.0**	**416.81**	**–6.50**
Gram	92.77	107.15	115.5	96.99	10.16
Urad	8.93	9.06	101.4	8.32	0.74
Moong	9.86	9.29	94.3	10.59	–1.30
Lentil	14.24	14.98	105.2	13.03	1.95
Others	19.09	17.61	92.2	15.60	2.01
Total Pulses	**144.88**	**158.09**	**109.1**	**144.52**	**13.57**
Total Foodgrains	**547.07**	**568.40**	**103.9**	**561.33**	**7.07**
Rapeseed& Mustard	59.44	68.53	115.3	68.56	–0.03
Groundnut	7.24	7.34	101.4	6.65	0.69
Safflower	1.15	0.49	42.4	0.52	–0.03
Sunflower	2.37	1.32	55.7	1.03	0.29
Linseed	2.74	2.34	85.2	1.80	0.54
Total Oilseeds	**72.94**	**80.01**	**109.7**	**78.56**	**1.46**
All- Crops	**620.01**	**648.41**	**104.6**	**639.88**	**8.53**

Source: Crops Divisions, DAC&FW

Articles

Consumption of Milk & Milk Products in Urban Areas in Himachal Pradesh: Projections, Preferences and Perspectives

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Abstract

Milk and milk products contribute significantly to the dietary consumption in various farms in urban areas in Himachal Pradesh. The productivity of milch cattle is low in the state and the demand for dairy products is met partially from supplies available from the adjoining states. The per capita consumption of these products is fairly good being 542 gm per day as against 375 gm per day at national level. Appraising the consumer preferences in the perspective of future demand projections is needed for development of dairy farming sector of the state economy. In this context, a study of 60 households from Shimla urban area and 30 household from Palampur urban area with reference year 2015-16 was conducted. Milk production is projected to increase from 907 million liters in 2010-11 to 1181 million liters in 2029-30. The state shows surplus milk output in terms of meeting nutritional demand as per ICMR norms (250 grams per day) but the projections also indicate significant deficit being 1441 million liters of milk output as far as economic demand fulfillment is concerned. Concerted measures are needed to meet the significant deficit in economic demand in 2029-30 keeping in view the increase in projected per capita income and population growth in the state.

Keywords: *Milk, dairy products, milk production*

1. Introduction

Milk and milk products make a significant contribution to dietary consumption in Himachal Pradesh. These are used in various forms like milk, ghee, cheese, butter, yoghurt (curd), butter milk, tea, coffee and so on. In urban areas, the demand for milk is not fully met by local milkmen and dairy cooperatives. Hence, the urban consumers partially fulfil their demand for these products by the supplies from outside the state.

The state of Himachal Pradesh has a large livestock population; still this sub-sector is less productive in general when compared to its potential. As such, its direct contribution to the state's economy is limited. Consequently, the aggregate milk production and the overall milk availability is low, though the per capita consumption/availability in Himachal Pradesh being 542 grams per day is better than the national average of 375 grams per day (2017-18). But at the national level, animal husbandry is emerging as an important sector with sustained annual growth rate of 4.04 percent in milk production and has become an important source for households to supplement their farm incomes. Animal husbandry contributes 26 percent of Gross Value Added (GVA) in agriculture nationally and it also makes a reasonably good contribution to Himachal Pradesh's farm economy. Appraising the consumer preferences in the perspective of future demand projections is called for vis-a-vis development of dairy farming in Himachal Pradesh.

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1.1 Objectives of the Study

The study was taken up with the following specific objectives:

(*i*) To project the milk production and requirement in future.

(*ii*) To study the consumer behaviour and their preferences.

(*iii*) To study the consumer perspective for milk consumption.

2. Methodology

In order to study consumer preferences for dairy products, Shimla and Palampur urban areas were purposely selected on the basis of expert advice from the officials of Himachal Pradesh State Co-operative Milk Producers' Federation (Milkfed), existing information as well as personal observations. A sample of 60 households from different localities of Shimla city and 30 households from Palampur city was drawn randomly. Thus, the study is based on the responses of 90 sampled urban households representing different types of localities, income groups, occupations, backgrounds, etc. Further, the sample was divided into three income groups *viz*. Low Income Group (LIG), Middle Income Group (MIG) and High Income Group (HIG). The details of this classification have been presented in Table 1. The data for this study covered the agricultural year 2015-16.

TABLE 1: CLASSIFICATION OF SAMPLED URBAN HOUSEHOLDS

Income groups	No. of Households	Income Rs./Month
LIG	30	< 30000
MIG	30	30000 to 60000
HIG	30	> 60000
Total	90	< 30000 to > 60000

Source: Author's own computation

3. Results and Discussions

3.1 Projections of demand and supply of milk

The supply of milk in Himachal Pradesh largely comes from the milk produced within the state. Some of it has to be supplied to National Milk Grid (NMG). About 4958 thousand litres was supplied during 2013-14. On the other hand, the standardised and pasteurised milk in polypacks finds its way to the state from neighbouring states of Punjab and Haryana. The projections of demand and supply of milk have been based on the expected increase in population calculated on the basis of decennial growth rate in this respect and the growth rates of demand and supply calculated on the basis of last nine years. The projections have been made year-wise from the year 2010-11 to 2029-30 on the basis of annual compound growth rate of demand for milk during the period of last nine years. Human population has been anticipated to increase from about 6.8 million during 2010-11 to about 10 million ending 2029-2030 (Table 2). Milk production is projected to increase from 907 million litres to 1181 million litres per annum during the corresponding period. This calculation is based on the annual compound growth rate (CGR) of 0.22 percent. Thus, whereas the population is likely to increase by 47 percent the milk production will be 30 percent lesser during this period indicating lesser per capita availability in future as compared to the present time.

On the demand side, two types of demands have been considered, the nutritional requirement and economic demand. The nutritional requirement has been calculated on the basis of minimum consumption of 250 grams of milk per day per capita based on the recommendations of Indian Council of Medical Research (ICMR). The production of milk was 907 million litres during 2010-11 while the nutritional demand was 627 million litres. Hence a surplus of about 280 million litres was observed. The nutritional requirement for milk is likely to increase to 912 million litres during 2029-30 indicating 'surplus' milk over it to the tune of 269 million litres per year (Table 2).

TABLE 2: PROJECTIONS OF MILK PRODUCTION, NUTRITIONAL REQUIREMENT AND ECONOMIC DEMAND FOR MILK IN HIMACHAL PRADESH

(in million litres)

Year	Projected population*	Milk production**	Nutritional requirement***	Economic demand****	Surplus/deficit	
					Nutritional	Economic
2010-11	6864602	907.00	626.39	935.70	280.60	-28.7
2011-12	7001894	1119.86	638.92	987.86	480.94	131.99
2012-13	7141931	1138.61	651.70	1042.94	486.91	95.67
2013-14	7284770	1141.11	664.73	1101.08	476.38	40.02
2014-15	7430465	1143.62	678.03	1162.47	465.59	–18.85
2015-16	7579074	1146.14	691.59	1227.28	454.55	–81.14
2016-17	7730655	1148.66	705.42	1295.71	443.24	–147.04
2017-18	7885268	1151.19	719.53	1367.94	431.65	–216.75
2018-19	8042973	1153.72	733.92	1444.21	419.80	–290.49
2019-20	8203832	1156.26	748.60	1524.73	407.66	–368.47
2020-21	8367909	1158.80	763.57	1609.74	395.23	–450.93
2021-22	8535267	1161.35	778.84	1699.48	382.50	–538.13
2022-23	8705972	1163.90	794.42	1794.23	369.48	–630.33
2023-24	8880091	1166.46	810.30	1894.26	356.15	–727.80
2024-25	9057693	1169.03	826.51	1999.87	342.51	–830.84
2025-26	9238847	1171.60	843.04	2111.37	328.55	–939.77
2026-27	9423624	1174.18	859.90	2229.08	314.27	–1054.91
2027-28	9612096	1176.76	877.10	2353.36	299.65	–1176.60
2028-29	9804338	1179.35	894.64	2484.56	284.70	–1305.22
2029-30	10000424	1181.94	912.53	2623.08	269.40	–1441.14

Source: Author's own computation

*On the basis of annual population growth 2%; **Based on ACGR 0.22 %.

***Based on per capita per day minimum requirement of 250 gms of milk as recommended by Nutritional Advisory Committee of ICMR, New Delhi.

****Based on annual growth in State Domestic Product (SDP) 8.08% & Income elasticity of demand for milk 0.69.

The economic demand based on the factors listed above was observed to be higher than the nutritional requirement indicating higher per capita intake of milk as compared to ICMR recommendations. The future demand of milk has been based on the current increase in State Domestic Product (SDP) of 8.8 percent per annum during 2004-05 to 2012-13 and income elasticity of demand for milk at 0.69. The income elasticity of demand for milk and milk products has been worked out on the basis of quick survey based on 90 urban and rural households of the state. It was observed that economic demand of 935 million litres during 2010-11 is likely to increase to 2623 million litres during 2029-2030. This clearly indicates that the domestic supply will not be able to keep pace with requirements and the gap between demand and supply would continuously widen from 28 million litres to 1441 million litres during projection period. This deficit in supply of milk is likely to be met by importing increased quantity of milk from neighbouring states, the current imports being 28.70 million litres per annum.

This scenario makes it clear that Himachal Pradesh would remain a milk deficient state in near future. The growing percentage of deficit

in future puts it in very difficult position. There is every likelihood that import from other states would increase. The problem is likely to be further compounded by quality aspect of milk. Poor availability of fodder in many areas, decreased milch animal population and predominance of local breeds results in poor milk (in both quality and quantity) which is low in fat percentage (2-3%) and hence cannot be marketed. Food Safety and Standards Act, 2006 (enforced 05.08.2011) makes 6.0% fat and 9.0% SNF, a minimum requirement for buffalo milk; 8.3% fat and 3.02% SNF for cow milk. The commercialization of agriculture towards vegetable and fruit crops has reduced the availability of crop by-products to animals. Moreover, average land holding in the state is decreasing due to increase in human population and other factors resulting in decrease in livestock holdings as well. The dairy development programmes in future should therefore concentrate on improvement of milk quality as well as productivity of milk animals for increased supply within the state.

3.2 Consumer behaviour and preferences

Preferences and consumer behaviour differ in different regions and across different occupations due to socio-economic factors and food habits. However, consumer behaviour and preferences are dynamic variables and systematic studies in this direction have to be carried out from time to time. Keeping in view the importance of such studies, a consumer survey in urban areas in Himachal Pradesh *viz*. Shimla city was conducted with following results.

Average family size is 3.82 persons per family (Table 3), which increased with the income level. Out of total persons, 28 percent were non-vegetarian. On an average, the family income is Rs. 48,000 per month.

TABLE 3: GENERAL FEATURES OF SAMPLED URBAN HOUSEHOLDS

Particulars	LIG	MIG	HIG	All
No. of House holds	30	30	30	90
Average family size	3.60	3.75	4.50	3.82
Adult	2.40	2.00	2.00	2.18
Children	1.20	1.75	2.50	1.64
% of Non-Veg. in Total Persons	30	28	22	28
Average Monthly Income (Rs./ House hold).	22000	45000	75000	48000

Source: Primary data

3.2.1 Purchase of dairy products: Monthly quantity of various dairy products purchased by sampled urban households is presented in Table 4 wherein it may be observed that average quantity of milk purchased by urban households was 85 litres per month which ranged between 60 litres in case of low income group (LIG) to 120 litres in case of high income group (HIG) households. The quantity of other dairy products purchased was 1.36 kg ghee, 0.58 kg butter, 0.61kg cheese and 1.43 kg curd per month. On an average, a household spends 11.50 percent of total income on dairy products. The share of total income spent on dairy products is relatively higher (15.40%) among LIG households than HIG (8.6%) households.

TABLE 4: AVERAGE MONTHLY QUANTITY OF DAIRY PRODUCTS PURCHASED

(Qty./Household.)

Particulars	Low Income Group	Middle Income Group	High Income Group	All
Milk (lit)	60	75	120	85
Ghee (kg)	1.60	1.75	2.00	1.36
Butter (kg)	0.50	0.60	0.75	0.58

Particulars	Low Income Group	Middle Income Group	High Income Group	All
Cheese (kg)	0.30	0.80	1.00	0.61
Curd (kg)	1.30	1.50	1.60	1.43
% of income spent on dairy products	15.40	10.50	8.60	11.50

Source: Primary data

3.2.2 Brands of packed milk: The various brands of packed milk available in the urban centres of Himachal Pradesh and their preference ranks have been presented in Table 5. The Verka brand of packed milk from Punjab and Vita brand from Haryana have good market in Himachal and are preferred by majority of urban consumers. The Him milk from H.P. milkfed ranked fourth in the consuming market due to reported poor quality and foul smell and is not preferred by many consumers.

TABLE 5: PREFERENCE PATTERNS OF PACKED MILK AMONG URBAN CONSUMERS OF HIMACHAL PRADESH

Brand	Processed by	Fat %	SNF %	Price/ Pack	Preference Rank
Verka	Punjab Milkfed	4.5	8.5	25	I
Vita	Haryana Milkfed	4.5	8.5	25	II
Milktime	Private Dairy	4.5	8.5	25	III
Him	H.P. Milkfed	4.5	8.5	25	IV
Vatika	Private Dairy	4.5	8.5	25	V
Farmer	Private Dairy	4.5	8.5	25	VI
Super	Private Dairy	4.5	8.5	25	VII
Gau Amirat	Private Dairy	3.5	8.5	20	VIII
Kamdhenu	Private Dairy	3.5	8.5	20	VIII

Source: Own Survey, 2015-16.
Note: All these brands are marketed in polypacks of 500 ml.

3.2.3 Reasons for preferring FWM: Reasons cited by consumers for purchasing Fresh Whole Milk (FWM) over packed milk (Table 6) show that FWM is mostly preferred due to natural flavour (65%), home delivery (72%) and monthly payment (96%). The FWM is better for processing into butter and cheese and this is the reason for purchasing it as reported by 29 percent sampled consumers. Old relation of family with milkman is the reason reported by 49 percent consumer households for purchasing FWM. The milk being good for infants was the reason reported by 15 percent sample households. The importance of home delivery underlines the consumer convenience service being provided by the milkmen, against which the packed milk market may find difficult to compete.

TABLE 6: REASONS FOR PURCHASING VARIOUS TYPES OF MILK IN URBAN AREAS OF HIMACHAL PRADESH

(% Multiple Responses)

Reasons for Preferred Milk Type	LIG	MIG	HIG	ALL
A. **Fresh Whole Milk (FWM)**				
I. Natural Flavour	65	70	60	65
II. In home Delivery	72	70	75	72
III. Monthly payment	95	94	98	96
IV. Good for Butter, Cream Processing	25	30	32	29

Reasons for Preferred Milk Type	LIG	MIG	HIG	ALL
V. Old Relation with Milkman	50	45	52	49
VI. Good for Infants	15	13	18	15
Total No. of H.H. Purchasing	10	12	15	37
B. **Packed Milk**				
I. High Quality	80	78	75	78
II. Easy in Handling	30	35	28	31
III. Good for Curd Making	75	70	78	74
IV. No Adulteration	60	65	63	63
V. Fresh Whole Milk is not Available	16	20	18	18
VI. Constant Quality	94	90	96	93
VII. Family Member to Take Delivery of Fresh Milk	8	10	13	10
Total No. of H.H. Purchasing	**20**	**18**	**15**	**53**

Source: Own Survey, 2015-16.

3.2.4 Reasons for preferring packed milk: The high and consistent quality as prescribed by the Food Safety and Standards Act, 2006 is the reason, which convinced about 78 percent consumers to buy this quality of milk (Table 6). The packed milk is available in 500 ml size, which is easy in handling and 31 percent of total consumers bought the packed milk only because of this reason. The quality of packed milk remains constant whereas the quality of FWM varies with season, quality of fodder, other practices and also due to integrity of milkmen, many of whom do not hesitate to adulterate it with water and these were the reasons due to which 93 percent of total milk consumers opted for it. This milk is good for curd making and consumers mostly converted it into curd and it was the reason for purchase put forwarded by nearly 74 percent consumers. There is no scope of adulteration in packed milk and hence quality standard was the reason reported by 63 percent consumers. The non-availability of FWM compelled 18 percent consumers to purchase packed milk. The family of working couples do not find it convenient to wait for milkman whose normal delivery time varies between 8 AM to 11 AM and hence buy packed milk at their own convenience. This was the case with 10 percent consumers.

3.3. Consumer perspectives

3.3.1 Consumers' perspectives for consumption of FWM: Various problems were reported by urban consumers regarding fresh whole milk supplied by milkmen and their responses are summarised in Table 7. It may be observed from this table that diluted milk supplied by the milkmen is the major problem reported by 84 percent of total consumers of this milk. High prices of such milk are the next problem felt by 72 percent consumers. In the initial days the milkmen supply good milk but after some time the quality of milk is deliberately deteriorated by adding more water, such problem was reported by 69 percent consumers. The diluted milk does not curdle properly and 20 percent consumers complained about it. Low quality of milk supplied by the milkman was reported by 10 percent sampled consumers. Low fat in the milk was reported by 8 percent consumers.

The consumers suggested that there should be quality control on milk supplied by the milkmen (83%). Though there is provision of quality control and officials of health department check the milk supplied by milkmen in the urban areas, such checking is hardly ever done and is ineffective. The prices of milk are increasing year after year

inspite of poor quality of milk. There is no check on prices. It is suggested that there should be some mechanism to control the prices of FWM supplied by milkman in the urban areas (40%). Consumers also suggested that govt./federation should supply the loose/FWM through booths in the city. By doing so, quality and prices of milk might be maintained. This was suggested by 45 percent consumers.

TABLE 7: CONSUMERS' PERSPECTIVES ON CONSUMPTION OF MILK & MILK PRODUCTS

(%, Multiple Response)

Consumers' Perspectives on Milk Products	Low Income Group	Middle Income Group	High Income Group	ALL
A. **Fresh Milk (Problems)**				
1. Diluted Milk	80	85	86	84
2. Quality Deterioration	65	70	72	69
3. Un-Hygienic Milk	10	12	15	12
4. High price	75	70	72	72
5. Not good For curd Making	20	22	18	20
6. Desired Quantity Not Available	8	10	12	10
7. Low Fat	3	5	7	8
8. Adulteration	10	8	12	10
Suggestions				
I. Quality Control	90	80	78	83
II. Price Control	40	30	50	40
II. Booths For Loose Fresh Milk	35	45	55	45
B. **Packed Milk (Problems)**				
1. Bad smell	90	85	92	89
2. High Price	80	78	82	80
3. Short Supply of Desired Brand	10	12	16	13
4. Available on Cash Payment Only	52	55	60	56
5. Poor Keeping Quality	20	15	25	20
Suggestions				
I. Regulate Supply	15	25	20	18
II. Low Price	70	65	60	65
III. Home Delivery	45	50	40	45

Source: Own Survey, 2015-16.

3.3.2 Consumers' perspectives for packed milk consumption: The problems faced in consumption of packed milk by consumers have been presented in Table 7, wherein it may be seen that offensive smell in the packed milk is the major problem as reported by 89 percent consumers. This may be due to the fact that most of the times, consumer has no way of finding out date of packing as it is usually stamped on pack which is blurred and sometimes gets erased during transportation. Thus, he has to rely upon the verbal assurance of retailer about its freshness, whereas it might have gone stale.

High price of this milk in comparison to FWM is complained by among 80 percent consumers. The consumers purchase packed milk from the shops where it is available on cash payment. Most of the shop owners do not sell it on credit. This problem is reported by 56 percent consumers. Poor keeping quality of packed milk is the problem reported by 20 percent consumers. Short supply of desired brand of packed milk is reported by 13 percent consumers in urban areas.

To increase the consumption of packed milk in urban areas, the consumers suggested that the supply of desired brand of milk should be maintained. Price control of packed milk is suggested by 65 percent consumers. The provision of home delivery of this milk is suggested by 45 percent consumers.

4. Conclusion and Suggestions

It may be concluded from above analysis that consumption of milk in urban areas is directly related with the income level. Fresh whole milk supplied by local milkman is most preferred milk among all income groups. The main reasons for this pattern are natural flavour, home delivery and low prices. Bad smell and high prices are the main problem in purchasing packed milk. Major portion of milk purchased is consumed directly and used in preparing tea/coffee. The other dairy products are also being consumed directly. A few measures suggested are:

1. Future plans for dairy development in Himachal Pradesh must keep in mind the increase in economic demand for milk and milk products, even though the nutritive requirements would be fully met within the state.
2. The dairy development programmes in future should therefore concentrate on improvement of milk quality as well as productivity of milk animals for increased supply within the state.
3. There should be some mechanism to control the prices of Fresh Whole Milk (FWM) supplied by milkman in the urban areas.
4. Government/federation should supply the loose/FWM through booths in the city so that quality and prices of milk might be maintained.

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The Dynamics of Indian Oilseed Sector in the Past Decade (2010-2020) and Way Forward

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Abstract

This paper draws attention to one of the important issue on the dynamics of Indian oilseed sector, in the backdrop of self-sufficiency in oilseed production in the country. First, it attempts to discern crop production niches, annual swings in area –crop wise, reasons for reduction in oilseed area, government schemes for oilseed promotion, etc. Second, how best the area can be increased under oilseeds with the current government interventions in the country. To gain insights on the oilseed area, secondary data were used to derive conclusions. This paper examines the journey of oilseeds sector during the past decade (2010-19) in terms of area, production and productivity swings/trends annually, and the ameliorative measures to be initiated to make good the shortfalls to sustain the supply chain of oil in the country. The results revealed that India is the leading castor producer (86 percent share of global production). For groundnut, rapeseed-mustard and sesame, the production varies between 10-20 percent of global production while other crops viz., soybean, linseed, safflower and sunflower, it is below 10 percent of global production. It is concluded that oilseed cultivation may be promoted in non-traditional areas and seasons as well as in rice fallows for horizontal intensification of oilseed area and production.

Keywords: *Oilseeds, self-sufficiency, production*

1. Introduction

In the vegetable oil map of the globe, India stands at 5th place, next to USA, China, Brazil and Argentina. In India, the oilseeds are raised in around 13-14 percent of the gross cropped area and contribute to 1.4 percent of the GDP and accrue 7 percent value of agricultural products. India has the distinction of producing seven edible oilseed crops (soybean, groundnut, rapeseed-mustard, sunflower, sesame, niger and safflower), two non-edible industrial oilseed crops (castor, linseed) and few perennial tree crops (oil palm, coconut and olive) on its diverse soil and agro environments under rainfed farming. Thus, the Indian oilseeds production system is largely prone to the vicissitudes of climate, mostly drought, calling for a need to drought proofing to fit into multiple cropping system. The cropping system forms a principal component of multifaceted farming system being adapted by the farming communities in their traditional ecological niches. During the past decade, the maximum area (28.05 mha) and production (32.75 mt) was achieved in 2013-14. Thereafter, there has been a decline in area by 2.3 mha from 2013 through 2017. As of 2018-19, an area of 26.48 mha was put to oilseeds farming with a production of 32.2 mt and productivity of 1216 kg/ha. Currently, India is forced to import more than half of its oil requirement. Of late, there seems to be a slacking of self-reliance mode in oilseeds sector, resorting to huge imports of oil with large foreign exchange outflow to the peril of domestic sector, a result of weakened erstwhile mission mode approach enshrined in National Mission on Oilseeds and Oil Palm (NMOOP).

1.1 Objectives of the Study

The study was carried out with the following objectives:

(*i*) To examine the journey of oilseeds sector during the past decade (2010-19) in terms of area, production and productivity swings/ trends annually.

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(*ii*) The measures to be initiated to sustain the supply chain of oil in the country.

2. Methodology

Secondary data available in the public domain were collected for the study. Many of the government data sources such as Directorate of Economics and Statistics, DAC&FW; commodity profiles of edible oil, Department of Commerce, GOI; Agricultural Statistics at a Glance; Directorate of Sugars and Vegetable Oils, DGCIS, Department of Commerce were consulted. The data thus sourced were collated; interpretations were drawn and discussed to arrive at meaningful inferences. With a view to bridge the yield gaps in various oilseeds raised in different agro-economic regions of the country, some of the practical and feasible measures to be adopted for making the country at least partially self reliant in oilseeds and to reduce the import of vegetable oils with huge drain of valuable foreign exchange and to conserve the same have been suggested.

3. Results and Discussion

As of 2017-18, the dominant states which contribute to the oilseed kitty in the country are Madhya Pradesh (6.64 mha), Maharashtra (4.13 mha), Rajasthan (4.13 mha), Gujarat (2.75 mha), Karnataka (1.09 mha) and Uttar Pradesh (1.08 mha). The respective states production contribution to the oilseed basket is 6.94 mt, 4.20 mt, 6.11 mt, 5.86 mt, 0.97 mt and 1.14 mt. Productivity wise, Tamil Nadu topped the states (2729 kg/ha), followed by Gujarat (2125 kg/ha), Haryana (2008 kg/ha), Telangana (1791 kg/ha), Rajasthan (1479 kg/ha), Punjab (1482 kg/ha) and Andhra Pradesh (13258 kg/ha) though the extent of crops raised are different in these domains.

3.1 Crop annual swings:

The crops like soybean (39 percent), groundnut (24 percent) and rapeseed-mustard (24 percent) contribute 87 percent of the total production. The major groundnut growing states are Gujarat, Rajasthan, Tamil Nadu, Andhra Pradesh; for sesame, West Bengal, Madhya Pradesh, Rajasthan, Uttar Pradesh; for soybean, Madhya Pradesh, Maharashtra, Rajasthan; for rapeseed-mustard, Rajasthan, Haryana, Uttar Pradesh, Madhya Pradesh; for sunflower and safflower, Karnataka and Maharashtra. The area, production and productivity during the past decade in various oilseed crops that have been witnessed due to a plethora of factors, is presented hereunder.

Castor:

There has been a continuous decline in area under production since 2011-12 (14.71 lakh ha) reaching 8.24 lakh ha in 2017-18. A concomitant deceleration in production was witnessed from 22.95 lakh tonne in 2011-12 to 12.15 lakh tonne in 2018-19, passing through violent annual swings. However, there was enhanced production from 1560 kg/ha (2011-12) through 1902 kg/ha in 2017-18. The decline in area has been mainly in Telangana where the crop is traditionally raised under rainfed condition, owing to the crop shifts in favour of other remunerative crops like cotton, maize, etc. Thus, the decline in area dragged down the production. The enhanced productivity with time has been due to improved high yielding hybrids culture under irrigated conditions in Gujarat, and more area put to irrigated cultivation in Rajasthan. By and large, under rainfed farming, farmers resort to crop shifts in favour of more remunerative, short duration, high value, less pest prone crops than the traditional crops. Crop shifts normally occur to achieve yield and economic stability of income under subsistence real farming rainfed situations.

Groundnut:

The traditional rainfed groundnut raised in Gujarat, Andhra Pradesh, Karnataka and Tamil Nadu witnessed cyclical trends in area and production. After every peak, there was a trough for a couple of years. The area which was 58.5 lakh ha in 2010 passing through a trough for 2 years peaked to 55.0 lakh ha in 2013 and to 53.3 lakh ha in 2016. The production too followed a trend akin to that of area with a yearly peak. The productivity was maximum in 2013 (1764 kg/ha) and 2017 (1893 kg/ha). In consonance with the area and production, the yield too tended to move southwards in a 2-year cycle across the country. Obviously, this type of cyclic pattern could be due

to rainfall, induced soil drought that may have occurred at any critical crop growth stage (early, mid, late), incidence of pest and disease stresses hindering crop biosynthesis adversely affecting sinks. To make good the low productivity in kharif, there is a need to bring additional area under irrigation in rabi/summer.

Soybean:

This nutritious protein crop is grown on black clay soils under rainfed situations in Madhya Pradesh, Maharashtra and Telangana. Its area increased from 9.6 mha in 2010 to 11.7 mha in 2013. Thereafter, it exhibited a declining trend till 2017 (10.3 mha). Akin to the area, the production too increased from 12.7 mt in 2010 to 14.6 mt in 2012 and 13.1 mt in 2016 and remained stable until 2018. Soybean yield had been high until 2012 (1353 kg/ha) and thereafter showed a declining trend till 2019. Though the area remained almost constant across years, productivity declined indicating the adverse impact of climate, monocropping, biological stresses that took a heavy toll of the crop raised under rainfed conditions. To obliviate the situation, the possibility of raising soybean in place of rice in rice-wheat cropping system in Punjab, Haryana and Uttar Pradesh may help to sustain the system.

Rapeseed-mustard:

An important rabi crop, it occupied 6.9 mha in 2010 and subsequently showed a marginal decline until 2019. The production stood at 8.1 mt in 2010 and it tended to decline until 2015 and then enhanced dramatically to reach the peak of 9.3 mt in 2018. The productivity of the crop almost remained constant from 2010 through 2015 (1180 kg/ha), thereafter it showed a increase to 1410 kg/ha in 2017 due to cultivation of elite varieties, efficient production and protection practices which assured moisture supply.

Sunflower:

The scenario of this oilseed crop which once had a glorious past in India, exhibited a pathetic cincture with a progressive decline in area from 0.9 mha in 2010 to 0.2 mha in 2017. In tune with the area, the production too decelerated with time from 0.6 mt in 2010 through 0.067 mt in the last decade. However, the productivity showed a marginal variation across years remaining at 700 kg/ha. This could be due to crop diversification to more remunerative crops, non-availability of seed of hybrids, weather aberration, biotic stresses and loss of interest among the farmers and the import of oil.

Sesame:

This traditional crop grown on 2.0 mha in 2010 tended to recede with time till 2017 (1.5 mha) barring 2015 (1.9 mha). Its production too followed a trend akin to the area of its cultivation. The crop productivity remained constant across years at a low level of 430 kg/ha; calling for a need to develop hybrids to cross the yield barrier; apart from introducing it as a catch crop/sandwich crop in multiple cropping systems across the nation as rabi/summer crop and in rice fallows across the country.

Niger:

This traditional crop grown in tribal belt under rainfed situation occupied 0.37 mha in 2010 and tended to decline in area with time (0.21mha in 2017). The production too exhibited a trend similar to its area. The yield of the crop remained static across around 300 kg/ha. The decline in area could be due to shifting cultivation by tribal farmers, non-availability of high yielding cultivars, crop shifting to other crop and Cuscuta parasite invasion.

Saffower:

This highly nutritious oil-bearing crop has a death knell since 2010 (0.24 mha) with successive decline in area to a low of 0.082 mha in 2017. Its production too declined with passing years to attain a low of 0.02 mt in 2018 from a high of 0.15 mt in 2010. The productivity of this rainfed black soil rabi crop remained static around 550 kg/ha with occasional bumps.

Linseed:

This non-edible, industrial oil producing crop grown as a rabi crop in Uttar Pradesh, Himachal Pradesh and Madhya Pradesh states of India maintained a stable area across the years (0.32 mha). The production followed a similar trend as that of its area peaking at 0.2 mt in 2019. The yield of this crop remained stable till 2015, thereafter showed an increasing tend (567 kg/ha). Since there is a growing demand for its non-drying oil and fiber in textile industry, there is a need to enhance its area and production evolving double purpose, high yielding genotypes, introduction as intercrop with other rabi crops, spread to other non-traditional areas in the North and North Eastern region; adoption to effective extension mechanisms to popularize it in rice fallows (utera).

3.2 Spread of new genes through seed chains:

Hitherto number of High Yielding Varieties (HYV's) were released in various oilseed crops for varied agro-economic zones of the nation. Some of them have ruled for several years and have outlived their utility. They need to be replaced by new genes. Recently, the following new varieties/ hybrids in kharif/rabi oilseed crop have been identified for release in the decade.

1. **Sunflower:** LSFH171 (Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana and Eastern India), Prabhat (AP), PDKVSH 952 (Maharashtra).

2. **Linseed:** JL 66, Varsha Alsi, Utera Alsi, Sabour Tisi 1, JLS 95, Him Palam varieties.

3. **Castor:** GNCH 1(for late kharif and rabi season in south and mid Gujarat) and LSL 93 (Maharashtra), YRCH 2(Tamil Nadu), GCH 8 (all castor areas), ICH 66 (rainfed and irrigated areas of peninsular India).

4. **Safflower:** ISH 764 variety (for rainfed and irrigated areas), ISF 1 (high 76 percent oleic type for rainfed and irrigated areas), DSH 185 (first CMS hybrid), NARI 96 variety (Maharashtra, Telangana, AP, MP, Chhattisgarh and Rajasthan)

To disseminate these new genotypes to the farmers' fields, it warrants to put them in seed chain (basic-breeder-foundation-certified seed) by replacing the old genotypes at 20 percent annually in a structured phased manner so that within a span of 5 years, the farmers' fields could be inundated with HYVs. This is easy to achieve in crops possessing greater Seed Multiplication Ratio (sesame, niger, mustard, sunflower, safflower, linseed) in comparison with bold seeded crops like soybean, groundnut and castor. Thus, Seed Multiplication Ratio (SMR) and Seed Replacement Ratio (SRR) are of great significance in the transfer of new genes to farmers' fields in a time targeted programme. This aspect of seed replacement would be quicker in case of self-pollinated crops (groundnut, sesame, niger, soybean, safflower and mustard) as compared to cross pollinated crops (sunflower and castor) and their hybrids.

3.3 Indian farm distress/crisis:

According to an estimate, by 2025, the demand for edible oils would scale up to 33.7 mt with per capita consumption of 25.6 kg/head and a population growth rate of 5 percent. The annual growth rate of oilseeds as of now is around 2 percent and the additional demand at rate of 6 percent is projected to be met through copious imports of edible oils like palm oil, soybean and sunflower.

Currently, the oilseed production scenario in the country is gloomy, especially in crops like groundnut, castor, sunflower, safflower, sesame, niger, linseed which are essentially raised under rainfed situations and are prone to environmental and soil drought at any stage of critical crop growth stages resulting in drastically dwindled productivity and production. However, the picture is bright in case of rapeseed and mustard and soybean crops as evidenced by the decadal statistics.

Recent (NCRB) reports revealed that Maharashtra topped in farmers suicides (3594) followed by Karnataka (2405), Telangana (908). During 2018, 10349 people involved in the farm sector (5763 farmers, 4586 agricultural labourers) have been reported to commit suicide in India. The gender wise farmer suicide in Telangana showed

that of the 908 suicides 801 were male and the rest female farmers. Majority of the farmers who committed suicide (720) were land owners, while 180 were tenant farmers. In Andhra Pradesh, 664 farm suicides were reported, of which 593 were males and the rest were female farmers. Of this, 199 were land owners, 166 were tenants and 299 agricultural labourers. Increased input cost, drought, poor market, low profits were cited as reasons in Rayalaseema and north coastal Andhra Pradesh. Farm distress and resultant suicides are the function of the increased production costs, low yield, biotic and abiotic stresses, non-remunerative prices of produce, unassured market, low level of government interventions, spiraling indebtedness, social shaming in the community. A study made earlier on farmers suicides revealed that monoculture farmers committed suicides as compared to farmers practicing multiple cropping and farming systems including dairy, poultry, goatery; as these are stable income producing avenues and more sustainable.

3.4 Technology dissemination

In the National Agricultural Research System, a number of crop production/crop protection technologies are being generated to enhance farm productivity of genotypes in various oilseed crops in different agro-economic regions of the country. Of these technologies, only few critical technologies have a bearing on the productivity of a crop. This need to be delineated through structured on farm extension research. Only such critical production and protection technologies are to be transferred to the farmers, for all the technologies are not transferable. Hitherto many of the transfer of technology interventions by the extension mechanism could not yield satisfactory results as they are cost prohibitive, impracticable, cumbersome, and confusing at farmer level. In India, as the land holdings are highly fragmented and are possessed by small and marginal farming communities, mechanization is always not feasible. Thus, the new technology dissemination needs to be targeted to this group of resource poor farmers and the technology should focus on reaching the unreached. Economic empowerment of the farming community through enhanced productivity with low production costs and greater take home money will go a long way in sustaining and improving their livelihood.

3.5 Bridging the yield gaps

By and large, as the on-station agricultural research is organized under controlled resource-rich conditions in small homogenous plots, it does not represent real farm situations where farmers operate under natural weather with limited resources on large holdings. Thus, a large gap exists in terms of inputs, resources, soil condition, biotic stresses, weather conditions, productivity, input cost and net returns. This calls for a need to effectively bridge the gaps through extension outreach programs such as on farm research, demonstration, farmer's participatory research in farmers' fields, farmers' training on latest technologies, validation of on-station technologies, reassessing technologies and re-introduction.

In technology dissemination, gaining the farmers confidence through introduction of effective technology interventions to enhance production with low input cost and greater take home returns will go a long way in improving agro-based economy and livelihoods of farmers. As the agricultural commodity process always fluctuates in an open market economy based on supply and demand, enhancing the productivity is the only option available to the farmer. Intensive crop cultivation in efficient crop zones offers greater productivity than extensive crop cultivation. Impact assessment of technology can be done post-technology intervention period through technology adoption and continuation, structured formats, lowered production costs, enhanced yields, improved living conditions improved social status, etc. For estimation of various gaps the following parameters could be adopted.

1. Technology gap: potential yield-demonstration yield

2. Extension gap: demonstration yield – farmers practice yield

3. Technology index (percent): (Potential yield-demonstration yield/Potential yield) × 100

By and large, the factors those contribute to technology gaps are - genotypes, seeding time, fertilizer, plant protection, etc. Technology index indicates the feasibility of improved technology on farmers' fields and the lower the index, more is the feasibility. Economic analysis of technology could be done by estimating gross returns, production cost, net returns, benefit:cost ratio, return per rupee invested, etc.

3.6 Transnational trade in oilseeds

As oilseeds are traditionally grown on moisture and nutrient starved rainfed conditions, the productivity had been limping until May, 1986 when the technology mission on oilseeds (TMO) was launched by the Government of India with the objective of reducing import of oil and outgo of foreign exchange with four mini missions - production and protection technologies, processing and post-harvest technology, input support system and processing and storage. India exported soymeal, castor oil, oil cakes, HPS groundnut and sesame seed earning $1000 million in 1996 with the contribution of oil meal being $900 million. In 1996, government allowed imports under open license with 20 percent import duty, resulting in increased import of 1.75 mt of edible oils to meet the 6 percent annual demand. TMO succeeded in enhanced production (7.28 mt) and reduced imports (1.95 mt) ushering in yellow revolution. Minor sources of oils such as rice bran, cotton seed oil, corn, oil cakes, sal, mango kernel, neem, mahua, jatropha and tumba contributed 16 percent of vegetable oil (1.38 mt). The success of TMO was due to HYV of crops, seed production, crop production technology, support prices, extension and training, better linkages between CACP, NAFED, NDDB and growers federation. India should strive to export value added products instead of oilseeds, oil and oil cakes for example, castor oil and mustard oil. There is a need to strengthen farmer-research-industry-policy sectoral interface for the development of oilseed sector. Owing to wide seasonal price fluctuation, FUTURS TRADING needs to be explored in exportable oilseeds.

3.7 India's place in global oilseed scenario

As of 2017, India had 71 percent and 86 percent share of global castor area and production, respectively, occupying the first place. In groundnut area and production, India's share is 19 percent and 20 percent, respectively, positioned at first and second place. Indian contributes 17 percent and 10 percent, respectively, to global rapeseed-mustard area and production occupying third place. In area and production of sesame, India contributes 18 percent and 14 percent occupying second and third ranks. In soybean area and production, India has 9 percent and 3 percent contribution occupying 4th and 5th position. With regards to linseed, India has a contribution 11 percent and 7 percent to world area and production occupying 4th and 5th position. In safflower and sunflower, the area and production, India is lagging far behind other nations of the world (Table 1).

TABLE 1. INDIA'S PLACE IN GLOBAL AREA AND PRODUCTION OF OILSEEDS (2017)

Crop	Area (000 ha)		% share	Rank	Production (000 mt)		% share	Rank
	World	India			World	India		
Groundnut	27940	5300	19	1st	47097	9179	20	2nd
Sunflower	26533	400	2	15th	47863	211	0.5	22nd
Soybean	123551	10600	9	4th	352644	10981	3	5th
Castor	1355	960	71	1st	1791	1568	86	1st
Linseed	2777	300	11	4th	2794	184	7	5th
Safflower	840	122	15	3rd	690	47	7	6th
Sesame	9983	1800	18	2nd	5532	751	14	3rd
Rapeseed-mustard	34740	6000	17	3rd	76238	7917	10	3rd

Source: Directorate of Economics and Statistics, DAC & FW

3.8 Minimum support price

The MSP of various oilseeds from 2014 through 2018 revealed that there was substantial enhancement in case of safflower (62.1 percent), niger (63.2 percent), sunflower (43.6 percent) and toria (38.7 percent) over time in comparison with that in 2014. However, the MSP increase in case of soybean (32.7 percent), sesame (35.8 percent), rapeseed-mustard (35.4 percent), toria (38.7 percent) has been less than the rest of the crops with groundnut having the least increase (22 percent).

Since there has been substantial deceleration in area and production of crops such as groundnut, sunflower, safflower, niger and linseed during the decade, the production too exhibited a declining trend with time. The government interventions through the increased MSP could not offset the productivity decline and return in these rainfed crops due to a plethora of reasons including drought, biotic stresses, increased production cost, competing crops and crop shifts (Table 2).

TABLE 2. MINIMUM SUPPORT PRICES OF VARIOUS OILSEED CROPS (2014-18)

Crop	2014-15	2015-16	2016-17	2017-18	2018-19	Percent increase over 2014
Kharif oilseeds						
Groundnut in shell	4000	4030	4220	4450	4890	22.0
Sunflower seed	3750	3800	3950	4100	5388	43.6
Soybean	2560	2600	3775	3050	3399	32.7
Sesame	4600	4700	5000	5300	6249	35.8
Niger	3600	3650	3825	4050	5877	63.2
Rabi oilseeds						
Rapeseed-mustard	3100	3350	3700	4000	4200	35.4
Safflower	3050	3300	3700	4100	4945	62.1
Toria	3020	3290	3560	3900	4190	38.7

Source: Directorate of Economics and Statistics, DAC & FW

3.9 Major Imports and Exports

The import of crude edible oils (palm oil, soybean oil and sunflower oil) necessitated by low domestic production, a consequence of declining area and productivity in many of the crops and increased consumption of oils by ever increasing demography. Table 3 shows that the import of palm oil has been steady over the years. However, there has been a dramatic increase in import of soybean and sunflower oils across the years. From a total of 75.6 lakh tonnes import in 2013, through 2018, the imports touched a staggering 124.5 lakh tonnes. The corresponding foreign exchange outgo has increased from Rs. 41630 crores in 2013 to Rs. 55780 crores in 2018. With the onset of global economic recession, India cannot afford to lose valuable foreign exchange hereafter (Table 3).

TABLE 3. INDIA'S CRUDE OIL IMPORT OF MAJOR EDIBLE OILS (2013-14 TO 2018-19)

Year	Palm oil		Soybean oil		Sunflower oil		Major oils	
	Quantity (lakh t)	Value (Rs Crores)	Quantity (lakh t)	Value (Rs. Crores)	Quantity (lakh t)	Value (Rs. Crores)	Quantity (lakh t)	Value (Rs. Crores)
2013-14	51.3	26440	13.5	8308	10.8	6882	75.6	41630
2014-15	69.7	33055	23.2	12908	17.1	9552	110	55515
2015-16	71.1	27409	39.6	19419	14.9	8323	125.6	55151
2016-17	53.6	26831	34.6	18703	17.3	9791	105.5	54875
2017-18	67.5	30851	31.5	16488	22.5	11857	121.5	59196
2018-19	64.2	25752	31.7	16373	25.8	13655	124.5	55780
Country of import	Indonesia, Malaysia, Netherlands		Argentina, Brazil, USA		Ukraine, Argentina, Russia, Netherlands			

Source: Commodity profile of edible oil for Sep 2019; Department of Commerce, GoI, Agricultural Statistics at a Glance, 2018 and DGCIS, Kolkata

The major oilseed products exported from India are soybean, groundnut, sesame, rapeseed, castor, mustard and linseed. The export of soybean products went down from Rs. 15195 crores in 2013 to Rs. 8772 crores in 2018. The export of groundnut increased substantially from Rs. 3291 crores in 2013 to a high of Rs. 19392 crores in 2016, thereafter exhibited a declining trend (Rs. 8435 crores in 2018). The exports of sesame remained almost static with marginal variations across the years. The export of rapeseed (Rs. 2253 crores) did show a declining trend from 2013 through 2018 (Rs. 1560 crores). Mustard products export increased from Rs. 401 crores in 2013 to Rs. 566 crores in 2018 with some lows in between. Exports of linseed products too declined from Rs. 150 crores in 2013 to Rs. 103 crores in 2018. The export earnings of sunflower and safflower have been marginal (Table 4). During 2018, India exported 5371037 t of oilseed products valued at Rs. 31131 crores, the best year being 2016 with an earnings of Rs. 34534 crores.

TABLE 4. INDIA'S AGGREGATE EXPORTS OF OILSEED PRODUCTS (2013-14 TO 2018-19)

(value in Rs. Crores)

Product	2013-14		2014-15		2015-16		2016-17		2017-18		2018-19	
	Quantity (lakh t)	Value	Quantity (lakh t)	Value	Quantity (lakh t)	Value	Quantity (lakh t)	Value	Quantity (lakh t)	Value	Quantity (lakh t)	Value
Soybean	4399187	15195	1855456	6569	690398	2753	1552305	4875	2218837	6327	2668130	8772
Groundnut	25986	3291	64846	11937	55204	14072	75008	19392	68725	11729	60734	8435
Sesame	267447	3681	384863	4822	337628	3127	318065	2825	348086	3135	323917	3949
Rapeseed	1443417	2253	1486760	2367	5126888	924	342035	641	603887	914	959231	1560
Castor	1147436	4717	1072145	5081	1134793	5010	1109103	4779	1132285	6964	966618	6390
Mustard	171122	401	121241	297	116615	329	128647	383	110392	319	216415	566
Linseed	28701	150	20399	100	14285	89	9437	82	13685	94	15174	103
Niger	20841	113	18155	108	14136	123	14070	117	9215	69	13370	95
Sunflower	8712	54	8650	58	9138	139	6454	45	10206	49	7855	48
Safflower	8052	35	8801	45	7746	29	8237	31	6820	29	4579	23
Coconut	70673	435	64759	560	74387	525	133595	907	77269	680	69839	667
Cotton	36696	72	46681	100	48143	111	62570	146	38989	74	39488	80
Others	17886	149	17535	219	21206	276	26998	302	39540	353	25277	439
Total	**7653412**	**28299**	**5171838**	**32289**	**3037267**	**27534**	**3786758**	**34534**	**4678185**	**30745**	**5371037**	**31131**

Source: Commodity profile of edible oil for Sep 2019; Department of Commerce, GoI, Agricultural Statistics at a Glance, 2018 and DGCIS, Kolkata

TABLE 5. THE SWINGS IN AREA, PRODUCTION AND PRODUCTIVITY OF OILSEEDS IN THE PAST DECADE

Year	Area (m ha)	Production (mt)	Productivity (kg/ha)	Per capita consumption	Domestic availability (mt)	Import (mt)
2010-11	27.22	32.48	1193	-	-	-
2011-12	26.31	29.8	1133	-	-	-
2012-13	26.48	30.94	1168	15.8	9.23	10.81
2013-14	28.05	32.75	1168	16.8	10.08	10.98
2014-15	25.73	27.51	1075	18.3	8.95	12.71
2015-16	26.09	25.25	965	19.1	9.19	14.85
2016-17	26.18	31.28	1195	18.3	10.75	14.00
2017-18	24.51	31.46	1284	19.3	10.38	15.36
2018-19	25.50	32.26	1265	18.5	10.50	14.88
2019-20	-	22.38	-	-	-	-

Source: Directorate of Economics and Statistics; DAC, MoA, GoI. Directorate of Sugars and Vegetable Oils; DGCI&S, Dept. of Commerce, Kolkata

As a part of National Food Security Mission (NFSM), with effect from 2018-19, NMOOP National Mission on Oilseeds and Oil Palm) scheme has been amalgamated with NFSM and is coined as NFSM (O&P) (National Food Security Mission- Oil and Palm) which has components of oilseeds, oil palm and tree borne oilseeds (TBO) and implemented through State Departments of Agriculture/Horticulture in 25 states. The principal objective is to enhance vegetable oil availability to reduce import, to enhance oil palm area to 17.1 lakh ha, to cover 2.1 lakh ha under TBO (olive, mahua, kokum and apricot, neem, jojoba, Karanja, Simarouba and tung) through financial assistance for seed, inputs and transfer of technology. By 2024, these interventions are targeted to produce 47.8 mt of oilseeds and oil production of 11 mt (currently 6 mt). To bridge the gap arising out of demand and supply, the import rate may rise by 78 percent to Rs. 1.3 lakh crore as per tentative estimates. DAC&FW is reportedly contemplating to start a mission on National Mission on Edible Oil (NMEO) to enhance domestic production, reduce import and move towards self-reliance which currently is in conceptual stage. Recently, Government of India has enacted three farm laws *viz*., The Farmers' Produce Trade and Commerce (Promotion and Facilitation), the Farmers (Empowerment and Protection) Agreement of Price Assurance and Farm Services, and the Essential Commodities (Amendment) whose implication will be seen in the ensuring years in the oilseed sector.

Of late, the rural youth are not interested in taking up farming as their livelihood. Census 2011 has revealed that 2000 farmers gave up farming daily, though farming continues to be the mainstay of Indian demography. This calls for a proactive credible business model in agriculture to retain growth in the rural farming sector. Farm holdings with less than 2 hectare area constitute 87 percent of farmers in India with some interstate variation. Of these small and marginal farmers, 62 percent are in Southern, Eastern and North-Eastern states with the highest in Uttar Pradesh (15 percent) and Bihar (11 percent) and the least in Punjab and Haryana (1 percent) with the farmers characterised by indebtedness, trapped in regressive market mechanism with least bargaining power. Minimum Support Price (MSP) bypasses these farmers due to their inability to participate in distorted market as they sell their produce just after harvest due to pressure from creditors whereas farmers from Punjab, Haryana and Western Uttar Pradesh are the real beneficiaries of the Government MSP as they can hold their produce for long.

4. Conclusions and Policy Suggestions

1. There is a need to regulate import of vegetable oils through a policy to enhance domestic production. Through self-sufficiency in vegetable oil production, there would be better livelihoods, profitability for farmers and processing industries.

2. When prices crash in the market, there should be market interventions by the Government through minimum support prices to various oilseeds.

3. For crop diversification and area expansion in oilseeds, cultivation needs to be promoted in non-traditional areas.

4. Wherever possible, oilseeds can be grown as intercrops in replacement or additive series in regular crops of regions.

5. The success story of technology mission on oilseeds which ushered in yellow revolution in the country needs to be revisited and revived to achieve almost self-sufficiency, reduced import and conservation of foreign exchange.

6. Farmers participatory on-farm/off campus research needs to be promoted in crop improvement, production and protection arena to reduce technology gap, to gain farmers confidence, to obtain validated assets and to enhance technology adoption. Thus, the interface of research-development-farmer will be strengthened in one go.

7. Reviving State Seed Corporations (SSC), State Farms Corporation of India (SFCI), National Seed Corporation (NSC), famers' association for their proactive role to pave a way to the spread of new genes to farming.

8. The oil palm cultivation, production and processing capabilities need to be enhanced to substitute for large scale imports from Malaysia, Indonesia, etc.

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Agro-Economic Research

Impact of Hail Protection Mechanism on Apple Crop in Himachal Pradesh- A Case Study of Shimla District*

ARVIND KALIA, NISHA DEVI SADRATE AND VAMIKA DARHEL

1. Introduction

Horticulture plays an important role in the economic development of Himachal Pradesh. Varied topography of the state provides great scope for apple production which is its major fruit crop. Shimla district is the highest apple producing belt in the state where the hail protection mechanism is functioning and protecting apple crops from hailstorms. For the past few years, apple orchardists have suffered heavy production losses due to hailstorm in areas where anti-hail cannons and nets are now being used to protect apple crop from hailstorm destruction. Anti-hail net is an old protection system against hailstorm which covers the plants like umbrellas. This mechanism is not provided by State Horticulture Department. Rather, farmers purchase anti-hail nets from private retailers and government provides 80 percent subsidy on them, out of which 30 percent is being borne by the State Government and 50 percent by Central Government. On the other hand, anti-hail cannon is a modern device which shoots a fire shot in the air to disperse off the hail causing clouds. Area covered by each anti-hail cannon is approximately 80-90 hectares *i.e.* within a radius of about 500 meters. For the first time in the country in 2010-11, the State Horticulture Department installed three anti-hail cannons on pilot basis in the state under a Central Government-funded project worth Rs. 3.29 crores. Due to lack of support in the form of financial assistance from the government for installation of more cannons, orchardists in Shimla took to adopting this technology on their own. The present study has been confined to examine the impact of hail protection mechanism on apple crop in the Shimla district of Himachal Pradesh. For this purpose the physical and financial aspects, technological effectiveness and institutional functioning of hail protection mechanism of the selected district has been studied. With this background the present study was conducted with following specific objectives.

1.1 Objectives of the Study

1. To study the institutional functioning, technological effectiveness and the economics of anti-hail cannons and nets.

2. To study impact of hail protection mechanism on apple production and income of apple orchardists.

3. To study benefits and drawbacks of hail protection mechanism from stakeholders perspectives.

4. To suggest policy recommendations for improved and better implementation of hail protection mechanism in the state.

2. Methodology of the Study

A multistage purposive cum random sampling technique was used in the selection criteria. Shimla district was purposively selected because ant-hail cannons were installed only in this district and also because it has the highest area coverage under anti-hail nets. Two blocks were selected on the basis of highest numbers of cannons installed and highest area covered under nets. Jubbal & Kotkhai block was selected for anti-hail cannons and Thanedhar block was selected for anti-hail nets. Five revenue villages were selected for anti-hail cannons on the basis of cannon installation and three villages were randomly selected for anti-hail nets. The study was based on a total sample of 120 orchardists, out of which 90 were mechanism users (45 users each for cannon and net) and 30 non-users (15 non-users each for cannon and net).

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3. Major Findings of the Study

Apple is the most important fruit crop of Himachal Pradesh, which constitutes about 49 percent of the total area under fruit crop and about 85 percent of the total fruit production. Shimla district alone accounts for about 55-60 percent of total production in the state. Block-wise, Jubbal & Kotkhai accounted for highest area and production among all 10 blocks of the district during all years (2009-10 to 2017-18).

The analysis reveals that there were two types of mechanism used to protect apple crops from hailstorm: anti-hail cannons and nets. Hail protection mechanism was mostly installed and used in district Shimla. Department of Horticulture was the main implementing agency, which monitors the functioning of anti-hail cannons and nets used for protecting apple crop. In Jubbal & Kotkhai block, farmer committees were formed by the orchardists to monitor the functioning of privately installed cannons in their areas during 2016. To protect apple crop from hailstorms, the State Government enhanced the subsidy on anti-hail nets from 50 percent to 80 percent during the year 2015-16. But there was no provision of assistance on anti-hail cannon before the year 2018. Ever since, the State Government introduced 60 percent subsidy on cannons.

One time installation cost of the government installed cannon at Braionghat was Rs. 47,54,000 during 2016-17. The material cost of operations like cannon shots, cost of cylinder, freight charges, cannon operator and labour were also incurred by the government during the years 2013-14 to 2018-19. In case of privately installed cannons for 2018-19 at Kalbog, Ratnari, Baghi and Mahasu villages of Jubbal & Kotkhai block, one time total installation cost was Rs. 2,87,99,525, which was Rs. 76,99,525, Rs. 68,00,000, Rs. 55,00,000 and Rs. 85,00,000, respectively, for the said villages. Installation cost was highest for Mahasu village, cost of cylinder refills and freight charges were highest for village Baghi while cannon operator charges were highest for Kalbog village.

The analysis of physical and financial achievements of anti-hail nets reveal that district Shimla had highest area covered under nets with subsidy and also highest subsidy provided on nets. Block-wise examination shows that Thanedhar block had highest coverage area under nets with subsidy and also attained highest share of subsidy on nets among all blocks of district Shimla.

Majority of the sample of anti-hail cannon and net users and non-users belonged to general category. In both the blocks, total males were more than total females. Majority of sampled orchardists were in the age group of 18-60 years. Educational status of sampled orchardists revealed that majority of anti-hail cannon users and non-users were graduates while majority of anti-hail net users were secondary level educated and non-users were graduates. Agriculture (horticulture) was the main and subsidiary occupation for majority of sampled orchardists. In both the blocks, anti-hail cannon and net users and non-users generated highest income from their apple orchard produce sale. Per household annual income was higher among users than non-users in both the blocks. Per farm own land area and gross cropped area (GCA) of users was more than that of non-users in both the blocks. Maximum area of their land was under apple crop, which was about 95 percent for anti-hail cannon users and non-users and about 92 percent for anti-hail net users and non-users. Per farm production of apples was higher among users than non-users under both mechanisms. Further, per farm quantity sold, total price and average price per box of apples and other fruits was higher among anti-hail cannon and net users than non-users.

Number and value of equipment and machinery was higher among users in both the blocks. For anti-hail cannon users and non-users, highest value was attributed to grading and packing machine of apple and for anti-hail net users and non-users, this was attributed to petrol/diesel spray machine. Per household total value of equipment and machinery was higher among users as compared to non-users of anti-hail cannon and net. Per household value of buildings; dwelling house, cattle shed and storage/shop was higher among users as compared to non-users in both the blocks. Per household number and value of other assets was also higher among

users, where four-wheeler had highest value in other assets owned by sampled orchardists. But, per household number and value of livestock was higher for non-users than users. Cattle were the major livestock reared by sampled orchardists in both the blocks. Anti-hail cannon and net users attained better socio-economic profile and farm level characteristics than non-users. They also attained better living standards as compared to non-users. This was due to increased production, sale and income from the produce because of the protection of their orchards with anti-hail cannons and nets.

The study reveals that anti-hail cannon users and non-users mentioned hailstorm as the biggest cause of loss to apple crop. Maximum loss due to hailstorms occurred during fruit setting season for cannon users and flowering season for cannon non-users. For anti-hail net users and non-users also, maximum loss of apple crop was due to hailstorm during all seasons. Maximum loss due to hailstorm occurred during flowering season for both, users and non-users of anti-hail net mechanism. Thus, before the installation of hail protection mechanism in the study area, hailstorm was a major event of loss for apple crop of sampled orchardists of district Shimla and this mostly happened during flowering and fruit setting seasons. In both the blocks, occurrence of hailstorms was more for non-users than users during study reference period. Higher frequency, duration and intensity of hailstorm accounted for non-users of anti-hail cannon. The frequency of hailstorm was highest (>3 times) for both users and non-users of anti-hail net. The duration and intensity of hailstorm was higher for non-users of anti-hail net.

Non-users of both mechanisms in the district reported higher expected loss of apple (in terms of affected area, quantitative and qualitative loss) due to hailstorms as compared to mechanism users. Thus, the hail protection mechanism had positive impact on its users of study area. Further, the analysis reveals that majority of users and non-users of both blocks (both mechanisms) were not satisfied about the role of horticulture department in terms of visits undertaken and mechanism advised post loss of apple crop due to hailstorm in their areas.

Hail protection mechanism has a two way impact on apple produce. Firstly, it increase the quantity of apple production by protecting the crop from hail damage during flowering and fruit setting period and secondly, the mechanism improves the quality of the produce by substantially reducing the hazards of marks and dents on the fully ripe fruit, hence giving the mechanism users a better price for their produce. For non-users, quantity of apple is reduced by early damage to the crop from hail and also the quality of produce is compromised by marks and dents in the fully ripe fruit. This results in comparatively lesser price for their apple produce in the market. Therefore, hail protection mechanism has positive impact on the income and the production of apple crop for the users compared to non-users.

All the users and non-users of anti-hail cannon and net mechanism were aware about hail protection mechanism in the district. Horticulture department was the main source of information about this mechanism for majority of users and non-users of both blocks in study area.

The analysis reveals that 100 percent anti-hail cannon and net users were aware that the horticulture department provided subsidy on anti-hail nets in the state. 100 percent anti-hail net users had applied for assistance on their purchase of nets, but 100 percent cannon users did not apply for subsidy because they did not purchase any anti-hail net due to anti-hail cannons being installed in their areas. About 84 percent anti-hail net users received subsidy on their purchase of nets. Majority of net users got 80 percent subsidy on their purchase of nets. Total per household subsidy was Rs. 87,339.58. Total subsidy given to all the net users was Rs. 33,18,904.

Further, the analysis reveals that majority of anti-hail net users responded that the horticulture department took a period of more than 3 months between processing and sanctioning of their subsidy applications. Total per farm area for net users was 0.93 hectare, out of which 60 percent was covered with subsidy and remaining 40 percent was covered without subsidy. Majority of net users (about 91%) responded that the financial assistance on nets was inadequate and is insufficient to meet

their requirements. Total per farm buying cost, installation cost and un-installation cost of anti-hail nets was Rs. 5,73,611.11, Rs. 31,300.00 and Rs. 13,284.44, respectively. The bigger land holding size group paid higher costs for using anti-hail nets in their farms.

The study reveals that the government officials recommended the installation of weather radars for better weather assessment. According to them, cannons are more effective than nets in protecting the apple crop from hailstorms. Farmers in their area preferred cannons over nets. The only drawback of the cannons according to the officials was that it is not working effectively. Biggest benefit of cannons according to them is the protection it provides to the crops against hailstorm. As no financial or otherwise assistance was given by the government, the orchardists had to bear heavy costs for private installation of cannons. The orchardists suggested installation of radars for accurate weather forecast, and that at least 3- 4 cannons installation in every panchayat, on the peak of the mountain for maximum impact.

Majority of users for both mechanisms responded that the horticulture department did not convene any meetings and give advice about hail protection mechanism in study area and the meetings held and information given about hail protection mechanism was ineffective. In total, 80 percent of the users perceived the mechanism to be good for apple protection and the remaining 20 percent perceived it to be average. In total, 68.89 percent users responded 75-100% quantitative protection to apple crop and 72.23 percent users responded same percentage of qualitative protection for both mechanisms. In total, 54.44 percent users preferred cannon over net. Out of total mechanism users, majority of them preferred cannon as a better hail protection mechanism for protecting their apple crop from hailstorms. Majority users preference for their mechanism (whether cannon or net) was mostly due to maximum protection of apple crop.

The analysis concluded that majority of users suffered the problem of high installation cost of the mechanism. Radar installation, government takeover of cannons, and more cannons installation were the top three recommendations given by the majority of anti-hail cannon users. Net structure provision, subsidy area increased and maintenance/ servicing were the top three recommendations given by the majority of anti-hail net users.

The two primary reasons given by non-users for not opting out this mechanism were: expensive and more labour effort. 100 percent of the non-users were willing to use this mechanism, out of which 63.33 percent preferred cannon and 36.67 percent preferred net. Majority of non-users suggested government control/takeover of the mechanism.

4. Policy Recommendation

As can be concluded from the study, cultivation of apple crop is the main source of income for majority of sampled orchardists and with hailstorms reported to be the biggest cause of loss to apple crop, special emphasis should be paid on protecting the apple crop from any kind of losses (particularly hailstorms) and to increase its production and sale. As Department of Horticulture is the main implementing agency for monitoring the government installed anti-hail cannons, it does not help with installation or operation of the privately installed cannons. Thus, the government through the Horticulture Department should help the orchardists by undertaking the financial and physical aspects of the functioning of the privately installed cannons. The government can keep the management in the private hands by letting the orchardists operate the cannons but provide financial help by fully funding the installation and annual operation costs like the costs of cylinder refills, labour costs, etc. The horticulture department also provides financial assistance on anti-hail nets, which is presently 80 percent in the state. Orchardists face a lot of trouble in installing and un-installing these nets every year in their orchards. Hence, the horticulture department can help provide suitable net structures and also organize well trained/ professional labour force every year, so as to make the use of anti-hail nets more efficient.

Presently, five functioning anti-hail cannons (1 government, 4 private) are installed in the sample block (Jubbal & Kotkhai). More number of

cannons should be installed in the hailstorm prone areas. The placement of these cannons should be of the peak of the hill for maximum impact. Anti-hail nets can be used for a time span of 4-5 years; after that these need to be discarded. As these nets are made of plastic, proper provision should be made to discard these nets after they have served their utility.

Hail protection mechanism users attained better social economic profile and farm level characteristics than non-users. Hence, the use of this mechanism (anti-hail cannons and nets) should be propagated in the apple producing belt of the state.

As seen from the study, non-users of hail protection mechanism reported higher expected loss of apple crop due to hailstorm as compared the users, which proves that the mechanism was effective in preventing the losses from hailstorm. Thus, use of this mechanism should be advertised and also incentivized.

The Horticulture Department is the main source of information for majority of users and non-users of hail protection mechanism. Hence, it should organize information dissemination, and training and skill development camps, where better and more effective and efficient use of this mechanism can be taught to the orchardists for helping them protect their crop from hailstorms. The time lag of three months in receiving of subsidy for anti-hail net should be tried to be minimized. Also, despite 80 percent subsidy on nets, orchardists still find this aid to be insufficient. Hence, the government should work upon providing more financial aid to the orchardists. Further, subsidy is given on 5,000 square meters area only and not on the entire orchard land.

Weather radars should be installed for every existing anti-hail cannon and also for the future ones, so that cannons can be operated effectively if and when the need be.

More percentage of mechanism users and non-users preferred cannons over nets as it saves them from the annual effort of installing and un-installing nets on trees. Thus, emphasis should be paid on long term use of cannons and its implications on the productivity of apple crop. Also, the government should conduct scientific research on the effects of this mechanism on the environment, *i.e.*, the impact of anti-hail cannon on the clouds and the weather and the impact of anti-hail nets on the health of the trees, fruit and also the soil, keeping in terms with the sustainable development aspect of agriculture economics.

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**Complete reference can been seen in the detailed report available at the website of respective AERC

Commodity Review

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2020-21 up to 31.03.2021 is 46.55 million tonnes as against 40.83 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 2020-21 (up to 31.03.2021) and the corresponding period of last year is given in figure 1. The percentage share of different states in procurement of rice has been given in figure 2.

TABLE 1: PROCUREMENT OF RICE

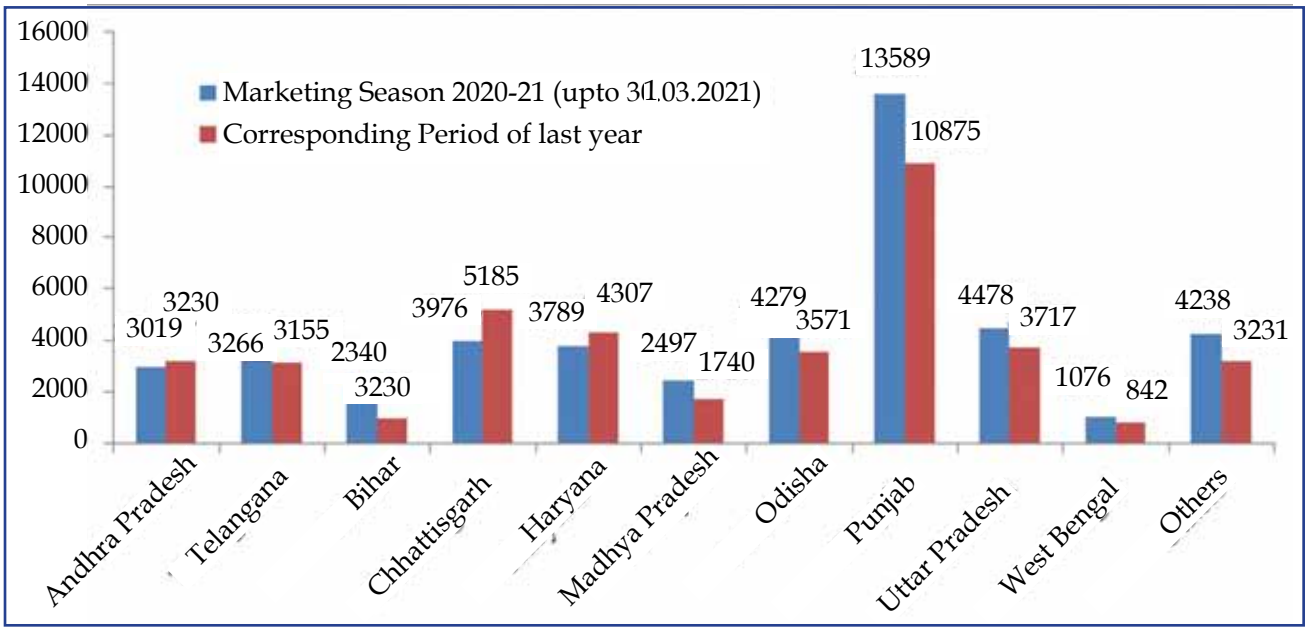
(In thousand tonnes)

State	Marketing Season 2020-21 (upto 31.03.2021)		Corresponding Period of last Year 2019-20	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Andhra Pradesh	3019	6.5	3230	7.9
Telangana	3266	7	3155	7.7
Bihar	2340	5.0	975	2.4
Chhattisgarh	3976	8.5	5185	12.7
Haryana	3789	8.1	4307	10.5
Madhya Pradesh	2497	5.4	1740	4.3
Odisha	4279	9.2	3571	8.7
Punjab	13589	29.2	10876	26.6
Uttar Pradesh	4478	9.6	3717	9.1
West Bengal	1076	2.3	842	2.1
Others	4238	9.1	3231	7.9
All India Total	46547	100	40829	100

Source: Department of Food & Public Distribution.

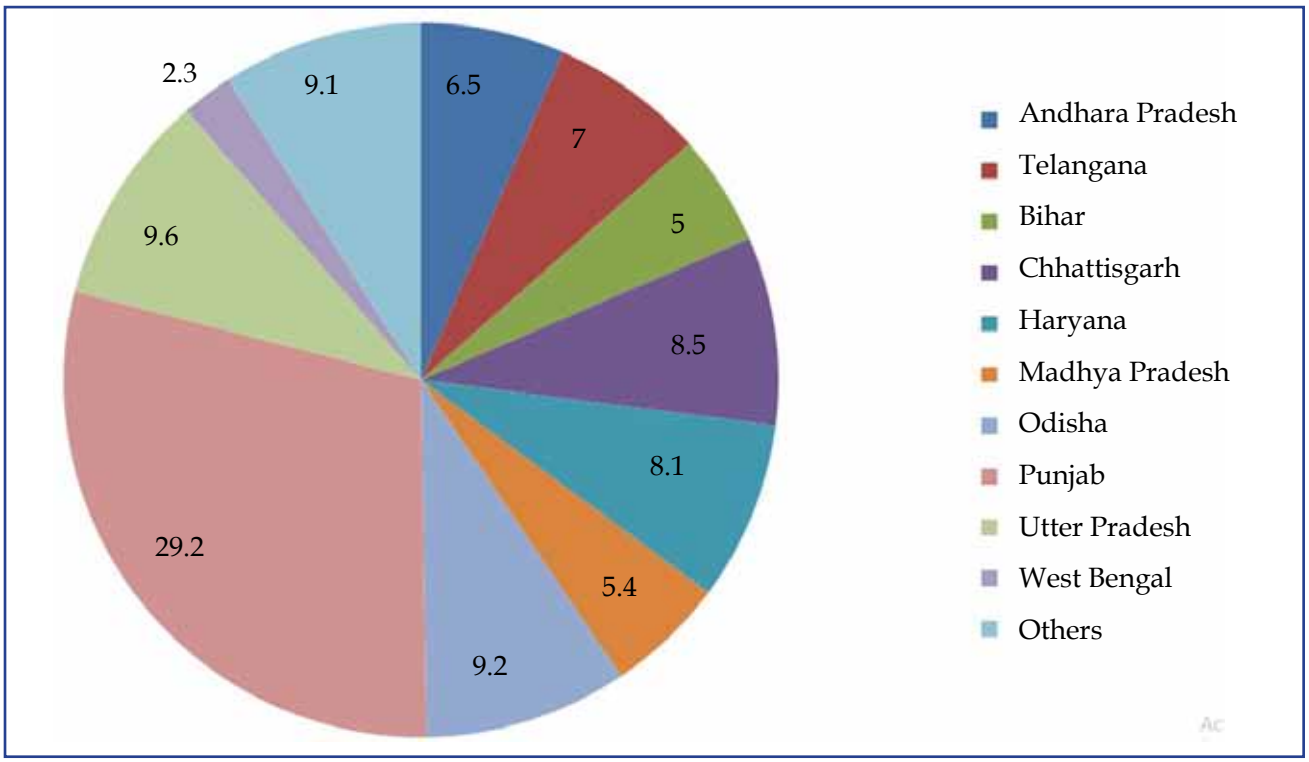
Figure 1: State-wise Procurement of Rice

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 2: Percentage Share of Different States in Procurement of Rice during Marketing Season 2020-21(up to 31.03.2021)



Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat during rabi marketing season 2021-22 up to 31.03.2021 is 3169 tonnes as against 60 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 31.03.2021) 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

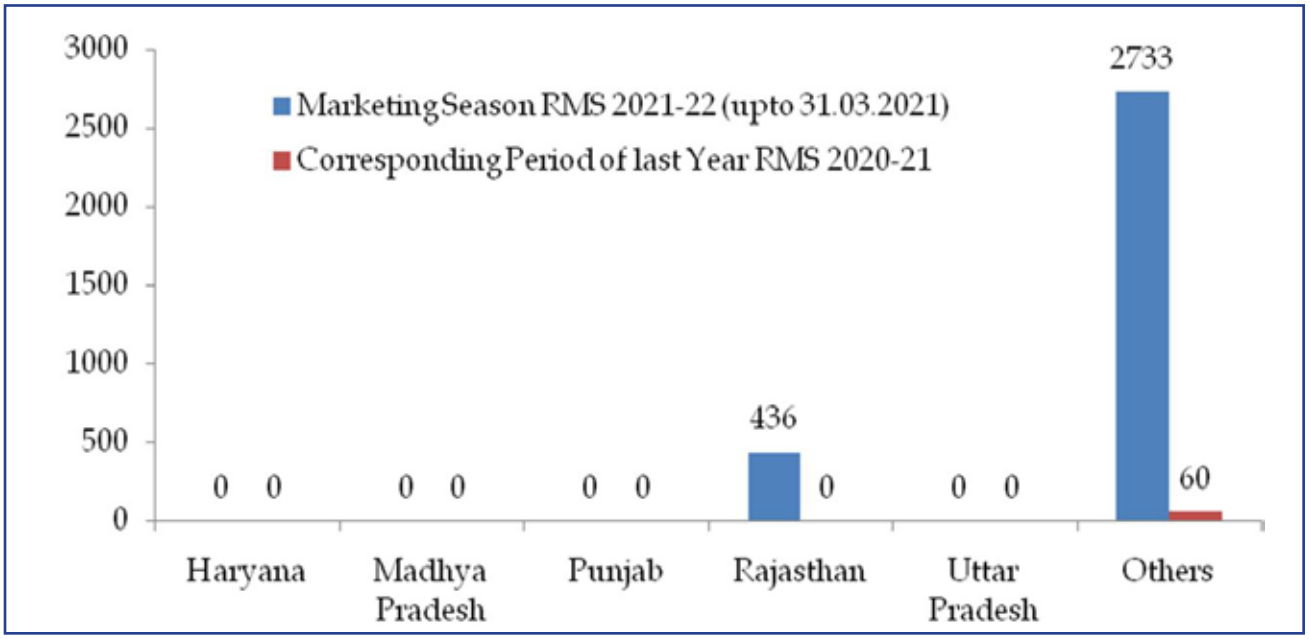
(In thousand tonnes)

State	Marketing Season RMS 2021-22 (upto 31.03.2021)		Corresponding Period of last Year RMS 2020-21	
	Procurement	% to Total	Procurement	% to Total
1	2	3	4	5
Haryana	0	0	0	0
Madhya Pradesh	0	0	0	0
Punjab	0	0	0	0
Rajasthan	436	13.8	0	0
Uttar Pradesh	0	0	0	0
Others	2733	86.2	60	100
Total	**3169**	**100**	**60**	**100**

Source: Department of Food & Public Distribution.

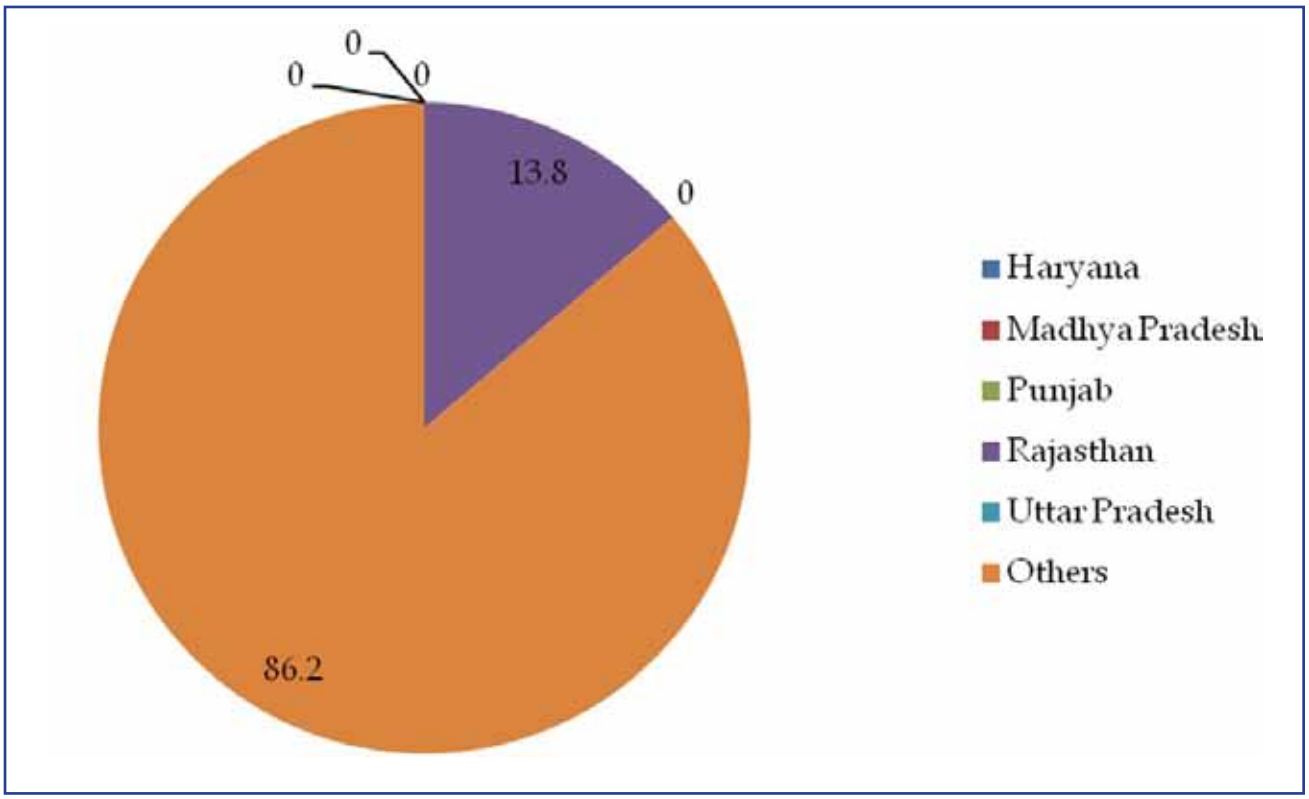
Figure 3: State-wise Procurement of Wheat

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 4: Percentage Share of Different States in Procurement of Wheat during Marketing Season 2021-22 (up to 31.03.2021)



Source: Department of Food & Public Distribution.

Commercial Crops

Oilseeds

Based on WPI, the annual inflation in nine major oilseeds as a group stood at 185 during March, 2021 showing an increase of 23.58 percent over the corresponding months of the previous year, whereas WPI increased by 5.53 percent in March, 2021 over February, 2021.

The WPI of all individual oilseeds showed a mixed trend. The WPI of groundnut seed (5.12 percent), cotton seed (2.13 percent), copra (4.47 percent), gingelly seed (sesamum) (1.09 percent), niger seed (3.47 percent), sunflower (7.74 percent) and soyabean (11.99 percent) increased over the previous month. However, the WPI of rape & mustard seed (3.41 percent) and safflower (2.66 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 170.8 in March, 2021 which shows an increase of 4.34 percent over the previous month. Moreover, it also increased by 34.17 percent over the corresponding months of the previous year. The WPI of soybean oil (5.34 percent), sunflower oil (3.95 percent), groundnut oil (3.28 percent), rapeseed oil (0.85 percent), copra oil (1.69 percent) and cotton seed oil (5.21 percent) increased over the previous month. However, the WPI of mustard oil (0.23 percent) decreased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 154.7 in March, 2021 showing a decrease of 3.73 percent over previous month and an increase of 4.03 percent over the corresponding month of the previous year.

Potato

The WPI of potato stood at 143.8 in March, 2021 showing a decrease of 3.03 percent over the previous month. Moreover, it also decreased by 33.40 percent over the corresponding months of the previous year.

Onion

The WPI of onion stood at 241.1 in March, 2021 showing a decrease of 33.51 percent over the previous month and an increase of 5.15 percent over the corresponding months of the previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 151.9 in March, 2021 showing an increase of 0.26 percent over the previous month and an increase of 2.84 percent over the corresponding months of the previous year. The WPI of black pepper increased by 4.44 percent, chillies (dry) increased by 0.50 percent and turmeric increased by 6.49 percent over the previous month.

Raw Cotton

The WPI of raw cotton stood at 116.1 in March, 2021 showing an increase of 1.93 percent over the previous month and an increase of 8.50 percent over the corresponding months of the previous year.

Raw Jute

The WPI of raw jute stood at 282.6 in March, 2021 showing an increase of 7.45 percent over the previous month and an increase of 34.44 percent over the corresponding months of the previous year.

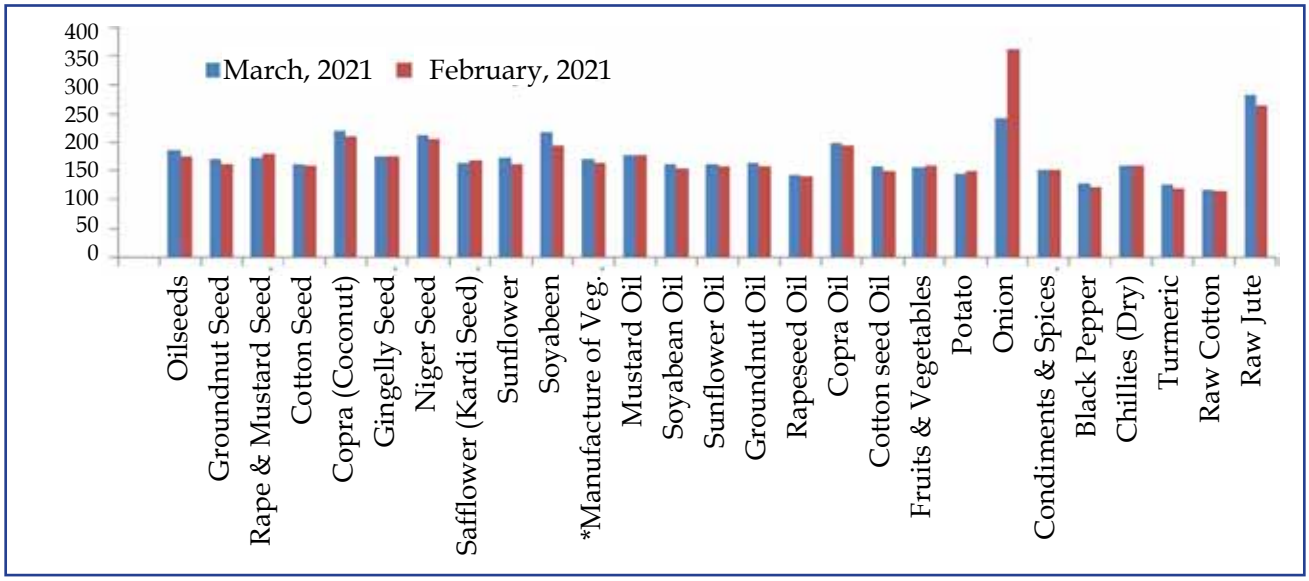
Wholesale Price Index of Commercial Crops is given in Table 3. A graphical comparison of WPI for the period of March, 2021 and February, 2021 is given in figure 5 and the comparison of WPI during the March, 2021 with the corresponding month of last year has been given in figure 6.

TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base Year: 2011-12=100)

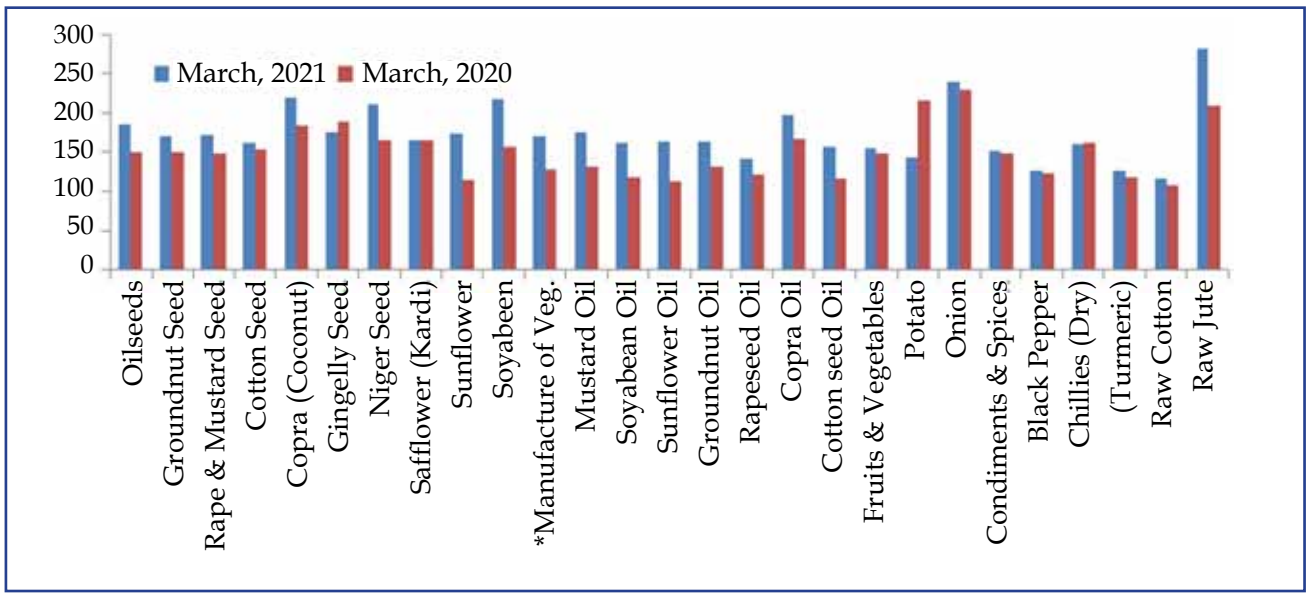
Commodity	Latest March, 2021	Month February, 2021	Year March, 2020	Percentage variation over the	
				Month	Year
Oilseeds	185.0	175.3	149.7	5.53	23.58
Groundnut Seed	170.4	162.1	149.8	5.12	13.75
Rape & Mustard Seed	172.8	178.9	148.2	-3.41	16.60
Cotton Seed	162.7	159.3	152.6	2.13	6.62
Copra (Coconut)	219.6	210.2	184.1	4.47	19.28
Gingelly Seed (Sesamum)	176.0	174.1	189.8	1.09	-7.27
Niger Seed	211.5	204.4	164.5	3.47	28.57
Safflower (Kardi Seed)	164.9	169.4	164.5	-2.66	0.24
Sunflower	174.0	161.5	114.8	7.74	51.57
Soyabean	217.7	194.4	157.2	11.99	38.49
Manufacture of Vegetable and Animal Oils and Fats	170.8	163.7	127.3	4.34	34.17
Mustard Oil	176.3	176.7	131.4	-0.23	34.17
Soyabean Oil	161.8	153.6	118.2	5.34	36.89
Sunflower Oil	163.2	157.0	112.8	3.95	44.68
Groundnut Oil	163.5	158.3	132.1	3.28	23.77
Rapeseed Oil	142.0	140.8	120.8	0.85	17.55
Copra oil	198.3	195.0	166.6	1.69	19.03
Cotton seed Oil	157.5	149.7	115.7	5.21	36.13
Fruits & Vegetables	154.7	160.7	148.7	-3.73	4.03
Potato	143.8	148.3	215.9	-3.03	-33.40
Onion	241.1	362.6	229.3	-33.51	5.15
Condiments & Spices	151.9	151.5	147.7	0.26	2.84
Black Pepper	126.9	121.5	121.9	4.44	4.10
Chillies (Dry)	160.0	159.2	162.0	0.50	-1.23
Turmeric	126.3	118.6	117.0	6.49	7.95
Raw Cotton	116.1	113.9	107.0	1.93	8.50
Raw Jute	282.6	263.0	210.2	7.45	34.44

Figure 5: WPI of commercial crops during March, 2021 and February, 2021



*Manufacture of Vegetable, Animal Oils and Fats

Figure 6: WPI of commercial crops during March, 2021 and March, 2020



*Manufacture of Vegetable, Animal Oils and Fats

Statistical Tables
Wages

1. STATE-WISE AVERAGE DAILY WAGES OF FIELD LABOURERS

(Value in Rs)

State	Month & Year	Normal Working Hours	Field Labour								Other Agri. Labour		Herdsman		* Field Labour		Skilled Rural Occupation		
			1. Ploghing		2. Sowing		3. Weeding		4. Reaping & Harvesting								Carpenter	Blacksmith	Cobbler
			M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	M	M
KARNATAKA	Mar, 20	8	NA	NA	NA	NA	NA	NA	NA	NA	362	334	383	325	364	268	404	363	389
HIMACHAL PRADESH	Jan,21	8	435	-	319	319	315	315	319	319	315	315	315	315	NA	NA	494	488	494
GUJARAT	Apr, 20	8	278	259	276	239	220	217	229	232	230	219	199	188	NA	NA	432	373	321
MAHARASHTRA (P*)	Dec,20	8	NA	NA	NA	NA	NA	NA	NA	NA	408	242	350	200	288	192	437	367	238
ASSAM	June, 20	8	325	-	317	285	303	231	335	252	303	243	272	-	NA	NA	403	369	335
BIHAR	Dec,20	8	325	-	311	283	308	267	313	279	312	291	433	228	NA	NA	484	478	-
KERALA	June, 20	8	1017		630	-	-	514	680	533	843	557	-	-	NA	NA	903	-	-
TELANGANA	June, 20	8	NA	NA	NA	NA	NA	NA	NA	NA	449	300	328	350	445	272	433	411	300
UTTARAKHAND	July,20	8	473	-	379	353	357	358	347	323	357	328	300	300	NA	NA	586	625	-
WEST BENGAL	June, 20	8	346	-	289	262	277	254	300	271	307	277	275	264	NA	NA	-	-	-
HARYANA	July, 20	8	490	-	469	317	436	397	436	395	421	373	-	-	NA	NA	607	560	-
JHARKHAND (P*)	Aug, 20	8	NA	NA	NA	NA	NA	NA	NA	NA	226	186	185	135	227	212	376	342	267
ODISHA	Nov, 20	8	348	-	329	283	318	272	331	284	361	295	294	251	NA	NA	506	446	406
UTTAR PRADESH	Jan,21	8	289	-	275	260	278	259	276	257	287	269	240	260	NA	NA	490	-	-
RAJASTHAN	Feb, 21	8	401	324	381	309	333	297	335	303	-	-	324	255	NA	NA	503	451	396
ANDHRA PRADESH	Jan,21	8	NA	NA	NA	NA	NA	NA	NA	NA	486	339	327	272	469	295	464	360	300
CHHATTISGARH	Dec, 20	8	384	-	247	184	176	162	193	174	227	184	232	190	NA	NA	369	268	257
MADHYA PRADESH	Jan,21	8	299	-	262	223	259	233	269	244	276	248	247	233	NA	NA	408	395	338
PUNJAB	Jan,21	8	447	-	438	365	405	356	438	368	418	353	-	-	NA	NA	526	517	-
TAMIL NADU	Jan,21	8	300	-	404	209	414	208	442	228	483	212	-	-	NA	NA	616	509	-
TRIPURA	Dec, 20	8	315	-	263	180	338	243	263	180	233	173	400	300	NA	NA	340	-	-

Source: State Government

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

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

P* - Provisional

NA: Not Applicable

Prices

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

Commodity	Variety	Unit	State	Centre	Feb-21	Jan-21	Feb-20
Wheat	PBW 343	Quintal	Punjab	Amritsar	1900	1900	2200
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1725	1730	2040
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1789	1751	2010
Jowar	-	Quintal	Maharashtra	Mumbai	3650	3400	4100
Gram	No III	Quintal	Madhya Pradesh	Sehore	4749	4291	3750
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1600	1825	1975
Gram Split	-	Quintal	Bihar	Patna	6240	6220	6200
Gram Split	-	Quintal	Maharashtra	Mumbai	6100	6100	5500
Arhar Split	-	Quintal	Bihar	Patna	9560	9440	8360
Arhar Split	-	Quintal	Maharashtra	Mumbai	8800	8300	8000
Arhar Split	-	Quintal	NCT of Delhi	Delhi	10000	10000	7900
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	8400	8200	7300
Gur	-	Quintal	Maharashtra	Mumbai	4500	4500	4900
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4500	4500	4500
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2580	2700	2400
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	5465	5450	4125
Mustard Seed	Black	Quintal	West Bengal	Raniganj	NA	4800	4400
Mustard Seed	-	Quintal	West Bengal	Kolkata	6400	6400	4350
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	5500	5325	5250
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	5400	5280	4650
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	2200	2200	1700
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	3000	3000	3000
Castor Seed	-	Quintal	Telangana	Hyderabad	NT	NT	3900
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	9300	9400	9875
Copra	FAQ	Quintal	Kerala	Alleppey	13950	12900	10800
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	6000	6000	6000
Groundnut	-	Quintal	Maharashtra	Mumbai	9000	9200	8000
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1830	1760	1370
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	2100	2175	1395
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	2310	2150	1800
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2250	2350	2000
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1790	1780	1440
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1875	1890	1245

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

Commodity	Variety	Unit	State	Centre	Feb-21	Jan-21	Feb-20
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	2050	2050	1830
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	3150	3250	2935
Coconut Oil	-	15 Kg.	Kerala	Cochin	3158	2880	2280
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2365	2260	2125
Groundnut Cake	-	Quintal	Telangana	Hyderabad	NT	NT	3642
Cotton/Kapas	NH 44	Quintal	Andhra pradesh	Nandyal	6300	5800	5000
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	5700	5700	4700
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	7000	6150	4900
Jute Raw	W 5	Quintal	West Bengal	Kolkata	7300	6450	4950
Oranges	-	100 No	NCT of Delhi	Delhi	NA	NA	667
Oranges	Big	100 No	Tamil Nadu	Chennai	600	650	400
Oranges	Nagpuri	100 No	West Bengal	Kolkata	900	500	650
Banana	-	100 No.	NCT of Delhi	Delhi	375	333	458
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	600	600	700
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	1E+05	84000	85000
Almonds	-	Quintal	Maharashtra	Mumbai	65000	65000	73000
Walnuts	-	Quintal	Maharashtra	Mumbai	70000	68000	60000
Kishmish	-	Quintal	Maharashtra	Mumbai	25000	24000	20000
Peas Green	-	Quintal	Maharashtra	Mumbai	9500	10000	5000
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	900	800	1050
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	3000	4200	1500
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1500	2500	2000
Potato	Red	Quintal	Bihar	Patna	950	1050	1640
Potato	Desi	Quintal	West Bengal	Kolkata	580	600	1100
Potato	Sort I	Quintal	Tamil Nadu	Mettuppa-layam	2904	3467	2630
Onion	Pole	Quintal	Maharashtra	Nashik	3250	2300	1800
Turmeric	Nadan	Quintal	Kerala	Cochin	11000	11000	11500
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	11000	9700	11000
Chillies	-	Quintal	Bihar	Patna	14600	14950	12650
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	31000	31000	29000
Ginger	Dry	Quintal	Kerala	Cochin	22500	24000	27000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	56000	56000	1E+05
Cardamom	Small	Quintal	West Bengal	Kolkata	2E+05	2E+05	4E+05
Milk	Buffalo	100 Liters	West Bengal	Kolkata	6000	6000	6500

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

Commodity	Variety	Unit	State	Centre	Feb-21	Jan-21	Feb-20
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	59363	59363	69035
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	42000	40000	42000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	40600	40850	39200
Fish	Rohu	Quintal	NCT of Delhi	Delhi	10000	10000	16000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	40000	43000	50000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4670	4714	4286
Tea	-	Quintal	Bihar	Patna	25800	25800	21950
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	NT	NT	NT
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	32000	39500	40000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	23000	28000	29500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	8600	8700	7750
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4150	4150	4800
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13100	13300	13200
Rubber	-	Quintal	Kerala	Kottayam	14200	12000	11700
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	66000	66000	61500

Crop Production

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

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Autumn Rice, Sugarcane, Groundnut	Summer Rice, Onion.
Assam	Winter Rice, Maize, Tur (R), Cotton.	Summer Potato (Hills).
Bihar	Autumn Rice, Jute, Mesta, Castor seed.	Summer Rice, Wheat, Barley, Gram, Linseed.
Gujarat	Sugarcane, Ginger, Turmeric.	Onion
Himachal Pradesh	Maize, Ragi, Small Millets (K), Summer Potato (Hills), Sugarcane, Ginger, Chillies (Dry), Tobacco, Sesamum, Cotton, Turmeric.	Wheat, Barley, Gram, Other Rabi Pulses, Linseed, Onion.
Jammu & Kashmir	Autumn Rice, Jowar (K), Maize, Ragi, Small, Millets (K), Mung (K), Tur (K), Other Tobacco, Sunn Hemp	Wheat, Barley, Small Millets (R) Tur (K), Sesamum, Rapeseed and Mustard, Lineseed, Onion.
Karnataka	Autumn Rice, Jowar (K), Maize, Ragi, Urad (K), Mung (K), Summer Potato (Hills), Tobacco, Castorseed, Sesamum, Cotton, Sweet Potato, Turmeric, Sunn Hemp, Onion, Tapioca.	Summer Rice, Ragi (R), Winter Potato (Plain), Tapioca.
Kerala	Autumn Rice, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Ginger, Turmeric, Tapioca (Early).	Summer Rice, Other Rabi Pulses, Tapioca (Late).
Madhya Pradesh	Sugarcane, Ginger, Chillies (Dry), Turmeric.	Winter Potato (Plains), Onion.
Maharashtra	Turmeric.	–
Manipur	Autumn Rice, Groundnut, Castorseed, Cotton, Turmeric.	–
Orissa	Autumn Rice, Sugarcane, Chillies (Dry), Jute.	Summer Rice, Cotton, Chillies (Dry).
Punjab and Haryana	Autumn Rice, Summer Rice, Ragi, Small Millets (K), Tur (K), Summer Potato (Hills) Chillies (Dry), Cotton, Sweet Potato.	Wheat, Barley, Winter Potato (Plains), Summer Potato, Tobacco, Onion.
Rajasthan	Sugarcane	Wheat, Small Millets (R), Tobacco.

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING THE MONTH OF MAY, 2021-*CONTD*

State	Sowing	Harvesting
(1)	(2)	(3)
Tamil Nadu	Tamil Nadu Autumn Rice, Bajra, Summer Potato, Sugarcane, Chillies (Dry), Groundnut, Turmeric, Sannhemp. Tapioca	Summer Rice, Jowar (R), Winter Potato (Hills), Sugarcane, Chillies (Dry), Sesamum, Onion.
Tripura	Autumn Rice, Maize, Sugarcane, Ginger, Chillies (Dry), Seasmum, Cotton, Jute, Mesta.	—
Uttar Pradesh	Autumn Rice, Tur (K), Chillies (Dry), Groundnut, Cotton, Jute, Mesta, Linseed.	Summer Rice, Wheat, Barley, Sugarcane, Tabacco, Rapeseed and Mustard, Sannhemp, Onion.
West Bengal	Autumn Rice, Winter Rice, Tur (K), Ginger, Chillies (Dry), Jute, Mesta.	Summer Rice, Chillies (Dry), Sesamum.
Delhi	Jowar (K), Onion.	

(K) – Kharif (R) – Rabi

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Note to Contributors

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Abbreviations used

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

Plus (+) indicates surplus or increase.

Minus (-) indicates deficit or decrease.

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