AGRICULTURAL SITUATION IN INDIA

Since 1948

NOVEMBER, 2018

FARM SECTOR NEWS

GENERAL SURVEY OF AGRICULTURE

ARTICLES

Does Groundwater Irrigation on from shared Wells Reduce Negative Externality in Hard-Rock Areas of Karnataka

Evaluation of Pradhan Mantri Fasal Yojana with its Coverage and Implementation in Himachal Pradesh

AGRO - ECONOMIC RESEARCH

Trade Policy and the Edible Oilseed Sector of India

COMMODITY REVIEWS
Foodgrains
Commercial Crops

TRENDS IN AGRICULTURE:
Wages & Prices

AGRICULTURAL SITUATION IN INDIA

VOL. LXXV November, 2018 No. 8

Publication Division

Directorate of Economics
and Statistics
Department of Agriculture,
Cooperation & Farmers Welfare
Ministry of Agriculture & Farmers Welfare
Government of India
C-1, Hutments, Dara Shukoh Road,
New Delhi-110 011
Phone : 23012669
(Email: agri.situation@gmail.com)

Subscription

	Inland	Foreign
Single Copy	: ` 40.00	£ 2.9 or $ 4.5
Annual	: ` 400.00	£ 29 or $ 45

Available from
The Controller of Publications,
Ministry of Urban Development,
Deptt. of Publications,
Publications Complex (Behind Old Secretariat),
Civil Lines, Delhi-110 054.
Phone : 23813761, 23813762, 23813764, 23813765
(Email: acop-dep@nic.in)

For submission see last page.

CONTENTS

	PAGES
FARM SECTOR NEWS	1
GENERAL SURVEY OF AGRICULTURE	9
ARTICLES	
Does Groundwater Irrigation from Shared Wells Reduce Negative Externality in Hard-Rock Areas of Karnataka- *A. V. Manjunatha, C. M. Devika and D. T. Preethika*	13
Evaluation of Pradhan Mantri Fasal Bima Yojana with its Coverage and Implementation in Himachal Pradesh-*Dr. Nisha Devi and Vamika Darhel*	22
AGRO-ECONOMIC RESEARCH	
Trade Policy and the Edible Oilseed Sector of India- *Jayanti Kajale-AERC, Gokhale Institute of Politics and Economics, Pune.*	29
COMMODITY REVIEWS	
Foodgrains	34
Commercial Crops	35
STATISTICAL TABLES	
WAGES	
1. Daily Agricultural Wages in Some States — Category-wise.	37
1.1. Daily Agricultural Wages in Some States — Operation-wise.	37
PRICES	
2. Wholesale Prices of Certain Important Agricultural Commodities and Animal Husbandry Products at Selected Centres in India.	39
3. Wholesale Prices of Some Important Agricultural Commodities in International Market during the year, 2018.	42
CROP PRODUCTION	
Sowing and Harvesting Operations Normally in Progress during December, 2018.	44

From Editor's Desk

The 'Agricultural Situation in India' this month is about the Government's various farmer-centric policy initiatives; latest updates on the general agricultural outlook; ongoing academic research in the arena of agriculture and rural economics; and the agro-economic research study on trade policy related issues pertaining to the edible oil sector of India.

Important initiatives and releases by the government talked about in the farm sector news are the dissemination of information from Gram Sabhas to farmers about various issues pertaining to Pradhan Mantri Fasal Bima Yojana (PMFBY); the Cabinet's approval for enhancement of MSPs for Rabi crops of 2018-19 season; financial assistance to the farmers to promote value chain in organic farming in the north western states; the Cabinet's approval for the MoU between India and Lebanon for strengthening bilateral cooperation in agriculture sector; celebration of world Egg day on 12th October, 2018 by the Department of Animal Husbandry, Dairying and Fisheries; emphasize the role of women in attaining the goal of doubling farmer's income by 2022. Other agriculture sector news comprise observance of World Food Day on 16th October, 2018 with special focus to achieve the goal of zero hunger; meeting between India's Agriculture minister and the US ambassador to India to reinforce various important bilateral issues related to trade in agriculture and allied sectors; the Cabinet's approval for creation of special Fisheries and Aquaculture Infrastructure Development Fund to facilitate both marine and fisheries sectors in order to achieve the target of 15 million tonne by 2020, etc.

Discussed in the policy alerts are: agricultural losses in Kerala due to floods in August, 2018; rising imports in Edible oils despite high tariffs; and problems related to Farm Mechanization Banks (FMB) in Bihar, prepared by AERC, CMA, IIM Ahmadabad. In view of above, measures such as precision farming methods, soil examination prior to further farming activities should be considered to rejuvenate kerala's agriculture; emphasis should be given to setup stable trade policy along with provision of adequate irrigation facilities, quality seeds and more investments on oilseeds and oil palm farming; and appropriate training should be given to farm members for operating the equipments in order to improve farm mechanization in Bihar.

So far as the agricultural outlook is concerned, the Wholesale Price Index(WPI) of foodgrains increased by 0.97 percent in September, 2018 as compared to that in September, 2017. The WPI of cereals, wheat and paddy showed an increasing trend; whereas there was a decline in case of pulses during the same period. The cumulative south-west monsoon season rainfall in the country has been 51 percent lower than the long period average during 1st October, 2018 to 24th October, 2018. Current live storage in 91 major water reservoirs (as on 25th October, 2018) in the country was 112.67 BCM as against 113.11 BCM of normal storage based on the average storage of last 10 years.

In academic writings, we are sharing two interesting research articles on groundwater irrigation from shared wells; and performance of Pradhan Mantri Fasal Bima Yojana (PMFBY). The first article examines weather groundwater irrigation from shared wells reduces negative externality in hard-rock areas of Karnataka or not. Based on a randomly collected primary data set during 2009-10 on 118 farmers from three villages of Chikkaballapur, the study reveals that negative externality per acre-inch of groundwater extracted and irrigation cost per acre-inch of groundwater among individual well farmers was higher in case of shared well farmers. This finding indicates, prima facie, the utilities of sharing groundwater over individually owned wells. Moreover, it is observed that, in comparison to the individual borewell farmers, the net returns per unit of irrigation cost increased and well failure declined for shared borewells farmers. The policy implications suggest to promote sustainable use of groundwater by encouraging collective investments in groundwater irrigation in hard-rock areas of Karnataka. The second article investigates the implications of PMFBY in Himachal Pradesh. The primary objective of this paper is to study the cluster-wise coverage performance of PMFBY during Kharif and Rabi seasons in the states during 2016-17. Using the data set maintained by IFFCO-TOKIO Agency, the study finds that the coverage of total insured farmers is highest in Mandi district; insurance companies face trouble due to improper data records of farmers' land and lack of coordination among themselves and with Agriculture Departments, etc. In policy front, the study recommends to announce one uniform scheme every year; release claim amount on time to the insurance companies; collect the data of scheme coverage properly; revive the services of Gram Sevak centres; implement Insurance Scheme at local level, etc.

In the agro-economic research column, we share a report on the trade policy pertaining to the edible oil seeds sector in India, prepared by AERC, Gokhale Institute of Politics and Economics, Pune. The major objectives of this study are: to study the performance of the oilseeds and edible oil sector in India in the post 1985 period; to discuss the trade policy changes for the edible oil sector in the post liberalization period; to examine the correlation between tariff rates on imported edible oils and various indicators of performance of the oilseed sector during 1994-95 to 2017-18, etc. To accomplish these objectives, the study uses both primary and secondary data. The policy recommendations of this study highlight the necessity of containing yield gap in view of increasing demand and dependence on imports of edible oil; importance of the provision of adequate and quality inputs; importance of increasing cultivation of palm; need to increase oilseeds import at lower rates; devise are stable export-import policy in order to reduce operational complexity and uncertainty for the shareholders of production and trade of edible oils, etc.

P. C. Bodh

Farm Sector News

Gram Sabhas to inform farmers about the enrolment of farmers under Pradhan Mantri Fasal Bima Yojna (PMFBY)

Gram Sabhas across the country were asked to inform the farmers about the enrolment and benefits of Pradhan Mantri Fasal Bima Yojan (PMFBY) at the beginning of the Rabi Season on 1st October 2018. The Gram Sabhas would also inform the farmers on how they can insure their crops under the Scheme. The Ministry of Agriculture and Farmers Welfare has requested the Ministry of Panchayati Raj and the State Governments to include this as an agenda in the upcoming Gram Sabhas, especially for the one scheduled on 2nd October 2018, in connection with Gandhi Jayanti. This is as part of the awareness initiatives taken up at various levels by the Govt and Insurance Companies to create awareness about the Scheme and mobilise farmers to insure their crops.

This is also the first season for PMFBY with its revised operational guidelines in place. The Government expects the companies to reduce premium rates, especially as the general cut-off date for enrolment has been advanced by 15 days for both seasons. As per the revised operational guidelines, the farmers get 72 hours to intimate individual claims against the existing 48 hours. This can be done through any of the channels provided under the Scheme and directly on the portal of PMFBY. In case of any grievance, the farmers can access dedicated grievance redressal authorities. Revised operational guidelines provide for appointment of District Level Grievance Redressal Officer and creation of State and District Grievance Redressal Cells for fast redressal of grievances.

Non-loanee farmers can approach designated Common Service Centres, banks and insurance agents for insuring their crops or directly enrol on the portal. Those farmers who avail short term crop loans from formal financial institutions at concessional rates of interest are automatically covered under the Scheme.

The Cabinet approved enhanced Minimum Support Prices (MSP) for Rabi Crops of 2018-19 Season to be marketed in 2019-20 Season

Giving a boost to farmers' income, the Cabinet Committee on Economic Affairs, chaired by the Hon'ble Prime Minister Shri Narendra Modi, approved the increase in the Minimum Support Prices (MSPs) for all Rabi crops for 2018-19 to be marketed in 2019-20 season. The farmer friendly initiative would give additional return to the farmers of Rs 62,635 crore by way of increasing MSP of notified crops to at least 50 percent return over cost of production and would aid in doubling farmers' income.

The increase in the MSPs of wheat has been raised by Rs.105 per quintal, safflower by Rs.845 per quintal, barley by Rs.30 per quintal, masur (lentil) by Rs. 225 per quintal, gram by Rs.220 per quintal and rapeseed & mustard by Rs.200 per quintal is another major step in this regard.

Details:

The MSPs fixed by the government for wheat, barley, gram, masur, rapeseed & mustard and safflower are much higher than the cost of production. For wheat, the cost of production is Rs 866 per quintal and MSP is Rs 1840 per quintal which gives a return of 112.5 percent over cost of production; for barley the cost of production is Rs 860 per quintal and MSP is Rs 1440 per quintal giving a return of 67.4 percent; for gram cost of production is Rs 2637 per quintal and MSP is Rs 4620 per quintal giving a return of 75.2 percent; for masur cost of production is Rs 2532 per quintal and MSP is Rs 4475 per quintal giving a return of 76.7 percent; for rapeseed & mustard the cost of production is Rs 2212 per quintal and MSP is Rs 4200 per quintal giving a return of 89.9 percent and for safflower the cost of production is Rs 3294 per quintal and MSP is Rs 4945 per quintal giving a return of 50.1 percent.

The Minimum Support Prices for all rabi crops of 2018-19 season to be marketed in 2019-20 is as follows:

Crop	MSP 2017-18 (Rs/ quintal)	MSP 2018-19 (Rs/ quintal)	Cost of production 2018-19 (Rs/quintal)	Increase in MSP		Return over cost* (in percent)
				Absolute	%	
Wheat	1735	1840	866	105	6.1	112.5
Barley	1410	1440	860	30	2.1	67.4
Gram	4400	4620	2637	220	5.0	75.2
Masur (Lentil)	4250	4475	2532	225	5.3	76.7
Rapeseed & Mustard	4000	4200	2212	200	5.0	89.9
Safflower	4100	4945	3294	845	20.6	50.1

**Includes all paid out costs such as those incurred on account of hired human labour, bullock labour/machine labour, rent paid for leased in land, expenses incurred on use of material inputs like seeds, fertilizers, manures, irrigation charges, depreciation on implements and farm buildings,interest on working capital, diesel/electricity for operation of pump sets etc, miscellaneous expenses and imputed value of family labour.*

India is willing to share its expertise and technological knowhow and would like to work closely for the benefit of the people of Suriname: Shri Radha Mohan Singh

Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh, met Mr. Lekhram Soerdjan, Minister of Agriculture, Animal Husbandry and Fisheries of the Republic of Suriname in Krishi Bhawan, New Delhi on 4th October 2018 and called for deepening bilateral cooperation in agriculture and allied sectors for the benefit of the people of Suriname.

The Minister observed that the visit adds to the historical and cultural ties going back to 145 years and said relations between the two countries must be enhanced further through people to people and government to government contacts. He assured his counterpart from Suriname of full cooperation in agriculture and allied sectors and said that the Work Plan of Joint Working Group (JWG) on Agriculture for 2017-21 would facilitate Training/Study visit of Indian Scientists/scholars to Suriname to build capacity of the farmers/agricultural scientists in various areas relating to agriculture and allied sectors such as food processing, animal husbandry and fisheries under the purview of JWG.

The Minister appreciated the efforts of the Government of Suriname for organising the celebration of 145thanniversary of the arrival of Indians in Suriname during May & June, 2018 and preserving and propagating the Hindi language by the Hindustani community in the country. He also thanked the Government of the Republic of Suriname for sending a high level delegation to participate in the International Solar Alliance Conference, an initiative of Hon'ble Prime Minister Shri Narendra Modi.

Financial assistance is being provided by the government to promote value chain in organic farming in North East region: Shri Radha Mohan Singh

Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh, while addressing the conclave of Chief Ministers of Himalayan states organized in Shimla, said that Himalayan states are diverse in agricultural species, agricultural production systems and livestock breeds. This diversity is extremely useful for the future, not only for humans but also for the protection and development of all animals and plants.

He said that organic farming should be emphasized for the coming generations. For the

promotion of organic farming, there is a plan to develop clusters of 50 acres for which funds are being provided in the ratio of 90:10. In order to promote value chain in organic farming in North East region, financial assistance for advanced seed plantation materials, development of basic structure, etc., is being provided to Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura.

The Minister also said that under the Paramparagat Krishi Vikas Yojana (PKVY), Rs 1307 crore has been allocated since 2015-16 for the development of organic farming in the cluster mode. 5 lakh farmers have benefited from this and 2.38 lakh hectare of land has been brought under organic farming. Under the Mission Organic Value Chain Development for North Eastern Region (MOVCD-NER), 50,000 farmers have been engaged in organic farming and 2500 interested farmers group have been developed. Sikkim was the first state to adopt organic farming and learning from it, other states are also adopting organic farming.

He further said that under the National Horticulture Mission, assistance is being provided mainly for the construction of CA storage, nurseries, processing units in the North Eastern and Himalayan states. So far, 26 CA (controlled atmospheric) storages have been established in Himachal Pradesh, Jammu & Kashmir and Uttarakhand with a capacity of 1 lakh metric tonne. 20 processing units have been established in North East and Himalayan states and 519 Marketing Infrastructure Units have been set up.

Drawing attention towards climate change, the Minister said that in order to deal with this, 45 Integrated Farming System models have been developed by ICAR covering all 15 agro-climatic areas of the country. These climate-friendly technologies are being displayed and promoted in 29 states through KVKs.

In a separate event, while addressing the 70th Foundation Day ceremony of ICAR- Central Potato Research Institute (CPRI) in Shimla, the Minister said that owing to the research work and innovative technology of the institute, India is today one of the leading potato producing countries of the world. In the last seven decades, a lot of progress has been made in potato production and acreage. While the area under potato cultivation was 2.30 lakh hectare and production was 15.4 lakh tonnes in 1949-50, it rose to 21.64 lakh hectares and 4.65 crore tones, respectively, in 2016-17.

The institute has developed several new technologies in order to increase potato production. The scientists of the institute have developed Indo-Blightcast model for forecasting potato late blight. The Institute has also developed multiple disease resistance advanced species of potato. Simultaneously, it has developed potato varieties for hilly regions like Kufri Himalini and Kufri Girdhari. Recently, CPRI have developed the aeroponic technology for the production of superior uniform size potato seeds free from viral diseases. The Institute also provides scientific backup to agencies for producing potato seeds using aeroponic technology. This has ensured easy availability of seed potatoes for the farmers. Annually the Institute is producing 3000 tonnes of potato breeder seed. Institute has developed and released six processing varieties viz., Kufri Chipsona 1-4, Kufri Himsona and Kirfri Frisona (chips and finger fry making). CPRI has also developed three processing and two storage technologies.

The Minister reiterated Hon'ble Prime Minister Shri Narendra Modi's vision of doubling farmers' income which, he said, can be achieved through intervention of modern agricultural techniques. He said that agricultural loans are being made available to the farmers at a minimum interest rate (4%) by the government and the *Pradhan Mantri Fasal Bima Yojna* (PMFBY) has been launched to ensure compensation for crop loss. To reduce the cost of agriculture, the government has increased subsidy on agricultural investment. The government has also made a historic increase in MSP of various crops in order to make the farmers financially strong.

The Minister expressed hope that the ICAR-CPRI would continue to contribute in the production and development of potato with full commitment and take India to the top in global potato production.

Sustainable production can be achieved through organic farming by way of improvement in soil health and fertility: Shri Radha Mohan Singh

Union Agriculture & Farmers Welfare Minister, Shri Radha Mohan Singh, said that organic farming

has the potential to provide livelihood to farmers and create employment opportunities for rural and urban people. Addressing Jaivik *Krishi Sammelan* organised by the National Centre of Organic Farming in Pandit Deen Dayal Dham, Mathura on 7th October 2018, he said that Sustainable production can be achieved through organic farming by way of improvement in soil health and fertility. The Minister said that the Modi government launched a new initiative the Paramparagat Krishi Vikas Yojana (PKVY) in 2015-16. From 2015-16 to 2018-19, Rs 1307 crore has been allocated to promote organic farming on cluster mode in the country. With the successful implementation of PKVY, Mission Organic Value Chain Development (MOVCD) and APEDA, more than 23.02 lakh hectares have been brought under certified organic farming till date in the country.

He added that the demand for Indian organic produce is high in the global market. During 2016-17, India produced 15 lakh tonne organic produce, where in, the export volume was 3.64 lakh tonne with value of Rs 2478 crore, whereas the domestic market size is estimated at Rs 2000 crore which is expected to touch Rs 10000 crore in the next three years. The Minister called for adoption of organic farming and reducing dependence on chemical fertiliser and pesticide. He asserted it is imperative that we protect our environment, soil health and fertility, mitigate climate change & global warming and achieve sustainable & nutritional security. He expressed happiness over NCOF developing multi-action waste decomposer and its simple mass multiplication technology for farmers.

Shri Singh said that the present government is committed to promote organic farming and is providing every possible help to farmers for the development of organic farming in the country. For an Organic Farming Revolution, he called upon farmers groups, NGOs and other stake holders to adopt organic farming in order to free the soil and environment from deadly chemicals.

The Cabinet approved MoU between India and Lebanon for cooperation in the field of agriculture and allied sectors.

The Union Cabinet, chaired by the Prime Minister Shri Narendra Modi, approved the signing of a Memorandum of Understanding (MoU) between India and Lebanon for cooperation in the field of agriculture and allied sectors.

Bilateral cooperation in the field of agriculture would be mutually beneficial to both the countries. The MoU would promote understanding of best Agricultural practices in the two countries and would help in better productivity at farmer fields as well as improved global market.

The MoU would help to increase agriculture production and productivity by getting access to best practices and market worldwide. It would lead to innovative techniques for increasing production and productivity, leading to strengthening of food security.

The Department of Animal Husbandry, Dairying and Fisheries observed "World Egg Day"

The Department of Animal Husbandry, Dairying and Fisheries, Government of India organized "World Egg Day" on 12th October 2018. The Minister of State of Agriculture & Farmers Welfare Smt. Krishna Raj was the Chief Guest at the event and Minister of State of Agriculture & Farmers Welfare, Shri Parshottam Rupala was the Chairman for the event. Farmers, members of poultry associations, research scholars, administrators and around 700 participants including poultry farmers attended the event. In the technical session, eminent speakers were invited to speak on various topics relating to importance of eggs in human nutrition which were followed by discussions & deliberations.

Shri Tarun Shridhar, Secretary, Department of Animal Husbandry, Dairying and Fisheries, addressed the gathering highlighted the importance of eggs in human nutrition and increasing poultry farmers' income. Minister of State of Agriculture & Farmers Welfare Shri Parshottam Rupala released a booklet on poultry entrepreneurs' success stories. Sanction orders were distributed to 5 entrepreneur beneficiaries under the Poultry Venture Capital Fund - Entrepreneurship Development and Employment Generation component of National Livestock Mission.

International Egg Commission has declared the second Friday of October every year as World Egg Day. This is celebrated in countries all around the

world, and is a unique opportunity to help raise awareness of the nutritional benefits of egg.

India is the third highest producer of eggs in the world, but the per capita availability is around 69 eggs per person per year. Egg is a wholesome, nutritious food with high nutrient density. It is a high value protein and provides a wide variety of other nutrients like vitamins, essential amino acids and minerals, etc., crucial for growth and good health.

Special importance to be given to the role of women in achieving the goal of doubling farmers' income by 2022: Shri Radha Mohan Singh

The government has allocated more than 30% funds for women under various major schemes, programs and development related activities in order to bring women in the agriculture mainstream. Stating this on the occasion of *Mahila Kisan Diwas*, on 15th October 2018, Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh, informed that about 18% of the agricultural households in India are led by women. In addition to agriculture, women have been making exceptional contribution in horticulture, fisheries, animal husbandry, beekeeping, etc. The Minister disclosed that a research by the Indian Council of Agricultural Research (ICAR) conducted in nine states shows that the participation of women is 75% in the production of major crops, 79% in horticulture, 51% in post-harvest work and 95% in animal husbandry and fisheries. He further said that a National Gender Resource Centre in Agriculture, set up in the Department of Agriculture Cooperation & Farmers Welfare, has developed a women sensitization module to bring about change in the mindset and behaviour of male program operators. In 2017-18, DAC&FW's MANAGE, EEI, SAMETI and other institutions have trained 5645 people through 222 programmes. Besides, more than 98.14 lakh women farmers have been trained so far under the ATMA scheme.

Shri Singh said that special importance is being given to the role of women in achieving the goal of doubling farmers' income by 2022. Keeping this in mind, the inter-ministerial committee formed under the chairmanship of Dr. Dalwai has written a separate chapter on the empowerment of women to double the income of farmers. These efforts would certainly prove to be effective in enhancing the participation of women in agriculture. The Central Institute for Women in Agriculture, Bhubaneswar (Odisha), set up under the ICAR, has also been working in this direction.

The Minister stated that cooperative education programs of women are organized through State Cooperative Societies to ensure womens participation in various activities in the field of cooperatives. Under the National Cooperative Union of India (NCUI), 38.78 lakh women have been trained in the last two years. Similarly, 6.07 lakh and 7000 women have benefited through KVKs and skill training respectively. A total of 53.34 lakh women have benefited during the year 2016-17 and 2017-18. He said that government's revised ATMA scheme is providing support to the Food Security Groups of the farmers to ensure food security at the domestic and community levels. Under this, the Women's Food Security Groups are being given financial assistance at the rate of 2 groups / per block and at the rate of Rs 10,000 per group / per year. The Minister congratulated women farmers and praised their commendable contribution in taking India to the path of Second Green Revolution and in changing the landscape of development in the country.

The Agriculture Minister's Message on World Food Day

World Food Day is a day of action dedicated to tackling global hunger. The theme of World Food Day 2018 was 'Our actions are our future – A zero hunger world by 2030 is possible'. Speaking on the World Food Day, the Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh, said that the Indian Council of Agricultural Research takes action to remove the suffering from hunger and ensure food security and a nutritious diet for all. The focus of the Government of India is that food is a basic need and fundamental human right. Zero hunger could save the lives of 301 million a year, and can help build a safer, more prosperous world for everyone. The Government of India aims to transform India's agricultural sector to contribute to the achievements of global environmental objectives, and has launched a new project in association with FAO, India office known as 'Green-agriculture: transforming Indian agriculture for global environmental benefits and the conservation of critical biodiversity and forest landscapes'.

On farmers welfare, the Minister said "the farmers, whom we respectfully call our 'Annadata' or the providers of food, are central to our efforts in food processing. We have a stated target of doubling farm incomes by 2022. Recently, the Pradhan Mantri Kisan Sampada Yojana, a national level programme, was launched to create world-class food processing infrastructure. This is expected to leverage investment of five billion US dollars, and benefit two million farmers and generate more than half a million jobs over the next two years."

On Mega Food Parks, the Minister said "Through these food parks, we aim to link agro-processing clusters with key production centres. This would offer immense value proposition in crops such as potato, pineapple, oranges and apples. Farmers groups are being encouraged to set up units in these parks, thereby reducing wastage and transportation costs, and creating new jobs."

On digitalization in Agriculture, the Minister said "We plan to link our villages through broadband connectivity within a clear timeframe. We are digitalizing land records, and providing various services to the people on mobile platforms. These steps are building momentum towards real-time transfer of information, knowledge and skills to farmers. The e-NAM, our national agriculture e-market, is connecting our agricultural markets nationwide, thereby giving our farmers the benefit of competitive pricing, and freedom of choice."

The Minister stated that he was happy to learn that the Indian Farming, a monthly magazine of the ICAR, is dedicating a special issue on the theme of World Food Day 2018 – 'Our actions are our future – A zero hunger world by 2030 is possible'. He said that qualitative information contributed by renowned scientists of FAO, CGIAR and ICAR systems would benefit agriculture knowledge seekers.

The Government is working continuously in a phased manner to achieve the goal of zero hunger: Shri Radha Mohan Singh.

The purpose of celebrating World Food Day this year is to demonstrate our global commitment to achieve the goal of creating "Zero Hunger World" by 2030. The Present government is working continuously in a phased manner to achieve the goal of zero hunger.

At the inauguration ceremony of Agri Startup & Entrepreneurship Conclave on the occasion of World Food Day on 16th October 2018, Union Agriculture & Farmers Welfare Minister, Shri Radha Mohan Singh, said that the efforts of farmers and techniques developed by the Indian Council of Agricultural Research (ICAR) have contributed to an increase in agricultural production and food security. As per the fourth advance estimate, foodgrain production is estimated at 284.83 million tonnes in 2017-18, an increase of over 20 million tonnes as compared to 2013-14.

The Minister informed that horticulture crops, which contribute significantly to nutritional security, have witnessed record production this year at 307 million tonnes. Now, India occupies the top spot in horticulture production. In the year 2015-16, the production of pulses was 16.25 million tonnes, which increased to 25.23 million tonnes according to the fourth advance estimate in the year 2017-18, which is about 9 million tonnes higher compared to the production achieved in the year 2013-14. The role of high quality crop variety, seed and technology has been significant in increasing production, the Minister stated. He added that 795 crop varieties were released for production during 2014-18 as compared to 448 crop varieties during 2010-14. The demand and production of breeder seeds during 2013-14 was 8479 tonnes and 8927 tonnes respectively which rose to 10405 tonnes and 12265 tonnes in 2016-17.

On 'Skill India', the Minister said that the Scheme was launched by the Indian government on a large scale nationwide. According to statistics, a requirement of 22 lakh skilled youth is in the agricultural sector, for which training of skill development is being conducted in various employment areas with the help of the Agriculture Department ICAR and Krishi Vigyan Kendras. The present Government has encouraged entrepreneurs through skill development and start-ups.

To attract the youth of the country towards agriculture, a project called ‹Arya› is being run through Krishi Vigyan Kendras and the Farmer First program is also playing a leading role in this direction. Skill development internships for youth are provided at the graduation level. There is tremendous potential for startups in the fields of

seed and plant production, food processing and post-mortgage management, veterinary, farm machinery, poultry, fish production, biological products and bioplasty.

The Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh, met Ambassador of USA in India Mr. Kenneth I. Juster.

The US Ambassador in India Mr. Kenneth I. Juster had called on to meet the Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh, on 17th October 2018, at Krishi Bhawan in New Delhi. During the course of the meeting, both the dignitaries discussed ways and means to reinforce trade and bilateral relations in agriculture.

The Union Minister of Agriculture and Farmers Welfare stated that the main objective of this meeting was to create new opportunities for mutually beneficial trade and economic partnership with USA so that Indian economy could be strengthened.

Shri Singh stated that USA expressed its satisfaction towards the systematic approach adopted by India for production of grapes and assured to expeditiously finalize the legislation related to the access of Indian commodities in USA markets so as to be able to export Indian table grapes to USA by November 2018 season.

Union Agriculture Minister pointed out that during the course of discussion, the issue of the sanction imposed on the import of Indian pomegranate arils by USA was brought up. Shri Singh requested US Ambassador for immediate removal of this ban assuring him that India has made necessary improvement in the production system related to these exports.

Union Minister of Agriculture and Farmers Welfare stated that these discussions would reinforce the bilateral relations resulting in the enhancement of the trade in agriculture and allied commodities between the two sides for improved outcomes in the future.

Creation of Fisheries and Aquaculture Infrastructure Development Fund (FIDF)

The Cabinet Committee on Economic Affairs, chaired by the Prime Minister Shri Narendra Modi, gave its approval for creation of special Fisheries and Aquaculture Infrastructure Development Fund (FIDF).

The approval entails an estimated fund size of Rs.7,522 crore, comprising Rs.5,266.40 crore to be raised by the Nodal Loaning Entities (NLEs), Rs. 1,316.6 crore beneficiaries contribution and Rs.939.48 crore budgetary support from the Government of India. National Bank for Agriculture and Rural Development (NABARD), National Cooperatives Development Corporation (NCDC) and all scheduled Banks (herein after referred as Banks) shall be the nodal Loaning Entities.

Benefits:

Creation of fisheries infrastructure facilities both in marine and inland fisheries sectors. To augment fish production to achieve its target of 15 million tonne by 2020 set under the Blue Revolution; and to achieve a sustainable growth of 8%-9% thereafter to reach the fish production to the level of about 20 MMT by 2022-23. Employment opportunities to over 9.40 lakh fishers/fishermen/fisherfolk and other entrepreneurs in fishing and allied activities. To attract private investment in creation and management of fisheries infrastructure facilities. Adoption of new technologies.

FIDF would provide concessional finance to State Governments / UTs and State entities, cooperatives, individuals and entrepreneurs, etc., for taking up of the identified investment activities of fisheries development. Under FIDF, loan lending would be over a period of five years from 2018-19 to 2022-23 and maximum repayment would be over a period of 12 years inclusive of moratorium of two years on repayment of principal.

Paramparagat Krishi Vikas Yojana (PKVY) is being implemented with a view to promote organic farming in the country: Shri Radha Mohan Singh

Union Agriculture & Farmers Welfare Minister, Shri Radha Mohan Singh, said that with an aim to double farmers' income, the budget outlay of the agriculture sector has been enhanced by 74.5% to Rs 2,11,694 crore during 2014-2019 as compared to Rs 1,21,082 crore during 2009-2014. On the occasion

of inauguration ceremony of Krishi Kumbh 2018 organised in Lucknow, Uttar Pradesh on 26th October, 2018, he said that the Government is implementing various schemes to ensure higher gains for farmers. The Soil Health Card (SHC) ensures judicious use of fertilizer application thus saving money for farmers. Neem-coated urea is being promoted as it enhances availability of nitrogen to the crop and reduces cost of fertilizer application. Paramparagat Krishi Vikas Yojana (PKVY) is being implemented with a view to promote organic farming in the country. This would improve soil health and organic matter content, and by receiving premium prices, net income of farmer would also increase. Realizing the possibility of organic farming in the northeast, Mission Organic Value Chain Development for North Eastern Region (MOVCD-NER) has been initiated.

He added that the National Agriculture Market scheme (e-NAM) has revolutionized agri-markets by ensuring better price discovery, bringing in transparency and competition in order to enable farmers to get better remuneration for their produce thereby moving towards 'One Nation One Market'. The Gramin Agricultural Markets (GrAMs), electronically linked to e-NAM portal and exempted from regulations of Agriculture Produce Marketing Committees (APMCs), provide farmers facility to make direct sale to consumers and bulk purchasers. Giving further boost to farmers' income, the government has also increased MSP of all kharif and rabi crops for 2018-19 season by at least 150% of the cost of production.

The Minister said that Pradhan Mantri Fasal Bima Yojana (PMFBY) & Restructured Weather Based Crop Insurance Scheme (RWCIS) provide insurance cover at all stages of the crop cycle including post-harvest risks to farmers at very low rates of premium. The government provides total interest subvention up to 5% (inclusive of 3% prompt repayment incentive) on short-term crop loans up to Rs 3 lakh. Thus, loan is available to farmers at a reduced rate of 4% per annum on prompt repayment.

Agro Economic Alerts

1. Agricultural losses in Kerala due to recent floods in August

Kerala witnessed heavy rains and consequent floods in August 2018. The inundation caused damage to 1.47 lakh ha of agricultural land, resulting in an estimated loss worth Rs. 5,622.86 crores to the economy of the state. Most of the crops, viz. pepper, paddy, cardamom, banana, etc., have been adversely affected. It has been stipulated that the flooded fields will not be suitable in time for the next crop of paddy.

Suggestion: the central and the State Government should provide comprehensive financial assistance to revive the agricultural sector. Steps like precision farming methods, examine soil conditions before planning future farming activities be taken.

2. Rising imports in Edible Oils despite high tariffs

India has high import dependence on palm oil, soybean oil and sunflower oil with about 66 percent of the domestic requirement of edible oil being met though imports in 2016-17. During 1994-95 and 2017-18, quantity of edible oil imported was observed to be negatively correlated with tariff rates on imported edible oils. On the basis of research by the Centre of management in Agriculture, it has been suggested that there's low awareness among farmers about tariff rate changes and their impact on oilseed prices.

Suggestion: A stable trade policy has been suggested, while for increasing yield, methods like provision of adequate irrigation facilities and quality seeds and more investment in Programmes like National Mission on Oilseeds and Oil Palm should be focused upon.

3. Problems with the Operationalization of farm Mechanisation Banks (FMB) in Bihar

To improve farm mechanisation, the State Government is instituting Farm Mechanisation Banks (FMBs) in all the 8,463 Primary Agricultural Cooperative Societies (PACS). However, there is scepticism about the launch of this scheme due to the inefficiency of a similar scheme initiated in some of the districts of Bihar during 11th FYP.

Suggestion: In view of the above, it has been suggested that proper training need be given to the farm members for operating the equipments. Leadership of FMBs be dynamic, etc.

General Survey of Agriculture

Trends in Foodgrain Prices

Based on Wholesale Price Index (WPI) (2011-12=100), inflation in pulses decreased by 18.14 percent in September, 2018 over September 2017. During the same period, WPI of foodgrains, cereals, wheat and paddy increased by 0.97 percent, 5.54 percent, 8.87 percent and 4.64 percent, respectively.

The WPI of pulses decreased by 1.04 percent in September, 2018 over August, 2018. During this period the WPI of food grains, cereals, wheat and paddy increased by 0.28 percent, 0.47 percent, 0.81 percent and 0.06 percent, respectively.

Rainfall Situation

Cumulative Post-Monsoon Season rainfall for the country as a whole during the period 01st October to 24th October, 2018 has been 51% lower than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been lower than LPA by 76% in North-West India, 61% East & North East India, 59% in Central India and 28% in South Peninsula.

Out of total 36 meteorological Sub-divisions, 3 sub divisions received large excess/excess rainfall, 4 sub divisions received normal rainfall and 29 Sub-divisions received deficient/large deficient.

Water Storage in Major Reservoirs

Central Water Commission monitors 91 major reservoirs in the country which have total live capacity of 161.99 Billion Cubic Metre (BCM) at Full Reservoir Level (FRL). Current live storage in these reservoirs (as on 25th October, 2018) was 112.67 BCM as against 111.58 BCM on 25.10.2017 (last year) and 113.11 BCM of normal storage (average storage of last 10 years). Current year's storage is 101% of last year's storage and 100% of the normal storage.

Economic Growth

The provisional estimates (PE) of national income released by Central Statistics Office (CSO) on 31st May 2018, estimated the growth of Gross Domestic Product (GDP) at constant market prices for the year 2017-18 to be 6.7 percent (Table 1). The growth rate of GDP at constant market prices was 7.1 percent

TABLE 1: Growth of GVA at Basic Prices by Economic Activity and GDP at Market Prices (per cent)

Sectors	Growth rate at constant (2011-12) prices (per cent)			Share in GVA at current prices (per cent)		
	2015-16 2nd RE	2016-17 1st RE	2017-18 1st PE	2015-16 2nd RE	2016-17 1st RE	2017-18 1st PE
Agriculture, forestry & f ishing	**0.6**	**6.3**	**3.4**	**17.7**	**17.9**	**17.1**
Industry	**9.8**	**6.8**	**5.5**	**29.8**	**29.3**	**29.1**
Mining & quarrying	13.8	13.0	2.9	2.4	2.4	2.5
Manufacturing	12.8	7.9	5.7	16.8	16.8	16.7
Electricity, gas, water supply & other utility services	4.7	9.2	7.2	2.7	2.6	2.6
Construction	3.7	1.3	5.7	7.9	7.4	7.4
Services	**9.6**	**7.5**	**7.9**	**52.5**	**52.8**	**53.9**
Trade, hotel, transport storage	10.3	7.2	8.0	18.3	18.2	18.5
Financial, real estate & prof. services	10.9	6.0	6.6	20.9	20.6	20.8
Public administration, defence and other services	6.1	10.7	10.0	13.2	13.9	14.5
GVA at basic prices	**8.1**	**7.1**	**6.5**	**100.0**	**100.0**	**100.0**
GDP at market prices	**8.2**	**7.1**	**6.7**	**---**	**---**	**---**

Source: *Central Statistics Office (CSO).*
Notes: *2nd RE: Second Revised Estimates, 1st RE: First Revised Estimates, PE: Provisional Estimates.*

(first revised estimate) in 2016-17 and 8.2 percent in 2015-16 (second revised estimate).

The growth in Gross Value Added (GVA) at constant basic prices for the year 2017-18 is estimated to be 6.5 percent (PE). At the sectoral level, agriculture, industry and services sectors are estimated to have grown at the rate of 3.4 percent, 5.5 percent and 7.9 percent respectively in 2017-18.

As per the quarterly estimates, the growth of GDP at constant prices for first quarter (April - June) (Q1) of 2018-19 was 8.2 percent, as compared to the growth of 5.6 percent recorded in the corresponding quarter of the last year.

The upswing in quarterly growth, which started in the second quarter of 2017-18, was reinforced in (Q1) of 2018-19, with higher growth as compared to third and fourth quarters of 2017-18 (Table 2)

TABLE 2: Quarter-wise Growth of GVA and GDP at Constant (2011-12) Prices (per cent)

Sectors	2016-17				2017-18				2018-19
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Agriculture, forestry & fishing	**4.3**	**5.5**	**7.5**	**7.1**	**3.0**	**2.6**	**3.1**	**4.5**	**5.3**
Industry	**8.3**	**6.8**	**7.1**	**5.0**	**0.1**	**6.1**	**7.1**	**8.8**	**10.3**
Mining & quarrying	10.5	9.1	12.1	18.8	1.7	6.9	1.4	2.7	0.1
Manufacturing	9.9	7.7	8.1	6.1	-1.8	7.1	8.5	9.1	13.5
Electricity, gas, water supply & other utility services	12.4	7.1	9.5	8.1	7.1	7.7	6.1	7.7	7.3
Construction	3.0	3.8	2.8	-3.9	1.8	3.1	6.6	11.5	8.7
Services	**9.4**	**7.9**	**6.5**	**6.3**	**9.5**	**6.8**	**7.7**	**7.7**	**7.3**
Trade, hotel, transport, communication and services related to broadcasting	8.9	7.2	7.5	5.5	8.4	8.5	8.5	6.8	6.7
Financial, real estate & professional services	10.5	8.3	2.8	1.0	8.4	6.1	6.9	5.0	6.5
Public administration, defence and other services	7.7	8.0	10.6	16.4	13.5	6.1	7.7	13.3	9.9
GVA at basic price	**8.3**	**7.2**	**6.9**	**6.0**	**5.6**	**6.1**	**6.6**	**7.6**	**8.0**
GDP at market prices	**8.1**	**7.6**	**6.8**	**6.1**	**5.6**	**6.3**	**7.0**	**7.7**	**8.2**

Source: CSO.

The share of total final consumption in GDP at current prices in 2017-18 is estimated to be 70.5 percent, as compared to 69.9 percent in 2016-17. The fixed investment rate (ratio of gross fixed capital formation to GDP) is estimated to be 28.5 percent in 2017-18, which is the same as in previous two years. After a transient slowdown in fixed investment growth in Q1 of 2017-18, it rebounded in second quarter and sustained momentum in following quarters.

The saving rate (ratio of gross saving to GDP) for the year 2016-17 was 30.0 percent, as compared to 31.3 percent in 2015-16. The investment rate (ratio of gross capital formation to GDP) was 30.6 percent in 2016-17, as compared to 32.3 percent in 2015-16.

Agriculture and Food Management

Rainfall

There has been a deficiency of 50 percent in the cumulative rainfall received for the country as a whole during the period 1st October 2018 to 23rd October 2018. The actual rainfall received during this period has been 34.2 mm, as compared to

the normal rainfall of 68.2 mm. Out 3 of the total 36 meteorological sub divisions, no sub division received large excess rainfall, 3 sub divisions received excess rainfall, 4 sub divisions received normal rainfall, 7 sub divisions received deficient rainfall and 22 sub divisions received large deficient rainfall. However, no sub division remained without rainfall during the period.

All India Production of Foodgrains

As per the 4th Advance Estimates released by Ministry of Agriculture & Farmers Welfare on 28th August 2018, the total production of foodgrains during 2017-18 is estimated at 284.8 million tonnes, as compared to the production of 275.1 million tonnes in 2016-17. As per the 1st Advance Estimates for 2018-19, the total production of kharif foodgrains is estimated at 141.6 million tonnes (Table 3).

TABLE 3: Production of Major Agricultural Crops (1st Adv. Est.)

Crops	Production (Million Tonnes)						
	2012-13	2013-14	2014-15	2015-16	2016-17 (Final)	2017-18 (4th AE)	2018-19* (1st AE)
Total Foodgrains	**257.1**	**265.0**	**252.0**	**251.6**	**275.1**	**284.8**	**141.6**
Rice	105.2	106.7	105.5	104.4	109.7	112.9	99.2
Wheat	93.5	95.9	86.5	92.3	98.5	99.7	--
Total Coarse Cereals	40.0	43.3	42.9	38.5	43.8	47.0	33.1
Total Pulses	18.3	19.3	17.2	16.4	23.1	25.2	9.2
Total Oilseeds	30.9	32.8	27.5	25.3	31.3	31.3	22.2
Sugarcane	341.2	352.1	362.3	348.4	306.1	376.9	383.9
Cotton#	34.2	35.9	34.8	30.0	32.6	34.9	32.5

Source: DES, DAC&FW, M/o Agriculture & Farmers Welfare.
*Note: 4th AE: 4th Advance Estimates, 1st AE: 1st Advance Estimates, * Kharif crops only; # Million bales of 170 kgs. each.*

Procurement

Procurement of rice as on 28 th September 2018 during Kharif Marketing Season 2017-18 was 38.2 million tonnes, and procurement of wheat during Rabi Marketing Season 2018-19 was 35.5 million tonnes (Table 4).

TABLE 4 : Procurement of Crops (Million Tonnes)

Crops	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Rice#	34.0	31.8	32.0	34.2	38.1	38.2*	--
Wheat@	38.2	25.1	28.0	28.1	23.0	30.8	35.5$
Total	**72.2**	**56.9**	**60.2**	**62.3**	**61.1**	**69.0**	**35.5**

Source: *FCI and DFPD, M/o Consumer Affairs, Food and Public Distribution.*
Notes: **-Procurement of rice as on 28.09.2018. $ - Procurement of wheat as on 06.07.2018.*
 # - Kharif Marketing Season (October-September), @ - Rabi Marketing Season (April-March).

Off-take

The off-take of rice under all schemes during the month of August 2018 has been 25.5 lakh tonnes. This comprises 21.9 lakh tonnes under TPDS/NFSA (off-take against the allocation for the month of September, 2018) and 3.7 lakh tonnes under other schemes. In respect of wheat, the total off take has been 24.3 lakh tonnes comprising of 19.4 lakh tonnes under TPDS/NFSA (off-take against the allocation for the month of September, 2018) and 4.9 lakh tonnes under other schemes. The cumulative off-take of foodgrains during 2018-19 is 28.7 million tonnes (Table 5).

TABLE 5: Off take of Food-grains (Million Tonnes)

Crops	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19*
Rice	29.2	30.7	31.8	32.8	35.0	16.7
Wheat	30.6	25.2	31.8	29.1	25.3	12.0
Total (Rice & Wheat)	**59.8**	**55.9**	**63.6**	**61.9**	**60.3**	**28.7**

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

Note: ** - upto August 2018.*

Stocks

The total stocks of rice and wheat held by FCI as on 1st October 2018 was 55.3 million tonnes, as compared to 43.3 million tonnes as on 1st October 2017 (Table 6).

TABLE 6: Stocks of Foodgrains (Million Tonnes)

Crops	September 1, 2017	September 1, 2018
1. Rice	16.3	18.6
2. Unmilled Paddy#	1.7	1.7
3. Converted Unmilled Paddy in terms of Rice	1.1	1.1
4. Wheat	25.9	35.6
Total (Rice & Wheat) (1+3+4)	**43.3**	**55.3**

Source: *FCI.*

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

Articles

Does Groundwater Irrigation from Shared Wells Reduce Negative Externality in Hard-Rock Areas of Karnataka

A. V. Manjunatha[1], C. M. Devika[2] and D. T. Preethika[3]

Abstract

Joint family system that induced joint ownership of resources has been a traditional practice in India. However, with the gradual breakdown of joint families, individual ownership of resources, specifically well/s, has increased. A comparison of the economics of groundwater irrigation and negative externality between individual and shared well farmers in Eastern Dry Zone of Karnataka provide insights that support shared management of water. The findings from the study indicate that externality per acre-inch of groundwater extracted and irrigation cost per acre inch of groundwater among individual well farmers was higher than the shared well farmers. Conversely, net return per rupee of irrigation cost was higher in the case of shared well farmers. This is a prima facie indicator of the benefits of sharing groundwater. Therefore, it is critical that further research would significantly influence a deeper understanding of the need to promote and nurture local management through shared/joint wells to check incessant mushrooming of wells that result in large-scale negative externalities.

Key words: *Family borewells, Externality, Individual borewells, Sharing, Sustainable groundwater use.*

Introduction

India has witnessed exponential growth in groundwater extraction with the number of wells rising from 0.1 million to 25 million during the period 1960-2010. In several water scarce regions of India, overdraft of groundwater has led to reduced water tables and increasing water costs. In order to cope with this predicament, farmers are practicing water sharing arrangements (Mukherji 2007; Rawal 2002). Water sharing arrangements include water markets (water buying and selling among farmers for crop share or labour or cash) (Deepak et al. 2005; Manjunatha, et al. 2011) and joint water sharing through joint irrigation investments (Tiwari 2010).

Historically, land in India is held in fragments, wherein a farmer may have land in several locations and each individual tract of land is called a fragment. This division of landed property is referred to as 'subdivision and fragmentation' of holdings, which decreases the individual size of holdings while increasing the total number of holdings. While the subdivision of holdings is inevitable, heirs demand the land from each fragment, as fragmentation facilitates diversification of crops and enterprises capturing locational advantage. With the increase in groundwater irrigation, fragmentation has an additional dimension of division of the 'irrigation well'. Theoretically, the irrigation well itself cannot be subdivided, but the groundwater from the well can be shared. The system of sharing borewell water by the elder with younger members in the family has been a traditional practice. In addition, high cost of groundwater irrigation and high proportion of initial and premature failure of wells in hard rock areas have further strengthened the cooperation for sharing groundwater, although, they resided separately.

However, the breakdown of joint family system has been a phenomenon in India for the past 30 years affecting the system of cooperation and sharing. While the process began in urban areas, it has gradually spread to rural areas too. While division of urban property was relatively easy due to greater

[1]Assistant Professor, Agricultural Development and Rural Transformation Centre, Institute for Social and Economic Change, Bangalore, India.
[2]Senior Consultant, Agricultural Development and Rural Transformation Centre, Institute for Social and Economic Change, Bangalore, India.
[3]Research Associate, Agricultural Development and Rural Transformation Centre, Institute for Social and Economic Change, Bangalore, India.

liquidity, in rural areas, breakdown of joint family has had repercussions on landed property and the appurtenant groundwater. Concurrent to the breakdown of joint families that has been occurring in rural areas of India, this study demonstrates the unique water sharing arrangements prevalent among the subdivided farm families highlighting the economic advantages of shared wells.

The remainder of the paper has been structured into three sections. In the second section, the conceptual framework and methodology has been presented, while the third section focuses on the results and discussion followed by concluding remarks

Conceptual framework and Methodology

Within the larger concept of collective action in small rural communities, where people share multiple resources (Ostrom et al, 2003), sharing of water among large joint family members provides insight for efficient usage and sustainable management of groundwater that can be systematized and scaled up by institutionalizing water rights in groundwater. It is a timely analysis given the public goods characteristic of groundwater and its unrestricted exploitation resulting in reciprocal externalities (Chandrakanth, 2015). Malik et al (2008) and Selvi et al (2009) revealed that rationed water allocation motivated farmers in Punjab to choose crops more economically and efficiently as compared to those farmers who have unrestricted access by virtue of having wells under individual ownership. Therefore, any rudimentary and local forms of water rights would be a positive step towards achieving equity, efficiency and sustainability in the use of groundwater in India.

Given this background, the analysis of familial shared wells augments our understanding and consequently helps in crafting institutions and policies for sustainable use of groundwater. The current study was conducted in the Eastern Dry Zone (EDZ) of Karnataka, a hard rock region of peninsular India. The area suffers from groundwater depletion due to water overdraft and poor unevenly distributed rainfall of around 600-700 mm. In the region, nearly 95% of area is irrigated by groundwater, while surface water only provides for any shortfall in irrigation (Government of Karnataka, 2010). This study sourced primary data in 2009-10 from 118 farmers possessing groundwater wells spread over three villages of Chikkaballapur, a chronic groundwater starved area with slow recharge. Data was collected randomly to study the economics of groundwater irrigation. During data collection from the groundwater dependent farmers, it was found that 88.1% of them owned individual irrigation wells and the remaining 11.9% of the farmers shared groundwater among heirs / siblings, specifically among brothers. Although, an insufficient sample size, this interesting finding on shared wells sheds light on the unique water sharing benefits, where increase in individually owned wells has been one of the causes for exacerbation of groundwater scarcity witnessed in the region.

In the case of 11.9% of the farm families, groundwater was shared among the siblings, with the line of control as father (and mother) of the family who by convention stayed with the eldest son (in their old age) or the eldest son and his family continued to stay with parents, while younger brother/s and their families moved into separate households. As the eldest and generally responsible for the care of their parents, a relatively higher proportion of the assets have been given to the eldest as compared to the assets inherited by the younger siblings. Although, the land has been subdivided, groundwater was shared among siblings / heirs, who performed essential farm functions such as joint sourcing of farm inputs (seeds, fertilizers and agrichemicals), joint sharing of labour, and participation in joint marketing activities.

Shared/family borewell farmers have access to groundwater, rights from the law of inheritance of paternal property. The inheritance of water rights has been common among farm families where the land property was inherited among siblings. In this regard, water rights from wells are shared and have been considered an important collective effort in the wake of water scarcity. The inheritance rights have resulted in sharing groundwater among relatives. Water and water cost have been shared among siblings in the family along with repairs and maintenance expenditure. Informally, the primogeniture law has been operating with water shares since groundwater was used by the eldest son with an oral agreement to share water with younger siblings who usually inherit the shared land. Thus,

there exist implicit sharing arrangements reflected in the opportunity costs and benefits of familial responsibilities of concerned children towards parents.

This is the social capital among families which sustains kinship and other family ties contributing to human capital, education, information sharing and risk in all aspects of farming. As such, it becomes relatively easier for diffusion of innovations for developmental departments as it reduces the prospective transaction costs of reaching individual families.

Therefore, to statistically prove the decrease in negative externalities from sourcing groundwater in shared wells for irrigation, the following methods have been adopted.

Estimation of Irrigation Cost

An explicit indicator of negative externalities in groundwater irrigation has been the rapid increase in number of borewells and a corresponding rapid closure of a large proportion of open wells. For determining the cost of borewell irrigation, the historic cost of all wells drilled by the farmer over the past, irrespective of whether the well is functioning or not, is compounded at 3% from the year of construction to the year 2010. This converts investment in irrigation wells to constant values for the year 2010. The real interest rate of 3% was estimated by subtracting the annual inflation rate (8%) from the nominal interest rate (11%).

Estimation of groundwater irrigation cost inclusive of the externalities of well failures was crucial for decision making (Chandrakanth *et al.*, 2004). The amortized cost of borewells represents the annual fixed cost component of irrigation water and depends on the status of the well, its year of construction, working life of the well, and the choice of an interest rate (Chandrakanth *et al.*, 2004).

Theoretically, the variable cost of groundwater irrigation was almost negligible as farmers do not pay for electricity. However, the estimated energy cost accounts for around 20 to 30% of the total cost of irrigation. The annual cost of irrigation pertains to all the wells on a farm (functioning as well as non-functioning). The cost of irrigation was appropriated over individual crops according to the volume of water used for irrigation in each crop. As the rate of initial and premature failure was around 40% due to the cumulative well interference externality, farmers were forced to invest in additional borewell/s, incur maintenance costs and/or buy water from a neighbouring farmer to protect their crops. Hence, the sunken cost of all irrigation wells was merged into variable cost (Chandrakanth *et al, 2004, 2015*; Deepak *et al,* 2005). While, the labour cost of irrigation was merged with the costs of other farm operations.

Working Life of Irrigation Wells

The working life of an irrigation well has been calculated using the 'Life table approach' as per statistical theory. Wherein, the working life of an irrigation well included age and life of the wells. The age of an irrigation well applied to wells that were functioning at the time of field data collection (2010). The life of an irrigation well referred to the number of years a non- functioning well had been in operation (Chandrakanth *et al.*, 2004; Chandrakanth, 2015).

As the period of life of the wells ranged from zero to 20 years in the study area, data on wells was gathered for wells drilled after the 1990's. Thereby, including the oldest wells drilled (2010-1990) in the region.

Considering a farmer j can grow k crops from the ith well belonging to the category m. The average working life of a borewell for a particular category was calculated as:

$$W_m = \frac{\sum_i f_{im} X_{im}}{\sum_i f_{im}}$$

where W_m = average working life of a borewell in the mth category, f_{im} = frequency of the ith borewell in the mth category, X_{im} = age or life of a borewell in category m, i = 1 to n wells, and m = category of borewell 1 to 3. The estimated average working life of a borewell in the study area was 5.9 and 7.72 years for shared wells and individual wells, respectively.

Total Amortized Cost of Borewell Investment

Further, to obtain the total amortized cost of the borewell investment, the investment was compounded and then amortized as:

$$CB_j = \sum_i BI_{ij} \times (1+r)^{(d_{ij}-c_{ij})}$$

Where, CB_j = compounded investment in borewell/s of the jth farmer, BI_{ij} = initial investment in the ith borewell by the jth farmer, d_{ij} = year of data collection i.e. 2010, of the ith borewell of the jth farmer and c_{ij} = year of well drilling or construction of ith borewell of jth farmer, and r = rate of interest.

Total compounded borewell investment was amortized as:

$$TAC_j = \sum_i \left[CB_{ij} \times \left\langle \frac{(1+r)^{W_m} \times r}{(1+r)^{W_m} - r} \right\rangle \right]$$

where TAC_j = total amortized cost of borewell/s for the jth farmer, CB_{ij} = compounded investment for the ith borewell of the jth farmer, W_m = average working life of the borewell of the mth category, and r = rate of interest.

Total Groundwater Use

Total groundwater used was estimated as:

$$TWU_j = \sum_i \sum_k \left[\frac{(Y_i \times T_k \times F_k \times D_k)}{22611} \right]$$

where TWU_j = total water use for crop k,(1 to p) from all wells of the jth farmer, Y_i = water yield of the ith well in gallons per hour, T_k = number of hours required for crop k for one irrigation, F_k = frequency of irrigation of crop k per month, D_k = duration of the growing season of crop k in months. The same procedure was applied for the estimation of water use for all crops in all seasons for individual farmers. Then the total water use of the farmer was divided by 22,611 which provide the water use in acre-inches since one acre-inch of water equals 22,611 gallons (102.79 cubic meter).

Then the amortized cost of irrigation plus annual maintenance cost of borewell/s (M_j) divided by total water use in acre-inches gives the water cost per acre-inch, was used to derive a cost of total water applied in acre- inches to each crop:

$$IC_j = \frac{TAC_j + M_j}{TWU_j}$$

where IC_j = irrigation cost per acre-inch of groundwater of the jth farmer, TAC_j = total amortized cost of borewell investment by the jth farmer, and TWU_j = total water use of the jth farmer. A similar estimation procedure was used for each farmer and finally this was summed across all farms to estimate irrigation costs of individual well and shared well farmers.

Costs and Returns

While computing the cost of production for major crops, only the variable costs were considered including the cost of groundwater irrigation. The items included in expenses were seeds, manure and chemical fertilizers, plant protection chemicals, bullock labour charges, labour charges (both hired and family labour), irrigation cost, marketing cost. Overheads like depreciation on equipment, rental value of land were not included in the study.

For returns, the gross value of output per farm from crops was calculated by multiplying production with the post-harvest price realized by the farmer in the village or in the nearest market. Finally, the net returns or profit or gross margin for a farmer was derived after deducting paid-out costs from the gross value of output.

Estimation of Negative Externality

Following Chandrakanth, Bisrat and Bhat (2003), negative externality per acre inch of groundwater = (amortized cost per functioning well – amortized cost per well) divided by water extracted per well. Net returns per rupee of negative externality = Total net returns divided by (Negative externality per acre inch x Total water extracted).

The Proportion of well failure was estimated as a ratio of non-functioning to functioning wells.

For crops which occupy the field all through the year (mulberry, grape, arecanut, banana, etc), the cropped area was considered as equivalent to three times the net sown area for estimation of gross irrigated area.

Results and Discussion

Selected Socio-Economic characteristics and Cropping Pattern of Sample Farmers

The selected socio-economic characteristics of sample farmers are presented in Table 1. The average education level of farmers was relatively high for individual borewell farmers (8.82 years) as compared to shared borewell farmers (7 years). The family size was also an indicator of the socio-economic status in addition to land holdings and a reliable indicator of the flow of human labour into agriculture. Although the family size of individual borewell farmers (6) was relatively higher than shared borewell farmers (5.4), a lower proportion of individual borewell family members (3.6) were employed in farming as compared to the former category (5). Shared borewell farmers' dependence on agriculture was lower due to lesser number of borewells in their farms. The average land holding was relatively higher for individual borewell farmers (4.8 acres) as compared to shared borewell farmers (2.2 acres), which indicated that they were potentially in a better economic position than shared borewell farmers. The number of land fragments per farm was higher among those sharing groundwater as compared with individual borewell farmers. Similar results were found in the studies by Saleth (1991), Deepak et al. (2005) and Sharma and Sharma (2006) in water-scarce regions of India.

TABLE-1: Socio-economic Characteristics of Sample Farmers

Socio-economic characteristics	Shared Borewells Farmers (N=14)	Individual Borewells Farmers (N=104)
Age (years)	44.9	46.3
Education level (schooling years)	7.0	8.82
Family size (number)	5.4	6.0
Agricultural laborers (number)	5.0	3.6
Rainfed land (acres)	0.9	2.4
Irrigated land (acres)	1.2	2.2
Fallow land (acres)	0.1	0.3
Total land (acres)	2.2	4.8
Number of land fragments	1.1	1.1

Note: A farmer was considered to have fragmented land when he has more than one agricultural plot at different locations within the same village or in the neighbouring villages.

In terms of their cropping pattern, among the sample farmers in rainfed systems, finger millet was the major crop for individual borewell farmers, whereas maize was the major crop for shared borewell farmers, indicating their interest in growing a marketable crop for generating income. Finger millet was usually for home consumption since it is a staple food of the region in addition to rice (Table 2). In irrigated land, mulberry (host plant of silk worms), grapes, tomatoes, carrots and cauliflower are the major crops. However, they also grow other vegetables like potatoes, beans, cabbage, gourds, etc. on a smaller scale. Individual borewells farmers (50%) have a larger proportion of area under annual and perennial crops because they require groundwater throughout the year. Whereas, shared borewells farmers (90%) devoted much of their land in growing short duration crops (Table 2).

TABLE-2: Cropping Pattern of Sample Farmers

Irrigation type: acres (%)	Shared Borewells Farmers (N=14)	Individual Borewells Farmers (N=104)
Rainfed		
Finger millet	2 (20.0)	74.65 (72.7)
Maize	7 (70.0)	24 (23.4)
Eucalyptus	1 (10.0)	4 (3.9)
Sub-total	**10 (100.0)**	**102.65 (100.0)**
Irrigated		
Mulberry	3.6 (6.8)	73.5 (22.8)
Grapes	0.0 (0.0)	63.5 (19.7)
Mango	0.0 (0.0)	9 (2.8)
Banana	0.0 (0.0)	5 (1.6)
Flowers	1.5 (2.8)	7 (2.2)
Arecanut	0.0 (0.0)	2 (0.6)
Carrot	2.5 (4.7)	18.5 (5.7)
Beetroot	2.0 (3.8)	1 (0.3)
Potato	2.0 (3.8)	21.5 (6.7)
Tomato	8.3 (15.5)	56 (17.3)
Cauliflower	5.0 (9.4)	22.5 (7.0)
Guards	1.0 (1.9)	4 (1.2)
Beans	2.8 (5.2)	21.5 (6.7)
Cabbage	0.0 (0.0)	6.5 (2.0)
Maize	3.5 (6.6)	6.5 (2.0)
Finger millet	1.0 (1.9)	5 (1.6)
Sub-total	**53.1 (100.0)**	**323 (100.0)**

Agriculture and dairy were the major sources of income among the various income sources (Table 3). However, irrigated agriculture's income share of total income was higher for individual borewell farmers (83.8%) compared to shared borewells farmers (70.6%), because they had greater access to groundwater and hence, were mostly dependent on agriculture. While, shared borewell farmers realized a higher share of income from rainfed agriculture and labour as compared with Individual borewell farmers, because they had relatively less access to groundwater. Considering annual net income across farm categories, individual borewells farmers received 1.8 times more annual net farm income than shared borewell farmers, indicating higher economic status of the former category as compared to the latter.

TABLE-3: Sources of Average Annual Net Income

Income source: Rs. (%)	Shared Borewell Farmers (N=14)	Individual Borewell Farmers (N=104)
Irrigated agriculture	65,987 (70.6)	137,906 (83.8)
Rainfed agriculture	12,316 (13.2)	8,848 (5.4)
Dairy income	6,149 (6.6)	11,410 (6.9)
Labour income	6,407 (6.9)	2,218 (1.4)
Off- farm income	2,643 (2.8)	4,163 (2.5)
Annual net income per farm	93502 (100.0)	164546 (100.0)

Economics of Irrigation

The proportion of well failures was higher for individual borewell farmers (62%) as compared with shared borewells farmers (50%). The average working life of a well was shorter for shared borewells farmers (5.9 years) as compared to individual borewells farmers (7.7 years) and this was because of negative externality due to cumulative groundwater interference among irrigation wells. What is crucial to note was that the irrigation cost per acre-inch was higher for individual borewells farmers (Rs. 325) by 58% as compared with shared borewells farmers (Rs. 206), since the shared well farmers had a lower proportion of well failure than individual well farmers. The externality per acre inch of groundwater of individual borewell farmers was higher by 81% than that of shared well farmers. This was because of the lower rate of well failure in shared well which reduced proliferation of irrigation wells, and thereby reduced the extensive irrigation investments required for each additional well drilled by individual well owning farmers, where well failure proportion was higher.

The irrigation cost per acre inch of groundwater was 58% higher for individually owned well farmers than that of shared well farmers. This was because on individually owned well farms, the number of wells per farm was 198% higher than in shared well farms. In addition, the number of functioning wells per farm on individually owned well farms was 187% higher than in shared well farms, due to singular behaviour of individual well ownership. This increased not only the irrigation cost per acre inch of groundwater, but also the negative externality per acre inch of groundwater.

The net return per rupee of irrigation cost among shared well farmers was 12% higher than that of individually owned well farmers. This was because of the lowered irrigation cost in shared wells farms as compared with individually owned well farms. Thus, the benefits of sharing well water among siblings or other farmers has been reflected in terms of reduced negative externality per acre inch of groundwater, reduced cost of groundwater irrigation and increased net return per rupee of irrigation cost. These are the prima facie statistically proven indicators of the benefits of sharing groundwater. Therefore, groundwater regulation currently applied in several states needs to promote shared / joint wells in farms in order to reduce extensive proliferation of wells resulting in large scale negative externality.

TABLE 4: ECONOMICS OF IRRIGATION

Irrigation details	Shared Borewell Farmers (N=14)	Individual Borewells Farmers (N=104)
Gross Irrigated Area (GIA) (acre)	45.2	580
Net Irrigated Area (GIA) (acre)	16.8	229.5
Functioning borewells (number)	6	123
Non-functioning wells (number)	3	76
Total wells (number)	9	199
Number of wells per farm	0.64	1.91
Number of functioning wells per farm	0.43	1.18
Proportion of well failure (%)	50	61.8
Average working life of a well (years)	5.9	7.7
Total water extracted (acre-inches)	633	7084.4
Total amortized cost (Rs.)	130,304	23,02,481
Amortized cost per well (Rs.)	14478	11570
Amortized cost per functioning well (Rs.)	21717	18719
Negative Externality per acre inch of water (Rs.)	68.61	124.13
Groundwater Extraction per well (acre inch)	105.5	57.59
Groundwater extraction per farm (acre inch)	45.21	68.11
Irrigation cost per acre-inch of water (Rs.)	206	325
GIA per functioning well (acres)	7.5	4.7
Total net returns (Rs.)	9,23,826	14,342,187
Net returns per Rupee of negative externality	21.27	16.30
Net returns per rupee of irrigation cost (Rs.)	7.09	6.2

Notes: Negative externality per acre inch of groundwater = (amortized cost per functioning well – amortized cost per well) divided by water extracted per well. Net returns per rupee of negative externality = Total net returns divided by (Negative externality per acre inch X Total water extracted) Proportion of well failure is estimated as a ratio of non-functioning to functioning wells; For crops which occupy the field all through the year (mulberry, grape, areca nut, banana, etc), the cropped area was considered as equivalent to three times the net sown area for estimation of gross irrigated area.

Concluding Remarks

This study demonstrated that sharing minimizes the number of irrigation wells drilled in an aquifer and the negative externality per acre inch of groundwater extracted and thereby increase net returns. It was hypothesised that a number of factors such as shared investment costs, inter-linkages of decisions and reciprocal externalities promote sustainable groundwater extraction in comparison to individually owned borewells. This theoretical premise was tested with empirical data from groundwater based agriculture where the 'joint-ness' of irrigation investments by families reduced reciprocal negative externalities and irrigation costs, and increased the net returns per rupee of irrigation costs.

As this traditional institution of sharing resources promotes more sustainable groundwater use, the findings of the study provides insights for promotion of joint investments in groundwater extraction. However, this aspect has not caught the attention of researchers especially considering the reduced negative externalities shared borewells provided in comparison to individually owned wells. The results indicate that water sharing has increased opportunities to reduce negative externalities in hard rock areas due to sharing water investments and water among siblings in the family. As sharing reduces the mushrooming and proliferation of irrigation wells, they reduce the negative externalities per acre inch of groundwater extracted. They also reduce the irrigation cost as the number of additional wells required is far lower in a well sharing situation compared with individual wells situation. Further, shared borewell farmers have increased net returns per unit of irrigation cost and reduced well failure as compared with individual borewells farmers.

References

Chandrakanth, M.G., Bisrat, A. and Bhat, M.G. 2004. Combating negative externalities of drought: A study of groundwater recharge through watershed, *Economic and Political Weekly*, 39(11): 1164-1170.

Chandrakanth, M. G. 2015. *Water resource economics: towards a sustainable use of water for irrigation in India*. Springer.

Deepak, S. C., Chandrakanth, M. G. and Nagaraj, N. 2005. Groundwater markets and water use efficiency: The case of Karnataka, *Water Policy Research Highlight No.* **12**. *5th Annual IWMI-TATA Partnerships Meet*, Anand, India. http://purl.umn.edu/43633. Assessed 12 August 2010

Government of Karnataka. 2010. Karnataka at a Glance, Department of Economics and Statistics, Bangalore, India.

Malik, A. K., Junaid, M., Tiwari, Rakesh, Kumar, M. Dinesh. 2008. Towards evolving groundwater rights: the case of shared well irrigation in Punjab. In Kumar, M. Dinesh (Ed.). Managing water in the face of growing scarcity, inequity and declining returns: exploring fresh approaches. Proceedings of the 7th Annual Partners Meet, IWMI TATA Water Policy Research Program, ICRISAT, Patancheru, Hyderabad, India, 2-4 April 2008. Vol.1. Hyderabad, India: International Water Management Institute (IWMI), South Asia Sub Regional Office. pp.439-451.

Manjunatha, A. V., Speelman. S., Chandrakanth, M. G. and Van Huylenbroeck, G. 2011. Impact of groundwater markets in India on water use efficiency: A data envelopment analysis approach, *Journal of Environmental Management,* **92**(11): 2924-2929.

Mukherji A. 2007. Implications of alternative institutional arrangements in groundwater sharing evidence from West Bengal, *Economic and Political Weekly*, **42**(6): 2543-2551.

Ostrom, E., Stern, P. C, and Dietz, T. 2003. Water rights in the commons. *Water Resources Impact*, *5*(2), 9-12.

Rawal, V. (2002) Non-market interventions in water-sharing: Case studies from West Bengal, India, *Journal of Agrarian Change*, **2** (4): 545–569.

Saleth, R. M. 1991. Factors affecting farmers' decision to buy groundwater: Empirical evidence from the Indo-Gangetic Region, *Indian Journal of Agricultural Economics,* **46**(3): 349-354.

Selvi, V., Machiwal, D., Shaheen, F, and Sharma, B. R. 2009. Groundwater resources and the impact of groundwater sharing institutions: Insights from Indian Punjab. *Groundwater Governance in the Indo-Gangetic and Yellow River Basins*, 87.

Sharma, P. and Sharma, R. C. 2006. Factors determining farmers' decision for buying irrigation water: Study of groundwater markets in Rajasthan, *Agricultural Economics Research Review,* **19**(1): 39-56.

Tiwary, R. 2010. Social organisation of shared well irrigation in Punjab, *Economic and Political Weekly*, **65**(26 & 27): 208-219.

Evaluation of Pradhan Mantri Fasal Bima Yojana with its coverage and implementation in Himachal Pradesh

[1]Dr. Nisha Devi and [2]Vamika Darhel

Abstract

Agriculture in India is highly susceptible to risks like droughts and floods. It is necessary to protect the farmers from natural calamities and ensure their credit eligibility for the next season. The Pradhan Mantri Fasal Bima Yojana (PMFBY) was launched by Prime Minister of India – Shri Narendra Modi on 18 February 2016. It envisages a uniform premium of only 2 percent to be paid by farmers for Kharif crops, and 1.5 percent for Rabi crops, while that for annual commercial and horticultural crops it is 5 percent. This scheme has been launched in the State of Himachal Pradesh from Kharif 2016 season as per the administrative approval and operational guidelines issued by the Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, and Government of India. Under this insurance scheme, maize and paddy crop will be covered during Kharif season while wheat and barley crops will be covered during Rabi season, in the State. The present research paper has covered the period of one year, during 2016-2017, under PMFBY in Himachal Pradesh. The major objective of this paper is to study the cluster-wise coverage performance of PMFBY under different executive agencies/ insurance companies in the State and to suggest the policy implications for the refinement as well as better execution of its implementation in the State.

Keywords: *Crop insurance, Pradhan Mantri Fasal Bima Yojana, Himachal Pradesh.*

Introduction

Crop insurance is a technique where losses suffered by few are met from funds accumulated through small contributions made by many, who are exposed to similar risk. Crop insurance is a measure to protect the cultivators against financial loss on account of anticipated crop-loss due to natural factors beyond their control such as natural fire, weather, floods, pests, diseases etc. India is in the throes of an agrarian crisis. Indebtedness, crop failures, non-remunerative prices for crops and poor returns over cost of cultivation have led to distress in the farming sector. According to National Crime Record Bureau data, farmer suicides increased by 41.7 percent in 2015 as compared to 2014. Farmer suicides were attributed to such causes as indebtedness, crop failure and other farming-related issues. Farmer distress is likely to worsen due to the increasing frequency and intensity of unseasonal and extreme weather events due to climate change.

To help farmers cope with crop losses, the Government of India launched its flagship scheme Pradhan Mantri Fasal Bima Yojana (PMFBY), started from the Kharif season of 2016. PMFBY replaced the National Agricultural Insurance Scheme (NAIS) and Modified National Agricultural Insurance Scheme (MNAIS). The Weather-Based Crop Insurance Scheme (WBCIS) remains in place, though its premium rates had been made the same as in PMFBY. State governments have the authority to decide whether they want PMFBY, WBCIS or both in their respective States. PMFBY is an improvement over NAIS and MNAIS and is designed to reduce the burden of crop insurance on farmers. The scheme aims to cover nearly 50 percent of the total cropped area in our country in the next three years. Initially, in 2015-16, the budget for crop insurance was fixed at Rs. 2823 crores and eventually raised to Rs. 7750 crores in 2018-19.

Implementation of PMFBY in Himachal Pradesh

This scheme was launched in the State from Kharif, 2016 season as per the Administrative approval and Operational guidelines issued by the Department of Agriculture cooperation and

[1]Research Investigator, AERC, Himachal Pradesh University, Shimla. [2]Research Fellow, AERC, Himachal Pradesh University, Shimla.

Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India. The scheme has been implemented in 10 districts of the State except Kinnaur and Lahaul & Spiti. In Himachal Pradesh, farmers have experienced three seasons of implementation of this Scheme, i.e. two seasons of Kharif crops and one season of Rabi crops under PMFBY during the years 2016-17 and 2017-18. But, this paper has covered the period of one year during 2016-17, wherein one season of Kharif crop and one season of Rabi crop has completed under the scheme of PMFBY.

Cluster Formation under PMFBY during Kharif and Rabi Seasons of 2016-17 in Himachal Pradesh

During Kharif season of 2016-17, maize and paddy crops were covered under the Scheme. In this season, 10 districts were clustered into two groups, where, cluster-1 was given to Agriculture Insurance Company (AIC), which covered four districts (Chamba, Hamirpur, Kangra and Una) of the State, and cluster-2 was given to IFFCO-TOKIO, which covered six districts (Bilaspur, Kullu, Mandi, Shimla, Sirmour and Solan) of the State under PMFBY.

During Rabi season of 2016-17, wheat and barley crops were covered under the scheme. In this season 11 districts were clustered into two groups, where, cluster-1 was given to AIC, which covered four districts (Chamba, Hamirpur, Kangra and Una) of the State, and cluster-2 was given to Oriental Insurance Company (OIC), which covered seven districts (Bilaspur, Kinnaur, Kullu, Mandi, Shimla, Sirmour and Solan) of the State under PMFBY.

Cluster-wise coverage and progress under PMFBY in Himachal Pradesh

This research paper has studied the cluster-wise coverage of PMFBY during Kharif and Rabi seasons (2016-17) in the State. The analysis includes different types of indicators/components like, district name, executing agency name, number of insured farmers (loanee and non-loanee), insured area (in hectares), sum insured (in rupees), premium, claims, number of beneficiary farmers and distributed indemnity under PMFBY in the State. Such types of indicators are presented in this research paper through tables with their analysis.

Major Findings

During kharif 2016-17 season cluster-1 was given to IFFCO-TOKIO executing agency, covered six districts under PMFBY during this season. Out of total number of 34,181 insured farmers, 33,164 were loanee and 1,017 were non-loanee farmers. Largest numbers of total insured farmers of the State were in Bilaspur district and least in Kullu district (Table-3). Similarly, in case of loanee and non-loanee farmers, largest number of insured farmers recorded in Bilaspur district and least in Kullu district. Under this cluster, total insured area covered was 10736.22 hectares. In terms of sum insured target, it was fixed at Rs. 7625.93 lakhs for the State. Total premium was Rs. 139.36 lakhs, collected for kharif season, which was highest in Bilaspur district, and lowest in Kullu district. The premium share of each government was Rs. 18.55 lakhs. The premium share of farmers was accounted Rs. 102.55 lakhs, which was highest in Bilaspur district and lowest in Kullu district. The total claim was Rs. 57.43 lakhs in cluster-1of PMFBY during kharif season 2016-17. Total 1,832 farmers were benefitted in the State under this scheme, largest claims and beneficiaries recorded in Solan district. The indemnity was Rs. 57.43 lakhs distributed only for Solan district in the State. Therefore, executing agency (IFFCO-TOKIO) has maintained proper record of data regarding PMFBY during kharif season (Cluster-1).

The cluster-2 was given to AIC executing agency, which covered four districts of Himachal Pradesh under the scheme during kharif 2016-17 season (Table-4). Out of total number of 76,697 insured farmers, 75,783 were loanee farmers and 914 were non-loanee farmers. Out of total insured farmers, as well as loanee and non-loanee insured farmers, largest proportion of farmers were covered in Kangra district, and lowest in Chamba district. In case of insured area, this cluster has covered 24681.48 hectares in the state; highest insured area lies in Kangra district and least in Chamba district. The total target of sum insured was Rs. 17537.45 lakhs, which was highest for Kangra district and lowest for Chamba district. Total premium was Rs. 155.96 lakhs collected by AIC during kharif season 2016-17 in the State, which was totally paid by farmers and there was no premium share of both governments. Further, it is clear from table that cluster-2 has no

figure regarding claim component of the scheme, however, 3,106 farmers were benefitted in Kangra and Chamba districts under this scheme, out of which highest coverage of beneficiary recorded in Chamba district. Therefore, this cluster has not been provided any claim/compensation for farmers, however, number of benefitted farmers already mentioned by executing agency under this scheme. Further, it can be concluded that Agriculture Insurance Company has not maintained proper data record of the PMFBY during kharif season (Cluster-2) due to its weak execution.

The OIC was executing agency for cluster-1, covering seven districts of Himachal Pradesh under the scheme during Rabi 2016-17 season. Out of total number of 70,402 insured farmers, 22,138 were loanee farmers and 48,264 were non-loanee farmers (Table-5). Mandi district covered largest numbers of total insured farmers and Kinnaur district covered lowest. In case of loanee farmers, largest number of insured farmers recorded in Bilaspur district and lowest in Shimla district. In Kinnaur and Kullu districts, no crop insurance of farmers under this scheme was recorded. In case of insured area, 21647.54 hectares area is covered in the State. Highest insured area was recorded in Mandi district and lowest in Kinnaur district. The total target of sum insured was Rs. 6483.64 lakh; highest was in Mandi district and lowest in Kinnaur district. Total premium was Rs. 677.41 lakh collected for Rabi season in the State, highest amount was in Bilaspur district and lowest in Kinnaur district. In the State, premium share of each government was Rs. 290.23 lakh, it was highest in Bilaspur district and lowest in Kullu district. The premium share of farmers was Rs. 96.95 lakh; accounted highest in Mandi district, and lowest in Kullu district during this season. Claim of insurance was found to be NIL in cluster-1 under PMFBY during rabi season 2016-17. However, 4,402 farmers were benefitted in Bilaspur and Mandi districts under this scheme. The highest coverage of beneficiary was recorded in Bilaspur district. It has been observed that executing agency OIC could not maintained complete record of data regarding PMFBY during rabi season (cluster-1).

The cluster-2 was given to AIC executing agency, which covered four districts of the State under the scheme during rabi 2016-17 season. Out of total 79,285 insured farmers, 70,165 were loanee farmers and 9,120 were non-loanee farmers (Table-6). Largest numbers of total insured farmers of the State as well as loanee farmers were in Kangra district and least in Chamba district. In case of non-loanee farmers, largest numbers of insured farmers were in Hamirpur district, and least in Chamba district. Under this cluster, total insured area was covered 28350.5 hectares; highest insured area was recorded in Kangra district and lowest in Chamba district. In case of sum insured target, it was fixed Rs. 8505.12 lakh for the State, which was highest for Kangra district and lowest for Chamba district. Total premium was Rs. 466.54 lakh collected by AIC for Rabi season in the State, which was highest in Hamirpur district and lowest in Kangra district. Premium share of each government was Rs. 221.86 lakh, which was higher in Hamirpur district and lowest in Chamba district. The premium share of farmers was Rs. 127.58 lakh, which was maximum in Kangra district and lowest in Chamba district during this season. Further, it is clear from table that cluster-2 has no figure regarding claims, beneficiary farmers and indemnity indicators of the scheme. Therefore, this cluster has not been provided any claim/compensation to farmers. The Agriculture Insurance Company has not maintained proper data record of the PMFBY due to its weak execution.

TABLE 1: DISTRICT-WISE PROGRESS UNDER PMFBY DURING KHARIF 2016-17 SEASON

Sr. No.	District	Name of the Executing Agency	No. of Farmers Insured			Insured area (in hectares)	Sum insured (in lakh Rupees)	Premium (in Lakh Rupees)				Claims registered	No. of Beneficiary farmers	Distributed Indemnity (in lakhs)
			Loanee Farmers	Non-Loanee Farmers	Total			Farmers share	Grant by Centre	Grant by State	Total Premium			
1	Bilaspur	IFFCO-TOKIO	11075	279	11354	3620.83	2542.53	50.85	18.55	18.55	87.96	0	0	0
2	Chamba	AIC	5194	5	5199	1200.77	842.43	12.49	0	0	12.49	-	1606	31.91
3	Hamirpur	AIC	17689	303	17992	5736.92	4019.39	42.07	0	0	42.07	-	-	-
4	Kangra	AIC	40727	402	41129	14315.95	10261.58	82.09	0	0	82.09	-	1500	103.48
5	Kullu	IFFCO-TOKIO	0	7	7	2.94	2.12	0.02	0	0	0.02	0	0	0
6	Mandi	IFFCO-TOKIO	7337	273	7610	2101.13	1508.88	24.37	0	0	24.37	0	0	0
7	Shimla	IFFCO-TOKIO	412	178	590	123.31	86.32	0.86	0	0	0.86	0	0	0
8	Sirmour	IFFCO-TOKIO	4709	28	4737	1789.59	1308.11	6.54	0	0	6.54	0	0	0
9	Solan	IFFCO-TOKIO	9631	252	9883	3098.42	2177.97	19.61	0	0	19.61	57.43	1832	57.43
10	Una	AIC	12173	204	12377	3427.84	2414.05	19.31	0	0	19.31	-	-	-
	Total in HP		**108947**	**1931**	**110878**	**35417.7**	**25163.38**	**258.21**	**18.55**	**18.55**	**295.32**	**57.43**	**4938**	**192.82**

Source: *Regional Office, Agriculture Insurance Company, Chandigarh and Corporate Office of IFFCO-TOKIO, General Insurance Company, Delhi.*

TABLE 2: DISTRICT-WISE PROGRESS UNDER PMFBY DURING RABI 2016-17 SEASON

Sr. No.	District	Name of the Executing Agency	No. of Farmers Insured			Insured area (in hectares)	Sum insured (in lakh Rupees)	Premium (in Lakh Rupees)				Claims registered	No. of Beneficiary farmers	Distributed Indemnity (in lakhs)
			Loanee Farmers	Non-Loanee Farmers	Total			Farmers share	Grant by Centre	Grant by State	Total Premium			
1	Bilaspur	OIC	9101	11717	20818	6548.22	1964.47	29.47	137.51	137.51	304.49	-	4313	151.78
2	Chamba	AIC	3549	24	3573	958.30	287.46	4.31	4.31	4.31	12.93	-	-	-
3	Hamirpur	AIC	17859	7035	24894	8472.82	2541.84	38.13	137.26	137.26	312.65	-	-	-
4	Kangra	AIC	36017	1351	37368	12932.67	3879.80	58.20	29.10	29.10	11.64	-	-	-
5	Kinnaur	OIC	0	121	121	37.12	9.84	0.11	0	0	0.11	-	-	-
6	Kullu	OIC	0	185	185	80.16	24.05	0.04	0.13	0.13	0.30	-	-	-
7	Mandi	OIC	9099	34871	43970	12032.80	3603.45	54.05	120.94	120.94	295.93	-	89	1.00
8	Shimla	OIC	258	176	434	96.42	28.93	0.44	0.58	0.58	1.60	-	-	-
9	Sirmour	OIC	2250	697	2947	1756.68	527.06	7.91	24.90	24.90	57.71	-	-	-
10	Solan	OIC	1430	497	1927	1096.13	325.84	4.93	6.17	6.17	17.27	-	-	-
11	Una	AIC	12740	710	13450	5986.72	1796.02	26.94	51.19	51.19	129.32	-	-	-
Total in HP			**92303**	**57384**	**149687**	**49998.04**	**14988.76**	**224.53**	**512.09**	**512.09**	**1143.95**	**-**	**4402**	**152.78**

Source: *Regional office of Agriculture Insurance Company, Chandigarh, and Divisional Office of Oriental Insurance Company, Shimla.*

TABLE 3: COVERAGE OF CLUSTER-1 UNDER PMFBY DURING KHARIF 2016-17 SEASON

Sr. No.	District	Name of the Executing Agency	No. of Farmers Insured			Insured area (in hectares)	Sum insured (in lakh Rupees)	Premium (in Lakh Rupees)				Claims registered	No. of Beneficiary farmers	Distributed Indemnity (in lakhs)
			Loanee Farmers	Non-Loanee Farmers	Total			Farmers share	Grant by Centre	Grant by State	Total Premium			
1	Bilaspur	IFFCO-TOKIO	11075	279	11354	3620.83	2542.53	50.85	18.55	18.55	87.96	0	0	0
2	Kullu	IFFCO-TOKIO	0	7	7	2.94	2.12	0.02	0	0	0.02	0	0	0
3	Mandi	IFFCO-TOKIO	7337	273	7610	2101.13	1508.88	24.37	0	0	24.37	0	0	0
4	Shimla	IFFCO-TOKIO	412	178	590	123.31	86.32	0.86	0	0	0.86	0	0	0
5	Sirmour	IFFCO-TOKIO	4709	28	4737	1789.59	1308.11	6.54	0	0	6.54	0	0	0
6	Solan	IFFCO-TOKIO	9631	252	9883	3098.42	2177.97	19.61	0	0	19.61	57.43	1832	57.43
Total			**33164**	**1017**	**34181**	**10736.22**	**7625.93**	**102.25**	**18.55**	**18.55**	**139.36**	**57.43**	**1832**	**57.43**

TABLE 4: COVERAGE OF CLUSTER-2 UNDER PMFBY DURING KHARIF 2016-17 SEASON

Sr. No.	District	Name of the Executing Agency	No. of Farmers Insured			Insured area (in hectares)	Sum insured (in lakh Rupees)	Premium (in Lakh Rupees)				Claims registered	No. of Beneficiary farmers	Distributed Indemnity (in lakhs)
			Loanee Farmers	Non-Loanee Farmers	Total			Farmers share	Grant by Centre	Grant by State	Total Premium			
1	Chamba	AIC	5194	5	5199	1200.77	842.433	12.49	0	0	12.49	-	1606	31.91
2	Hamirpur	AIC	17689	303	17992	5736.92	4019.39	42.07	0	0	42.07	-	-	-
3	Kangra	AIC	40727	402	41129	14315.95	10261.58	82.09	0	0	82.09	-	1500	103.48
4	Una	AIC	12173	204	12377	3427.84	2414.05	19.31	0	0	19.31	-	-	-
Total			**75783**	**914**	**76697**	**24681.48**	**17537.45**	**155.96**	**0**	**0**	**155.96**	**0**	**3106**	**135.39**

TABLE 5: COVERAGE OF CLUSTER-1 UNDER PMFBY DURING RABI 2016-17 SEASON

Sr. No.	District	Name of the Executing Agency	No. of Farmers Insured			Insured area (in hectares)	Sum insured (in lakh Rupees)	Premium (in Lakh Rupees)				Claims registered	No. of Beneficiary farmers	Distributed Indemnity (in lakhs)
			Loanee Farmers	Non-Loanee Farmers	Total			Farmers share	Grant by Centre	Grant by State	Total Premium			
1	Bilaspur	OIC	9101	11717	20818	6548.22	1964.47	29.47	137.51	137.51	304.49	-	4313	151.78
2	Kinnaur	OIC	0	121	121	37.12	9.84	0.11	0	0	0.11	-	-	-
3	Kullu	OIC	0	185	185	80.163	24.05	0.04	0.13	0.13	0.30	-	-	-
4	Mandi	OIC	9099	34871	43970	12032.80	3603.45	54.05	120.94	120.94	295.93	-	89	1.00
5	Shimla	OIC	258	176	434	96.42	28.93	0.44	0.58	0.58	1.60	-	-	-
6	Sirmour	OIC	2250	697	2947	1756.68	527.06	7.91	24.90	24.90	57.71	-	-	-
7	Solan	OIC	1430	497	1927	1096.13	325.84	4.93	6.17	6.17	17.27	-	-	-
Total			**22138**	**48264**	**70402**	**21647.54**	**6483.64**	**96.95**	**290.23**	**290.23**	**677.41**	**-**	**4402**	**152.78**

TABLE 6: COVERAGE OF CLUSTER-2 UNDER PMFBY DURING RABI 2016-17 SEASON

Sr. No.	District	Name of the Executing Agency	No. of Farmers Insured			Insured area (in hectares)	Sum insured (in lakh Rupees)	Premium (in Lakh Rupees)				Claims registered	No. of Beneficiary farmers	Distributed Indemnity (in lakhs)
			Loanee Farmers	Non-Loanee Farmers	Total			Farmers share	Grant by Centre	Grant by State	Total Premium			
1	Chamba	AIC	3549	24	3573	958.30	287.46	4.31	4.31	4.31	12.93	-	-	-
2	Hamirpur	AIC	17859	7035	24894	8472.82	2541.84	38.13	137.26	137.26	312.65	-	-	-
3	Kangra	AIC	36017	1351	37368	12932.67	3879.80	58.20	29.10	29.10	11.64	-	-	-
4	Una	AIC	12740	710	13450	5986.72	1796.02	26.94	51.19	51.19	129.32	-	-	-
	Total		**70165**	**9120**	**79285**	**28350.51**	**8505.12**	**127.58**	**221.86**	**221.86**	**466.54**	**-**	**-**	**-**

Conclusion

In Himachal Pradesh, total 1,10,878 farmers were insured and covered under PMFBY during Kharif 2016-17, where 1,08,947 were loanee farmers and 1,931 were non-loanee farmers in the State. Total insured area under Kharif season was 35,417.7 hectare, the total target of sum insured was fixed at Rs. 25,163.38 lakhs and total premium was Rs. 295.32 lakhs in the State. The total claim amount was Rs. 57.43 lakhs, only provided for Solan district of the State under PMFBY during this season. During Rabi 2016-17 season, total 1,49,687 farmers were insured for wheat and barley crop under this scheme, out of which, 92,303 were loanee farmers and 57,384 were non-loanee farmers. The coverage of total insured farmers was highest in Mandi district. Total insured area under Rabi season was 49998 hectares, total target of sum insured was fixed at Rs. 14988.76 lakhs and total premium was Rs. 1143.95 lakhs in the State. There was no claim provided under the scheme during this season. Executing agencies, namely, Oriental Insurance Company and Agriculture Insurance Company, did not maintained proper record of cluster-1, cluster-2 of Rabi season as well as cluster-2 of Kharif season, due to its weak execution of monitoring system. However, IFFCO-TOKIO Agency maintained proper record of data analyses regarding cluster-1 of PMFBY during Kharif season. Executing agencies like insurance companies are facing trouble with improper data records of farmers land and harvest and lack of coordination among themselves and with the agriculture departments. Dearth of initiative and interest in some insurance offices along with less awareness among farmers about the scheme makes it furthermore difficult for the insurance agencies to complete its targets. The previous Scheme of NAIS (National agriculture Insurance Scheme) was better according to the agriculture department, as PMFBY has failed in providing compensation to farmers. Even WBIS (Weather Based Insurance Scheme) is a better scheme than PMFBY, because it gives more claims and hence, PMFBY should be based on WBIS instruments.

Recommendations

1. Government should announce one uniform scheme every year so that the farmers do not get confused with different names of similar benefits.
2. Government should release claim amount on time to the insurance companies.
3. Data collection of scheme coverage should be done properly by the banks, insurance agencies and agriculture departments. *Patwari* and *Kanungo* should be more involved and should maintain proper records (*Girdwari*) especially of the area cultivated.
4. Farm on which insurance is being taken should be scrutinized properly for the crops cultivated. Proper demarcation between *Kabza* (who is cultivating) and *Malik* (who is the owner) should be identified.
5. Implementation of the scheme should be at the local level. Insurance Units should be made on *Panchayat* level as this is the closest way of

coverage of the farmers. Monitoring of insurance agencies should also be done on local level such that right working is assured.

6. On speaking with the farmers it was found that claims were not disbursed timely. Just like premium deduction, the Government should also make the procedure for attainment of claims on losses automatic for the farmers.

7. Loan limit should be increased for the area of land so that farmers have access to more credit for their agricultural needs.

8. Individual farm losses should be catered. Yield assessment should not be based on a sample plot as individuals suffer different amounts of losses. And farmers should be supported even before the actual loss happens in the form of provision of high quality seeds at subsidized rates, cheaper fertilizers, irrigation facilities, easier credit facilities etc.

9. The farmers asked for the services of *Gram Sevak* Centers to be revived, as the *Gram Sevaks* used to help farmers with soil testing and spread awareness about various government schemes. Having a person in every village, which farmers can approach easily, makes it convenient for them to resolve their farming problems.

10. Crops in Himachal Pradesh are under big risk of damage from wild animals like monkeys, boars, peacocks etc. but this is not covered in PMFBY as loss caused by wild animals cannot be proven. Farmers suggest that the government should at least provide protection from these animals, if not insurance.

References:

Corporate Office of IFFCO-TOKIO, General Insurance Company (2016-17), Progress Report of PMFBY during Kharif and Rabi Seasons, Gurugram, Delhi.

Divisional Office of Oriental Insurance Company (2016-17), Progress Report of PMFBY during Kharif and Rabi Seasons, Shimla.

Government of Himachal (2016-17), Official Guidelines of PMFBY, Directorate of Agriculture, Shimla.

Government of Himachal Pradesh (2016), *Statistical Outline*, Directorate of Economics and Statistics, Shimla.

Government of India (2016), Guidelines of PMFBY, Ministry of Agriculture and Farmer Welfare, Delhi.

Government of Himachal Pradesh (2016-17), State Progress Report of PMFBY during Kharif and Rabi Seasons, Deputy Directorate of Agriculture, Shimla.

Regional Office of Agriculture Insurance Company (2016-17), Progress Report of PMFBY during Kharif and Rabi Seasons, Chandigarh.

World Bank (2003, August), Piloting Weather Insurance Scheme in India, web.worldbank.org.

Zonal Office of Uco Bank (2016-17), Official Guidelines of PMFBY, Lead Bank, Himland, Shimla.

Agro-Economic Research

Trade Policy and the Edible Oilseed Sector of India*

Jayanti Kajale

The edible oilseed sector of India that includes oilseed growers as well as processors of oilseeds and producers of vegetable oils has been increasingly relying on international trade for satisfying domestic as well as international demand for the edible oilseeds, oil and oil meal. The major characteristic feature of the Indian oilseed sector trade is the growing domestic demand for edible oils and increasing import dependency on the oil exporting countries. In fact, India today has become the largest importer of edible oils.

Whereas domestic performance of the sector, to a certain extent, determines its trade flow, the latter in turn is considered to be affecting the former through trade policy of the government. Studies based on the measures of competitiveness have indicated that oilseed production and processing has always remained inefficient when compared with cheaper imports. However, with declining in self-sufficiency in edible oil production from 97 percent in 1992-93 to 42 percent in 2016-17, growing concern has been expressed about increasing magnitude of imports and impact of the international factors on the oilseed economy, that is considered to be adversely affecting profitability and incomes of producers of oilseeds.

Considering importance of the oilseed sector in the economy and magnitude of imports, government from time to time has been bringing about changes in the trade policy for regulating trade flows of edible oilseeds, oil and oil meal in the interest of consumers and producers of oilseeds and oil. Whereas an increase in tariff rate of the imported oils is expected to positively affect derived demand for oilseeds and support their prices, while a reduction in tariffs is expected to increase quantity of imports and adversely affect prices of the oilseed seeds.

In view of this, analysis of the performance of the edible oilseed/ oil sector in the context of trade policy followed in the post liberalization (1994) period was considered important. Since 1994, trade policy of India relating to edible oils has exhibited various phases depending upon the tariff rates applied and market access granted to the imports.

Therefore, the study makes an attempt to present an overview of the tariff policy followed during 1994-95 and 2017-18 and analyses correlation between tariff rates of imported oil and the performance indicators of the sector in terms of quantity of imports, prices and production of oilseeds and oil during 1994-95 and 2017-18 and its sub periods. It also discusses perceptions of farmers and oilseed processors regarding tariff rate changes.

Objectives of the Study

1. To study the performance of the oilseed and edible oil sector in India in the post 1985 period.
2. To present an overview of the trade policy changes for the edible oil sector in the post liberalization, i.e., post 1994 period and discuss its features.
3. To analyse correlation between tariff rates on imported edible oils and various indicators of performance of the oilseed sector during 1994-95 and 2017-18 and its sub periods.
4. To study the perceptions of the cultivators and processors of oilseeds about impact of changes in tariffs mainly on prices and production of oilseeds and edible oil.
5. To suggest policy measures in the light of secondary and primary data analysis.

Methodology and Sampling

The study is based on secondary as well as primary data collection. Secondary data was collected from

*AERC, Gokhale Institute of Politics and Economics, Pune-411004

various government as well as non-government sources. Information relating to trade policy changes (specifically relating to tariffs rates) and other information about the edible oil sector was collected from the office of Solvent Extraction Association of India, Mumbai.

Maharashtra occupied around 16 percent of total oilseed area in 2016-17 and its contribution to total major oilseed production was 15 percent in this year. The major oilseed crop of state is soybean. Maharashtra is also a state with important ports on the west cost of India and received around 10 percent of total imports of edible oils in 2016-17. It has the highest number of solvent extraction units (39 or 14 percent of a total of 272 units in India). The daily capacity of these units is highest (21555 MMT.) as compared to other states as on August 1, 2017. In view of the importance of the state in the oilseed economy, Maharashtra was selected for selecting sample farmers as well as traders and manufacturers.

For understanding perceptions of the farmers about impact of trade policy changes on farmers on variables such as their cropping pattern and market prices, a survey of farmers was undertaken in oilseed growing regions of Maharashtra. Two oilseed growing districts, viz., Kolhapur which is agriculturally developed and Latur which belongs to drought prone region of the state were selected. In all, 25 farmers in each of the districts and a total of 50 farmers were selected from the selected districts.

For understanding the perception of importers and oilseed processors, about impact of trade policy changes on the edible oil sector, discussions with associations of processors of edible oil as well as individual processors were conducted. Accordingly, focused group discussions were held with the officials of the Solvent Extraction Association of India, Mumbai and Kolhapur Oil Mills Owners Association, Kolhapur. Discussions were also held with individual importers of crude oil, refineries and exporters of oil meal.

Major findings from the study

Major finding emerging from analysis of the secondary data are as follows

1. Performance of Edible Oilseed and Oil Sector

In 2016-17, the total production of edible oilseeds was around 34 MMT. As per an estimate, for satisfying the annual domestic requirement of edible oils of around 20MMT in 2020, the annual requirement from total oilseeds would be 67.37 MMT in 2020. Thus, it is unlikely that the domestic production of edible oilseeds and oil would rise to 20 MMT and 67 MMT, respectively, in by 2020 as per the above estimate. Hence, the oil industry has to depend upon importing oil for satisfying domestic demand. As per the figures given by the Solvent Extraction Association of India, around 66 percent of the domestic requirement of edible oil was met through imports in 2016-17.

The data reveals that though at all India level the area, production and yield of oilseeds were increasing significantly during 1985-86 to 2016-17, growth rates of these variables during the sub period 2003-04 to 2016-17 were non-significant.

It was observed that annual average prices of oilseeds were growing at positive and significant growth rates ranging between around 5 and 8 percent during 2002 to 2016. Similarly, the net returns in absolute as well in percentage (of costs) terms were positive during TE 2010-11 and TE 2014-15. Growth rates of MSPs of oilseeds were marginally lower than those in case of food grains.

The data on imports shows that 81 percent of total imports consist of crude oil which supports the oil processing industry. Among the crude oils, mainly palm oil, soybean oil and sunflower oil are imported. The imports of refined oils consist only of refined, RBD palm oil.

The growth rates of domestic production and yield of oilseeds (1985-86 to 2016-17) were 3.6 percent and 2.52 percent, respectively. Growth rate of production of oil (1987-88 to 2016-17) was and 1.95 percent. In comparison, growth rate of imports of edible oil (1985-86 to 2016-17) was 12 percent and was much higher than that of production of oilseeds and oil. Whereas the domestic edible oil production increased by around 1.8 times and the imports increased by around 33 times during 1985-86 and 2016-17.

Analysis of the secondary data brings out stagnancy in the domestic oilseed production and inability of the oilseed sector to satisfy input requirements of the processing sector in spite of profitability of the oilseed production and increasing demand for edible oil. Domestic oil production has also stagnated leading to higher import dependency.

2. Tariff Rate Changes for the Edible Oil Sector, 1994-95 to 2017-18

Before 1994, trade in edible oil sector in India was largely controlled by the government. With liberlisation of Indian trade policy in 1994, restrictions on imports of edible oil were reduced. The policy change coupled with high potential demand for cheaper imported edible oils led to increase in the volume of imports of palm oil, especially from Malaysia and Indonesia. With a surge of imports due to policy change and later due to worldwide recession on account of the East Asian crisis, domestic prices of edible oils were also adversely affected. As a result, custom duties on different edible oils imported were raised gradually from 1998 onwards. Tariff rates remained at a higher level till 2006. Post 2006 period was marked not only by declining tariff rates but also by reduction in spread in the tariff rate structure. The tariff rates again started increasing 2013 onwards.

The period during 1994 and 2017 thus can be classified into four phases based on the levels of tariffs –

1. 1994-95 to 1997-98: Period of falling or lower tariff rates. This was a period of adoption of liberal trade policy and the lowest tariff rate in the tariff rate structure was 15 percent in 1998.
2. 1998-99 to 2006-07 was a period of increasing or higher tariff rates -This was also a period of declining prices due to East Asian crisis. Highest tariff rate during this period was 90 percent (for palm oil)
3. 2007-08 to 2012-13: Period of declining or lower tariff rates. During this post East Asian crisis recovery period of liberal trade regime, tariff rates were lowered and palm oil attracted; and
4. 2013-14 to 2017-18: This has been a period of increasing tariff rates due to increasing imports.

The bound duties, which are the maximum permissible duties that could be applied under agreement on agriculture under WTO are very high (300 percent) for all the edible oils except soybean oil (45 percent). However, the actual applied tariff rates are very low and India has the flexibility to increase the tariff rates upto the bound rates.

In the recent past, i.e., during the period of September 23, 2016 and March 1, 2018, the duties were revised and increased 4 times with an objective of limiting overseas purchases of edible oils and making the crushing of local oilseeds profitable. With this revision, palm oil now attracts highest (RBD 54 percent and crude oil 44 percent) tariff rate. This is followed by other major imported oils (crude soybean and crude sunflower oil 30 percent and 25 percent, respectively).

As per the reports, duty hikes that were implemented 2013-14 onwards, were expected to reduce quantity of imports and increase the demand for domestic oilseeds and hence support prices of oilseeds.

The data however shows that quantity imported kept on increasing. It increased from 11.62 MMT in 2013-14 to 15.08 MMT in 2016-17.

As per the India ASEAN Comprehensive Economic Cooperation Agreement which became operational from January 10, 2010, crude and refined palm oils were placed in India's list of special products and the applied MFN tariff rates for Indonesian and Malaysian palm oil were to be reduced gradually to 37.5 percent by December 2019. However, the above analysis shows that the basic customs duties of palm oil have been increasing and was 54 percent and 44 percent for crude and refined oil, respectively, on March 1, 2018. However, it is not clear whether the current MFN rates would be reduced in 2019.

3. Tariff Rate and its Correlates

An increase in the tariff rate is likely to affect quantum of imports adversely. It is expected to affect other variables such as domestic production of oilseeds and oils and their respective prices positively through increased demand. Prices

would get affected depending upon the extent of transmission of marginal change in imported oil price. For observing the nature of correlation, coefficient of correlation (CC) between the tariff rate and the quantity of imports and domestic production and prices of respective oil and oilseed were calculated for the period during 1994-95 and 2017-18.

Correlation of tariff rates with quantity of respective oil imported was significant and had expected negative sign indicating that with rise in tariff rates, the latter would decline. This is observed for all types of oil except refined sunflower oil. CC in case of other variables- domestic production of oilseed and of oil, did not exhibit expected sign and did not comply with the expectation of a positive (negative) correlation due to protection offered (removed) during high (low) tariff regime to the domestic oilseeds and oils production.

The data showed that the CC with price of oil was positive. However, that with oilseed prices was negative. This indicated that with tariff rate changes, domestic prices of oil also move in similar direction, however, this may not translate into increasing demand for domestic oilseeds and oilseed prices.

In view of existence of multiple tariff rates and substitutability between oils, simple annual average tariff rate was also calculated for each financial year and its CC with other variables such as quantity of total imports and total production of oils and oilseeds and the wholesale price indices (WPI) of oils and oilseeds during 1996-97 and 2016-17 were found out.

Almost all the variables were negatively correlated with average tariff rate. Among all the variables, correlation of tariff rate with the quantity of imports was relatively stronger and had expected signs.

The coefficients were significant with negative signs, as far as production of edible oils and oilseeds are concerned indicating that with increase (decrease) in the tariff rate, these variables also decline (rise). Again, this does not comply with the expectation of a positive (negative) correlation due to protection offered (removed) during high (low) tariff regime to the domestic oilseeds and oil production. WPI of oilseeds is also negatively correlated with annual average tariff as against the expectation. Thus, when tariff rate increases, oilseed prices do not seem to be increasing. This indicates that factors other than tariff rates may be largely affecting production and prices of oilseeds.

The plot of tariff rates of the major oil imported - crude and refined palm oil along with available WPI of oilseeds and edible oils shows that tariff rates were declining since 2005-06 and again started rising since 2014-15. The price indices however have shown an increasing trend over the concerned period. Thus, a one to one relationship between tariff rates and price indices doesn't seem obvious from the movement of variables.

Phase wise percentage change in simple average tariff rate as well as in other variables was found out and compared. However, there does not appear to be any phase wise pattern indicating that there may not be any one to one and direct relationship between tariff rates and performance variables of the oil/ oilseed sector. Especially, the production and prices of oilseeds do not seem to be correlated with changes in annual average tariff rate positively during the overall period and during phases.

Major finding emerging from analysis of the primary data are as follows

1. Perceptions of the Farmer Households

Majority of the farmers were not aware about import of edible oil for satisfying domestic demand. Only three percent of the households were aware about impact of cheaper imports and its adverse impact on the crop.

66 percent of the farmers reported that the major problem faced by them was higher cost of inputs as compared to the prices received. The responses also revealed that prices received were comparatively lower than the costs incurred due to higher labour costs, lower price paid by the intermediaries and also due higher production. Therefore, the major suggestion given by the farmers was related to monitoring of the local distributors of the inputs for ensuring timely and adequate supply of quality inputs at lower costs.

2. Perceptions of the Oil Processors regarding Trade Policy Changes and their Impact

The interests of processors vary and are conflicting, a wide range of policy suggestions emerged from the discussions. Whereas the solvent extraction units supported tariff hikes for refined oil and duty differential between crude and refined oil, for processors especially agro-food industries dependent on import of crude palm oil, maintaining a stable import policy and implementation of other domestic policies were more important than the tariff rate hike.

Policy implications

Following are the policy implications emerging from the study:

1. It is observed that the yield gap in case of oilseeds is very high. In view of the increasing demand and dependence on imports of edible oil, efforts should be made to bridge the yield gaps. As mentioned in the CACP reports of 2017-18, there is a need to study farming practices of the benchmarking countries as well as benchmarking states and emulate those practices which are suitable at the micro level so as to increase crop yields, reduce production cost and increase income of farmers.
2. As suggested by oil processors, provision of adequate and quality inputs including seeds and water is extremely important. It is observed that the marginal return from provision of water is very high in case of oilseeds.
3. Extension machinery should be used to create awareness among farmers about seeds of high-yielding varieties, and improve productivity by all means.
4. As palm oil is widely consumed in India, the government should focus on increasing cultivation of palm and encourage investment therein.
5. Cultivation and export of traditional/indigenous oilseeds and those which have unique properties and niche demand in the international markets needs to be promoted.
6. Given the need for higher edible oil imports in the short run, government policy should focus on exports of oilseeds, oil and oil meal based products.
7. Import of oilseeds needs to be allowed at lower rates.
8. One of the strategies of the Foreign Trade Policy of India 2017 is to provide for a stable and sustainable policy environment for merchandise trade so as to reduce operational complexity and uncertainty for the stakeholders involved in production and trade of edible oilseeds and oils. Therefore, it is important to have a stable export as well as import policy.

Overall, the analysis revealed that tariff rate changes might not be able to bring about desired changes in the production and prices of oilseeds. Domestic policies would play a major role in increasing the productivity and production of oilseeds so as to satisfy the demand of the processing industry. It was revealed from the discussions that only tariff rate changes may not lead to increase in production if necessary inputs are not provided for increasing oilseed production as it would reduce the imports temporarily and starve the oil processing industry of the raw material. Similarly frequent changes in tariff rates would add to administrative costs and complexities. Hence, strengthening the domestic oilseed sector and encouraging exports remain the most important policy implications.

Commodity Reviews

Foodgrains

Procurement of Rice

As on 28.09.2018, the total procurement of rice stood at 38.18 million tones in September, 2018, as against 38.07 million tonnes during the corresponding period of last year. The details are given below:

Procurement of Rice (*In thousand tonnes*)

State	Marketing Season 2017-18 (upto 28.09.2018)		Corresponding Period of last Year 2016-17		Marketing Year (October-September)			
					2016-17		2015-2016	
	Procure-ment	% to Total	Procure-ment	% to Total	Procure-ment	% to Total	Procure-ment	% to Total
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Andhra Pradesh	3994	10.46	3724	9.78	3725	9.78	4326	12.65
Chhatisqarh	3255	8.53	4022	10.56	4022	10.56	3442	10.06
Haryana	3992	10.46	3583	9.41	3583	9.40	2861	8.36
Maharashtra	179	0.47	309	0.81	309	0.82	230	0.67
Punjab	11833	31.00	11052	29.03	11052	29.00	9350	27.33
Tamil nadu	1008	2.64	141	0.37	144	0.38	1191	3.48
Uttar Pradesh	2875	7.53	2354	6.18	2354	6.18	2910	8.50
Uttarakhand	38	0.10	706	1.85	706	1.85	598	1.75
Other	11001	28.82	12180	31.99	12210	32.04	9301	27.19
Total	**38175**	**100.00**	**38070**	**100.00**	**38105**	**100.00**	**34209**	**100.00**

Source: Department of Food & Public Distribution

Procurement of Wheat

The total procurement of wheat during rabi marketing season 2018-19 up to 05.10.2018 is 35.80 million tonnes as against 30.82 million tonnes during the corresponding period of last year. The details are given below:

Procurement of Wheat (*In thousand tonnes*)

State	Marketing Season 2018-19 (upto 05.10.2018)		Corresponding Period of last Year 2017-18		Marketing Year (April-March)			
					2017-18		2016-2017	
	Procure-ment	% to Total	Procure-ment	% to Total	Procure-ment	% to Total	Procure-ment	% to Total
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Haryana	8784	24.54	7432	24.11	7432	24.11	6722	29.32
Madhya Pradesh	7313	20.43	6724	21.81	6725	21.82	3990	17.40
Punjab	12692	35.46	11706	37.98	11706	37.98	10645	46.42
Rajasthan	1532	4.28	1245	4.04	1245	4.04	762	3.32
Uttar Pradesh	5294	14.79	3699	12.00	3699	12.00	802	3.50
Other	180	0.50	18	0.06	18	0.06	9	0.04
Total	**35795**	**100.00**	**30824**	**100.00**	**30825**	**100.00**	**22930**	**100.00**

Source: Department of Food & Public Distribution

Commercial Crops

Oilseeds

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 138.5 in September, 2018 showing a decrease of 1.14 percent over the previous month. However, it increased by 8.20 percent over the previous year.

The Wholesale Price Index (WPI) of all individual oilseeds showed a mixed trend. The WPI of rape and mustard seed (1.25 percent), cotton seed (0.57 percent), gingelly seed (sesamum) (5.53 percent), niger seed (6.72 percent), safflower (2.43 percent), sunflower (5.19 percent) increased over the previous month. However, the WPI of groundnut seed (-1.42 percent), copra (coconut) (-2.97 percent) and soybean (-2.86 percent) decreased over the previous month.

Manufacture of Vegetable and Animal Oils and Fats

The Wholesale Price Index (WPI) of vegetable and animal oils and fats as a group stood 119 in September, 2018 which is same as the previous month. However, it increased by 10.39 percent over the corresponding month of the previous year. The WPI of soyabean oil (0.09 percent), sunflower oil (1.45 percent), groundnut oil (0.55 percent) increased over the previous month. The WPI of rapeseed oil (-0.36 percent), copra oil (-1.76 percent) and cotton seed oil (-0.35 percent) decreased over the previous month. The WPI of mustard oil remained unchanged as compared to the previous month.

Fruits & Vegetable

The Wholesale Price Index (WPI) of fruits & vegetable as a group stood at 154 in September, 2018 showing a decrease of (-1.03 percent) over the previous month and a decrease of (-5.41 percent) over the corresponding months of the previous year.

Potato

The Wholesale Price Index (WPI) of potato stood at 220.3 in September, 2018 showing a decrease of (-2.91 percent) over the previous month. However, it increased by 80.13 percent over corresponding months of the previous year.

Onion

The Wholesale Price Index (WPI) of onion stood at 144.9 in September, 2018 showing a decrease of (-10.22 percent) over the previous month and a decrease of (-25.23 percent) over the corresponding months of the previous year.

Condiments & Spices

The Wholesale Price Index (WPI) of condiments & spices (group) stood at 133.7 in September, 2018 showing an increase of 1.98 percent over the previous month and 7.82 percent over the corresponding months of the previous year.

The Wholesale Price Index of Black pepper increased by 6.93 percent whereas the Wholesale Price Index (WPI) of chillies(dry) decreased by 1.71 percent and WPI of turmeric decreased by 1.06 percent over the previous month.

Raw Cotton

The Wholesale Price Index (WPI) of raw cotton stood at 120.9 in September, 2018 showing a decrease of (-1.39 percent) over the previous month and an increase of 13.52 percent over the corresponding months of the previous year.

Raw Jute

The Wholesale Price Index (WPI) of raw jute stood at 181.7 in September, 2018 showing an increase of 5.21 percent over the previous month and increased by 13.63 percent over the corresponding months of the previous year.

Wholesale Price Index of Commercial Cops

(*Base Year: 2011-12=100*)

Commodity	Sep-18	Aug-18	Sep-17	% Variation Over the	
				Month	Year
Oil Seeds	138.5	140.1	128.0	-1.14	8.20
Groundnut Seed	118.2	119.9	118.0	-1.42	0.17
Rape & Mustard Seed	145.6	143.8	134.6	1.25	8.17
Cotton Seed	141.1	140.3	142.9	0.57	-1.26
Copra (Coconut)	212.2	218.7	188.6	-2.97	12.51
Gingelly Seed (Sesamum)	141.3	133.9	119.7	5.53	18.05
Niger Seed	139.7	130.9	204.8	6.72	-31.79
Safflower (Kardi Seed)	139.3	136	140.2	2.43	-0.64
Sunflower	111.4	105.9	98.4	5.19	13.21
Soyabean	142.9	147.1	124.8	-2.86	14.50
Manufacture of vegetable and animal oils and fats	119	119	107.8	0.00	10.39
Mustard Oil	126.7	126.7	116.4	0.00	8.85
Soyabean Oil	111.8	111.7	105.8	0.09	5.67
Sunflower Oil	111.7	110.1	102.1	1.45	9.40
Groundnut Oil	110.6	110	105.1	0.55	5.23
Rapeseed Oil	112.1	112.5	112.0	-0.36	0.09
Copra oil	178.2	181.4	163.0	-1.76	9.33
Cotton seed Oil	113.3	113.7	101.5	-0.35	11.63
Fruits & Vegetables	154	155.6	162.8	-1.03	-5.41
Potato	220.3	226.9	122.3	-2.91	80.13
Onion	144.9	161.4	193.8	-10.22	-25.23
Condiments & Spices	133.7	131.1	124.0	1.98	7.82
Black Pepper	142	132.8	157.8	6.93	-10.01
Chillies (Dry)	132.4	134.7	107.2	-1.71	23.51
Turmeric	121.2	122.5	122.6	-1.06	-1.14
Raw Cotton	120.9	122.6	106.5	-1.39	13.52
Raw Jute	181.7	172.7	159.9	5.21	13.63

Statistical Tables

Wages

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

(*In Rs.*)

State	District	Centre	Moth & Year	Daily Normal Working Hours	Field Labour		Other Agri. Labour Carpenter		Herdsman Black Smith Cobbler		Skilled Labour		
					M	W	M	W	M	W	M	M	M
Andhra Pradesh	Krishna	Ghantasala	June, 18	8	500	NA	NA	NA	250	NA	NA	NA	NA
	Guntur	Tadikonda	June, 18	8	275	250	NA	NA	275	NA	NA	NA	NA
Telangana	Ranga Reddy	Arutala	May,18	8	650	266	500	NA	NA	NA	600	550	NA
Karnataka	Bangalore	Harisandra	Sep, 17	8	360	340	400	350	400	300	600	450	NA
	Tumkur	Gidlahali	Sep,17	8	250	200	250	200	250	NA	300	280	NA
Maharashtra	Bhandara	Adyal	Oct, 17	8	200	150	250	150	200	150	350	250	200
	Chandrapur	Ballarpur	July, 18	8	300	150	300	150	200	NA	250	250	150
Jharkhand	Ranchi	Gaitalsood	Nov, 17	8	230	230	230	230	230	230	317	317	NA

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

(*In Rs.*)

State	District	Centre	Month & Year	Type of Labour	Normal Daily Working Hours	Plough-ing	Sow-ing	Weeding	Har-vesting	Other Agri Labour	Herds-man	Skilled Labours		
												Car-penter	Black Smith	Cobbler
Assam	Barpeta	Lahara-para	Apr, 17	M	8	250	250	250	250	250	250	350	250	350
				W	8	NA	NA	200	200	200	NA	NA	NA	NA
Bihar	Muzaffar-pur	Bhalui Rasul	June,17	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Shekhpura	Kutaut	June,17	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chhattis-garh	Dhamtari	Sihava	March, 18	M	8	NA	NA	NA	160	180	175	300	200	200
				W	8	NA	NA	NA	150	160	150	NA	100	NA
Gujarat*	Rajkot	Rajkot	June,18	M	8	259	259	253	246	227	193	500	494	456
				W	8	NA	260	246	246	227	178	NA	NA	NA
	Dahod	Dahod	June,18	M	8	293	293	164	164	164	NA	371	321	286
				W	8	NA	250	164	164	164	NA	NA	NA	NA
Haryana	Panipat	Ugara-kheri	May,18	M	8	400	400	400	400	400	NA	550	400	NA
				W	8	NA	300	300	350	300	NA	NA	NA	NA
Himachal Pradesh	Mandi	Mandi	June,16	M	8	NA	182	182	182	182	182	300	300	NA
				W	8	NA	182	182	182	182	182	NA	NA	NA

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

State	District	Centre	Month & Year	Type of Labour	Normal Daily Working Hours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Kerala	Kozhikode	Koduvally	May,18	M	4-8	960	800	NA	800	832	NA	900	NA	NA
				W	4-8	NA	NA	650	650	650	NA	NA	NA	NA
	Palakkad	Elappally	May,18	M	4-8	NA	500	NA	500	633	NA	650	NA	NA
				W	4-8	NA	NA	300	300	300	NA	NA	NA	NA
Madhya Pradesh	Hoshangabad	Sangarkhera	March, 18	M	8	250	NA	250	250	250	150	400	400	NA
				W	8	NA	NA	250	250	200	150	NA	NA	`
	Satna	Kotar	March, 18	M	8	200	200	200	200	200	200	350	350	350
				W	8	NA	200	200	200	200	200	NA	NA	NA
	Shyopurkala	Vijaypur	March, 18	M	8	NA	300	300	300	NA	300	300	300	NA
				W	8	NA	300	300	300	NA	300	NA	NA	NA
Odisha	Bhadrak	Chandbali	May, 18	M	8	250	250	250	300	300	250	450	400	350
				W	8	NA	220	220	250	250	220	NA	NA	NA
	Ganjam	Aska	May, 18	M	8	350	250	250	350	300	250	500	400	350
				W	8	NA	220	220	300	250	220	NA	NA	NA
Punjab	Ludhiyana	Pakhowal	March, 18	M	8	480	480	480	500	400	NA	480	480	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rajasthan	Barmer	Kuseep	July,18	M	8	500	500	400	NA	NA	500	700	500	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jalore	Sarnau	July,18	M	8	450	300	300	NA	NA	NA	400	300	NA
				W	8	NA	NA	200	NA	NA	NA	NA	NA	NA
Tamil Nadu*	Thanjavur	Pulvarnatham	June, 18	M	8	NA	347	NA	333	375	NA	500	350	NA
				W	8	NA	NA	150	144	139	NA	NA	NA	NA
	Tirunelveli	Malayakulam	June, 18	M	8	NA	187	181	500	380	NA	NA	NA	NA
				W	8	NA	NA	NA	175	NA	NA	NA	NA	NA
Tripura	State Average		Oct, 17 W	M	8	361	323	311	317	304	306	359	324	275
				8	NA	256	256	252	253	280	NA	NA	NA	
Uttar Pradesh*	Meerut	Ganeshpur	June,18	M	8	300	300	300	300	300	NA	500	NA	NA
				W	8	NA	250	250	250	250	NA	NA	NA	NA
	Aurraiya	Aurraiya	June,18	M	8	170	175	185	250	171	NA	500	NA	.NA
				W	8	NA	NA	185	250	171	NA	NA	NA	NA
	Chandauli	Chandauli	June,18	M	8	NA	NA	NA	NA	200	NA	400	NA	NA
				W	8	NA	NA	NA	NA	200	NA	NA	NA	NA

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

Prices

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

Commodity	Variety	Unit	State	Centre	Sep-18	Aug-18	Sep-17
Wheat	PBW 343	Quintal	Punjab	Amritsar	1900	1800	1650
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1865	1780	1625
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	2000	2000	1671
Jowar	-	Quintal	Maharashtra	Mumbai	2750	2800	2500
Gram	No III	Quintal	Madhya Pradesh	Sehore	3600	3900	5276
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1325	1360	1330
Gram Split	-	Quintal	Bihar	Patna	5580	5510	7000
Gram Split	-	Quintal	Maharashtra	Mumbai	5000	5200	7600
Arhar Split	-	Quintal	Bihar	Patna	5650	5750	7800
Arhar Split	-	Quintal	Maharashtra	Mumbai	5700	5600	5850
Arhar Split	-	Quintal	NCT of Delhi	Delhi	5000	5450	5600
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	5400	5400	6500
Gur	-	Quintal	Maharashtra	Mumbai	3900	3800	3950
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4400	4600	5000
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2750	2800	3480
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	3925	3800	3600
Mustard Seed	Black	Quintal	West Bengal	Raniganj	4450	4550	4000
Mustard Seed	-	Quintal	West Bengal	Kolkata	4400	4400	4200
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	3925	4000	4450
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4150	4200	4430
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	1750	1450	2000
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	2700	2560	2580
Castor Seed	-	Quintal	Andhra Pradesh	Hyderabad	4050	4350	4000
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	8660	8800	6190
Copra	FAQ	Quintal	Kerala	Alleppey	10150	11550	11350
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	5800	5800	5200
Groundnut	-	Quintal	Maharashtra	Mumbai	5850	5750	4800
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1350	1350	1340
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1425	1450	1425

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

Commodity	Variety	Unit	State	Centre	Sep-18	Aug-18	Sep-17
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1300	1330	1250
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1765	1825	1825
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1425	1440	1425
Castor Oil	-	15 Kg.	Andhra Pradesh	Hyderabad	1380	1440	1410
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1750	1700	1560
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2700	2650	2325
Coconut Oil	-	15 Kg.	Kerala	Cochin	2250	2475	2415
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	1700	1820	1825
Groundnut Cake	-	Quintal	Andhra Pradesh	Hyderabad	3214	3071	2643
Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	5300	5800	4300
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	5200	4900	4300
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	4175	4100	3610
Jute Raw	W 5	Quintal	West Bengal	Kolkata	4175	4100	3660
Oranges	-	100 No	NCT of Delhi	Delhi	NA	NA	NA
Oranges	Big	100 No	Tamil Nadu	Chennai	650	600	NA
Banana	-	100 No.	NCT of Delhi	Delhi	333	375	450
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	683	683	670
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	98000	92000	100000
Almonds	-	Quintal	Maharashtra	Mumbai	75000	73000	85000
Walnuts	-	Quintal	Maharashtra	Mumbai	75000	75000	100000
Kishmish	-	Quintal	Maharashtra	Mumbai	19000	19000	12000
Peas Green	-	Quintal	Maharashtra	Mumbai	5100	4300	3600
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	1100	1800	1800
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	1500	2000	2000
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1700	1850	2000
Potato	Red	Quintal	Bihar	Patna	1220	1260	940
Potato	Desi	Quintal	West Bengal	Kolkata	1400	1400	620
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	2830	2543	1643
Onion	Pole	Quintal	Maharashtra	Nashik	700	750	1300
Turmeric	Nadan	Quintal	Kerala	Cochin	12000	12000	14500

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

Commodity	Variety	Unit	State	Centre	Sep-18	Aug-18	Sep-17
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	11500	11300	12000
Chillies	-	Quintal	Bihar	Patna	10100	10400	11800
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	36000	37500	38500
Ginger	Dry	Quintal	Kerala	Cochin	19000	19500	14000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	87000	83000	118000
Cardamom	Small	Quintal	West Bengal	Kolkata	120000	120000	135000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	5200	5200	5200
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	73370	70000	63365
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	46000	46300	46000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	39500	39000	39250
Fish	Rohu	Quintal	NCT of Delhi	Delhi	14000	13500	13000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	35000	45000	33500
Eggs	Madras	1000 No.	West Bengal	Kolkata	4380	4000	4330
Tea	-	Quintal	Bihar	Patna	21350	21300	21300
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	39000	39000	37000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	24500	23000	24800
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	16000	13500	15000
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	3500	3650	3200
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	2450	2000	2300
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13500	13200	13300
Rubber	-	Quintal	Kerala	Kottayam	11400	12200	12000
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	60000	57500	32700

3. WHOLESALE PRICES OF SOME IMPORTANT AGRICULTURAL COMMODITIES IN INTERNATIONAL MARKETS DURING YEAR 2018

Commodity	Variety	Country	Centre	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
CARDAMOM	Guatmala Bold Green	U.K.	-	Dollar/ MT	18500	19500	19500	19500	19500	19500	19500	19500	19500
				Rs./Qtl	117642	126477	126887	130065	132483	133653	133887	138294	141473
CASHEW KERNELS	Spot U.K. 320s	U.K.	-	Dollar/ MT	11535	11346	11368	10823	10038	10252	10157	10229	9463
				Rs./Qtl	73351	73593	73973	72187	68198	70265	69739	72542	68655
CASTOR OIL	Any Origin ex tank Rotterdam	Netherlands	-	Dollar/ MT	1612	1652	1602	1567	1566	1526	1621	1621	1611
				Rs./Qtl	10251	10716	10427	10451	10638	10456	11128	11494	11686
CHILLIES	Birds eye 2005 crop	Africa	-	Dollar/ MT	5800	4800	4800	4800	4800	4800	4800	4800	4800
				Rs./Qtl	36882	31133	31234	32016	32611	32899	32957	34042	34824
CLOVES	Singapore	Madagascar	-	Dollar/ MT	7900	8100	7750	7750	7900	8100	8800	7700	7600
				Rs./Qtl	50236	52537	50429	51693	53673	55517	60421	54608	55138
COCONUT OIL	Crude Phillipine/ Indonesia, cif Rotterdam	Netherlands	-	Dollar/ MT	1365	1260	1095	1115	1080	910	890	900	910
				Rs./Qtl	8680	8172	7125	7437	7338	6237	6111	6383	6602
COPRA	Phillipines cif Rotterdam	Phillipine	-	Dollar/ MT	769	716	681	672	670	611	610	607	569
				Rs./Qtl	4890	4644	4431	4479	4552	4188	4185	4305	4124
CORRIANDER		India	-	Dollar/ MT	1650	1650	1650	1650	1650	1650	1650	1650	1650
				Rs./Qtl	10492	10702	10737	11006	11210	11309	11329	11702	11971
CUMMIN SEED		India	-	Dollar/ MT	3300	3300	3000	3000	3000	3000	3400	3400	3400
				Rs./Qtl	20985	21404	19521	20010	20382	20562	23344	24113	24667
MAIZE		U.S.A.	Chicago	C/56 lbs	355	367	386	390	390	353	337	341	336
				Rs./Qtl	887	935	987	1022	1041	951	909	950	958
OATS		CANADA	Winnipeg	Dollar/ MT	340	327	291	286	294	318	334	326	322
				Rs./Qtl	2164	2123	1895	1905	1995	2180	2296	2310	2336
PALM KERNAL OIL	Crude Malaysia/ Indonesia, cif Rotterdam	Netherlands	-	Dollar/ MT	1255	1140	1030	970	960	870	890	945	860
				Rs./Qtl	7981	7394	6702	6470	6522	5963	6111	6702	6239
PALM OIL	Crude Malaysian/ Sumatra, cif Rotterdam	Netherlands	-	Dollar/ MT	685	663	680	665	630	650	600	560	550
				Rs./Qtl	4356	4297	4425	4436	4280	4455	4120	3972	3990
PEPPER (Black)	Sarawak Black lable	Malaysia	-	Dollar/ MT	5000	5000	4800	4800	4800	4400	4400	3600	3600
				Rs./Qtl	31795	32430	31234	32016	32611	30158	30210	25531	26118

3. WHOLESALE PRICES OF SOME IMPORTANT AGRICULTURAL COMMODITIES IN INTERNATIONAL MARKETS DURING YEAR 2018

Commodity	Variety	Country	Centre	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
RAPESEED	Canola	CANADA	Winnipeg	Can Dollar/MT	485	511	516	533	532	524	493	495	495
				Rs./Qtl	2500	2610	2602	2765	2792	2719	2590	2694	2765
	UK delivered rapeseed, delivered Erith(buyer)	U.K.	-	Pound/MT	275	276	272	288	289	290	301	318	311
				Rs./Qtl	2482	2500	2484	2657	2619	2614	2708	2857	2945
RAPESEED OIL	Refined bleached and deodorised ex-tanks,broker price	U.K.	-	Pound/MT	669	697	652	665	676	695	695	695	695
				Rs./Qtl	6039	6313	5954	6135	6127	6265	6254	6402	6582
SOYABEAN MEAL	UK produced 49% oil & protein ('hi-pro') ex-mill seaforth UK bulk	U.K.	-	Pound/MT	305	337	339	363	355	321	330	326	310
				Rs./Qtl	2753	3053	3096	3349	3217	2893	2969	3003	2936
SOYABEAN OIL		U.S.A.	-	C/lbs	33	32	32	30	31	29	28	28	27
				Rs./Qtl	4625	4574	4589	4410	4642	4381	4237	4377	4317
	Refined bleached and deodorised ex-tanks,broker price	U.K.	-	Pound/MT	651	657	647	630	640	635	635	635	635
				Rs./Qtl	5877	5951	5908	5812	5800	5724	5714	5850	6013
SOYABEANS		U.S.A.	-	C/60 lbs	941	1032	1041	1045	995	868	830	854	823
				Rs./Qtl	2196	2457	2486	2558	2481	2183	2091	2223	2191
	US NO.2 yellow	Netherlands	Chicago	Dollar/MT	385	423	426	444	432	380	381	354	363
				Rs./Qtl	2451	2744	2772	2958	2932	2602	2614	2511	2631
SUNFLOWER SEED OIL	Refined bleached and deodorised ex-tanks,broker price	U.K.	-	Pound/MT	724	727	723	735	747	722	724	724	724
				Rs./Qtl	6536	6585	6602	6780	6770	6508	6515	6669	6856
Wheat		U.S.A.	Chicago	C/60 lbs	435	451	486	496	490	480	483	508	472
				Rs./Qtl	1015	1074	1161	1214	1222	1207	1217	1322	1257

Source- Public Ledger

FOREIGN EXCHANGE RATES

Currency	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
CanDollar	51.57	51.11	50.48	51.84	52.51	51.92	52.55	54.43	55.89
UKPound	90.27	90.58	91.32	92.25	90.63	90.14	89.98	92.12	94.7
USDollar	63.59	64.86	65.07	66.7	67.94	68.54	68.66	70.92	72.55

Crop Production

Sowing and Harvesting Operations Normally in Progress During the Month of December, 2018

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Summer Rice, Jowar (R), Maize, Ragi, Small Millets (R), Gram, Urad (R), Mung (R)	Winter Rice, Urad (K), Bajra, Ragi (K), Small Millets (K), Sugarcane, Ginger, Mesta, Sweet Potato, Groundnut, Nigerseed, Onion
Assam	Wheat	Winter Rice, Sugarcane, Castor seed, Sesamum
Bihar	Wheat, Barley, Gram, Winter Potato (Plains), Sugarcane, Linseed	Winter Rice, Jowar (K), Bajra, Winter Potato (Plains), Groundnut, Cotton
Gujarat	Winter Potato (Hills), Sugarcane, Onion	Winter Rice, Jowar (K), Sugarcane, Ginger, Chillies (Dry), Tobacco, Caster seed, Sesamum, Cotton, Turmeric
Himachal Pradesh	Onion	Sugarcane, Ginger, Cillies (Dry), Cotton, Turmeric
Jammu & Kashmir	Onion	Winter Potato (Plains), Sugarcane, Ginger, Chillies (Dry), Sesamum
Karnataka	Summer Rice, Gram, Urad (R), Mung (R), Winter Potato (Plains), Summer Potato (Plains), Sugarcane, Onion	Summer Rice, Gram, Urad (K), Mung (K), Ragi, Small Millets (K), Tur (K), other Kharif Pulses, Winter Potato (Plains), Summer Potato (Plains), Sugarcane, Chillies (Dry), Tobacco, Groundnut, Castor seed, Sesamum, Cotton, Mesta, Sweet Potato, Sannhemp, Nigerseed, Kardiseed, Tapioca
Kerala	Summer Rice, Sugarcane, Sesamum (3rd Crop), Sweet Potato (3rd Crop)	Winter Rice, Ragi, Small Millets (R), Tur (R), Other Kharif Pulses, Other Rabi Pulses, Sugarcane, Ginger, Pepper Black, Sesamum (2nd Crop), Sweet Potato (2nd Crop), Turmeric, Tapioca
Madhya Pradesh	Winter Potato (Hills), Sugarcane, Castorseed, Onion	Autumn Rice, Jowar (K), Bajra, Small Millets (K), Tur (K), Mung (R), Other Rabi Pulses, Summer Potato (Plains), Chillies (Dry), Tobacco, Ginger, Sugarcane, Castorseed, Sesamum, Cotton, Jute, Mesta, Sweet Potato, Turmeric, Sannhemp, Nigerseed
Maharashtra	Maize (R), Other Rabi Pulses, Sugarcane, Onion	Winter Rice, Jowar (K), Small Millets (K), Sugarcane, Chillies (Dry), Groundnut, Sesamum, Cotton, Sannhemp, Nigerseed
Manipur		Winter Rice, Sweet Potato

State	Sowing	Harvesting
(1)	(2)	(3)
Orissa	Summer Rice, Bajra (R), Urad (R), Mung (R), Chillies (Dry), Rape & Mustard, Cotton (Late)	Winter Rice, Sugarcane, Chillies (Dry), Groundnut, Castorseed, Cotton (Early), Mesta, Nigerseed
Punjab and Haryana	Wheat, Barley, Winter Potato (Plains), Tobacco, Onion	Summer Potato, Sugarcane, Ginger, Chillies (Dry), Groundnut, Cotton, Sweet Potato, Turmeric, Sannhemp
Rajasthan	Wheat, Barley, Tobacco, (3rd Crop)	Autumn Rice, Jowar (K), Small Millets (K), Tur (K), Urad (K), Mung (K), other Kharif Pulses, Winter Potato (Plains), Sugarcane, Chillies (Dry), Tobacco, Groundnut, Sesamum, Cotton
Tamil Nadu	Winter Rice, Jowar (R), Bajra, Tur (R), other Rabi Pulses (Kulthi), Winter Potato (Hills), Sugarcane, Chillies (Dry), Tobacco, Onion	Autumn Rice, Jowar (K), Bajra, Ragi, Small Millets (K), Gram, Tur (K), Mung (K), Winter Potato (Hills), Sugarcane, Pepper Black, Chillies (Dry), Groundnut, Castor seed, Sesamum, Cotton, Onion, Tapioca
Tripura	Summer Rice, Urad (R), Mung (R), other Rabi Pulses, Winter Potato (Plains), Chillies (Dry), Tobacco	Winter Rice, Sugarcane, Cotton
Uttar Pradesh	Wheat, Winter Potato (Hills), Sugarcane, Tobacco, Onion	Winter Rice, Jowar (K), Tur (K), Winter Potato (Plains), Summer Potato, Sugarcane, Groundnut, Rape & Mustard, Cotton, Sweet Potato, Tapioca
West Bengal	Summer Rice, Wheat, Gram, Urad (R), Mung (R), other Rabi Pulses, Sugarcane, Tobacco, Chillies (Dry)	Winter Rice, Tur (K), Urad (K), Mung (R), other Rabi Pulses, Sugarcane, Ginger, Chillies (Dry), Sesamum, Mesta
Delhi	Tobacco	Sugarcane
Andaman & Nicobar Island		Winter Rice

(K) – Kharif (R) – Rabi

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

Note to Contributors

Articles on the State of Indian Agriculture and allied sectors are accepted for publication in the Directorate of Economics & Statistics, Department of Agriculture, Cooperation & Farmers Welfare's monthly Journal "Agricultural Situation in India". The Journal intends to provide a forum for scholarly work and also to promote technical competence for research in agricultural and allied subjects. Good articles in Hard Copy as well as Soft Copy (agri.situation@gmail.com) in MS Word, not exceeding five thounsand words, may be sent in duplicate, typed in double space on one side of foolscap paper in Times New Roman font size 12, addressed to the Editor, Publication Division, Directorate of Economics and Statistics, M/o Agriculture & Farmers Welfare, C-1, Hutments Dara Shukoh Road, New Delhi-110 011 along with a declaration by the author(s) that the article has neither been published nor submitted for publication elsewhere. The author (s) should furnish their e-mail 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.

Although authors are solely responsible for the factual accuracy and the opinion expressed in their articles, the Editorial Board of the Journal, reserves the right to edit, amend and delete any portion of the article with a view to making it more presentable or to reject any article, if not found suitable. Articles which are not found suitable will not be returned unless accompanied by a self-addressed and stamped envelope. No correspondence will be entertained on the articles rejected by the Editorial Board.

An honorarium of Rs. 2000/- per article of atleast 2000 words for the regular issue and Rs. 2500/- per article of at least 2500 words for the Special/Annual issue is paid by the Directorate of Economics & Statistics to the authors of the articles accepted for the Journal.

Disclaimer: Views expressed in the articles and studies are of the authors only and may not necessarily represent those of Government of India.

We are pleased to inform that our monthly journal Agricultural Situation in India has been accredited by the National Academy of Agricultural Sciences (NAAS) and it has been given a score of 3.15 out of 6. The score is effective from January, 2018 onwards. The score may be seen in the following website:
www.naasindia.org

Soft copy of the journal may be seen in PDF at the following URL :
eands.dacnet.nic.in/publication.htm

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.

ISSN 0002-1679
Regn.No.:840

P. Agri. 21-11-2018
450

Other Publications of the Directorate

Agricultural Statistics at a Glance*

State of Indian Agriculture

Glimpses of Indian Agriculture

Land Use Statistics at a Glance*

Agricultural Prices in India

Agricultural Wages in India

Cost of Cultivation of Principal Crops in India

Farm Harvest Prices of Principal Crops in India

***Copies are available at:**
The Controller of Publications, Civil Lines, Delhi-110054

Jaina Offset Printers: 9873149889, 9811269844