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AGRICULTURAL SITUATION IN INDIA

January, 2017

FARM SECTOR NEWS

GENERAL SURVEY OF AGRICULTURE

ARTICLES

An Analysis of Extent, Distribution and Determinants of Indebtedness among Farmers and Agricultural Labourers in Rural Punjab

Economy of Growing Vegetables and Farm Incomes in Himachal Pradesh

Production Trend and Cost - Profitability Chickpea in Central India: The Dynamic Scenario

AGRO - ECONOMIC RESEARCH

Assessment of Marketable and Marketed Surplus of Major Foodgrains in Andhra Pradesh

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Cover Design By:

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C-1, HUTMENTS, DALHOUSIE ROAD,

NEW DELHI-110 011

PHONE : 23012669

(Email: agri.situation@gmail.com)

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(Email: acop-dep@nic.in)

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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

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

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Abbreviations used

N.A.	—	Not Available.
N.Q.	—	Not Quoted.
N.T.	—	No Transactions.
N.S.	—	No Supply/No Stock.
R.	—	Revised.
M.C.	—	Market Closed.
N.R.	—	Not Reported.
Neg.	—	Negligible.
Kg.	—	Kilogram.
Q.	—	Quintal.
(P)	—	Provisional.
Plus (+) indicates surplus or increase.		
Minus (–) indicates deficit or decrease.		

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, 2017 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

Farm Sector News

Shri Radha Mohan Singh briefed Achievements & Initiatives taken by the Ministry of Agriculture and Farmers Welfare during last 30 months

Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh held a press conference on 29th December, 2016 to brief achievements and initiatives taken by his ministry during the last 30 months.

Following are the main highlights of the activities of the Ministry of Agriculture and Farmers Welfare in the last 30 months :

Pradhan Mantri Fasal Bima Yojana:

About 309 lakh farmers of 23 states had been covered under Fasal Beema during previous Kharif Season 2015 in which 294 lakh farmers were loanee and 15 lakh farmers were non-loanee. During Kharif 2016, however, 366.64 lakh farmers have been covered out of which 264.04 lakh farmers are loanee and 102.60 lakh farmers are non-loanee. Pradhan Mantri Fasal Beema Yojana had been implemented by 21 states during Kharif 2016.

Soil Health Card Scheme:

Against a target of 2.53 crore soil samples collection upto March 2017, 2.33 crore soil samples had been collected till 27.12.2016, from which 12.82 crore soil health cards were being made. Out of these, 4.31 crore soil health cards had been printed and 4.25 crore soil health cards had been distributed to the farmers and remainings are under process.

Paramparagat Krishi Vikas Yojana:

The scheme was started in 2014 to promote organic farming with an allocation of Rs. 597 crore for three years and a target to set up 10,000 clusters. Till December, 2016, State Governments had made 9186 clusters.

National Agriculture Market (NAM):

Under this scheme, 250 mandis of 10 states had been integrated with e-NAM Portal. In principal, approval had been made to integrate 399 mandis with e NAM for which an amount of Rs. 93 crore had been released. As on 27.12.2016, 35,04,371.13 tonnes of agriculture produce worth Rs.7,131.21 crore had been transacted on e-NAM platform. As on 27.12.2016, 9,49,112 Farmers, 59,742 Traders and 31,317 Commission Agents had been registered on the e-NAM platform.

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY):

During 2013-14, an area of 4.3 lakh hectare was covered under micro irrigation. Whereas, during 2014-16, an area of 12.74 lakh hectare had been brought under micro irrigation under Pradhan Mantri Krishi Sinchayee Yojana which is an increase of 200 %. PMKSY scheme is being implemented in mission mode with aim of completing 99 major and medium irrigation projects with the capacity of 76.03 lakh hectare in a phased manner by December, 2019 with command area development with an amount of Rs. 77,595 crore.

Development of Beekeeping:

Honey production had increased from 1,48,450 MT during 2012-14 to 2,63,930 MT during 2014-16 which is an increase of 78 %. An amount of Rs. 7.15 crores released to National Bee Board (NBB) during last two years (2014-15 & 2015-16) in comparison to an amount of Rs. 5.94 crores released during last three years (2011-12 to 2013-14). An amount of Rs. 12.00 crores had been approved for National Bee Board (NBB) for the year 2016-17.

Farmer Producer Organization (FPO):

568 FPOs had been registered during 2014-16 (2 Years) against 223 FPOs which were registered during 2011-14 (3 years) which is an increase of 155 %.

Financing of Joint Liability Groups (JLGS):

Financing of 18.21 lakh Joint Liability Groups was done from 2014 to 2016 during just 2 years as compared to 6.7 lakh JLGs during the 7 years from 2007 to 2014. In comparison to cumulative achievement of Rs. 6630 cr. during 7 years from 2007 to 2014, Rs. 18,005.79 cr. were made available to JLGs during just 2 years from 2014 to September, 2016.

Horticulture:

During the last decade, area under horticulture had increased about 2.7% per year and annual production had increased by 5.5%. In spite of two successive droughts during 2014-15 and 2015-16, the production of horticulture crops had increased.

Coconut Development:

From the beginning of this financial year 2016-17, India has started exporting Coconut Oil to Malaysia, Indonesia

and Sri Lanka from where coconut oil was being imported from these countries in previous years. India became first in coconut production and productivity in the world. Coconut area, production and productivity reached 1.97 million ha, 20.439 billion nuts and 10345 nuts per ha, respectively. A 33% increase was found in replanting and area rejuvenation of Coconut Development Board (CDB) during the year 2014-16 as compared to 2011-14.

State Disaster Relief Fund:

For the years 2010-2015, a provision of Rs. 33580.93 crore was made for State Disaster Response Fund. The same has been increased to Rs. 61,220 crore for the period 2015-2020.

National Disaster Relief Fund:

During 2010-14, States sought an assistance of Rs. 92044 cr. and were granted Rs. 12516 cr. whereas during, 2014-16, States sought an assistance of Rs. 94787 cr. and were granted Rs. 24556 cr.

Neem Coated Urea:

In one year, Modi Government has made available 100% neem coated area in the country. Due to this, diversion of unauthorized use of urea by Chemical Factories has been stopped. Now, farmers are getting urea in adequate quantity. Besides this, the cost of production has been reduced by 10-15% with the use of neem coated urea. Productivity also has increased with the use of Neem Coated Urea.

Coordinated Programme on Horticulture Assessment and Management using Geo-Informatics (Chaman):

The programme has the objective to develop and firm up methodology for estimation of area and production under horticulture crops using Remote Sensing Technology and Sample Survey Methodology launched during September, 2014; is to be completed in 3 years.

Initiation of Mobile App for Farmers:

The Following mobile apps had been launched for the welfare of farmers: Kisan Suvidha, PUSA Agriculture, Agri Market, Crop Insurance and Crop Cutting Experiment (CCE) which can be downloaded from google play store as well as from www.mkisan.gov.in.

National Food Security Mission (NFSM) / Steps Taken For Pulse Production:

- Till 2013-14, only three crops were covered under National Food Security Mission, namely, rice, wheat & pulses. The coverage during the present Government had been increased to seven crops, namely, - rice, wheat, pulses, jute, sugarcane, cotton & coarse cereals.
- Till the year 2013-14, 482 districts of 16 States were included in National Food Security Mission

(NFSM). Now, with the addition of 8 North Eastern States, 3 Hilly States (Jammu & Kashmir, Himachal Pradesh and Uttarakhand), Goa and Kerala, the Mission covers all 638 districts of 29 States in the country.

- In the year 2016-17, demonstrations of new techniques for pulse production are being carried out in 31,000 hectares by 534 Agriculture Science Centers through ICAR & State Agriculture Universities and Rs.25.29 crores were allocated for this purpose.
- Seed Hubs were being created through ICAR, State Agriculture Universities and Krishi Vigyan Kendras (KVKs) for ensuring the availability of new kinds of seeds. For this purpose, Rs. 225.31 crore had been approved for establishment of 150 seed centers during 2016-17 to 2017-18, out of which Rs.131.74 crore was proposed for 2016-17. From these seed centers, 1.50 lakh quintals of improved seeds would be ensured.

Milk Production: In comparison with 2014-16, growth rate between 2012-14 was 11.7%. Annual Milk production had increased by 6.3 % during 2015-16.

New Schemes for Dairy Sector:

a) Pashudhan Sanjivani :

- An animal Wellness Programme; encompassing provision of Animal Health cards (Nakul Swasthya Patraj) along with UID identification of animals in milk and a creation of National Data Base is proposed under this.
- Under the scheme, 8.5 crore animals would be identified using UID and their data would be uploaded in the INAPH data base.

b) Rashtriya Gokul Mission:

With a view to conserve and develop indigenous bovine breeds, Rashtriya Gokul Mission, a new initiative under National Programme for Bovine Breeding and Dairy Development had been launched for the first time in the country, with an allocation of Rs 500 crore. Under the Mission, 14 Gokul Grams were being established, 35 Bull Mother Farms modernized with investment of more funds and 3629 Bulls had been inducted for genetic upgradation.

Attracting students, youth towards agriculture and improving the scientists - farmers interface:

- Attracting and Retaining Youth in Agriculture (ARYA):

The ARYA project would attract and empower the youth in rural areas to take up various Agri-enterprises in Agriculture, allied and service sector for sustainable income and gainful employment.

Presently, the project is running in 25 districts of 25 States through KVKs.

➤ **Farmer first:**

The Farmer FIRST aims at enriching Farmers - Scientist interface, technology assemblage, application and feedback, partnership and institutional building and content mobilization. It would provide a platform to farmers and scientists for creating linkages, capacity building, technology adaptation and application, on-site input management, feedback and institution building. The scientists from 100 ICAR Institutes/ Universities are proposed to work with one lakh farmers directly.

Fish production:

Fish production had increased from 186.12 lakh tonnes during 2012-14 to 209.59 tonnes during 2014-16 (which is an increase of Rs.12.61 %). The Annual growth rate of fish production during 2015-16 was 6.21%.

Egg production:

During the year 2015-16, 82,930 million eggs were produced while during 2014-15, 78,484 million eggs were produced. Egg production is now increasing by 5.66% annually. In comparison to 2012-14, during 2014-16, egg production growth rate was 10.99 %. Annual egg production rate was 5 %. Per person availability of egg had reached 66.

E-pashudhan haat portal:

- At present, there is no authentic market for bovine germplasm in the form of semen, embryos, male & female calves; heifers and adult bovines. Farmers depend on middlemen for sale and purchase of quality germplasm.
- Breed wise information on availability of bovine germplasm is not available which is essential for promotion of indigenous bovine breeds.
- For the first time in the country under National Mission on Bovine Productivity, E Pashudhan Haat portal has been developed. This portal would play important role in connecting breeders and farmers of indigenous breeds.
- Through this portal, farmers would be aware about breed wise information on indigenous breeds. Farmers/breeders can sale animals of indigenous breeds through this portal. Information on all forms of germplasm has been uploaded on the portal. Immediately, farmers can obtain benefits of the portal.

No adverse effect of Demonetization drive: Shri Radha Mohan Singh

Union Minister of Agriculture and Farmers Welfare Shri Radha Mohan Singh said that there is no adverse effect of

demonetization and stated the examples of followings:

Milk Sale

Shri Singh said that if we would study the data of sale of milk, we would find that there was no adverse effect of demonetization on this rather, it had increased.

(a) AMUL: Before demonetization, the average sale of milk per day was Rs. 64.55 crore. After demonetization it had increased to Rs. 74.25 crore per day during November-December, 2016.

(b) MOTHER DAIRY: Similarly, before demonetization, the average sale of Mother Dairy milk was 28.06 lakh litre, the average cost was Rs. 11.42 crore. After demonetization it had increased to 29.61 lakh litre per day. in November-December.

(c) DELHI MILK SCHEME: Under Delhi Milk Scheme, average sale was 2.70 lakh litre per day and average cost was Rs. 1.05 crore per day. After demonetization, it had increased to 2.76 lakh litre in November-December, the average cost had become Rs. 1.07 crore per day.

SEED

Shri Singh informed that if we compare the data of 2016 with the data of sale of seed of Rabi 2015, we would find that in most of the states, either the data had increased or remained more or less equal. For example, Madhya Pradesh State Seed Corporation sold 10.42 lakh quintal of seeds for sowing of Rabi 2015, This had increased to 11.93 lakh quintal this year. Similarly, Maharashtra State Seed Corporation sold 2.64 lakh quintal seeds during last year, this year it was 2.7 lakh quintals. Karnataka State Seed Corporation sold 1.36 lakh quintal seeds during previous year, this year it was 1.49 lakh quintals.

He also added that if a study would have been conducted on the data of National Seed Corporation we would find that till 23rd December, 2015 5.51 lakh quintal seeds was sold by it. There is a slight decrease; it is 5.20 quintal this year. Similarly, in Telangana State the sale of seed was 1.55 lakh quintals in Rabi 2015 and there is a slight decrease in it and it is 1.48 lakh quintals. In Uttarakhand also there is a slight decrease in it. It was 3.8 thousand quintal. In the year, 2016 it is 3.7 thousand quintal.

NAFED

Shri Singh further said that similarly, it is clear from the study of data of NAFED before demonetization on 8th November 2016, the average sale of NAFED was Rs. 2 lakh per day which had increased 1 and half times after demonetization and it had become Rs. 3.70 lakh per day. The main reason of this was the continuation of circulation of old Rs. 500 and 1000 notes on the cooperative shops. In December 2016 this income had stabilized at Rs. 2.31 lakh per day which is more than the data of sale before demonetization.

To Keep Soil Healthy, the Government is Putting Every Possible Effort: Shri Radha Mohan Singh

Union Minister of the Agriculture & Farmers Welfare, Shri Radha Mohan Singh had said that the farmers owe their income to the yield in the field, therefore, to keep their soil healthy, the government is doing every possible effort. He stated this in the programme on World Soil Day in College of Engineering, Binda, Roorkee (Uttarakhand), held on 5th December, 2016.

The Minister said that Soil Health Card scheme was initiated in 2015 to increase the knowhow about soil and soil management and to reduce the gaps that existed between the scientist/extension personnel as well as farmers. This programme is being operationalised to facilitate the scientific information based on the requirements of the farmers. Shri Singh further said that government aims to issue Soil Health Cards based on soil testing to all of 14 crore farmers on the cycle of two years.

Shri Singh also added that the soil of the field is the pivotal source of agricultural products. Soil provides nutritional elements as well as water to the plants. 95% of food sources are obtained from the soil. We cannot produce healthy food grains without the help of healthy soil. Soil not only produces food grains but also ensieves rain pour water, stores carbon. Millions and millions micro virus are comprised within a handful of soil. It is very necessary to maintain the potentiality of soil for the storage of the carbon and to combat the effects created by climate change.

Shri Singh further stated that the awareness campaigns had been conducted across the country so as to make the farmers aware about the importance of soil health on the occasion of World Soil Day.

The worthwhile pieces of advice meant for the farmers on world soil day are as follow:-

- A number of devices would be included in soil health management so as to maintain the fertility of the soil as per the instructions issued by Ministry of Agriculture & Farmers Welfare.
- Soil Health Card promotes the balanced and rationalized use of nutrition on the farm.
- The micro nutritional elements with first and secondary basis keeping in view the soil testing may be used.
- The consumption of chemical fertilizers would be reduced by motivating integrated nutrition management.
- Adopt compost, manure, rural compost, urban compost, green manure in the particular sector of farming under integrated nutrition management.
- Reduce the cost of farming by using different types of bio fertilizers.

- Arrange bio carbon in the soil.
- Assimilate residuals while ploughing the fields to have improvements in soil fertility.
- Get your soil card made, utilize that and enhance your income.

Price Policy for Rabi Crops for 2016-17 Season-Fixation of Minimum Support Price (MSP) of Toria at Rs 3560 per quintal for 2016-17 season to be marketed in 2017-18.

The Minimum Support Price (MSP) of Toria of Fair Average Quality (FAQ) for 2016-17 season to be marketed in 2017-18 has been fixed at Rs. 3560 per quintal. As per the decision of the Cabinet Committee on Economic Affairs (CCEA) regarding the Price Policy for Rabi Crops of 2016-17 season to be marketed in 2017-18, the MSP of Toria has been fixed on the basis of the normal market price differentials between Toria and Rapeseed/Mustard. The decision was taken by Agriculture & Farmers Welfare Ministry on 5th December, 2016.

FCI would continue to be the designated Central Nodal Agency for procurement of pulses and oilseeds. To supplement the efforts of FCI, the National Agriculture Cooperative Marketing Federation of India Limited (NAFED), National Cooperative Consumer Federation (NCCF), Central Warehousing Cooperation (CWC) and Small Farmers Agri-Business Consortium (SFAC) may also undertake procurement of oilseeds and pulses as per their capacity. The losses, if any, incurred by the Nodal agencies in such operations may be fully reimbursed by the Government.

PMFBY has provided Coverage to 366.64 lakh Farmers (26.50%) and at this rate it is likely to exceed the Target of 30% Coverage for both Kharif and Rabi seasons in 2016-17

The Pradhan Mantri Fasal Bima Yojana (PMFBY) launched in the country from Kharif 2016 had made impressive progress in the first season itself. As on date, the scheme had provided coverage to 366.64 lakh farmers (26.50%) and at this rate it is likely to exceed the target of 30% coverage for both Kharif and Rabi seasons in 2016-17.

In terms of total area covered, the achievement had been significant amounting to a total area of 388.62 lakh ha. and sum insured of Rs. 141339 crore. The Pradhan Mantri Fasal Bima Yojana was recast as a new scheme by the Government as the earlier existing insurance schemes were not meeting the full requirements of the farmers for insurance coverage.

The performance this season had improved by 18.50% in terms of farmers coverage, 15% in terms of area coverage and 104% in terms of sum insured in comparison to Kharif 2015, which happened to be one of

the worst drought affected seasons when the number of farmers covered was 309 lakh (22.33%), total area coverage was 339 lakh ha. and sum insured was Rs. 69307 crore. The performance in Kharif 2016 was better despite the fact that there were teething issues to begin with. For instance, many States did the bidding process for selection of the insurance companies for concerned clusters for the first time and consequently, the notification of the scheme was delayed in a number of States.

Organic farming on the Banks of Ganga River

A Memorandum of Understanding had been signed between Ministry of Water Resources, River Development and Ganga Rejuvenation and Ministry of Agriculture and Farmers Welfares to promote organic clusters on the banks of Ganga in 5 Ganga basin States, namely, Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal. It is proposed to cover 136 gram panchayats/villages under the programme.

The Paramparagat Krishi Vikas Yojana (PKVY) programme components would be converged with Namami Ganga programme to implement the organic cluster in these Ganga basin States. A financial assistance of 14.95 lakhs for 3 years would be provided per cluster towards organic farming practices and Participatory Guarantee System (PGS) of Certification. The components for which funding is made available is detailed below:

- i) Mobilization, PGS certification and training of farmers
- ii) Quality control: soil sample analysis, process documentation, inspection of fields of cluster members, residue analysis, PGS certification charges
- iii) Conversion practices: transition from current practices to organic farming, which includes procurement of organic inputs, organic seeds and traditional organic input production units and biological nitrogen harvest planting etc.
- iv) Integrated manure management: procurement of Liquid Bio fertilizer consortia/Bio pesticides, Neem cake, Phosphate Rich Organic Manure and Vermicompost.
- v) Custom hiring: to hire agricultural implements as per Sub Mission of Agricultural Mechanisation (SMAM) guidelines.
- vi) Labeling and Packaging Assistance.
- vii) Transport assistance and marketing through organic fairs.

Agriculture Scientists should develop techniques adaptable to the needs of marginal farmers: Shri Radha Mohan Singh

The Union Agriculture & Farmers Welfare Minister, Shri Radha Mohan Singh appealed to the agriculture scientists that they should develop techniques adaptable to the needs of huge number of marginal farmers in the country. He stated this on the occasion of completion of centenary year of IRAR- Central Plantation Crops Research Institute (CPCRI) situated at Kasargod in Kerala. Shri Singh also inaugurated the 'Kisan Mela' here and participated in an international seminar on research and development of coconut & plantation crops.

Speaking on the occasion, Shri Singh said that agricultural holdings in Kerala are 0.22 hectare against the national average of 1.15 hectare. Therefore, it is necessary to adopt unified agriculture system as well as low volume - high value crops so as to make agriculture a profit making sector. Agriculture Minister further said that by adopting multi dimensional crops cycle system, with the inclusion of coconut along with black pepper, banana, pineapple, ginger, turmeric, jaifal and jimicand, the farmers of the state would be benefited. The Minister said that CPCRI has given the nation greater development pace by developing innovative technique related to plantation crops during span of 100 years.

Shri Singh added that India is among the world's leading coconut producer nations. Kerala has a significant contribution in this. During 2014-15, 32 percent land area of Kerala in the year 2014-15 and 24 percent of production had been recorded in the country. In the year 2015-16, coconut products worth 1450 cr. rupees had been exported, according to Coconut Development Board figures.

Shri Singh further informed that the Ministry of Agriculture has initiated a number of schemes for the welfare of the farmers. Under Pradhan Mantri Krishi Sinchae Yojana (PMKSY), irrigation schemes have been launched in Karpujha and Mowatupujha in Kerala which were to be completed by March 2018. Under Soil Health Card Scheme, a target of 7,05,420 Soil Health Cards had been fixed for distribution in Kerala. However, only 1,32,828 Soil Health Cards have been distributed in Kerala as yet. Under Paramparagat Krishi Vikas Yojana (PKVY), 119 cluster as a whole were in place for which a sum of Rs. 382.22 lakh had been released. However, the utilization certificates are awaited from state government in this regard. Pradhan Mantri Fasal Yojana (PMFBY) is a revolutionary insurance scheme for the farmers. But this scheme has not been implemented in Kerala till now. More than 250 Mandis had been linked nationwide with National Agriculture Market (e- NAM) by 6th September, 2016 and a target had been laid down to link 585 mandis by March, 2018. But e - NAM Scheme has not been launched

in Kerala. The Minister appealed to the state government to implement different central agricultural schemes for the welfare of the farmers.

Cabinet approves Signing of an Agreement between India and Kyrgyzstan on Cooperation in the field of Agriculture and Food related Industry

The Union Cabinet, chaired by the Hon'ble Prime Minister, Shri Narendra Modi approved the proposal of the Ministry of Agriculture and Farmers Welfare for Signing of an agreement between India and Kyrgyzstan on cooperation in the field of agriculture and food related industry.

The proposed agreement between India and Kyrgyzstan covers various activities in the field of agriculture and allied sector but also includes areas such as exchange of information and experience in the field of research; animal breeding, Avian Influenza and Food & Mouth Disease (FMD); veterinary medicine; plant growing, production of seeds based on modern technology, certification of seed; introduction of different types of irrigation, & establishing Indian Pilot Project; information technology on efficient use of food processing and packaging technology.

Apart from exchange of information, the MOU also provided for cooperation in the field of protection of plant variety rights; agricultural, food trade and horticulture; agricultural research & education, horticultural research & education and food safety and standards; aquaculture and fisheries, etc.

The Agreement provides for constitution of a Joint Working Group comprising of representatives from both countries which shall prepare plans of cooperation, provide solutions to the problems arising during the implementation of this Agreement and implementation of tasks determined by the Parties.

The Agreement shall enter into force on the date of its signing and shall remain in force for a period of five years and would be automatically extended for a subsequent period of five years unless either Party gives written notice through diplomatic channels to the other Party of its intention to terminate the Agreement at least six months before its expiration.

Change in Environment is the Key Factor for Emergence of New Races of Pathogen, Minor Diseases of Insect-Pests become Major Biotic Stresses: Shri Radha Mohan Singh

The Union Agriculture & Farmers Welfare Minister, Shri Radha Mohan Singh chaired the In- Session meeting of the Consultative Committee of the Ministry of Agriculture & Farmers Welfare on "Emerging biotic stresses as a

challenge under changing climate" in New Delhi. The Minister in his opening remarks said that the biotic stress refers to diseases, insect - pests and weeds which affect adversely the normal growth of living organisms (plant, animals, and human beings). Shri Singh informed that biotic stress requires conducive interaction among the host, pest and environment. Such stresses can cause losses even up to 100 % in the year of epidemic and the most infamous example was epidemic of brown spot of rice in 1943 (*Helminthosporium oryzae*), causing the Great Bengal Famine, in States of West Bengal, Bihar and Odisha. The historic devastation caused death due to starvation of about four million people. Pests and pathogens evolve continuously and rate of evolution speeds up if environment becomes congenial. Thus, change in environment is the key factor for emergence of new races of pathogen; minor diseases of insect-pests become major biotic stresses. Elevated CO₂, a greenhouse gas responsible for climate change, can increase levels of simple sugars in leaves and lower their nitrogen content. These can increase the damage caused by many insects, who would consume more leaves to meet their metabolic requirements of nitrogen. Thus, any attack would be more severe. Higher temperatures from global warming, mainly due to elevated CO₂, would mean that more numbers of pests will survive the winter season.

Shri Singh suggested the following immediate areas/ strategies to strengthen agricultural biosecurity and to ensure efficient management of biotic stresses:

- (a) Development of Biotic stress resilient crops/ breeds of animals using indigenous as well as wild resources.
- (b) Enhanced use of cutting edge technologies and tools like MAS, transgenic and advanced molecular tools to accelerate the process of development of biotic stress resilient organisms.
- (c) Strengthening of domestic and International quarantines to prevent movement of infected products to pest free areas/ countries.
- (d) Organizing IPM approaches and strengthening effective system of delivery of biocontrol agents and label expansion of effective pesticides.
- (e) Forging regional and global cooperation on issues related to biosafety and biosecurity.
- (f) Global networking for ensuring availability of diagnostic tools/ vaccines to monitor invasion and spread of invasive pests pathogens and immunization.

Government decides to provide the additional grace period of 60 days to Farmers, whose Crop loan dues fall due between 1st November, 2016 and 31st December, 2016

Following the recent demonetization drive of Specified Bank Notes (SBNs), the Government is seized of the constraints faced by the farming community in repayment of loan dues within the prescribed time limit. Appreciating the requirement for some more time by the farmers to repay their loan dues, the Government had on the lines of RBI circular dated 21st November, 2016 decided to provide an additional grace period of 60 days to such farmers, whose crop loan dues fall due between 1st November, 2016 and 31st December, 2016 and if such farmers repay the same within 60 days with effect from the date on which the repayment was due, they would be eligible for prompt repayment incentive for 2016-17.

With a view to provide stimulation to the rural sector and farming community, the Government provides crop loans at subvented rates of interest @ 7 % per annum at the ground level. An added incentive of 3 % per annum is provided to the farmers for prompt repayment of loans within due date and upto a maximum period of one year. The prompt payee farmers in effect avail short term crop loans @ 4 % per annum. This prompt repayment incentive however does not accrue to those farmers who repay after one year of availing such loans.

Necessary to Promote Hybrid Seeds of improved Varieties for the Areas of varied Agriculture Climate so as to cope with Global Climate change: said by Shri Radha Mohan Singh.

The Union Minister for Agriculture & Farmers Welfare, Shri Radha Mohan Singh has said that it is imperative to develop hybrid seeds of improved variety for the areas of varied agricultural climate so as to sort out the problems emerging due to global climate change. Shri Radha Mohan Singh further said that it is also very necessary to work out the issues of bio and non-bio adverse effects along with improvement in productivity. He stated it in a function organized for Plant Genome Saviour Awards at PUSA. The Minister extended his hearty congratulations to the five award winner groups for Genome Protection in the function organized on above said subjects. The names of the Plant Genome Savior Community Awards 2013-14 are as follows:

- (1) Farming community of Village Sagam and Danwathpora, Dist-Anantnag, J & K,
- (2) Chengalikodan Banana Growers Association, Erumapetty, Thrissur, Kerala
- (3) Sagar Krishnanagar Swami Vivekananda Youth Cultural Society, South 24 Parganas, West Bengal,

- (4) Kholra / Canacona Chilli Cultivators Groups, Kholra, Shirothi, South Goa
- (5) Karen Welfare Association, Webi, Mayabunder, Middle Andaman, A& N Islands

Shri Singh congratulated 3 farmers selected for Plant Genome Saviour Farmer Rewards 2014 and another 11 farmers selected for Plant Genome Saviour Farmer Recognition 2014 from the various parts of the country. He said that these farmers have contributed greatly to maintain resources concerned with plant breeding and as well as to conserve them. The Minister added that Protection of Plant Varieties & Farmers' Rights Act (PPV&FRA) 2001 had been enforced to promote the new species of plants, for the preservation of plants as well as Rights of the farmers. Protection of Plant Varieties & Farmers' Rights Authority had been constituted so as to implement this constitution in November, 2005.

Government Agencies would Ascertain Support Price of Farmers' Products Wherever Market Price of Pulses would go down below the Support Price: Shri Radha Mohan Singh

Union Agriculture Minister, Shri Radha Mohan Singh said that for the first time, Government has made provision to ascertain the sale of pulses on support price for the farmers. Under this provision, wherever the market price of the pulses falls below the support price, the Government of India ascertains support price for the farmers. Apart from this, the Government also decided to maintain a buffer stock of pulses to the extent of 20 lakh tonne so that people could be provided pulses at reasonable prices when market prices escalate. Shri Singh briefed this on the closing ceremony of International Pulses Year, 2016 in Agra on 22 December, 2016. The General Assembly of United Nations had decided to celebrate the year 2016 as International Pulses Year to make the common people aware of the nutritional properties in pulses.

Shri Radha Mohan Singh informed that the Government has increased minimum support price of the pulses to promote the cultivation and production of pulses. The Government of India had declared minimum support price for Arhar at Rs.4625/-, for black gram at Rs.4575/- and for Moong at Rs.4500/- which is the maximum support price till now. The Government had also declared additional bonus for Rs.25/- per quintal for pulses along with minimum support price.

Agriculture Minister said that the Government of India had taken a number of measures for International Pulses Year, 2016 to increase the production and productivity of pulse crops in the country. For this purpose, the two Departments of Agriculture and Farmers Welfare and Indian Council of Agriculture Research and Agriculture have implemented an extensive course of action jointly under National Food Security Mission

Project. Under this scheme, Government of India has laid down a target of 200 lakh tonne production for the year 2016-17, 210 lakh tonne for year 2017-18 and 240 lakh tonne for year 2020-21. Shri Singh added that additional "breeder seed" production programmes have been launched with the cost of Rs.20.39 crores at Regional Centres of 10 Agricultural Universities with Indian Pulses Research Institute, Kanpur. A target of 5801 quintal additional breeder seed production has been fixed in addition to 7561 quintal breeder seed being produced presently by the Centres by 2018-19 apart from 3717 quintal additional breeder seed by 2016-17 by these Centres. Shri Singh said that these steps have been taken to strengthen the formal seed mechanism of pulse crops and to increase availability of seeds of improved varieties in the country.

Government directs GCMMF/Amul to ensure 100% Milk Producer's Accounts to be opened by 30th December, 2016.

Consequent upon the Governments decisions of demonetization, certain unintended impacts had been observed especially in the sectors thriving upon sheer cash transactions. In this regards, non-availability of funds to the co-operative banks for making payments to Milk producers/farmers by dairy co-operative against the milk supplied by then came to the notice of the government. GCMMF/Amul had been specifically directed to ensure 100% milk producers accounts to be opened by 30th December, 2016. Similarly, other co-operatives have been directed to ensure the opening of 100% accounts of milk producers/farmers by 30th January, 2017.

Specific instructions had been issued to all the agencies such as National Dairy Development Board, Mother Dairy, Delhi Milk Scheme and all state Dairy co-operative federations for ensuring direct payment to milk producers' bank account at the earliest. Low penetration of nationalized banks and co-operative bank accounts in rural areas need adequate financial support with appropriate safe guards.

It is to be noted that there are 1.70 lakh Dairy Co-operative Societies (DCS) at village level having 1.6 crore milk producers affiliated with 218 milk unions. About 850 lakh litres per day Milk is procured including from private dairies. However, the value of milk procured from DCS is to the tune of rupees 120 crore per day. For weekly and 10 days payment cycle the substantive amount is to be disbursed to lakhs of milk producers spread over varied geographical areas.

Using the window of opportunity opened by the demonetization decision, it is high time to accelerate the opening of bank accounts of all those unbanked milk producers to make it cashless and digital sooner than later. Eventually, transparency saving habits, financial enclosure etc. would be benefiting milk producer in multiple ways.

Rabi Crops Sowing Crossed 582 Lakh Hectare

As per the preliminary reports received from the states, the total area sown under rabi crops as on 30th December, 2016 stands at 582.87 lakh hectares, as compared to 545.46 lakh hectare this time during 2015.

Wheat had been sown/transplanted in 292.39 lakh hectares, rice in 10.68 lakh hectares, pulses in 148.11 lakh hectares, coarse cereals in 52.21 lakh hectares and area sown under oilseeds is 79.48 lakh hectares.

The area sown so far and that sown during last year this time is as follows:

(In lakh hectare)		
Crop	Area sown in 2016-17	Area sown in 2015-16
Wheat	292.39	271.46
Rice	10.68	14.77
Pulses	148.11	131.12
Coarse Cereals	52.21	56.29
Oilseeds	79.48	71.83
Total	582.87	545.46

General Survey of Agriculture

Trends in foodgrain prices

During the month of November, 2016 the All India Index Number of Wholesale Price (2004-05=100) of foodgrains increased by 2.33 percent from 283.6 in October, 2016 to 290.2 in November, 2016.

The Wholesale Price Index (WPI) Number of cereals increased by 1.60 percent from 249.5 to 253.5 and WPI of pulses increased by 4.21 percent from 444.1 to 462.8 during the same period.

The Wholesale Price Index Number of wheat increased by 5.20 percent from 232.9 to 245.0 while that of rice decreased by 0.28 percent from 249.5 to 248.8 during the same period.

Weather, Rainfall and Reservoir Situation during December, 2016

Rainfall Situation

Cumulative Post-Monsoon Season rainfall for the country as a whole during the period 01st October to 28th December, 2016 has been 45% 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 72% in North-West India, 60% in South Peninsula, 27% in East & North East India and 14% in Central India.

Out of total 36 meteorological sub-divisions, 03 sub-divisions received large excess rainfall, 07 sub-divisions received excess/normal rainfall, 13 sub-divisions received deficient rainfall and 13 sub-divisions received large deficient rainfall.

Water Storage in Major Reservoirs

Central Water Commission monitors 91 major reservoirs in the country which have total live capacity of 157.80 Billion Cubic Metre (BCM) at Full Reservoir Level (FRL). Current live storage in these reservoirs (as on 29th December, 2016) is 92.59 BCM as against 73.32 BCM on 29.12.2015 (last year) and 94.58 BCM of normal storage (average storage of last 10 years). Current year's storage is higher than the last year's storage by 26% but lower than normal storage by 2%.

Sowing Position during Rabi 2016

As per latest information available on sowing of crops, around 93% of the normal area under rabi crops has been

sown upto 30.12.2016. Total area sown under rabi crops in the country has been reported to be 582.87 lakh hectares as compared to 545.46 lakh hectares during the same period of last year. This year's area coverage so far is higher by 37.4 lakh ha. than the area coverage during the corresponding period of last year and 15.7 lakh ha. than the normal as on date.

1. Economic Growth

- As per the estimates of Gross Domestic Product (GDP) for the first quarter (April-June) 2016-17, released by the Central Statistics Office (CSO), the growth rate of GDP in Q1 of 2016-17 was 7.1 per cent as compared to the growth 7.5 per cent in Q1 of 2015-16 and 7.9 per cent in Q4 of 2015-16.
- The growth in gross value added (GVA) at constant (2011-12) basic prices in Q1 of 2016-17 was 7.3 per cent, as compared to the growth rate of 7.2 per cent in Q1 of 2015-16. At the sectoral level, agriculture, industry and services sectors grew at the rate of 1.8 per cent, 6.0 per cent and 9.6 per cent in 2014-15 (Table1).
- In May 2016, CSO had estimated the growth rate of Gross Domestic Product (GDP) at constant (2011-12 prices for the year 2015-16 is estimated at 7.6 per cent as compared to the growth of 7.2 per cent in 2014-15 (Table1).
- The share of total final consumption in GDP at current prices in 2015-16 is estimated at 70.1 per cent as compared to 68.5 per cent in 2014-15 to 29.3 per cent in 2015-16.
- The saving rate (ratio of gross saving to GDP) for the year 2014-15 and 2013-14 was 33.0 per cent as compared to 33.8 per cent in 2012-13. the investment rate (gross capital formation to GDP) in 2014-15 was 34.2 per cent, as compared to 34.7 per cent and 38.6 per cent respectively in 2013-14 and 2012-13.

2. Agriculture and Food Management

- **Rainfall:** The country received 797.8 mm of rainfall during the South-West monsoon season (1st June- 20th September, 2016) which was 5 per cent below normal. Out of the total 36 meteorological sub divisions, 3 sub divisions

received excess season rainfall, 25 sub divisions received normal season rainfall and the remaining 8 sub division deficient/scanty/no season rainfall.

- **All India production of foodgrains:** As per the 1st Advance Estimates of production of major Kharif crops for 2016-17, the production of kharif foodgrains is estimated to be 135.0 million tonnes for the kharif seasons as compared to 124.0 million tonnes for the kharif season of 2015-16 (Table 3).
- **Procurement:** Procurement of rice as on 9th September 2016 was 34.2 million tonnes during Kharif Marketing Season 2015-16 (KMS is under progress) whereas procurement of wheat as on 30th June 2016 was 22.9 million tonnes during Rabi marketing Season 2016-17 (Table 4).
- **Off-take:** Off-take of rice during the month of April 2016 was 24.2 lakh tonnes. this comprises 22.8 lakh tonnes under TPDS/NFSA (offtake against the allocation for the month of May, 2016) and 1.5 lakh tonnes under other schemes. In respect of wheat, the total off-take was 21.15 lakh tonnes comprising 19.4 lakh tonnes under TPDS/NFSA (offtake against the allocation for the month of May 2016) and 1.8 lakh tonnes under other schemes. Cumulative off-take of food grains during 2016-17 (till April 2016) is 8.5 million tonnes (Table 5).
- **Stocks:** As on September 1, 2016 stocks of foodgrains (rice and wheat) held by FCI were 42.9 million tonnes, as compared to 51.8 million tonnes, as compared to 51.8 million tonnes as on September 1, 2015 (Table 6).

TABLE 1: GROWTH OF GVA AT BASIC PRICES BY ECONOMIC ACTIVITY (AT 2011-12 PRICES) (IN PER CENT)

Sector	Growth			Share in GVA		
	2013-14	2014-15 (1st RE)	2015-16 (PE)	2013-14	2014-15 (1st RE)	2015-16 (PE)
Agriculture, forestry & fishing	4.2	-0.2	1.2	17.5	16.3	15.4
Industry	5.0	5.9	7.4	31.6	31.2	31.3
Mining & quarrying	3.0	10.8	7.4	2.9	3.0	3.1
Manufacturing	5.6	5.5	9.3	17.4	17.1	17.5
Electricity, gas, water supply & other utility services	4.7	8.0	6.6	2.2	2.2	2.2
Construction	4.6	4.4	3.9	9.0	8.8	8.5
Services	7.8	10.3	8.9	51.0	52.5	53.4
Trade, hotels, transport, communication and broadcasting services	7.8	9.8	9.0	18.4	18.9	19.2
Financial, real estate & professional services	10.1	10.6	10.3	20.3	21.0	21.6
Public administration, defence and other Services	4.5	10.7	6.6	12.3	12.7	12.6
GVA at basic prices	6.3	7.1	7.2	100.0	100.0	100.0
GDP at market prices	6.6	7.2	7.6	—	—	—

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

TABLE 2: QUARTER-WISE GROWTH OF GVA AT CONSTANT (2011-12) BASIC PRICES (PER CENT)

Sectors	2014-15				2015-16				2016-17
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Agriculture, forestry & fishing	2.3	2.8	-2.4	-1.7	2.6	2.0	-1.0	2.3	1.8
Industry	8.0	5.9	3.8	5.7	6.7	6.3	8.6	7.9	6.0
Mining & quarrying	16.5	7.0	9.1	10.1	8.5	5.0	7.1	8.6	-0.4
Manufacturing	7.9	5.8	1.7	6.6	7.3	9.2	11.5	9.3	9.1
Electricity, gas, water supply	10.2	8.8	8.8	4.4	4.0	7.5	5.6	9.3	9.4

TABLE 2: QUARTER-WISE GROWTH OF GVA AT CONSTANT (2011-12) BASIC PRICES (PER CENT)—CONTD.

Sector	2014-15				2015-16				2016-17
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
& other utility services									
Construction	5.0	5.3	4.9	2.6	5.6	0.8	4.6	4.5	1.5
services	8.6	10.7	12.9	9.3	8.8	9.0	9.1	8.7	9.6
Trade, hotels, transport, communication and services related to broadcasting	11.6	8.4	6.2	13.1	10.0	6.7	9.2	9.9	8.1
Financial, real estate & professional services	8.5	12.7	12.1	9.0	9.3	11.9	10.5	9.1	9.4
Public administration, defence and other Services	4.2	10.3	25.3	4.1	5.9	6.9	7.2	6.4	12.3
GVA at basic prices	7.4	8.1	6.7	6.2	7.2	7.3	6.9	7.4	7.3
GDP at market prices	7.5	8.3	6.6	6.7	7.5	7.6	7.2	7.9	7.1

Source: Central Statistics Office (CSO).

TABLE 3: PRODUCTION ON MAJOR AGRICULTURAL CROPS (1ST ADV. EST.)

Crops	Production (in Million Tonnes)				
	2012-13	2013-14	2014-15	2015-16 (4 th AE)	2016-17 (1 st AE)
Total Foodgrains	257.1	265.0	252.0	252.2	135.0
Rice	105.2	106.7	105.5	104.3	93.9
Wheat	93.5	95.9	86.5	93.5	—
Total Coarse Cereals	40.0	43.3	42.9	37.9	32.5
Total Pulses	18.3	19.3	17.2	16.5	8.7
Total Oilseeds	30.9	32.8	27.5	25.3	23.4
Sugarcane	341.2	352.1	362.3	352.2	305.2
Cotton#	34.2	35.9	34.8	30.1	32.1

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

TABLE 4: PROCUREMENT OF CROPS IN MILLION TONNES

Crops	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Rice#	35.0	34.0	31.8	32.0	34.2 [^]	-
Wheat@	28.3	38.2	25.1	28.0	28.1	22.9 ^β
Total	63.3	72.2	56.9	60.2	62.3	-

Source: DFPD, M/o Consumer Affairs and Public Distribution; # Kharif Marketing Season (October-September), @ Rabi Marketing Season (April-March), [^]Position as on 09.09.2016. ^βPosition as on 30.06.2016.

TABLE 5: OFF-TAKE OF FOODGRAINS (MILLION TONNES)

Crops	2012-13	2013-14	2014-15	2015-16	2016-17 (Till April)
Rice	32.6	29.2	30.7	31.8	4.6
Wheat	33.2	30.6	25.2	31.8	3.9
Total (Rice & Wheat)	65.8	59.8	55.9	63.6	8.5

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

TABLE 6: STOCKS OF FOODGRAINS (MILLION TONNES)

Crops	September 1, 2015	September 1, 2016
1. Rice	13.9	16.5
2. Unmilled Paddy#	3.6	3.2
3. Converted Unmilled Paddy in terms of Rice	2.4	2.2
4. Wheat	35.5	24.2
Total (Rice & Wheat)(1+3+4)	51.8	42.9

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

ARTICLES

An Analysis of Extent, Distribution and Determinants of Indebtedness among Farmers and Agricultural Labourers in Rural Punjab

*GIAN SINGH, *ANUPAMA, **GURINDER KAUR, *RUPINDER KAUR, ***SUKHVIR KAUR

Abstract

Punjab's agriculture sector has been experiencing prosperity as well as various challenges since the very inception of the Green Revolution during the mid 60s. It has been noticed that the large farmers were primarily able to get maximum benefit of this revolution. The scenario of the small and landless farmers has been critical and needs to be examined against the back-drop of some serious challenges, such as fragile agricultural credit system, volatile agricultural income, rising input prices, competition from global market etc. In this background, the present study intends to investigate the extent, distribution and determinants of indebtedness of Punjab's farmers and agricultural labourers. For this purpose, household level data is collected through a primary survey conducted in three districts of Punjab. A log-linear regression model is applied to assess the impact of various environmental variables on indebtedness. The study investigates the determinants of indebtedness in two dimensions, viz. category-wise and region-wise. In the policy front, the paper recommends that to improve firm-size, policymakers should revisit the land reform policy in the state which would ultimately help to increase marginal and small farmers' income. Moreover, the farmers and agricultural labourers should get free and quality education in order to reduce their indebtedness as the study found a negative association between education level and indebtedness.

Keywords: Punjab, Indebtedness, Green revolution, Agricultural income, Marginal and small farmers, Agricultural labourers, Log-linear regression, Household survey, Farm size.

Introduction

The increasing commercialization of agriculture, the subscription to the dominant Green Revolution model, the range of risks, and the knowledge dissonance indicate the impact of the Green Revolution for marginal areas and marginalized agriculturists. Increasing indebtedness, lack

of marketing support, unviable parcels of land and the inability to provide basic support to cater to the family's requirements mark the lives of those attempting to sustain themselves within this dominant model. This is specially so for those who have inadequate capital, knowledge, and social support and who consider this to be the only route to enhance their livelihoods, economic mobility and social status (Vasavi, 2009).

During the mid 1960s, the face of agriculture received a new look with the dawn of the Green Revolution era. Punjab was one of the pioneer states for incorporating the modern methods of farming (Sharma et al., 2015). The adoption of New Agricultural Technology pushed up the capital requirement of the farm sector manifold as the different components of New Agricultural Technology involve increasing reliance on non-conventional inputs (Kaur and Singh, 2009). Since most of the inputs used by farmers are now purchased from market, the farmers have to spend huge amount of cash on purchasing market supplied farm inputs to carry out their production operations (Kaur, 2011). Inadequate and poor access to institutional credit forces farmers to depend upon the informal credit market to meet the costs of agricultural production (Kaur and Singh, 2014). Borrower have to obtain credit on the basis of an interlocked market transaction. This means that the extension of credit will be linked by the lenders to the conditions governing them receipt from the borrower of other commodities, either the labour power or the product of labour at predetermined lower prices, fixed by the lenders. This results in substantial income loss to the small and marginal farmers (Sahu et al., 2004).

A large majority of the farm household had an income deficit vis-à-vis their consumption expenditure speaks volumes about the situation on the ground. Spiraling input prices on the one hand and highly volatile output prices, influenced by international trends rather than domestic output, on the other has caused this squeeze in farm incomes. Output prices no longer cover costs of

* Professors & Assistant Professor, Department of Economics, Punjabi University, Patiala.

** Professor, Department of Geography, Punjabi University, Patiala.

*** Assistant Professor, Dashmesh Khalsa College, Zirakpur.

Note: This research paper is based on the field survey conducted for a research project "Indebtedness among Farmers and Agricultural Labourers in Rural Punjab", sponsored by ICSSR, New Delhi.

production in the case of a significant number of crops in several regions (Pillai, 2007). Incurring debt for agricultural production is not bad. In fact, it is necessary element of the proper conduct of agricultural operations. But India's agriculturists take loans to meet such consumption needs as family expenditure on consumption, performance of social functions connected with marriage ,birth, death, litigation etc. Since these loans contribute nothing to production, it becomes impossible to provide their payment (Kaur et al. 2016).

The increase in population, subdivision and fragmentation of land holdings due to breakdown of joint family system encouraging conversion of semi-medium and medium group of farmers into group of small and marginal farmers, resulted in un-economic land holdings (Singh, 2012). As a result, the growth of agriculture considerably slowed down. Both the labour productivity as well as land productivity have fallen by half in the last three decades and capital-labour ratio has doubled in agriculture (Behera, 2012). The decreases in production, increase in cost of production and bare minimum increase in Minimum Support Prices have made the agricultural activity unremunerative. As a result, indebtedness in agriculture has increased (Mahajan, 2015). The New Agricultural Technology has not made any significant impact on the conditions of rural labourers. All indicators related to the well being of rural labourers have indicated that New Agricultural Technology has worsened the lives of rural labour instead of improving (Jha, 1997).

Punjab agriculture is beset with its own internal problems such as stagnating/declining yield, increasing cost, stagnating returns, over mechanization, over use of fertilizers and pesticides and herbicides ,depletion of ground water, etc.(Pal and Singh,2012). It is now widely observed that Punjab economy, particularly its conventional agriculture sector, after witnessing a high rate of growth started experiencing deceleration since the mid 1980s and more particularly since the onset of the process of economic reforms in 1991(Bhullar and Mohan, 2015). Introduction of liberalization and globalization during the early 1990s increased pressure on the agrarian economy. While the benefits of globalization go to the seeds and chemical corporations through expanding markets, the cost and risks are exclusively born by the small farmers and landless peasants (Jodhka, 2006). In the current phase of globalization, Indian peasants were compelled to produce commercial crops like cotton. The amount of loan they took to produce cotton was much higher than they had taken in the past, as they would have grown rain-fed food crops on the same land, which would have cost much for production. So, the switch to an exportable commercial crop led to a scenario of rising indebtedness (Patnaik, 2004). The bulk of the cultivators of Punjab are born in debt, live in debt and die in debt (Darling, 1925). Though this was the case about nine decades back, the problem of

indebtedness not only remained true today but it has aggravated further in the recent years (Narayanamoorthy and Kalamkar, 2005).

In the backdrop of above stated facts, the present paper is an attempt to examine the extent and determinants of indebtedness among the different farm-size categories and agricultural labourers in the rural areas of Punjab.

Methodology

For the purpose of the present study, data is collected from the three districts of Punjab state representing the three different regions, i.e., the South-West Region, the Central Plains Region and the Shivalik Foothills Region. The South-West Region comprises of Bathinda, Mansa, Ferozepur, Fazilka, Faridkot, Muktsar and Moga districts. The Central Plains Region constitutes Patiala, Fatehgarh Sahib, Sangrur, Amritsar, Kapurthala, Jalandhar, Nawanshahr, Tarn Taran and Ludhiana districts. The Shivalik Foothills Region comprises of Hoshiarpur, Pathankot, Gurdaspur and Ropar districts. Keeping in view the differences in agro-climatic conditions and to avoid the geographical contiguity of the sampled districts, it was deemed fit to select one district from each region on random basis. Mansa district from the South-West Region; Ludhiana district from the Central Plains Region; and Hoshiarpur district from the Shivalik Foothills Region have been selected for the purpose of present study.

On the basis of random sample method, one village from each development block of the selected districts has been chosen. There are twenty seven development blocks in the selected three districts. Thus, in all, twenty seven villages have been selected from the three districts under study. A representative proportional sample of households comprising marginal farmers, small farmers, medium farmers, large farmers and agricultural labourers have been taken up for survey. Out of these 27 villages, 1007 farm households and 301 agricultural labour households are selected from the three districts for the purpose of survey. Out of which, 240 farm households and 111 agricultural labour households from Mansa district, 481 farm households and 139 agricultural labour households from Ludhiana district and 286 farm households and 51 agricultural labour households from Hoshiarpur district have been selected. Out of 1007 selected farm households, 408 belong to the category of marginal farmers, 273 to small farmers, 192 to semi-medium farmers, 88 to medium farmers and 46 to large farmers.

Functional Analysis: It is important to study the factors associated with indebtedness. Log linear regression has been used to analyse the relative indebtedness of different farm-size categories in the selected regions as given below:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6)$$

Where, Y= Indebtedness (Rs.)

X₁= Family size

X₂= Ratio of credit from non institutional sources to that from institutional sources

X₃= Income from subsidiary occupations other than the main occupation (Rs.)

X₄= Educational level of the decision-maker of the family (Dummy)

X₅= Farm-size (acres)

Results and Discussion

Indebtedness: Extent and Distribution

The category-wise and region-wise extent of debt among different categories of farmers and agricultural labourers in Punjab is shown in Table 1. The table depicts that 85.90 per cent of the farming households in the state of Punjab are under debt. There are certain variations across the different farm-size categories. As many as 89.06 per cent

of the semi-medium farm households are under debt, while in the case of marginal, small, medium and large farm-size categories, these percentages are 83.33, 88.64, 84.09 and 82.61, respectively. Slightly more than 80 per cent of the agricultural labour households are under debt. The table brings out that the indebted farm households range between 74.48 per cent in the Shivalik Foothills Region to 91.67 per cent in the South-West Region. For the marginal, semi-medium and large farm-size categories, the proportion of households under debt is the highest in the South- West Region followed by the Central Plains and Shivalik Foothills Regions. The highest proportion of the small farmers under debt is in the Central Plains Region, while the lowest exists in the Shivalik Foothills Region. The Shivalik Foothills Region shows the highest proportion under debt for the medium farm-size category. The highest proportion of the agricultural labour households under debt is in the South-West Region, followed by the Shivalik Foothills Region and the Central Plains Region.

TABLE 1 EXTENT OF DEBT AMONG FARMERS AND AGRICULTURAL LABOURERS: REGION-WISE

Regions	Farm-Size Categories	No. of Households		Indebted Households as Percentage of Sample Households	Average Amount of Debt (Rs.)	
		Sampled	Indebted		Per Sampled Household	Per Indebted Household
South-West Region	Marginal Farm	88	84	95.45	222522.71	233119.03
	Small Farm	62	56	90.32	395677.45	438071.46
	Semi-Medium farm	47	43	91.49	443829.79	485116.28
	Medium Farm	29	25	86.21	617344.83	716120.00
	Large Farm	14	12	85.71	1266428.57	1477500.00
	All Sampled Farmers	240	220	91.67	419195.83	457304.55
	Agri. Labourers	111	104	93.69	75657.66	80750.00
Central Plains Region	Marginal Farm	161	147	91.30	302472.05	331278.91
	Small Farm	149	136	91.28	585093.96	641022.06
	Semi-Medium farm	107	96	89.72	717710.28	799947.92
	Medium Farm	44	36	81.82	863295.45	1055138.89
	Large Farm	20	17	85.00	1784200.00	2099058.82
	All Sampled Farmers	481	432	89.81	595303.53	662826.38
	Agri. Labourers	139	96	69.06	42143.88	61020.83
Shivalik Foothills Region	Marginal Farm	159	109	68.55	162550.31	237114.68
	Small Farm	62	50	80.65	373629.03	463300.00
	Semi-Medium farm	38	32	84.21	511052.63	606875.00
	Medium Farm	15	13	86.67	889800.00	1026692.31
	Large Farm	12	9	75.00	734166.67	978888.89
	All Sampled Farmers	286	213	74.48	316739.53	425293.45
	Agri. Labourers	51	41	80.39	43362.75	53939.02
Punjab	Marginal Farm	408	340	83.33	230699.75	276839.70
	Small Farm	273	242	88.64	494051.29	557338.85
	Semi-Medium farm	192	171	89.06	609765.63	684649.12
	Medium Farm	88	74	84.09	786761.36	935608.10
	Large Farm	46	38	82.61	1352695.65	1637473.68
	All Sampled Farmers	1007	865	85.90	474215.99	552064.16
	Agri. Labourers	301	241	80.07	54709.30	68329.88

Source: Field Survey, 2014-15

The average amount of debt per indebted sampled farm household in rural Punjab is Rs. 552064.16, while the average amount of debt per sampled farm household is Rs. 474215.99.

The amount of debt per indebted household and per sampled household increases as farm-size goes up. This reveals that the needs of farmers are increasing as farm-size increases because without investing in operational as well as fixed costs, the major share of income cannot be generated. The positive relationship between the amount of loan and farm-size implies that the loan advancing sources take into consideration the repaying capacity of the farm household, which is mainly indicated by their ownership of land (Pal and Singh, 2012). The average amount of debt per indebted agricultural labour household in rural Punjab is Rs. 68329.88, while the average amount of debt per sampled agricultural labour household is Rs. 54709.30.

The amount of per household debt ranges between Rs. 42143.88 for the agricultural labour households in the Central Plains Region to Rs.1784200 for the large farm-size category of the Central Plains Region. The lowest indebtedness for the marginal, small and large farm-size categories per household as well as per indebted household is prevalent in the Shivalik Foothills Region. The highest indebtedness per sampled household and as well as per indebted household, is prevalent amongst all the categories except the medium farmers and agricultural labourers in the Central Plains Region. The result of the study and field survey has brought out that the reason behind this higher tendency of indebtedness in this region is the high operational cost. The lowest indebtedness is found in the Shivalik Foothills Region. This is the result of low adoption of the New Agricultural Technology.

Determinants of Indebtedness: Category-wise Analysis

Agricultural indebtedness increases in Punjab mainly because of a sharp deceleration in the growth of prices of many agricultural commodities and increase in the cost of cultivation after the introduction of economic reforms (Rao

ana Suri, 2006). The uncertainty of weather, dependence on borrowed credit from informal sources, the squeeze in farm incomes and dwindling employment opportunities are the reasons for a phenomenal rise in the level of indebtedness within the peasantry (Sidhu and Rampal, 2016). An attempt has been made in this paper to identify economic factors influencing indebtedness among farmers and agricultural labourers.

The amount of debt at a point of time is influenced by several economic and non economic factors. The various economic factors, important as they are in the policy framework, are subjected to analysis. It is hypothesized that indebtedness depends upon family size, ratio of credit from non institutional sources to that from institutional sources, income from subsidiary occupations, educational level of the head of the family and farm-size. This objective is met by fitting a number of series of regression function. Regression function finally selected is based upon the better coefficient of multiple determination (R^2), significance of the parameters and sign of the regression coefficients of the parameters and sign of the regression coefficients which are theoretically consistent. In order to determine and signify the factors influencing indebtedness among the farm and agricultural labour households in rural Punjab, multiple regression model is used. The results obtained are presented in Table 2.

Marginal Farmers: The estimated log linear relationship between indebtedness and explanatory variables for the marginal farmers is given in Table 2. The estimates indicate that the ratio of credit from non institutional sources to that from institutional sources and farm-size are the main determinants of indebtedness. The regression coefficients for family size, education level and income from subsidiary occupations are non-significant statistically. The regression coefficients for income from subsidiary occupations and educational level are found to be negative which implies inverse relationship between income and indebtedness and between education level and indebtedness. Together, all the explanatory variables explain 18 per cent of the variation in the magnitude of indebtedness.

TABLE 2 FACTORS DETERMINING INDEBTEDNESS AMONG FARMERS AND AGRICULTURAL LABOURERS IN RURAL PUNJAB: CATEGORY-WISE
(Results of Multiple Regression Analysis)

Sl. No.	Factors	Marginal Farmers	Small Farmers	Semi-Medium Farmers	Medium Farmers	Large Farmers	All Sample Farmers	Agri. Labourers
1.	Family-size	-.567	-3.414**	-1.180	-3.057	-6.043	-2.262*	1.450***
2.	Ratio of credit from non-institutional sources to that from institutional sources	0.321*	.309*	.294*	.449*	.427**	.330*	1.017*
3.	Income from subsidiary Occupations	-.007	-.021	-.043	-.117	-.202	-.037	.012

TABLE 2 FACTORS DETERMINING INDEBTEDNESS AMONG FARMERS AND AGRICULTURAL LABOURERS IN RURAL PUNJAB: CATEGORY-WISE
-CONDT...

		(Results of Multiple Regression Analysis)						
Sl. No.	Factors	Marginal Farmers	Small Farmers	Semi-Medium Farmers	Medium Farmers	Large Farmers	All Sample Farmers	Agri. Labourers
4.	Educational level of the head of the family	-.044	-.084	-.111	-.052	.037	-.070***	.010
5.	Farm-size	3.151*	1.917*	2.217***	2.165	.562	2.526*	-
	R2	0.18	0.17	0.14	0.18	0.18	0.16	0.73
	(F)	(17.117)	(10.836)	(5.968)	(3.640)	(1.792)	(38.853)	(200.15)

Source: Field Survey, 2014-15

* Significant at one per cent

** Significant at five per cent

*** Significant at ten per cent

Small Farmers: The estimates of regression coefficient suggest that the variations in the magnitude of indebtedness of the small farmers is explained to a large extent by family size, ratio of credit from non institutional sources to that from institutional sources and farm-size. The regression coefficient for family size is negative and is significant at five per cent level, indicating negative relationship of family size with indebtedness. This may be due to the increased income with the increase in family size. The regression coefficient for farm-size and ratio of credit from non institutional sources to that from institutional sources is positive and significant at one per cent level, which indicates indebtedness increases as either farm-size goes up or ratio of credit from non institutional sources to that from institutional source increases. The coefficient of multiple determinations is 0.17. This suggests that explanatory variable explains 17 per cent variation in the dependent variable.

Semi-Medium Farmers: The estimates of regression coefficient suggest that the variations in the magnitude of indebtedness of the semi-medium farmers explained to a large extent by ratio of credit from non institutional sources to that from institutional sources and farm-size. The regression coefficient for farm-size and ratio of credit from non institutional sources to that from institutional sources is positive and significant at one per cent level, which indicates indebtedness increases either farm-size goes up or ratio of credit from non-institutional sources to that from institutional source increases. The regression coefficient for family size, income from subsidiary occupations and educational level is negative and statistically non significant. The coefficient of multiple determinations is 0.14. This suggests that explanatory variable explains 14 per cent variation in the dependent variable.

Medium Farmers: Variations in the magnitude of indebtedness among the medium farmers are explained by family size, ratio of credit from non institutional sources to that from institutional sources, income from subsidiary

occupations and educational level. The regression coefficient for ratio of credit from non institutional sources, to that from institutional sources is statistically significant at one per cent level. The regression coefficients of non institutional to that from institutional sources and farm-size are positive which indicate that indebtedness increases as either farm-size increases or debt from non institutional sources increases. Income from subsidiary occupations and educational level are having inverse relation with indebtedness. If the educational level of the household increases the indebtedness decreases. The value of R^2 is of 0.18.

Large Farmers: For the large farmers the regression coefficient of credit from non institutional sources to that from institutional sources is positive and significant at five per cent level. The regression coefficients for the income from subsidiary occupations and family-size are negative and statistically non-significant. The regression coefficients for educational level and farm-size are positive but not significant. Taken together all the variables explain 18 per cent variation in the dependent variables.

All Categories: In the case of all the categories of the farm households taken together, the contribution of the explanatory variables such as ratio of credit from non-institutional sources to that from institutional sources, family size, education level and farm-size are statistically significant. The regression coefficients for income from subsidiary occupations and education level are negative which indicate that indebtedness decreases as education level of the head of family increases or the income from subsidiary occupations increases. Therefore, various institutional training programmes should be organised to provide knowledge and skills to the farmers regarding subsidiary occupations (Gill and Saini,2010)

The regression coefficient for family size is negative. This implies that with the increase in family size the indebtedness also increases. Positive relation between farm-size and indebtedness shows that the capacity to take loans and pay back loan increases as farm-size increases.

Agricultural Labourers: The estimates of regression coefficient suggest that the variations in the magnitude of indebtedness of the agricultural labourers are explained to a large extent by family size and ratio of credit from non institutional sources to that from institutional sources. The regression coefficient for family size is of the order of 1.457 and is significant at ten per cent level, indicating positive relationship of family size with indebtedness. This may be due to the increased expenditure on family maintenance, shelter and so on with the increase in family size. The regression coefficient for education level and income from subsidiary occupations is positive and non significant statistically. The coefficient of multiple determinations is 0.73. This suggests that explanatory variable explains 73 per cent variation in the dependent variable.

The above analysis of determinants of indebtedness shows that increase in income from subsidiary occupations, increase in educational level of the head of the family and reducing the loans from non institutional sources results in reducing the magnitude of indebtedness.

Determinants of Indebtedness: Region-wise

In order to analyse the variations in the significance of factors influencing the magnitude of indebtedness, region-wise analysis has also been done and it has been reflected in Table 3.

Marginal Farmers: Variations in the magnitude of indebtedness among the marginal farmers of all the regions are explained by ratio of credit from non -institutional sources to that from institutional sources, Income from subsidiary occupations, family size and farm-size. The

regression coefficient for ratio of credit from non institutional sources to that from institutional sources is positive and significant in all the regions except the Shivalik Foothills Region. The regression coefficient for family size is positive in the South- West and Shivalik Foothills Regions. Income from subsidiary occupations has negative relationship with indebtedness in the South-West and Shivalik Foothills Regions. The coefficient for farm-size is positive and statistically significant in the Shivalik Foothills Region and the Central Plains Region. The coefficient for educational level is negative in the South-West Region and positive in the remaining two regions.

Small Farmers: The estimates of regression coefficients suggest that the variations in the magnitude of indebtedness among the small farmers across the regions are explained by ratio of credit from non institutional sources to that from institutional sources, family size, income from subsidiary occupations and farm-size. The regression coefficient for family size in the Shivalik Foothills Region and the Central Plains Region is negative indicating negative relationship of family size with indebtedness. The coefficient for ratio of credit from non-institutional sources to that from institutional sources is positive and statistically significant in all the regions. Income from subsidiary occupations contributes in decreasing indebtedness significantly in the Shivalik Foothills Region and the South-West Region. The coefficient for educational level is negative in the Central Plains Region and positive in the remaining two regions. The coefficient for farm-size is positive and statistically significant in the Shivalik Foothills Region and the Central Plains Region.

TABLE 3 FACTORS DETERMINING INDEBTEDNESS AMONG FARMERS AND AGRICULTURAL LABOURERS: REGION-WISE
(Results of Multiple Regression Analysis)

Sl. No.	Purpose	Marginal Farmers	Small Farmers	Semi-Medium Farmers	Medium Farmers	Large Farmers	All Sample Farmers	Agri. Labourers
South-West Region								
1.	Family size	2.885***	3.392	-1.653	11.899**	-1.884	2.361***	.393
2.	Ratio of credit from non institutional sources to that from institutional sources	.243*	.283**	.278**	.478**	.241	.290*	1.136*
3.	Income from subsidiary occupations	-.007	-.159***	-.106	-.279***	-.068	-.088**	.021
4.	Educational level of the head of family	-.006	.031	-.063	-.125	.471	.019	-.055
5.	Farm-size	-.117	-1.498	1.139	-14.174	21.597	-.051	-
	R ²	0.19	0.21	0.16	0.34	0.29	0.16	0.86
	(F)	(3.861)	(2.974)	(1.525)	(2.379)	(.646)	(8.703)	(160.65)

TABLE 3 FACTORS DETERMINING INDEBTEDNESS AMONG FARMERS AND AGRICULTURAL LABOURERS: REGION-WISE—CONTD...
(Results of Multiple Regression Analysis)

Sl. No.	Purpose	Marginal Farmers	Small Farmers	Semi-Medium Farmers	Medium Farmers	Large Farmers	All Sample Farmers	Agri. Labourers
Central Plains Region								
1.	Family size	-2.057	-4.895*	.200	-10.842*	-12.686***	-3.865*	1.529
2.	Ratio of credit from non institutional sources to that from institutional sources	.509*	.262*	.306*	.690*	.306	.370*	1.055*
3.	Income from subsidiary occupations	.052	.022	-.070	-.099	-.239	-.015	-.017
4.	Educational level of the head of family	.063	-.139	-.164	-.178	-.025	-.077***	-.011
5.	Farm-size	1.568**	1.222	1.532	3.604	.188	1.623*	-
	R ² (F)	0.33 (15.290)	0.19 (6.623)	0.17 (4.086)	0.34 (3.860)	0.36 (1.568)	0.20 (24.157)	0.73 (92.347)
Shivalik Foothills Region								
1.	Family size	1.747	-3.302	-3.354	-9.600	-.937	-.943	3.012
2.	Ratio of credit from non institutional sources to that from institutional sources	.090	.312***	.266	.272	.174	.182**	.818*
3.	Income from subsidiary occupations	-.038	-.046	.103	-.428*	-.635	-.040	.099
4.	Educational level of the head of family	.009	.266	-.016	-32.052*	13.710	-.010	.072
5.	Farm-size	4.180*	3.627**	4.440	10.846**	-8.459	3.590*	-
	R ² (F)	0.11 (3.706)	0.19 (2.536)	0.11 (.805)	0.66 (3.486)	0.32 (.551)	0.13 (8.579)	0.57 (15.498)

Source: Field Survey, 2015-16

* Significant at one per cent

** Significant at five per cent

*** Significant at ten per cent

Semi-Medium Farmers: The estimates of regression coefficient suggest that the variations in the magnitude of indebtedness among the semi-medium farmers across the regions are explained by ratio of credit from non institutional sources to that from institutional sources, family size, income from subsidiary occupations and farm-size. The regression coefficient for family size in the Shivalik Foothills Region and the South-West Region is negative indicating negative relationship of family size with indebtedness. The coefficient for ratio of credit from non institutional sources to that from institutional sources is positive and statistically significant in all the regions. Income from subsidiary occupations

contributes in decreasing indebtedness significantly in the Central Plains Region and the South-West Region. The coefficient for educational level is negative in all the regions. The coefficient for farm-size is positive in all the regions. This indicates that with the increase in farm-size, indebtedness also increases as requirements of credit for productive purposes increase.

Medium Farmers: The contribution of the explanatory variables such as ratio of credit from non institutional to that from institutional sources and family size are statistically significant in the case of medium farmers in the Central Plains and South-West Regions. In the Shivalik Foothills Region, the contribution of

explanatory variables, i.e., the income from subsidiary occupations and education level of the head of household is negative and significant. The regression coefficient for farm-size is positive and significant in the Shivalik Foothills Region only. The coefficient for farm-size is found to be non-significant statistically in the remaining two regions.

Large Farmers: For the large farm-size category, the regression coefficient for ratio of credit from non institutional sources to that from institutional sources is positive in all the regions. The regression coefficient for family size is negative in all the regions. Income from subsidiary occupations has significant contribution towards decreasing the magnitude of indebtedness of the large farmers in all the regions. The coefficients for farm-size are positive but non significant in all the regions. The regression coefficient for educational level of the head of the family is found to be negative in the Central Plains Region and the South-West Region.

All Categories: In the case of all the categories of the farmers taken together, the contribution of ratio of credit from non institutional sources to that from institutional sources is significant in all the regions. The variable of ratio of credit from non institutional sources to that from institutional sources bears a direct relationship with indebtedness implying an increase in indebtedness with the increase in debt from non institutional sources. The non institutional sources are mainly approached due to lack of security assets with them, frequent needs, inadequate supply of institutional credit, undue delays in procedure and malpractices adopted by institutional lending agencies (Singh and Sekhon, 2005). The regression coefficient for income from subsidiary occupations is negative in all the regions. This reveals that income from subsidiary occupations has an inverse relationship with indebtedness, as this income increases the capacity to repay loans increases.

The regression coefficient for family size is significant in the South-West Region and the Central Plains Region. Farm-size has a significant positive relation with indebtedness in the Central Plains and Shivalik Foothills Regions. This indicates that the capacity of the farmers to take loans increases as farm-size goes up. The educational level of the head of the family has inverse relationship with indebtedness in the Central Plains and Shivalik Foothills Regions. This suggests that education increases the awareness among the farmers.

Agricultural Labourers: The estimates of regression coefficient suggest that the variations in the magnitude of indebtedness of the agricultural labourers are explained to a large extent by family size and ratio of credit from non institutional sources to that from institutional sources. The regression coefficient for ratio of credit from non institutional sources to that from

institutional sources is positive and significant in all the regions. The regression coefficient for family size is positive in all the regions, indicating positive relationship of family size and indebtedness. This may be due to the increased expenditure on family maintenance, shelter and so on with the increase in family size. The regression coefficients for education level and income from subsidiary occupations are positive and non significant statistically in the Shivalik Foothills Region and negative in the Central Plains Region. The coefficient of multiple determinations is 0.57, 0.73 and 0.86 respectively in the Shivalik Foothills, Central Plains and South-West Regions.

Conclusions and Policy Implications

The above analysis shows that 85.90 per cent of the farm households and slightly more than 80 per cent of the agricultural labour households in the rural areas of Punjab state are under debt. Inter-regional analysis shows that for the agricultural labourers and marginal, semi-medium and large farm-size categories, the proportion of households under debt is the highest in the South-West Region. The highest proportion of the small farmers under debt is in the Central Plains Region. The Shivalik Foothills Region shows the highest proportion under debt for the medium farm-size category. The amount of debt per indebted household and per sampled household increases as farm-size goes up. The average amount of debt per indebted agricultural labour household is Rs. 68329.88 in Punjab. The lowest indebtedness for the marginal, small and large farm-size categories per household as well as per indebted household is prevalent in the Shivalik Foothills Region. The highest indebtedness per household and per indebted household is prevalent amongst all the categories except the medium farmers and agricultural labourers as well as an average sampled household of the Central Plains Region. The reason behind this higher tendency of indebtedness in this region may be high operational costs.

The estimates of regression coefficient suggest that the variations in the magnitude of indebtedness of the agricultural labourers are explained to a large extent by family size and ratio of credit from non institutional sources to that from institutional sources. In the case of all the categories of the farm households taken together, the contribution of the explanatory variables such as ratio of credit from non institutional sources to that from institutional sources, family size, education level and farm-size are statistically significant. Inter-regional analysis of determinants shows that in the case of all the categories of the farmers taken together, the contribution of ratio of credit from non institutional sources to that from institutional sources is significant in all the regions. The regression coefficient for income from subsidiary occupation is negative in all the regions. This reveals that income from subsidiary occupations has an inverse

relationship with indebtedness as this income increases the capacity to repay loans also increases. The regression coefficient for family size is negative. This implies that with the increase in family size, indebtedness increases. The regression coefficient for family size is significant in the South-West Region and the Central Plains Region. Farm-size has a significant positive relation with indebtedness in the Central Plains and Shivalik Foothills Regions. This indicates that the capacity of the farmers to take loans increases as farm-size goes up. The educational level of the head of the family has inverse relationship with indebtedness in the Central Plains and Shivalik Foothills Regions. This suggests that education increases the awareness among the farmers. The analysis of determinants of indebtedness shows that increase in income from subsidiary occupations and increase in educational level of the head of the family results in reducing the magnitude of indebtedness.

To tackle the problem of indebtedness, effective measures should be taken to increase the income of the farm households and agricultural labour households. It is utmost necessary to re-visit land reforms in favour of the marginal and small farmers as it would result in increasing their farm-size and as a result will be helpful in increasing their Farm Business Income (FBI). The agricultural labourers, an important section of the farming community that has been ignored for ages, must be equally associated with re-visiting the land reforms. Since the contribution of ratio of credit from non institutional sources to that from institutional sources is significant in all the regions, the dependence on non institutional sources must be eliminated through providing institutional loans in adequate amount and proper time. Govt. should provide loans to marginal and small farmers and agricultural labourers at zero rate of interest unless and until their income has increased to a desired minimum level. As the study depicts that income from subsidiary occupations has inverse relationship with indebtedness, it becomes necessary to provide every type of help in increasing income from subsidiary occupations. Since the study has brought out that education level of the head of the family has inverse relationship with indebtedness, free and quality education should be given to the marginal and small farmers and agricultural labourers. The regression coefficient for family size is negative. This result suggest that the government should help the farming community in reducing their family size which is quite possible through increasing their level of income and providing them quality education and health services.

REFERENCES

- Behera, D. K. (2012). Determinants of Employment and Strucutural Transformation in India in Pre and Post-Reforms Period. Ph.D. thesis submitted to Department of Economics, University of Hyderabad.
- Bhular, G. S. & Mohan, H. (2015). Ill effects of green revolution on the agricultural development in Punjab . *Journal of Economics and Development*, 11(1), 411-416.
- Darling, M.L. (1925). *The Punjab Peasant in Prosperity and Debt*. South Asian Books, Columbia (U.S.A.), 246.
- Gill, T.K. & Saini, S. K. (2010). Awareness among farmers regarding processed products from farm produce. *Indian Journal of Social Research*, 5(3), 302.
- Jha, P. (1997). Economic reforms and agricultural labourer. *Economic and Political Weekly*, 32(20), 1066-1068.
- Jodhka, S. S. (2006). Beyond crisis rethinking contempory Punjab agriculture, *Economic and Political Weekly*, 41 (16), 1530-1545.
- Kaur, P., Singh, G. & Singh, S. (2016). Magnitude and determinants of indebtedness among farmers in rural Punjab. *Indian Journal of Economics and Development*, 12(1a), 241-250.
- Kaur, R. (2011). *Indebtedness among farmers*. Twenty First Century Publications, Patiala, 92
- Kaur, R & Singh, G. (2009). Extent and determinants of indebtedness among farmers in rural Punjab : Inter-Reginal Analysis. *Punjab Geographer*, 5, 30-48.
- Kaur, V & Singh, G. (2009). Determinants of indebtedness among farmers in rural Haryana. *Indian Journal of Economics and Development*, 10(2), 123-131.
- Narayanamoorthy, A. & Kalamkar, S.S. (2005). Indebtedness of farmer households across states: Recent trends, status and determinants. *Indian Journal of Agricultural Economics*, LX(3), 289-30.
- Mahajan, R.K. (2015). Dwindling agricultural performance and lifeless rural economy in India. In: Gian Singh (ed.) *Agriculture Performance and Rural Development in India*. Publication Bureau, Punjabi University, Patiala: 20-36
- Pal, D. & Singh, G. (2010). Magnitude and determinants of indebtedness among small and marginal Farmers: A case study of Patiala district in Punjab. *Agricultural situation in India*, LXIX(2), 144-151.
- Pillai, S. R. (2007). Agrarian crisis and the way out. *The Marxist*, XXIII(3), 1-18.
- Patnaik, U. (2004). It is crisis rooted in economic reforms. *Frontline*, 21 (13), 20.
- Rao, N. P., & Suri, K.C. (2006). Dimensions of agrarian distress in Andhra Pradesh. *Economic and Political Weekly*, 41, 1546-1552.

- Sahu, G.B., Madheswaran, S., & Rajasekher, D. (2004). Credit constraints and distress sales in rural Indian: Evidence from Kalahandi district, Orissa. *The Journal of Peasant Studies*, 31(2), 210-241.
- Sharma, V. K., Kingra, H.S., Bhogal, S., & Singh, S. (2015). Sustainable agricultural development and pattern of domestic consumption expenditure of Punjab farmers. *Indian Journal of Economics and Development*, 11(1), 439-447.
- Sidhu, J., & Rampal, V.K. (2016). Causes and consequences of indebtedness: A brief review. *Indian Journal of Economics and Development*, 12 (1a), 209-212.
- Singh, H., & Sekhon, M. K., (2005). Cash-in- benefits to the Kissan Credit Card scheme: Onus is upon the farmers. *Indian Journal of Agricultural Economics*, LX(3), 319-334.
- Singh, M. (2012). Challenges and opportunities for sustainable viability of marginal and small farmers in India. *Agricultural Situation in India*, 77(2), 133-14.
- Vasavi, A.R. (2009). Suicides and the making of India's agrarian distress. *South African Review of Sociology*, 40(1), 94-108.

Economy of Growing Vegetables and Farm Incomes in Himachal Pradesh

VIRENDER KUMAR*, DIVYA SHARMA AND HARBANS LAL

Summary

Despite a recent slowdown in Indian agriculture, the growth of horticulture sector continues to be encouraging. The diversification of agriculture towards high value horticultural crops and livestock products for improving the incomes of the peasantry finds place in policy prescriptions across the board. Due to natural agro-climatic advantages in Himachal Pradesh, vegetable cultivation during the past has catapulted the state's agriculture to new heights. However, over time the cost of cultivation has increased substantially due to hike in input costs, especially the human labour. The present article seeks to examine the contribution of vegetable crops to the economy of Himachal Pradesh along with the changing economics of vegetable cultivation. The study is based on both the secondary as well as primary data. The results of the investigation revealed that the contribution of vegetables to the total value of output in agriculture and allied activities in the state has increased noticeably. A scrutiny of the growth in area, production and productivity of vegetables crops indicated that the last decade saw higher growth than that achieved in the previous decade. Among various crops, peas (green) and tomato accounted for about fifty per cent of the total area and production of all vegetables in the state. The regional production scenario revealed that there has been an increase in the area in mid and low hills districts. The changes in the cost and returns of vegetable growing showed that the increase in net returns was not commensurate with the increased costs during the past two and a half decades despite hikes in productivity. Thus, the profitability of vegetable farming in the state is on the decline which needs to be reversed so as to provide income security to the farmers.

Introduction

In recent years, Indian agriculture has witnessed a slowed down growth amidst increased volatility (Sen, 2016). Notwithstanding this, the scenario of horticultural crops in India continues to be encouraging and the percentage share of horticulture output in agriculture is more than 33 per cent (Government of India, 2016). The diversification of agriculture towards high value horticultural crops and livestock products is aptly recommended option for improving the farm incomes as these generate 7-9 times output per hectare as compared to cereals and oilseeds

(Government of India, 2015). The fact that even though the limited diversification towards high value horticultural crops and livestock products has made agriculture more productive in the past, there is still a need to have a policy paradigm shift from food security (confined to few cereal crops) to income security (Gautam, 2016).

Revolution in agriculture and information technology during the past two decades or so in conjunction with the natural bounty of agro-climatic advantages in Himachal Pradesh has catapulted the state's agriculture to new heights through vegetable cultivation. This is amply borne by the fact that the area under vegetable cultivation in the state more than trebled to about seventy five thousand hectares during this period with a concomitant quadrupling of production to nearly sixteen lakh tonnes which has surpassed the foodgrains production in the state. Vegetables cultivation has augmented the farmers' incomes in the state leading to the upliftment of their living standards and is thus a more lucrative option *vis-a-vis* cereals crops, more so on the rainfed small sized holdings in the mid to high hill districts (Sharma and Kumar, 2013). The share of all high value commodities in the value of agricultural output in Himachal Pradesh increased from 46.30 per cent in 1990-91 to 62.51 per cent in 2010-11 (Joshi, 2015). However, over time the cost of cultivation has increased substantially due to hike in input costs, especially the human labour which has become a limiting factor amidst changing socio-economic-political milieu. With this background in view, the present article seeks to examine the contribution of vegetable crops to the economy of Himachal Pradesh along with the changing economics of vegetable cultivation. The study is based on both the secondary as well as primary data. While the first section describes the role of vegetables in the economy of the hilly state using the secondary data, the second section details out the changes in the area, production and yields of these crops. The third part deals with the economics of vegetable cultivation based on primary data collected from select studies conducted over time in the state and the final section brings forth the conclusions of the study.

1. Contribution of Vegetables to the State Economy

Agriculture continues to be a major source of livelihoods as it provides direct employment to about 62 per cent of

*Professor (Agricultural Economics), Department of Agricultural Economics, Extension Education & Rural Sociology, College of Agriculture, CSK HPKV, PALAMPUR-176 062, HP (INDIA)

total workforce in the State. Notwithstanding this, as a natural corollary of development process, the percentage contribution of agriculture and allied sectors in total State Domestic Product has declined from 55.5 per cent in 1967-68 to 26.5 percent in 1990-91 and to 10.4 percent in 2014-15 (Government of Himachal Pradesh, 2016). Notwithstanding its declining share in overall SDP, the gross value of output from agriculture and allied activities increased from Rs 7566.82 crore in 2004-05 to 9391.66 crore in 2010-11 (Table 1). The share of agriculture stood at 60.73 per cent while that of livestock and forestry was 21.83 and 16.99 per cent, respectively. During this period, the value of output from agriculture and allied activities in the state registered a growth of 2.21 per cent per annum

while that of agriculture stood at 2.18 per cent per annum. But it was in livestock that the highest growth (4.40 %) was observed (Table 2).

As regards the contribution of vegetables to the total value of output in agriculture and allied activities is concerned, it varied from 0.11 per cent in 2004-05 to 0.17 in 2009-10 (Table 3). Further, if one looks at the share of vegetables within the agriculture only, it was less than one per cent and varied from 0.19 in 2004-05 to 0.33 per cent in 2009-10. The growing contribution of vegetables vis-à-vis horticulture is clearly visible in this table when in 2006-07 and 2009-10, vegetables' share was more than fifty per cent overshadowing the contribution of horticulture (mainly apple).

TABLE 1: VALUE OF OUTPUT (RS. LAKH) FROM AGRICULTURE AND ALLIED ACTIVITIES IN HP

(At 2004-05 prices)							
Items	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Gross value of output of which	756682	736772	672076	746621	736838	690788	939166
1. Agriculture	429302 (56.73)	408815 (55.49)	358445 (53.33)	430305 (57.63)	394659 (53.56)	344267 (49.84)	570381 (60.73)
2. Livestock	159509 (21.08)	159384 (21.63)	160540 (23.89)	161961 (21.69)	190731 (25.89)	183360 (26.54)	205017 (21.83)
3. Forestry	163896 (21.66)	164380 (22.31)	149135 (22.19)	150145 (20.11)	146959 (19.94)	158653 (22.97)	159530 (16.99)
4. Fisheries	3975 (0.53)	4193 (0.57)	3956 (0.59)	4210 (0.56)	4489 (0.61)	4507 (0.65)	4238 (0.45)

Note: 1. Figures within parentheses are per cent of gross value of output.

Source: CSO

TABLE 2: COMPOUND ANNUAL GROWTH RATE OF VALUE OF OUTPUT FROM AGRICULTURE & ALLIED CTIVITIES IN HIMACHAL PRADESH, 2004-05 TO 2010-11

Sr. No.	Sector	Annual Growth Rate (per cent)
1	Agriculture & allied activities	2.21* (0.1023)
2	Agriculture	2.18* (0.1644)
3	Livestock	4.40* (0.0976)
4	Forestry	-0.59* (0.0127)
5	Fisheries	1.67* (0.0296)

Note: * Indicates significance at 5 % probability level and figures within parentheses are standard errors.

Source: Derived from Table 1.

TABLE 3: PER CENT SHARE OF VEGETABLES IN VALUE OF OUTPUT OF AGRICULTURE & ALLIED SECTORS, 2004-05 TO 2010-11 IN HIMACHAL PRADESH

(AT 2004-05 PRICES)			
Year	In Agriculture and allied sectors	In Agriculture	In Fruits & vegetables
2004-05	0.11	0.19	0.31
2005-06	0.14	0.25	0.40
2006-07	0.15	0.28	0.55
2007-08	0.13	0.23	0.37
2008-09	0.11	0.21	0.36
2009-10	0.17	0.33	0.55
2010-11	0.14	0.23	0.35

Source: Same as in Table1.

2. Area, Production and Yields of Vegetables in HP

Though vegetable growing has been an integral part of cropping pattern in the state, it has become more pronounced during the past three decades or so. The state produces a number of vegetables like green peas, tomato, beans, cabbage, cauliflower and capsicum, etc. Quite a few of them are produced at such times of the year when these are not produced in plains. Resultantly, these off season vegetables fetch very good prices in markets of the adjoining states. The acreage under vegetable crops has witnessed more than three-fold increase between 1990-91 and 2014-15 and at present is around 75,000 hectares (Table 4). The production during this period has gone up from 3.68 lakh tonnes to 15.76 lakh tonnes and has become

higher than that of foodgrains production in the state which still occupy more than eighty per cent of the total cropped area. The area under vegetables in the state has grown at a rate of 6.07 per cent per annum during the past two and a half decades while the production increased at a rate of 7.23 per cent per annum. However, the corresponding growth rate of vegetables yields stood at 1.09 per cent. A dissection of the entire period in two parts revealed that during the latter decade (2003-04 to 2014-15), the growth rates of area, production and yield was higher than the previous decade (1991-92 to 2002-03) which evinces the increasing role of vegetable cultivation in income generation in the hill regions that has limited employment opportunities.

TABLE 4: AREA, PRODUCTION AND YIELD OF VEGETABLES IN HP, 1991-92 TO 2014-15

Year/CAGR	Area (ha)	Production (tonnes)	Yield (t/ha)
1991-92	23,000	3,68,000	16.00
2003-04	44,274	731,350	16.52
2014-15	73,894	15,76,454	21.33
CAGR (%) during			
1991-92 to 2002-03	4.15* (0.0245)	5.45* (0.0331)	1.24* (0.0043)
2003-04 to 2014-15	4.93*(0.0271)	6.74* (0.0452)	1.73* (0.0089)
1991-92 to 2014-15	6.07* (0.0280)	7.23* (0.0288)	1.09* (0.0021)

Note: * Indicates significance at 5 % probability level. Figures within parentheses are standard errors.

Source: Derived from data from Directorate of Agriculture, Government of HP, Shimla.

Though, there are many vegetables that are grown in the state, peas (green) and tomato account for about fifty per cent of the total area and production of all

vegetables in the state (Table 5). But these two crops have witnessed a decline of about 5-6 percentage points in their shares of area and production in 2014-15 over that of 2004-05.

TABLE 5: CROP-WISE AREA AND PRODUCTION SHARES OF VEGETABLES IN HP

Sr. No.	Districts	(per cent)			
		2004-05		2014-15	
		Area	Production	Area	Production
1	Peas (Green)	33.41	19.48	31.97	17.62
2	Tomato	19.42	36.16	14.62	30.19
3	Beans	5.64	3.21	5.09	2.99
4	Onion & Garlic	8.52	5.8	8.66	7.26
5	Cabbage	6.25	10.68	6.52	10.04
6	Cauliflower	3.91	4.14	7.02	7.42
7	Radish, Turnip & Carrot	2.75	2.78	3.75	3.64
8	Bhindi	3.07	1.74	3.84	2.27
9	Cucurbits	4.37	5.64	3.54	4.03
10	Capsicum & Chillies	3.97	2.34	4.78	4.41
11	Brinjal	1.35	1.34	1.61	1.72
12	Other Vegetables	7.33	6.71	8.62	8.40

Source: Same as in Table 4.

Cauliflower, another important crop has gained area during this period. In terms of value of output, these two crops accounted for 43 per cent of the total value within vegetables in 2010-11 with tomato accounted for 25 per cent and green peas 18 per cent (Table 6). But the value of output of cabbage, green peas and cauliflower registered very high growth rates (12.28, 7.14 and 6.89 %, respectively) during the period 2004-05 to 2010-11. Here

it is pertinent to point out that though the area under peas is more than that under tomato, yet the production and value of output is more in case of latter.

Regional spread of the vegetable growing in the state has also undergone a change during the past three decades or so. While, earlier it was confined to mid and high hills of the state and some valleys, it descended down further to low and mid hills during this period.

TABLE 6: PER CENT SHARE OF MAJOR VEGETABLES IN VALUE OF OUTPUT OF ALL VEGETABLES IN HP, 2004-05 TO 2010-11

(AT 2004-05 PRICES)

Year	Tomato	Green peas	Potato	Cabbage	Cauliflower
2004-05	31.18	18.79	13.62	4.47	3.99
2005-06	24.30	15.97	11.65	6.74	4.79
2006-07	26.37	18.89	12.04	7.17	4.90
2007-08	27.17	19.46	11.80	7.38	5.04
2008-09	34.29	23.10	15.73	10.34	6.22
2009-10	28.06	19.41	12.02	7.62	4.63
2010-11	24.54	17.97	11.56	6.56	4.29
CAGR (%)	4.78*(0.0814)	7.14*(0.1462)	4.80*(0.1105)	12.28*(1.0623)	6.89*(0.3785)

Note: * Indicates significance at 5 % probability level and figures within parentheses are standard errors.

Source: Same as in Table 4.

TABLE 7: AREA AND PRODUCTION SHARES (PER CENT) OF VEGETABLES ACROSS DISTRICTS IN HP

Sr. No.	Districts	2005-06		2014-15	
		Area	Production	Area	Production
1	Bilaspur	4.11	5.40	3.97	5.08
2	Chamba	3.85	2.39	4.28	3.58
3	Hamirpur	3.00	3.46	5.13	3.73
4	Kangra	12.11	10.83	10.55	10.76
5	Kinnaur	5.08	3.46	4.74	2.70
6	Kullu	8.22	10.81	8.05	8.04
7	Lahaul Spiti	8.29	5.20	5.66	3.45
8	Mandi	11.56	11.39	14.52	13.48
9	Shimla	16.14	16.19	17.13	14.68
10	Sirmaur	11.05	10.87	11.00	11.78
11	Solan	14.00	17.82	12.76	20.78
12	Una	2.60	2.17	2.21	1.95

Source: Same as in Table 4.

The districts of Shimla, Mandi, Solan, Sirmaur and Kangra account for two-thirds of area under vegetables in the state and contribute about 60 per cent to total production (Table 7). There has an increase in the area shares of Mandi and Hamirpur districts which lie in mid and low hills, respectively. Also, it is worth noting that though the area share of Solan has declined,

its share in production has increased during the last one decade or so.

3. Cost Structure and Returns in Vegetable Production in HP

Of late, there has been a growing concern of the poor economic viability in agriculture that has led to several

unwanted socio-economic ills such as growing disenchantment of the farmers with agriculture in general and youth in particular. This has resulted in most unfortunate happenings such as farmers' suicides throughout the country. Among other things, rising costs of agriculture, consequent heavy debts and inability to repay these are cited as reasons for these mishaps. In order to examine the changes in the cost structure and returns in vegetable production in the state over time, a comparison of two studies Lal, Harbans (1989) and Kumar (2013) conducted during the past two and a half decades (Table 8) was attempted and the detailed results are given in

TABLE 8: DETAILS OF VEGETABLE STUDIES CONSIDERED

Sr. No.	Study	Year	Main vegetable crops	Area/District
1	Resource use efficiency and marketing management of off-season vegetables cultivation in Himachal Pradesh	1989	Tomato, Peas, Cabbage, Capsicum and Cauliflower	Solan, Shimla
2	Estimation of cost of cultivation of commercial crops in Himachal Pradesh	2013	Tomato, Peas, Capsicum, Cabbage and Cauliflower	Solan, Kangra, Shimla

A comparative analysis of the cost of cultivation and returns structure in these studies was done for some important crops (Table 9). As explained above, tomato is the most important cash crop produced in Himachal Pradesh. It is evident from the table that the contribution of human labour towards total cost in tomato was found to be about 44 per cent both in 1989 and 2013. As regards the contribution of bullock labour it was about 4 per cent in 1989 and about 3 per cent in 2013. In nominal terms, total cost of cultivation (Cost C) of tomato per hectare was Rs. 33,974 and Rs.3,38,263, respectively in these studies. The net returns per hectare over Cost C stood at Rs.16,996 and Rs 76,687, respectively. The output-input ratios were 1.50:1, and 1.23:1, correspondingly. Similarly for peas (green), the second most important cash crop, while Cost C increased from Rs 15,255 to Rs 2,11,192 during the same period and the output-input ratios came down from 1.29 to 1.24. Similar trend were there for other crops.

Here it is pertinent to point out that human labour is most important cost component in these crops as its share in total cost of vegetable cultivation ranged from about 35 to 45 per cent in 1989 and the same varied from 31 to 55 per cent in 2013. And rightly so because, firstly the scope of mechanization is constrained by the undulating topography in the hills and secondly vegetables are highly labour intensive crops. A cursory look on the figures in Table 10 reveals that the Cost C witnessed an increase of about 6 to 14 times in different vegetable crops, except cauliflower by 2013 vis-à-vis 1989. A slightly more pronounced increase was observed between these two periods with respect to Cost A. On the other hand, the

Table 9. The salient findings of the same have been compiled in Table 10. When doing so, we have chosen Cost C because it takes into account the family labour and the rental value of land. This is necessitated by the fact that with the nuclear families becoming the norm of the day and the opportunity cost of farmers' labour in terms of wages from such programmes as MNREGS, there is shortage of farm labour in general. Secondly, with the dwindling land holding, the practice of leasing in land in vegetable dominant districts of Solan and Shimla is not uncommon. Under these circumstances, Cost C is more appropriate than Cost A.

increase in net returns over Cost C ranged from just 2 to 7 times, except capsicum where it appeared abnormal. Similar results were found with respect to Cost A. The output - input ratio showed declines of varying degrees in tomato, pea and cauliflower while it revealed a noticeable increase in capsicum. All this has happened despite the varying increase in productivity of these crops except cauliflower. The yield hike in capsicum was highest at over 4 times during this period. Thus it is quite evident from these results that the net returns from vegetable farming in the state has not kept pace with the rising cost of cultivation in general, barring a few aberrations.

TABLE 9: CHANGES IN THE ECONOMICS OF VEGETABLE PRODUCTION IN HP

Particulars/ crops	Resource use efficiency and marketing commercial crops in Himachal Pradesh (2013)	Estimation of cost of cultivation of (1989)
1. Tomato		
Cost (% of total cost)		
Seed/seedlings	0.45	1.17
FYM	6.17	10.47
Fertilizers	11.60	0.96
Bullock labour	3.51	3.23
Human labour	43.93	43.67

TABLE 9: CHANGES IN THE ECONOMICS OF VEGETABLE PRODUCTION IN HP-CONTD..

Particulars/ crops	Resource use efficiency and marketing management of off-season vegetables cultivation in Himachal Pradesh (1989)	Estimation of cost of cultivation of commercial crops in Himachal Pradesh (2013)
Cost A (Rs./ha)	9,161	84,225
Cost C (Rs./ha)	33,974	3,38,263
Returns (Rs/ha)		
Gross returns	50,970	4,15,950
Net returns over Cost A	41,809	3,31,725
Net returns over Cost C	16,996	76,687
Productivity (q/ha)	172	271
Output-Input ratio	1.50:1	1.23:1
2. Peas		
Cost (% of total cost)		
Seed/seedlings	6.77	3.33
FYM	7.38	7.50
Fertilizers	4.27	0.57
Bullock labour	6.08	1.57
Human labour	42.67	35.51
Cost A (Rs./ha)	4,713	86,592
Cost C (Rs./ha)	15,255	2,11,192
Returns (Rs/ha)		
Gross returns (Rs./ha)	19,751	2,62,500
Net returns over Cost A (Rs./ha)	15,038	1,75,908
Net returns over Cost C (Rs./ha)	10,304	51,308
Productivity (q/ha)	47	87.5
Output-Input ratio	1.29	1.24
3. Cabbage		
Cost (% of total cost)		
Seed/seedlings	1.22	5.70
FYM	7.08	4.07
Fertilizers	7.42	1.75
Bullock labour	3.77	8.73
Human labour	44.69	54.53
Cost A (Rs./ha)	7,179	49,044
Cost C (Rs./ha)	24,951	1,56,284
Returns (Rs/ha)		
Gross returns (Rs./ha)	34,695	2,20,000

TABLE 9: CHANGES IN THE ECONOMICS OF VEGETABLE PRODUCTION IN HP-CONTD..

Particulars/ crops	Resource use efficiency and marketing management of off-season vegetables cultivation in Himachal Pradesh (1989)	Estimation of cost of cultivation of commercial crops in Himachal Pradesh (2013)
Net returns over Cost A	27,516	1,70,957
Net returns over Cost C	9,744	63,716
Productivity (q/ha)	115	275
Output-Input ratio	1.39:1	1.41:1
4. Cauliflower		
Cost (% of total cost)		
Seed/seedlings	0.98	5.26
FYM	5.23	3.39
Fertilizers	17.90	3.05
Bullock labour	2.41	9.25
Human labour	34.62	53.17
Cost A (Rs./ha)	17,356	47,719
Cost C (Rs./ha)	56,687	1,47,459
Returns (Rs/ha)		
Gross returns	83,215	2,10,000
Net returns over Cost A	65,859	1,62,281
Net returns over Cost C	26,528	62,541
Productivity (q/ha)	328	150
Output-Input ratio	1.47:1	1.42:1
5. Capsicum		
Cost (% of total cost)		
Seed/seedlings	5.8	4.51
FYM	7.51	10.26
Fertilizers	9.06	1.12
Bullock labour	4.88	4.01
Human labour	37.58	30.66
Cost A (Rs./ha)	6,910	1,12,034
Cost C (Rs./ha)	23,422	2,83,509
Returns (Rs/ha)		
Gross returns	30,972	5,85,000
Net returns over Cost A	24,062	4,72,966
Net returns over Cost C	7,550	301,491
Productivity (q/ha)	79	325
Output-Input ratio	1.32:1	2.06:1

TABLE 10: MAGNITUDE OF CHANGE IN COSTS AND RETURNS IN VEGETABLES IN 2013 OVER 1989

Particulars	Increase in Cost C (times)	Increase in Cost A (times)	Increase in net returns over Cost C (times)	Increase in net returns over Cost A (times)	Output-input ratio		Increase in yield (times)
					1989	2013	
1. Tomato	9.96	9.19	4.51	7.93	1.50	1.23	1.56
2. Peas	13.84	18.37	4.98	11.70	1.29	1.24	1.86
3. Cabbage	6.26	6.83	6.54	6.21	1.39	1.41	2.39
4. Cauliflower	2.60	2.75	2.36	2.46	1.47	1.42	0.45
5. Capsicum	12.10	16.21	39.93	19.65	1.32	2.06	4.11

Source: Derived from Table10.

3. Conclusions

The contribution of vegetables to the total value of output in agriculture and allied activities in the state has increased noticeably. Thus, the vegetable crops have now become as important as horticulture (mainly apple) in the state. A scrutiny of the growth in area, production and productivity of vegetables crops revealed that the period 2003-04 to 2014-15 witnessed higher growth than that achieved in the previous decade (1991-92 to 2002-03). Among various crops, peas (green) and tomato accounted for about fifty per cent of the total area and production of all vegetables in the state. In terms of the value of output, cabbage, green peas and cauliflower registered very high growth rates during the study period. The regional production scenario revealed that the districts of Shimla, Mandi, Solan, Sirmour and Kangra account for about two-thirds of area under vegetables in the state and contribute about sixty per cent to total production. There has been an increase in the area the districts of Mandi and Hamirpur which lie in mid and low hills, respectively. As regards the changes in the cost and returns of vegetable growing is concerned the results showed that the increase in net returns was not commensurate with the increased costs during the past two and a half decades for most of the crops. Also the share of human labour in total cost ranged from one-third to over fifty per cent. Evidently, the profitability of vegetable farming in the state is on the decline which may jeopardize the farmers' livelihoods and hence calls for reversal of trends.

REFERENCES

- Government of Himachal Pradesh (2016). Economic Survey, 2015-16, Directorate of Economics and Statistics, Shimla (HP).
- Government of India (2015). Raising Agricultural Productivity and Making Farming Remunerative for Farmers. An Occasional Paper by the Task Force on Agricultural Development, NITI Aayog, New Delhi.
- Government of India (2016). Economic Survey, 2015-16, Ministry of Finance, Department of Economic Affairs, Economics Division, New Delhi.
- Gautam, Madhur (2016). Making Indian agriculture more resilient: Some Policy Priorities. *Economic & Political Weekly*, 51(8):24-27.
- Joshi, P K (2015). Has Indian agriculture become more crowded and risky? *Indian Journal of Agricultural Economics*; 68(3):1-41.
- Lal, Harbans (1989). Resource use efficiency and marketing management of off-season vegetables cultivation in Himachal Pradesh. M.Sc thesis (unpublished), Department of Economics, Sociology and Extension Education, Dr Y S Parmar University of Horticulture and Forestry, Solan.
- Kumar, Virender (2013). Estimation of cost of cultivation of commercial crops in Himachal Pradesh. Research Report:64, Department of Agricultural Economics, Extension Education & Rural Sociology, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur (HP)-176 062
- Sen, Abhijit (2016). Some reflections on agricultural prospects. *Economic & Political Weekly*, 51(8):12-15.
- Sharma, S K and Kumar, Virender (2012). Improving Economic Viability of Small and Marginal Landholders through Vegetable Cultivation in Himachal Pradesh. *Agricultural Situation in India*; 69 (9): 493-497.

Production Trend and Cost-Profitability Structure of Chickpea in Central India: The Dynamic Scenario

SUNIL NAHATKAR*

Abstract

In the present study, the analysis was carried out to seek the information on changes in chickpea production and profitability using time series data. For analyzing changes in chickpea production scenario in the country, 48 years time series data on area, production and productivity was collected from different published bulletins and websites. The entire period was divided into two parts. First part consists of Green Revolution Period (GRP- from 1966-67 to 1989-90) and the second part considers Post-Green Revolution Period (PGRP- from 1990-91 to 2013-14. For studying changes in cost and profitability structure of chickpea production, data for the period of 1996-97 to 2012-13 (15 years) was collected from published reports of commission on Agricultural Costs and Prices and Web site of Directorate of Economics & Statistics, GOI, New Delhi. The results of the study show that the area under chickpea declined marginally (4.84%) during the period of 48 years, but production increased by 66.51% from 52.17 to 86.67 lakh MT and this has happened mainly due to increase in productivity of chickpea from 556 to 975 kg/ha (75.36% gain). The scenario of chickpea production during this period had changed and this was a shift from Northern -Central States to Central-Southern states. The growth in production of chickpea during the GRP was highest for the State of Maharashtra (4.69%) followed by Gujarat (4.46%) and Madhya Pradesh (2.92%) on the other hand during PGRP this was highest for Andhra Pradesh (10.58%) followed by Karnataka (8.31%), Gujarat (6.43%), Maharashtra (6.32%) and Madhya Pradesh (2.90%). The negative growth (0.26%) was converted to positive growth (2.56%) in the production of chickpea in the country during the same period. In case of cultivation of chickpea in Central India (Madhya Pradesh), animal energy component was substituted by mechanical power. The data also revealed that there is scope of increasing the productivity and profitability from chickpea through reallocation of resources at optimum level by reducing the proportionate expenditure on operational and managerial inputs and enhancing proportionate expenditure on productive and protective inputs. This can be manage effectively and efficiently through proper training and demonstration of improved chickpea production technologies. The break even analysis shows

that over the years, the farmers of the state of Madhya Pradesh are operating chickpea production business above the break even point or in profit zone.

Keywords: Chickpea production, profitability, Green revolution, Productivity, Area.

Introduction

Though India has made a significant head way in increasing agricultural production in general, pulses have continued to evade solution. The per capita availability of pulses in India has been continuously decreasing, which was 65 gm per day in 1951-52, which increased to 69 gm per day in 1960-61 and it started decline to about 42 gm per day in 1983-84 further to around 35 grams per day in 2000s. However, in the past four years, there has been significant increase in consumption averaging around 50 grams due to somewhat higher production (NCAER, 2014). Accordingly, to nutritional standards, it has to be at least 80 gm per day (FAO & WHO). Therefore, this trend needs to be arrested as early as possible to safe-guard the nutritional standard of average Indian diet in general and that of the vegetarian population in particular. The major pulses produced in the country are chickpea, pigeonpea, green gram and black gram. Chickpea, *Cicer arietinum* L., is a drought tolerant leguminous crop used in various foods in several developing countries, particularly in India, as a source of dietary protein. It is also known as Bengal gram. It reportedly originated from western Asia, specially Turkey.

It is one of the seven Neolithic founder crops that has always been the most important pulse crop of India and its global importance has increased considerably during the past three decades. The number of chickpea growing countries has increased from 36 to 52 and importing countries from 30 to 150 during 1981 to 2011. Chickpea is currently the second most important food legume in the world after common bean (French bean). About 90% of the global pigeon pea, 65% of chickpea and 37% of lentil area accounts for India, corresponding to 93%, 68% and 32% of the global production, respectively. Most of the production and consumption of chickpea (95%) take place in developing countries. Chickpea is grown in many areas, as a food crop, as a cash crop and for soil fertility restoration. During 2013,

*Principal Scientist, Agricultural Economics & Farm Management, Directorate of Research Services, J.N.K.V.V. Jabalpur, Madhya Pradesh, India 482004

Email.sbnahatkar@rediffmail.com

89.20% of the chickpea area and 84.47% of production was in Asia, 3.57% and 4.05% in Africa, 4.24% and 6.22% in Oceania, 2.44% and 4.55% in America and 0.55% and 0.71% in Europe (FAOSTAT 2015), respectively. The major chickpea producing countries, which contributed to about 90% of the global chickpea production during 2013, include India (67.4%), Australia (6.21%), Pakistan (5.73%), Turkey (3.86%), Myanmar (3.74%), and Iran (2.25%). Global production, as per the latest available estimates of Food and Agricultural Organization (FAO), is about 12 million metric tons. India is the largest producer, with about 8.68 million tons, accounting for more than 72% of world production (TE 2013-14). In India, chickpea accounts for about 48% of total pulses produced in the country. In order to ensure self-sufficiency, the requirement for pulses in the country is projected at 39 million tons by the year 2050; at an annual growth rate of 2.2%. This will require a pragmatic change in research and developmental strategies, beside good policy support from the government. (Gowada et al, 2015).

Chickpea is one of the important pulses traded globally. The top ten chickpea exporting countries are India, Australia, Mexico, Canada, Myanmar, Ethiopia, USA, Tanzania and Kazakhstan. According to the latest available estimates by the FAO, Pakistan is the largest importer while Australia is the largest exporter in the world (2011). However, the per capita consumption of chickpea in India is estimated to be less at 5.7 kg per year, compared to that of Myanmar at 6.6 kg per year and that of Turkey at 6.4 kg per year. Looking to the national and international importance of this crop as a source of dietary protein for majority of vegetarian population in the world and as a major pulse crop grown in India; the study on its production trend and changes in cost-profitability structure was undertaken considering 48 years long time series data for trend analysis and 15 years published data of cost of cultivation of chickpea published in reports of Commission on Agricultural Cost and Prices of various years for Central India (Madhya Pradesh) since this state alone contributes more than 45% of production of chickpea in the country.

Research Methodology

The production of chickpea is stagnating and its variability is increased in the past five decades. The present study is an attempt to examine the pattern of growth, variability and the changes in cost and profitability in production of chickpea. The time series data for the Green Revolution Period (GRP) consisting of data for the period of 1966-67 to 1989-90 (24 years) and Post Green Revolution Period (PGRP) for the years 1990-91 to 2013-14 (24 years) regarding production, area and yield of chickpea has been used to compute compound growth rates and variability across the chickpea growing states. The GRP period is mainly characterized as continued growth of returns to land through intensification of chemical input and labour

input use per hectare main emphasis on increasing production of rice and wheat through increase in irrigation sources. The PGRP period begins when input use is high and further gains in productivity are largely dependent on increased efficiency of input use with economic liberalization and emphasis is on diversification of cropping pattern due to ill effects of continued Rice-Wheat production on pattern specially in Punjab, Haryana and Uttar Pradesh. In this period, government liberalized chickpea trade to secure adequate domestic supply of pulses, for example, tariffs on pulses were reduced significantly, significant shift was observed in cropping pattern (Kumar and Mittal, 2000).

Results and Discussions

Changes in National Scenario of Chickpea Production

Over the period TE 1963-64 to 2013-14, the area under chickpea in India had decreased marginally (4.84%) from 93.70 lakh hectares to 89.16 lakh hectares, but production had increased by 66.51% (from 52.17 to 86.67 lakh metric tons). The percentage of chickpea area to total pulses also declined during this period from 38.67 to 36.67 with marginal increase in percentage share of chickpea production (from 46.92 during TE 1963-64 to 47.66 during TE 2013-14). On the other hand, the share of total pulses in the total foodgrain production had decreased significantly from 13.70 per cent during TE 1963-64 to 7.00 per cent during TE 2013-14 (Table-1). This clearly indicated that the nutritional balance in the India dietary system for protein and carbohydrates has changed drastically and therefore the gap between demand for pulses and its supply has widen which reflects in surging prices of pulses and huge amount of import of pulses. During 2014-15, India imported 4.4 million tonnes of pulses and during 2015 it is estimated to import 10 million tonnes of pulses (Varadharajan, 2015). The total area under pulses remains unchanged during last 5 decades. This is hovering around 242 to 243 lakh ha but gain in production of about 64 percent was mainly due to increased productivity from 556 to 975 kg /ha, the gain of 75.36%, i.e., about 9 kg per year. This shows the gloomy picture of pulses and chickpea production in the country. Chickpea production in India is slow in post green revolution years due to strong competition from wheat, rice and mustard, as expansion in irrigation and rapid technological change has favoured these crops at the cost of chickpea. Consequently, the area under these crops has increased over the years with replacement of pulses. The recent liberalization has expanded the demand for chickpea from international markets in addition to the growing domestic demand due to increasing population and income.

The highest ever average yield of chickpea in the country was 975kg per hectare during TE 2013-14. The results of national demonstration trials for chickpea conducted by ICAR show that the potential yield of as many as 23 different region specific varieties released

during 1995-2003 varies between 15 to 30 quintals per hectare (AICRP Annual Reports of Chickpea). These varieties are bold seeded, resistant to wilt, root rot, drought tolerant, suitable for saline conditions etc. This wide gap between the potential and actual yield reflects in common problem in transfer of technology to the farmers across the whole range of crops. In fact, the wide publicity of these varieties through state extension machinery, electronic and print media and through Kisan Call Centres/

Krishi Vigyan Kendras can at least double the yield and production of chickpea in the country. The demonstration of pulses production technologies through large scale technology demonstrations, frontline demonstrations, policy support from various schemes like National Food Security Mission (NFSM), Rashtriya Krishi Vikas Yojana (RKVY), and Accelerated Pulses Production Program (A3P) etc. launched by the central government to promote pulses cultivation are helping in this direction.

TABLE 1: PRODUCTION OF CHICKPEA, TOTAL PULSES AND TOTAL FOODGRAINS IN INDIA

Years	Particulars	Chickpea	Percent of chickpea to total pulses	Total pulses	Percent pulses to total food grains	Total Food
TE 2013-14	Area (lakh ha)	89.16	36.67	243.11	19.68	1235.25
	Prod. (lakh tons)	86.87	47.66	182.28	7.00	2604.85
	Yield (kg/ha)	975	130.00	750	-	2109
TE 2003-04	Area (lakh ha)	64.60	29.38	219.90	18.32	1200.30
	Prod. (lakh tons)	51.433	39.15	131.37	6.56	2002.70
	Yield (kg/ha)	794	133.45	595	-	1665
TE 1993-94	Area (lakh ha)	61.30	27.39	223.83	18.25	1225.90
	Prod. (lakh tons)	45.10	35.48	127.12	7.17	1773.73
	Yield (kg/ha)	735	129.40	568	-	1447
TE 1983-84	Area (lakh ha)	74.77	31.95	234.03	18.21	1284.67
	Prod. (lakh tons)	48.93	40.48	120.87	8.73	1383.97
	Yield (kg/ha)	656	126.89	517	-	1076
TE 1973-74	Area (lakh ha)	75.47	34.05	221.67	18.05	1228.13
	Prod. (lakh tons)	45.73	40.34	113.37	11.08	1022.90
	Yield (kg/ha)	607	129.98	467	-	833
TE 1963-64	Area (lakh ha)	93.70	38.67	242.30	20.62	1174.97
	Prod. (lakh tons)	52.17	46.92	111.20	13.70	811.67
	Yield (kg/ha)	556	121.13	459	-	691

Changes in Chickpea Production Across the States

The area under chickpea was mainly concentrated to central and northern states during TE 1968-69. Uttar Pradesh was on the top (29.50%) followed by Madhya Pradesh (20.87), Rajasthan (14.69%) and Haryana (12.96%). These four states were accounted for about 80 per cent of the national acreage of chickpea. But with the introduction of high yielding varieties of wheat with assured irrigation in Punjab, Haryana and Uttar Pradesh, the area under chickpea crop is substituted by wheat on account of profitability. This changed drastically during TE 2013-14 with domination of Madhya Pradesh (37.84%) followed by Rajasthan (17.24), Maharashtra (14.92%) and Karnataka (10.16%). Presently these four states account

for more than 80 per cent of acreage of chickpea. Madhya Pradesh is the single largest producer in the country, accounting for about 43% of total production. Rajasthan, Maharashtra, Andhra Pradesh, Uttar Pradesh and Karnataka contributed about 15.27%, 12.63%, 8.15%, 7.05% and 6.93%, respectively in TE 2013-14 (Table-2). During TE 1968-69, Uttar Pradesh was the top producer (29.94%) followed by Haryana (17.28%), Madhya Pradesh (16.39%) and Rajasthan (15.59%). During the triennium ending 1968-69 and 2013-14 (Table-2), the area under chickpea declined from 4.7 to 0.7 million ha in northern states (Punjab, Haryana and Uttar Pradesh), while it increased from 2.1 to 6.1 million ha in central and southern states (Madhya Pradesh, Maharashtra, Andhra Pradesh and Karnataka). This clearly shows that the

scenario of chickpea production has been changed from Northern-Central States to Central-Southern states, because during TE 1968-69, Uttar Pradesh, Haryana, Madhya Pradesh and Rajasthan accounted for more than 79.20 per cent of the national production. On the contrary during TE 2013-14, Madhya Pradesh, Rajasthan, Maharashtra, Andhra Pradesh, Uttar Pradesh and Karnataka accounted for more than 93 per cent of the national production of chickpea.

In terms of productivity, during TE 1968-69, Haryana and Punjab topped with average productivity of

775-781 kg per ha, while average productivity of the country during the same period was only 594 kg per ha. The productivity in chickpea producing states during this period was very low, it ranged between 300 to 600 kg per ha. Over the period of five decades, gain in productivity of 64.14 per cent at national level was observed. The highest increase in productivity was recorded in Andhra Pradesh (373%), followed by Maharashtra, Gujarat, and Madhya Pradesh. In major chickpea producing states the productivity of chickpea during TE 2013-14 ranged between 810 to 1150 kg per hectare.

TABLE 2: STATE-WISE SHIFT IN AREA AND PRODUCTION OF CHICKPEA IN INDIA

States	TE 1968-69						Percentage change in TE 2013-14 over TE 1968-69		
	A			p			Y		
	A	p	Y	A	p	Y	A	p	Y
Madhya Pradesh	1625.40 (20.87)	759.40 (16.39)	467 (78.62)	3373.47 (37.84)	3719.67 (42.82)	1103 (113.13)	107.55	389.81	136.19
Rajasthan	1144.47 (14.69)	722.37 (15.59)	631 (106.23)	1536.79 (17.24)	1326.17 (15.27)	871 (89.33)	34.28	83.58	38.03
Uttar Pradesh	2297.23 (29.50)	1387.50 (29.94)	608 (102.36)	586.33 (6.58)	612.00 (7.05)	1043 (106.97)	-74.47	-55.89	71.55
Haryana	1009.67 (12.96)	800.67 (17.28)	781 (131.48)	69.67 (0.78)	66.67 (0.77)	981 (100.62)	-93.10	-91.67	25.61
Maharashtra	382.47 (4.91)	116.63 (2.52)	305 (51.35)	1330.33 (14.92)	1097.00 (12.63)	810 (83.08)	247.82	840.58	165.57
Punjab	503.33 (6.46)	398.67 (8.60)	775 (130.47)	1.97 (0.02)	2.37 (0.03)	1204 (123.49)	-99.60	-99.40	55.35
Bihar	289.23 (3.71)	173.03 (3.73)	508 (85.52)	201.30 (2.26)	237.80 (2.74)	1209 (124.00)	-30.40	37.43	138.00
Karnataka	187.77 (2.41)	81.83 (1.77)	431 (72.56)	906.00 (10.16)	602.40 (6.93)	661 (67.79)	382.50	636.16	53.36
W. Bengal	178.07 (2.29)	125.30 (2.70)	619 (104.21)	24.44 (0.27)	27.75 (0.32)	1133 (116.21)	-86.27	-77.85	83.04
Gujarat	37.37 (0.48)	16.57 (0.36)	437 (73.57)	219.67 (2.46)	250.07 (2.88)	1122 (115.08)	487.82	1409.17	156.75
Andhra Pradesh	76.53 (0.98)	18.80 (0.41)	245 (41.25)	610.67 (6.85)	708.33 (8.15)	1159 (118.87)	697.95	3667.71	373.06
Orissa	21.83 (0.28)	12.80 (0.28)	584 (98.32)	42.44 (0.48)	32.63 (0.38)	769 (78.87)	94.40	154.92	31.68
Other States	35.1 (0.45)	20.76 (0.45)	591 (99.49)	13.02 (0.15)	4.14 (0.05)	318 (32.62)	-62.90	-80.06	-46.19
India	7788.47 (100)	4634.33 (100)	594 (100)	8916.10 (100)	8687.00 (100)	975 (100)	14.48	87.45	64.14

(Area in 000' ha, Production in 000' tons and yield in kg/ha)

Figures in parentheses shows percentage to national figures

State-wise Variability and Growth in Chickpea Production

For empirical analysis, all major chickpea producing states were considered to get reliable estimates of variability (CV %) and growth (GR %) in area, production and productivity. Overall, India's contribution towards global chickpea area and production is about 70%, so the global trend follows the Indian trend in chickpea area and production. For the country as a whole, chickpea production decreased marginally with a GR of -0.26% in GRP, while during PGRP it increased significantly with GR of 2.56%. On the other hand, the coefficient of variation of production increased from 15.85 % to 24.51 percent. It shows that the increased production was mainly on account of increase in variability in both area and productivity during PGRP. States with high growth rates in production during PGRP were Andhra Pradesh (10.58%), Karnataka (8.31%), Gujarat (6.43), Maharashtra (6.32), and Madhya Pradesh (2.90). For easy interpretation, the states are grouped into two categories on the basis of growth rates of production under chickpea. Andhra Pradesh, Maharashtra, Karnataka, Madhya Pradesh, West Bengal, Orissa, Bihar and Rajasthan are having positive growth rate, while Punjab, Haryana, and Uttar Pradesh, were having negative growth rate in

production during PGRP. In terms of growth rate in area, highest positive growth rate was recorded in Andhra Pradesh (8.95%), followed by Karnataka (6.43%), Maharashtra (4.10%), while highest negative growth rate was recorded in Punjab (-12.70%), Haryana (-8.96) and Uttar Pradesh (340%). These figures confirm the fact that in states with assured irrigation facilities, area under chickpea has been drastically reduced, while area under chickpea increased in states with large area under rainfed farming. This is in conformity with the proposition that increased variability of chickpea production (24.51%) during PGRP as compared to variability during GRP (15.85%) may be due to increase in area under chickpea in fragile agro-ecosystem specially in rainfed ecosystem.

The growth rate of productivity for the country as a whole was positive during both the periods, it was 0.50% during GRP and 1.15% during PGRP, although both were found to be statistically insignificant. The growth in productivity indicated a lower growth during PGRP in traditional chickpea producing states like Madhya Pradesh and Maharashtra while in other states, higher growth in chickpea productivity was recorded during the same period. The variability in productivity of chickpea during PGRP was lower as compared to GRP for the country as a whole and for most of the states.

TABLE 3: STATE-WISE VARIABILITY AND GROWTH RATE IN AREA, PRODUCTION AND PRODUCTIVITY OF CHICKPEA IN INDIA

States	Particulars (Percentage)	GRP (1666-67 to 1989-90)			PGRP (1990-91 to 2013-14)		
		A	P	Y	A	P	Y
Madhya Pradesh	CV	13.20	24.24	15.32	13.96	25.82	15.12
	GR	1.60	2.92*	1.34	1.67	2.90*	1.18
Rajasthan	CV	22.48	34.37	17.39	37.88	47.80	19.56
	GR	0.20	0.62	0.43	-0.65	0.34	0.90
Uttar Pradesh	CV	19.24	19.92	18.38	25.20	24.67	11.15
	GR	-2.59*	-1.28	1.23	-3.40*	-2.94*	0.35
Haryana	CV	31.16	52.04	32.16	74.81	78.74	20.69
	GR	-3.22*	-4.05*	-1.03	-8.96**	-8.73**	0.51
Maharashtra	CV	19.67	45.74	25.40	34.28	55.08	21.05
	GR	2.30*	4.69*	2.27*	4.10*	6.32**	2.19*
Punjab	CV	57.78	65.94	21.01	112.92	99.23	19.31
	GR	-7.45**	-8.20**	-1.11	-12.70**	-11.30**	2.15
Bihar	CV	20.05	19.10	19.20	31.73	41.44	14.39
	GR	-2.53*	-0.88	1.77	-1.02	2.07*	0.79
Karnataka	CV	18.42	26.18	18.25	49.73	65.79	21.91
	GR	0.82	0.31	-0.32	6.43**	8.31**	2.20
W. Bengal	CV	44.80	46.29	28.08	35.67	36.99	14.76
	GR	-5.84**	-5.61**	0.60	0.35	1.58	0.88
Gujarat	CV	48.69	63.88	26.64	44.62	64.44	26.99
	GR	3.82*	4.46*	0.97	3.49*	6.43**	2.93
Andhra Pradesh	CV	18.54	26.69	26.02	66.80	81.88	33.17
	GR	-1.95	0.40	2.29*	8.95**	10.58**	3.53*
Orissa	CV	30.56	37.14	13.71	19.14	30.13	13.19
	GR	3.82*	4.76*	0.84	0.95	2.14*	1.13
India	CV	8.96	15.85	12.10	15.56	24.51	1.59
	GR	-0.76	-0.26	0.50	1.34	2.56*	1.15

** & * indicate significant at 1 and 5 per cent level, respectively.

This is possible due to development of high yielding disease resistant varieties, matching production and protection technologies and better rainfall distribution in chickpea growing areas. Minimum support price of chickpea has increased 100% over the past 7 years from Rs 1445 per q in 2007-08 to Rs 3000 per q in 2013-14. A sharp increase of about 33% was noted during 2012-13 to Rs 2800 per quintal from Rs 2100 per quintal a year before. This steep rise has apparently pushed the area and production. Thus, the government intervention in the form of support prices has apparently been one of the important motivating factors for the expansion in chickpea output in the recent years.

Changes in Cost-Profitability Structure

Changes in use of Critical Inputs

The seed and fertilizers are considered as the critical inputs for the chickpea production along with supporting

operational and managerial inputs like human and bullock labour and therefore, the information on use of these critical inputs in physical form over the years is given in table-4. The use of seed of chickpea per hectare was around 85 kg during 1996-97 which rose to 93.52 kg per ha during 2012-13 although it is higher than recommended rate of 60 kg/ha for most of the dominating varieties in central part of the country. The increased seed rate might be due to low seed replacement rate by the farmers and thus using the same farm can save seed for 4-5 years with low germination percentage and poor seed vigour. Although percentage growth in its use over the years was insignificant (0.43%) which revealed that the use of chickpea seed by the farmers had not changed significantly but it was already overused and thus cost of the production could be minimized through seed and varietal replacement and reducing seed rate.

TABLE 4: LEVEL OF USE OF CRITICAL INPUTS IN CULTIVATION OF CHICKPEA IN MADHYA PRADESH

Years	Seed (kg/ha)	Fertilizers (kg nutrients/ha)	Human labour (man hr/ha)	Bullock labour (pair hr/ha)
1996-1997	85.05	30.36	304.03	51.20
2000-2001	88.18	33.46	307.50	49.12
2004-2005	81.25	32.52	248.18	30.81
2008-2009	88.79	34.31	237.04	14.45
2012-2013	93.52	42.76	256.91	7.16
AC	8.47	12.40	-47.12	-44.04
RC	9.96	40.84	-15.50	-86.01
CV(%)	3.77	12.62	9.12	50.66
GR(%)	0.43	1.90*	-1.34	-9.84**

** & * indicates significant at 1 and 5 per cent level, respectively.

Source: Commission for Agricultural Costs and Prices (various published & unpublished reports), DAC,GOI.

In terms of absolute change, there was increase in use of seed by 8.47 kg and in term of relative changes, it was 9.96 per cent. With the increase in irrigated acreage of chickpea in the state, the nutrient use per hectare increased from 30.36 kg during the year 1996-97 to 42.76 kg per hectare during 2012-13, while the recommended dose of nutrient is 120 kg/ha (20:60:20:20 kg NPKS) revealing that the application of nutrient is one third of the recommended rate along with imbalance use and negligible application of potash, zinc and sulphur. The absolute change of 12.40 kg with relative change of 40.84 per cent was observed in use of nutrient application with growth rate of 1.90 per cent, which was significant at 5 per cent probability level. This shows that there is a tremendous scope of increasing the productivity of chickpea through use of balanced plant nutrients. The use of human labour decreases marginally while use of bullock labour decreases substantially. The insignificant decreasing

trend in use of human labour (-1.34 %), in absolute terms of man hour is -47 man hr and in relative terms it is -15.50 per cent, while reduction in use of bullock labour (-9.84%) revealed that the animal energy component was substituted by mechanical power over the years due to time, management and availability constraint and in relative terms it decreases substantially (86%). This shows that over the period of time there were changes in its input use, specially for field operations.

Changes in Cost Structure

The estimates on operational cost of chickpea cultivation for different years show that there were gradual increase in operational cost of cultivation from Rs. 4762.68/ha (1996-97) to Rs. 19279.41/ha (2012-13) showing an increase of 304.80 per cent (Table 5). The enhancement in cost was mainly on account of escalation of input prices and substitution of animal power by machine power since

use of seeds and fertilizers did not reveal sizeable changes during this period but their relative prices in relative terms had increased significantly. The estimates of fixed cost indicate that the fixed cost increased from Rs. 3910.70 / ha in 1996-97 to Rs. 12325.30 /ha in 2012-13. The rental value of owned land, which is calculated as 1/6 of the

gross income from the produce was the main item of the fixed cost and it was increased mainly due to enhancement in prices of chickpea and yield over time. Land revenue, depreciation on farm assets, interest on fixed capital were the minor items of the fixed cost over the time period.

TABLE 5: CHANGES IN COST STRUCTURE OF CHICKPEA CULTIVATION IN MADHYA PRADESH (Rs/ha)

Cost items	1996-97	2000-2001	2004-2005	2008-2009	2012-13	RC (%)	GR (%)
Human labour	1468.12 (16.93)	1879.26 (16.96)	1749.73 (15.76)	2598.82 (15.40)	5735.42 (18.15)	290.66	8.39*
Bullock labour	619.57 (7.14)	540.75 (4.88)	603.77 (5.44)	452.72 (2.68)	393.70 (1.25)	-36.46	-2.55
Machine power	748.36 (8.63)	977.86 (8.82)	1114.17 (10.04)	2149.82 (12.74)	3625.85 (11.47)	384.51	10.44*
Seed	1030.60 (11.88)	1491.05 (13.45)	1280.66 (11.54)	2361.16 (13.99)	4893.85 (15.48)	374.85	8.70*
Fertilizers	424.70 (4.90)	479.08 (4.32)	497.74 (4.48)	522.06 (3.09)	1691.40 (5.35)	298.26	7.55*
Manures	0.41 (0.00)	7.80 (0.07)	29.14 (0.26)	0.00 (0.00)	0.00 (0.00)	-100.00	4.51
Insecticides	99.79 (1.15)	25.79 (0.23)	62.63 (0.56)	232.70 (1.38)	740.04 (2.34)	641.60	13.63**
Irrigation	250.11 (2.88)	576.52 (5.20)	640.31 (5.77)	858.58 (5.09)	1668.96 (5.28)	567.29	9.26*
Miscellaneous	0.83 (0.01)	0.00 (0.00)	0.13 (0.00)	9.34 (0.06)	44.42 (0.14)	5251.81	8.26*
Interest on working capital	120.19 (1.39)	151.80 (1.37)	154.65 (1.39)	236.11 (1.40)	485.77 (1.54)	304.17	25.02**
Total Operational cost	4762.68 (54.91)	6129.91 (55.31)	6132.93 (55.25)	9421.31 (55.84)	19279.41 (61.00)	304.80	8.28*
Rental value of owned land	2959.14 (34.12)	3538.56 (31.93)	3613.30 (32.55)	5481.89 (32.49)	10384.97 (32.86)	250.95	8.66*
Land revenue	6.04 (0.07)	6.94 (0.06)	6.67 (0.06)	6.00 (0.04)	5.56 (0.02)	-7.95	-0.62
Depreciation on farm assets	246.69 (2.84)	383.05 (3.46)	324.04 (2.92)	376.58 (2.23)	344.41 (1.09)	39.61	2.27
Interest on fixed capital	698.83 (8.06)	1023.97 (9.24)	1023.86 (9.22)	1587.39 (9.41)	1590.36 (5.03)	127.57	5.52
Total fixed cost	3910.70 (45.09)	4952.52 (44.69)	4967.87 (44.75)	7451.86 (44.16)	12325.30 (39.00)	215.17	7.72*
Total cost	8673.38 (100.00)	11082.43 (100.00)	11100.80 (100.00)	16873.17 (100.00)	31604.71 (100.00)	264.39	8.04*

** & * indicates significant at 1 and 5 per cent level, respectively.

(Figures in parentheses shows percentage to total cost)

Data Source: Commission for Agricultural Costs and Prices (various published & unpublished reports), DAC,GOI.

The proportionate expenditure on human labour, machine power and insecticides increases over time; while it decreased for bullock labour (from 7.14% to 1.25%) It indicates that over the period of time, the chickpea production becomes more expensive due to increase in cost of human labour and substitution of bullock labour by machine power. Total operational cost during the period of time increased by 304.80 per cent, while total cost of cultivation increased by 264.39 per cent. The growth rates of expenditure on all the inputs were positive and significant except for bullock labour. This revealed that over the period of time, the expenditure on input use in

chickpea production increased significantly. The overall total cost of production in the year 2012-13 was Rs. 31604.710 for the state of Madhya Pradesh and the proportion of operational and fixed cost was about 60:40.

The major components of operational and managerial inputs are human labour, bullock labour, machine power and interest on working capital, while productive and protective inputs cover items like seed, fertilizer, manure, irrigation and insecticides. The information on its proportionate change over the period of time is given in table 6.

TABLE 6: PROPORTIONATE EXPENDITURE ON BASIC INPUTS AND PRODUCTIVITY OF CHICKPEA IN MADHYA PRADESH

Cost items	1996-1997	2000-2001	2004-2005	2008-2009	2012-2013
Operational & managerial inputs	62.07	57.91	59.06	57.71	53.12
Productive & protective inputs	37.93	42.09	40.94	42.29	46.88
Productivity of chickpea (q/ha)	9.81	9.36	10.42	10.05	11.93

(Operational inputs include human labour, bullock labour, machine power & interest on working capital. Productive & protective inputs include seed, fertilizer, manure, irrigation, insecticides)

The proportionate expenditure on operational and managerial inputs was 62.07 per cent during 1996-97 which declined to 53.12 per cent in the year 2012-13. In contrary to this, the percentage expenditure on productive and protective inputs increased from 37.93 per cent during 1996-97 to 46.88 per cent during 2012-13, which reveals technological intensification in chickpea production in the state. With the increased use of productive and protective inputs, the productivity of chickpeas also tends to increase from 9.81 q to 11.93 q per ha during 1996-97 to 2012-13,

respectively. Thus, there is further scope of increasing the productivity of chickpea through minimizing the proportionate expenditure on operational and managerial inputs and enhancing the proportionate expenditure on productive and protective inputs through reallocation of inputs at optimum level.

Productivity and Profitability

The data on productivity and profitability of chickpea cultivation over the period of time is presented in table 7.

TABLE 7: PRODUCTIVITY AND PROFITABILITY OF CHICKPEA IN MADHYA PRADESH

Cost items						(Rs/ha)
	1996-1997	2000-2001	2004-2005	2008-2009	2012-2013	GR (%)
Yield (q/ha)	9.81	9.36	10.42	10.05	11.93	1.03
Implicit price (Rs/q)	1144.27	1441.00	1308.27	2065.02	3329.61	7.44*
MSP (Rs/q)	740.00	1100.00	1425.00	1730.00	3000.00	10.29**
Gross income	11836.56	14154.23	14453.19	21927.55	41539.87	8.66*
Operational cost (OC)	4762.68	6129.91	6132.93	9421.31	19279.41	8.28*
Net income at OC	7073.88	8024.32	8320.26	12506.24	22260.46	8.92*
Input output ratio at OC	2.49	2.31	2.36	2.33	2.15	-
Fixed Cost (FC)	3910.70	4952.52	4967.87	7451.86	12325.30	7.72*
Total cost (OC+FC)	8673.38	11082.43	11100.80	16873.17	31604.71	8.04*
Net income at total cost	3163.18	3071.8	3352.39	5054.38	9935.16	10.51**
Input output ratio at total cost	1.36	1.28	1.30	1.30	1.31	-

** & * indicates significant at 5 and 10 per cent level, respectively.

Estimated on the basis of cost items given in table 5 & 6, and data on the yield and prices received by the farmers were taken from the same source

The data revealed that the gain in productivity over the period of about 16 years is only 2.12 quintal, i.e., 176 kg per year which is very negligible looking to the production potential of available varieties (20 q/ha). The growth rate of productivity was 1.03 which was non-significant. The implicit prices of chickpea during the period under consideration have been increased at the growth rate of 7.44 per cent which is significant at 5 per cent probability level. The increase in MSP during the same period was higher (10.29%) as compared to increase in implicit prices showing government price policy support works as an incentive for enhancing the pulses production in the country.

On account of enhancement in prices followed by enhancement of productivity of chickpea, the gross income from chickpea increased @ 8.66 per cent per annum. On the other side, the operational cost increased @ 8.26 per cent. This shows that the rate of increase in gross income was surpassed the rate of increase in operational and total cost (8.04%) and thus net income at operational cost increased nearly by 300 per cent @ 8.92 per cent per annum. But input output ratio shows marginally declining trend which was 2.49 in 1996-97 that declined to 2.15 during 2012-13, revealing that return to investment of one rupee at operational cost declined marginally on account of proportionality higher increase in operational cost

during the period. Rate of increase in net income over total cost was higher as compared to operational cost revealing that the proportionate expenditure on fixed cost declined marginally over the period of time. The input-output ratio at total cost was almost identical over the period of time with marginal year to year deviation.

The above data clearly indicated that the chickpea cultivation with given productivity level and cost prices structure is profitable even at total cost. And this crop enterprise can be made more profitable through reduction in cost and enhancing productivity per unit of area. Since this is rainfed -partially irrigated crop, the water use efficiency can be further enhanced through proper mulching and using sprinkler irrigation wherever necessary. The cost of production, profitability (per quintal) and break even analysis were carried out to know the potential profitability of expenditure for chickpea production in the market based economy and data on the same are presented in table 8.

The operational cost/ average variable cost per quintal was Rs.423.18 during 1996-97 which rose to Rs. 1463.00 during 2012-13. The net income at operational cost per quintal was Rs. 721.09 which increased to 1866.61 during 2012-13 showing an increase of 158.86 per cent. Break even analysis is carried out using cost and revenue data presented in table 8. Break-even analysis is a type of cost-volume-profit analysis and break-even point for a product is the point where total revenue received equals the total costs associated with the sale of that product.

TABLE 8: PRODUCTION COST, PER QUINTAL PROFITABILITY AND BREAK EVEN ANALYSIS OF CHICKPEA IN MADHYA PRADESH (Rs/q)

Cost items	1996-1997	2000-2001	2004-2005	2008-2009	2012-2013
Yield (q/ha)	9.81	9.36	10.42	10.05	11.93
Operational Cost (AVC)	423.18	583.70	509.78	821.09	1463.00
Net income at OC	721.09	857.30	798.49	1243.93	1866.61
Total cost (TVC)	821.83	1112.82	986.55	1562.57	2496.13
Net income at total cost	322.44	328.18	321.72	502.45	833.48
Average revenue (AR)	1144.27	1441.00	1308.27	2065.02	3329.61
Fixed cost (Rs/ha) (TFC)	3910.70	4952.52	4967.87	7451.86	12325.30
Break even yield (q/ha)	5.4	5.8	6.2	6.0	6.6
Actual yield (q/ha)	9.81	9.36	10.42	10.05	11.93
Difference between AY & BEY (q/ha)	4.41	3.56	4.22	4.05	5.33
	(81.67)	(61.38)	(68.06)	(67.50)	(80.76)

Figures in parentheses shows percentage differences in Actual yield and break-even yield

The break even yield of chickpea in the State of Madhya Pradesh with the given cost and price structure shows that the farmers of the state are operating chickpea

production business above the break even point. This revealed that they are operating in profit zone in the cultivation of chickpea.

Conclusions

- The scenario of chickpea production in the country is changing and it shifted towards Central-Southern direction from Northern-Central direction.
- The growth in chickpea production was higher in post-green revolution period as compared to green revolution period.
- The profitability from chickpea production exhibited positive change from 1996-97 to 2012-13 with proportionate enhancement in expenditure on use of productive and protective inputs.
- The difference in actual and break even yield is about 80 per cent revealing that even with 7 quintal of yield of chickpea, the farmers can reap sizeable profit over operational costs.
- The profitability from chickpea can be further enhanced through enhancing productivity per unit of area and input use.

Suggestions and Recommendations

1. The productivity of chickpea in the state can be increased through increasing seed and varietal replacement, enhancing use of balance plant nutrient and judicious use of IPM technology and reducing expenditure on operational and managerial inputs through effective management practices; this will help in reducing cost of production of chickpea.
2. Greater thrust should be laid on bridging the substantial yield gaps that still prevail between the potential and attainable yield of chickpea, through appropriate production technology dissemination.
3. Competitiveness in chickpea exports can be enhanced through improving productivity, enhancing grain quality and consistent supply at competitive prices.
4. Price being the major deciding factor for acreage allocation under chickpea. Therefore, mechanism for procurement of chickpea in case of market failure should be developed.
5. There is an urgent need for increasing chickpea production through formulating varietal specific (Kabuli, Gulabi and deshi type) and region specific

short and long term strategies and developing seed rolling plan and establishment of seed hub for supply of quality seed to the chickpea producers.

6. For increasing chickpea production, safety net in terms of Crop Insurance as per new Cop Insurance Scheme which has only 2 per cent of premium rate of sum insured should be provided to chickpea growers, specially for non-loanee farmers.

REFERENCES

- Aivalli, Girish (2015) India needs a pulses revolution, The Hindu Business Lines, October 11, 2015.
- Gowda, CL Laxmipathi, Chaturvedi, Sushil K, Gaur, Pooran M, Kumar, CV Sameer and Jukanti, Aravind K (2015). Pulses research and development strategies for India, Pulses Hand book, 2015, Commodity .Com, pp 17-33.
- GOI (2014) Agricultural Statistics at a Glance 2014, Government of India, Ministry of Agriculture, Department of Agriculture & Cooperation, Directorate of Economics & Statistics, Published in India by Oxford University Press.
- NCAER (2014) India's Pulses Scenario, A research paper prepared under the project Agricultural Outlook and Situation Analysis Reports, National Council of Applied Economic Research, New Delhi, pp12.
- Reddy, A. Amarendra and Mishra, Devraj (2016) Growth and Instability in Chickpea Production in India: A State Level Analysis, <https://www.researchgate.net/publication/216308282>.
- Sinha, Neelam, Banafar, K.N.S., & Gouraha, A.K. (2014) An Economic Analysis of Production of Chickpea in Bemetara District of Chhattisgarh, Indian Journal of Animal Nutrition, 7 (16): 2291- 2294.
- Varadharajan, S (2015) India may need to import 10 million tonnes of pulses, The Hindu, Business and Agri-Business, November 1st 2015.
- Kumar, Praduman & Mittal, Surabhi (2003). Crop diversification in India: Analysis by State and farm size group, Agricultural Situation in India, August 2003, 272-281.

AGRO-ECONOMIC RESEARCH

Assessment of Marketable and Marketed Surplus of Major Foodgrains in Andhra Pradesh*

DR. M. NAGESWARA RAO

Agricultural Characteristics of Andhra Pradesh

Andhra Pradesh is an agrarian state and it is considered as one of the most progressive states with respect to agricultural development, maintaining high levels of crop production compared to other Indian states. It is the 5th (8.46 mil) and 4th largest (275.04 lakh ha.) population and geographical area in Indian states. The state having 137.59 lakh ha. (50.0%) of Gross Cropped Area (GCA) and 111.60 lakh ha. (40.6%) of Net Cropped Area (NCA), against the total geographical area (2012-13). Rice is the major food crop and staple food followed by Jowar, Bajra, Maize and pulses are major food crops all together constitute 66.02 per cent of area. Oilseeds, Cotton and Sugarcane which are important non-food crops together with horticultural crops cover 33.98 per cent of GCA in the state. There are two important perennial rivers, the Godavari and the Krishna which flows through the state providing irrigation through canals. The major source of irrigation is tube wells which accounts for a share of 50 per cent (25.45 lakh hectares), followed by canals 35.7 per cent (18.18 lakh ha.), tanks at 10.8 per cent (5.50 lakh ha.) and other sources account for a share of 3.35 percent (1.77 lakh ha.) in the state. Agriculture is the primary source of income and rapid agriculture growth is essential to maintain food security. Moreover, the state has 29.9 million work force and as much as 19.5 million (65%) are engaged as agricultural workers in the state. Therefore, optimistic trend was observed in foodgrain production making the state rank 6th at the national level during 2003-04. Further, it has attained 4th rank in (2004-05) and 3rd during (2005-06, 2006-07 and 2008-09). The state foodgrain production has been fluctuating due to occurrence of severe climate changes like droughts and floods, labour scarcity, high cost of cultivation, cropping pattern and prices fluctuation etc.

In Andhra Pradesh major area was cultivated mostly by conventional crops such as Jowar, Castor, Ragi and Mesta etc. which were grown before the green revolution. Now, the cultivable area has changed to include rice, maize, and cotton crops and horticultural crops. Rice is the major cereal crop production constituted 75.4 per cent of total food crops production followed by other cereal crops of Jowar (7.8%) and Maize (7.3%) during 1992-93. But the share of Rice production had declined during the period 1992-93 to 2011-2012. Whereas production of

Maize crop registered a massive increase from 2.3 per cent to 19.9 per cent in the same period.

Among the Pulse crops, Bengal gram production has been increasing in estimated periods. The main reason, particularly after Green Revolution, was both central and state governments had been taking needful steps to increase the production and productivity of agricultural sector.

Objectives of the study:

The main objectives of the study are:

1. To estimate marketable and marketed surplus for Paddy, Maize and Bengal gram crops in Andhra Pradesh.
2. To estimate farm retention for consumption seed, feed, wages and other payments in kind etc. for selected crops and
3. To examine role of various factors such as institutional, infrastructural, socio-economic etc. influencing household marketed surplus decision at household level.

Sampling Methodology:

The data used in this study was collected from both secondary and primary sources. The study is confined only to three major foodgrain crops, namely, paddy, maize and bengal gram in the state of Andhra Pradesh. For primary survey (Household survey), at first stage, three districts, namely, West Godavari, Guntur and Kurnool were selected on the basis of production shares of study crops in states total production.

The selected districts of West Godavari and Guntur which were growing more than one selected crop were selected for the household survey and to study the crop production share in the states production. At second stage, two mandals were selected from each sample district purposively on the basis of their area and production of study crops. At third stage, for conducting household survey, two sample villages from each selected Mandal (total 18 villages) were selected on consultation with concerned agriculture officers in the district. The two sample villages were selected purposively considering the location, one village near the market yard/town (within 15 km) and the other village taken was least 15 km away from the market yard/town from the Mandal headquarters.

*A.E.R.C. Andhra University, Visakhapatnam

Finally, from each selected village, at least 12 farmer households which had grown at least one study crop in the reference year 2012-13 and with representation in different farm categories (marginal 0-1 ha, small 1-2 ha, semi-medium 2-4 ha, medium 4-10 ha. and large more than 10 ha.) were selected. Overall, a total of 450 sample households comprising of 88 marginal, 88 small, 92 semi medium, 104 medium and 78 large farmers were selected for the survey. Out of total 450 sample HH for selected crops of paddy, maize and gram, 200 households grow paddy, 150 households had grown maize and 100 households had grown bengal gram. Across these three districts, 175 sample HH were selected from West Godavari district consisting 100 HH which were paddy cultivators and 75 which were maize cultivators. In Guntur district, 225 sample HH were selected consisting of 100 HH which were paddy and 75 were maize and 50 HH were gram cultivators, respectively. Further, from Kurnool district, 50 households were selected for gram crop. The Primary data was collected by canvassing a pre-designed schedule for agricultural year 2012-13.

Major Findings of the Primary Survey:

(1) On the whole, average size of the family was 3.69 persons consisting of 1.9 males and 1.79 females. Out of 450 sample HH, 99.33 per cent were those families where male persons were head of the family and the average age of the family head in total sample was 47 years and his average year of schooling was 8.56 years with the highest being for large farmers at 9.62 years. Overall, 94 per cent of HH had agriculture as the main occupation and dairy was the least i.e., 1.11 per cent of HH had dairy as an occupation. Majority of HH pursue more than one occupation. Of the total sample HH, 70.62 per cent and 20.22 HH belonged to OBC and general category, respectively.

(2) The average size of operational holding per HH for entire sample was 4.12 ha. comprising 3.20 ha. Irrigated and 0.92 ha. Unirrigated land. Across sample farmers, non-cultivable land was not available except for medium farmers and no farmer expressed about cultivable waste. Very few HH involved in leased-in and leased out land. Canal is the major source of irrigation in West Godavari and Guntur districts, whereas tube well irrigation is the major source in Kurnool. Overall, 34 households (7.56%) had taken land on lease (6.1%) and majority of sample farmers (76.47%) paid fixed money as rent and the remaining (23.53%) paid 50% share of the crop production as rent.

(3) Overall, per sample HH, total livestock units were contained 0.40 cattle, 2.16 buffalo, and 1.83 others (goat, sheep etc.) Among farmer groups, the highest livestock reported per HH was 5.97 for small farmers and least 3.16 units for large farmers.

(4) On the whole, the average investment per hectare on farm machineries and related implements by sample HH was of Rs.39,984 of the total investment and the highest investment of Rs.32,044 was on tube wells/bore wells followed by Rs.7144 for tractors and Rs.796 for threshing machines etc. Therefore, use of farm technology is inadequate due to lack of knowledge and investment of the farmers.

(5) Overall, in the selected districts of Guntur, West Godavari and Kurnool, the average GCA per HH worked out to be 5.49 ha. Category wise it was 0.92 for marginal farmers, 1.89 ha for small farmers, 3.66 for semi medium farmers, 7.96 ha. for medium farmers and 12.97 ha. for large farmers of the gross cropped area (GCA). Of the total area (GCA) 2466.43 ha., 57.26 per cent and 42.74 per cent area was cultivated under kharif and rabi crops, respectively. Among kharif crops, paddy was most important foodgrain crop which alone occupied 54.26 per cent of GCA followed by maize (2.22%) and jowar (0.78%). On the other hand, under rabi crops paddy, bengal gram and maize were important food crops claiming 18.97, 12.68 and 11.09 per cent of GCA, respectively. Moreover, pulses and oilseed crops were also important crops of the selected districts. Between kharif and rabi crops, paddy crop area was the highest under selected districts of West Godavari and Guntur due to availability of more irrigated lands. Overall, sample HH cropping intensity was 133.20 per cent and the highest reported was 140.31 per cent from marginal and least was 120.39 per cent from large farmer per household. It was found that cropping intensity is changing across farm size of the farmers. Regarding paddy, yield per hectare was 34.71 quintals, across farm sizes with not significant variations but the highest yield reported from marginal farmers was 36.42 quintals. For jowar crop, yield per hectare was 39.63 quintals under kharif and 36.66 quintals under rabi season. Further, for bengal gram, yield per hectare was 21.74 quintals and significant variations was observed among the farm size. The gram crop yield varied between 22.56 qtl for MF and least 19.74 qtl for large farmers.

(6) Overall, on an average per household, total retention of paddy produce was 8.02 qtl, of which 7.49 qtl (96.86%) and 0.25 qtl (3.14%) retained for self-consumption and seed purposes. Paddy produce used for payment in kind and other purposes was not reported by the farmers. Majority of farmers reported that they purchased rice for home consumption. So, the retention of paddy produce for self-consumption was small quantity except for medium and large farmers. This was pre dominantly due to government of Andhra Pradesh distributing subsidy priced rice through Public Distribution System (PDS). On the other hand, seed was also sold through A.P Seed Corporation at subsidized price. Therefore, the retention pattern of the HH for paddy produce is negligible. The

highest and least retention of paddy produce were found to be large and marginal farmers, respectively.

(7) Overall, total retention of maize quantity per household was 0.28 Qtl, which was negligible. Positive relationship was observed between the farm size and total retention of maize produce except in large case of farmers per HH. Total retention of gram per household was 0.15 qtl and this retention of gram was meant only for self-consumption per HH. No quantity of gram produce was retained for other uses like seed and payments.

(8) Producers performed different operations during crop harvesting. Majority of farmers used manual methods to carry out harvesting, threshing and winnowing operations of selected crops.

Losses during Harvesting Stages (kg)

Crop	Manual Operation (Kg)	Mechanical operation (kg)	Total Losses (Kg)	% Losses to total production
Paddy	1.27	1.61	2.88	1.26
Maize	0.58	0.50	1.09	0.31
Gram	0.50	0.28	0.78	1.14

Regarding Paddy harvesting, threshing and winnowing operations performed by both manual and mechanical methods, majority of large farmers performed it mechanically and per HH total losses was 2.88 kg (1.26%) of the total produce. The harvesting losses reported inverse relation between land size and harvesting losses of crop per HH. In the case of maize crop, harvesting operations loss reported was 1.09 kg (0.31%). The losses reported in different harvesting operations per household were 0.51 kg (0.15%) for harvesting 0.47 kg (0.14%) for threshing and 0.10 kg (0.03%) for winnowing. Further, for gram crop per HH, total harvesting losses was 0.78 kgs of which different harvesting operations per HH losses were 0.45 kg (0.66%) for harvesting, 0.33 kg (0.48%) for threshing and no losses for winnowing under gram crop. Therefore, non availability of mechanization unsuitable lands and unawareness are the causes for majority of

farmers depending on manual methods for harvesting of the study crops. Among study crops, percentage losses at harvesting stage under maize produce was less compared to other two crops (paddy and maize) due to which majority of the farmers sold their produce at their fields to the private buyers.

(9) Majority farmers used head load mode and buffalo cart transportation of produce from field to threshing floor. Further, tractor trolley and trucks were the common mode of transportation used by sample HH to transport their produce from field/storage to market yards. The transportation losses occurred at the time of packing loading and unloading. The details of transportation losses are given below.

Crop	Paddy	Maize	Gram
Total Transportation Losses Kg/hh.	0.044	0.046	0.026
% of production	0.02	0.01	0.04

For paddy crop produce per HH, absolute quantity lost during transportation was found to be increasing with farm sizes. The transportation losses varied from 0.07 kg (0.01%) for large farmers to 0.03 kg (0.06%) for marginal farmers per HH. But the percentage loss revealed a declining trend with increase in farm size of sample HH under Paddy produce. In the case of maize, average per HH transport loss was 0.046kg (0.01%) of which transportation loss occurred from field to threshing floor was 0.034 kg (0.01%) and from farm/field to market yard was 0.012 kg per HH and the mode of transport was gunny bags. Moreover, gram transportation used mainly head load and buffalo cart from field to threshing floor and loss was 0.026 kg per HH. Further, for transportation from farm to market yard, farmers used tractor trolley and truck and the loss was 0.01kg (0.01%) per household. Therefore, among study crops, gram production loss in absolute terms was minimal (0.026 kg per HH).

(10) The details of Overall Production Losses during storage of produce of selected crops:

Crop	Quantity stored per HH	Quantity lost	% of storage loss to stored quantity	% of storage loss to production	Average storage cost Rs/month/Qtl
Paddy	14.66	0.02	0.12	0.003	2.00
Maize	8.17	0.09	1.58	0.002	3.41
Gram	128.25	0.18	0.14	0.12	5.35

Very few farmers used hired godowns and house storages. For in house storage, they used home godowns and for packing, they used gunny bags. The storage losses occurred due to weight loss, poor packing, humidity,

improper storage, rodents and handling etc. The production losses during storage were 0.02, 0.09 and 0.18 percent for paddy, maize and gram, respectively. Among selected crops less quantity of produce is stored under maize due

to which majority of the farmers were forced to sell at their field or farm gate.

(11) Production losses under total post-harvest operations were 1.28, 0.35 and 1.62 per cent in harvesting, transportation and storage for paddy, maize and gram, respectively. The highest production losses was at harvesting stage followed by storage and transportation stage. Bengal gram crop reported the highest loss due to low market prices. So, most of the farmers kept the largest produce at market yards during the survey period. Whereas in case of the paddy farmers, poor knowledge about the harvest time and low mechanization used at harvesting and natural calamities were also the reasons for highest post harvest losses under Paddy crop.

(12) Marketed surplus means actual quantity of produce sold by the producer irrespective of his needs, self-consumption and needful requirements.

So, marketed surplus = Marketable surplus + distress sale.

(13) Paddy crop produce marketable and marketed surplus accounted for 95.24 and 96.27 per cent, respectively. There is a gap between marketable and marketed surplus (1.03%) due to majority of small, marginal and semi-medium farmers used to sell at the time of harvesting except some medium and large farmers. Category-wise, marketed surplus output ratio (MSR) of paddy was found to be highest at 98.19 per cent for semi medium and lowest at 92.92 per cent for medium farmers. The average distance covered to sell paddy produce was 4.43 km. 83.84 per cent of paddy was sold to private traders/money lenders and village traders. On the other hand, overall maize production marketable and marketed surplus accounted for 99.90 and 99.92 per cent, respectively and the average distance covered to sold maize produce was 7.92 km. The total marketed surplus was 88.14 per cent of maize produce sold to private traders and only 12 per cent sold to government agencies. In case of gram produce, marketable and marketed surplus accounted for 99.58 per cent and 12.70 per cent of production. For gram, marketed surplus output ratio was higher because gram is not regularly used in daily diet and the average distance covered was 4.70 km. Majority of farmers stored their gram produce at market yards for higher price. Sometimes open market price per quintal for gram was higher than MSP of government agencies. Therefore, gram producers sold the produce at 92.85 per cent of MSP to private agencies. So, government participation to purchase the gram produce is nominal, as expressed by the farmers.

Majority of marginal and small farmers expressed the percentage of marketed surplus for paddy and maize which was found to be higher than marketable surplus, due to meet their urgent cash needs and repayment of debts to private traders etc. Regarding time of sale, it was found

that marketed surplus of paddy and maize produce was immediately disposed after crop harvesting due to distress sale expressed by majority of marginal and small farmers and the sale of these two crops at their fields after harvesting. Some medium and large farmers kept some produce at their house storage or kept in market yards with gunny bags for sale at higher prices. On the other hand, marketed surplus was less than marketable surplus due to low price at the time of harvesting under gram produce. The main reasons for this were both low government procurement price as well as low open market price at harvesting time. So, farmers kept the large scale produce in market yards for future remunerative price at the market expressed by the farmers.

Private traders and money lenders played a vital role to buy the foodgrain produce. Total quantity of marketed surplus was 83.84, 88.14 and 92.85 per cent of the paddy, maize and gram produce sold to the above mentioned agencies due to urgent cash need and debt repayments. Moreover, the other problem was mainly foodgrain procurement operations by the government agencies which were not in time and purchase were made at MSP than open market at the time of crop harvesting of the farmer. Therefore, unregulated private marketing system exploited the farmers to a great extent through weighing, grading of produce at the time of sale. Across farm size, the marginal and small farmers sold the produce at the time of harvesting mainly to repay the debts. Moreover, the other causes are inability to transport their produce to the markets because of poor transportation facilities, packing and loading/unloading, problems, lack of market knowledge. So, they did not prefer to sell the produce at the market yards. Moreover, marginal and small farmers felt that by selling produce to private agencies/village traders. They would save on transportation charges and other expenses.

(14) Regarding market information, nearly 53.11 per cent of sample farmers had accessed to price through traders and village business men. Next important sources of information were market committee (APMC) yard (13.11 per cent), followed by 1.56 per cent of the farmers who got to know through print media, 11.11 per cent buyers at village level and 5.11 per cent through electronic media.

(15) The study found that all sample farmers had access to the credit and as the farm size increases, the amount of credit accessed also increased. Across the credit sources, 60.39 percent obtained credit from commercial banks followed by 26.67 per cent cooperative banks and 8.60 per cent from private money lenders. Category wise, credit ranged from 17.24 per cent for MF to zero per cent for LF. So, the private money lending is decreasing with increasing land size. Therefore, institutional credit is the main source, which is available at low rate of interest. Majority of farmers expressed that main purpose to borrow money was for crop loans.

(16) Out of 450 sample farmers, 36.89 per cent households knew about MSP of selected crops and the level of awareness and farm size were found positively related due to literacy levels of sample HH. Very few farmers have responded about future trading and warehouse receipt programme. Contract farming was not operating in these areas and storage and warehouse facilities were used only for gram and paddy produce expressed by the sample farmers. Majority of farmers expressed that price increases the marketed surplus and farmers sold a higher proportion of their produce instead of keeping it for self-consumption or seed use and feed mainly in paddy produce. The government of Andhra Pradesh is supplying the rice and seed at subsidized prices to the marginal, small and semi-medium farmers through Public Distribution System (PDS) and Seed supply Corporation.

Policy Implications:

1. Adequate measures should be adopted by the government to increase the productivity levels of agricultural crops through linkage of MGNREGS scheme, which would reduce the cost of cultivation. Due to this, farmers debt burden would be reduced.

2. Paddy and gram are important foodgrain crops. The department of agriculture is responsible for providing the farm machineries and related implements exclusively to marginal and small farmers at subsidy prices through government loans. Moreover, increased access to scientific knowledge and improved methods can also help to reduce the post-harvest losses at farm level for all category farmers.

3. Extension of institutional finance through banks and other government financial institutions at low interest rate can protect the rural farmer from the non-institutional finance and private traders and can be instrumental to reduce the repayment of debt owed to traders and commission agents.

4. The government should extend the marketing facilities to purchase all types of agricultural produce at the time of harvesting, by which it can control the private traders and unregulated markets.

5. The Department of Agriculture should extend the mechanization in agricultural production through supply of tractors, harvesters and other technical implements at subsidized prices to the farmers in order to reduce the production costs and losses.

6. The Government should extend and disseminate market information of agricultural commodities relating to provision of loans and advances, supply of seeds, agricultural implements and fertilizers to the farming community at village level through print and electronic media.

7. Market committees may take necessary steps to minimize the problems like lack of minimum facilities, delay in disposal of produce, irregular behavior of committee employees and officials at marketing yards.

8. Both central and state governments should extend the foodgrain exports through tax incentives and subsidies and reduce the imports from other nations.

9. Extension of the purchasing capacity of government agencies like Market Fed, F.C.I etc., to purchase the foodgrains in the state.

10. Fixation of the Minimum Support Price (MSP) of all types of foodgrains before the crop season. It will benefit the farmer by indicating whether cultivation of the crop is beneficial or not.

11. Department of Agriculture and other Governmental agencies should educate the farming community to adopt co-operative farming and corporate agriculture. It will reduce the cost of cultivation and lead to sustainable income to the farmers.

12. Farmers can easily access the banking activities, if more number of nationalized bank branches and other government financial institutions at village level are established.

So the institutional and infrastructural facilities can enhance the productivity and generate more production value of study crops for the farmers, moreover, this could reduce the losses from different activities involved from harvesting to marketed surplus.

Commodity Reviews

Foodgrains

During the month of November, 2016 the Wholesale Price Index (Base 2004-05=100) of pulses increased by 4.21%, cereals increased by 1.60% & foodgrains increased by 2.33% respectively over the previous month.

INDEX NUMBER OF WHOLESALE PRICES

(Base: 2004-2005=100)

Commodity	Weight (%)	WPI for the month of November, 2016	WPI for the month of October, 2016	WPI A year ago	Percentage Change during	
					A month	A year
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rice	1.793	248.8	249.5	237.4	-0.28	4.80
Wheat	1.116	245.0	232.9	221.3	5.20	10.71
Jowar	0.096	293.4	291.6	284.6	0.62	3.09
Bajra	0.115	293.2	289.1	261.0	1.42	12.34
Maize	0.217	277.9	283.3	259.9	-1.91	6.93
Barley	0.017	286.8	276.3	238.5	3.80	20.25
Ragi	0.019	445.2	369.7	326.7	20.42	36.27
Cereals	3.373	253.5	249.5	236.2	1.60	7.32
Pulses	0.717	462.8	444.1	380.2	4.21	21.73
Foodgrains	4.09	290.2	283.6	261.4	2.33	11.02

Source: Office of the Economic Adviser, M/O Commerce and Industry.

Procurement of Rice

4.79 million tonnes of rice (including paddy converted into rice) was procured during November 2016 as against 5.29 million tonnes of rice (including paddy converted into rice) procured during November 2015. The total procurement of Rice in the current marketing season *i.e*

2016-2017, up to 29.11.2016 stood at 16.25 million tonnes, as against 13.96 million tonnes of rice procured, during the corresponding period of last year. The details are given in the following table:

PROCUREMENT OF RICE

(in Thousand Tonnes)

State	Marketing Season 2016-17 (upto 29.11.2016)		Corresponding Period of last Year 2015-16		Marketing Year (October-September)			
					2015-16		2014-15	
	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Andhra Pradesh	109	0.67	150	1.07	4326	12.65	3591	11.17
Chhattisgarh	524	3.22	458	3.28	3442	10.06	3423	10.64
Haryana	3567	21.95	2853	20.44	2861	8.36	2015	6.27
Maharashtra	37	0.23	9	0.06	230	0.67	199	0.62
Punjab	10991	67.65	9301	66.65	9350	27.33	7786	24.21
Tamil Nadu	8	0.05	39	0.28	1191	3.48	1049	3.26
Uttar Pradesh	176	1.08	372	2.67	2910	8.50	1698	5.28
Uttarakhand	175	1.08	129	0.92	598	1.75	465	1.45
Others	660	4.06	644	4.61	9301	27.19	11936	37.11
Total	16247	100.00	13955	100.00	34209	100.00	32162	100.00

Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat in the current marketing season i.e 2016-2017 up to June, 2016 is 22.93 million tonnes against a total of 27.89 million tonnes of wheat procured during last year. The details are given in the following table:

PROCUREMENT OF WHEAT

(in Thousand Tonnes)

State	Marketing Season 2016-17 (upto 30.06.2016)		Corresponding Period of last Year 2015-16		Marketing Year (April-March)			
					2015-16		2014-15	
	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Haryana	6722	29.32	6692	24.00	6778	24.13	6495	23.20
Madhya Pradesh	3990	17.40	7195	25.80	7309	26.02	7094	25.34
Punjab	10645	46.42	10346	37.10	10344	36.83	11641	41.58
Rajasthan	762	3.32	1300	4.66	1300	4.63	2159	7.71
Uttar Pradesh	802	3.50	2267	8.13	2267	8.07	599	2.14
Others	9	0.04	85	0.30	90	0.32	6	0.02
Total	22930	100.00	27885	100.00	28088	100.00	27994	100.00

Source: Department of Food & Public Distribution.

Commercial Crops

Oil Seeds and Edible Oils

The wholesale Price Index (WPI) of nine major oilseeds as a group stood at 206.9 in November, 2016 showing a decrease of 2.5% and 5.0% over the previous month and year respectively. The WPI of Copra (Coconut) increased by 1.2%, safflower (kardi seed) by 0.9% and rape & mustard seed by 5.4%, soybean by 4.3%, gingelly seed by 0.6%, cotton seed by 0.5% and niger seed remain unchanged over the previous month.

The WPI of Edible Oils as a group stood at 156.6 in November, 2016 showing a decrease of 0.4% and 4.0% over the previous month and year respectively. The WPI of Copra Oil increased by 1.8%, Soybean Oil by 0.7%, Cotton Seed Oil by 0.3%, Mustard & Rapeseed Oil and Gingelly Oil by 0.1% over the previous month. The WPI of Groundnut Oil decreased by 3.3% & Sunflower Oil by 0.1% over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 246.3 in November, 2016 showing a decrease of 7.3% & 11.8% over the previous month and year respectively.

Potato

The WPI of potato stood at 275.3 in November, 2016 showing a decrease of 3.3% over the previous month and an increase of 37.0% over the previous year.

Onion

The WPI of onion stood at 245.1 in November, 2016 showing an increase of 12.1% over the previous month and a decrease of 51.5% over the previous year.

Condiments & Spices

The WPI of raw condiments & spices (group) stood at 349.2 in November, 2016 which shows a decrease of 1.0% and 3.9% over the previous month and year respectively. The WPI of turmeric increased by 1.0% over the previous month. The WPI of black pepper & chillies (dry) decreased by 2.4% and 1.9% respectively over the previous month.

Raw Cotton

The WPI of raw cotton stood at 215.3 in November, 2016 showing a decrease of 3.0% over the previous month and an increase of 17.4% over the previous year.

Raw Jute

The WPI of raw jute stood at 420.9 in November, 2016 showing an increase of 2.2% over the previous month and a decrease of 3.1% over the previous year.

WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

Commodity	Latest	Month	Year	% Variation over	
	November, 2016	October, 2016	November, 2015	Month	Year
<i>OIL SEEDS</i>	206.9	212.1	217.9	-2.5	-5.0
Groundnut Seed	236.0	249.5	231.5	-5.4	1.9
Rape & Mustard Seed	239.1	237.7	244.1	0.6	-2.0
Cotton Seed	228.9	229.2	205.8	-0.1	11.2
Copra (Coconut)	122.3	120.8	141.8	1.2	-13.8
Gingelly Seed (Seasamum)	312.0	313.9	301.1	-0.6	3.6
Niger Seed	321.9	321.9	402.4	0.0	-20.0
Safflower (Kardi Seed)	159.1	157.7	148.8	0.9	6.9
Sunflower	169.3	191.1	198.3	-11.4	-14.6

WHOLESALE PRICE INDEX OF COMMERCIAL CROPS—*Contd.*

Commodity	Latest	Month	Year	% Variation over	
	November, 2016	October, 2016	November, 2015	Month	Year
Soyabean	173.1	180.9	220.0	-4.3	-21.3
<i>EDIBLE OILS</i>	156.6	157.2	150.6	-04.	4.0
Groundnut Oil	208.8	216.0	192.2	-3.3	8.6
Cotton Seed Oil	204.3	203.7	186.1	0.3	9.8
Mustard & Rapeseed Oil	186.3	186.1	192.2	0.1	-3.1
Soyabean Oil	155.4	154.3	150.3	0.7	3.4
Copra Oil	137.6	135.2	148.6	1.8	-7.4
Sunflower Oil	133.6	135.6	134.3	-1.5	-0.5
Gingelly Oil	185.3	185.1	159.3	0.1	16.3
<i>FRUITS & VEGETABLES</i>	246.3	265.6	279.1	-7.3	-11.8
Potato	275.3	284.7	201.0	-3.3	37.0
Onion	245.1	218.6	505.5	12.1	-51.5
<i>CONDIMENTS & SPICES</i>	349.2	352.7	363.3	-1.0	-3.9
Black Pepper	719.1	737.0	762.1	-2.4	-5.6
Chillies (Dry)	390.3	397.8	389.9	-1.9	0.1
Turmeric	244.4	242.0	262.4	1.0	-6.9
Raw Cotton	215.3	222.0	183.4	-3.0	17.4
Raw Jute	420.9	411.7	434.3	2.2	-3.1

STATISTICAL TABLES

WAGES

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

(In Rs.)

State	District	Centre	Month & Year	Daily Normal Working	Field Labour		Other. Agri Labour		Herdsman		Skilled Labour		
					Hours	M	W	M	W	M	Carpenter	Black Smith	Cobbler
											W	M	M
M													
Andhra Pradesh	Krishna	Ghantasala	Dec,15	8	200	200	300	NA	250	NA	300	NA	NA
	Guntur	Tadikonda	Dec,15	8	270	218	275	NA	225	NA	NA	NA	NA
Telangana	Ranga Reddy	Arutala	Feb, 16	8	350	269	NA	NA	NA	NA	350	350	NA
Karnataka	Bangalore	Harisandra	June, 16	8	375	305	400	305	400	305	600	600	NA
	Tumkur	Gidlahali	Nov, 15	8	180	170	180	NA	NA	NA	200	200	NA
Maharashtra	Nagpur	Mauda	Sep, 14	8	100	80	NA	NA	NA	NA	NA	NA	NA
	Ahmednagar	Akole	Sep, 14	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jharkhand	Ranchi	Gaitalsood	March,14	8	120	120	100	100	75	75	200	200	NA

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

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily working Hours	Ploughing	Sowing	Weeding	Harvest- ing	Other Agri Labour	Herds- man	Skilled Labour		
												Carpenter	Black Smith	Cobbler
Assam	Barpeta	Laharapara	May, 16	M	8	300	250	250	250	250	200	350	300	250
				W	8	NA	200	200	200	200	NA	NA	NA	NA
Bihar	Muzaffarpur	Bhalui Rasul	June,16	M	8	300	300	300	300	300	300	400	400	NA
				W	8	NA	300	NA	NA	300	NA	NA	NA	NA
	Shekhpura	Kutaut	June,16	M	8	250	NA	225	100	NA	NA	500	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chhattisgarh	Dhamtari	Sihava	July,16	M	8	NA	NA	170	NA	150	150	250	200	250
				W	8	NA	NA	150	NA	100	100	NA	NA	150
Gujarat*	Rajkot	Rajkot	Sep, 15	M	8	215	205	163	180	150	188	450	450	360
				W	8	NA	175	150	175	135	117	NA	NA	NA
	Dahod	Dahod	Sep,15	M	8	180	160	160	160	130	NA	260	210	210
				W	8	NA	160	160	160	130	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	Mach, 16	M	8	400	400	400	400	400	NA	NA	NA	NA
				W	8	NA	300	300	300	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
Kerala	Kozhikode	Koduvally	March,16	M	4-8	1290	675	NA	675	1008	NA	825	NA	NA
				W	4-8	NA	NA	475	575	550	NA	NA	NA	NA
	Palakkad	Elappally	March,16	M	4-8	NA	500	NA	500	467	NA	600	NA	NA
				W	4-8	NA	NA	300	300	300	NA	NA	NA	NA
Madhya Pradesh	Hoshangabad	Sangarkhera	Sep, 16	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Satna	Kotar	Sep,16	M	8	200	200	200	200	200	200	300	300	300
				W	8	NA	200	200	200	200	200	NA	NA	NA
	Shyopurkala	Vijaypur	Sep,16	M	8	NA	300	300	300	300	NA	300	300	NA
				W	8	NA	300	300	300	NA	NA	NA	NA	NA

1.1 : AVERAGE 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	Harvest- ing	Other Agri. Labour	Herds- man	Skilled Labour		
												Carpenter	Black Smith	Cobbler
Odisha	Bhadrak	Chandbali	April, 16	W	8	NA	300	300	300	NA	NA	NA	NA	NA
				M	8	300	NA	NA	300	300	300	350	300	250
	Ganjam	Aska	March, 16	M	8	300	200	200	250	300	NA	400	400	200
Punjab	Ludhiana	Pakhowal	Nov, 15	W	8	NA	100	100	200	200	200	NA	NA	NA
				M	8	395	NA	395	395	380	100	400	400	200
Rajasthan	Barmer	Kuseep	Aug,15	W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				M	8	NA	NA	300	NA	NA	300	700	500	NA
	Jalore	Sarnau	Aug,15	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tamil Nadu*	Thanjavur	Pulvarnatham	June, 16	W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				M	8	NA	343	NA	355	344	NA	NA	NA	NA
	Tirunelveli	Malayakulam	June, 16	M	8	NA	350	375	400	491	NA	NA	NA	NA
Tripura	State Average		June, 15	W	8	NA	NA	171	180	329	NA	NA	NA	NA
				M	8	294	280	280	281	279	295	328	291	297
				W	8	NA	216	218	216	215	225	NA	NA	NA
Uttar Pradesh*	Meerut	Ganeshpur	Sep,16	M	8	250	250	261	250	256	NA	377	NA	NA
				W	8	NA	200	215	200	215	NA	NA	NA	NA
	Auraiya	Auraiya	Sep,16	M	8	170	175	150	235	171	NA	350	NA	NA
	Chandauli	Chandauli	Sep,16	W	8	NA	NA	150	235	171	NA	NA	NA	NA
				M	8	200	200	200	NA	200	NA	400	NA	NA
				W	8	NA	200	200	NA	200	NA	NA	NA	NA

M-Man

W-Woman

NA- Not Available

* States 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	Nov-16	Oct-16	Nov-15
Wheat	PBW 343	Quintal	Punjab	Amritsar	1800	1700	1600
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	2050	1640	1560
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	2000	1744	1530
Jowar	-	Quintal	Maharashtra	Mumbai	2350	2500	2300
Gram	No III	Quintal	Madhya Pradesh	Sehore	8201	9200	4300
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur		1330	1360
Gram Split	-	Quintal	Bihar	Patna	8550	8550	6150
Gram Split	-	Quintal	Maharashtra	Mumbai	11900	12300	6150
Arhar Split	-	Quintal	Bihar	Patna	11000	11000	15000
Arhar Split	-	Quintal	Maharashtra	Mumbai	8750	9100	12600
Arhar Split	-	Quintal	NCT of Delhi	Delhi	9775	9675	12800
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	11200	11200	12300
Gur	-	Quintal	Maharashtra	Mumbai	4000	4050	3000
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4600	4600	4000
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2450	2810	2130
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4300	4325	4450
Mustard Seed	Black	Quintal	West Bengal	Raniganj	4500	4650	
Mustard Seed	-	Quintal	West Bengal	Kolkata	5050	4850	4800
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	6120	6500	4415
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4680	4630	4100
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	2300	2500	1900
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	2500	2500	2300
Castor Seed	-	Quintal	Telangana	Hyderabad	3500	3300	3650
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	8470	8530	13400
Copra	FAQ	Quintal	Kerala	Alleppey	6700	6500	6950
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	5500	5500	4500
Groundnut	-	Quintal	Maharashtra	Mumbai	6400	8000	5900
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1480	1470	1470
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1560	1550	1590
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1500	1570	1335
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1935	1935	1725
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1545	1545	1462
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1155	1125	1185
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1500	1485	1380
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2250	2205	1725
Coconut Oil	-	15 Kg.	Kerala	Cochin	1515	1410	1485
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2300	2550	2250
Groundnut Cake	-	Quintal	Telangana	Hyderabad	3429	3714	3500
Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	4800	4800	3900
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	4000	NT	3000
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	3850	3800	4910
Jute Raw	W 5	Quintal	West Bengal	Kolkata	3850	3800	4860
Oranges	-	100 No	NCT of Delhi	Delhi	625	NA	600

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

Commodity	Variety	Unit	State	Centre	Nov-16	Oct-16	Nov-15
Oranges	Big	100 No	Tamil Nadu	Chennai	450	NT	500
Oranges	Nagpuri	100 No	West Bengal	Kolkata			250
Banana	-	100 No.	NCT of Delhi	Delhi	350	375	333
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	501	505	501
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	80000	80000	82000
Almonds	-	Quintal	Maharashtra	Mumbai	70000	70000	95000
Walnuts	-	Quintal	Maharashtra	Mumbai	70000	70000	82000
Kishmish	-	Quintal	Maharashtra	Mumbai	11000	11000	23000
Peas Green	-	Quintal	Maharashtra	Mumbai	3500	3400	4200
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	1170	1650	2200
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	550	1300	4000
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1500	1500	3500
Potato	Red	Quintal	Bihar	Patna	1250	1400	970
Potato	Desi	Quintal	West Bengal	Kolkata	1200	1580	1000
Potato	Sort I	Quintal	Tamil Nadu	Mettupalayam	2370	2200	
Onion	Pole	Quintal	Maharashtra	Nashik	500	550	1500
Turmeric	Nadan	Quintal	Kerala	Cochin	15500	15500	12500
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	8400	8400	8800
Chillies	-	Quintal	Bihar	Patna	9500	9500	10000
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	64000	65000	67000
Ginger	Dry	Quintal	Kerala	Cochin	15000	14500	20500
Cardamom	Major	Quintal	NCT of Delhi	Delhi	130500	130500	131000
Cardamom	Small	Quintal	West Bengal	Kolkata	150000	105000	105000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	3800	3800	3600
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	34017	34017	34684
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	46000	46000	46000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	36400	37150	35600
Fish	Rohu	Quintal	NCT of Delhi	Delhi	12000	11500	9000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	34500	34500	32000
Eggs	Madras	1000 No.	West Bengal	Kolkata	3900	4250	4100
Tea	-	Quintal	Bihar	Patna	21200	21200	21100
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	34000	34000	33000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	26500	26000	31000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	16000	15500	13500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	4600	4550	4600
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	3600	3600	3550
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13000	13500	
Rubber	-	Quintal	Kerala	Kottayam	11500	10200	9400
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	32700	32700	31500

3. MONTH END WHOLESALE PRICES OF SOME IMPORTANT AGRICULTURAL COMMODITIES IN INTERNATIONAL MARKETS DURING YEAR 2016

Commodity	Variety	Country	Centre	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
CARDAMOM	Guatemala Bold Green	U.K.	-	Dollar/MT	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00
CASHEW KERNELS	Spot U.K. 320s	U.K.	-	Rs./Qtl	61281.00	61542.00	60210.00	59796.00	60255.00	60516.00	60309.00	60309.00	60138.00	60210.00	61875.00
CASTOR OIL	Any Origin ex tank Rotterdam	Netherlands	-	Dollar/MT	8350.09	8143.20	8333.00	9184.69	9568.85	9560.20	9620.02	8629.11	10342.18	10479.17	10724.82
CHILLIES	Birds eye 2005 crop	Africa	-	Rs./Qtl	56855.76	55683.20	55747.77	61023.08	64063.45	64282.78	64463.75	57823.67	69106.45	70105.65	73733.14
CLOVES	Singapore	Madagascar	-	Dollar/MT	1374.00	1244.70	1244.70	1244.70	1274.70	1249.90	1249.90	1335.00	1439.70	1439.00	1438.40
COCONUT OIL	Crude Philippines/Indonesia, cif Rotterdam	Netherlands	-	Rs./Qtl	9355.57	8511.26	8327.04	8269.79	8534.12	8404.33	8375.58	8945.84	9620.08	9626.91	9889.00
COPRA	Philippines cif Rotterdam	Philippines	-	Dollar/MT	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00
CORRIANDER	Crude Any Origin cif Rotterdam	U.K.	-	Rs./Qtl	27916.90	28035.80	27429.00	27240.40	27449.50	27568.20	27474.10	27474.10	27396.20	27429.00	28187.50
CUMMIN SEED	India	India	-	Dollar/MT	8650.00	8650.00	8650.00	8700.00	8750.00	8750.00	8900.00	8250.00	8250.00	8000.00	7850.00
GROUNDNUT OIL	Crude Any Origin cif Rotterdam	U.K.	-	Rs./Qtl	58897.85	59148.70	57868.50	57802.80	58581.25	58835.00	59638.90	55283.25	55126.50	53520.00	53968.75
MAIZE	U.S.A.	U.S.A.	Chicago	C/56 lbs	1155.00	1255.00	1545.00	1535.00	1430.00	1600.00	1500.00	1610.00	1475.00	1515.00	1570.00
OATS	CANADA	CANADA	Winnipeg	Rs./Qtl	7864.40	8581.69	10336.05	10198.54	9573.85	10758.40	10051.50	10788.61	9855.95	10135.35	10828.13
PALM KERNEL OIL	Crude Malaysia/Indonesia, cif Rotterdam	Netherlands	-	Dollar/MT	687.50	714.50	811.00	813.00	767.00	798.50	797.00	818.00	789.00	795.50	813.00
PALM OIL	Crude Malaysian/Sumatra, cif Rotterdam	Netherlands	-	Rs./Qtl	4681.19	4885.75	5425.59	5401.57	5135.07	5369.11	5340.70	5481.42	5272.10	5321.90	5589.38
PEPPER (Black)	Sarawak Black lable	Malaysia	-	Dollar/MT	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	1650.00	1650.00	1650.00	1650.00
RAPESEED	Canola	CANADA	Winnipeg	Rs./Qtl	13618.00	13676.00	13380.00	13288.00	13390.00	13448.00	13402.00	11056.65	11025.30	11038.50	11343.75
RAPESEED OIL	UK delivered rapeseed, delivered Erith(buyer)	U.K.	-	Pound/MT	2200.00	2200.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00
SOYABEAN MEAL	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Rs./Qtl	14979.80	15043.60	16725.00	16610.00	16737.50	16810.00	16752.50	16752.50	16705.00	16725.00	17185.50
SOYABEAN OIL	UK produced 49% oil & protein (hi-pro) ex-mill seaforth UK bulk	U.S.A.	-	C/lbs	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00
	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Rs./Qtl	8170.80	8205.60	8028.00	7972.80	8034.00	8068.80	8041.20	8041.20	8018.40	8028.00	8001.60
					369.25	359.75	368.50	380.75	404.75	393.00	335.75	327.50	329.25	354.00	350.75
					988.09	966.77	968.85	994.17	1064.95	1038.52	884.20	862.47	864.62	930.73	945.68
					283.14	250.42	250.99	247.92	244.91	263.38	314.33	221.77	214.72	281.80	297.14
					1927.90	1712.37	1679.12	1647.18	1639.67	1770.97	2106.33	1486.08	1434.76	1885.24	2042.84
					890.00	1030.00	1320.00	1285.00	1200.00	1410.00	1350.00	1505.00	1410.00	1390.00	1525.00
					6060.01	7043.14	8830.80	8537.54	8034.00	9480.84	9046.35	10085.01	9421.62	9299.10	10484.38
					575.00	637.50	705.00	710.00	717.50	710.00	655.00	775.00	740.00	750.00	760.00
					3915.18	4359.23	4716.45	4717.24	4803.66	4774.04	4389.16	5193.28	4944.68	5017.50	5225.00
					10000.00	10000.00	10000.00	10000.00	10200.00	10200.00	10200.00	10200.00	8200.00	8200.00	7900.00
					68090.00	68380.00	66900.00	66440.00	68289.00	68584.80	68350.20	68350.20	54792.40	54858.00	54312.50
					481.20	460.70	469.50	499.50	524.80	480.00	453.90	468.80	464.20	510.20	528.00
					2334.78	2298.89	2378.02	2643.85	2707.97	2515.20	2312.62	2432.60	2358.14	2549.98	2690.69
					247.00	247.00	245.00	245.00	245.00	232.00	252.00	252.00	255.00	250.00	315.00
					2415.66	2352.43	2314.03	2378.22	2405.66	2271.05	2222.39	2227.93	2208.81	2035.75	2696.72
					660.00	614.00	615.00	658.00	602.00	602.00	594.00	594.00	670.00	726.00	820.00
					6454.80	5847.74	5808.68	6387.21	5911.04	5892.98	5238.49	5251.55	5803.54	5947.39	7020.02
					248.00	255.00	249.00	291.00	342.00	325.00	331.00	314.00	295.00	322.00	312.00
					2425.44	2428.62	2351.81	2824.74	3358.10	3181.43	2919.09	2776.07	2555.29	2622.05	2671.03
					30.87	30.92	33.36	33.62	31.34	31.55	29.53	33.57	32.64	35.72	36.85
					4632.67	4659.94	4918.85	4923.10	4624.46	4675.61	4361.29	4957.95	4806.93	5266.83	5583.70
					618.00	639.00	650.00	616.00	590.00	596.00	653.00	714.00	714.00	786.00	769.00
					6044.04	6085.84	6139.25	5979.51	5793.21	5834.24	5758.81	6312.47	6184.67	6400.40	6583.41

3. MONTH END WHOLESale PRICES OF SOME IMPORTANT ARIcULTURAL COMMODITIES IN INTERNATIONAL MARKETS DURING YEAR 2015—Contd.

Commodity	Variety	Country	Centre	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT		
SOYABEANS	US NO.2 yellow	U.S.A.	-	C/60 lbs	883.00	867.50	905.25	1019.00	1085.50	1137.50	1010.50	1030.75	1010.00	1034.25		
				Rs./Qtl	2206.53	2177.03	2222.60	2484.68	2667.14	2807.02	2485.09	2534.89	2318.64	2479.78		
		Netherlands	Chicago	Dollar/MT	377.20	372.90	385.60	409.20	426.00	456.40	412.00	420.90	397.10	407.90		
SUNFLOWER SEED	Refined bleached and deodorised ex-tanks,broker price	U.K.	-	Rs./Qtl	2568.35	2549.89	2579.66	2718.72	2852.07	3068.83	2760.81	2820.45	2653.42	2693.63		
				Pound/MT	674.00	720.00	720.00	720.00	720.00	720.00	746.00	748.00	781.00	838.00		
				Rs./Qtl	6591.72	6857.28	6800.40	6989.04	7069.68	7048.08	6578.97	6613.07	6765.02	6839.76		
Wheat		U.S.A.	Chicago	C/60 lbs	476.50	442.75	463.00	474.25	466.00	458.75	414.75	404.00	403.25	401.50		
				Rs./Qtl	1190.73	1111.10	1136.77	1156.39	1144.99	1132.06	1019.98	993.54	988.89	1010.33		
Source - Public Ledger																
Currency					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	
Foreign Exchange Rates					CanDollar	48.52	49.90	50.65	52.93	51.60	52.40	50.95	51.89	50.80	49.98	50.96
					UKPound	97.80	95.24	94.45	97.07	98.19	97.89	88.19	88.41	86.62	81.43	85.61
					USDollar	68.09	68.38	66.90	66.44	66.95	67.24	67.01	67.01	66.82	66.90	68.75

Crop Production

4. Sowing and Harvesting Operations Normally in Progress During February, 2017

State	Sowing	Harvesting
Andhra Pradesh	Summer Rice, Ragi (R) Sugarcane	Winter Rice Jowar (K), Maize (R), Ragi (K), Wheat Gram, Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Winter Potato (Plains), Sugarcane, Chillies (Dry), Tobacco, Castorseed, Linseed, Cotton, Turmeric, Onion (2nd Crop) Coriander.
Andhra Pradesh	Assam Autumn Rice, Summer Potato (Hills), Jute.	Gram Urad (R), Winter Potato, Tobacco, Rapeseed & Mustard, Linseed, Cotton.
Bihar	Sugarcane.	Wheat, Barley, Gram, Winter Potato (Plain), Rapeseed & Mustard, Sugarcane, Linseed.
Gujarat	Sugarcane.	Jowar (R), Wheat, Gram Tur (K), Other Rabi Pulses, Winter Potato, Sugarcane, Ginger, Chillies (Dry), Tobacco, Castorseed, Rapeseed & Mustard, Cotton, Turmeric, Onion.
Himachal Pradesh	Winter Potato (Hills),	—
Jammu & Kashmir	Sugarcane, Onion.	Winter Potato.
Karnataka	Summer Rice, Mung (R), Sugarcane.	Winter Rice, Jowar (R), Maize (R), Wheat, Barley, Gram, Tur (K), Other Kharif Pulses, Potato, Sugarcane, Black Pepper, Tobacco, Castorseed, Rapeseed & Mustard, Linseed, Cotton, Turmeric Cardiseed.
Kerala	Summer Rice, Tur (K), other Rabi Pulses (Kulthi), Sugarcane, Sesamum.	Winter Rice, Urad (R), Sugarcane, Cotton, Sweet Potato. Madhya Pradesh Sugarcane, Onion, Jowar (R), Wheat, Barley, Small Millets (R), Gram, Tur, Urad (R), Mung (R), Other Rabi Pulses, Winter Potato (Hills) Sugarcane, Ginger, Chillies (Dry), Tobacco, Castorseed, Rapeseed & Mustard, Linseed, Cotton, Sweet Potato, Turmeric, Sannhemp, Cardiseed, Onion.
Maharashtra	Sugarcane.	Jowar (R), Wheat, Barley, Gram, Tur (K), Urad (R), Mung (R), Other Rabi Pulses, Winter Potato (Plains), Sugarcane, Chillies (Dry), Tobacco, Castorseed, Rapeseed & Mustard, Linseed, Cotton, Cardiseed.
Manipur	Jute.	Wheat, Castorseed, Rapeseed & Mustard, Turmeric, Orissa Sugarcane, Chillies (Dry), Bajra (R), Winter Potato (Plains), Chillies (Dry), Rapeseed & Mustard.
Punjab and Haryana	Sugarcane, Tobacco, Onion, Potato.	Potato, Sugarcane, Rapeseed & Mustard, Turmeric Rajasthan Sugarcane, Gram, Tur (K), Winter Potato (Plains), Sugarcane, Castorseed, Rapeseed & Mustard, Linseed.
Tamil Nadu	Summer Rice, Jowar (R), Sugarcane, Groundnut, Cotton, Onion, Sesamum (Late).	Winter Rice, Jowar (R), Bajra, Ragi Small Millets (K), Gram, Tur, Urad (K) Mung (K), Other Rabi Pulses (Kulthi), Winter Potato, Sugarcane, Black Papper, Tobacco, Castor seed, Sesamum, Cotton, Turmeric, Onion,
Tripura	Sugarcane.	Gram, Urad(R), Mung (R), Other Rabi Pulses, Winter Potato (Plains), Sugarcane, Chillies (Dry), Rapeseed & Mustard, Sweet Potato.
Uttar Pradesh	Summer Rice, Small Millets (R), Sugarcane, Tobacco Jute, Tapioca (Ist Crop).	Rapeseed & Mustard.
West Bengal	Summer Rice, Sugarcane,	Tur (K), Urd (R), Mung (R), Other Rabi Rulses, Winter Potato Sugarcane, Ginger, Chillies (Dry), Tobacco Sesamum, (Ist Crop, Rapeseed & Mustard.

(K)—Kharif (R)—Rabi