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Contents

From Editor's Desk

This issue of 'Agricultural Situation in India' covers two research articles; one on distribution of land holdings in Himachal Pradesh during 1970-71 to 2010-11 and second on impact of farm debt waiver scheme on livelihood of the farmers of Punjab and Uttar Pradesh; and an Agro-Economic Research assessing the situation of livestock feed and fodder in West Bengal. It also includes news relating to the farm sector, prices of commodities, rates of inflation and price indices among other information.

The major news covered in this edition are: honey testing laboratory project launched on the occasion of World Bee Day; Kharif Strategy 2021 formulated; MIS module launched by National Bamboo Mission for strengthening domestic agarbatti industry; Third Advance Estimates of Principal Crops for 2020-21 released; India and Israel sign a three-year work program for cooperation in Agriculture among other news.

For the month of April, 2021 food inflation stood at 10.49 percent. The Wholesale Price Index (WPI) of pulses and fruits increased by 10.74 percent and 27.43 percent, respectively, whereas for foodgrains, cereals, vegetables, paddy and wheat, it decreased by 0.74 percent, 3.32 percent, 9.03 percent, 0.92 percent and 3.29 percent, respectively, in April, 2021 as compared to the corresponding period of last year. The cumulative pre-monsoon season rainfall in the country during the period 1st March, 2021 to 26th May, 2021 has been 12 percent higher than the long period average (LPA). Current live storage in 130 major water reservoirs in the country was 50.82 BCM as against 39.85 BCM of normal storage based on the average storage of last 10 years.

The first article tries to ascertain how land holding pattern in Himachal Pradesh has changed over the years across all the land holding categories. The study reveals that over the years, number of land holdings have increased but total area under operation is more or less the same. Also across the study period, wholly or self operated holdings have increased at the cost of leased holdings. The increase in number of holdings in totality and decrease in operated area under large category can be attributed to subdivision of land over the years. Over the years, the inequality in distribution of land holdings has decreased indicating a overall growth on the agricultural front.

In the second article, the authors try to evaluate the impact of farm debt waivers which were undertaken by the Governments of Punjab and Uttar Pradesh. With indebtedness being the cause of distress among the farmers and debt waiver being perceived as its solution, this study assumes importance to understand the ground level effects of the scheme. Overall the scheme caused a decrease in indebtedness of the farmers and has resulted in an increase in average income of the beneficiaries leading to higher investment in livestock. The study suggests that scope of this scheme may be increased to bring more distressed farmers under its cover. Also the farmers may be encouraged to take up allied activities to supplement their income and initiatives to make farming more profitable must be taken to help the farmers caught in this vicious circle of indebtedness.

The Agro-Economic Research article assesses the situation of livestock feed and fodder in West Bengal. Currently ranked 4th in livestock population, the majority of the states' rural population is dependent on it for its livelihood. Further, most of the livestock is indigenous and has a low productivity. Also there is an acute shortage of both feed and fodder in the state with less than half of the required amount being produced at the household level. This is due to the preference given to the cultivation of staple food as it gives better financial returns. But, there is a need to increase the production and quality of both feed and fodder so as to maximize the livestock productivity for which training programmes on fodder cultivation may be arranged. Also, availability of low cost and better quality fodder seeds may encourage farmers to go for fodder cultivation.

Promodita Sathish

Farm Sector News

Government Intervention

Agriculture Minister launches Honey Testing Laboratory project on the occasion of World Bee Day

On the occasion of World Bee Day and in the auspicious context of the 'Azadi ka Amrit Mahotsav', Union Agriculture & Farmers' Welfare Minister, Shri Narendra Singh Tomar launched the project of setting up of a honey testing laboratory at the Indian Agricultural Research Institute, Pusa, New Delhi.

Inaugurating the project at the Indian Agricultural Research Institute (IARI) for quality testing of honey and other products of beekeeping under the National Beekeeping and Honey Mission, the Union Minister said that when farmers used to get a bag of DAP for Rs. 1200, its actual price was Rs. 1700. The government used to pay the remaining Rs. 500. Due to sudden increase in the prices of phosphoric acid, ammonia, etc., at the international level, the price of DAP increased and staggered at Rs. 2400. So, now the Centre has decided to maintain the price of DAP at Rs. 1200 by granting a support of Rs. 700 as a subsidy of more than 140 percent.

Shri Tomar said that production of honey is increasing in the country and its export is also going up. Efforts are also being made for good quality of honey. Small and medium scale farmers should come forward to take up this work so that their income can be increased. Rs. 300 crores has been approved for the overall promotion of National Beekeeping & Honey Mission (NBHM), development of scientific beekeeping and achieving the target of "Sweet Revolution." Besides, Rs. 500 crores has been allocated to NBHM by the Centre under the AtmaNirbhar Bharat campaign. A world-class state of art honey testing lab has been established at National Dairy Development Board (NDDB), Anand with the help of Rs. 5 crores. Apart from this, two more regional/big testing laboratories have been sanctioned with an amount of Rs. 8 crores each for honey and other products of beekeeping. Aiming at the development of this sector, 13 mini/satellite district level laboratories for honey and other products of beekeeping and projects related to online registration and development of traceability sources of honey and other products and other important projects have also been approved. The Madhu Kranti portal for online registration and traceability system to track the source of honey and other bee products has also been launched.

Union Government formulates Kharif Strategy 2021

To achieve self-sufficiency in the production of oilseeds, the Ministry of Agriculture and Farmers' Welfare has adopted a multi-pronged strategy under which the Government of India has approved an ambitious plan for the free distribution of high yielding varieties of seeds to the farmers for the kharif season 2021 in the form of minikits. The special kharif programme will bring an additional 6.37 lakh hectare area under oilseeds and is likely to produce 120.26 lakh quintals of oilseeds and edible oil amounting to 24.36 lakh quintals.

To become AatmaNirbhar in oilseeds, Union Agriculture Minister also emphasized on enhancing the productivity of oilseeds by increasing the availability of high yielding varieties of seeds for the farmers to use on their fields. Accordingly, the special kharif plan was discussed in detail with the State Governments in a webinar in April, 2021 and also in the Kharif Conference on 30th April, 2021. Through these consultations, both area and productivity enhancement has been formulated for soybean and groundnut with a focus on high yielding varieties of seeds to be provided free of cost under the National Food Security Mission (Oil Seeds and Oil Palm) as under;

- Distribution of soyabean seeds for intercropping for 41 districts in the 6 states of Madhya Pradesh, Maharashtra, Rajasthan, Gujarat, Karnataka, Telangana and Chhattisgarh costing Rs. 76.03 crores and covering 1,47,500 ha.

- Distribution of soyabean seeds for high potential districts in 73 districts of the 8 states of Madhya Pradesh, Maharashtra, Rajasthan, Telangana, Karnataka, Uttar Pradesh, Chhattisgarh and Gujarat costing Rs. 104 crores and covering 3,90,000 ha area.

- Distribution of minikits in 90 districts of 9 states of Madhya Pradesh, Maharashtra, Rajasthan, Karnataka, Telangana, Chhattisgarh, Gujarat, Uttar Pradesh and Bihar costing Rs. 40 crores. The area covered will be 1,006,636 ha and the number of minikits will be 8,16,435.

- The soyabean seeds to be distributed will have a yield of not less than 20 qtl/ha. The distribution of seeds for intercropping and high potential districts will be through the state seed agencies and the seeds for the minikits will be through the central seed producing agencies.

- Distribution of 74,000 groundnut seed minikits in 7 states of Gujarat, Andhra Pradesh, Rajasthan, Karnataka, Maharashtra, Madhya Pradesh and Tamil Nadu costing Rs. 13.03 crores for seeds and yield not less than 22 qtl/ha.

Union Minister launches Horticulture Cluster Development Programme

To ensure holistic growth of horticulture, Union Minister of Agriculture and Farmers' Welfare, Shri Narendra Singh Tomar virtually launched the Horticulture Cluster Development Programme (CDP) on 31st May, 2021. In the pilot phase, the programme will be implemented in 12 horticulture clusters out of the total 53 clusters selected for the programme. A central sector programme implemented by the National Horticulture Board (NHB) of the Ministry of Agriculture and Farmers' Welfare, CDP aims at growing and developing identified horticulture clusters to make them globally competitive.

Shri Tomar highlighted that the programme will address all major issues related to the Indian horticulture sector including pre-production, production, post-harvest management, logistics, marketing and branding. The programme is designed to leverage geographical specialisation and promote integrated and market-led development of horticulture clusters.

Talking about the reach and impact of the programme, Shri Tomar said, "Doubling farmers' income is one of the biggest priorities of our government. CDP will benefit about 10 lakh farmers and related stakeholders of the value chain. With this programme, we aim to improve exports of the targeted crops by approximately 20 percent and create cluster-specific brands to enhance the competitiveness of cluster crops." CDP is expected to attract an estimated investment of Rs. 10,000 crores when implemented in all the 53 clusters.

The clusters of the pilot phase include Shopian (J&K) and Kinnaur (H.P.) for apple; Lucknow (U.P.), Kutch (Gujarat) and Mahbubnagar (Telangana) for mango; Anantpur (A.P.) and Theni (T.N.) for banana; Nasik (Maharashtra) for grapes; Siphahijala (Tripura) for pineapple; Solapur (Maharashtra) and Chitradurga (Karnataka) for pomegranate and West Jaintia Hills (Meghalaya) for turmeric. These clusters will be implemented through Cluster Development Agencies (CDAs) which are appointed on the recommendations of the respective State/UT Government.

The programme is expected to converge with other initiatives of the Government such as the Agriculture Infrastructure Fund which is a medium-long term financing facility for investment in projects for post-harvest management infrastructure and community farming assets and will leverage the central sector scheme of the Ministry for Formation and Promotion of 10,000 Farmers Producer Organisations (FPOs).

The Cluster Development Programme has a huge potential to transform the entire horticulture ecosystem; improving its global competitiveness by building last-mile connectivity with the use of multimodal transport for the efficient and timely evacuation and transport of horticulture produce.

National Bamboo Mission launches MIS module for strengthening domestic agarbatti industry

National Bamboo Mission (NBM) has launched an MIS (Management Information Systems) based reporting platform for agarbatti stick production to collate the locations of stick making units, availability of raw material, functioning of units, production capacity, marketing, etc. With the help of this module, the linkages with the industry will be synergised better to enable seamless procurement from production units and information gaps can be plugged. All NBM states are in the process of documenting all the units to assess how further support can be given for 'Vocal for Local' and 'Make for the World' since Indian agarbatti are much sought after in global markets.

National Bamboo Mission (NBM), Ministry of Small and Medium Enterprises (MSME), Khadi and Village Industries Commission (KVIC) schemes as well as states together with industry partners have stepped up focused support to enable India to become AtmaNirbhar in the agarbatti sector, to bring back livelihoods for the local communities while at the same time modernising the sector too. The agarbatti sector traditionally provided large scale employment to the local workforce, which however dwindled due to various factors including the ingress of cheap imports of round sticks and raw batti. A comprehensive study was carried out by NBM in 2019 following which policy measures taken by the Government like moving raw batti imports from free to restricted category in August, 2019 and increasing import duty on round stick uniformly to 25 percent in June, 2020 came as a boost to the domestic units.

Background of NBM

The restructured National Bamboo Mission (NBM) was launched in 2018-19 for holistic development of the bamboo sector through a cluster-based approach in a hub (industry) and spoke model to harness the opportunities by providing backward and forward linkages among the stakeholders – linking farmers to markets. There is a huge potential to place Indian bamboo products in the domestic as well as global markets with the latest technologies, modern processing and by generating awareness on compliance requirements for destination countries. The Mission is streamlining its interventions to enhance domestic industrial activities as well as augmenting the farmer's income with support from technical agencies and facilitative steps. Direct subsidy of 50 percent is given to farmers at Rs. 1.00 lakh per ha, 100 percent to Government agencies and also to entrepreneurs for setting up various product development units, etc. The Mission is presently being executed by 21 states, including all the 9 states of NER through the respective State Bamboo Missions. NBM is also advising states to make available quality planting material to the farmers to carry out plantations of commercially required species, set up common facility centres and other post-harvest units in complete sync with the requirement of existing and sunrise industries for a win-win situation for farmers and Indian bamboo industry.

General Agriculture Sector News

PM releases 8th installment of financial benefit under PM-KISAN

Prime Minister Shri Narendra Modi released the 8th installment of financial benefit of Rs. 2,06,67,75,66,000 to 9,50,67,601 beneficiary farmers under Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) scheme on 14th May, 2021 *via* video conferencing.

Speaking on the occasion, the Prime Minister said for the first time, the farmers of West Bengal would be getting the benefit of this scheme. He lauded the efforts of the farmers who have made record produce in food grains and horticulture amidst the difficulties during the pandemic. He added that so far this year, about 10 percent more wheat has been procured at MSP, compared to last year and about Rs. 58,000 crores for wheat procurement has reached the farmers' account directly.

Prime Minister remarked that the Government is constantly trying to provide new solutions and new options in farming. Promoting organic farming is also one of such effort. He said that now organic farming is being practised on both banks of Ganga and within a radius of about 5 kilometers, so that the Ganga remains clean.

He stressed that during this COVID-19 pandemic, Kisan Credit Card's deadline has been extended and installments can now be renewed by 30 June. He said more than 2 crore Kisan Credit Cards have been issued in recent years.

State-wise Farmer Beneficiaries and Amount Transferred

State/UT Name	Number of farmers	Amount transferred (in Rs.)
Andaman and Nicobar Islands	15857	32642000
Andhra Pradesh	4301882	9437854000
Arunachal Pradesh	91811	189014000
Assam	1246277	4048380000
Bihar	7758514	15795196000
Chhattisgarh	2460478	5174490000
Delhi	12226	25584000
Goa	8584	18302000
Gujarat	5479600	11559276000
Haryana	1729311	3561590000
Himachal Pradesh	901777	1832414000
Jammu and Kashmir	855835	1793784000
Jharkhand	1388264	2861544000
Karnataka	5167535	10652594000
Kerala	3339880	6849242000
Ladakh	16535	33726000
Madhya Pradesh	8095544	16753310000
Maharashtra	9160108	18920402000
Manipur	282506	574982000
Meghalaya	8967	18078000
Mizoram	85662	180476000
Nagaland	174564	351162000
Odisha	2590315	7204622000
Puducherry	10154	20360000
Punjab	1756246	3537126000
Rajasthan	6615374	14024320000
Tamil Nadu	3715536	7519080000
Telangana	3542673	7244320000
Dadar and Nagar Haveli and Daman	9666	19986000
Tripura	208075	423616000
Uttar Pradesh	22508275	51505252000
Uttarakhand	825615	1699022000
West Bengal	703955	2815820000
Total	**95067601**	**206677566000**

Third Advance Estimates of Principal Crops for 2020-21 released

The Third Advance Estimates of production of major agricultural crops for 2020-21 have been released by the Department of Agriculture, Cooperation and Farmers' Welfare. The total foodgrain production is estimated at 305.44 million tonnes. The assessment of production of different crops is based on the data received from the states and validated with information available from other sources. As per 3rd Advance Estimates, the estimated production of major crops during 2020-21 is as under:

- Foodgrains – 305.44 million tonnes. (record)
- Rice – 121.46 million tonnes. (record)
- Wheat – 108.75 million tonnes. (record)
- Nutri / Coarse Cereals – 49.66 million tonnes.
- Maize – 30.24 million tonnes. (record)
- Pulses – 25.58 million tonnes.
- Tur – 4.14 million tonnes.
- Gram – 12.61 million tonnes. (record)
- Oilseeds – 36.57 million tonnes.
- Groundnut – 10.12 million tonnes (record)
- Soyabean – 13.41 million tonnes
- Rapeseed and Mustard – 9.99 million tonnes (record)
- Sugarcane – 392.80 million tonnes
- Cotton – 36.49 million bales (of 170 kg each)
- Jute & Mesta – 9.62 million bales (of 180 kg each)

As per Third Advance Estimates for 2020-21, total foodgrain production in the country is estimated at record 305.44 million tonnes which is higher by 7.94 million tonnes than the production of food grain achieved during 2019-20. Further, the production during 2020-21 is higher by 26.66 million tonnes than the previous five years' (2015-16 to 2019-20) average production of food grain.

Major Crops	Production 2020-21	Avg. Production 2015-16 to 2020-21
Rice	121.46 MT	112.44 MT
Wheat	108.75 MT	100.42 MT
Nutri/Coarse cereals	49.66 MT	43.98 MT
Pulse	25.58 MT	21.93 MT
Oilseeds	36.57 MT	30.55 MT
Sugarcane	392.80 MT	362.07 MT
Cotton	36.49 million bales	31.9 million bales

Source: DES, DAC&FE, GoI

India and Israel sign a three-year work program for cooperation in Agriculture

Taking forward the ever growing partnership in agriculture between Israel and India, the two Governments have agreed to enhance their cooperation in agriculture and signed a three year work program agreement for development in agriculture cooperation while affirming the ever growing bilateral partnership and recognizing the centrality of agriculture and water sectors in the bilateral relationship.

India and Israel are implementing the "INDO-ISRAEL Agricultural Project Centres of Excellence." and "INDO-ISRAEL Villages of Excellence."

Mission of Integrated Development of Horticulture (MIDH), Ministry of Agriculture & Farmers' Welfare, Government of India and MASHAV - Israel's Agency for International Development Cooperation are leading Israel's largest G2G cooperation, with 29 operational Centres of Excellence (COEs) across India in 12 states, implementing advanced-intensive agriculture farms with Israeli agro-technology tailored to local conditions. The Centres of

Excellence generate knowledge, demonstrate best practices and train farmers. Every year, these COEs produce more than 25 million quality vegetable seedlings, more than 387 thousand quality fruit plants and train more than 1.2 lakh farmers about latest technology in the field of horticulture.

Shri Narendra Singh Tomar, Minister of Agriculture & Farmers' Welfare said that India and Israel have had bilateral relations since 1993 in the agricultural sector. This is the 5th IIAP (Indo-Isreal Agriculture Action Plan). "So far, we have successfully completed 4 action plans. This new work programme will further strengthen the bilateral relations and mutual cooperation between the two countries in the field of agriculture for the benefit of the farming community. The COEs established under these Israeli-based action plans are playing an important role in doubling farmers' income. The exchange of technology between India and Israel will greatly improve the productivity and quality of horticulture, thereby increasing the income of farmers", he added.

The work program will aim to grow existing Centres of Excellence, establish new centers, increase CoE's value chain, bring the Centres of Excellence into the self-sufficient mode, and encourage private sector companies and collaboration. As for the "INDO-ISRAEL Villages of Excellence", this is a new concept aimed at creating a model ecosystem in agriculture across eight states, alongside 13 Centers of Excellence within 75 villages. The program will promote the increase of net income and better the livelihood of the individual farmer, transforming traditional farms into modern-intensive farms based on IIAP standards. Large-scale and complete value chain approach with economic sustainability, embedded with Israeli novel technologies and methodologies will be tailored to local conditions. The IIVOE program will focus on: (1) Modern agriculture infrastructure, (2) Capacity building, (3) Market linkage.

General Survey of Agriculture

Trend in Food Prices

The rate of inflation, based on monthly WPI, stood at 10.49% (provisional) for the month of April, 2021 over April, 2020 as compared to 1.86% (provisional) for the month of April, 2021 over March, 2021.

Based on Wholesale Price Index (WPI) (2011-12=100), WPI in case of foodgrains decreased by 0.74 percent in April, 2021 over April, 2020.

Among foodgrains, WPI of pulses and fruits increased by 10.74 percent and 27.43 percent, respectively, and that of cereals and vegetables decreased by 3.32 percent and 9.03 percent in April, 2021 over April, 2020.

Among cereals, WPI for paddy and wheat decreased by 0.92 percent and 3.29, respectively, in April, 2021 over April, 2020.

Similarly, WPI in case of foodgrains increased by 1.58 percent in April, 2021 over March, 2021.

Among foodgrains, WPI of fruits, cereals, vegetables and pulses increased by 22.89 percent, 1.42 percent, 1.53 percent and 2.34 percent, respectively, in April, 2021 over March, 2021.

Among cereals, WPI for paddy decreased by 0.19 percent and WPI for wheat increased by 3.79 percent in April, 2021 over March, 2021.

WPI Food Index (Weight 24.38%)

The Food Index consisting of 'Food Articles' from Primary Articles group and 'Food Product' from Manufactured Products group has increased from 153.4 in March, 2021 to 158.9 in April, 2021. The rate of inflation based on WPI Food Index increased from 5.28% in March, 2021 to 7.58% in April, 2021.

Food vs. Non-food Inflation

The inflation rate for non-food items increased by 3.47 percentage points (from 8.27% in March, 2021 to 11.74% in April, 2021) while the inflation rate of food items increased by 2.30% percentage points (from 5.28% in March, 2021 to 7.58% in April, 2021) resulting in an increase in WPI based inflation rate for all commodities from 7.39% in March, 2021 to 10.49% in April, 2021.

The Consumer Price Index (CPI) based inflation rate has decreased to 4.29% in April, 2021 on point to point basis (*i.e.* April, 2021 over April, 2020) as it was 5.52% a month ago, according to data released by the Central Statistics Office (CSO) on 12th May, 2021. The Consumer Food Price Index (CFPI) for All-India combined has decreased to 2.02% in April, 2021 from 4.87% in March, 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 26th May, 2021 has been 12% higher than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been higher than LPA by 132% in Central India, by 47% in South Peninsula, by 7% in North-West India but lower than LPA by 24% in East & North East India.

Out of 36 meteorological sub-divisions, 24 meteorological sub-divisions received large excess/excess rainfall, 08 meteorological sub-division received normal rainfall and 04 meteorological sub-divisions received deficient/ large deficient rainfall.

Current live storage in 130 reservoirs (as on 27th May, 2021) monitored by Central Water Commission having Total Live Capacity of 174.23 BCM was 50.82 BCM as against 59.53 BCM on 27.05.2020 (last year) and 39.85 BCM of normal storage (average storage of last 10 years). Current year's storage is 85% of last year's storage and 128% of the normal storage.

As per 3rd Advance Estimates 2020-21, around 105.4% of the normal area under rabi crops has been sown. During 2020-21, total area sown under

rabi crops in the country has been reported to be 653.64 lakh hectares as compared to 639.88 lakh hectares during 2019-20.

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 (3rd Adv. Est.) *vis-à-vis* 2019-20

(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 2019-20	
Wheat	303.28	317.60	104.7	313.57	4.0
Rice	41.78	47.76	114.3	46.49	1.3
Jowar	33.40	27.93	83.6	30.69	-2.8
Maize	17.37	17.69	101.9	20.16	-2.5
Barley	6.38	6.09	95.4	5.90	0.2
Total Coarse Cereals	**57.14**	**51.71**	**90.5**	**56.74**	**-5.0**
Total Cereals	**402.20**	**417.07**	**103.7**	**416.81**	**0.3**
Gram	92.77	104.25	112.4	96.99	7.3
Urad	8.93	9.41	105.5	8.32	1.1
Moong	9.86	9.88	100.3	10.59	-0.7
Lentil	14.24	14.61	102.6	13.03	1.6
Others	19.09	18.58	97.4	15.60	3.0
Total Pulses	**144.88**	**156.74**	**108.2**	**144.52**	**12.2**
Total Foodgrains	**547.07**	**573.81**	**104.9**	**561.33**	**12.5**
Rapeseed& Mustard	59.44	67.89	114.2	68.56	-0.7
Groundnut	7.24	7.60	104.9	6.65	0.9
Safflower	1.15	0.76	65.7	0.52	0.2
Sunflower	2.37	1.76	74.2	1.03	0.7
Linseed	2.74	1.83	66.9	1.80	0.0
Total Oilseeds	**72.94**	**79.84**	**109.5**	**78.56**	**1.3**
All- Crops	**620.01**	**653.64**	**105.4**	**639.88**	**13.8**

Source: Crops Divisions, DAC&FW, GoI

Articles

Distribution of Land Holdings, its Inequality and Land Tenure Status in Himachal Pradesh during 1970-71 to 2010-11

SIKANDER KUMAR[1], S.P. SARASWAT[2] AND N.S. BIST[3]

Abstract

This paper deals with the agrarian structure which has a bearing on agricultural economy in the state of Himachal Pradesh. This structure is described in terms of operational land holdings and tenurial relationship. The analysis of data for a period of nine Agricultural Census years from 1970-71 to 2010-11 has been accomplished by considering five size classes of operational holdings and area. Tenancy status of operational holdings has also been analysed. Inequality in land holding in the state has been described in terms of well known indices, namely Ginni, Theil and Atkinson index which effectively represent the social welfare function. The findings reveal that operational holdings under marginal class have increased over the period while in all the other classes, it has continuously decreased. Also in respect of ownership, wholly owned and self-operated holdings have increased at the cost of others. Interestingly, inequality indices reflect a declining trend over the study period, suggesting an improvement and overall growth of the state on the agricultural front which is found consistent with the increase in GDP of the state.

Keywords: *Agricultural Census, land holdings, unequal distribution*

1. Introduction

The agrarian structure is one of the important determinants of the pattern of agriculture development. It is dependent upon the size class distribution and pattern of the operational land holding, cropping pattern along with tenurial relationship. It has a close bearing on an overall development of the agricultural economy (Grewal and Rangi, 1981). It also reflects the main attributes of production units which may be classified, generally, by the size of the land holdings (Vyas, 1979). The main thrust of land reforms during post independence period has been to systematize the agrarian structure of the country so as to get rid of the exploitative system which was prevalent in the past.

In the developing economies, the central activity of the rural populace is based on agriculture and operational land holdings, the pattern of which has important consequences towards the agricultural production and the distribution of income. The unequal distribution of land leads to poor productivity, low per capita income, slow or stagnant growth including many socio-economic evils, therefore hindering the process of socialistic pattern of society. Pattern of land distribution plays an important role in the development of an economy, particularly in hilly areas like Himachal Pradesh where terrace farming on tiny holding has to be practiced and where the size of farm is one of the important factors which determine the level of productivity to a large extent.

The inequality in land distribution affects productivity. Typically, majority of farmers with marginal holdings would not go for cultivation of conventional crops as they are highly uneconomical for them. Nevertheless, these marginal land holdings are being used to produce vegetables. It may be mentioned that the land reforms and operation of dynamic forces like technology and technical know-how along with

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the state intervention have played a vital role in breaking the hegemony of large farmers.

A few interesting observations were made by Ali (2008) from Asian Development Bank, in the context of Asia, as follows:

- The Asian continent (or India at the country level) has experienced significant growth but at the same time, it has experienced increased inequality.
- Inequality in land holdings, along with education, health, public services, infrastructure and capital market has largely contributed to the lack of economic opportunities and decline in social cohesion.
- Poorer households have benefitted less from the growth than the richer lot.

These observations are equally relevant in the Indian context, particularly in respect of land holdings (Kaushik, 1999; Ericsson and Vollrath, 2004), education (Bhalla, 2011) and capital market (Rotheli, 2011).

1.1 Objectives of the study

The present paper is based on different Agriculture Census periods from 1970-71 to 2010-11 in Himachal Pradesh. The main objectives are to study:

1. The distribution pattern of number and area of operational holdings.
2. The average size of holdings by broad size clases.
3. Tenancy status of owned and leased in holdings and area.
4. Percentage distribution of leased in area, by terms of lease.
5. Inequality of land distribution in terms of inequality indices in Himachal Pradesh, *viz.*, Gini coefficient, Atkinson index, Theil index.

2. Data sources and methodology

The agrarian structure in Himachal Pradesh has undergone changes in respect of relative position of different categories of farmers in terms of number of holdings, operational area, tenancy term of leasing, etc. For this purpose, detailed statistics regarding number of holdings, area, size of farm and leased in area, etc. have been collected from Directorate of Agriculture Census, Himachal Pradesh for the nine Census periods from 1970-71 to 2010-11. The statistical information/data provided for these Census periods has been arranged in a uniform pattern so as to have a proper analysis. The analysis of the nature and extent of change in size class distribution of operational holding emphasizes the concentration of number of holdings and operational land with different size of farm tenurial relation, term of leasing, etc. Various expressions of inequalities are presented later along with the discussions.

3. Results and discussion

3.1. Distribution pattern of operational holdings

To facilitate interclass comparison, the size groups of holdings reported in the Agriculture Census have been consolidated in five categories namely, (1) Marginal (up to one hectare of land), (2) Small (one to two hectares of land), (3) Semi-medium (two to four hectares of land), (4) Medium (four to ten hectares of land) and (5) Large (above 10 hectares of land) (Table 1).

TABLE 1: DISTRIBUTION PATTERN OF OPERATIONAL HOLDINGS IN HIMACHAL PRADESH

(No. of Holdings)

Census Period	Marginal < 1 Hectare	Small 1-2 hectares	Semi-medium 2- 4 hectares	Medium 4-10 hectares	Large > 10 hectares	Total
1970-71	354625	123368	86274	38146	6732	609145
%	58.22	20.25	14.16	6.26	1.11	100.00
1976-77	339783	136449	94903	42542	7741	621418
%	54.68	21.96	15.27	6.85	1.25	100.00
1980- 81	352291	140365	96592	41879	6959	638086
%	55.21	22.00	15.14	6.56	1.09	100.00
1986- 87	463403	155311	92173	36352	5643	752882
%	61.55	20.63	12.24	4.83	0.75	100.00
1990- 91	532134	166410	93915	35811	5522	833792
%	63.82	19.96	11.26	4.29	0.66	100.00
1995- 96	555632	173455	95057	34019	4734	862897
%	64.39	20.10	11.02	3.94	0.55	100.00
2000- 01	614942	174230	89873	30899	3970	913914
%	67.29	19.06	9.83	3.38	0.43	100.00
2005- 06	585357	175651	88447	29136	3530	882121
%	66.36	19.91	10.03	3.30	0.40	100.00
2010 -11	670425	174596	84868	27606	3270	960765
%	69.78	18.17	8.83	2.87	0.34	100.00

Source: Agriculture Census, 1971-71 to 2010-11

Data over the nine Census years since 1970-71 shows that the marginal holdings have increased almost continuously from 58.22 percent in 1970-71 to 69.78 percent in 2010-11 with an exception of years 1976-77 and 1980-81. In Solan, Shimla, Sirmour, Kinnaur, Bilaspur and Lahaul Spiti districts, proportion of marginal holding was reported to be lower than that of the state average in all nine Census years. The probable reason for this situation may be uneconomic size of land holding, preponderance of poverty among marginal farmers, lower per hectare return, lesser use of modern techniques due to financial constraints, etc. As a result, marginal farmers look forward for next opportunity in the alternative avocation sector. Some of the artisans sold their land and migrated to city. The share of small holdings remained static at around 20 percent with the exception of two years (1976-77 and 1980-81) which witnessed shareholding of about 22 percent. The Census year 2010-11 had a decreasing trend (18.17 percent share) in the small class holdings. This trend may be understood as the marginal farmers may have started acquiring more land to become small farmers for better returns per unit area. In the other three classes *i.e.*, semi-medium, medium and large, proportionate holdings initially increased till 1976-77 and then it was an overall perceptible declining trend, may be because of the socio- economic situation of the state. Nevertheless, there was an overall increase in the holdings by 60 percent in the year 2010-11 as compared to that during 1970-71.

3.2. Operational holding area

Table 2 presents the operational area under different size of holdings in nine Census periods from 1970-71 to 2010-11. For the marginal and the small class, the area was found to increase over the Census years (with the exception in 2005-06). For the semi-medium class, it remained almost constant. For the medium class it remained almost constant till 1980-81, thereafter, it decreased

and finally for the large class category, the area decreased over the study period. Interestingly, the proportionate area in case of large category was found to decrease continuously from 17.12 percent to 5.29 percent over the Census years. The above pattern may be due to the strict implementation of the land reform legislations, change in the socio-political situation and subdivision of the large holdings due to multiplication of families.

TABLE 2: DISTRIBUTION PATTERN OF AREA UNDER OPERATIONAL HOLDINGS

(Area in hectares)

Census Period	Marginal < 1 hectare	Small 1-2 hectares	Semi medium 2- 4 hectares	Medium 4-10 hectares	Large > 10 hectares	Total
1970-71	135461	176536	238872	220665	159327	930861
%	14.55	18.96	25.66	23.71	17.12	100.00
1976-77	142951	196547	263205	247492	159571	1009766
%	14.16	19.46	26.07	24.51	15.80	100.00
1980-81	146255	200337	265485	243715	124633	980425
%	14.92	20.43	27.08	24.86	12.71	100.00
1986-87	200584	222589	254561	207656	94850	980240
%	20.46	22.71	25.97	21.18	9.68	100.00
1990-91	214719	235144	257816	205199	97088	1009966
%	21.26	23.28	25.53	20.32	9.61	100.00
1995-96	230198	240737	256302	194128	78311	999676
%	23.03	24.08	25.64	19.42	7.83	100.00
2000-01	251772	244629	243316	175879	63160	978756
%	25.72	24.99	24.86	17.97	6.45	100.00
2005-06	240752	244741	240355	164994	60006	950848
%	25.32	25.74	25.28	17.35	6.31	100.00
2010-11	273270	243942	230469	156459	50510	954650
%	28.63	25.55	24.14	16.39	5.29	100.00

Source: Agriculture Census, 1971-71 to 2010-11

3.3. Average size of holding

It is observed that the average size of land holding in Himachal Pradesh decreased from 1.5 hectares to 0.99 hectares over the nine Agriculture Census years from 1970-71 to 2010-11 (Table 3). There are various ways by which shifts in the relative importance of different size group of holdings have come about. In the upward ladder process, it could be described as land owners acquiring more land to improve their position and get classified in better categories. Similarly a decreasing trend for number of holdings and operational area of large farmers confirm the fluctuation of the ladder in reverse direction.

The average size of holding is an indicator of the agricultural economy in the sense that it provides the basis for judging whether a holding is viable enough; not merely from the point of view of cultivation but also from the angle of providing adequate sustenance to the operation holder. The average size of operational holding is factorized into the number of holdings and area operated. Change in size over a period of time is thus dependent upon relative change in the number and area of holding. The size of holding indicates the broad magnitude of the problem in respect of pressure of population on the land and the average unit of cultivation.

TABLE 3: AVERAGE SIZE OF LAND HOLDING BY BROAD SIZE CLASS

Census	Marginal up to 1 hectare	Small 1 to 2 hectares	Semi-Medium 2 to 4 hectares	Medium 4 to 10 hectares	Large above 10 hectares	Overall Average
1970-71	0.38	1.43	2.76	5.78	23.66	1.52
1976-77	0.42	1.44	2.77	5.81	20.61	1.62
1980-81	0.41	1.42	2.74	5.81	17.90	1.53
1986-87	0.43	1.43	2.76	5.71	16.80	1.30
1990-91	0.40	1.36	2.71	5.66	18.10	1.20
1995-96	0.41	1.38	2.69	5.70	16.54	1.16
2000-01	0.40	1.40	2.70	5.69	15.90	1.07
2005-06	0.41	1.39	2.71	5.66	16.99	1.04
2010-11	0.41	1.39	2.72	5.61	17.00	0.99

Source: Agriculture Census, 1971-71 to 2010-11

3.4. Tenancy status of owned holding and leasing

Ownership of land is an essential factor in encouraging a person to make long term investment in land improvement, as it ensures his continued possession and operation over the area. Various land reform measures in the state have introduced curbs on subletting of land except in certain prescribed situations. However in practice, subletting and share cropping cannot be stopped. A large part of the transactions in the lease market are concealed and are not within the easy reach of state laws.

The distribution patterns of owned and leased holdings presented in Table 4 shows that over the nine Census years, number of wholly owned holdings have been continuously increasing from 61.87 percent in 1970-71 to 98.37 percent in 2010-11. Initially, a sudden change was noticed from 1970-71 to 1976-77 (from 61.87 percent to 72.59 percent) and then from 1980-81 to 1986-87 (from 75.5 percent to 88.69 percent). But, 'partly owned and partly leased' holdings decreased from 23.89 percent in 1970-71 to 1.48 percent in 2010-11, and wholly leased in holdings from 14.24 percent in 1970-71 to 0.15 percent in 2010-11.

TABLE 4: DISTRIBUTION PATTERN OF OWNERSHIP OF HOLDINGS

(Number of holdings)

Census Period	Wholly Owned & Self Operated	Partly Owned Partly Leased	Wholly Leased	Total No.
1	2	3	4	5= 2+3+4
1970-71	376867	145518	86760	609145
%	61.87	23.89	14.24	100.00
1976-77	451084	144170	26146	621400
%	72.59	23.20	4.21	100.00
1980- 81	481726	138788	17567	638081
%	75.50	21.75	2.75	100.00
1986- 87	667713	76187	8982	752882
%	88.69	10.12	1.19	100.00
1990- 91	757664	58601	17528	833793
%	90.87	7.03	2.10	100.00

Census Period	Wholly Owned & Self Operated	Partly Owned Partly Leased	Wholly Leased	Total No.
1995- 96	827346	31903	3648	862897
%	95.88	3.70	0.42	100.00
2000- 01	880329	31761	1824	913914
%	96.33	3.48	0.20	100.00
2005- 06	911900	19687	1796	933383
%	97.70	2.11	0.19	100.00
2010- 11	945065	14213	1487	960765
%	98.37	1.48	0.15	100.00

Source: Agriculture Census, 1971-71 to 2010-11

3.5. Operational area by tenure of land

The distribution pattern of owned and leased in area is depicted in Table 5. A similar pattern was observed in operational area. The wholly owned class increased from 62.62 percent to 97.55 percent (from 1970-71 to 2010-11), partly owned and partly leased area decreased from 31.72 percent to 2.35 percent and totally leased area decreased from 5.66 percent to 0.10 percent over the duration of nine Census years. The total cultivated area remained almost the same within ±7%.

TABLE 5: DISTRIBUTION PATTERN OF OPERATIONAL AREA BY TENURE

(Area in Hectare)

Census Period	Wholly owned and self operated	Partially owned and partially leased in area			Wholly Leased in Area	Total Holding Area
		Owned Area	Leased in Area	Total Area		
1	**2**	**3**	**4**	**3+4=5**	**6**	**7=2+5+6**
1970-71	582914	227460	67838	295298	52648	930860
%	62.62	24.44	7.29	31.72	5.66	100.00
1976-77	704595	234957	42727	277684	24936	1007215
%	69.95	23.33	4.24	27.57	2.48	100.00
1980- 81	693254	251271	27544	278815	8356	980425
%	70.71	25.63	2.81	28.44	0.85	100.00
1986- 87	856684	95019	23650	118669	4887	980240
%	87.40	9.69	2.41	12.11	0.50	100.00
1990- 91	893135	87359	23384	110743	5888	1009766
%	88.45	8.65	2.32	10.97	0.58	100.00
1995- 96	943355	43663	7180	50843	5436	999634
%	94.37	4.37	0.72	5.09	0.54	100.00
2000- 01	922370	44816	10807	55623	772	978765
%	94.24	4.58	1.10	5.68	0.08	100.00
2005- 06	935182	26544	5572	32116	1046	968344
%	96.58	2.74	0.58	3.32	0.11	100.00
2010 -11	931285	18870	3564	22434	932	954651
%	97.55	1.98	0.37	2.35	0.10	100.00

Source: Agriculture Census, 1971-71 to 2010-11

3.6. Terms of lease

The system of leasing in was quite prevalent during pre independence in Himachal Pradesh. However during post independence period and with the land reforms, this system has seen a declining trend. The lease may vary as per the mutual understanding between the owner and the tenant as follows: (i) for fixed amount of money, (ii) for fixed quantity of produce, (iii) for share of produce and (iv) under other terms. The land leased under the last category generally includes the land leased in for which lease is partly paid in cash and partly in kind or any other combination of the above categories. This also includes the land given on the condition of rendering services either to the village community or to the government and thus the area is held free of lease. It also includes the cases where labourers are given some land without any permanent rights.

Table 6 presents the details for two categories, one 'partly owned/leased in holdings' and another 'wholly leased in holdings.' The area under 'fixed money' (terms of leasing) for partly owned and partly leased in holdings, decreased from 16.59 percent to 10.28 percent, whereas a mixed trend was observed in case of wholly leased in land area over the duration of nine Census years. The share of 'fixed produce' in both the categories contributed only marginally. It is further revealed that the position of land under 'share of produce' saw an overall decrease in both the categories. The 'other' case depicted an overall increase in behavior. Interestingly, the total area under the two categories showed a decrease by a factor of 19 percent and 52 percent, respectively, over the duration of nine Census years. These trends are mainly attributed to the implementation of various land reform legislations which prompted the land owners to remain reluctant to lease out their land and also to some socio-economic compulsions.

TABLE 6: DISTRIBUTION OF LEASED IN AREA BY TERM OF LEASE

(in percent)

Contents	1970-71	1976-77	1980-81	1986-87	1990-91	1996-97	2000-01	2005-06	2010-11
Partly owned/Leased in holding for									
1. Fixed money	16.59	11.78	9.3	10.23	12.08	10.68	7.35	11.12	10.28
2. Fixed produce	4.2	2.75	5.02	2.51	3.95	2.99	14.39	7.05	4.18
3.Share of produce	34.56	42.57	43.81	15.3	18.17	24.56	19.26	18.71	20.89
4. Others	44.65	42.9	41.87	71.96	65.8	61.77	59	63.12	64.65
5. Total	100	100	100	100	100	100	100	100	100
Area (Hectare)	67839	42727	27544	23650	23384	7180	10807	5572	3564
Wholly leased in holding for									
1. Fixed money	15.9	12.51	7.35	15.38	10.35	41.55	5.26	33.51	29.29
2. Fixed produce	3.44	9.39	6.91	5	6.32	3.61	16.38	3.36	3.14
3.Share of produce	46.85	57.49	45.07	49.2	44.73	39.82	20.25	15.4	14.49
4. Others	33.81	20.61	40.67	30.42	38.6	15.02	58.11	47.73	53.08
5. Total	100	100	100	100	100	100	100	100	100
Area (Hectare)	52648	24936	8356	4887	5888	5436	772	1046	932

Source: Agriculture Census, 1971-71 to 2010-11

3.7. Inequality in Land Holding

Various inequality indices, namely Gini coefficient, Atkinson indices, Simple Theil indices, separately for operational holdings and for operational area, along with Decomposable Theil Indices (DTI), between (B) and within (W) are presented in Table 7.

The trend of different inequality indices are described as follows:

Gini Coefficient: The simplest measure is Gini coefficient which measures statistical dispersion or inequality in a distribution over time (Gini, 1912). It varies between 0 and 1. However, it does not address issues related to causes and differential efficiency of skills related to household income (Atkinson, 1970; Subramanyam, 1990).

TABLE 7: INEQUALITY INDICES IN HIMACHAL PRADESH DURING DIFFERENT CENSUS PERIODS

Census Period	Gini Coefficient	Atkinson's Index	Theil Index in holding, p	Theil Index in area, q	DTI (B)	DTI (W)	Theil Total
1970-71	0.7144	0.0981	0.2465	0.0147	0.4557	0.3578	0.0979
1975-76	0.6661	0.0603	0.2283	0.0029	0.3706	0.1133	0.4839
1980-81	0.6572	0.0791	0.2281	0.0095	0.3268	0.0964	0.4232
1985-86	0.5724	0.2721	0.2457	0.0114	0.2671	0.0648	0.3319
1990-91	0.5205	0.4181	0.2561	0.0044	0.2615	0.0617	0.3232
1995-96	0.4891	0.4281	0.2627	0.0151	0.2302	0.0498	0.2801
2000-01	0.4577	0.4753	0.2881	0.0292	0.1977	0.0342	0.2319
2005-06	0.4883	0.4329	0.2826	0.0375	0.1922	0.0327	0.2249
2010-11	0.4274	0.5081	0.3152	0.0459	0.1659	0.0189	0.1848

DTI (B) = Decomposable Theil Index (Between), DTI (W)= Decomposable Theil Index (Within)

Source: Author's own computation

The Gini coefficient may be defined with respect to the well known Lorenz curve between two real distributions given by P_i and Q_i as,

$$GC = 1 - \Sigma (P_i - P_{i-1})(Q_i + Q_{i-1}) \quad \ldots(1)$$

Where P_i and Q_i refer to the cumulative percentage of the number of operational holdings (Table 1) and the operational area (Table 2), respectively, in the i^{th} group.

From Table 7, it becomes obvious that overall trend of Gini coefficients over the years has been a decline in inequality suggesting a reduction in the land distribution. However, some strange behavior was also noticed *i.e.*, a shallow minima in the year 1980-81 and 1995-96 followed by a broad maxima.

Theil's Measure: Gini's coefficient is unable to reflect inter-farm (between groups) and intra-farm (within group) inequality in land holdings, for which Theil's measure (1967) is an appropriate entropy based measure and always preferred to Gini coefficient as it is a decomposable measure of inequality. It represents a utilitarian social welfare function (SWF) utilized by Foster and Sen (1996). Theil's coefficient may be obtained in the form of Simple Theil Index (STI) and alternatively Decomposable Theil Index (DTI), which may be defined as follows:

(a) Simple Theil Index (STI): It may be expressed as:

$$Th\ p = \log (n) - H(p)$$

$$Th\ q = \log (n) - H(q) \quad \ldots(2)$$

Here, p and q stand for the relative (may be in percentage) number of operational holdings and the relative operational area, respectively, n represents the number of groups/size-classes. The functions H(p) and H(q) signify the respective entropies as

$$H(p) = \Sigma^n p_i . \log (1/p_i), \text{ and } H(q) = \Sigma^n q_i . \log (1/q_i). \quad \ldots(3)$$

p_i and q_i represent the respective ratio's, $p_i = x_i / \Sigma x_i$ and $q_i = y_i / \Sigma y_i$, in the distribution pattern, with x_i as the number of operational holdings and y_i as the operational area, respectively, for the i^{th} size class and n is the number of size classes.

STI obtained for the number of holdings and operational area separately for nine Census years suggests an overall increase reflecting a greater concentration in the number of holdings than those in the area operated. The extent of concentration is found enhanced in the former case and declined in the latter. However, the results in case of number of holdings are not found in conformity with the Gini coefficients.

(b) Alternative Theil Index: The Total Theil Index (Bourguignon, 1988) may be expressed as:

$$TL = \Sigma^{n} q_i \log (q_i/p_i) \quad \ldots (4)$$

It is interesting that the size distribution of holdings and area operated may be decomposed into size groups to estimate the 'between group' inequality and 'within group' inequality. These **Decomposable Theil Indices (DTI)** may further be written as two terms on the right hand side as:

$$DTI = \Sigma q_i . T_i + \Sigma q_i \log (q_i/p_i)$$

$$\text{with} \qquad T_i = S q_{ij} .\log (q_{ij}/ p_{ij}). \quad \ldots (5)$$

Here in q_{ij} and p_{ij} the subscripts 'i' represent the group (with elements varying over 1,2….n) and 'j' varies over the number of subgroups containing 1,2…or m elements. The two terms on the right hand side of eq. (5) represents the decomposition of the Theil index as 'within group' (intra-group) and 'between group' (inter-group) Theil indices, respectively.

The values of DTI are found consistent with the Gini's indices. Further, the decomposition of the index revealed that inter-group inequality is much greater than that obtained for the intra-group. Both the types of inequalities show a declining trend, with some exceptions.

Atkinson's Index (AI): Atkinson Index (1970) also falls in the general entropy class of inequality measure and its one of the most popular welfare based inequality in the form of an explicit social welfare function. It targets policy analysts to enhance their capabilities in assessing the impact of development policies on welfare.

The AI provides an index of potential gains from redistribution of operated area equally among the farmers. In this measure, a distributional feature has been introduced through an explicit parameter E, called as 'inequality aversion parameter', which represents the weight attached by society to the inequality in the distribution. Zero value of E implies that the society is indifferent to inequality, and its higher value indicates that the society is more and more averse to inequality. The value of E may lie, in principle, between zero and infinity. However, for realistic situations it may be somewhere between 1 to 2.5. Atkinson's index has a natural interpretation for welfare losses due to unequal distribution of land. To be more explicit, suppose at some particular value of E, the value of AI is 0.40. It means that the same level of social welfare can be obtained with 60 percent of the total operated land or alternatively the gain from redistribution to bring about equality is equivalent to raising operated land by 40 percent.

The Atkinson's index may be defined as:

$$AI = 1 - [\Sigma (q^{av}i/\mu)^{(1-E)} . p_i]^{1/(1-E)} \quad \ldots (6)$$

Where $q^{av}i$ is the average operational area per holding in the i^{th} size class *i.e.* (y_i/x_i). μ is the mean operated area per holding *i.e.* $(S\ y_i/S\ x_i)$, and E is effectively an arbitrary parameter representing the degree of inequality aversion.

AI reflects the Social Welfare Function (SWF) which cannot be achieved by the earlier two indices. While calculating AI, inequality aversion parameter E was carefully chosen to be 1.5. Table 7 depicts an overall decrease in AI over the nine Census years from 1970-71 to 2010-11.

The decrease in AI over the years suggests that same level of social welfare can be obtained with 100(1-AI) (in 1970-71) to that in 2010-11 of the total operated land. (Or alternatively, the gains from redistribution to bring about equality is equivalent to raising operational land by 100-AI (year) percent). In this way, AI provides an index of the potential gains from redistribution.

It may be pointed out that sudden variations like increase or decrease, maxima or minima in the

inequality index in a particular year in the state is supposed to be due to some socio-economic dynamic phenomena affecting the operational holdings in that year. It may be understood within the framework of Kuznets (1955) between inequality and growth that tells about the phenomenon of workers migrating from agriculture to industry; and/or rural workers moving to urban jobs so as to exhibit large growth (difference in income) in spite of the fragmentation of the land holdings and hardly any variation in the agricultural income. Obviously, as economies experience growth, it gets reflected in mass education providing greater opportunities and thus decreasing the inequality and the lower income portion of the population gaining political power to change governmental policies.

4. Conclusions and suggestions

- The area under marginal holdings in the state as a whole increased. It may be attributed to implementation of the land reforms legislations and sub-division of large holdings as a result of inheritance. However, the increase in the area belonging to the marginal and small classes may be attributed to another phenomena *i.e.* sale of land by other rural artisans/land holders for reason of change in occupation or migration to bigger towns/cities.

- The distribution of operational holdings in the state of Himachal Pradesh is iniquitous and skewed.

- It is observed that the wholly owned self operated holdings increased continuously over the nine Census periods whereas partly leased holdings and wholly leased in holdings reduced drastically over the period because of the land reform measures implemented by the State.

- All the indices effectively show a declining trend in the degree of inequality over the period of nine Census years suggesting an improvement in the distribution of operational holdings, reflecting an overall growth of the state on the agriculture front. The increasing pattern of gross domestic product (GDP, 2012) in the state confirms this important finding.

- How far these variations are the results of implementation of Government policies in respect of land reforms on one hand and the operation of dynamic forces on the other is difficult to visualize. But certainly, the state intervention has played a definite role in bringing the decline in inequalities in all the districts, generating additional employment in agriculture directly/indirectly and thus raising the agriculture productivity. It has further improved the social efficiency in respect of agriculture production. Not only that, small farms started to appear more productive per unit of land and capital by maximizing returns to scarce resources.

- The state should strive for an inclusive growth by focusing on the rapid expansion of opportunities and ensuring equitous access. At the same time, the Government as a matter of policy should ensure the lower viable limit of holding and further subdivision of the land beyond a particular limit should not be allowed in view of the sustainability of a family.

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Economic Impact of Farm Debt Waiver Scheme on Farmers Livelihood: A Study of Punjab and Uttar Pradesh

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Abstract

The present paper evaluates the impact of 'Farm Debt Waiver Schemes' announced by the Governments of Punjab and Uttar Pradesh in 2017 on the livelihood of beneficiary farmers in both the states. The data were collected for the pre-debt waiver year period (before redemption) and post-debt waiver period (after redemption) by selecting 180 beneficiary farmers each from the selected states. The results of the study reveal that in Punjab, major change in the occupational status of beneficiaries after debt redemption was observed in case of dairy as secondary occupation, since more farmers started rearing dairy animals by adopting it as an enterprise. On the contrary in Uttar Pradesh, slight change was observed in agricultural labour as secondary occupation adopted by beneficiaries followed by a meagre change in adoption of dairy enterprise. The income of beneficiary farmers both in Punjab and Uttar Pradesh increased after the redemption of debt. Due to loan waiver of institutional liability, sampled farmers in Punjab were able to return higher quantum of non-institutional loans also. Thus, loan waiver scheme in Punjab has resulted in decline of indebtedness on the sampled household farms. In Uttar Pradesh also, there was change in amount borrowed as well as decline in the amount outstanding for the selected beneficiaries which confirms the impact of debt waiver scheme in Uttar Pradesh.

Keywords: *Impact, debt waiver, livelihood, indebtedness*

1. Introduction

India adopted significant policy reforms in order to achieve the goal of food grain self-sufficiency in the Green Revolution era. In the initial stage of Green Revolution (1967-68 to 1979-80), they mainly included limited crops (wheat) and geographical coverage only in states of Punjab, Haryana and Western Uttar Pradesh (Bhalla, 2007). Irrigated areas which accounted for about one-third of the total cropped area, largely benefited from improved seeds and new technology extended to these areas. Some of the states like Punjab, Haryana and Uttar Pradesh achieved tremendous growth in the Green Revolution era and their productivity jumped many folds as compared to other states where the impact was not so much. New technology spread to eastern states of India such as Bihar, Odisha and West Bengal during 1970s and 1980s after it had reached its limit in the states of initial adoption. In 1980s, the policy of Indian agriculture shifted to "evolution of a production pattern in line with the demand pattern" leading to a shift in emphasis to other agricultural products such as fruits, vegetables and oilseeds. Farmers started the adoption of improved techniques and technologies in dairying, fisheries, livestock and meeting the diversified food requirements of the growing population.

In India, the increase of productivity in agriculture did not get translated into significant higher levels of economic growth, especially in the rural areas. Moreover, in the reform era during 1990's, situation deteriorated leading to a significant deceleration in agricultural output and productivity. The deceleration in agricultural production largely affected the rural poor, which unfavourably further increased disparity in rural areas. Different weather conditions, varied agro-

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climatic factors, varying levels of resources, irrigation facilities, varied infrastructural development and high pressure of the population in rural areas across the states and regions were the factors for unevenness and deceleration in agricultural growth and development (Banerjee and Kuri, 2015).

The increased dependence of farmers on credit to meet out the rising costs of cultivation and decreased returns from additional costs has mainly caused the indebtedness of farmers. The scenario commonly described as 'Agrarian Crisis' has caused distress in Punjab and Uttar Pradesh farmers. Considering the gravity of situation/distress among the farming community, Governments of Punjab and Uttar Pradesh announced 'Farm Debt Waiver Scheme' for marginal and small farmers in 2017. Keeping this in view, states of Punjab and Uttar Pradesh were selected for concurrent evaluation of debt waiver schemes for studying their impact on the livelihood, investments and indebtedness of beneficiaries.

1.1 Objective of the study

The main aim for which the study has been conducted is to study the impact of debt waiver on the livelihood of beneficiary farmers of the state of Punjab and Uttar Pradesh and to compare their situation before and after the implementation of debt waiver schemes by their respective states.

2. Data sources and methodology

The present study is based on the primary data collected from the beneficiary farmers of the 'Farm Debt Waiver Schemes' initiated by the Governments of Punjab and Uttar Pradesh during the year 2017. In order to assess the impact of debt waiver on the livelihood of beneficiary farmers, 'Before' and 'After' approach has been employed. The data were collected from the scheme beneficiaries for the pre-debt waiver year period (before redemption) and post-debt waiver period *i.e.* (after redemption) in which year the debt waiver scheme was implemented.

In order to select sample in Punjab, three districts representing different agro-climatic zones of the state *viz.*, Jalandhar from central plain zone, Hoshiarpur from sub-mountainous zone and Bathinda from south-western zone were randomly chosen. In Uttar Pradesh also, three representative districts were randomly selected from each of the three distinct agro-climatic zones of the western region of Uttar Pradesh. These districts were namely; Bulandshahar from western plain zone, Moradabad from mid-western plain zone and Agra from south-western semi-arid zone. Two blocks from each selected district were taken for both Punjab and Uttar Pradesh. Further, two clusters from each selected block were chosen for the field survey and the list of beneficiary farmers was collected from co-operative societies located in the respective areas. The selected clusters in each block comprised of varying number of villages according to the location of sample beneficiaries in different villages. Thus, 15 beneficiaries of the scheme were selected randomly from each cluster. Hence, the total sample comprised of 180 beneficiary farmers each from Punjab and Uttar Pradesh.

3. Results and discussion

It encompasses following sections:

1. Status of farm debt waiver scheme.
2. Impact of farm debt waiver scheme on beneficiary farmers.
3. Perception of beneficiary households regarding the scheme.

3.1. Status of farm debt waiver scheme

The first loan waiver was announced about three decades ago in 1987 by Chief Minister of Haryana, Chaudhary Devi Lal. Post this announcement, there have been 16 loan waivers, most of which have been announced by the state governments.

The 'Farm Debt Waiver Scheme' as announced by the Government of Punjab in the year 2017 covered crop loans of marginal and small farmers. In case of marginal farmers, the entire eligible amount of those farmers who had total outstanding crop loan liability up to Rs. 2 lakh was to be provided as debt relief and in case of eligible

amount of more than Rs. 2 lakh, only Rs. 2 lakh was to be provided as debt relief. In case of small farmers, the entire eligible amount of those farmers who have total outstanding crop loan liability up to Rs. 2 lakh was to be provided as debt relief by the lending institutions namely; Co-operative Credit Institutions, Commercial Banks and Regional Rural Banks. To start with, the scheme was implemented for loans availed only from Co-operative Credit Institutions and then covering the loans forwarded by commercial banks. The amount eligible for debt relief under the scheme comprised of outstanding liability under crop loan (principal and interest) as on March 31, 2017. Later on, the benefits of debt waiver scheme were also provided to the landless labourers. The scheme envisaged providing debt waiver to the tune of Rs. 5.1 thousand crores for 6.6 lakh farmers and 2.85 lakh landless labourers be given a relief of Rs. 520 crores. Though the scheme is still in progress in the state, the district-wise status of beneficiary farmers is not available for Punjab state.

The Government of Uttar Pradesh had announced to provide loan redemption up to Rs. 1 lakh to individual marginal and small farmers whose crop loans were disbursed by lending institutions on or before 31st March, 2016. For the purpose of calculating the loan redemption amount, the outstanding amount (including interest) as on 31st March, 2016 was reduced by the repayments/credits received from the farmer during the financial year (FY) 2016-17 after 31st March, 2016 and till 31st March, 2017 without taking into account the money withdrawn by the farmer or new sanctions by the lending institutions during FY 2016-17. In the state of Uttar Pradesh, as on 01.04.2019, the total number of farmers reported as beneficiaries under the scheme were 44,54,064 and the total amount paid to them was estimated at Rs. 24821.30 crores.

3.2. Impact of farm debt waiver scheme on beneficiary farmers

The present section deals with the impact of 'Farm Debt Waiver Scheme' in Punjab as well as Uttar Pradesh. It encompasses the perceptions of beneficiaries about the realized impact of scheme on different aspects of their livelihood *viz.*, occupational structure of the beneficiary households, operational holding, capital investment, livestock inventory, annual household expenditure and credit structure of sample farmers before and after redemption of debt under farm debt waiver scheme.

3.2.1. Occupational structure

Agriculture and allied (except dairy) was the primary occupation of most of the beneficiary farmers in the selected states and it did not change even after the redemption of debt (Table 1). In Punjab, the next primary occupation was non-agricultural labour and about 3 percent farmers had opted it as primary occupation before and after redemption of debt. Besides this, some of the farmers were also having salaried work, pension, household work, small shopkeeper and mechanics whose percentage remained same after redemption of debt. As far as secondary occupation opted by the beneficiary farmers is concerned, the highest change in secondary occupation of beneficiaries was observed in case of dairy, which changed from about 44 percent to 50 percent after redemption of debt. All other occupations *viz.*, agricultural labour, non-agricultural labour, salaried work and household work showed relative decline after the redemption of debt, except in case of 'self employed in services' which showed no change.

In Uttar Pradesh also, major occupation of the beneficiaries was agriculture and allied (except dairy) and their number slightly increased after redemption of loan. Similarly, slight decline in the adoption of other primary occupations *i.e.* non-agricultural labour, household work of the beneficiary farmers was observed. As regards to the secondary occupation opted by beneficiary farmers, 7.2 percent had opted agriculture and allied as secondary occupation before redemption of debt and which after redemption decreased to 6.7 percent. In relative terms, 28.9 percent farmers had opted dairy as secondary occupation before redemption which increased to 29.4 percent after redemption. This shows that debt waiver scheme has somehow helped few beneficiary farmers to invest in dairy enterprise. Also, about 17 percent farmers had opted agricultural labour as secondary occupation before redemption which

increased to about 19 percent after redemption. In other secondary occupations, no change was observed in case of selected beneficiaries.

Thus in Punjab, major change in the occupational status of beneficiaries is observed in case of dairy as secondary occupation since more farmers started rearing dairy animals by adopting it as an enterprise. On the contrary in Uttar Pradesh, slight change is observed in agricultural labour as secondary occupation adopted by beneficiaries followed by a meager change in adoption of dairy enterprise.

TABLE 1: IMPACT OF FARM DEBT WAIVER SCHEME ON OCCUPATIONAL STATUS OF BENEFICIARY HOUSEHOLDS

(in percent)

Type	Punjab			Uttar Pradesh		
	Before redemption	After redemption	Change	Before redemption	After redemption	Change
Primary						
Agriculture and allied (except dairy)	91.67	91.67	0.00	77.22	78.33	1.11
Dairy	0.56	0.56	0.00	0.56	0.56	0.00
Non-agricultural labour	3.33	3.33	0.00	2.78	2.22	-0.56
Agricultural labour	0.00	0.00	0.00	0.00	0.00	0.00
Salaried work	1.11	1.11	0.00	2.22	2.22	0.00
Self employment in household industry	0.00	0.00	0.00	1.11	1.11	0.00
Household work*	1.67	1.67	0.00	8.33	7.22	-1.11
Self employed in services	0.00	0.00	0.00	0.00	0.00	0.00
Pension	0.56	0.56	0.00	1.11	1.11	0.00
Others (Small shopkeeper, mechanics)	1.11	1.11	0.00	6.67	7.22	0.56
Secondary						
Agriculture and allied (except dairy)	5.56	5.56	0.00	7.22	6.67	-0.56
Dairy	43.89	50.00	6.11	28.89	29.44	0.56
Agricultural labour	9.44	8.89	-0.56	17.22	18.89	1.67
Self employment in household industry	1.11	0.00	-1.11	2.22	2.22	0.00
Self employed in services	1.67	1.67	0.00	1.11	1.11	0.00
Non-agricultural labour	7.78	5.56	-2.22	7.22	7.22	0.00
Salaried work	3.33	2.78	-0.56	3.33	3.33	0.00
Household work*	2.22	1.67	-0.56	0.00	0.00	0.00
Pension	0.00	0.56	0.56	0.56	0.56	0.00
Others	3.33	2.78	-0.56	0.56	0.56	0.00
No secondary occupation	21.67	20.56	-1.11	31.67	30.00	-1.67

Source: Primary Data

Note: *Household work refers to the housekeeping activities like cleaning, washing, cooking, etc. Most of the respondents belonging to this occupation were females.

3.2.2 Annual household income

Annual income of the beneficiary farmers is more in Punjab as compared to Uttar Pradesh before and after redemption of debt (Table 2). However, the relative increase in annual income is higher for beneficiaries in Uttar Pradesh (about 21%) as compared to Punjab (about 16%). In Punjab, of the total beneficiaries, the maximum number *i.e.* about 35 percent were in the income group of up to Rs. 1 lakh before redemption of debt which decreased to about 31 percent after redemption. While in the income group of Rs. 1-2 lakh, the percentage of households decreased from about 21 percent before redemption to about 18 percent after redemption. Like-wise in the income group of Rs. 2-4 lakh also, slight decline in the percentage of beneficiaries was observed after debt redemption. On the other hand, in the income group of more than Rs. 4 lakh, there was an increase in the percentage of beneficiaries from about 23 percent to 30 percent after redemption of debt in case of Punjab farmers.

In Uttar Pradesh, out of total beneficiaries, about 39 percent were in the income group of up to Rs. 1 lakh before redemption of debt and their percentage decreased to about 23 percent after debt redemption showing a huge decline. However, in the income group of Rs. 1-2 lakh, the percentage of households increased from about 32 percent before redemption to about 37 percent after redemption. Like-wise in income group of Rs. 2-4 lakh also, the percentage of beneficiaries increased from about 22 percent to about 27 percent. In the income group of more than Rs. 4 lakh, the percentage of households after redemption of debt increased from about 8 percent to about 13 percent.

Thus, it is quite evident that farmer's income increased after redemption of debt in Punjab and Uttar Pradesh. However, it may not be just because of debt waiver but also due to some other associated factors also.

TABLE 2: IMPACT OF FARM DEBT WAIVER SCHEME ON THE DISTRIBUTION OF BENEFICIARY ANNUAL HOUSEHOLD INCOME

(in percent)

Income (Rs.)	Punjab			Uttar Pradesh		
	Before redemption	After redemption	Change	Before redemption	After redemption	Change
Up to one lakh	34.44	31.11	-3.33	38.89	23.33	-15.56
1 – 2 lakh	21.11	17.78	-3.33	31.67	36.67	5.00
2-4 lakh	21.67	21.11	-0.56	21.67	27.22	5.55
More than 4 lakh	22.78	30.00	7.22	7.78	12.78	5.00
Average annual income	**339686**	**395404**	**16.40**	**180556**	**218056**	**20.77**

Source: Primary Data

3.2.3 Operational holding

The change in operational holdings for Punjab and Uttar Pradesh after the redemption of debt has been depicted in Table 3. The increase in operational holding of the beneficiary farmers is lower in Punjab (2.3%) as compared to Uttar Pradesh (2.42%) after redemption of debt. In

Punjab, before redemption of debt, the operational holding size was 6.1 acres per farm which increased to 6.24 acres per farm after the redemption of debt. Thus, there was only 2.3 percent increase in the operational holdings after the redemption of debt on an average but there was slight decline *i.e.* 1.32 percent in owned land and 4.44 percent increase in leased in land.

In Uttar Pradesh, the operational holding of all farmers before the redemption of debt was estimated at 2.89 acres per farm which had increased to 2.96 acres per farm after the redemption of debt. Thus, there was 2.42 percent increase in the operational holding after the redemption of debt on an average. The total land owned and leased in land per farm remained as such after the redemption of debt too. In uncultivated land, there was change by (-) 54.55 percent after redemption.

Thus, there was no major change in the size of operational holding after redemption of credit on the selected farms in Punjab and Uttar Pradesh.

TABLE 3: IMPACT OF FARM DEBT WAIVER SCHEME ON OPERATIONAL HOLDING OF BENEFICIARY HOUSEHOLDS

(Acres/farm)

S No	Type of Land	Irrigated			Un-irrigated			Overall		
		BR	AR	PC	BR	AR	PC	BR	AR	PC
					Punjab					
1	Total owned land	2.28	2.25	(-) 1.32	-	-	-	2.28	2.25	(-) 1.32
2	Leased-in	3.83	4.00	4.44	-	-	-	3.83	4.00	4.44
3	Leased -out	0.01	0.01	0.00	-	-	-	0.01	0.01	0.00
4	Uncultivated land				-	-	-			
5	Total operational land (1+2-3-4)	6.10	6.24	2.30	-	-	-	6.10	6.24	2.30
					Uttar Pradesh					
1	Total owned land	1.73	1.73	0.00	--	--	--	1.73	1.73	0.00
2	Leased-in	1.29	1.29	0.00	--	--	--	1.29	1.29	0.00
3	Leased -out	--	--	--	--	--	--	--	--	--
4	Uncultivated land	0.19	0.07	(-) 63.16	0.11	0.05	(-) 54.55	0.13	0.06	(-) 53.85
5	Total operational land (1+2-3-4)	2.83	2.95	4.24	--	--	--	2.89	2.96	2.42

Source: Primary Data

Note: BR- Before redemption, AR- After redemption and PC- Percent Change

3.2.4 Capital investment

In order to work out present value of capital investment made by respondent farmers on farm machinery implements, farm building and irrigation infrastructure, they were asked to take into account depreciation of different assets while divulging details during data collection. A perusal of Table 4 reveals that increase in capital investment was found to be higher for Uttar Pradesh (6.29%) as compared to Punjab (0.32%) after debt redemption.

TABLE 4: IMPACT OF FARM DEBT WAIVER SCHEME ON CAPITAL INVESTMENT OF BENEFICIARY HOUSEHOLDS

Type of machine	Before redemption		After redemption		Percent Change	
	No./farm	Present Value (Rs./farm)	No./farm	Present Value (Rs./farm)	No./farm	Present Value
Punjab						
1. Farm machinery and implement						
Tractor	0.42	90084	0.42	83894	0.00	-6.87
Trolley	0.22	7250	0.22	6650	0.00	-8.28
Disc harrow	0.08	831	0.08	828	0.00	-0.36
Cultivator	0.36	2306	0.36	2144	0.00	-7.03
Rotavator	0.04	4100	0.04	4117	0.00	0.41
Seed-drill	0.06	516	0.06	398	0.00	-22.87
Generator	0.02	972	0.02	972	0.00	0.00
Spray pump	0.44	729	0.44	695	0.00	-4.66
Potato planter	0.02	333	0.03	1445	50.00	333.93
Potato digger	0.01	333	0.01	333	0.00	0.00
Ridger	0.01	28	0.01	28	0.00	0.00
Thresher	0.01	500	0.02	773	100.00	54.60
Laser land leveler	0.01	1667	0.01	1667	0.00	0.00
Happy seeder	0.01	555	0.01	555	0.00	0.00
Mulcher	0.01	278	0.01	572	0.00	105.76
Others (Small tools etc.)	6.37	976	6.37	932	0.00	-4.51
2. Farm buildings						
Implements/storage shed	0.06	1214	0.07	1830	16.67	50.74
Cattle shed	0.38	3659	0.38	3494	0.00	-4.51
3. Irrigation structure						
Electric motor	0.26	3036	0.26	2775	0.00	-8.60
Diesel engine	0.21	1096	0.21	1002	0.00	-8.58
Submersible pump	0.32	5222	0.32	5071	0.00	-2.89
Total	**9.32**	**125685**	**9.35**	**120175**	**0.32**	**-4.38**
Uttar Pradesh						
1. Farm machinery and implements						
Tractor	0.08	16,611	0.07	14583	(-) 12.50	(-) 12.21
Trolley	0.08	3317	0.07	2756	(-) 12.50	(-) 16.91
Harrow	0.04	550	0.04	883	0	60.55
Cultivator	0.06	847	0.05	622	(-) 16.67	(-) 26.56

Type of machine	Before redemption		After redemption		Percent Change	
	No./farm	Present Value (Rs./farm)	No./farm	Present Value (Rs./farm)	No./farm	Present Value
Rotavator	0.01	83	0.01	214	0	157.83
Seed drill	0	0	0	0	0	0
Generator	0	0	0	0	0	0
Spray pump	0	0	0	0	0	0
Potato planter	0	0	0	0	0	0
Thresher/Chaff cutter	0.10	564	0.10	647	0	14.72
Small tools	4.99	814	5.07	900	1.60	10.57
Other (specify)	0	0	0	0	0	0
2. Farm Buildings						
Implements/storage shed	0.01	56	0.01	56	0	0
Cattle shed	0.58	27163	0.91	36402	56.90	34.01
Other (specify)	0	0	0	0	0	0
3. Irrigation Structure						
Electric motor	0.08	2158	0.07	1917	(-) 12.50	(-) 11.17
Diesel Engine	0.17	3699	0.19	4182	11.76	13.06
Submersible pump	0	0	0	0	0	0
Drip System	0	0	0	0	0	0
other (specify)	0	0	0	0	0	0
Total	**6.20**	**55862**	**6.59**	**63162**	**6.29**	**13.07**

Source: Primary Data

In case of farm households of Punjab, the numbers of farm machinery and implements, farm buildings and irrigation structures were estimated at 9.32 per farm before the redemption of debt which changed to 9.35 per farm after redemption of debt. The present value of these assets declined from Rs. 125685 before redemption period of debt to Rs. 120175 after redemption period of debt showing a percentage change by 4.38 percent mainly due to the depreciation in their value. Hence, after redemption of debt under Farm Debt Waiver Scheme in Punjab, there was no significant change in ownership of different farm assets owned by the sampled households. However, the value of capital invested declined due to usage, and wear and tear.

For Uttar Pradesh, the number of farm machinery and implements, farm buildings and irrigation structures were estimated at 6.20 per farm before the redemption of debt which increased to 6.59 per farm after redemption of debt. The value of these assets increased from Rs. 55862 before redemption period of debt to Rs. 63162 after redemption period showing a change of 13.07 percent on all farms. This evidently confirms that after redemption of debts the capital investments on implements like harrow, rotavator, thresher/chaff cutter and small tools as well as on cattle sheds and on irrigation structure particularly diesel engine had increased on all farms. On the other hand, the capital investments particularly on tractors, trolleys, cultivators and

electric motors had decreased *i.e.* 12.21 percent on tractors, 16.91 percent on trolleys, 26.56 percent on cultivators and 11.17 percent on electric motors after the redemption of debts. This shows that the farm debt waiver scheme has not been effective on changing the ownership of machinery like tractors and electric motors as well as on heavy implements like trolleys and cultivators on all the sample farms on an average.

3.2.5 Livestock inventory

The change in livestock inventory for Punjab and Uttar Pradesh after the redemption of debt has been depicted in Table 5. In case of Punjab, the livestock population was reported as 2.41 per farm before redemption which increased to 3.07 per farm after redemption of debt showing an increase of about 27 percent and the present value increased by about 32 percent from Rs. 59448 to Rs. 78429 per farm. The increase in ownership of female crossbred cattle in Punjab was about 22 percent while in case of buffalo it was nearly 39 percent. However, there was slight (3.37 percent) decline in the investment on female indigenous cattle. Hence, after redemption of debt, there was slight increase in the investment on adult female buffaloes and female crossbred cattle in case of Punjab farms, which can be seen as positive impact on livestock investment pattern.

In case of Uttar Pradesh, total number of livestock was reported to be 3.28 per farm before redemption of debt which increased to 3.83 per farm after redemption of debt which is an increase of about 17 percent. The increase in ownership of female indigenous cattle in Uttar Pradesh is 11.40 percent while in case of female crossbred cattle, it is 60.27 percent and for buffalo it is 23 percent. Hence, after redemption of debt in Uttar Pradesh, there is higher investment on female crossbred cattle as compared to buffalo and female indigenous cattle. It shows higher investment pattern on livestock inventory on sample farms in Uttar Pradesh after redemption of debt.

TABLE 5: IMPACT OF FARM DEBT WAIVER SCHEME ON LIVESTOCK INVENTORY OF BENEFICIARY HOUSEHOLDS

Livestock	Before redemption		After redemption		Percent change	
	No./farm	Present Value (Rs./farm)	No./farm	Present Value (Rs./farm)	No./farm	Present Value
			Punjab			
1. Indigenous Cattle						
Adult female	0.29	4806	0.28	4644	-3.45	-3.37
Adult male	0.03	561	0.03	394	0.00	-29.77
Young stock	0.05	103	0.03	28	-40.00	-72.82
2. Crossbred Cattle						
Adult female	0.48	11767	0.53	14344	10.42	21.90
Adult male	0.02	53	0.03	92	50.00	73.58
Young stock	0.14	375	0.22	470	57.14	25.33
3. Buffalo						
Adult female	1.05	40333	1.37	55872	30.48	38.53
Adult male	0.03	244	0.04	694	33.33	184.43
Young stock	0.32	1206	0.54	1891	68.75	56.80
Total	**2.41**	**59448**	**3.07**	**78429**	**27.39**	**31.93**

Livestock	Before redemption		After redemption		Percent change	
	No./farm	Present Value (Rs./farm)	No./farm	Present Value (Rs./farm)	No./farm	Present Value
Uttar Pradesh						
1. Indigenous Cattle						
Adult Female	0.17	2668	0.18	2972	6.45	11.40
Adult Male	0.04	363	0.05	471	28.57	29.84
Young Stock	0.06	58	0.07	78	18.18	33.03
2. Crossbred Cattle						
Adult Female	1.24	31842	1.66	51034	33.63	60.27
Adult Male	0.03	142	0.04	241	60.00	70.10
Young Stock	0.04	32	0.07	73	71.43	123.99
3. Buffalo						
Adult Female	1.53	68292	1.55	84001	1.45	23.00
Adult Male	0.02	80	0.03	137	66.67	70.96
Young Stock	0.12	90	0.15	139	22.73	54.58
4. Others						
Adult Female	0.03	750	0.03	820	0.00	9.38
Adult Male		0				
Young Stock		0				
Total	**3.28**	**104317**	**3.83**	**139966**	**16.95**	**34.17**

Source: Primary Data

3.2.6 Household expenditure pattern

The increase in household expenditure is found to be higher for Uttar Pradesh (11.65%) as compared to Punjab (6.16%) after the redemption of debt (Table 6). In Punjab, the total domestic expenditure per household per annum was Rs. 101188 before redemption of debt which increased to Rs. 107426 per household per annum after the redemption of debt, increasing by about 6 percent. Grocery is the major item of domestic expenditure whose expense increased by about 11 percent.

In Uttar Pradesh, the total domestic expenditure per household per annum was Rs.35022 before redemption of debt which increased to Rs. 39103 per household per annum after redemption of debt. Therefore, there has been an increase of 11.65 percent after the redemption of debt on all farms on an average. Here also, grocery is the major item of domestic expenditure showing an increase of 22 percent after the redemption of debt.

Thus in both Punjab and Uttar Pradesh, there has been an increase in household expenditure of beneficiary farmers majorly on grocery items, education, health care and electricity/phone bills. Although this change may be due to increase in prices of grocery items, education fee and healthcare facilities also.

TABLE 6: IMPACT OF FARM DEBT WAIVER SCHEME ON HOUSEHOLD EXPENDITURE PATTERN OF BENEFICIARY FARMERS

(Rs./farm/annum)

Particular	Before Redemption	After redemption	Percent change
	Punjab		
Grocery items	41720	46333	11.06
Durable items	1257	1603	27.53
Health care	11848	9427	-20.43
Education (fees/books/uniform, IELTS coaching others)	9607	10300	7.21
Entertainment (cable/Dish/internet charges, etc.)	2657	2900	9.15
Electricity bill	11530	11957	3.70
Phone bill	3280	3347	2.04
Conveyance fuel	10013	10613	5.99
Social ceremonies	1587	1837	15.75
Any insurance payment (life/car/ home, etc.)	107	0	-100.00
House construction/Maintenance	1676	2533	51.13
Legal issues	33	73	121.21
Others	5873	6503	10.73
Total Domestic Expenditure	**101188**	**107426**	**6.16**
	Uttar Pradesh		
Grocery items	8564	10510	22.72
Durable items	2960	3817	28.95
Health care	4635	4559	1.64
Education (fees/books/uniform, IELTS coaching others)	4410	5240	18.82
Entertainment (cable/Dish/internet charges, etc.)	1129	1234	9.30
Electricity bill	3022	4514	39.51
Phone bill	1487	1700	14.32
Conveyance fuel	1065	1755	64.79
Intoxicants	307	374	21.82
Social ceremonies	1603	1913	19.34
Any insurance payment (life/car/ home, etc.)	881	657	(-) 25.43
House construction/Maintenance	4027	1997	(-) 50.41
Payment of any installment (debt, home loan, car, etc.)	5722	622	(-) 89.13
Legal	61	50	(-) 18.03
Others	300	159	(-) 47.00
Total Domestic Expenditure	**35022**	**39103**	**11.65**

Source: Primary Data

3.2.7 Impact of farm debt waiver scheme on nature and extent of indebtedness

The impact of farm debt waiver scheme on nature and extent of indebtedness in Punjab and Uttar Pradesh has been depicted in Table 7. A perusal of the table reveals that in Punjab, the amount of loan borrowed on sampled farm households declined from Rs. 2.59 lakh per farm to 2.15 lakh with relative decline of about 17 percent. The proportionate share of institutional sources of finance remained about 80 percent of the total loan taken while about 20 percent is from non-institutional sources. The quantum of institutional loan decline after loan redemption is about 15 percent while for non-institutional loan, decline is nearly 25 percent. Due to loan waiver of institutional liability, sampled farmers were able to return higher quantum of non-institutional loan also. Thus, loan waiver scheme has resulted in decline of indebtedness on the sampled household farms in Punjab.

In Uttar Pradesh, on an average, the amount borrowed from the banking institutions before redemption of debt was reported as Rs. 99778 per farm and the outstanding loan amount was estimated as Rs. 106762 per farm. The borrowing from non-institutional sources was reported to be nil.

After the redemption of debt, the amount borrowed from financial institutions was estimated as Rs. 74558 per farm and the outstanding amount was estimated as Rs. 79777 per farm with the borrowings from non-financial institutions being nil on all the sample farms. Therefore, the change in amount borrowed as well as in the amount outstanding declined by 25.28 percent and it confirms the impact of debt waiver scheme in Uttar Pradesh.

TABLE 7: IMPACT OF FARM DEBT WAIVER SCHEME ON NATURE AND EXTENT OF INDEBTEDNESS AMONG BENEFICIARY HOUSEHOLDS

(Rs./farm)

Name of the agency	Amount borrowed	Outstanding loan amount
	Punjab	
Before redemption		
Institutional	206182 (79.47)	204817 (79.36)
Non- Institutional	53278 (20.53)	53278 (20.64)
Total	**259460 (100.00)**	**258095 (100.00)**
After redemption		
Institutional	175732 (81.55)	175732 (81.55)
Non- Institutional	39750 (18.45)	39750 (18.45)
Total	**215482 (100.00)**	**215482 (100.00)**

Name of the agency	Amount borrowed	Outstanding loan amount
Percent change		
Institutional	-14.77	-14.20
Non- Institutional	-25.39	-25.39
Total	-16.95	-16.51
Uttar Pradesh		
Before redemption		
Institutional	99778 (100.00)	106762 (100.00)
Non- Institutional	--	--
Total	**99778 (100.00)**	**106762 (100.00)**
After redemption		
Institutional	74558 (100.00)	79777 (100.00)
Non- Institutional	--	--
Total	**74558 (100.00)**	**79777 (100.00)**
Percent change		
Institutional	- 25.28	- 25.28
Non- Institutional	--	--
Total	**- 25.28**	**-25.28**

Source: Primary Data
Note: Figures in parentheses are percentages to total

3.3. Perception of beneficiary households regarding the scheme

The present section deals with the types of constraints/difficulties confronted in getting the benefits of scheme and the suggestions/ perceptions regarding the farm debt waiver scheme implemented in Punjab and Uttar Pradesh.

3.3.1 Difficulties/constraints in getting benefit of loan waiver scheme

The farmers were asked about the difficulties/ constraints faced in availing the benefits of loan waiver scheme. A perusal of the Table 8 reveals that about 92 percent of the sampled farmers in Punjab lost mandays to fulfil the requirements for availing the benefits under loan waiver scheme. Also, 25 percent respondents reported the scheme to be very time consuming since they have to spend enough time to prepare the documents to get relief under the scheme. The respondent farmers also revealed that they have to incur different type of costs in terms of delayed dairy/farm related activities while availing benefits of the scheme.

In Uttar Pradesh, 28.88 percent of the farmers in the study area reported that the debt waiver scheme being cost incurring and 24.44 percent told that many man days were lost in getting the benefits of the scheme. Also, 12.77 percent of the farmers faced humiliation and 32.77 percent expressed different problems and other constraints such as giving bribe, etc. while 1.11 percent of the sampled farmers revealed that getting benefits of scheme was time consuming/cumbersome.

TABLE 8: TYPE OF CONSTRAINTS /DIFFICULTIES CONFRONTED IN GETTING THE BENEFITS OF DEBT WAIVER SCHEME
(Percent multiple response)

Particular	Punjab	Uttar Pradesh
Time consuming/cumbersome	25.00	1.11
Cost incurring	5.00	28.88
Man days lost	92.22	24.44
Humiliation	-	12.77
Others (Giving bribe etc)	-	32.77

Source: Primary Data

3.3.2 Perceptions and suggestions regarding debt waiver scheme

In case of beneficiary farmers in Punjab, 36.67 percent reported that the debt waiver scheme helped in 'moderate' reduction of agrarian distress, 30 percent reported as 'extreme', 13.89 percent as 'low' and 3.33 percent as 'high'. Also, 16.11 percent reported that there was 'not at all' reduction in agrarian distress. As far as perception about increased farm profitability is concerned, majority of the farmers *i.e.* 84.44 percent said it to be 'not at all' (Table 9).

TABLE 9: SUGGESTIONS/PERCEPTIONS OF BENEFICIARY FARMERS REGARDING THE FARM DEBT WAIVER SCHEME
(percent)

Particular	Extreme (5)	High (4)	Moderate (3)	Low (2)	Not at all (1)
Punjab					
Reduction in agrarian distress	30.00	3.33	36.67	13.89	16.11
Increased farm profitability	0.00	2.22	2.22	11.11	84.44
Loans taken from commission agent/arhtia should also be waived off	15.00	3.33	22.22	17.78	41.67
Decreased indebtedness	23.33	2.22	33.89	22.78	17.78
Uttar Pradesh					
Reduction in agrarian distress	0.00	27.22	23.89	12.22	36.67
Increased farm profitability	4.44	35.56	38.33	8.84	12.78
Loans taken from commission agent/ arhtia should also be waived off	1.11	4.44	35.00	16.67	42.78
Decreased indebtedness	6.11	17.78	52.22	18.33	5.56

Source: Primary Data

In Uttar Pradesh, 36.67 percent beneficiary farmers said that there was 'not at all' reduction in agrarian distress, 12.22 percent reported it 'low', 23.89 percent as 'moderate', 27.22 percent as 'high' and no farmer reported it 'extreme'. About increased farm profitability, 38.33 percent reported it under 'moderate' category (Table 9)

Thus in Punjab, some of the farmers reported about reduction in agrarian distress, decrease in indebtedness due to the implementation of farm debt waiver scheme and suggested waiving off loans taken from commission agent/arhtias also. On the contrary in Uttar Pradesh, some of the farmers reported increase in farm profitability, reduction in agrarian distress and decrease in indebtedness as a result of farm debt waiver scheme implementation.

4. Conclusions

The major change in the occupational status of beneficiaries after debt redemption is observed in case of dairy as secondary occupation, since more farmers started rearing dairy animals by adopting it as an enterprise. On the contrary in Uttar Pradesh, slight change was observed in agricultural labour as secondary occupation adopted by beneficiaries followed by a meagre change in adoption of dairy enterprise. Beneficiary farmer's income increased after redemption of debt in Punjab and Uttar Pradesh. There was no major change in operational holding and ownership of different farm assets owned by beneficiary farmers after redemption of debt in both the states. In fact, there was impact of farm debt waiver in terms of higher investment made by beneficiaries on female crossbred cattle and buffaloes in the study area in both Punjab and Uttar Pradesh. Due to loan waiver of institutional liability, sampled farmers in Punjab were able to return higher quantum of non-institutional loan also. Thus, loan waiver scheme in Punjab has resulted in decline of indebtedness on the sampled household farms. In Uttar Pradesh also, there was change in amount borrowed as well as decline in the amount outstanding for the selected beneficiaries which confirms the impact of debt waiver scheme in Uttar Pradesh. The farmers opined that they lost mandays to fulfil the requirements for availing scheme benefits, found it to be time consuming/cumbersome and cost incurring also. These constraints/difficulties should be taken care of to make the scheme more lucrative.

5. Policy implications

The major benefit of loan waiver scheme was availed by those farmers who took loan from co-operative societies, which are leading public sector institutions giving crop loan to the farmers. However, some meagre amount being waived off was of loans given by commercial banks. Thus, there is a need to expand the quantum of 'Farm Loan Waiver Scheme' to give relief to eligible farmers. Debt waive has resulted in slight decline in the dependence of farmers on non-institutional sources of finance in Punjab. It should be viewed as positive impact of the debt waiver scheme in the sense that interest liability of farmers to non-institutional sources declined and they took more loan from institutional sources with lower interest rates. Thus, there is a need to further strengthen the debt waiver scheme for the farmers benefit. The amount of loan waived off for the selected beneficiaries in Punjab was Rs. 69656 per farm which was about 35 percent of the entitled amount (Rs. 2 lakh) under the 'Farm Debt Waiver Scheme'. But the most important implication is that since agriculture is in distress, relief measures provided under the scheme to the farmers can somehow rejuvenate this sector. There is a need to start another debt waiver scheme to include higher number of farmers with no cap on holding size. The farmers opined that they lost many mandays to fulfil the requirements for availing scheme benefits, found it to be time consuming/cumbersome and cost incurring also. These constraints/difficulties should be taken care of to make the scheme more lucrative. All the farmers must be benefited under 'Farm Debt Waiver Scheme' with poor resource base. The scheme must be implemented transparently avoiding discrimination with the farmers who repay installments of loan regularly. Farmers should be encouraged and assisted to shift from their primary occupation of agriculture to other allied and secondary occupations for increasing their income. The subsidies on farm machines particularly rotavators, power threshers, etc. must be increased to benefit the farmers.

For increasing farmer's income, they should be facilitated and encouraged to rear crossbred cattle, buffaloes and improved breeds of goats on their farms. Farmers must minimize their domestic expenditure, litigations and on social ceremonies. To alleviate indebtedness, farm profitability of farmers must be increased through modern and improved techniques of farming.

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Agro-Economic Research

Assessment of Livestock Feed and Fodder in the State of West Bengal*

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1. Introduction

One of the pillars of West Bengal's economy is animal husbandry and dairy sector. The importance of the livestock sector in the economy of West Bengal can be judged from the fact that it contributes nearly 20.34 percent of the state's total agricultural production (AgSDP). Employment opportunities in traditional agriculture sector are shrinking rapidly and there is virtually no scope for employment of rural unskilled youth in capital intensive industrial units. On the other hand, due to ever increasing population growth and changing food habits, demand for milk, meat, egg & other livestock related products is growing rapidly. Livestock rearing can therefore be a major source of livelihood, particularly among the landless laborers, small and marginal farmers, and especially women.

Availability and efficient use of feed resources are the primary drivers to maximize the livestock production and productivity. But there is a lack of reliable estimates for availability and requirements of feed and fodder at state level. The FAO standards of feed requirements are based on animal body weight but are available only for dry matter. The National Agricultural Technology Project (NATP) standards are average for whole of the country and are available only for four different categories of cattle and buffaloes. However, actual feeding practices differ across the regions as well as livestock species, breed types, stages of life, feeding practices, age and sex of the animal. Assessment of livestock feed resources based on actual feeding practices at state level is very important for effective planning and policymaking for this sector. Therefore, considering the magnitude of dependence on livestock sector in West Bengal on one hand and low animal productivity on the other, the present study has been undertaken to assess livestock feed and fodder resources in the state.

1.1 Objectives of the study

The study has been conducted in the state of West Bengal with the following specific objectives:

1. To estimate the area, production and productivity of major green and dry fodder crops.
2. To study the growth pattern of major livestock production.
3. To assess feed and fodder availability, requirement, deficit/surplus to improve productivity.

2. Study design

The study is based on both secondary information and primary survey which was carried out in three districts of West Bengal, namely, North 24-Parganas, Burdwan and Murshidabad covering 120 sample farmers each for cattle, buffalo and goat.

3. Major findings of the study

The major findings of the study are as follows:

1. The state of West Bengal is home to 37.48 million livestock which is 4th largest number in the country. However, most of livestock are indigenous (82.46 percent) in nature which is one of the important constraints to boost up the productivity.

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2. Indigenous cattle and goat dominates the livestock sector in West Bengal. Together they constitute more than 85 percent of total livestock population in the state. While cattle accounts for 50.92 percent of total livestock, goat accounts for as high as 43.44 percent against the national average of 27.80 percent only.

3. During last 7 years, population of crossbred cattle has increased by 21.33 percent and that of female crossbred by 3.74 percent. However, total number as well as relative share of buffalo, sheep, pig and other livestock has shown a declining trend during last five censuses.

4. Rural people in West Bengal are highly dependent on mixed crop-livestock farming system for their livelihood. Crossbred cattle and buffaloes are mostly reared with commercial motive of milk production and goat for mutton. Rearing indigenous cattle is an important part of subsistence farming in meeting both the requirements of milk and animal power for farming operations.

5. Livestock rearing in West Bengal is a highly labour intensive and profitable enterprise primarily run by family members, particularly women. Livestock rearing plays a major role in supplementing family income and generating gainful employment.

6. West Bengal has an insatiable appetite for goat meat, chicken and eggs. Therefore, both goat and poultry farming represents a golden opportunity for off-farm livelihood diversification for unemployed youth in the state.

7. Production of egg is growing at an annual rate of 13.54 percent per annum in West Bengal. The growth rate in meat production is also more than 5 percent per annum. However, growth in milk production as well as milk yield in West Bengal is much lower than all India average. Production of wool is negligible in West Bengal.

8. Goat rearing is very profitable and has huge economic potentiality. Because of low rearing cost, low initial investment, early maturity (at the age of 10–12 months), short gestation period and above all, delicious meat and high quality skin, rearing of Black Bengal breed of goat is very popular among the poor farmers of the state as they can efficiently survive on household waste, and available shrubs and trees.

9. There is severe feed and fodder scarcity at household level. On an average, the livestock farmers could produce only 40 percent of their feed requirement. This is a matter of serious concern as the quantity and quality of feed resources are the primary drivers to maximize the livestock production and productivity.

10. West Bengal is an acute fodder deficient state. It is partly due to non-availability of fodder land which is far below the all India average and partly due to lack of adequate pasture and grazing land. Only 0.07 percent of the total land is available for pasture and grazing in the state. Total area under fodder crops in West Bengal is only 0.04 percent of gross sown area as compared to a national average of 4.6 percent.

11. Availability of feed ingredients is also bleak. Estimated availability of green fodder, dry fodder and concentrates in the state is 2.29 million tonnes, 27.14 million tonnes and 3.10 million tonnes, respectively. Availability of feed and fodder in terms of Dry Matter (DM), Total Digestible Nutrient (TDN) and Crude Protein (CP) are estimated at 27.87 million tonnes (MT), 16.63 million tonnes (MT) and 1.18 million tonnes (MT), respectively.

12. There exists a huge gap between availability and requirements of all types of feed resources, particularly, green fodder, dry fodder and in terms of TDN and CP. This is a matter of serious concern for the development of livestock sector as both the quantity and quality of feed resources are primary drivers to maximize the livestock production and productivity.

13. As per NATP standards, the state falls short by 27.45 MT of green fodder which is as high as 92.30 percent of its total requirement and by 1.00 MT (3.55 percent of requirement) of dry fodder. However, the state is self-sufficient in concentrate feed with a surplus of 0.34 MT (11.93 percent of requirements). The deficit in terms of DM, TDN and CP is estimated at 7.46 MT, 14.87 MT and 1.96 MT, respectively.

14. As per FAO standards, total dry matter requirement in the state is estimated at 33.74 million tonnes against the availability of 27.87 MT, resulting in a shortfall of 17.40 percent of total requirement.

15. Actual feed consumption rates in the study area are different from the NATP standards. Actual rates are slightly lower for green fodder but significantly higher for dry fodder and concentrates. As per actual feeding practices, total annual requirement of feed and fodder in West Bengal during 2019 was 69.03 MT against the total availability of only 32.62 MT *i.e.*, there is a deficit of 52.75 percent.

16. Bulk of the feed requirement came from cattle. Though the share of goat in total livestock population in the state is as high as 43.44 percent, its share in the total requirement of feed and fodder is only 4.22 percent of dry fodder, 12.52 percent of concentrate and 20.78 percent of green fodder.

17. Due to small farm subsistence farming, farmers are not inclined to put their scarce land into fodder cultivation because of household requirement for staple food and low returns from fodder cultivation. Majority of livestock farmers are eager to take up fodder cultivation and are interested in learning post harvest management techniques of fodder crops. However, they are unable to do so due to lack of technical know-how about fodder cultivation and post harvest management, non-availability of quality seed, low productivity and high cost of fodder seeds.

18. There are several programmes for livestock development in the state but very few livestock farmers have actually benefited from such schemes. The main benefit derived by them is free advice from the block veterinary surgeon on livestock diseases. Only 8 percent sample farmers received free vaccination and training and a mere 3.33 percent received benefits from artificial insemination (AI) programme. However, as high as 42.67 percent households did not receive any kind of benefit, not even free advice.

4. Policy recommendations

The findings of the study show that there are three distinct constraints to the development of livestock sector in West Bengal. First, predominance of indigenous breeds with low productivity; second serious constraint is acute shortage of feed and fodder; and third important constraint is limited reach/coverage of livestock extension services. However, livestock rearing is a highly labour intensive and profitable enterprise in West Bengal. Therefore, based on the findings of the study, the following policy interventions have been suggested for sustainable development of livestock sector:

1. **Increase feed and fodder production in West Bengal**: The findings of the study have amply demonstrated that there exists an overall shortage of all types of feed resources and in order to increase feed and fodder availability in the state, following interventions are suggested.

- Arrange training programmes to popularize fodder cultivation.

- Ensure timely availability of quality fodder seed at subsidized rate.

- Promote maize and other fodder crops to meet the growing feed demand.

2. **Breed Improvement:** Since 82.46 percent of livestock in West Bengal are indigenous breeds with low productivity, breed improvement is must to boost up the animal productivity. And for that, the following interventions are needed.

- Increase coverage under crossbred cattle through the production of superior quality bulls.
- Upgrading indigenous cattle through the production of superior quality semen and extensive coverage under artificial insemination programme.
- Upgrading Black Bengal goat through selective breeding with high yielding pure breeds.
- Replacement of old bucks/rams/bulls for the promotion of profitable goat/sheep/cattle farming among the small holder farmers.

3. **Livestock Extension Services:** Inadequate coverage of livestock extension services in West Bengal remains a major area of concern. There is a need of various extension services in the state like:

- Training on fodder cultivation and post harvest management.
- Promotion of balanced feeding with mineral fortified feed mixture.
- Encouraging commercial livestock farming.

4. **Others:** The animal husbandry and livestock sectors are critical for the rural economy, especially for the landless labourers, women, and small and marginal farmers. Therefore, there is a need to ensure the following:

- Promote backyard poultry and rearing of Black Bengal breed of goat as they represent a golden opportunity for off-farm livelihood diversification for unemployed youth in the state.
- Conserve the world famous meat type prolific Black Bengal breed of goat, adopting a definite breeding policy is urgently required.
- Promote FPOs in livestock for procurement of inputs as well as marketing of animal products.
- Ensure provision for animal shed to keep the animals stress free.
- Promote processing facilities for dairy and livestock products in the state.
- A separate National Livestock Policy with greater emphasis on feed and fodder.

5. Conclusion

Livestock rearing is one of the most important economic activities in West Bengal but scarcity of feed and fodder is a serious constraint for the development of this sector. Predominance of indigenous breeds with low productivity and poor reach of livestock extension services adds to the problem. The share of crossbred livestock population is increasing in West Bengal, but the state is not able to increase enough feed and fodder due to the heavy pressure of growing staple and commercial crops. However, augmentation of animal productivity is the most challenging constraint which needs to be addressed immediately. For this, increase in feed and fodder along with breed improvement is a must. The present study estimates the feed and fodder availability and requirement based on NATP standards as well as actual feeding practices followed by the livestock rearing farmers in West Bengal. Since there is hardly any reliable estimate at the state level, these state level estimates will provide a sound basis for determining the input output relations for the livestock sector in West Bengal and in effective planning and policymaking for this sector.

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Commodity Review

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2020-21 up to 31.05.2021 is 52.92 million tonnes as against 48.32 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 31.05.2021) 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

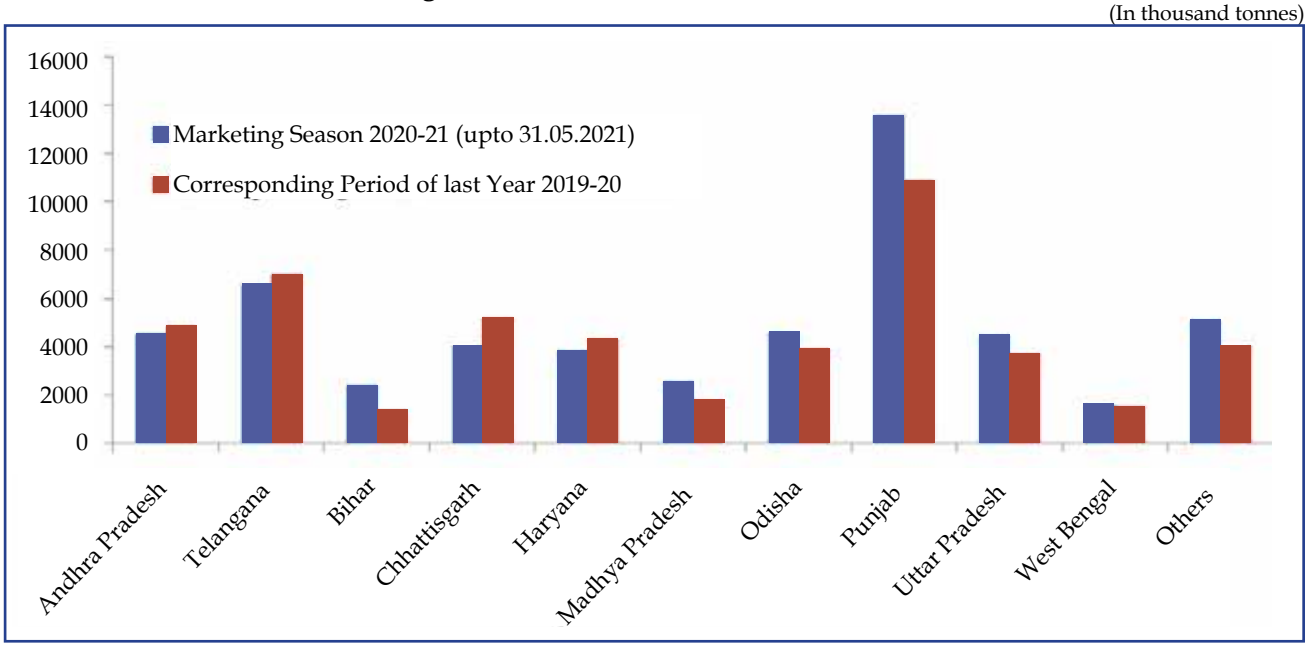
(In thousand tonnes)

State	Marketing Season 2020-21 (upto 31.05.2021)		Corresponding Period of last Year 2019-20	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Andhra Pradesh	4489	8.5	4836	10.0
Telangana	6547	12.4	6960	14.4
Bihar	2340	4.4	1341	2.8
Chhattisgarh	3976	7.5	5185	10.7
Haryana	3789	7.2	4307	8.9
Madhya Pradesh	2497	4.7	1740	3.6
Odisha	4568	8.6	3897	8.1
Punjab	13589	25.7	10876	22.5
Uttar Pradesh	4478	8.5	3717	7.7
West Bengal	1559	2.9	1477	3.1
Others	5091	9.6	3989	8.3
All India Total	52923	100	48325	100.0

Source: Department of Food & Public Distribution, GoI

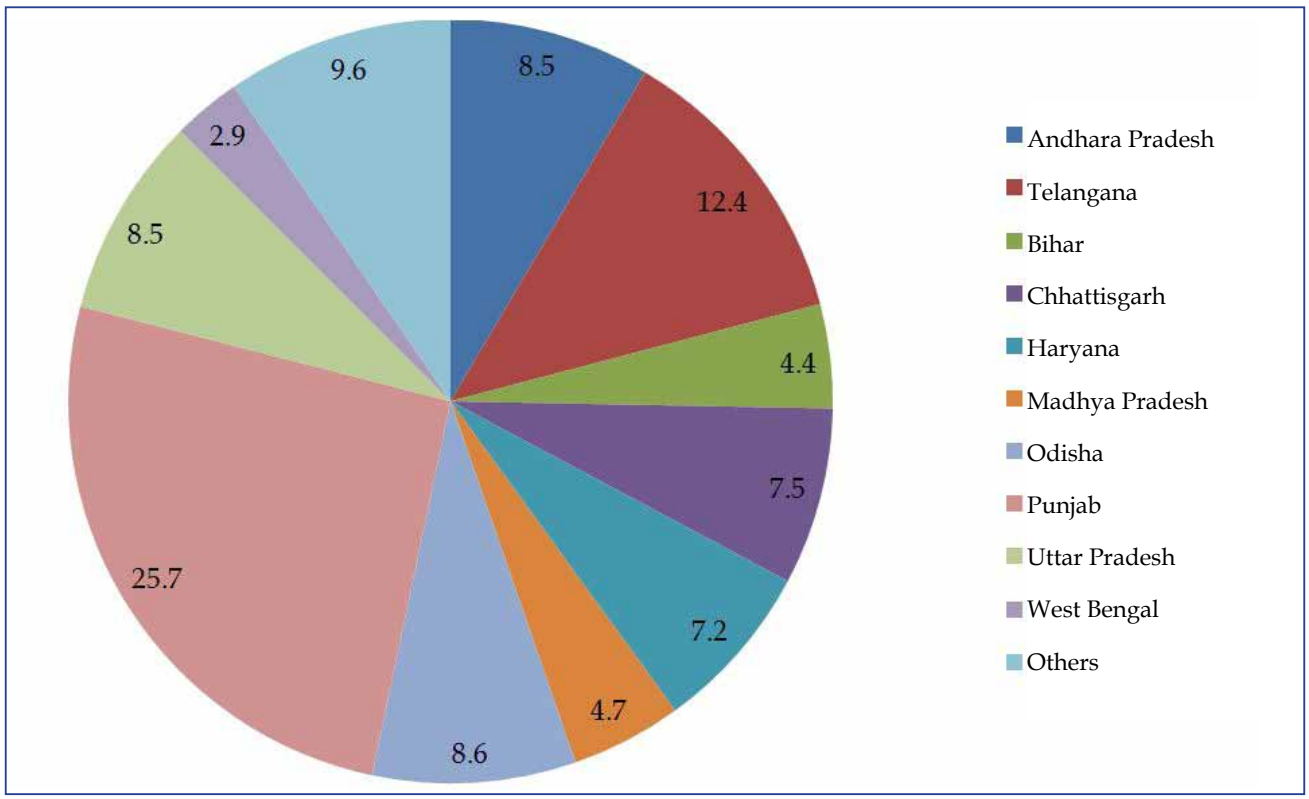
Figure 1: State-wise Procurement of Rice

(In thousand tonnes)



Source: Department of Food & Public Distribution, GoI

Figure 2: Percentage Share of Different States in Procurement of Rice during Marketing Season 2020-21(up to 31.05.2021)



Source: Department of Food & Public Distribution, GoI

Procurement of Wheat

The total procurement of wheat during rabi marketing season 2021-22 up to 31.05.2021 is 40.68 tonnes as against 36.03 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 31.05.2021) 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

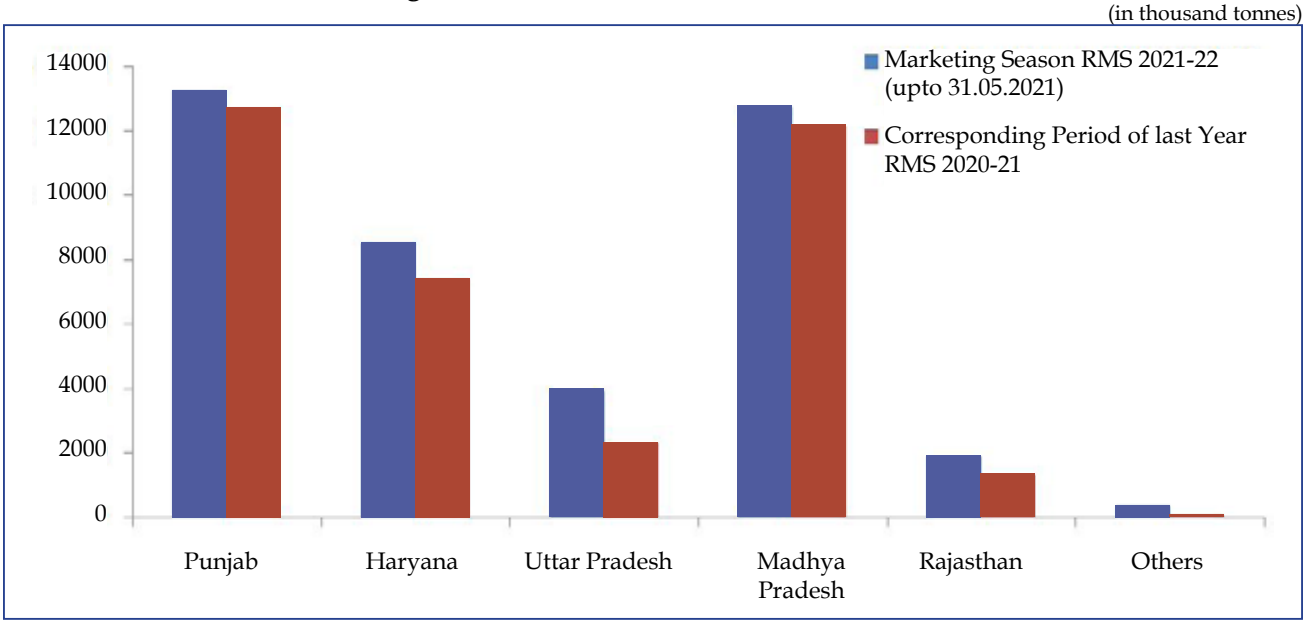
(In thousand tonnes)

State	Marketing Season RMS 2021-22 (upto 31.05.2021)		Corresponding Period of last Year RMS 2020-21	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Punjab	13210	32.5	12697	35.2
Haryana	8493	20.9	7400	20.5
Uttar Pradesh	3950	9.7	2338	6.5
Madhya Pradesh	12708	31.2	12153	33.7
Rajasthan	1914	4.7	1357	3.8
Others	400	1.0	83	0.2
All India	40675	100.0	36028	100.0

Source: Department of Food & Public Distribution, GoI

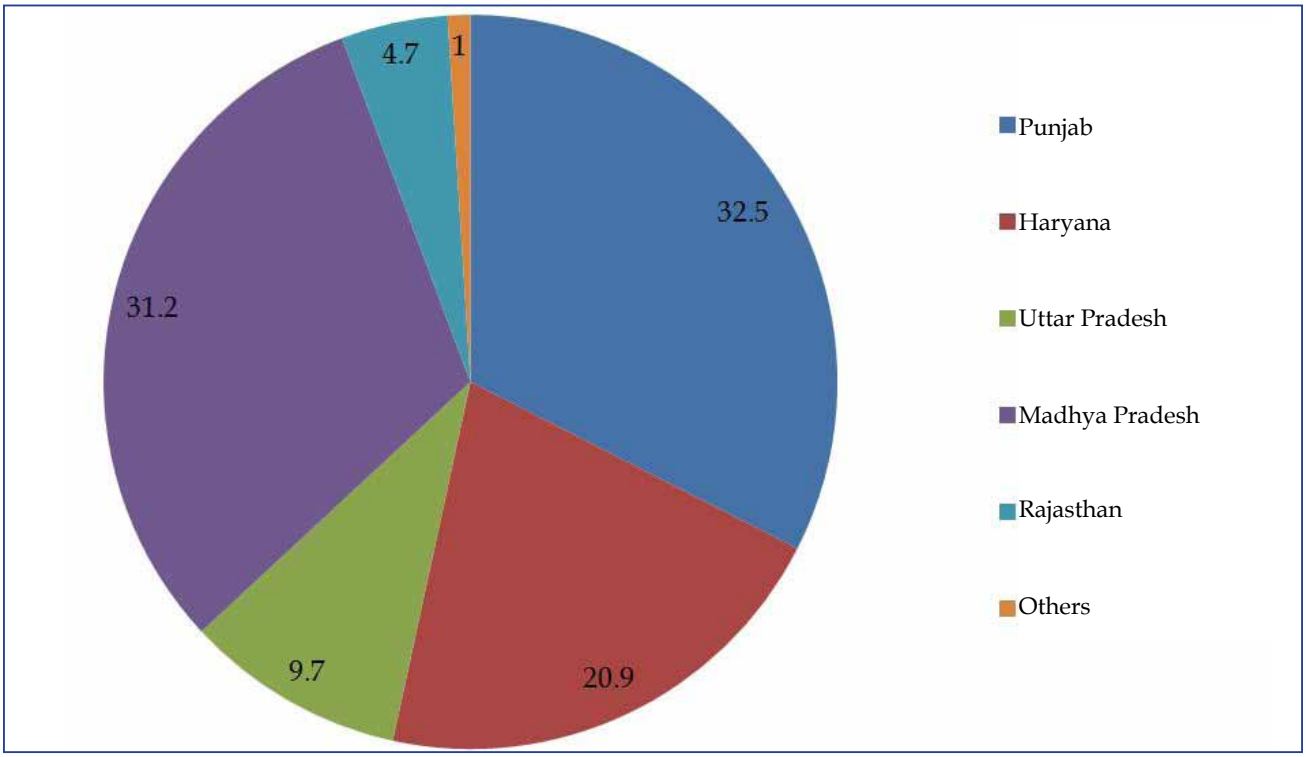
Figure 3: State-wise Procurement of Wheat

(in thousand tonnes)



Source: Department of Food & Public Distribution, GoI

Figure 4: Percentage Share of Different States in Procurement of Wheat during Marketing Season 2021-22 (up to 31.05.2021)



Source: Department of Food & Public Distribution, GoI

Commercial Crops

Oilseeds

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 208.8 during May, 2021 increased by 35.94 percent over the corresponding months of the previous year whereas WPI increased by 6.69 percent in May, 2021 over April, 2021.

The WPI of all individual oilseeds showed a mixed trend. The WPI of rape & mustard seed (8.17 percent), niger seed (6.01 percent), safflower (1.58 percent), sunflower (3.89 percent), soyabean (13.04 percent) increased over the previous month. However, the WPI of groundnut seed (2.56 percent), cotton seed (0.25 percent), copra (1.51 percent), and gingelly seed (sesamum) (1.51 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 190.7 in May, 2021 which shows an increase of 5.30 percent over the previous month. Moreover, it also increased by 51.71 percent over the corresponding months of the previous year. The WPI of mustard oil (4.86 percent), soybean oil (6.75 percent), sunflower oil (2.22 percent), rapeseed oil (0.13 percent) copra oil (0.85 percent) and cotton seed oil (4.55 percent) increased over the previous month. However, the WPI of groundnut oil (0.60 percent) decreased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 159.5 in May, 2021 showing a decrease of 7.70 percent over previous month and an increase of 4.38 percent over the corresponding month of the previous year.

Potato

The WPI of potato stood at 173.7 in May, 2021 showing an increase of 7.69 percent over the previous month. Moreover, it also decreased by 27.90 percent over the corresponding months of the previous year.

Onion

The WPI of onion stood at 175 in May, 2021 showing an increase of 6.64 percent over the previous month and an increase of 23.24 percent over the corresponding months of the previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 149.8 in May, 2021 showing a decrease of 0.60 percent over the previous month and an increase of 1.56 percent over the corresponding months of the previous year. The WPI of black pepper increased by 0.23 percent, chillies (dry) decreased by 0.19 percent and turmeric decreased by 2.42 percent over the previous month.

Raw Cotton

The WPI of raw cotton stood at 116.7 in May, 2021 showing an increase of 1.57 percent over the previous month and an increase of 11.78 percent over the corresponding months of the previous year.

Raw Jute

The WPI of raw jute stood at 298.6 in May, 2021 showing an increase of 3.00 percent over the previous month and an increase of 41.58 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 May, 2021 and April, 2021 is given in figure 5 and the comparison of WPI during the May, 2021 with the corresponding month of last year has been given in figure 6.

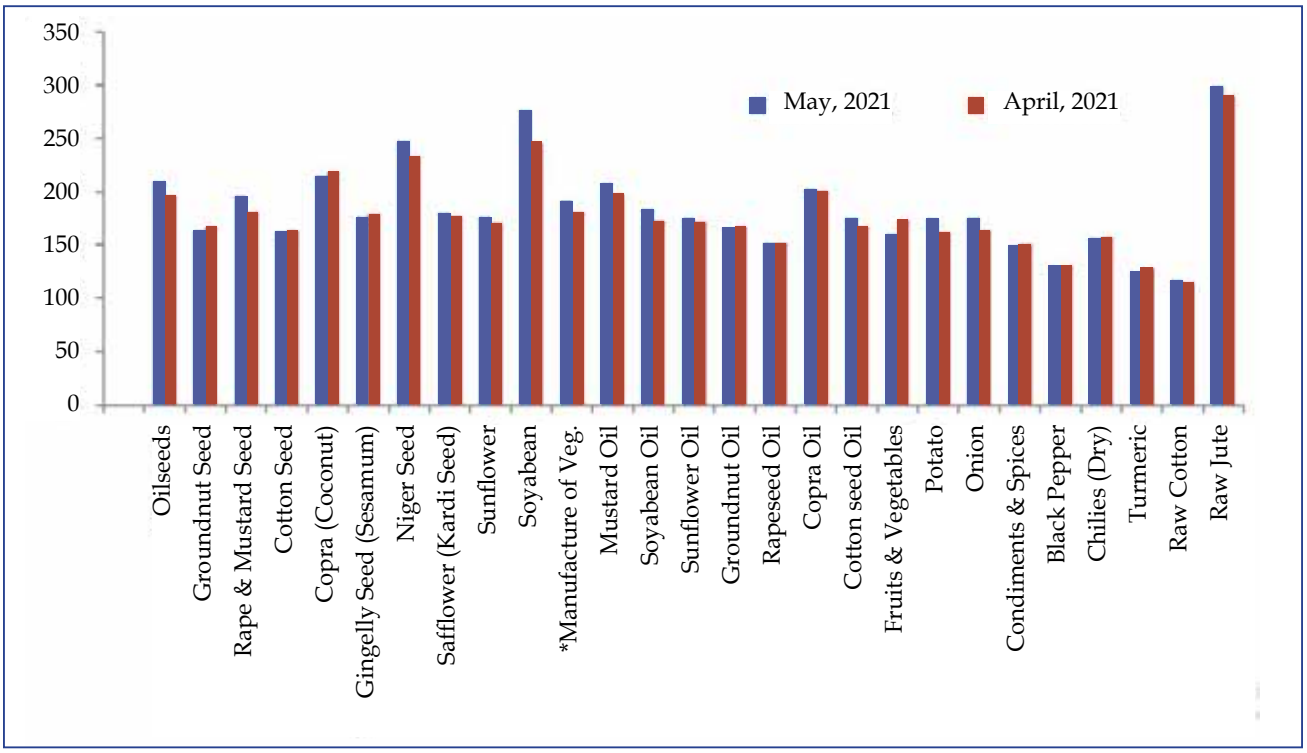
TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base Year: 2011-12=100)

Commodity	Latest May, 2021	Month April, 2021	Year May, 2020	Percentage variation over the	
				Month	Year
Oilseeds	208.8	195.7	153.6	6.69	35.94
Groundnut Seed	163.4	167.7	157.7	-2.56	3.61
Rape & Mustard Seed	195.9	181.1	148.6	8.17	31.83
Cotton Seed	162.8	163.2	154.3	-0.25	5.51
Copra (Coconut)	215.2	218.5	181.4	-1.51	18.63
Gingelly Seed (Sesamum)	175.9	178.6	193.8	-1.51	-9.24
Niger Seed	247.1	233.1	160.4	6.01	54.05
Safflower (Kardi Seed)	179.8	177.0	157.2	1.58	14.38
Sunflower	176.4	169.8	107.6	3.89	63.94
Soyabean	276.5	244.6	164.1	13.04	68.49
Manufacture of Vegetable and Animal Oils and Fats	190.7	181.1	125.7	5.30	51.71
Mustard Oil	207.1	197.5	138.9	4.86	49.10
Soyabean Oil	183.5	171.9	116.4	6.75	57.65
Sunflower Oil	174.9	171.1	116.3	2.22	50.39
Groundnut Oil	166.6	167.6	137.9	-0.60	20.81
Rapeseed Oil	151.6	151.4	124.7	0.13	21.57
Copra oil	202.1	200.4	167.3	0.85	20.80
Cotton seed Oil	174.6	167.0	116.2	4.55	50.26
Fruits & Vegetables	159.5	172.8	152.8	-7.70	4.38
Potato	173.7	161.3	240.9	7.69	-27.90
Onion	175.0	164.1	142.0	6.64	23.24
Condiments & Spices	149.8	150.7	147.5	-0.60	1.56
Black Pepper	130.6	130.3	124.0	0.23	5.32
Chillies (Dry)	156.5	156.8	164.3	-0.19	-4.75
Turmeric	125.1	128.2	116.5	-2.42	7.38
Raw Cotton	116.7	114.9	104.4	1.57	11.78
Raw Jute	298.6	289.9	210.9	3.00	41.58

Source: DPIIT, Ministry of Commerce and Industry, GoI

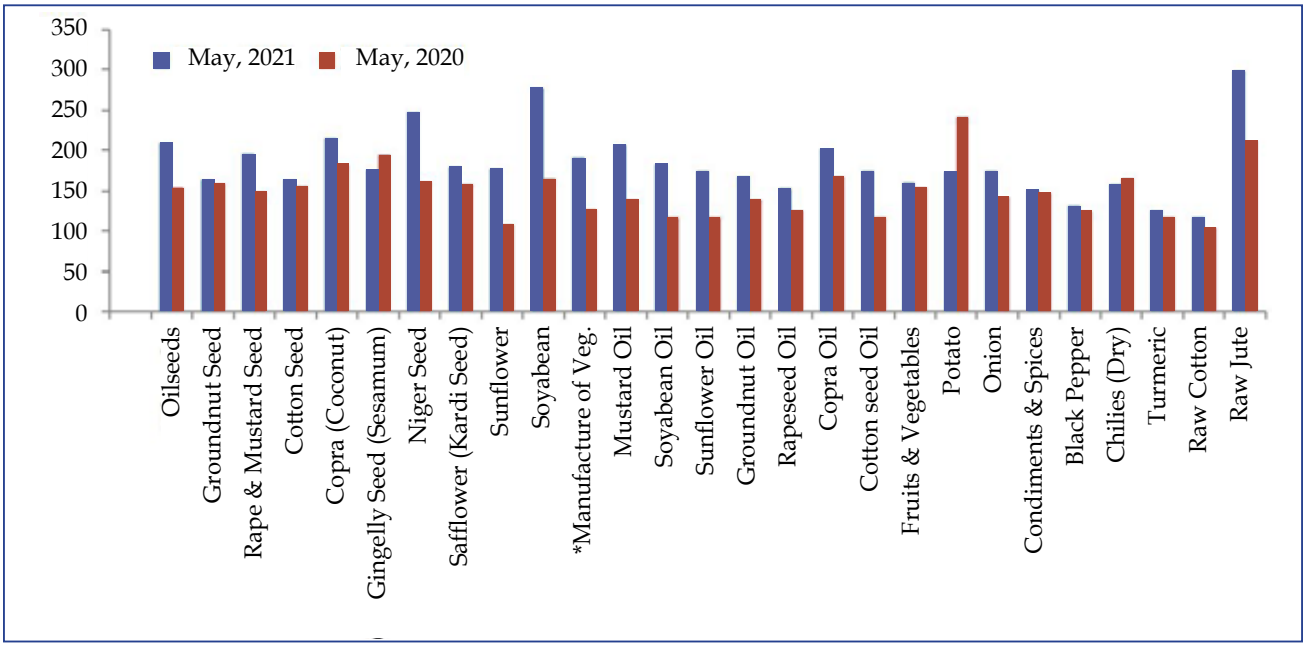
Figure 5: WPI of commercial crops during May, 2021 and April, 2021



Source: DPIIT, Ministry of Commerce and Industry, GoI

*Manufacture of Vegetable, Animal Oils and Fats

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



Source: DPIIT, Ministry of Commerce and Industry, GoI

*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		
			1. Plogting		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	332	404	363	389
HIMACHAL PRADESH	Feb, 21	8	438	-	319	319	315	315	319	319	315	315	315	315	NA	NA	494	488	494
GUJARAT	June, 20	8	283	254	266	250	206	204	213	213	223	217	214	213	NA	NA	464	409	366
MAHARASHTRA (P*)	Dec,20	8	NA	NA	NA	NA	NA	NA	NA	NA	381	231	350	200	291	200	440	375	247
ASSAM	June, 20	8	327	-	320	285	307	239	336	257	306	248	272	-	NA	NA	400	367	336
BIHAR	Jan, 21	8	315	279	304	271	303	263	305	268	306	284	287	227	NA	NA	482	471	-
KERALA	June, 20	8	1017		630	-	-	514	680	533	843	557	-	-	NA	NA	903	-	-
TELANGANA	April, 21	8	NA	NA	NA	NA	NA	NA	NA	NA	456	363	325	-	386	293	437	426	317
UTTARAKHAND	Aug, 20	8	448	-	300	278	362	319	357	373	358	327	300	300	NA	NA	588	-	-
WEST BENGAL	Dec, 20	8	364	-	311	271	299	266	332	280	315	270	259	246	NA	NA	-	-	-
HARYANA	July, 20	8	490	-	469	317	436	397	436	395	421	373	-	-	NA	NA	607	560	-
JHARKHAND (P*)	Sep, 20	8	NA	NA	NA	NA	NA	NA	NA	NA	153	140	80	60	170	157	285	238	150
ODISHA	Feb, 21	8	355	-	334	288	320	277	334	288	363	299	298	257	NA	NA	510	453	411
UTTAR PRADESH	Feb, 21	8	294	-	276	261	279	262	278	263	289	271	250	250	NA	NA	495	-	-
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	Feb, 21	8	343	-	228	177	187	163	199	176	218	187	194	178	NA	NA	388	317	308
MADHYA PRADESH	March, 21	8	307	-	270	230	264	232	271	241	288	253	249	241	NA	NA	416	400	337
PUNJAB	Feb, 21	8	441	-	431	365	413	357	430	358	415	350	-	-	NA	NA	525	518	-
TAMIL NADU	March, 21	8	-	-	414	208	438	205	437	216	460	213	-	-	NA	NA	624	512	-
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
3. P* - Provisional
4. 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	Apr-21	Mar-21	Apr-20
Wheat	PBW 343	Quintal	Punjab	Amritsar	1975	1850	2200
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1975	1730	1950
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	NT	1818	1960
Jowar	-	Quintal	Maharashtra	Mumbai	3600	3800	3300
Gram	No III	Quintal	Madhya Pradesh	Sehore	5001	4700	3850
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1520	1470	1900
Gram Split	-	Quintal	Bihar	Patna	6420	6280	6200
Gram Split	-	Quintal	Maharashtra	Mumbai	6300	6100	6250
Arhar Split	-	Quintal	Bihar	Patna	9780	9600	8500
Arhar Split	-	Quintal	Maharashtra	Mumbai	9500	9000	9400
Arhar Split	-	Quintal	NCT of Delhi	Delhi	9900	9900	NA
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	9000	8800	9000
Gur	-	Quintal	Maharashtra	Mumbai	4600	4500	4700
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4500	4500	4500
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2700	2700	2800
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	6500	4850	3900
Mustard Seed	Black	Quintal	West Bengal	Raniganj	4300	4250	4300
Mustard Seed	-	Quintal	West Bengal	Kolkata	7400	6100	4600
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	5600	5300	5150
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	5600	5200	4600
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	2400	2500	1800
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	3700	3200	3000
Castor Seed	-	Quintal	Telangana	Hyderabad	NT	NT	NA
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	9500	9050	9500
Copra	FAQ	Quintal	Kerala	Alleppey	12100	13650	11250
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	5600	6000	5000
Groundnut	-	Quintal	Maharashtra	Mumbai	8600	8700	9100
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1975	1830	1385
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	2475	2100	NA
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	2350	2340	2000
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2800	2775	2175

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

Commodity	Variety	Unit	State	Centre	Apr-21	Mar-21	Apr-20
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1870	1785	1445
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1725	1875	NA
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	2300	2200	NA
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	3600	3300	3400
Coconut Oil	-	15 Kg.	Kerala	Cochin	2678	3113	2355
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2400	2320	2100
Groundnut Cake	-	Quintal	Telangana	Hyderabad	NT	NT	NA
Cotton/Kapas	NH 44	Quintal	Andhra pradesh	Nandyal	6350	6150	NA
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	6100	6000	NA
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	7975	7400	NA
Jute Raw	W 5	Quintal	West Bengal	Kolkata	8275	7700	NA
Oranges	-	100 No	NCT of Delhi	Delhi	NA	NA	NA
Oranges	Big	100 No	Tamil Nadu	Chennai	2800	800	650
Banana	-	100 No.	NCT of Delhi	Delhi	417	417	NA
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	600	620	300
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	87000	87000	80000
Almonds	-	Quintal	Maharashtra	Mumbai	65000	63000	61000
Walnuts	-	Quintal	Maharashtra	Mumbai	68000	65000	65000
Kishmish	-	Quintal	Maharashtra	Mumbai	24000	23000	20000
Peas Green	-	Quintal	Maharashtra	Mumbai	6000	7500	7000
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	900	650	1500
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	1500	1400	2400
Cauliflower	-	100 No.	Tamil Nadu	Chennai	2500	2000	1800
Potato	Red	Quintal	Bihar	Patna	1100	900	1900
Potato	Desi	Quintal	West Bengal	Kolkata	1100	800	1900
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	2922	1367	NA
Onion	Pole	Quintal	Maharashtra	Nashik	1000	950	700
Turmeric	Nadan	Quintal	Kerala	Cochin	12000	11000	11000
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	13000	12500	12000
Chillies	-	Quintal	Bihar	Patna	17500	15300	13050
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	35000	35000	NT
Ginger	Dry	Quintal	Kerala	Cochin	20000	20000	27000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	56200	56200	NA
Cardamom	Small	Quintal	West Bengal	Kolkata	160000	175000	NA

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

Commodity	Variety	Unit	State	Centre	Apr-21	Mar-21	Apr-20
Milk	Buffalo	100 Liters	West Bengal	Kolkata	6000	6000	NA
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	59363	59363	NA
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	41500	41000	42000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	40800	41500	40250
Fish	Rohu	Quintal	NCT of Delhi	Delhi	9500	9000	NA
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	60000	45000	35000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4476	4524	NA
Tea	-	Quintal	Bihar	Patna	25800	25800	21950
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	12963	14794	NT
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	31000	31000	40000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	22000	22000	29500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	8500	8350	8150
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4350	4200	5250
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13200	13200	NA
Rubber	-	Quintal	Kerala	Kottayam	15000	15000	NT
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	67000	65000	63000

Source: DPIIT, Ministry of Commerce and Industry, GoI

Crop Production

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

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Winter Rice, Jowar (K), Bajra, Maize (K), Ragi(K), Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Ginger, Chillies (Dry), Groundnut, Castorseed, Sesamum, Cotton, Mesta, Sweet Potato, Turmeric, Sannhemp, Nigerseed, Onion, Tapioca.	Autumn rice.
Assam	Winter Rice, Castorseed.	Autumn Rice, Jute.
Bihar	Autumn Rice, Winter Rice, Jowar (K) Bajra, Maize,Ragi, Small Millets (K) Tur (K), Groundnut, Castorseed, Sesamum, Cotton, Jute, Mesta.	Jute.
Gujarat	Winter Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Chillies (Dry), Tobacco, Groundnut, Castorseed, Sesamum, Cotton, Sannhemp.	–
Himachal Pradesh	Summer Rice, Jowar (K), Bajra, Ragi, Small Millets (K) Urad (K), Mung (K), Other Kharif Pulses, Chillies (Dry), Sesamum, Sennhemp, Sumer Potato (Plains).	Winter Potato (Hills).
Jammu & Kashmir	Autumn Rice, Jowar (K) Bajra, Small Millets (K), Urad (K), Mung (K), Winter Potato, Ginger, Tobacco, sesamum, Jute, Onion.	Tobacco, Sesamum, Onion.
Karnataka	Autumn Rice, Winter Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Winter Potato (Plains), Summer Potato (Plains) Black Pepper, Chillies (Dry), Tobacco, Groundnut, Castorseed, Sesamum, Cotton, Mesta, Sweet Potato, Turmeric, Sannhemp, Nigerseed, Onion, Tapioca.	–
Kerala	Ragi, Sweet Potato, Tapicoa.	Sesamum, Tapioca.
Madhya Pradesh	Autumn Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Mung (K), Other Kharif Pulses, Summer Potato, Ginger, Chillies (Dry), Tobacco, Groundnut, Castorseed, Sesamum, Cotton, Jute, Mesta, Sweet Potato, Turmeric, Sannhemp, Nigerseed.	–
Maharashtra	Winter Rice, Jowar (K), Bajra, Maize, Ragi Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Summer Potato (Plains), Chillies (Dry) Tobacco, Groundnut, Castorseed, Sesamum, Cotton, Jute, Mesta, Sannhemp, Nigerseed.	–
Manipur	Winter Rice, Tur (K), Sesamum (K), Sweet Potato, Maize.	–
Orissa	Winter Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Summer Potato (Plains), Chillies (Dry), Groundnut, Castorseed, Cotton, Mesta	Chillies (Dry.)

(K) – Kharif (R) – Rabi

Note to Contributors

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

Articles on the State of Indian Agriculture and allied sectors are accepted for publication in the Directorate of Economics & Statistics, Department of Agriculture & Farmers Welfare's monthly Journal "Agricultural Situation in India". The Journal aims to provide a forum for scholarly work and disseminate knowledge; provide a learned reference in the field; and provide platform for communication between academic and research experts, policy makers. Articles in Hard Copy as well as Soft Copy (publication.des-agri@gov.in) in MS Word may be sent in duplicate to the Editor, Publication Division, Directorate of Economics & Statistics, M/o Agriculture & Farmers Welfare, 103, F-Wing, Shastri Bhawan, New Delhi-110001 along with a declaration by the author(s) that the article has neither been published or submitted for publication elsewhere. The author(s) should furnish their email address, phone no. and their permanent address only on the forwarding letter so as to maintain anonymity of the author while seeking comments of the referees on the suitability of the article for publication. The Article should be prepared according to the following guidelines:

(a) Articles should not exceed five thousand words (including footnotes), typed in double space on one side of foolscap paper in Times New Roman font size 12.

(b) Typescript should be arranged in the following order: title, abstract, introduction, data or methodology, text, conclusions, policy suggestions, and references.

(c) Abstract (with keywords) is required and should not exceed 300 words in length.

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

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

(f) Reference List should be given in alphabetical order of surname. The American Psychological Association (APA) style for reference lists should be followed. For example:

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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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450

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