Special Issue:
PERSISTENCE OF AGRARIAN CRISIS

AGRICULTURAL SITUATION IN INDIA

DECEMBER, 2015

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The Journal is brought out by the Directorate of Economics and Statistics, Ministry of Agriculture and 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.

STATISTICAL TABLES

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.

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Farm Sector News

MSP for Rabi Crops of 2015-16 season

The Cabinet Committee on Economic Affairs, chaired by the Prime Minister Shri Narendra Modi, has given its approval for the Minimum Support Prices (MSPs) for Rabi Crops of 2015-16 Season to be Marketed in 2016-17. The decision is based on recommendations of Commission for Agricultural Costs and Prices (CACP) for the Price Policy for Rabi Crops for the Marketing Season 2016-17. CACP, which is an expert body, takes into account the cost of production, overall demand-supply, domestic and international prices, inter-crop price parity, terms of trade between agricultural and non-agricultural sectors, the likely effect of the Price Policy on the rest of economy, besides ensuring rational utilization of production resources like land and water, while recommending MSPs.

The CACP being the expert body, its recommendations are generally accepted as such. However, in view of the gap in the demand and domestic supply of pulses, the Cabinet has decided to give a bonus of Rs.75/- per quintal for rabi pulses over and above the recommendations of the CACP. This is expected to give a strong price signal to farmers to increase acreage and invest for increase in productivity of pulses.

The Minimum Support Prices (MSPs) for all Rabi Crops of 2015-16 season to be marketed in 2016-17 have been increased and are given in table below:

Commodity	MSP for 2014-15 season	MSP for 2015-16 season	Increase in MSP over 2014-15		Bonus *
	(Rs per quintal)	(Rs per quintal)	Absolute	%	(Rs per quintal)
Wheat	1450	1525	75	5.2	-
Barley	1150	1225	75	6.5	-
Gram	3175	3425	250	7.9	75
Masur (Lentil)	3075	3325	250	8.1	75
Rapeseed/ Mustard	3100	3350	250	8.0	-
Safflower	3050	3300	250	8.2	-

Note: * Bonus on Rabi pulses is payable over and above the MSP.

The prices would be effective from the Rabi marketing season 2016-17. The higher MSPs would increase investment and production through assured remunerative prices to farmers.

Rabi Crops Sowing Crosses 317 Lakh Hactare

As per preliminary reports received from the States.The total area sown under Rabi crops as on 27thNovember, 2015 stands to 317.96 lakh hectares.

Wheat has been sown/transplanted in 117.32 lakh hectares, pulses in 90.91 lakh hectare coarse cereals in 44.40 lakh hectares, oilseeds in 57.08 lakh hectares and Rice in 8.26 lakh hectares.

The details of the area covered so far and that covered during last year this time is as follows:

TABLE: Area under Rabi Crops as on 27/11/15

(Lakh hectare)

Crop	Area sown in 2015-16	Area sown in 2014-15
Wheat	117.32	161.57
Pulses	90.91	97.80
Coarse Cereals	44.40	37.48
Oilseeds	57.08	65.73
Rice	8.26	10.04
Total	317.96	372.61

National Policy on Marine Fisheries to be Reviewed

The Government is in the process of revising National Policy on Marine Fisheries. A committee under the

chairmanship of DG, ICAR is seeking the inputs from stakeholders. The new policy will ensure all-round development of Fisheries sector in the country. Addressing the consultative committee of the Ministry of Agriculture and Farmers Welfare in Varanasi on 6th November, 2015, Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh said that Marine Fisheries is the fastest growing food producing sector in the world with a great potential to meet the food, especially protein requirement of a large number of population. And with an annual growth rate of above 7 per cent, India is the second largest producer of fish from aquaculture in the world.

Underlining the importance of fresh water aquaculture, the Minister said that the species diversification in the recent years has led to development of technology of breeding and hatchery management of several important species for fresh water aquaculture. Establishment of 'Brood bank' for commercially important species at Bhubaneswar by the NFDB is expected to ensure production and supply of certified broods to hatcheries in the country. The cage culture in reservoirs has picked up very well in recent years. The feasibility of inland saline aquaculture in the States of Haryana, Punjab and Utter Pradesh has opened up scope for bringing the land unfit for agricultural activity under economic use. In order to augment production of freshwater aquaculture, Guidelines have been issued for regulating introduction and culture of Tilapia as well as Pangasius species and also for Shrimp species L. Vannamei.

Shri Radha Mohan Singh apprised the members of the committee of development in Fisheries sector. He said that the Central Inland Fisheries Research Institute (CIFRI) has standardized pen and cage farming for some species which offer vast potential for inland aquaculture in the country *i.e.* Pangasius and Indian Major Carp. The production potential from sustainable cage culture is about 50 kg / m3 and from pens is about 3500-5400 kg / ha /6 months with huge potential for up-scaling. It is expected that large scale adoption of the technologies of breeding and seed production by the farmers across the country shall lead to sustainable freshwater aquaculture leading towards 'Blue Revolution' in the country.

Shri Radha Mohan Singh Discusses Bilateral Cooperation with Brazil in the Area of Agriculture

Union Agriculture Ministers, Shri Radha Mohan Singh and Minister of Agriculture of Brazil Ms. Katia Abreu, along with their respective high level teams had a meeting on 14th November, 2015. The meeting took place in a very cordial environment. Discussions were quite meaningful and focused on various issues of mutual interest.

India and Brazil have a long standing relationship based upon friendship, mutual respect and co-operation which has endured over time. Both sides agreed to take this relationship a step further in the areas of agriculture, animal husbandry and allied sectors to their mutual benefit.

Both India and Brazil already have a Memorandum of Understanding between their Agriculture Ministries for furthering mutual cooperation in the area of agriculture, animal husbandry and other allied activities, and aimed at sharing the benefits of research, technology and a wide range of other incidental activities.

Similarly, there is a Memorandum of Understanding between ICAR and EMBRAPA in the areas of research, exchange of technology, trainings and visits of personnel.

Further, both the countries now intend to enter into a Memorandum of Understanding between NDDB and EMBRAPA for taking up collaborative projects in the field of productivity improvement of cattle and buffaloes through exchange of advanced breeding technology, knowledge sharing, institutional strengthening and exchange of genetic material for mutual benefits.

The meeting concluded with both India and Brazil agreeing to take the present relationship of mutual cooperation to higher level of engagement in the interest of both the countries.

Technological Progress in Agriculture is Crucial for the Overall Economic Development of the Country— Shri Radha Mohan Singh

Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh laid the Foundation Stone of Acharya N.G.Ranga Agricultural University in Andhra Pradesh on 16th November, 2015. Shri Singh on the occasion said that "there are still large productivity gaps in the potential and the realized farm output and with development and infusion of new technologies our farm production will go up to meet the rising domestic food demand".

Full text of Union Minister of Agriculture and Farmers Welfare speech:

"Chief Minister of Andhra Pradesh, Shri Chandrababu Naidu garu, my cabinet colleagues, Union Minister for Urban Development, Housing and Urban Poverty Alleviation and Parliamentary Affairs, Shri Venkaiah Naidu garu, Union Minister for Civil Aviation, Shri Ashok Gajapathi Raju Garu, Minister of State for Commerce and Industry, Finance and Corporate Affairs, Smt. Nirmala Sitharaman Ji, Minister for State for Science & Technology, Earth Science, Shri Y.S. Chowdary Garu, MLA of Tadikonda and President of the function Shri T. Sravana Kumar garu, Secretary, DARE & Director General, Dr. S. Ayyappan, Vice Chancellor Dr. A. Padma Raju, other dignitaries, members of press and media, farmers, students, ladies and gentlemen.

Agriculture continues to remain a major sector of the Indian economy. It contributes to 60 per cent of employment and continues to be the primary source of living for 70 per cent of the population. Technological progress in agriculture is, therefore, crucial for the overall economic development of the country.

The agricultural technologies generated by our research institutions and the Agricultural Universities have enabled us to achieve self-reliant food security at national level and today we are among the leading producers of several food items. In recent years, our foodgrain production has exceeded 260 million tonnes, horticultural production is about 280 million tonnes, milk is 137 million tonnes, eggs-73 billion and fish over 9.8 million tonnes.

The growth and development of agriculture in our country is considerably driven by our institutions of higher agricultural education and research. India has one of the largest agricultural education and research systems in the world with the largest number of scientific personnel of any developing country except China. The research system includes approximately 30,000 scientists and more than one lakh supporting staff actively engaged in teaching and research related to agriculture. The National Agricultural Research and Education System (NARES) comprises essentially two main streams, the ICAR at the national level and the Agricultural Universities at the State level. Today we have 73 agricultural universities and 101 ICAR research institutions serving the farming community."

MoU between India and Vietnam for cooperation in the field of Animal Health

The Union Cabinet, chaired by the Prime Minister Shri Narendra Modi has given its ex-post facto approval for signing of a Memorandum of Understanding (MoU) between India and Vietnam for cooperation in the field of Animal Health. The MoU was signed in September, 2014.

The MoU aims to promote mutual cooperation between India and Vietnam through joint activities in the areas of Animal Health and has agreed to:

  i. Exchange special information on animal health in general and particularly information on status of animal diseases of common concern, standards and procedures for animal quarantine and inspection status and progress of surveillance and monitoring programmes in place for animal diseases and food borne pathogens;

  ii. Exchange of special information on meat processing, meat products and slaughter houses/abattoirs;

  iii. Set up Mutual Recognition Agreement on Veterinary hygiene, health certificate between competent authorities of the two Parties.

  iv. Cooperate in the training and upgrading human resources in the field of animal health.

The MoU shall remain in force for a period of 10 years unless either of the Parties give prior written notice of at least six months to the other Party of its intention to terminate the MoU.

Center Seeks Memorandum from the States for Providing Drought Assistance

In view of sustained dry spell during the last Kharif season, as also in the early Rabi period in some part of the country, the Center has asked the affected states to submit memorandum for drought assistance immediately.

In a communication to the state Government of Bihar, Uttar Pradesh, Orissa, Jharkhand, Telangana and Andhra Pradesh, Union Minister of Agriculture and Farmers welfare has urged the states to intimate immediately number of drought affected districts in the state and whether drought has been declared in these area or not. States have also been asked to submit the financial memorandum for assistance from National Drought Relief Fund (NDRF).

On the receipt of this information, Center team will visit states to take stock of the situation and assess the assistance required.

So far memorandum for assistance for Drought Relief has been received from Karnataka, Chhattisgarh, Madhya Pradesh and Maharashtra. Central teams have visited three states and is currently on tour of Maharashtra for assessing quantum of assistance required by the states.

There is Need of Strong Services Sector in Rural India—said by Shri Radha Mohan Singh, Minister of Agriculture & Farmers Welfare

There is need of a strong services sector in rural India. This should include Agri-business centers and agri-clinics on a big scale. This was stated by Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh while addressing International Grassland Congress on 20th November, 2015. He said that the current focus is on how to make agriculture more attractive and rewarding to the younger generation. It is imperative for the nation to produce food not only to feed its more than one billion human population but also for an equal number of livestock, he added.

An Umbrella Scheme 'Blue Revolution: Integrated Development and Management of Fisheries'with an Outlay of Rs. 3000 crore Proposed- by Shri Radha Mohan Singh

"World Fisheries Day—2015 Inaugurated"

Union Agriculture and Farmers Welfare Minister Shri

Radha Mohan Singh inaugurated the "World fisheries Day-2015"on 21st November, 2015. Shri Singh, on the occasion said that "considering the importance and growth potential of the sector, and considering the need for effective implementation of different schemes, the Ministry by merging all the existing schemes, has proposed to formulate an umbrella scheme 'Blue Revolution: Integrated Development and Management of Fisheries' with an outlay of Rs. 3000 crore. This umbrella scheme will cover inland fisheries, aquaculture, marine fisheries including deep sea fishing, mari-culture and all activities undertaken by the National Fisheries Development Board (NFDB) towards realizing "Blue Revolution". Minister further said that a "focused approach of this nature shall lead to ushering in Blue Revolution through an integrated development and management of fisheries and aquaculture sector and would ensure sustained acceleration and intensification of fish production beyond the projected annual growth rate."

Union Minister on the occasion felicitates some of the fishers/fish farmers who have come from different states of the country and released a souvenir. Minister of State Dr.Sanjeev Kumar Balyan, Secretary, Department of Animal Husbandry and Fisheries, Shri Ashok Kumar Angurana and Secretary DARE, Dr. S. Ayyappan were also present on the occasion.

Union Agriculture and Farmers Welfare Minister has taken a review meeting with Agricultural Production Commissioners and Principal Secretaries of all State Governments

Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh has taken a review meeting on 24th November, 2015, with Agricultural Production Commissioners and Principal Secretaries of all State Governments. Shri Singh reviewed five major issues namely:

1. Soil Health Card
2. Paramparagat Krishi Vikas Yojana (Organic Farming)
3. Pradhan Mantri Krishi Sinchai Yojana (PMKSY)
4. National Agricultural Market, and
5. Situation of Drought in the States

In the review meeting it was found that in Soil Health Card, West Bengal and Uttar Pradesh are lagging behind. Their officials were directed to activate the state agriculture machinery to collect samples and provide Soil Health Card to farmers in an accelerated manner. Madhya Pradesh requested that GOI's established rate of Rs. 190 should be declared as nominative and State Governments should give flexibility to liberalise this amount. The State Government of Karnataka has started no work for in this scheme and has been directed to do so immediately. Shri Singh reiterated that the scheme has to be executed by the State Governments and its agriculture machinery and Institutions

like KVK's and State Agriculture Universities are supplementary to the efforts of the State Governments.

Shri Singh asked the State Government Officials about their preparations to celebrate World Soil Day on 5th December, 2015. Minister urged all the States to organise programmes at State, District, Block and Village level as well as KVKs and ICAR institutes on 5th December, 2015 in which farmers would be provided Soil Health Cards and knowledge about the importance of Soil Health Card. Shri Singh suggested States to invite public representatives viz Chief Minister, Centre & State Ministers, MP's and MLA to attend these programmes. States like Rajasthan, Gujarat, U.P., Orissa, Andhra Pradesh, Maharashtra, Haryana and Jharkhand, Punjab, Himachal Pradesh, Mizoram, Meghalaya informed the Minister about the preparations they have made in this regard.

In PMKSY, Minister reviewed the financial and physical achievements made by States. States like Gujarat, Telangana, Andhra Pradesh, Maharashtra and Tamil Nadu have done well in terms of achieving physical and financial progress under the Scheme. Himachal Pradesh and North Eastern States have not taken the Central share in view of the 50:50 funding pattern. They were told that the new funding pattern it has been modified to 60:40 for States and 90:10 for the North Eastern States. Hence, they should take the Central share immediately. West Bengal has unspent balance since last four years. Minister directed that officials from our ministry should visit these States at the earliest and make sure that they are able to avail the benefits of the scheme. Shri Singh urged all North Eastern States to submit their proposal in respect of new funding pattern of 90:10 today itself. Minister urged all States to spend money under this Scheme in an accelerated manner and submit their utilization certificates to obtain the second instalment.

Secretary Water Resources also participated for PMKSY component under Water Resources Ministry and asked all the States to coordinate between agriculture and irrigation departments. Department of Land Resources and the Ministry of Rural Development also participated in the meeting which looks after the watershed component of Pradhan Mantri Krishi Sinchai Yojana (PMKSY). Agriculture and Farmers Welfare Minister directed that State Governments should be written with respect to streamlining the release of funds citing examples of states whether there has been delay in release of funds.

Paramparagat Krishi Vikas Yojana (Organic Farming) was also reviewed, States were asked to form clusters and promote organic farming good work has been done by Madhya Pradesh which formed 880 clusters. Several discussions have been also held with respect to minimum numbers of farmers and area of land holdings to form the clusters.

Under National Agriculture Market, proposals have been received from the States Governments of Chhattisgarh, Andhra Pradesh, Telangana, Jharkhand, Gujarat, Maharashtra and Uttarakhand. The proposal of Gujarat has been recently sanctioned. Uttar Pradesh, Punjab and Haryana were asked about the difficulty in sending their proposals.

With respect to drought condition, discussions were held with the States. Karnataka has been recently sanctioned Rs. 1540 Crore. For Chhattisgarh, Agriculture Ministry has recommended Rs. 1387 Crore to Home Ministry. Presently, Central Teams are visiting Maharashtra and Madhya Pradesh. Memorandum has been received from UP and Orissa and Teams are being dispatched immediately. Andhra Pradesh were urged by Agriculture Minister to send its memorandum as drought has been declared by the State. Further, other States like Bihar, Jharkhand, Telangana affected by drought were also asked to submit their memorandum urgently.

Need to Develop such Strategies that will lead to Sustainable Productivity Gains and also Profitability of Farming- said by Shri Radha Mohan Singh

Second Green Revolution will come from the Eastern States—Shri Singh

Golden Jubilee of Green Revolution

Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh, inaugurate the Golden Jubilee of Green Revolution celebration on 27th November, 2015. Shri Singh said that it is a proud moment for Indian agriculture when we have assembled here to commemorate the advent of Green Revolution in India. Further, Minister said that after the green revolution years today once again Indian agriculture is on cross roads with new challenges of development. Our major challenges are depletion and degradation of natural resources, drop in the water table, reduction in flow of water in rivers, lakes, biotic and abiotic stresses, climatic change etc. Today we need to develop such strategies that will lead to sustainable productivity gains and also profitability of farming. To sustain krishi as a profession, we need to attract youth towards agriculture.

Full Text of the Speech:

"It is a matter of pleasure for India that today we are not only self-sufficient in foodgrains but also exporter of food items, whereas we were importing foodgrains for our food security and Indian agriculture was given begging bowl status in the world. Following the Green Revolution, our foodgrain production that was 82 MT in 1960-61 has touched 264 MT by 2013-14. In this period the rice production increased from 34 MT to our 100 MT. simultaneously, the wheat production which was 11 MT is now over 90 MT. At national level the average productivity of rice which was 1013 kg per ha. is now above 2500 kg per ha. Similarly, the productivity of wheat also has gone up fron 850 kg/ha to over 3000 kg/ha in the corresponding period. Thereafter, Indian agriculture witnessed an all round development as a result of which horticulture production is now over 280 MT, milk production about 140 MT, fisheries 9.5 MT and eggs are about 73 billion. These achievements have placed India among the leading producer of these food items. The success of green revolution in India proved wrong the theories of Malthus and economists who said that India would suffer on account of poverty and technological backwardness. Several countries in the world are now trying to adopt the Green Revolution model of India for their respective agricultural development.

The discovery and use of Norin-10 gene by late Dr. Normal Borlaug in developing dwarf and high yielding wheat varieties laid the foundation of green revolution. Under the leadership of Hon'ble M.S. Swaminathan, the Mexican wheat were received in India and also developed Sonora-64 to suit the Indian agro climatic conditions. In this journey of agricultural developments, we congratulate the Nobel laureate late Dr. Norman Borlaug, India's renowned agriculture scientist Dr. M.S. Swaminathan along with all the agriculture researchers, extension workers and above all the farmers in the country.

After the green revolution years today once again Indian agriculture is on cross roads with new challenges of development. Our major challenges are depletion and degradation of natural resources, drop in the water table, reduction in flow of water in rivers, lakes, biotic and abiotic stresses, climatic change etc. Today we need to develop such strategies that will lead to sustainable productivity gains and also profitability of farming. To sustain krishi as a profession, we need to attract youth towards agriculture.

It is generally believed that the benefits of green revolution were confined to areas with better natural endowments and the rainfed areas could not benefit as much. The rainfed areas today contribute about 60% to the agricultural production. Therefore, we need to focus on water management and conservation in these areas.

Over 50% of our agricultural import budget is used in pulses and oilseeds only. Looking to the consumption patterns we need to develop such farming systems that besides safeguarding rice, wheat systems also include production of pulses and oilseeds.

It is time for second green revolution in the country and we believe that this can happen from the eastern states of our country. We have already taken several initiatives in research and development to achieve this goal. ICAR has launched Mera Gaon Mera Gaurav and Farmer FIRST wherein our agricultural scientists will adopt the villages and will directly interface with the farmers to solve their problems. This year the Cabinet has also approved Rs. 3900 crores in the XII Plan for continuation and further strengthening of KrishiVigyan Kendras (KVK) in the country. In this proposal 109 new KVKs and three new Agricultural Technology Application Research Institutes (ATARI) have also been approved. This will enable KVKs in improving their outreach programmes and helping the farmers. The ICAR has also established IARI, Hazaribagh in Jharkhand and Indian Institute of Agricultural Biotechnology, Ranchi during this year. At the same time, the ICAR has established National Research Centre for Integrated Farming, Motihari to further strengthen the agricultural research for the Eastern Region. The Rajendra Agricultural University at Pusa, Bihar is also being converted to Central Agricultural University (CAU) for which a MoU has been signed with the State Government. The Central Agricultural University, Imphal has been sanctioned six new Colleges for the North Eastern States that will raise the total number of colleges under the University from 7 to 13. It is also planned to establish a new CAU at Barapani, Meghalaya. The ICAR has launched Attracting & Retaining Youth in Agriculture (ARYA) and Student READY schemes that will improve skill development amongst agricultural graduates and prepare them to take up agri-entrepreneurship. The government has already launched Bringing Green Revolution to Eastern India (BGREI) for seven eastern states and in the last two years Rs. 1000 crores have been allocated for further strengthening it. The government has also launched Paramparagat KrishiYojna, Soil Health Card Scheme, Pradhanmantri Krishi Sichai Yojna, Chaman for horticultural development, National Agri-tech Infrastructure Fund.

Our National Agricultural policy has set a target of 4% growth in agriculture. We are very close to achieving it, but certain impediments have come in form of natural calamities. However, we are striving towards achieving this goal and we are hopeful that with the collective efforts we will be able to achieve this target. The Institutions like NAAS are a rich source of intellect and experience especially with regard to agricultural research and development. We call upon the esteemed fellowship of NAAS to provide us their view and inputs regarding growth and development of agriculture especially in respect of improving resource use efficiency, attracting rural youth in agriculture, sustaining productivity, improving quality and standard of higher agricultural education, skill development, extension of technologies to farmers using ICTs and commercialization of agriculture.

Finally I once again congratulate the agricultural scientists, extension workers, policy planners, farmers and other stakeholders on the occasion of Golden Jubilee of Green Revolution."

General Survey of Agriculture

Important Policy Decisions taken during the Month of November, 2015

Government has announced Rabi Price Policy for 2015-16 season. Government has increased MSP for 6 Rabi crops. In order to encourage farmers to grow pulses, Government has announced a bonus of Rs. 75/Quintal for both Gram and Masur(Lentil) payable over and above MSP. Further, in order to improve procurement, Government has decided that FCI shall be the nodal central agency for procurement of pulses and oilseeds also.

Trends in foodgrain prices

During the month of October, 2015, the All India Index Number of Wholesale Price (2004-05=100) of foodgrains increased by 2.43 percent from 251.4 in September, 2015 to 257.5 in October, 2015.

The Wholesale Price Index (WPI) Number of cereals increased by 0.43 percent from 233.8 to 234.8 and WPI of pulses increased by 9.17 percent from 333.8 to 364.4 during the same period.

The Wholesale Price Index Number of wheat increased by 1.15 percent from 216.8 to 219.3 while that of rice increased by 0.13 percent from 238.3 to 238.6 during the same period.

Weather, Rainfall and Reservoir situation during November, 2015

Rainfall Situation

Cumulative Post-Monsoon Rainfall for the country as a whole during 1st October to 25th November, 2015 was 25% lower than Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period was lower by 63% in Central India, 61% in East & North East India and 16% in North West India respectively and higher by 12% in South Peninsula.

Out of 36 meteorological sub-divisions, 10 meteorological sub-divisions have received excess/normal rainfall, and 26 meteorological sub-divisions received deficient/ scanty rainfall.

Water Storage in Major Reservoirs

Central Water Commission monitors 91 major reservoirs in the country which have a total live capacity of 157.80 BCM at Full Reservoir Level (FRL). Live storage in these reservoirs as on 26th November, 2015 has been 83.20 BCM as against 106.99 BCM on 26.11.2014 (last year) and 110.42 BCM of normal storage (average storage of the last 10 years). Current year's storage as on 26.11.2015 has been 22% lower than last year's and 25% lower than the normal storage.

Sowing Position during Rabi, 2015

As per latest information available on sowing of crops, around 51.20% of the normal area under Rabi crops has been sown upto 27.11.2015. Area sown under all Rabi crops taken together has been reported to be 317.96 lakh hectares at All India level as compared to 372.61 lakh hectares in the corresponding period of last year i.e. lower by 54.7 lakh ha. than the last year.

Economic Growth*

As per the quarterly estimates of Gross Domestic Product (GDP) released by the Central Statistics Office (CSO) on 31st August 2015, the growth rate of GDP at constant (2011-12) market prices for the first quarter (Q1) (April-June) of 2015-16 is estimated at 7.0 per cent as compared to the growth of 6.7 per cent in Q1, and 7.5 per cent in Q4 of 2014-15.

The growth of Gross Value Added (GVA) at constant (2011-12) basic prices for agriculture & allied sectors, industry sector and services sector are estimated at 1.9 per cent, 6.5 per cent and 8.9 per cent respectively in Q1 of 2015-16 as compared to the corresponding rates of 2.6 per cent, 7.7 per cent and 8.7 per cent respectively in Q1 of 2014-15 (Table 2).

The private final consumption expenditure as a percentage of GDP increased from 60.7 per cent in Q1 of 2014-15 to 61.3 per cent in Q1 of 2015-16. Gross fixed capital formation (GFCF) as a percentage of GDP declined from 29.2 per cent in Q1 of 2014-15 to 27.8 per cent in Q1 of 2015-16.

The growth rate of Gross Domestic Product (GDP) at constant (2011-12) market prices was estimated at 7.3 per cent in 2014-15 (full year; provisional estimates), as compared to 6.9 per cent and 5.1 per cent in 2013-14 and 2012-13 respectively (Table 1).

There was a decline in the rate of gross domestic saving from 33.9 per cent of the GDP in 2011-12 to 31.8 per cent in 2012-13 and further to 30.6 per cent in 2013-14. This was caused mainly by the sharp decline in the rate of household physical savings.

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* Source: www.finmin.nic.in.

Agriculture and Food Management

Rainfall: During the South West Monsoon season (1st June - 30th September) of 2015, the cumulative rainfall received for the country as a whole has been 14 per cent below normal. The actual rainfall received during the Monsoon season 2015, as on 30.09.2015 was 760.6 mm as against the normal at 887.5 mm. Out of the total 36 meteorological sub-divisions, 1 sub-division received excess season rainfall, 18 sub-divisions received normal season rainfall and the remaining 17 sub-divisions received deficient season rainfall.

All India Production of Foodgrains: As per the 1st advance estimates released by Ministry of Agriculture on 16.09.2015, production of kharif foodgrains during 2015-16 is estimated at 124.1 million tonnes as compared to 120.3 million tonnes in 2014-15 (1st AE) (Table 3).

Procurement: Procurement of rice as on 07.10.2015 was 32.2 million tonnes during Kharif Marketing Season 2014-15 and procurement of wheat as on 07.10.2015 was 28.1 million tonnes during Rabi Marketing Season 2015-16 (Table 4).

Off-take: Off-take of rice during the month of August, 2015 was 26.9 lakh tonnes. This comprises 22.8 lakh tonnes under TPDS/NFSA (offtake against the allocation for the month of September, 2015) and 4.1 lakh tonnes under the other schemes. In respect of wheat, the total off-take was 21.9 lakh tonnes comprising of 18.5 lakh tonnes under TPDS/NFSA (offtake against the allocation for the month of September, 2015) and 3.4 lakh tonnes under other schemes.

Stocks: Stocks of foodgrains (rice and wheat) held by FCI as on September 1, 2015 were 50.8 million tonnes, as compared to 57.3 million tonnes as on September 1, 2014 (Table 5).

TABLE 1: Growth of GVA at Basic Prices by Economic Activity (at 2011-12 Prices) (in per cent)

Sector	Growth			Share in GVA		
	2012-13	2013-14	2014-15 (PE)	2012-13	2013-14	2014-15 (PE)
Agriculture, forestry & fishing	1.2	3.7	0.2	17.7	17.2	16.1
Industry	2.4	4.5	6.1	32.3	31.7	31.4
Mining & quarrying	-0.2	5.4	2.4	3.0	3.0	2.9
Manufacturing	6.2	5.3	7.1	18.3	18.1	18.1
Electricity, gas, water supply & other utility services	4.0	4.8	7.9	2.4	2.3	2.3
Construction	-4.3	2.5	4.8	8.6	8.3	8.1
Services	8.0	9.1	10.2	50.0	51.1	52.5
Trade, hotels, transport, communication and services related to broadcasting	9.6	11.1	10.7	18.0	18.8	19.4
Financial, real estate & professional services	8.8	7.9	11.5	19.5	19.7	20.5
Public administration, defence and Other Services	4.7	7.9	7.2	12.5	12.6	12.6
GVA at basic prices	4.9	6.6	7.2	100.00	100.00	100.00
GDP at market prices	5.1	6.9	7.3	---	---	---

Source: Central Statistics Office (CSO). PE: Provisional Estimates.

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

Sectors	2013-14				2014-15				2015-16
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Agriculture, forestry & fishing	2.7	3.6	3.8	4.4	2.6	2.1	-1.1	-1.4	1.9
Industry	4.8	4.0	5.0	4.3	7.7	7.6	3.6	5.6	6.5

Sectors	2013-14				2014-15				2015-16
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Mining & quarrying	0.8	4.5	4.2	11.5	4.3	1.4	1.5	2.3	4.0
Manufacturing	7.2	3.8	5.9	4.4	8.4	7.9	3.6	8.4	7.2
Electricity, gas, water supply & other utility services	2.8	6.5	3.9	5.9	10.1	8.7	8.7	4.2	3.2
Construction	1.5	3.5	3.8	1.2	6.5	8.7	3.1	1.4	6.9
Services	10.2	10.6	9.1	6.4	8.7	10.4	12.5	9.2	8.9
Trade, hotels, transport, communication and services related to broadcasting	10.3	11.9	12.4	9.9	12.1	8.9	7.4	14.1	12.8
Financial, real estate & professional services	7.7	11.9	5.7	5.5	9.3	13.5	13.3	10.2	8.9
Public administration, defence and Other Services	14.4	6.9	9.1	2.4	2.8	7.1	19.7	0.1	2.7
GVA at basic prices	7.2	7.5	6.6	5.3	7.4	8.4	6.8	6.1	7.1
GDP at market prices	7.0	7.5	6.4	6.7	6.7	8.4	6.6	7.5	7.0

Source: Central Statistics Office (CSO).

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

Crops	Production (in Million Tonnes)			
	2012-13 (Final)	2013-14 (Final)	2014-15 (4th AE)	2015-16$ (1st AE)
Total Foodgrains	257.1	265.0	252.7	124.1
Rice	105.2	106.7	104.8	90.6
Wheat	93.5	95.9	88.9	-
Total Coarse Cereals	40.0	43.3	41.8	27.9
Total Pulses	18.3	19.3	17.2	5.6
Total Oilseeds	30.9	32.8	26.7	19.9
Sugarcane	341.2	352.1	359.3	341.4
Cotton	34.2	35.9	35.5	33.5

$: Covers only Kharif Crops.

TABLE 4: PROCUREMENT OF CROPS IN MILLION TONNES

Crops	2010-11	2011-12	2012-13	2013-14	2-14-15	2015-16
Rice#	34.2	35.0	34.0	31.8	32.2*	--
Wheat@	22.5	28.3	38.2	25.1	28.0	28.1*
Total	56.7	63.4	72.2	56.9	60.2	20.1

#Kharif Marketing Season (October-September), @ Rabi Marketing Season (April-March), *Position as on 07.10.2015.

TABLE 5: Off-Take and Stocks of Foodgrains (Million Tonnes)

Crops	Off-take				Stocks	
	2012-13	2013-14	2014-15	2015-16 (Till August)	September 1, 2014	September 1, 2015
1. Rice	32.6	29.2	30.7	14.2	17.3	13.9
2. Unmilled Paddy#					6.7	3.6
3. Converted Unmilled Paddy in terms of Rice					4.5	2.4
4. Wheat	33.2	30.6	25.2	12.1	35.5	34.5
Total (Rice & Wheat) (1+3+4)	65.9	59.8	55.9	26.3	57.3	50.8

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

Articles

Farmers' Suicides in Andhra Pradesh: An Exploratory Study

G. Nancharaiah *   and G. Jagadeesh**

Abstract

Socio-economic investigative study of Farmers' Suicides in Andhra Pradesh using Primary and Secondary data in three districts representing three regions of Andhra Pradesh; it examines the underlying causes. The study finds out that indebtedness, exploitative high interest rates, exorbitant expenditure on digging the bore well, seeds, fertilizers and pesticides and crop loss due to pest and natural calamities burden the Cotton, Chilly and Groundnut farmers with economic hardships and debt-traps, eventually compelling them to suicide. Interestingly same phenomenon has subtly spread to the Horticulture Farmers.

Key words: exploitative high interest rates, natural calamities, economic hardships, debt traps

Introduction

Indian agriculture is currently passing through a period of severe crisis. Although some features of the crisis started manifesting themselves in certain parts of India during the late 1980s, the crisis has assumed a serious dimension since the middle of the 1990s[1]. One of the serious outcomes of these changes is the incidence of suicides of farmers in different states like Maharashtra, Andhra Pradesh, Karnataka, Punjab and Kerala[2]. According to the official statistics, there were 8900 suicides by the farmers alone between 2001 and 2006 in four states of India viz., Andhra Pradesh, Karnataka, Kerala and Maharashtra[3]. Studies on farmers' suicides at national and international level have pointed out that several structural and institutional factors are responsible for the pathetic situation[4]. Many research studies pointed out that the agrarian distress is the resultant outcome of the farmer unfriendly policies pursued by the government for the last two decades at the central and state level as well[5].

The first incidence of farmers' suicide was reported in 1986 by Kerala. This was a Rubber growing farmer. Not only the incidence was neglected by the state government but also was brushed aside as a freak accident[6]. Like a contagious disease during the 1990s, this unfortunate unhealthy trend extended to north and south Karnataka, Andhra Pradesh, Maharashtra and Punjab and resulted subsequently in the spate of farmers' suicides.

Interestingly, most of these farmers were Cotton growers[7]. However, there are marked regional differences in the pattern of farmers' suicides. Each state stands out with unique characteristic causative phenomenon of the farmers' suicides. Though, the indebtedness is one of the root causes of suicides, each state with varied reasons provoke the researchers of good will to probe the suicide issue with ever new interest and dynamism. In Maharashtra, lack of irrigation facilities, drying up of institutional credit and price volatility of Cotton were found responsible for suicides by farmers[8]. Farmers' suicides are chiefly found in a concentrated manner in the Northern Region of Karnataka. Dry land farming, uncertain about the quality of new varieties of seeds and poor yields and decline in the productivity and thereby production and income from agriculture compounded the farmers' suicides. The cost of cultivation has been continuously on the rise and returns have decelerated. Further such downtrend has led to the indebtedness and subsequent unmanageable and unacceptable distress resulting in the widespread of farmers' suicides in the state of Karnataka[9]. On the other hand, in Punjab, the increase in consumption on non-agricultural expenditure has been at the root of the agrarian crisis[10]. It is worth to note that the farmers' suicides have reached saturated levels only among the cash crop growers viz., Cotton, Chilies, Groundnut, Rubber, etc. No doubt those farmers' suicides are an indisputable agrarian crisis and such alarming proportions have become a reality to grapple with particularly after the introduction of the New Economic Policy in the country.

Under the chairmanship of R. Radhakrishna, Government of India constituted an expert committee to have an in-depth study on agriculture indebtedness. They said, "There are twin dimensions to this crisis. One is that which threatens the livelihood of those dependent on agriculture, particularly the small and marginal farmers and landless agricultural labourers. The second one is agricultural developmental crisis that manifests through a deceleration of productivity which can be attributed to the neglect in the designing of programme and in the allocation of resources towards agriculture"[11]. The report of the Expert Group on Agriculture stated that "Indian agriculture is currently passing through a period of severe crisis". The Situation Assessment Survey of farmers (SAS) carried out by NSSO (2002-03) projected that at All-India level, an

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estimated 60.4% of rural households were farmer households and of them 48.6% were reported to be indebted. The incidence of indebtedness was highest in Andhra Pradesh (82.0%), followed by Tamil Nadu (74.5%),Punjab (65.4%),Kerala (64.4%), Karnataka (61.6%) and Maharashtra (54.8%).Moreover, Haryana, Rajasthan, Gujarat, Madhya Pradesh and West Bengal each had about 50 to 53% farmer households indebted. States with very low proportion of indebted farmer households were Meghalaya, Arunachal Pradesh and Uttaranchal. In each of these States less than 10% farmer households were indebted.

On the eve of the 2004 state assembly election, the Congress Government took full advantage of the unhappiness among farming community and the rural poor in its campaign (Reddy 2013). Therefore, the political think tanks in their manifesto assured the voters and inserted and campaigned the following to come to power: Investment in Irrigation, Farm Debt Relief, Free Power to Agriculture, and Subsidized Low Interest Loans for women Self Help Groups (SHG), Land Distribution to the Schedule Caste and Schedule Tribes, and the promise of Legislation on Guaranteed Right to Work. When the Congress Party came to power, it put in action initiatives like setting up of the AP Commission for Farmers Welfare, launching of a massive Irrigation Development Programme, Free Power to Agriculture, the 'Pavala Vaddi' (3 percent interest) Loans to the SHGs, Indira Awas Yojana (housing programme for rural poor) and NREGS Programmers for the unemployed rural people (Reddy 2013). Even though government implemented such programs to address agrarian distress and to prevent farmers' suicides more or less same trend of farmers' suicides continued in Andhra Pradesh. There were 1489 farmers' suicides between 2006 and 2009. Keeping in mind the above state of affairs in the rural economy of Andhra Pradesh, the present study examines underlying causes for farmers' suicides among different selected districts in Andhra Pradesh.

Data and Methodology

The study is based on both primary and secondary data. Primary data was obtained from the surveys conducted in the field by the researchers. Secondary data was availed from state government sources. The paper is organized as follows: Section one analyses the genesis and the extent of farmers' suicides in Andhra Pradesh, Section two presents the agriculture in Andhra Pradesh in selected districts. The underlying causes of farmers' suicides in different districts are offered in the third section and the fourth Section deals with comparison of farmers' suicides with non-suicides households. The final section summarizes the major findings of the study.

Farmers' Suicides in Andhra Pradesh

According to Government of Andhra Pradesh, there were only 4661 farmers' suicides. In order to map the pattern or trend of farmers' suicides systematically, we classified all the 23 districts in the state into three regions namely Costal Andhra, Telangana and Rayalaseema. Table 1 provides the regional pattern of farmers' suicides in Andhra Pradesh from 1998 to 2009. There is a high degree of variation in terms of number of farmers' suicides as well as percentage of farmers' suicides in the three regions. Coastal Andhra region, out of 4661 farmers' suicides in the state constitutes 9.1 percent and Rayalaseema amounts to 26 percent whereas Telangana stands out with 64.9 percent. Coastal Andhra region consists of nine districts and among all the districts Guntur registered highest number of farmers' suicides (203),and then followed by Prakasam (89), Krishna (59), Nellore (26) and Visakhapatnam (18). Though Rayalaseema region has only four districts, among all the districts in this region Anantapur recorded highest number of farmers' suicides (554) then followed by Kadapa (97), Kurnool (421) and Chittoor (140). Telangana region comprises of ten districts and in almost all the districts farmers committed suicides. Warangal district witnessed highest number of farmers' suicides (734).

TABLE-1 Distribution of Farmers' Suicides in Andhra Pradesh

Region wise	Name of the District	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Costal	Srikakulam	0	0	0	1	0	0	4	1	0	0	1	0	7
Andhra	Vizianagaran	0	0	0	0	0	0	1	0	0	0	0	0	1
	Visakhapatnam	0	0	0	0	0	0	9	5	2	1	1	0	18
	East Godavari	0	1	0	0	1	0	4	2	3	2	1	0	14
	West Godavari	0	0	0	0	0	0	8	0	0	1	1	1	11
	Krishna	1	0	2	0	1	0	24	13	6	4	2	1	54
	Guntur	5	12	1	4	5	1	73	24	31	20	1	26	203
	Prakasam	0	4	4	1	1	0	44	9	8	10	8	0	89
	S.P.S.R. Nellore	0	0	0	1	0	2	13	7	1	2	2	1	29
	Total													426(9.1)

Region wise	Name of the District	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Rayalaseema	Cuddapah	0	0	0	0	1	5	21	17	9	26	17	1	97
	Kurnool	13	6	3	6	11	7	78	64	72	86	57	18	421
	Anantapur	1	9	21	35	61	72	72	40	53	98	60	32	554
	Chittoor	0	0	2	4	1	4	39	21	25	25	16	3	140
	Total													1212(26)
Telangana	Adilabad	8	16	23	26	20	26	64	62	82	45	13	9	394
	Karimnagar	12	15	15	36	38	36	107	73	48	54	53	10	497
	Khammam	1	7	0	9	4	7	39	23	22	7	12	2	133
	Mahbubnagar	4	15	20	9	22	17	116	57	33	29	0	12	334
	Medak	2	1	5	3	11	25	107	41	19	23	20	14	271
	Nalgonda	10	9	8	15	19	11	87	52	48	10	34	3	306
	Nizamabad	1	3	6	8	24	9	72	27	11	12	4	7	184
	Ranga Reddy	0	4	3	1	5	5	60	40	23	18	8	3	170
	Warangal	50	76	77	98	92	82	146	47	36	3	10	17	734
	Total													3023(64.1)
All Total		108	178	190	257	317	309	1188	625	532	490	390	77	4661

Source: Revenue Department, Government of Andhra Pradesh, 2009.

Agriculture in Andhra Pradesh: A Macro Outlook

Andhra Pradesh is the 5th largest state in India both in terms of geographical area and population. Close to 30% of state's GDP is from the agriculture and allied sectors and provides employment to 64.55% of the state's population. The share of agriculture in GSDP and employment are higher in Andhra Pradesh as compared to all India.

TABLE-2 Compound Growth Rates of Area, Production and Yield in Andhra Pradesh
(1971 to 2009)

		Guntur		Warangal		Anantapur		Andhra Pradesh	
Crops	Years	1971-90 Phase -1	1991-09 Phase-2	1971-90 Phase -1	1991-09 Phase-2	1971-90 Phase -1	1991-09 Phase-2	1971-90 Phase -1	1991-09 Phase-2
	Area	0.23	-0.8	2.9	2.72	-3.13	-1.88	0.75	-0.28
Rice	Production	4.2	0.05	5.24	4.56	-1.51	0.19	3.67	1.45
	Yield	3.9	0.8	2.25	1.79	1.66	2.11	2.65	1.74
	Area	5.7	11.8	-2.12	12.07	0.52	17.19	0.54	6.74
Maize	Production	8.4	20.6	0.59	4.19	1.95	22.11	2.92	10.44
	Yield	2.5	8.5	2.78	-7.02	1.43	4.2	2.36	3.46
	Area	-2.19	-0.38	-1.65	2.64	-6.68	-3.09	-1.25	-0.73
Cereals	Production	2.73	1.83	1.51	6.11	-2.83	0.08	2.43	2.39
	Yield	5.03	2.22	3.22	3.38	4.12	3.027	3.73	3.15
	Area	3.56	0.15	-1.51	-1.64	-3.75	6.05	0.54	1.83
Pulses	Production	5.78	2.25	0.58	0.16	-3.2	7.43	3.96	5.28
	Yield	2.13	2.1	2.13	1.84	0.56	1.3	3.39	3.38
Food	Area	-1.6	1.69	-0.8	-0.1	-6.52	-0.23	-0.91	0.006
Grains	Yield	3	3.45	4.2	2	-3.79	2.58	2.5	2.4
	Production	1.45	5.7	3	1.9	3.6	3.02	3.44	2.41

		Guntur		Warangal		Anantapur		Andhra Pradesh	
Crops	Years	1971-90 Phase -1	1991-09 Phase-2	1971-90 Phase -1	1991-09 Phase-2	1971-90 Phase -1	1991-09 Phase-2	1971-90 Phase -1	1991-09 Phase-2
	Area	11.23	-2.4	24.11	6.87	-4.6	-9	3.58	1.8
Cotton	Production	14.72	-0.008	34.36	10	1.9	-13.3	9.4	4.2
	Yield	3.13	2.45	8.26	2.92	6.9	-4.6	5.62	2.39
	Area	-3.4	7	4.3	-1.9	-2.1	-3.3	0.74	0.1
Chillies	Production	5.9	12.2	8.7	2.3	-1	3.2	6.68	5.66
	Yield	9.7	4.8	4.2	4.4	1.1	6.8	5.89	5.54
	Area	0.45	-11.31	4.97	-5.91	5.42	0.82	2.28	-2.85
Groundnut	Production	2.71	-7.7	4.24	-2.69	6.68	-4.06	3.18	-3.75
	Yield	2.25	4.07	-0.7	3.42	1.2	-4.84	0.87	-0.93
	Area	-0.25	-4.24	4.7	-5.6	5.1	1.2	1.84	-1.42
Oilseed	Production	2.38	-1.09	4	-3.3	6.6	-3.5	3.05	-1.04
	Yield	2.64	3.28	-0.6	2.4	1.3	-4.7	1.18	0.38

Source: Season and Crops Report of Andhra Pradesh, 1970-71 to 2008-09 & Statistical Abstract of Andhra Pradesh

Table-2 not only shows the Compound growth rates of Area, Production and Yield in Andhra Pradesh but also highlights the noticeable variation in Warangal, Guntur and Ananthapur districts during 1970-71 and 2008-09 period of time representing realistically the situation immediately before and after the implementation of neoliberal policies. In phase-1, Cotton showed the highest growth of production (9.4 percent) followed by chillies, rice, pulses and groundnut (6.68, 3.67, 3.96, 3.18) respectively. Both the large area and succeeding yield contributed to the highest growth rates of Cotton. Whereas the growth pattern of the dominant crops like rice, pulses and chilies was due to the higher yield only. Phase-II represented the true picture of the state of agriculture and farmers after the liberalization policies. No doubt, the statistics depicted disheartening facts about the moderate growth when compared to Phase-I. Maize illustrated the highest growth rates of production (10.44) followed by chillies, pulses, cotton, cereals (5.66, 5.28, 4.2, 2.39). The highest growth rates of cereals and chillies were because of highest growth rates of respective crops yields. Remaining other crops growth rates varied depending on both the area and the yield.

A Micro Analysis

Andhra Pradesh is distinctly divided into three regions, namely the Coastal Andhra, Telangana and Rayalaseema due to considerable heterogeneity in the socio-cultural and agro-climatic conditions, which are likely to influence the extent of suicides and indebtedness across the regions. Three districts, namely, Guntur District from Coastal Region, Warangal District from Telangana Region, and Anantapur District from Rayalaseema Region were selected for this study since most or high number of suicides occurred in the above mentioned districts. These three districts also cover all the political sub-regions of Andhra Pradesh based on the reported cases of suicides. Moreover, such sampling provides not only space for regional factors but also socio-economic, cultural and religious factors, which prompted farmers to suicides. Specific villages were selected based on the list of suicides cases from 2007 to 2009 provided by the Government of Andhra Pradesh. Primary data for the study was collected from in-depth study of three districts of Andhra Pradesh. The primary data mainly was generated by means of scientific questionnaire, which was carefully designed and standardized. The questionnaire has:

Interview schedule for close kin of the suicide victims.

For evaluating the specific objectives of the study, necessary primary data was obtained from the 129 selected families where suicides occurred during 2007 to 2009 from 125 villages of three regions of Andhra Pradesh, through personal interviews with the help of a well-structured schedule. The study confined to the collection of data pertaining to the 2011-2012 agricultural year. The data collected from the respondents includes general information about suicide farmers, their resource position, land holding, cropping pattern, debt condition, asset position, sources of credit, purpose of credit, mental status of person, addictions, if any, reasons for suicide and any other information family wishes to share. Further, the study also provided comparison of farmers' suicides with non-suicides in Andhra Pradesh. We identified if at all there were to exist some non- suicides households that are similar to the suicides families in the village in term of

landholdings and other assets. This particular information was obtained from the village Sarpanch, village revenue officers and elders of the village. For an objective analysis, we also used data collected from 87 non-suicide families from 87 villages.

Percentages and averages were used as analytical tools for achieving the objectives of the study. The information was then processed district and category wise later incorporated in the results and held discussions accordingly. Before discussing the indebtedness among the farmers who committed suicides from various dimensions, we thought that it was important to discuss profile and the landholding pattern of the families in all the three different districts.

TABLE-3 Suicide Farmers Landholdings in Selected Districts of Andhra Pradesh

Size of Landholdings	Warangal No.	Warangal AL	Guntur No.	Guntur AL	Anantapur No.	Anantapur AL
Marginal	12	1.9	8	1.6	7	2.05
Small	18	3.6	15	3.5	15	3.9
Semi-Medium	8	5.8	5	6.6	31	6.7
Medium	-	-	3	16	6	12.2
Large	-	-	-	-	1	25

Note: No. indicates number of farm suicide households, AL indicates average land. Land size-category is as follows: 0-2.5 acres-Marginal, 2.5-5 acres-Small, 5-10 Semi-medium, 10-20 acres-Medium, and 20+ acres-Large.
Source: Field survey during the year 2010 to 2011.

Table-3 furnishes the profile of the distribution of land holding of selected sample households among the different size groups from the selected three districts. Among the selected landholders, we did not come across large farmers in Guntur and Warangal. Whereas we found considerable small farmers in all the three selected districts, interestingly Anantapur district alone stood out with large proportion of semi-medium farmers (31) and comparatively very less in Warangal and Guntur. Average size of marginal holding in Anantapur district was highest due to the dry land owned by them compared to the combination of dry and wet land owned by marginal farmers in Guntur and Warangal districts. The distinct feature of Warangal district was the absence of medium and large farmers in the selected sample households.

Cropping Pattern among the Suicide Households:

Cropping pattern across three districts was more diversified. The proportion of cropped area under non-food crops in the gross cropped area was highest in Anantapur, Guntur and Warangal in the decreasing order. However, the incidence of suicides did not follow the same order. Therefore, one could conclude that the proportion of area under non-food crops was not correlating with the incidence of suicides. In order to understand the cropping pattern from different districts and regions, crops were classified into three types- 1.Canal irrigated Crops 2.Bore well irrigated Crops, 3.Rain-fed Crops. The cropping pattern in the Table-4 revealed that Cotton crop continued and continues to be the dominant crop in Guntur and Warangal and groundnut in Anantapur district. We discovered in Table-4 the cropping pattern practiced by suicides families in the selected three districts.

TABLE: 4: Cropping Pattern of Suicides Families from Selected District

Cropping Pattern	Warangal Acres	Warangal Percentage	Guntur Acres	Guntur Percentage	Anantapur Acres	Anantapur Percentage
Canal irrigated cotton	4	2.9	64	42.8	-	-
Bore Well irrigation cotton	94.78	69.1	8	5.3	-	-
Rain-fed cotton	18.02	13.1	6	4	-	-
Canal irrigated chillies	-	-	48.75	32.6	-	-
Bore Well irrigated chillies	2	1.4	8	5.3	-	-
Rain-fed chillies	-	-	-	-	-	-
Canal irrigated paddy	2.84	2	14.75	9.8	-	-
Bore Well irrigated paddy	15.5	11.3	-	-	2	0.5
Rain-fed paddy	-	-	-	-	-	-
Canal irrigated Ground Nut	-	-	-	-	1	0.2
BoreWell irrigated Ground Nut	-	-	-	-	22.75	6.5
Rain fed Ground Nut	-	-	-	-	309.52	90.5
Canal irrigated Sweet orange	-	-	-	-	-	-
Bore Well irrigated Sweet orange	-	-	-	-	5.38	1.5
Rain fed Sweet orange	-	-	-	-	-	-
Total area irrigated	137.14	100	149.5	100	341.65	100

Source: Field survey during 2010 to 2011

From the Table-4 one could comfortably conclude that the cotton crop cultivation under canal was only limited to Guntur district while the cotton cultivation under well was widespread in Warangal district. Chillies cultivation under canal was identified only in Guntur district and a small proportion of land in Warangal district was under well irrigation. Similarly, 1/10 of the land owned by the selected farm households in Guntur district irrigated paddy crop under canal and equal area owned by selected farm households in Warangal district irrigated paddy under wells. Cultivation of cotton, chillies and paddy crops seemed to have disappeared in Anantapur district. On the other hand, groundnut emerged as the principal crop in the district, of which 6.5 per cent was irrigated under well and nearly 90 per cent depended on rains. The gradual increase of groundnut cultivation in Anantapur district steadily decreased the quality and quantity of the raising of crops like Raagi, Pulses and Sunflower. We observed detectable change in the cropping pattern of the district. In other words Anantapur district appeared to be heading towards mono-crop (groundnut) at the cost of rewarding multi-crops like Raagi, Pulses and Sunflower, which suite to the weather pattern of the district. To have suitable land for groundnut cultivation deliberately farmers spread sand carted from the nearby rivers and rivulets. Such an inadvertent move transformed the original soil into sandy soil, which would no more go well with other crops in case one intended to give up groundnuts and take up other crops. Such unintended initiative sowed the seed for the Desertification of the good cultivable land. Today Anantapur district shot into fame not for groundnut cultivation but for the recurring phenomenon of desertification. Since sand was mined from the rivers and rivulets, recharging of the ground water table came to stand still resulting in poor records of ground water and water tables ensuing continuous droughts. Despite the fact that Anantapur is known as a rain shadow district in the country the government machinery, very specially the agricultural department, dared to do away with native crops and paved the way for groundnuts. Other important change in the cropping pattern of Anantapur district was deliberate discontinuance of cash crop Sericulture. As if it were not enough government introduced horticulture crops like Sweet Orange. The subsidies offered by government for raising Sweet Orange crop were so attractive and enticing many took to Sweet Orange cultivation. As days went by recurring droughts worsened the economic condition of Sweet Orange growers, they too experienced economic slowdown and debts, which frustrated them to commit suicides. Therefore, in Anantapur district we came across suicides among commercial crops growers as well as horticulture growers.

Structure of Indebtedness among Suicides Farmers Households

The indebtedness was measured up to the suicide committing date of the farmers. The important indicators of indebtedness developed and collected from the farmers were: the district wise extent of debt-farm size of all holdings; magnitude of debt-farm size for all holdings; magnitude of per hectare debt-farm size; source of debt-institutional and non-institutional sources-farm size; interest rate of debt-farm size, purpose of debt-productive and non-productive consumption purposes-component-wise and district-wise etc.

TABLE-5 DISTRIBUTION OF SUICIDES BORROWER FARMERS AMONG DIFFERENT SIZE OF GROUPS

Average amount (Rs.)

Warangal District	Number of borrower household	per borrower	Per hector
Marginal	12	101495	127400
Small	18	176200	120100
Semi-medium	8	205437	87559
Medium	-	-	-
Large	-	-	-
All Categories	38	158764	110204
Guntur District			
Marginal	8	99803	153544
Small	15	235394	156929
Semi-medium	5	334000	126515
Medium	3	483333	75520
Large	-	-	-
All Categories	31	240301	123949
Ananthapur District			
Marginal	7	178142	218771
Small	15	175472	111528
Semi-medium	31	192558	74803
Medium	6	291512	59290
Large	1	1154027	115310
All Categories	60	212524	85810

Source: Field survey during 2010- 2011.

The Table-5 presents the Distribution of suicides of borrower farmers among different size of groups. The per farm magnitude of debt among different categories of farmers was also presented in Table 6.9. In Andhra Pradesh, the average amount of debt per suicides farmers sample household at the end of March 2011 was Rs.203363/-. The average amount of debt per sample farm household was highest (Rs.240301/-) in Guntur district of Andhra region, followed by Anantapur district of Rayalaseema region (Rs.212524/-) and Warangal district of Telangana region (Rs.158764/-).The average amount of debt on per hectare basis was Rs. 99580. Since the average farm size in Guntur district of Andhra region was the largest, the per hectare amount of debt was also highest. It was Rs.123949/- in Guntur district of Andhra region, followed by Warangal district of Telangana region (Rs.110204/-) and Anantapur district of Rayalaseema region (Rs.85810/-) per suicides sample household. Such alarming statistics were mainly due to the cotton crop failure from 2007 to 2009 in Andhra and Telangana regions and groundnut failure in Rayalaseema region. The amount of debt per suicides sample household was directly related to the farm size. It was the highest in the case of marginal and small farmers and lowest in the case of semi-medium farmers. However, in relation to land (per ha), the association was negative. The relative indebtedness of the marginal farmers, *i.e.* on per ha basis was two times than that for larger farmers for Andhra Pradesh as a whole. It was Rs. 159500/-and Rs.83048/- per ha per sample household for marginal and medium suicides farmers respectively. In the Anantapur district of Rayalaseema region, marginal farmers were almost three times more indebted on per ha basis than the large farmers in the following range of Rs.218771/- and Rs. 59290/-per ha per marginal and large farmers respectively. It was even higher in the Guntur district of Andhra region where indebtedness was double for marginal farmers (Rs.153544/- per ha) than large farmers.

Table-6 a, b, c, distribution of average borrowed amount in different institutions and non-Institutions among different size of groups. In Warangal district, distribution of average borrowed amount from different institutions and non-institutions among different size of groups was as follows: 34.5 % from institutional sources like commercial banks, 19.6 % from cooperatives, and 45.8 % from rural banks. All the farm size categories were almost equally served. Amongst non-institutional sources, the moneylenders were the major source of credit, and provided about 20.3 % of total farm credit, which almost amounted to 82.2 % of the total credit from non-institutional sources. If one were to look at from farm size

category, marginal farmers obtained 14.1 percent of loans from institutional sources and 85.8 percent from non-institutional sources. The small farmers whereas acquired 16.6 % of their loans from institutional sources and 83.2 % from non-institutional sources. On the other hand, semi-medium farmers claimed 21.5 % of their loans from institutional and 78.4 % from non-institutional sources.

In Guntur district, distribution of average borrowed amount from different institutions and non-institutions among different size of groups pointed to the following interesting discovery. Amongst institutional sources, commercial banks provided 39.8%, cooperatives about 48.2 % and rural banks about11.9 percent of loans. Here too almost all the farm size categories were equally served. Amongst non-institutional sources, the moneylenders and landlords were the major sources of credit. They supplied about 46.5 percent of total farm credit, which was around 86.4 % of the total credit from non-institutional sources. Farm size category statistics disclosed that the marginal farmers procured 9.6 percent of their loans from institutional sources and 90.3 percent from the non-institutional sources, while the small farmers obtained 19.9 percent of their loans from institutional sources and 89 percent from non-institutional sources. The total percent of loans received by the semi-medium farmers from institutional sources was 16.7 and from non-institutional sources were 83.2 percent. The medium farmers whereas accounted 14 percent of their loans from institutional sources and 84.9 percent from non-institutional sources.

In Anantapur district, distribution of average borrowed amount from different institutions and non-institutions among different size of groups divulged attention grabbing conclusions. Amongst institutional sources, commercial bank provided 77.2 percent of the loans, co-operatives about 9.2 percent and rural banks about11.3 percent. Here too we noticed that all the farm size categories were equally served. Amongst the non-institutional sources, landlords were the major source of credit, and provided about 46.5 percent of total farm credit, which amounted to 86.4 percent of the total credit from non-institutional sources. In the farm size category, marginal farmers obtained 16.1 percent of their loans from institutional sources and 83.8 percent from non-institutional sources. The small farmers obtained 33.6 percent of their loans from institutional sources and 66.3 percent from non-institutional sources. In the case of semi-medium farmers, 29.3 percent of loans were from institutional sources and 70.6 percent from non-institutional sources. The medium farmers whereas accounted for 29.8 percent of loans from institutional sources and 70.1 from non- institutional sources.

TABLE 6 A - Distribution of average borrowed amount from different institutions and Non-Institutions among different size of groups in Warangal

(In Rs.)

Different institutions	Size of landholding					
	Marginal farmer	Small farmers	Semi-Medium	Medium farmers	large farmers	Total (In Rs.)
	A. Amount	A. Amount	A. Amount	A. Amount	A. Amount	A. Amount
Commercial bank	0	14333 (33.1)	30000 (52.1)	-	-	44333 (34.5)
Rural bank	15000 (60)	16250 (35.5)	27500 (47.8)	-	-	58750 (45.8)
Cooperative bank	10000 (40)	151549 (33.1)	0	-	-	25154 (19.6)
Sub-Total	25000 (14.1)	45737 (16.6)	57500 (21.5)			128237 (17.8)
Different Non-Institutions						
SHG	8445 (5.5)	9941 (4.3)	11000 (5.2)	- -	- -	29386 (4.9)
Micro finance	22500 (14.8)	30000 (13.1)	30000 (14.3)	- -	- -	82500 (14)
Money lender	29166 (19.2)	41450 (18.1)	49444 (23.6)	- -	- -	120060 (20.3)
Trader	33540 (22.1)	34055 (14.9)	41812 (19.9)	- -	- -	109407 (18.5)
Landlord	27083 (17.9)	34684 (15.1)	43250 (20.6)	- -	- -	105017 (17.8)
Friends/relatives	10416 (6.8)	65384 (28.6)	14875 (7.1)	- -	- -	90675 (15.4)
Other	20000 (13.2)	13000 (5.6)	18750 (8.9)	- -	- -	51750 (8.7)
Sub-total	151150 (85.8)	228514 (83.2)	209131 (78.4)			588795 (82.2)
Total	176150	274551	266631			717032

Source: Field survey during the year 2010-2011.

*Figures in parentheses indicate percentage of borrowed amount from institutional & non-institutional sources.

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TABLE 6B - Distribution of average borrowed amount from different institutions and Non- Institutions among different size of groups in Guntur.

(In Rs.)

Different institutions	Size of landholding					
	Marginal farmers	Small farmers	Semi-Medium	Medium farmers	large farmers	Total (In Rs.)
	A. Amount	A. Amount	A. Amount	A. Amount	A. Amount	A. Amount
Commercial bank	10000 (62.5)	16000 (51.6)	31666 (51.3)	12500 (18.5)	-	70166 (39.8)
Rural bank	6000 (37.5)	0	0	15000 (22.2)	-	21000 (11.9)
Cooperative bank	0	15000 (48.3)	30000 (48.6)	40000 (59.2)	-	85000 (48.2)
Sub-total	16000 (9.6)	31000 (10.9)	61666 (16.7)	67500 (14)	-	176166 (13.5)
Different Non-Institutions						
SHG	11333 (7.5)	12083 (4.7)	13000 (4.2)	15000 (3.6)	-	51416 (4.5)
Micro finance	20428 (13.6)	33571 (13.2)	30000 (9.7)	40000 (9.6)	-	123999 (11.0)
Money lender	37000 (24.7)	56875 (22.4)	73333 (23.9)	95000 (22.9)	-	262208 (23.3)
Trader	31250 (20.9)	38214 (15.0)	80000 (26.1)	106666 (25.8)	-	256130 (22.8)
Landlord	30833 (20.6)	48000 (18.9)	55000 (17.9)	126666 (30.6)	-	260499 (23.2)
Friends/relatives	18385 (12.3)	19538 (7.7)	55000 (17.9)	30000 (7.2)	-	122923 (10.9)
Other	0	45000 (17.7)	0	0		45000
Sub-Total	149229 (90.3)	253281 (89)	306333 (83.2)	413332 (84.9)		1122175 (86.4)
Total	165229	284281	367999	480832		1298341

Source: Field survey during the year 2010-2011.

*Figures in parentheses indicate the percentage of average amount and number of borrower.

TABLE 6C - DISTRIBUTION OF AVERAGE BORROWED AMOUNT FROM DIFFERENT INSTITUTIONS AND NON- INSTITUTIONS AMONG DIFFERENT SIZE OF GROUPS IN ANANTHAPUR

(In Rs.)

Ananthapur	Size of landholding					
	Marginal farmers	Small farmers	Semi-Medium	Medium farmers	large farmers	Total (In Rs.)
	A. Amount	A. Amount	A. Amount	A. Amount	A. Amount	A. Amount
Commercial bank	25555 (72.8)	28444 (34)	32489 (33.7)	40000 (34.3)	500000 (100)	626488 (77.2)
Rural bank	9500 (27.1)	30000 (35.9)	35000 (36.3)	51532 (44.2)	0	105532 (13)
Cooperative bank	0	25000 (29.9)	28895 (29.9)	25000 (21.4)	0	78895 (9.7)
Sub-Total	35055 (16.1)	83444 (33.6)	96384 (29.3)	116532 (29.8)	500000 (47.8)	810915 (36.7)
Different non- institutions						
SHG	9800 (5.3)	11923 (7.2)	11368 (4.8)	14600 (5.3)	45000 (8.2)	92691 (6.6)
Micro finance	0	0	25000 (10.7)	27500 (10)	70000 (12.8)	122500 (8.7)
Money lender	56428 (30.9)	47117 (28.6)	76181 (32.7)	76333 (27.9)	120000 (22)	376059 (26.8)
Trader	45000 (24.6)	42923 (26)	57285 (24.6)	64983 (23.7)	80000 (14.6)	290191 (20.7)
Landlord	50000 (27.4)	45083 (27.4)	42576 (18.3)	61666 (22.5)	200000 (36.6)	399325 (28.5)
Friends/relatives	21250 (11.6)	17458 (10.6)	20113 (8.6)	28433 (10.3)	30000 (5.5)	117254 (8.3)
Other	-	-	-	-		
Sub-Total	182478 (83.8)	164504 (66.3)	232523 (70.6)	273515 (70.1)	545000 (52.1)	1398020 (63.2)
Total	217533	247948		390047		

Source: Field survey during the year 2010-2011.

*Figures in parentheses indicate the percentage of average amount and number of borrower.

TABLE-7A DISTRIBUTION OF AVERAGE BORROWED AMOUNT ACCORDING TO RATE OF INTEREST AMONG DIFFERENT SIZE GROUPS IN WARANGAL

(In Rs.)

Size of landholding	Rate of Interest					Total (In Rs.) A. Amount
	9 %- 12% A. Amount	13% - 24% A. Amount	25% - 34% A. Amount	35 %- 44% A. Amount	45% - 54% A. Amount	
Marginal	9518 (16.9)	24287 (43.1)	-	22500 (39.9)	-	56305
Small	12277 (14.8)	40213 (48.7)	-	30000 (36.3)	-	82490
Semi-Medium	16916 (10.3)	117026 (71.3)	-	30000 (18.2)	-	163942
Medium	-	-	-	-	-	-
Large	-	-	-	-	-	-

Source: Field survey during the year 2010-2011.

*Figures in parentheses indicate that percentage of average amount and number of borrower.

TABLE-7B DISTRIBUTION OF AVERAGE BORROWED AMOUNT ACCORDING TO RATE OF INTEREST AMONG DIFFERENT SIZE GROUPS IN GUNTUR

(In Rs.)

Different size of landholding	Rate of Interest					Total (In Rs.) A. Amount
	9 %- 12% A. Amount	13% - 24% A. Amount	25% - 34% A. Amount	35 %- 44% A. Amount	45% - 54% A. Amount	
Marginal	10444 (12.6)	18385 (22.3)	32999 (40.1)	-	20428 (24.8)	82256
Small	13333 (11.3)	22932 (19.4)	47911 (40.6)	-	33571 (28.5)	117747
Semi-medium	23427 (13.1)	55000 (30.8)	69999 (39.2)	-	30000 (16.6)	178426
Medium	19000 (9.6)	30000 (15.2)	107999 (54.8)	-	40000 (20.3)	196999
Large	-	-	-	-	-	

Source: Field survey during the year 2010-2011.

*Figures in parentheses indicate that percentage of average amount and number of borrower.

TABLE-7C DISTRIBUTION OF AVERAGE BORROWED AMOUNT ACCORDING TO RATE OF INTEREST AMONG DIFFERENT SIZE GROUPS IN ANANTHAPUR.

(In Rs.)

Different size of landholding	Rate of Interest					Total (In Rs.) A. Amount
	9 %- 12% A. Amount	13% - 24% A. Amount	25% - 34% A. Amount	35 %- 44% A. Amount	45% - 54% A. Amount	
Marginal	15474 (7.9)	21250 (10.9)	157631 (81.1)	-	-	194355

Different size of landholding	Rate of Interest					
	9 %- 12% A. Amount	13% - 24% A. Amount	25% - 34% A. Amount	35 %- 44% A. Amount	45% - 54% A. Amount	Total (In Rs.) A. Amount
Small	20407 (24.5)	17458 (21)	45234 (54.4)	-	-	83099
Semi-Medium	24950 (19.1)	20113 (14.5)	60377 (46.2)	25000 (19.1)	-	130440
Medium	29697 (19.2)	28433 (18.4)	68859 (44.5)	27500 (17.8)	-	154489
Large	272500 (53.8)	30000 (5.9)	133333 (26.3)	70000 (13.8)	-	505833

Source: Field survey during the year 2010-2011.

*Figures in parentheses indicate that percentage of average amount and number of borrower.

Table 7a, b and c, clearly represented the distribution of average borrowed amount according to rate of interest among different size groups. From the tabulations, it was clear that most of the farmer households borrowed amount at 9% to 44% rates of interest in all the selected three districts. In Warangal district, most of the suicide farmers borrowed average amount at13%- 24% rate of interest among all size of farmers. Another interesting observation was that nearly 40 per cent of average loan was borrowed at the rate of 35 %- 44% interest in this district alone. On the other hand, all the suicide farmers borrowed very little amount at the rate of 9%-12% interest.In Guntur district, highest amount of rate of interest varied from 25% - 34%. It was then followed by other rates of interest. Similar situation also was observed in Anantapur district too. Another significant feature in the structure of borrowing by the farm households was that the micro-finance institutions levied 45% to 54% interest rate on the loans. Such phenomenon was very prevalent in Guntur district. Such high interest rates imposed by the micro-finance institutions on the loans borrowed by the farm households resulted in socio-economic distress and discrimination. The coercive methods employed by the micro-finance institutions to recover loans from the borrowers inflicted social shame and deflated dignity and worth of the farm household members. Such shameful harassment was unbearable, inescapable and inexplicable which generated suicidal tendencies among the farmers.

Borrowed Loans Expenditure and Utilization Pattern

The following table depicts category wise expenditure and utilization details of borrowed loans by the suicide farmers' households. It is a known fact that the farmers receive loans for agricultural purpose from both institutional as well as non-institutional agencies. Very often, such loans were diverted for other purposes like social functions, house constructions and debt repayments. We hit upon category-wise utilization of borrowed loans by selected farm household in tables 8a, b and c correspondingly. In the field survey, it was conspicuous that the borrowed loans utilization could be broadly divided into two major categories:

1. Agriculture Expenditure- sinking bore wells, buying live stocks, investment on seeds, fertilizers, pesticides, farm equipment and crop management

2. Non-agriculture Expenditure- health, education, housing, marriage, debt repayment and house hold consumption

Table-8a provides the Category-wise utilization of loans borrowed by selected farm household in Warangal. The various purposes for which the suicides farmers in Warangal district of Telangana regions of the state were taking loans are presented in Table-6a. An average farm household in the Warangal district incurred Rs. 341205/-(35 percent) and Rs. 632874/-(64.9 percent) on productive and unproductive purposes, respectively. Amongst the productive purposes, the highest debt was reported for digging repairing the bore well (42.1 percent of total loan).Second highest debt was reported for the purchase of agricultural inputs like seed, fertilizer and fertilizers diesel/mobile oil (41.1 percent of the total loan). Similarly, more than 9 percent of the total debt amount was spent on lease payment for land. About 5.9 percent of the funds were borrowed for developing land and purchases of livestock and other activities. Farm size category-wise semi-medium suicides farmers farm investment accounted more than 45 per cent of total loan compared to marginal, small suicides farmers who invested on productive purpose which was more than 35 per cent of the total loan.

TABLE-8A CATEGORY WISE UTILIZATION OF LOANS BORROWED BY SELECTED FARM HOUSEHOLD IN WARANGAL DISTRICT

(In Rs.)

Warangal	Marginal farmers	Small Farmers	Semi- Medium	Medium Farmers	Large Farmers	Overall
Agriculture Expenditure						
Bore well	30555 (31.9)	61875 (48.5)	51428 (43.4)	-	-	143858 (42.1)
Crop Investment	35400 (37.0)	44722 (35.1)	56875 (48.0)	-	-	136997 (41.1)
livestock	8000 (8.3)	0	0	-	-	8000 (2.3)
Lease	10000 (10.4)	12000 (9.4)	10000 (8.4)	-	-	32000 (9.3)
Land Development	11600 (12.1)	8750 (6.8)	0	-	-	20350 (5.9)
Sub-Total	95555 (35)	127347 (38.1)	118303 (32.1)		-	341205 (35)
Non- Agriculture Expenditure						
Marriage	50000 (28.2)	51111 (24.7)	83333 (33.4)	-	-	184444 (29.1)
Consumption	32000 (18.0)	35555 (17.2)	50875 (20.4)	-	-	118430 (18.7)
Drinking	15000 (8.4)	10000 (4.8)	10000 (4.0)	-	-	35000 (5.5)
Education	0	40000 (19.3)	25000 (10.3)	-	-	65000 (10.2)
House	30000 (16.9)	70000 (33.8)	0	-	-	100000 (15.8)
Non-farm	0	0	0	-	-	0
Health	50000 (28.2)	0	80000 (32.1)	-	-	130000 (20.5)
Sub-Total	177000 (64.9)	206666 (61.8)	249208 (67.8)	-	-	632874 (64.9)
Total	272555	334013	367511	-	-	974079

Sources: Field survey during the year 2010-2011.

*Figures in parentheses indicate that percentage of average amount expenditure.

TABLE-8B CATEGORY WISE UTILIZATION OF LOANS BORROWED BY SELECTED FARM HOUSEHOLD IN GUNTUR DISTRICT

(In Rs.)

Guntur	Marginal farmers	Small Farmers	Semi-Medium	Medium Farmers	Large Farmers	Overall
Agriculture expenditure						
Bore well	-	-	-	-	-	-
Crop Investment	65000 (81.2)	83333 (60.6)	132000 (76.1)	163333 (44.9)	-	443666 (58.3)
livestock	0	0	0	100000 (27.5)	-	100000 (13.2)
Lease	15000 (18.7)	39166 (28.4)	41250 (23.8)	90000 (24.7)	-	185416 (24.5)
Land development	0	15000 (10.9)	0	10000 (2.7)	-	25000 (3.3)
Sub-Total	80000 (36.2)	137499 (34.6)	173250 (31.3)	363333 (50.7)	-	754082 (39.9)
Non- Agriculture Expenditure						
Marriage	0	90000 (34.6)	100000 (26.3)	200000 (56.7)	-	390000 (34.4)
Consumption	38916 (27.6)	52500 (20.2)	70000 (18.4)	60000 (17.0)	-	221416 (19.5)
Drinking	20000 (14.2)	26500 (10.2)	15000 (3.9)	42500 (12.0)	-	104000 (9.1)
Education	0	33750 (13.0)	50000 (13.1)	50000 (14.1)	-	133750 (11.8)
House	40000 (28.4)	56666 (21.8)	110000 (28.9)	0	-	206666 (18.2)
Non-farm	0	0	35000 (9.2)	0	-	35000 (3.0)
Health	41856 (29.7)	0	0	0	-	41856 (3.6)
Sub-Total	140772 (63.7)	259416 (65.3)	380000 (68.6)	352500 (49.2)	-	1132688 (60)
Total	220772	396915	553250	715833	-	1886770

*Figures in parentheses indicate that percentage of average amount expenditure.

Source: Field survey during the year 2010-2011.

TABLE-8C CATEGORY WISE UTILIZATION OF LOANS BORROWED BY SELECTED FARM HOUSEHOLD IN ANANTAPUR DISTRICT

(In Rs.)

Anantapur	Marginal farmers	Small Farmers	Semi-Medium Farmers	Medium Farmers	Large Farmers	Overall
Agriculture expenditure						
Bore well	31666.67 (46.0)	31000 (28.9)	50333.33 (40.1)	60000 (40.6)	80000 (33.3)	253000 (36.7)
Crop Investment	37142.86 (53.9)	51000 (47.6)	55172.41 (43.9)	75000 (50.8)	160000 (66.6)	378315.3 (54.9)
livestock	0	25000 (23.3)	20000 (15.9)	12500 (8.4)	0	57500 (8.3)
Lease	0	0	0	0	0	0
Land dev	0	0	0	0	0	0
Sub-Total	68809.53 (17.8)	107000 (32.5)	125505.7 (20.3)	147500 (34.5)	240000 (20.7)	688815.2 (23.6)
Non- Agriculture expenditure						
Marriage	85000 (26.8)	77500 (34.8)	250000 (50.8)	0	0	412500 (18.5)
Consumption	46000 (14.5)	51571 (23.2)	57222 (11.6)	66666 (23.8)	154027 (16.8)	375486 (16.8)
Drinking	21500 (6.7)	26000 (11.7)	24117 (4.9)	28333 (10.1)	0	99950 (4.4)
Education	30000 (9.4)	2000 (0.9)	41000 (8.3)	27500 (9.8)	0	100500 (4.5)
House	0	0	0	25000 (8.9)	0	25000 (1.1)
Non-farm	80000 (25.2)	45000 (20.2)	63125 (12.8)	82500 (29.4)	0	270625 (1.2)
Health	54333.33 (17.1)	20000 (9.0)	56028 (11.3)	50000 (17.8)	760000 (83.1)	940361.3 (42.2)
Sub-Total	316833.3 (82.1)	222071 (67.4)	491492 (79.6)	279999 (65.4)	914027 (79.8)	2224422 (76.3)
Total	385642.9	329071	616997	427499	1154027	

Source: Field survey during the year 2010-2011.

*Figures in parentheses indicate that percentage of the expenditure.

Amongst the non-productive purposes, the highest debt was reported for the celebration of marriages of their children and for domestic expenditure (39.3 percent of total debt). House hold consumption and health expenditure cost significant amounts (38.12 percent of total debt). House construction including farm building and repairs was a major expenditure on which the suicides farmers invested and it was about 15.8 percent. Farm size category-wise small semi-medium suicides farmers non-productive investment incurred was more than 65 percent compared to marginal suicides farmers who invested on non-productive purpose and that accounted for less than 65 percent of total loan.

Table-8b depicts the expenditure and utilization statistics of borrowed loans in Guntur district by the suicides farmers. On an average farm household in the

Guntur district incurred expenditure of Rs. 754082/- (39.9 percent) and Rs. 1132688/- (60 percent) on productive and unproductive purposes respectively.58.3 percent was reportedly used for the productive purposes like the purchase of agricultural inputs- seeds, fertilizers, pesticides, diesel oil and crop management. Similarly, more than 24.5 percent of the total borrowed loan amount was spent on lease payment for land. About 16.5 percent of the borrowed funds were utilized for developing the land and purchase of livestock and other allied agricultural activities. Medium size farmers invested more than 50.7 percent of the total borrowed loan on productive purposes. Marginal, small and semi-medium suicides farmers whereas invested less than 40 percent on the productive purposes of the total borrowed loan amount. Amongst the non-productive purposes, 34.4 percent out of total borrowed loan was spent on children marriages and domestic needs. Nearly 19.9 percent of total borrowed loan was allocated for consumption expenditure. Around 18.2 percent was diverted towards house construction including farm building and repairs. In terms of farm size medium suicides, farmers invested 49.2 percent on non-productive purposes, while marginal small, semi-medium suicides farmers accounted for more than 65 percent expenditure on non-productive purposes of the total loan.

Comparison of suicides with Non- Suicide Households

Logistic regression model was used to examine the influence of different factors, namely, size of the landholding (SL), Family size (SF), Total indebtedness (TI), Total expenditure (TE), per hector expenditure (PHE), Value of livestock in rupees (LSV). The influence of various socio-economic factors on the probability of incidence of suicide was investigated through LOGIT Model. The dependent variable (probability of incidence of suicide) was expected to lie between 0 and 1.00. In the present study, suicide farmers and non-suicide farmers made the dependent variable discreet. Hence, the multivariate LOGIT model was useful for the analysis. The LOGIT model assumes that the probability of an individual, i, being committed suicide has the form as:

$$P_i = P(Y_i = 1/X_i) = e^{X_i\beta}(1 + e^{X_i\beta}) \quad (1)$$

Where Xi is the set of explanatory variables that include individual characteristics and B is the set of unknown parameters. Similarly, the probability of an individual not committing suicide as:

$$1 - P_i = P(Y_i = 0/X_i) = \frac{1}{(1 + e^{X_i\beta})} \quad (2)$$

Taking the ratio of the two expressions we get

$$\frac{P(Y_i = 1)}{P(Y_i = 0)} = e^{X_i\beta} \quad (3)$$

Taking the natural log of both sides we get the equation as:

$$Ln\left[\frac{P_i}{(1 - P_i)}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots \ldots \ldots + \beta_n X_n \quad (4)$$

The LOGIT model guarantees probabilities in the range of (0, 1).

The specific LOGIT model to predict the odds of a suicides farmer is specified as follows:

$$Ln\left[\frac{P_i}{(1 - P_i)}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + u_i \quad (5)$$

Where,

ln = Natural logarithm

Pi = Probability that the ith farmer will be a farmer who committed suicide

1-Pi = Probability that the ith farmer will not commit suicide

X1: size of the landholding (SL)

X2: Family size (SF)

X3: Total indebtedness (TI)

X4: Total expenditure (TE)

X5 : per hector expenditure (PHE)

X6 : Value of livestock in rupees (LSV)

β_1 to β_6 are the coefficients of the six independent ariables.

U is error term

TABLE-9 Results (Odds Ratio) of Logit Regression Analysis

Variables	Coefficient	Prob.level
C	2.286016	0.3818
SL	-1.770075	0.0201**
TI	5.88E-05	0.0000***
TE	-4.71E-06	0.7315
PHE	-6.54E-05	0.0269**
LSV	-0.000178	0.0002***
SF	-0.083412	0.8777
McFadden R-squared	0.829446	
LR statistic	236.9741	
Prob(LR statistic)	0.000000	

Note: *** denotes significant at 1% level.

**denotes significant at 5% level.

Estimates OF the LOGIT model is presented in the Table-9. From the analysis we found that four out of six explanatory variables had statistically significant impact on farmers' suicides. From the above table it was inferred that if size of land went up by one unit (1 hct) then log of odd ratio in favour of committing suicide would come down by 1.77 units. If total indebtedness went up by a unit then, the log of odd ratio committing suicides would increase by 5.88 units. If per hector expenditure went up by one unit, than log of odd ratio committing suicides would go down by in 6.54 units. If total live stock value went up by one unit, and then log of odd ratio in committing suicides would go down by -0.0001unit. Out of the six variables only two variables namely total expenditure and size of family were insignificant. From the probability of LR statistics and McFadden R-squared, it was clearly concluded that the LOGIT regression was highly significant. That means, LOGIT model provides a good fit for the data.

Distribution of Various Methods of Suicides Employed

In Table-10, all 129 reported suicide cases are tabulated according to the methods employed by the dead farmers. Most of them resorted to either consumption of pesticides or hanging. Percentage wise calculations exposed that 82.5 percent dead farmers consumed pesticide, 11.6 percent of them hanged themselves and remaining 3.1 percent of farmers resorted to other methods. In Warangal, 92.1 percent of farmers who committed suicides chose consumption of pesticides and 7.8 percent farmers hanging. In Guntur 93.5 percent of farmers, preferred consumption of pesticides and 6.4 percent, farmers opted for other means to end life. In Anantapur, 76.5 percent ended life by consuming pesticides, 20 percent by hanging and 3.3 percent by other means respectively out of the total suicides.

TABLE-10 Method wise Distribution of Suicides

Method of suicides	Name of the district.			
	Warangal	Guntur	Ananthapur	Total
Pesticide Consumption	35 (92.1)	29 (93.5)	46 (76.6)	110 (85.2)
Hanging	3 (7.8)	0	12 (20)	15 (11.6)
Other (specify)	0	2(6.4)	2(3.3)	4(3.1)
Total	38	31	60	129

Note: Fingers in the brackets indicates percentage.

Source: Households field survey during 2010 to 2011

Conclusions

From the 129 suicide cases under analysis, among the selected landholders, large farmers were not found in Guntur and Warangal. While the small farmers were considerable in all the three selected districts, in Ananthapur alone we unearthed large proportion of semi-medium farmers (54.3 percent) and comparatively very less in Warangal and Guntur. Average size of marginal holding in Ananthapur district was highest due to the dry land owned by them compared to combination of dry and wet land owned by marginal farmers in Guntur and Warangal districts. The distinct feature of Warangal district was the absence of medium and large farmers in the selected sample households. It was a surprise that the large majority of suicides farmers had borrowed heavily from non-institutional sources at high rates of interest. On other hand only 10 to 15 percent of the loans raised by suicides' farmers were from institutional sources. Very interestingly the small farmers and semi-medium farmers heavily borrowed high amount of loans from the institutional sources only. We did not find suicides among the traditional large land holding farmers.

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Farmers Suicide in the Corporate Economy of India: an Analytical Study

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Abstract

Despite the popular image of farming as a peaceful and healthy way of life, agriculture has the highest rates of mortality in any industry. Suicide among farmers is now a universal phenomenon. Studies across the globe have identified farming as one of the most dangerous industries. Farming environments are characterized by a broad and changeable range of physical, biological and chemical hazards that are similar across all cultures. Thus, it is important to view the issue of farmers' suicide from a global perspective. Since 1995, more than 2, 53,000 farmers have been reported to have committed suicides in India, making this the largest wave of suicides in the world. Although farming practices, production systems and type of farms are diverse, there are commonalities across the farms, which are important to health. Most farms continue to be family-owned and operated business and are exposed to the volatility of commodity markets, the variability of weather patterns and the influence of respective government regulations. Farmers are thus exposed to a high rate of stress. Physical stressors and hazards of the farm environment are compounded by regulatory framework and economic dynamics of managing farm business. These operate in the context of declining trends of trade for agricultural produce, volatile commodity markets, limited availability of off-farm employment, growing cost of machinery and production and loss of farm or livelihood due to crop failures. Economic concerns and sometimes government policies have been consistently identified as a major cause of stress and a contributor to suicide. There is no customary or mandatory retirement age for farmers all over the world and many tend to work beyond the customary retirement age, placing the younger generation in a dependant relationship with their parents for much longer than is typical. This can lead to tension between the two generations on the farm. No wonder then that the abominable phenomenon of farmer suicides continues with unmitigated ferocity

Keywords: Farmers' suicides, Agrarian crisis, Marginal farmers, Cash crops, Indebtedness

Back Drop

The study has been initiated in the backdrop of the agrarian crisis that the Indian region has been facing over the last few months. Reports have been coming in the media regularly on crop failure due to water shortage, farmers demanding compensation and that some farmers have taken their lives due to crop failure. The farmer suicides have become a controversial subject over the past month with the member of Parliament of the state ruling party denying in the floor of the Parliament that there are suicides happening due to failure of crops

The impact of trade liberalization policies on Indian farmers and Indian agriculture since the new economic policy was introduced in 1991 and since the WTO rules of the Agreement on Agriculture came into force in 1995. The increasing costs of production and the falling farm prices that go hand in hand with globalisation, combined with the decline in farm credit is putting an unbearable debt burden on farmers. This is the burden that is pushing farmers to suicide. Government agencies have deliberately delinked the economic crisis farmers are facing from the psychological stresses that this results in. An attempt has been made to reduce the biggest crisis the Indian peasantry has faced in its long and ancient history to the problem of alcoholism and adultery, in order to protect the unworkable and non-sustainable trade liberalization policies as the basis of agriculture. The non-sustainability was exposed in Cancun at the WTO ministerial. At the negotiation level, the talks collapsed because the group of 20 rejected a system of unfair rules for agriculture trade, which destroys small farmers by forcing open up markets to dump artificially cheap, dishonestly priced agricultural products subsidized with $ 400 billion dollars. At the human level, the non-sustainability of the current agricultural system was symbolized in the suicide by Lee Kyung Hae, a Korean farmer, who took his life at the barricades of the peoples protest against the WTO ministerial. As he stabbed himself, he carried a banner stating "WTO kills farmers."

During the ceremony, to honour Mr. Lee's sacrifice the message was, "the sacrifice of Mr. Lee was not in vain. His spirit of struggle will live on in our hearts as we keep fighting for the better world that is possible." Mr. Lee's suicide was symbolic of the suicides of thousands of farmers. In this study, the series on farm suicides, we show how farmers are paying for corporate led globalisation

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with their very lives. We hope that the failure of WTO talks in Cancun and the high human cost of farmers' suicides will provide a momentum to shift agriculture and trade policy towards justice, sustainability and the defence of farmers' human rights to their lives and livelihoods.

The suicide rate for farmers throughout the world is higher than for the non-farming population. In the Midwest of the U.S., suicide rates among male farmers are twice that of the general population. In Britain farmers are taking their own lives at a rate of one a week. In India, one farmer committed suicide every 32 minutes between 1997 and 2015. All over the world, the impact of an industrial approach to boosting crop yields has stripped many small farmers of their self-sufficiency and thrown them into despair.

India is an agrarian country with around 60% of its people depending directly or indirectly upon agriculture. Farmer suicides account for 11.2% of all suicides in India. Activists and scholars have offered a number of conflicting reasons for farmer suicides, such as monsoon failure, high debt burdens, genetically modified crops, government policies, public mental health, personal issues and family problems. There is also accusation of states fudging the data on farmer suicides. Farmer suicide in India is the intentional ending of one's life by a person dependent on farming as their primary source of livelihood. In 2012, the National Crime Records Bureau of India reported 13,754 farmer suicides. The highest numbers of farmer suicides were recorded in 2004, when 18,241 farmers committed suicide. The farmer's suicide rate in India has ranged between 1.4 to 1.8 per 100,000 total population over a 10-year period through 2005. From 1995 to 2015, a total of 2, 53,000 farmers have killed themselves in India, or an average of 20,550 suicides per year. During the same period, about 9.5 million people died per year in India from other causes including malnutrition, diseases and suicides that were non-farming related, or about 191 million deaths from 1995 to 2015.

1.2 Methodology

A recent study reported the first reliable estimates of suicide rates in India. National-level Suicide rates are among the highest in the world, but suicide rates vary sharply between states and the causes of these differences are disputed. We test whether differences in the structure of agricultural production explain inter-state variation in suicides rates. This hypothesis is supported by a large number of qualitative studies, which argue that the liberalization of the agricultural sector in the early-1990s led to an agrarian crisis and that consequently farmers with certain socio-economic characteristics-cash crops cultivators, with marginal landholdings, and debts-are at particular risk of committing suicide. The recent study, however, contends that there is no evidence to support this hypothesis.

Methods

We report scatter diagrams and linear regression models that combine the new state-level suicide rate estimates and the proportion of marginal farmers, cash crop cultivation, and indebted farmers. Combines state-level suicide rates with other variables to investigate whether the finding identified by narrowly focussed case studies can be generalized to the whole of India. More specifically, we test the hypothesis that suicide rates will be higher in states where there are more marginal farmers, where more cash crops are grown, and where there are more indebted farmers. To the best of our knowledge, which is based on systematic searches of Pub Med and Web of the Knowledge, and with the study to analyse India-wide quantitative data to investigate whether the findings of qualitative studies of farmers' suicides are generalizable? Following Patel et al.., including undivided Bihar, Madhya Pradesh and Uttar Pradesh, as well as a combined unit for the smaller north-eastern states that comprises Sikkim, Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, and Meghalaya. The dependent variable is the age standardized male suicide mortality rate (suicides per 100,000 per year). Patel et al.'s figures are based on data collected between 2010 and 2013-although they are adjusted to give estimates for 2015. The data comes from a nationally representative mortality survey designed to determine the cause of deaths in 1·1 million homes in 6,671 randomly selected small areas. Study estimates ($\mu = 26.1$) are considerably higher than the official and annually enumerated National Crime Records Bureau (NCRB) figures ($\mu = 15 \cdot 5$). This disparity can be explained by the fact that the latter are compiled from local police reports and suicide is illegal-as well as heavily stigmatised-in India. Nevertheless, there is a very strong correlation between the two figures($r = 0 \cdot 950$, $p < 0 \cdot 001$). For our dependent variable, we use NCRB figures and adjust for under or over-reporting using for Study estimates. The proportion of marginal farmers-farming households with a landholding of less than one hectare-was recorded by the Ministry of Agriculture's quinquennial "Agricultural Census of India" in 2005-06 and 2014-15. There was only a small difference between the figures in the two surveys, with the proportion of marginal farmers tending to increase slightly (mean = $1 \cdot 5\%$) over the period. To estimate annual figures, we interpolate between the two data points. To operationalize cash crops, we use the proportion of land that is used to cultivate "non-food crops", according to Ministry of Agriculture's annual "Land Use Statistics at a Glance". This category comprises oil seeds, fibres, dyes, tanning materials, drugs, narcotics and plantations crops, and includes commodities such as cotton and coffee that have been identified by ethnographic research as being associated with farmers' suicides. Both the "Agricultural Census" and "Land Use Statistics" are compiled by the Directorate of Economics and Statistics

of the Ministry of Agriculture using a combination of land ownership records where they exist (in 87% of India). Data on farmers' indebtedness has only been collected once, by the National Sample Survey Organization's "Situation Assessment Survey of Farmers" in 2014. The sample included 51,770 households in 6,638 villages. The definition of an indebted farming household is: "if it had any loan in cash or kind and its value at the time of transaction was 300 rupees [$5] or more". While this is a relatively small amount of money by Western standards, we should bear in mind that the Planning Commission recently stated that 25 rupees ($0.4) a day is an "adequate" daily income in rural India. In our time-series analysis we assume that the proportion of indebted farmers is stable for the two years before and after 2005. In reality, we would expect some level of variation over this period. Nevertheless, as the political and economic shocks that brought about the agrarian crisis and mass indebtedness occurred in the early and mid-1990s, we would not expect to see significant changes over this period. Table 1 shows the descriptive statistics and Table 2 is a correlation matrix. In the next section, we investigate the relationship between these variables-first using scatter plots and second with linear regressions.

1.3 Outcome of Literature Review

1.3.1 Why are Farmer Suicide Rates so High in India?

Financial Stress - Constant financial pressure related to the "Farm Crisis" and on-going drought and flood which add to the economic problems.

Loss of independence and control: Many of the issues are not within the farmer's control—disease, weather, Government policy, but the debts are personal.

Sense of Loss: Repeated sense of hopelessness, loss of crops, loss of land, loss of income, loss of community, loss of family farm, loss of a way of life, geographical remoteness and the potential for social isolation.

Untreated Mental Illness: Lack of access to mental health services in rural areas and the stigma attached to treatment.

Depression arising from exposure to agricultural chemicals/pesticides may increase the risk for mood disorders and ultimately suicide 24 years of economic reforms have given farmers access to expensive and promising biotechnology. These reforms have not led to crop insurance, land irrigation, or enough bank loans. Reforms opened Indian farmers to global competition, such as with the United States and UK who receive over $18 billion a year in subsidies. For farmers in India such foreign subsidies have driven down the price of crops in the global market, such as cotton.

13.2 Minimum Financial Support

In order to compete, many farmers turned to high-cost seeds, fertilizers and pesticides, believing in easier returns. Modified seeds cost nearly twice as much as ordinary ones, necessitating larger loans.

There has been minimal financial support from the Government for small farmers. Many small farmers don't qualify for bank credit, forcing farmers to turn to moneylenders, who charge up to 20% interest on a four-month loan. As collateral, farmers often sign away the title to their land. The benefit of India's 2008 farmer relief package remains to be seen.

1.3.3 Tipping Point is Relatively Low

A crop failure, an unexpected health expense or the marriage of a daughter are perilous to the livelihood of these farmers. Suicide has spread like an epidemic among the distraught farmers. Many farmers have committed suicide by drinking the very pesticides that no longer work on their crops.

More than 2, 53,000 farmers have taken their lives since 1997.86.5 percent of farmers who took their own lives were financially indebted. Their average debt was about $890. On average, there has been one farmer's suicide every 32 minutes since 2002.

Reasons for farmers suicides	Percent (of suicides)
Habits like drinking, gambling, etc.	20.35
Failure of crops	16.81
Other reasons (e.g. chit fund)	15.04
Family problems with spouse, others	13.27
Chronic illness	9.73
Marriage of daughters	5.31
Political affiliation	4.42
Property disputes	2.65
Debt burden	2.65
Price crash	2.65
Borrowing too much (e.g. for house construction)	2.65
Losses in non-farm activities	1.77
Failure of bore well	0.88

Note: "Reasons were given by close relatives and friends. There are multiple reasons for suicides.

Not even one case was given only one reason.

1.4 Study Outcome for Suicide of Farmers in India

1.4.1 The Aggregate-level Picture

To understand the macro-level linkages running from policy changes to the phenomenon of farmer suicides, we need to ask: what is leading to such a large number of farmers to commit suicides? The simple answer is: agrarian distress. Farmers (and sometimes their family members)

are committing suicides due to the acute distress they are facing. Our next question is: what is causing such acute distress among farmers? Large mounting and unsustainable levels of indebtedness, which brings forth the next question: why are farmers becoming increasingly indebted? because their incomes are systematically falling below their expenditures. Thus, we are led to the simple conclusion to understand the phenomenon of unprecedented farmer suicides we need to understand the patterns and sources of income & expenditures of the vast majority of farmer households.

1.4.2 Financial Reasons

As an agrarian economy more the 60% population of India depends on agriculture and its allied activities. But for the successful running of agriculture and its allied activities requires capital. More than 80% of the Indian farmers are marginal land owners and they are economically poor. So they are facing economical problems for successful running of agricultural activities. At the same time, nationalized banks are not willing to lend funds to farmers as there is no surety to return it. Even when the private money lenders don't lend funds to them as they don't have any mortgage except their land. Even when they lends funds to farmers they charges high rate or compound rate of interest. In addition to this, the farmers have their family responsibilities like education, marriages and health provisions of their family members and children, which require huge money. Even the Government of India (GOI) and concerned state government also fail to give economic relief to farmers.

1.4.3 Natural Calamities

In addition to economic reasons, natural calamities are also responsible for farmer's suicides. The effective agricultural production mostly depends on favourable weather condition. Due to the global warming, deforestation and other manmade reasons, natural condition has become more worsen and reasons like heavy rain, floods, droughts, delay in raining, heavy cyclones, and manmade reason like reduction in subsidies, fire, accidents and so on, farmers are not able to take qualitative and quantitative production from their farm. Even all the conditions are in favour of farmers and production is good in quality & quantity, farmers don't get proper return of their product in the market, as more supply of goods reduces demand and reduction in demands automatically reduces price of the same. Most of the time farmers are not able to recover cost price of their product. The State governments declare MSPs of the agricultural product every year. But the MSPs declared by government are less than the total cost incurred for production. Due to these reasons, agriculture becomes an assured loss making business. But the marginal & small farmers of India don't

have another option for earning. And they again & again put all their efforts in the agriculture. Continuous losses turn them to become insolvent and frustration of the same forces them to commit suicides.

1.4.4 Increase in Cost of Production

In addition to the above reasons, increase in cost of production also forces the farmers to commit suicide. Agricultural sector in India requires huge manpower for ploughing, digging, soil maintenance etc., for insecticides, pesticides, cutting, transportation and selling of products requires funds. In addition to this hybrid seeds are also required for good quality & quantity of produce, which are very costly and not affordable to marginal and poor farmers of India. The following table no. 4 shows that the cost incurred for per hectare of wheat production and income.

1.4.5 Stagnant Revenues

Why has income from agricultural production been dwindling? Quite simply because revenues have been stagnant (or falling) while costs of agricultural production have been gone up. Revenues have been stagnant because of a complex set of factors. Let us take them up one by one. First: yield (i.e., crop output per unit of land) growth of most crops has stagnated. This is the direct result of the increasing pressure on cultivable land: the total area under cultivation has declined while the number of operational holding have increased, implying that each operational holding is now much smaller than in the early 1960s. Between 1960-61 and 2003, the total number of operational holdings increased from 50.77 million to 101.27 million. During the same period, the total operated area declined from 133.46 million hectares to 107.65 million hectares. Thus average operated area declined from 2.63 hectares to 1.06 hectares. (NSSO, *Some Aspects of Operational Land Holdings in India,* various issues) On top of this is the fragmentation of each holding into multiple plots. Thus, the declining size of operational holding, along with continued fragmentation, has meant smaller production units in terms of land area. This constrains the ability to use improved technologies of production, and has been one of the main reasons behind the stagnation of yield and growth.

Second: due to the neoliberal policy orientation and the neglect of the rural sector, agricultural research and extension services have virtually disappeared from the country; thus new and better crop varieties have not reached the farmer. Along with this, irrigation (surface water) infrastructure has been neglected, and soil improvement and management efforts have been drastically curtailed. Compounding this has been the excessive use of fertilizers in several areas of the country

that saw the so-called Green Revolution. All this has led to degradation in the quality of the soil, and contributed to the stagnation of crop yield growth.

Third: gradually doing away with import restrictions has meant a flood of low price agricultural imports (the low prices from US and European countries being supported by massive subsidies in those countries). By a perverse turn of policy, the minimum support price (MSP) for many crops have been kept below market prices. Both these factors have put downward pressure on crop prices, especially for smaller farmers who lack storage and transportation facilities (and have to sell to the local trader right after harvest).

1.4.6 Rising Costs of Cultivation

Let us now turn to costs of agricultural production and see why they have been rising over the past two decades. One of the main reasons behind the rising costs of cultivation is the gradual change in crop patterns that have been directly and indirectly induced by policy changes. Lifting of export restrictions and entry of multinational corporations have encouraged farmers so that they could shift from traditional crops (like rice, wheat, pulses, etc.) to cash crops like cotton, potato, tomato, etc. Cotton is the quintessential crop that lies entwined with the wave of farmer suicides. So, let us take a closer look at cotton. Production of cotton requires large capital outlays, large in comparison to typical earnings of farmer households. Seeds need to be bought from the market every year (because of restrictions put in place by the MNCs selling the seeds); large quantities of fertilizers and pesticides are also needed (whose prices are increasing because of reduction of subsidies). Cotton cultivation (like most other cash crops) is very water intensive. Since, during this same period, provision of irrigation was being systematically reduced, farmers had to make investments in bore well (tube well) technology to secure the supply of ground water. This involved substantial outlays, most of the time a sum that was far beyond the reach of the average farmer. Taken together, these factors implied increasing costs of cotton cultivation.

Most of the time, these costs (especially the large outlays required for tube wells or even the buying of seeds, fertilizer and pesticides that was part of the cotton cultivation package) could only be met with credit. The credit was provided by the same agency (often a branch of some MNC like Monsanto) that sold the seeds, the fertilizer and the pesticide, along with the knowledge that was required to carry out the cultivation. With such interlinked markets, there was a serious conflict of interest in the sense that the agency would almost always "advise" farmers to use much more than the optimal quantity of inputs.

1.4.7 Rising Essential Expenditures

The same neoliberal policy framework that reduced subsidies on fertilizer and diesel (and petrol), let the irrigation infrastructure gradually go to the dogs, opened up the import and export of agricultural crops, increased the cost of electricity, also reduced the rural component of development expenditures. For instance, gross fixed capital formation in agriculture as a share of GDP declined from 3.1% during the late 1980s to 1.6% during the last part of the Ninth Plan period. Again, and probably more relevant for our purposes, the share of plan expenditures devoted to the agricultural sector fell from 13.1% to 7.4% during the same period (GOI, 2006, pp. 37). This meant that the burden of health care, social security and educational expenditures now fell on households, including poor farmer households. Put the three components of the story together and you can see how vulnerable to shocks the poor farmer households became. If there was a medical emergency in the household or if there was an important life event (birth, marriage, death) or if there was a crop failure due to weather shocks of growth of pests, thehousehold had to per force incur debt. This debt, it must be remembered, is in addition to the debt that the farmer would already have incurred if he/she had decided to move into the cultivation of cash crops like cotton. But where could the farmers turn to for credit at such times?

1.4.8 Dwindling Institutional Credit

After nationalization of the banking system in 1969, there was an impressive expansion of credit to the agricultural sector. The share of agricultural credit in total bank lending nearly doubled from around 10% in the mid-1970s to about 18% in the late 1980s. Financial liberalization, an important part of the neoliberal policy regime, reversed this trend. The share of agricultural credit in total bank lending declined from the peak of 18% in the late 1980s to about 11% in 2005 (GOI, 2007). The decline has continued since then.

Financial sector reforms also struck down the policy of branch expansion to rural areas in the mid-1990s. The result has been along expected lines: rural branches of commercial banks have declined from 51.2% in March 1996 to 45.7% in March 2005. Data also shows that the share of agricultural credit cornered by farm sizes of more than 5 acres has increased (GOI, 2007). With institutional sources of credit drying up as a direct result of policy changes, farmer households, especially small and marginal farmer households, were pushed into the lap of the new breed of moneylenders, including the so-called micro finance institutions (MFIs). Interest rates charged by these sources were very high if not outright usurious.

Thus, debt-service payments became an important, and increasingly large, component of monthly household

expenditures. With mounting debt came the pressure of monthly payments. And, if for some reason cash flow problems emerged (for instance, due to a crop failure), it increased the stress on the household enormously. In extreme cases, it led to loss of face, despair and suicide.

To summarize, the adoption of the neoliberal model of capitalism by the ruling elite in India since the early 1990s have led to distinct aggregate level institutional and policy changes related to public investment, input subsidies, organized credit and external trade. These policy changes have negatively impacted on the incomes of small and marginal farmers while their essential expenditures have continued increasing. Stagnant incomes and rising expenditures have led to pressures of mounting debt, creating acute distress that often leads to the extreme step of suicide.

Farmers Suicide in India

STATE	Total Farm Suicides between 1995-2014	Average Deaths per year
Maharashtra	54,500	3,155
Chhattisgarh	43,000	2,566
Karnataka	38,000	2,190
Andhra Pradesh	29,000	1,945
West Bengal	19,250	1,208
Kerala	17,250	1,181
Tamil Nadu	16,000	930
Uttar Pradesh	11,000	586
Punjab	14,000	450
Haryana	6,000	350
Rajasthan	5,000	250
India	2,53,000	20,550

Source: NCRBI

Keeping the Background of literature review, our study revealed the magnitude of suicide as a public health problem. In 2015, 2,53,000 people died from suicide in India-this amounts to one fifth of all suicides in the world. Indian suicide rates -26 · 3 for men and 17 · 5 for women- are among the highest in the world. Suicide is the second leading cause of death among young adults in India-after road accidents for men and maternity-related complications for women, study demonstrated that suicide in India is a very different social phenomenon to suicide in high income countries (HICs): suicide rates in rural areas are almost double to those in urban areas, whereas in HICs there is little difference; suicide rates in India are highest in wealthier regions, which challenges findings in HICs; the most common method of suicide in India-the ingestion of pesticides-is rarely seen in HICs; and unlike elsewhere in the world, suicide rates in India are not higher among elderly people. Consequently, as India undergoes the epidemiological transition and starts to turn its attention from infectious diseases to issues such as suicide prevention it cannot rely on approaches that have been successful elsewhere.

Study shows that there is substantial geographical variation in suicides rates within India. Suicide rates in some states are more than ten times those in others. Kerala, which is often presented as a model of success in terms of public health and human development, has the highest male suicide rate. Indeed, if Kerala was a country, its male suicide rate (66 · 3) would be the highest in the world-a position currently held by Lithuania (61 · 3) [1, 5]. Bihar, on the other hand, which is one of the least developed states in India, has the lowest male suicide rate.

(6·3). This inter-state variation is a puzzle that has yet to be resolved by public health researchers. But it also provides us with an opportunity because, if we can understand why these differences occur, it is possible to infer lessons, guide public policy, and ultimately reduce

Total number of agrarian suicides
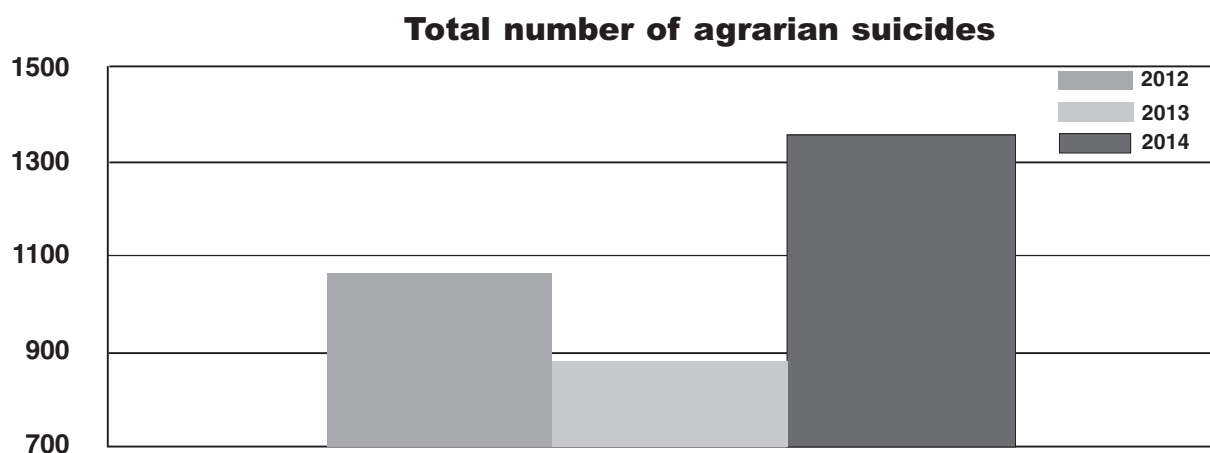
suicide rates. The Lancet study notes: "Most public attention [on suicide] in India has focused on suicide in farmers". A significant number of ethnographies, case studies, government reports, and newspaper articles claim that the opening of markets and scaling back of state support that followed the liberalization of the Indian economy in the early-1990s led to an "agrarian crisis" and an increase in farmers' suicides. So-called "marginal farmers" with landholdings of less than one hectare, who cultivate capital-intensive cash crops that are subject to price fluctuations, such as coffee and cotton, are most likely to have debts that they are unable to pay back, and are, therefore, at greater risk of committing suicide. This research concentrates on states that have some of the highest suicide rates in the country-such as Andhra Pradesh, Kerala, Karnataka and Maharashtra. Thus, when taken as a whole this body of research suggests that inter-state variation in suicide rates can, at least to some extent, be explained by the characteristics of the rural political economy. Study reviews finding that suicide rates are twice as high in rural areas compared to urban areas and that ingestion of pesticides accounts for almost half of all suicides-would seem to confirm the farmers' suicide thesis. Nevertheless, they state: "our findings do not suggest that suicide is any more prevalent in agricultural workers (including farmers) than it is in any other profession". This finding received international media attention: for example, it was featured in an article on the BBC news website that was titled "Indian farmers and suicide: How big is the problem?"

How can we explain the fact that Patel's et al. National level quantitative analysis apparently contradicts such a large number of case studies and anecdotal accounts? There is a tendency to view large-N statistical research as more reliable than narrowly focussed qualitative analyses, particularly in medical sciences. To some extent this assumption is reasonable. As with any case study, these analyses select on the dependent variable. In other words, they attempt to understand farmers' suicides by focusing on an area that is affected by this phenomenon. It is not possible to generalize from this body of research because it is plausible that there are other areas with similar political and economic conditions that are not affected by farmers' suicides and, therefore, not studied. Consequently, it would be easy to conclude that Patel et al.'s study falsifies a widely cited "pseudo fact" established by unreliable case study data and that the issue of farmers' suicides is merely a"pseudo problem". The Lancet study does not, however, correctly operationalize the mechanism that many case studies identify as linking farmers to increased suicide rates study reach their conclusion by comparing the primary occupations of those people who committed suicide, noting that while agricultural workers accounted for 30% of suicides, non-workers and others (salaried, professional and other jobs) accounted for 33% and 38% respectively.

This is problematic on two main counts. Firstly, it reifies the occupational structure of rural India because in social reality there is not a neat separation between agricultural workers, non-workers, and others. Case studies demonstrate that, before they commit suicide, many struggling farmers undertake wage labour to supplement their meagre income or quit cultivation altogether to begin another occupation. If their income from non-agricultural activities exceeds their income from farming-which is highly likely in a period of agrarian crisis-they would not be classified as a farmer. Nevertheless, if such an ex-farmer committed suicide, one would have a very strong case for arguing that this should be classified as a "farmer's suicide". Secondly, case studies of farmers' suicides do not argue that the phenomenon accounts for all suicides or that it affects all farmers. Rather, they claim that farmers with certain socio-economic characteristics-those with marginal landholdings, who cultivate cash crops and are indebted-are at particular risk of committing suicide. Patel et al. do not have the data to test this proposition and are only able to correlate suicide with occupation, as well as other general characteristics such as gender, education, geographical region, and marital status.

1.5 Finding and Discussion

First, we report three scatter plots that combine NCRBs suicide figures adjusted for under- or over-reporting using Patel et al.'s estimates with each independent variable. The relationship between the proportion of marginal farmers and suicide rates is not particularly clear ($r = 0 \cdot 241$, $p = 0 \cdot 378$) (Figure 1). The three states with the highest suicide rates-Kerala, Tamil Nadu, and Andhra Pradesh-have some of the highest proportions of marginal farmers and other states-Punjab, Gujarat, and Rajasthan-have both a low proportion of marginal farmers and among the lowest suicide rates. Nevertheless, there is a cluster of states on the bottom right of the scatter plot-Bihar, Jammu and Kashmir, Uttar Pradesh, Himachal Pradesh, the north eastern states, and Assam-which have a high percentage of marginal farmers but low suicide rates and therefore do not fit into this pattern. It is apparent from Figures 2 and3 respectively that this cluster of states also has the lowest proportion of both cash crops and indebtedness in India. This suggests that the percentage of marginal farmers is only associated with higher suicide rates in states where farmers are subject to the vulnerability of cash crop cultivation and indebtedness. West Bengal is another outlier, with a relatively high proportion of marginal farmers but a suicide rate only just above the mean. This anomaly might be explained by strength of the Communist Party of India (Marxist) in the state over the past 35 years and, in particular, their unrivalled commitment to improve the hitherto precarious position of marginal farmers. Figure 2 shows there is a clear association between the proportion

of cash crops and the suicide rate (r = 0 · 628, p = 0· 005). The two anomalies are Gujarat and to a lesser extent Rajasthan, which have high levels of cash crops and low suicide rates. Nevertheless, they both have among the lowest proportion of marginal farmers (see Figure 1). Gujarat and Rajasthan's relatively low suicide rates might be explained by the fact that in these states cash crops tend to be cultivated by farmers with relatively large landholdings and they have the resources to endure difficult periods without suffering from the same economic problems as marginal farmers.

TABLE1 Descriptive Statistics of Main Variables

Variable	N	M	Std Dev	Min	Max
Suicide rate	90	23.5	17.3	2.1	77.0
Marginal Rate %	90	58.9	21.3	12.3	95.5
Cash Crops %	90	23.5	15.4	3.2	58.1
Indebted Farmers%	90	50.4	15.8	18.1	82.0

Figure 3 shows there is a clear association between the percentage of indebted farmers and suicide rates (r = 0 ·729, p = 0 · 018). With a high proportion of indebted farmers but low suicide rate, Punjab is an outlier.

TABLE 2 Correlation Matrix of Main Variable

Variable	1	2	3	4
Suicide rate	1			
Marginal Rate %	.310	1		
Cash Crops %	.606	-223	1	
Indebted Farmers%	.610	-251	.534	1

Figure 1 demonstrates that Punjab has by far the lowest proportion of marginal farmers. This indicates that indebtedness is less likely to lead to suicide where farmers have larger landholdings, more resources, and therefore a greater ability to endure difficult periods. The scatter plots demonstrate that high levels of marginal farmers, cash crops production and indebted farmers are not, on their own, sufficient conditions for high levels of suicide. Nevertheless, there is a clear positive association between the proportion of both cash crops grown and indebted farmers and suicide rates and, while the association between the proportion of marginal farmers and suicide rates is not so clear, we would expect it to become significant when we control for either or both cash crops and indebtedness. The results of pooled linear regressions using data for the period 2006-15 are shown in Table 3.

Study reports the regression coefficient and in parentheses we specify robust standard errors clustered by state to account for the non independence of observations from the same state. The results are in line with what we would expect from analysing the scatter plots. The proportion of marginal farmers is not significantly related to suicide rates but the sign of the coefficient is positive. The significance of the regression model that includes the proportion of cash crops is just above the five percent level, indicating that there is a positive relationship with suicide rates. The proportion of indebted farmers displays a significant positive relationship with suicide rates. The percentage of marginal farmers becomes significant when we add either cash crops or indebted farmers in the regression equation

Figure 1. Percentage of Marginal Farmers and Suicide Rate
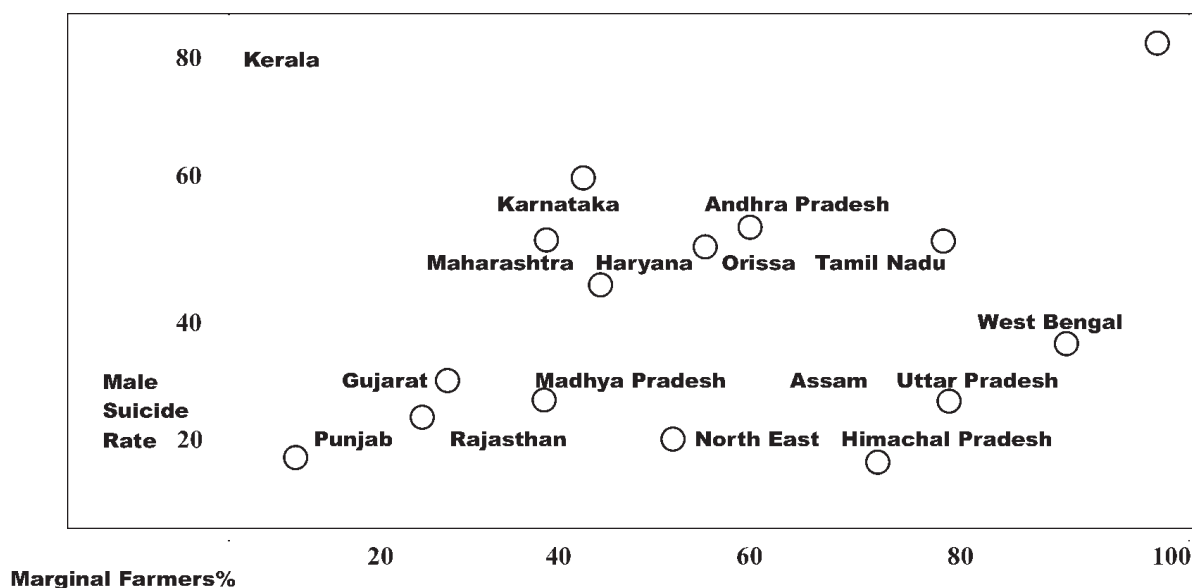
Figure 2. Percentage of Cash Crops and Suicide Rate
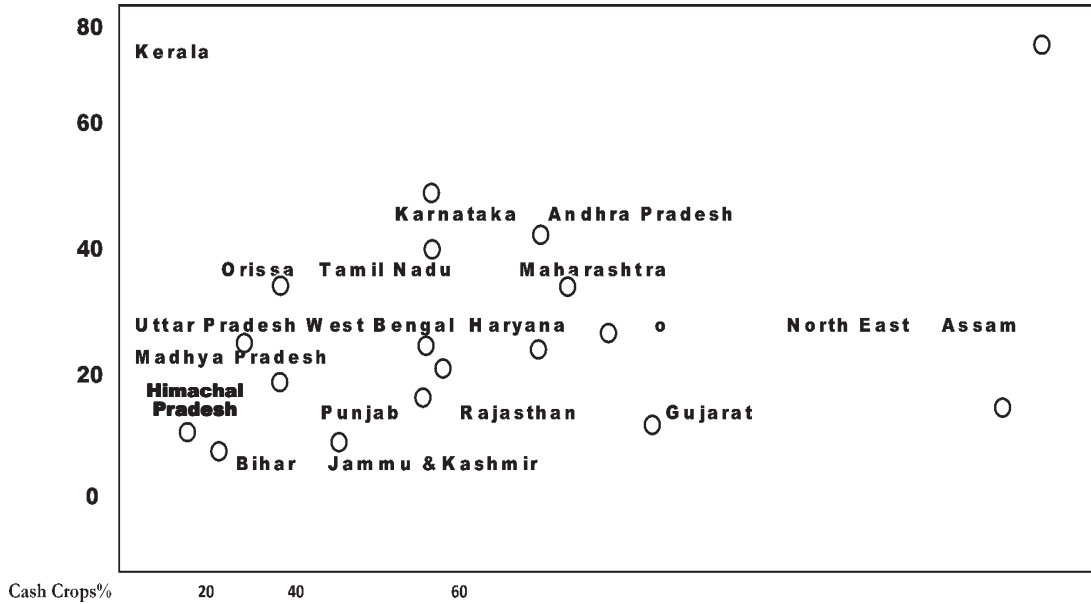
Figure 3. Percentage of Indebted Farmers and Suicide Rate
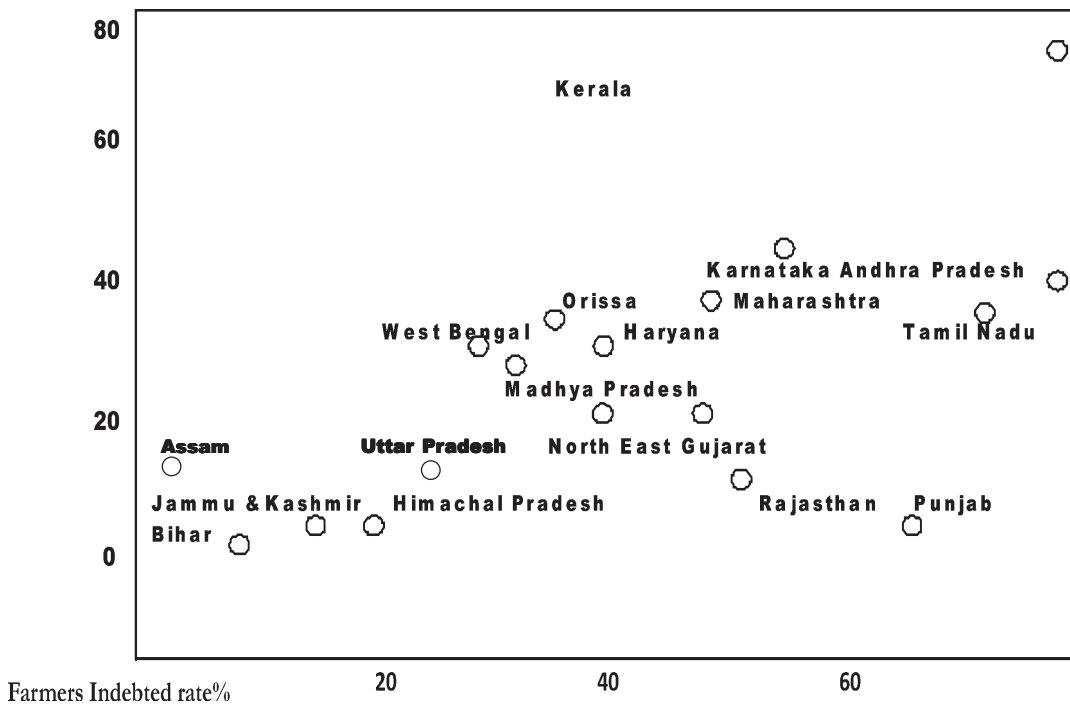
When we include marginal farmers, cash crops, and indebted farmers in the same regression equation, all three variables are significant .We would expect an increase of $0 \cdot 437$ in a state's suicide rate for every one per cent increase in marginal farmers, assuming that all other variables in the model are held constant. A one per cent increase in the percentage of cash crops and indebted farmers would respectively result in a $0 \cdot 518$ and $0 \cdot 549$ increase in the suicide rate.

The adjusted R^2 for model indicates that 74% of the variability in state-level suicide rates is accounted for by marginal farmers, cash crops, and indebted farmers. We performed a number of tests on the robustness of

model. We tested for the possibility that the percentage of marginal farmers, cash crops, and indebted farmers are actually proxies for more general state-level characteristics, such as per capita income poverty, or inequality (see Table 4). These variables have been shown to be significantly related to other health outcomes in India. We found that neither per capita income nor percentage of the population below the poverty line is significant when included in the regression equation on their own or alongside the proportion of marginal farmers. In Figure 2, the percentage of cash crops and suicide rates is shown and in Figure 3 cash crops and indebted farmers is represented.

TABLE 3 Linear Regressions Showing the Political and Economic Determinants of Farmers' Suicide

	1	2	3	4	5	6
Marginal Farmers	·252 (·233)			·381* (·123)	·402* (·163)	·437*** (·095)
Cash Crops		.6835 (.355)		·801** (.240)		·518* .(209)
Indebted Farmers			·670* (·214)		·806** (·231)	·549* (.187)
Model N	90	90	90	90	90	90
Model F	1.17	3.70	9.83*	13·97	*** 6·53*	18·06***
Model Adjusted R^2	·086	·359	365	566	591	741

There is a significant positive relationship between Gini coefficient of per capita consumer expenditure and suicide rates: in other words, suicide rates tend to be higher in states that are more unequal. Nevertheless, the relationship disappears when we control for indebtedness, marginal farmers, and cash crops. This demonstrates that the proportion of marginal farmers, cash crops, and indebted farmers are better predictors of suicide rates than inequality. We also ran the regressions with various alternative specifications of the dependent variable (see Table 5). First, we used the same method to calculate the suicide rates as in the original model, but used figures for the period 2006 to 2015 (i.e. lagged by five years) the model remains similar to the original. Second we used the original NCRB data, unadjusted for under or over-reporting as identified by study. In this model the regression coefficients are lower because, as we noted above, the unadjusted NCRB figures underestimate the magnitude of suicide in India. Apart from the effect size, the results are similar to those we get when using the

adjusted suicide rates. We then tested whether our results were robust to changes in the gender composition of the dependent variable. In the original models we use male suicide rate. This is because qualitative accounts overwhelmingly characterise farmers' suicide as a phenomenon that affect small farmers who are generally the head of household and responsible for its economic wellbeing. In the popular imagination female suicide tends to be associated with sati-the act of self-immolation by a widow-or family conflict over dowries.

An analysis of NCRB data suggests that in the period 1997-2006, 85 percent of farmers' suicides were by male farmers and that over this period the number of male farmers' suicides increased at a rate of 3% per annum while female farmers' suicides remained constant. Nevertheless, it is plausible that farmers' suicides involving females are understated in NCRB data because, although Indian women often do a large proportion of the agricultural work, they are often not classified as farmers because the land is not registered in their names.

TABLE 4 Linear Regressions Showing the Effects of Income, Poverty, Inequality on Farmers' Suicide

	1	2	3	4	5	6
Income	·554 (.493)	·051 (.223)				
Poverty			· 063 (·339)	·233 (·133)		
Inequality					·322* (.115)	·092 (·073)

	1	2	3	4	5	6
Marginal Farmers%		·441*** (·099)		428*** (.099)		429*** (.093)
Cash Crops%·		·514* (·208)		·549* (.205)		·448* (.215)
Indebted Farmers%		·542* (·189)		571* (.184)		·395* (.169)
Model N	90	90	90	90	90	90
Model F	1.27	14·83***	.03	16·39***	7.88*	14·12***
Model Adjusted R^2	.038	.738	.010	.757	.361	.735

Notes:-*p < = · 05 (5%), **p < = · 01 (1%), ***p < = · 001 (0.1%), § p = ·056 (5.6%). Constants calculated but not reported. For inequality there is no data for Himachal Pradesh, Jammu and Kashmir, and the north eastern states.

The coefficients were smaller when we used total suicide rate rather than male suicide rate. This supports the idea that farmers' suicide is a phenomenon that disproportionately affects male farmers. Nevertheless, overall the results were largely unaltered with all three independent variables remaining significant.

TABLE 5 Linear regressions showing the economic determinants of farmers' suicide with alternative specifications of dependent variables,

	Lagged 13	NCBR 14	ALL 15	Female 16
Marginal Farmers	·406*** (·068))	224** (·068)	·327*** (·062)	·217* (·073)
Cash Crops	·449* · (·170))	355* (·140)	·300* (·128)	·077 (·097)
Indebted Farmers	·617** · (·179))	259§ (·128)	·474*** (·130)	403*** (·090
Model N	90	90	90	90
Model F	46·93***	10·79***	33·96***	19·16***
Model Adjusted R^2	·800 ·	.630	·733 ·	.596

Notes:-*p < = · 05 (5%), **p < = · 01 (1%), ***p < = · 001 (0.1%), §p = ·060 (6%).Constants calculated but not reported.

TABLE 6 Linear Regressions Showing the Economic Determinants of Farmers' Suicide with Alternative Specifications

	Without Robust(SE) 17	Calendar Year 18
Marginal Farmers	·437*** (·046)	·438*** (·095)
Cash Crops	·518*** · (·072)	518* (·211)
Indebted Farmers	·549*** (·071)	·549* (·189)
Calendar Year		- · 087
Model N	90	90
Model F	85.66***	15·25***
Model Adjusted R2	·741	·738

Note:-*p < = · 05 (5%), **p < = · 01 (1%), ***p < = · 001 (0.1%). Constants Calculated but not reported

Model which uses female suicide rate as the dependent variable is different in several respects to the one that uses male suicide rate. The percentage of marginal farmers is significant (p = ·009), but the regression coefficients half the size of the coefficient in model 6: assuming that all other variables in the model are held constant we would expect an increase of $0 \cdot 217$ in a state's female suicide rate for every one per cent increase in marginal farmers, compared to an increase of $0 \cdot 437$ in the male suicide rate. The percentage of cash crops is a significant predictor of male suicide rate but is not significant when female suicide rate is the dependent variable. But the percentage of indebted farmers is a significant predictor of both female and male suicide rates. A one per cent increase in the percentage of indebted farmers would result in a $0 \cdot 403$ and $0 \cdot 549$ increase in the female and male suicide rate respectively. The adjusted R^2 indicates that model 16 accounts for about 60% of the variability in state-level female suicide rates, compared to 75% for male suicide rates. These results suggest that, contrary to perceived wisdom, the structure of agrarian production does to some extent explain state-level variation in female suicide rates. Nevertheless, it is better at explaining male suicide rates-most probably because men are ultimately responsible for the household's economic wellbeing in rural India. This finding suggests that qualitative studies of farmers' suicides should not ignore women. Indeed, more qualitative research is needed to explain why the proportion of marginal farmers and indebted farmers are significant predictors of female suicide but the percentage of cash crops is not. Table 6

reports two further robustness tests. In the model we run the regression without using sandwich estimators for standard errors: that is, standard errors are not clustered by state to account for the non-independence of observations from the same state. The standard errors in this model are, on average, between 2 and 3 times smaller than when we use a sandwich estimator. This might suggest that the error terms do not have constant variance-i.e., they are heteroskedastic. We, therefore, undertook a Breusch-Pagan/Cook-Weisberg test (which tests the null hypothesis that the error variances are all equal versus the alternative that the error variances area multiplicative function of one or more variables). The small and non-significant chi-square value ($x2 = 0 \cdot 05, p = 0 \cdot 83$) indicates that heteroskedasticity is not a problem in our analysis. Finally, the regression model is more or less unaltered when we include a calendar year variable to control for possible changes over time, such as external shocks to economy. There were no outliers with standardized residuals. These tests increase our confidence in the finding that differences in the structure of agricultural production explain a large amount of inter-state variation in Indian suicide levels. While this analysis is due to the availability of data, necessarily at a relatively high level of aggregation and only covers a short period of time, our confidence in these findings is considerably increased by the large amount of qualitative data that corroborates our conclusions. There is clearly room for collecting and analysing better quantitative data. More disaggregated or survey data would increase our certainty that the findings are not the result of ecological fallacy, while time-series data would allow us to test whether there was a causal relationship between liberalization and suicide, as argued by qualitative studies and as demonstrated, for example, in post-soviet central and eastern Europe.

Result of the Matrix:

When we include all variables in the regression equation, there is a significant positive relationship between the percentage of marginal farmers, cash crop production, and indebted farmers, and suicide rates. This model accounts for almost 75% of inter-state variation in suicide rates. If the proportion of marginal farmers, cash crops, or indebted farmers were reduced by 1%, the suicide rate-suicides per 100,000 per year-would fall by $0 \cdot 437, 0 \cdot 518$ or $0 \cdot 549$ respectively, when all other variables are held constant.

1.6 International Comparison

Farmer's suicide is a global phenomenon. Outside India, studies in Sri Lanka, USA, Canada, England and Australia have identified farming as a high stress profession that is associated with a higher suicide rate than the general population. This is particularly true among small scale farmers and after periods of economic distress. Fraser et al., similarly, after a review of 52 scholarly publications,

conclude that farming populations in the United Kingdom, Europe, Australia, Canada and the United States have the highest rates of suicide of any industry and there is growing evidence that those involved in farming are at higher risk of developing mental health problems. Their review claims a wide range of reasons behind farmer's suicide globally including mental health issues, physical environment, family problems, economic stress and uncertainties. Significantly higher suicide rate among farmers than general population have been reported in developed countries such as the UK and the US. Studies in India, Sri Lanka, USA, Canada, England and Australia have identified farming as one of the most dangerous industries associated with a high suicide rate than in general population. In India, farmers' suicides had been reported from various states, *viz*. Punjab, Maharashtra, Andhra Pradesh, Kerala and various other states with varied cultural practices and farming patterns. A study in the Vidarbha region of Maharashtra had associated indebtedness (87%) and deterioration in the economic status (74%) as major risk factors for suicide. This study has revealed that age-adjusted suicide mortality rate for male farmers had trebled from 17 in 1995 to 53 in 2014. Study by the author in the region concluded that farmers committing suicide were in their 40s, who were living with family and most were married. Among modes of suicide, poisoning was the most prevalent, followed by hanging and jumping from a height. In England and Wales, in contrast, fire arms were the method most frequently used by male farmers, followed by hanging and carbon monoxide poisoning. Farmers who commit suicide tend to use methods to which they have easy access because of their occupation. In India, due to the easy availability of pesticide and lack of education and efforts on the part of the system to train farmers in safe use of it, pesticide consumption is the most common method of committing suicide. On the other hand, fire arms are not easily available and affordable due to the high cost. Reports from the state of Punjab showed that a majority of the victims were small and marginal farmers who were loners and heavy drinkers or drug users and 20% had informed relatives or friends about their suicidal intent. In Australia and the United Kingdom, male farmers have higher suicide rates than the national average and a higher rate of suicide than other rural males. Farmers in the UK were shown to have a lower incidence of mental illness and used fire arms as a method of suicide. A decline in farmer's suicide was recorded after introduction of legislation on fire arm purchase, storage and registration in 1989 in England, indicating the role of easy accessibility of dangerous means and rate of suicide. Even in the absence of psychiatric morbidity, farmers were more likely to report that life is not worth living compared with the general population and suicide in them was an end point to a series of difficulties that accumulated over time. In Australia, there is a strong correlation between droughts and suicide rates among farmers. In the US, there was a rise in farmers' suicide after great depression. To

counter this, the government started a farmers' insurance program, which is the only major federally managed insurance program, except Medicare in the United States. When compared with Australia, India is grossly, socially and geographically different, but shares farmers' suicide alike. Scarcity of water in Australia is due to successive droughts while in India it is mainly due to political reasons. Migration to urban areas and shrinking of farm employment are the other stated causes while in India lack of credit and cost of raising genetically-modified crops are the reasons sought. Political response to this issue is also grossly different in the two nations. In Australia, in foresight of drought, there is rapid mobilization of social workers, psychologists and psychiatrists to the drought-hit region along with other supportive measures while in India it is predominantly limited to political announcement of *ex-gratia* benefits and not toward prevention strategies.

1.7 Observations

The narration above provides a detailed picture of each farmer's background and the circumstances in which they died. From the narrations, the study team in Karnataka has made out the following observations.

1. There are farmer suicides happening in the various states at all over India and very clearly distress in agriculture is a major/ important reason for all suicides. 4 out of the 7 farmers visited had committed suicide and an important reason behind all these suicides were lack of enough water and their fear of inability to save the standing crop. It seems that farmers who had committed suicide thought that they have run out of all options and lost hope to lead a life with dignity.

2. There is a clear division among these 8 states into two groups. The first group consists of Maharashtra, Madhya Pradesh (including Chhattisgarh), Karnataka, and Andhra Pradesh. These 4 states are in a league by themselves, reporting more than 2000 farmer suicides per year over the last couple of years, and accounting for 62 percent of the total farmer suicides in the country between 1995 and 2014. Most alarmingly, the trend of farmer suicides within these 4 states, accounting for two-thirds of all the farmer suicides in the country in 2010, is increasing over time. While Maharashtra reported lower number of farmer suicides compared to the astronomical highs in the mid-2000s, the others have continued their upward trend. Moreover, even Maharashtra reports much higher suicides today compared to the mid-1990s. Hence, the overall trend in this group of 4 states is increasing over time.

3. The second group consists of West Bengal, Kerala, Tamil Nadu and Uttar Pradesh. In recent years, these 4 states have accounted for about 20 percent of all the farmer suicides in the country and have consistently reported between 500 and 1000 farmer suicides every year, with Uttar Pradesh reporting the lowest figures. The trend among these 4 states, for the period between 1995 and

2010, is flat. These states have witnessed some declines since the early 2000s, but that has only brought them to levels that they reported in the mid-1990s. Over the whole period since 1995, these states do not show any significant decline in the number of farmer suicides. The reader's attention hardly needs to be drawn towards the irony that two of these states, West Bengal and Kerala, had been ruled by "communists" for the whole or significant parts of the period under consideration. The fact that West Bengal figures consistently among the 6 "top" states in terms of farmer suicides flies in the face of all claims by CPI (Marxist) sympathizers that the mainstream left has been more farmer-friendly than other bourgeoisie political parties in India.

Farmers fell into debt because of a combination of high farming costs (exorbitantly priced hybrid (so-called high yielding) seeds and pesticides sold by multinationals and a lack of a good price for their produce, partly due to imports. Drought added to their woes. Irrigation was too expensive for these farmers and the state government didn't help.

4. Studies have shown that even in the most progressive and agriculturally developed states like Punjab, 78 per cent of farmers have availed credit from non-institutionalized sources such as relatives, *arhtiyas* (grain brokers), agro inputs dealers and private moneylenders. The rate of interest paid by the farmers to avail the credit would make the topmost corporate houses sweat in the winter, as the farmers pay minimum of two per cent per month compounded rate of interest. The burden of indebtedness in rural India is great, and it falls mainly on the households of rural working people. The exploitation of this group in the credit market is one of the most pervasive and persistent features of rural life in India, and despite major structural changes in credit institutions and forums of rural credit in the post-independence period, situation is much fragile in most places. The credit market is highly fragmented and regressive. Moneylenders attend the most urgent-felt needs like consumption, medical aid, emergency situations and daughter's marriage.

5. In sugar belt areas of Mandya in Karnataka drowning in debt, many small farmers have had to sell part of their land. The moneylenders are raking these in. They charge farmers interest at rates anywhere between 36 and 60 percent, sometime even more. If the farmers can't pay, they just take over the land. Earlier, when government and cooperative banks came here, moneylenders lost their hold over small peasants. Now they are back with a vengeance. Sugarcane growers are being squeezed from both ends. Sugarcane prices offered by factories have fallen by around 25 percent in the past five years. Around a third of factories have not even paid farmers the Minimum Support Price. Production costs have risen by around two thirds in the last five years. There have been huge hikes in power, irrigation and other overcharges due to economic liberalization.

6. To sum up: more than 253,000 farmers have been reported to have committed suicides between 1995 and 2010; the actual number is likely to be higher because of deficiencies in reporting suicides. Four states account for about two-thirds of these suicides: Maharashtra, Madhya Pradesh (including Chhattisgarh), Karnataka and Andhra Pradesh. Another four states account for a fifth of all the suicides: West Bengal, Kerala, Tamil Nadu and Uttar Pradesh. Even though the all-India number of farmer suicides have declined slightly since then so what used to happen before the advent of globalisation? Well, farmers went in for low yield, low risk farming. Their crops may have failed, but they didn't sink into debt which they could not repay…they managed to survive. It was their decision to go for high yielding crops with its resultant high cost of farming which did them in…it's also a failure of our banking system that these poor farmers had to fall back on money lenders. Money lenders in rural areas are notorious for charging 30-40 per cent interest and then if the farmer does not pay, they make his life miserable. Threats to life and intimidation of family members are common. Murder is also not unheard of. Farmers often see no way out but to die.Mid-2000s, the 4 states that account for most of the farmer suicides have not shown much decline. An obvious and accepted problem faced by Indian farmers is that they often do not get a fair price for their produce. A disproportionately large fraction of the price that the consumers pay does not go to the farmers, but is appropriated by middlemen and traders. This problem arises mainly because farmers cannot directly reach consumers, and they have to depend on middlemen or traders to market their products.

1.8 Recommendations

The study has made an attempt to bring out the circumstances and reasons as narrated by the family members and nearby villagers and have tried our best to understand the reasons of these deaths. The study team could visibly confirm after the visit that agriculture issues have played a major/ important role in most of these 7 deaths. The study team has carried this out with utmost sincerity and truthfulness and based on the observations, the following recommendations are made for the government.

1. The state government seems to be in denial that such deaths are happening due to agriculture issues. We sincerely appeal to the state government to accept and understand that some of these farmers have taken the extreme step due to farm related issues and formulate suitable relief and rehabilitation measures.

2. The government should set up a process immediately to identify all such cases of suicide in the state due to agriculture as well as other deaths related to agriculture.

3. All the families we visited definitely require a lot of support to rebuild their lives. The farmers who have committed suicide did so as they thought that it was impossible to settle their loans and lead a life with dignity. But unfortunately, their suicides have now shifted the entire burden to their wife, brothers, sisters and children who are younger and in most cases less skilled. Hence we kindly request the state government to provide the families of all farmers who have committed suicide in Tamil Nadu due to agriculture issues with a suitable relief and rehabilitation package. Apart from this, the government should also seriously consider ways of support to sustain their family in the long run.

4. Apart from suicides, the government should also take into consideration other kinds of death that have been happening in the farming families due to agricultural issues and also provide them with a suitable relief package. Farmers were worried about the failing crop before they had heart attacks. Government should compensate all such families suitably.

5. The media and other organizations must also refrain from misquoting nature of deaths and should talk and enquire with the family members directly before putting up such news. This will help all of us in raising such issues with more credibility and could help solve such issues faster.

6. The fact that most of them had to borrow in order to cultivate crop from moneylenders at high rate of interest tells us about the deeper crisis in agriculture where one cannot even put in his own savings after doing agriculture for many years. Also, none of them had accessed a bank loan for agriculture. The Government has to look at the deeper symptoms and take up more sustained initiatives that would benefit small, marginal and tenancy farmers directly.

7. Owning land should not be considered a criterion for benefits rendered to a farmer including cooperative society loans for crop cultivation. Anyone who cultivates should be eligible for all benefits. In many cases, even farmers who own land did not have the land registered in their name. Tenancy farmers should be treated on par with land owning farmers for any benefits given. All the tenancy farmers should also be given farmer card.

8. The state should also look at devising and providing better crop insurance policies that calculates crop losses at individual farmer level/ at least village level in case of damages due to drought, winds and floods as none of the farmers whose crops got affected by Cyclone and rains were compensated.

1.9 Conclusion

This paper investigated whether differences in the structure of agricultural production explain inter-state variation in suicides rates in India. The hypothesis is supported by a large number of qualitative studies, which argue that the liberalization of the agricultural sector in the early-1990s led to an agrarian crisis and that

consequently farmers with certain socioeconomic characteristics-cash crops cultivators, with marginal landholdings, and debts-are at particular risk of committing suicide. Our analysis combined with state-level suicide estimates with additional variables to demonstrate that there is a significant and positive relationship between the percentage of marginal farmers and suicide rates, but only when we control for either or both cash crop production and indebted farmers. Our findings have clear policy implications: they suggest that if the state were able to reduce the proportion of marginal farmers, cash crops, or indebted farmers by one percent, the suicide rates-suicides per 100,000 per year-would be reduced by $0 \cdot 437$, $0 \cdot 518$ and $0 \cdot 549$ respectively, when all other variables are held constant. Despite more than six decades of trying, the majority of Indian states have been unable to enact meaningful land reforms, largely because of the strength of the rural elite at the local level. Thus, while redistribution of land is a desirable policy prescription, it is perhaps not a realistic one. But even if the size of landholdings are left untouched, our analysis indicates that state interventions to stabilize the price of cash crops and relieve indebted farmers may be effective at reducing suicide rates in India.

Farming is clearly a high-stressed and dangerous occupation. Changing farming practices and various regulations governing it have compounded stressors traditionally associated with agricultural production. A number of studies have found high rates of depression and anxiety among farmers. Various risk factors act in cohesion to culminate into suicide by farmers. Although there are social and geographic variations, farmers' suicide is a global problem that needs detailed evaluation. The preventive strategies used by other nations may not completely apply in the Indian scenario, but it can be a guiding path for more research and formulation of preventive strategies. Farmers face a particular set of issues related to access to health care. Severe misdistributions of psychiatrists and psychologists among the rural and urban population is a global problem and needs to be addressed by effective government strategies, which may include incentive-based programs as run by Australia. Active participation by psychiatrists in prevention and research work in the field of farmers' suicide is now being recognized in India. Heightened visibility among small farming communities may lead to fear of stigma related to seeking psychiatric services. This area needs to be investigated further. In India, 40% of the farmers would want to quit agriculture and take up some other career as a part of insecurity. Work done in south Indian states like Andhra Pradesh and Karnataka is a success story in field of mental health, but much more needs to be done urgently by us professionals for containment of this issue. It is high time now to take necessary steps otherwise we may be facing extinction of another group from earth, this time a class from our own homo-sapiens species, our food growers.

Remarks: Even if the Indian state is unable to enact land reforms due to the power of local elites, interventions to stabilize the price of cash crops and relieve indebted farmers effective at reducing suicide rates.

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Persistent Agrarian Crisis:
Can Policy/Market-driven Large-scale Crop-diversification be a Panacea? [1]

Dr. Saumya Chakrabarti*

Abstract

Diversification of agriculture and allied production processes intended for the high-value domestic and export markets may create the scope for intervention of big capital through variety of contracts. However, this entry of capital may displace the petty production-based rural non-farm economy (RNFE), having a symbiotic relation with the traditional subsistence agriculture. The change in the cropping pattern in favour of high-value-crop (HVC) and diversion of resources towards the modern animal husbandry may initiate an inclusion of the relatively advanced and asset-rich parts of agriculture and allied activities and inclusion of those involved in relatively advanced production-processing-packaging-storing-transporting-retailing, into the growing global economy, but it could break the close links between the subsistence agriculture and petty RNFE. Furthermore, the population engaged in urban food retailing may also be displaced by the entry of supermarket-chains. Finally, if crop-diversification is undertaken through large-scale substitution of basic cereal production, it may affect the micro- and macro-food-security leading to immiserization of the rural and urban poor. Given these probable adverse effects (over and above the positive inclusionary possibilities), the policy-makers should take necessary steps so that: (a) there is substantial production expansion also for the basic cereals-pulses-etc along with that for the HVC; (b) big capital cannot engulf the space of the innumerable small-players (in agriculture as well as in related/linked non-agriculture), even if it is allowed to do business; (c) the petty-units/agents become dynamic entities and can reap economic benefits out of their interactions with the global-market (global-exchange-network); (d) the small-players are able to organize themselves to muster a level-playing field for their global-market-mediated interactions with the big capital.

Key words: Crop-diversification; Firm-farm contracts; Rural non-farm economy; Food-security; WDR 2008; Inclusion/Exclusion; Political-economy; Empirical-analysis; Policy-question; India.

Introduction

It is widely argued that, significant progress in the spheres of trade, finance, industry and other services in the LDCs is due to the fact that these sectors of the developing world have achieved considerable extent of global connectivity. Contrarily, it is contemplated that, by and large, the agricultural sector of the LDCs remains outside this globalizing world and hence, the third world agriculture lags behind. Furthermore, as the vast majority of the people of the developing world have to live on this sector, they are unable to come out of the poverty trap. Consequently, a programme of 'inclusive growth' cannot neglect the issue of inclusion of the third world agriculture into the global market-economy.

In this context, the World Development Report 2008 (WDR 2008) has been introduced with the title "Agriculture for Development". The World Bank President observes that "today, rapidly expanding domestic and global markets; institutional innovations in markets, finance, and collective action; and revolutions in biotechnology and information technology all offer exciting opportunities to use agriculture to promote development" (WDR, 2008, p. xiii). The inherent logic of this WDR 2008 is to attach agriculture with the globalization process which could ensure access to all these opportunities. It is proposed that, with the incorporation of the third world agriculture within the global economy, not only the new growth opportunities are created, but also the benefits of this growth percolate to the rural poor; and thus, an inclusive growth process is ensured.

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Dominant View

Global Connectivity // Global Inclusion → **Trade Finance Industry & Other Services**
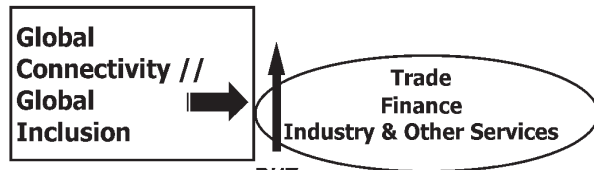
BUT......
Agriculture of the developing world is _NOT_ globalised
hindering **"Transition" & "_Inclusive_ Growth"**

World Development Report 2008: "Agriculture for Development" →

WDR 2008:

Bringing Agriculture to the Global **Market**: **As a method towards** *Inclusive* **Growth.**

QS: How??

A Major Suggestion of WDR: **'Crop Diversification' towards 'High-Value-Crop' (HVC) to** *integrate* **the 3rd World Agriculture with the Global** *Market* **// Global Value** *Chain* .... *Why & How??* ....

WDR 2008: A Major Policy Suggestion

It is noted in the WDR 2008 that "(f)ar-reaching changes in domestic and global markets are creating big opportunities for farmers and agribusiness entrepreneurs. The demand for high-value primary and processed products is rapidly increasing, driven by rising incomes, faster urbanization, liberalized trade, foreign investment, and advancing technology. These developments are expanding market opportunities, which is important for faster agricultural and non-farm growth and for greater employment and rural incomes...." (p. 118; author's emphasis). Consequently, the WDR 2008 prescribes for extensive 'diversification' in the LDCs shifting agricultural and allied production away from the traditional subsistence crops to the 'high-value-crops' (HVC), i.e. high-value cereals, fruits and vegetables, flower and agro-fuel feedstock as also modern livestock products.

"High-value markets for domestic consumption are the fastest-growing agricultural markets in most developing countries, expanding up to 6-7 percent a year, led by livestock products and horticulture. Fresh and processed fruits and vegetables, fish and fish products, meat, nuts, spices, and floriculture now account for 43 percent of agro-food exports from developing countries, worth about $138 billion in 2004." (WDR, 2008, p. 12) … "Agricultural exports diversified significantly in the last two decades, particularly into high-value fresh and processed products, fueled by changing consumer tastes and advances in production, transport, and other supply-chain technologies. ... Continued growth of these high-value exports will require efficient value chains, particularly domestic transport, handling, and packaging, which make up a large share of the final costs" (ibid. p. 128-9).

Domestic consumption and exports of high-value products in developing countries are growing rapidly:
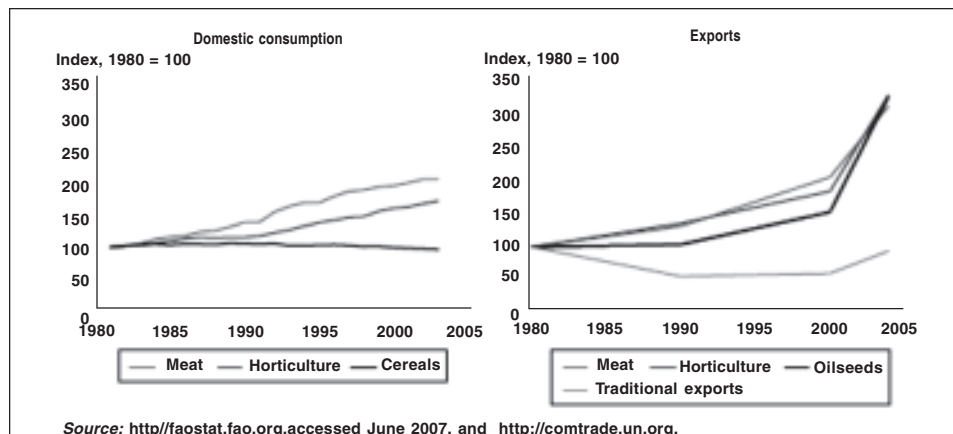
Source: WDR 2008, p. 13.

In fact, the argument is that the traditional subsistence crop farming is no more profitable. On the one hand, costs are steeply rising due to withdrawal of the State-supports and other economic, agro-climatic and technological reasons (like big players' control over the input trade, problems of soil-fertility, ground-water depletion, over-use of chemical fertilizer, increasing costs for modern inputs etc) and, on the other, prices are not that remunerative in the absence of 'support-prices' and also due to increased global competition. There are serious

ecological costs as well. Nonetheless, both the domestic and international 'higher-value' markets for the high-value commodities (both primary and processed products) are expanding very fast which is creating a unique opportunity for the third world agriculture, because a large part of the developing world has comparative advantage in these high-value items. Many of the LDCs have agro-climatic conditions that are favourable for production of HVC and modern livestock-products. But, most of the high-value-crops especially fruits, flowers and vegetables and the livestock products are highly perishable and hence, require sophisticated 'supply-chain' consisting of modern handling, grading, storing, processing, transportation and quick delivery mechanisms. The advancement of technology and entry of big players in a globalized world have made this modern supply-chain commercially available.

"Rising incomes, urbanization, greater female participation in the workforce, wider media penetration-all are driving the demand for higher-value products, semiprocessed and processed products, and convenience foods. They are also increasing consumer attention to food quality and safety. Diets are globalizing too, with local consumer preferences influenced by international tastes. These trends open new markets for a wide range of higher-value agricultural products and propel the evolution of the marketing system in many developing countries, with the entry and rapid growth of supermarket chains and the food processing and food service industries......... For many developing countries, the supermarket revolution began in the early to mid-1990s. By the early 2000s, retail food sales in supermarkets exceeded 50 percent of total retail food sales in many countries in Latin America and in major urban centers elsewhere. Accelerating the expansion: significant foreign direct investment by multinational supermarket chains in developing countries, either directly or through joint ventures with local firms. Changing consumer demand is also driving the growth of the food processing and food service industries. Processed foods account for about 80 percent of global food sales, estimated at $3.2 trillion in 2002. Although spending on processed foods is still low in developing countries ($143 per capita per year in lower-middle-income countries and $63 per capita in low-income countries), it is growing fastest in these countries-28 percent a year in lower-middle-income countries and 13 percent a year in low-income countries. "Eating out" is also becoming popular. For example, spending on food services now accounts for 22 percent of food budgets in Brazil and Indonesia and 15 percent of urban food spending in China." (WDR, 2008, p. 124-5).

Hence, it is argued that in the presence of all these demand and supply side supports extensive HVC and modern livestock farming has become feasible and profitable for the LDCs and the agricultural sectors of many of the developing countries should be reoriented to capture these opportunities. Diversification of production towards the HVC and advanced livestock products is thus argued to be an instrument of 'inclusive growth' in a globalizing world.

However, the crucial point in this course of global integration of the 'diversified' agriculture and allied activities is that, the opportunities of expanding 'higher value market' for the HVC and livestock products could be realized only through an appropriate utilization of the modern supply-chain, i.e. only through the use of modern processing, storing, transportation and delivery mechanisms. Let us look at the international experiences.

It is found that the linking of the diversified agriculture and allied activities with the global market has been possible with the entry and rapid growth of supermarket chains and the food processing and food service industries. Obviously, this implies entry of big capital in the stages of handling, storing, processing, transportation and retailing of the primary and processed HVC and livestock products. Furthermore, high-value domestic and international markets impose stringent food quality and food safety norms. Adherence to such global standards is possible only with the use of modern capital intensive techniques. In fact, in many cases the very process of extensive crop-diversification and livestock production has been driven by the entry of big capital.
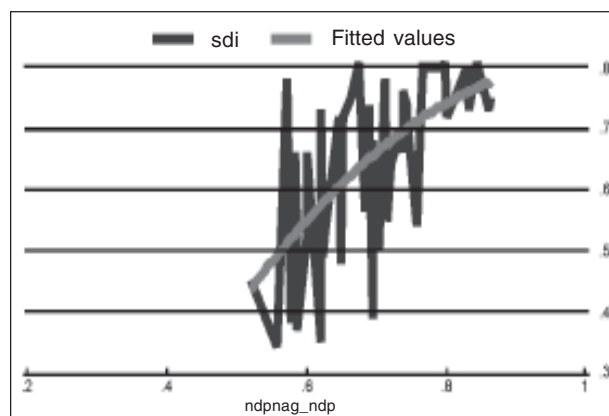
The diagram above strikingly shows, with rising share of non-agriculture in net state domestic product (ndpnag_ndp) across 15 major Indian states pooled over 1994-95, 2000-01 and 2005-06, the Simpson crop-diversification index (sdi) rises hugely. This may indicate, with modernisation of the economies (i.e. with increasing dominance of industry and services in the net value added), crop-diversification rises considerably.

"The perishability of most high-value agricultural products requires careful handling, special facilities (packhouses, cold storage, and refrigerated transport), and rapid delivery to consumers to maintain quality and reduce physical and nutritional losses. In many developing countries, the long supply chain, poor access to roads and electricity, and inadequate infrastructure and services in physical markets add to the transaction costs and cause quality deterioration and high spoilage losses……..Significant inefficiencies in the traditional wholesale marketing systems and competition encourage supermarkets, food processors, and food service providers to use supply chains to reduce coordination costs, capture economies of scale, and increase food safety and quality. This is profoundly changing the structure of production and wholesale marketing in many developing countries." WDR, 2008, p.125-6.

McKinsey Report of the Earlier Left-Front Government of West Bengal:

"several established and credible companies are willing to provide assured markets and remunerative prices for farmers. They would like to enter into trust-based contract farming relationships with farmers who will continue to own their own land. … Companies such as Hindustan Lever, Cargill and ITC are planning to conduct international market surveys to determine which scented rice varieties of West Bengal can become strong brands (like Basmati). A team of experts from Department of Agriculture will need to continuously interact with these companies to provide them samples and other expert advice to assist them in their effort to promote West Bengal…. As the shift from agriculture to agribusiness is made, a number of participants across the food value chain will play an important role viz. input, extension, storage, marketing, processing and retailing".

(McKinsey & Company, 2002; quoted from: Swagato Sarkar, Journal of South Asian Dev, 2014, pg. 4).

WDR 2008: Some Pros and Cons of Large-scale Diversification of Agriculture and Allied-activities

However, as the modern supply and retail chain is appropriate for the HVC cultivation and modern livestock production and as it is much more efficient than the traditional indigenous processes, the latter has been replaced with the former.

As is recognised by the WDR 2008 itself, the intervention of efficient capital in the process of 'diversification' is inducing profound changes in the structure of agricultural and allied production and distribution. Let us now turn to the probable effects of diversification supported by the expansion of high-value-markets and complemented with the modern supply and retail chain provided by big capital. First, we look at the income and employment inducing (positive) effects.

As both primary and processed diversified outputs are remunerative, the farmers who are able to undertake this diversification gain significantly. The WDR 2008 reports that "(p)articipation in modern supply chains can increase farmer income by 10 to 100 percent (Guatemala, Indonesia, Kenya). Recent studies of contract farmers show that they have significantly higher incomes than other farmers." (p. 127). On the other hand, as HVC and livestock production is much more labour-intensive compared to the traditional crops, it enhances the employment generation potential of the third world agriculture and allied activities. Thus it is noted that "(p)articipating farmers use much more labour-intensive practices because of requirements for field practices, sorting, and packing. Because they are more likely to double-crop over the year, participating farmers hire 2.5 times more labour (typically from local asset-poor households). So even if small farmers do not participate directly, they can benefit through farm employment…" (ibid. p. 127).

Labour requirements are considerably higher for vegetables than for cereals
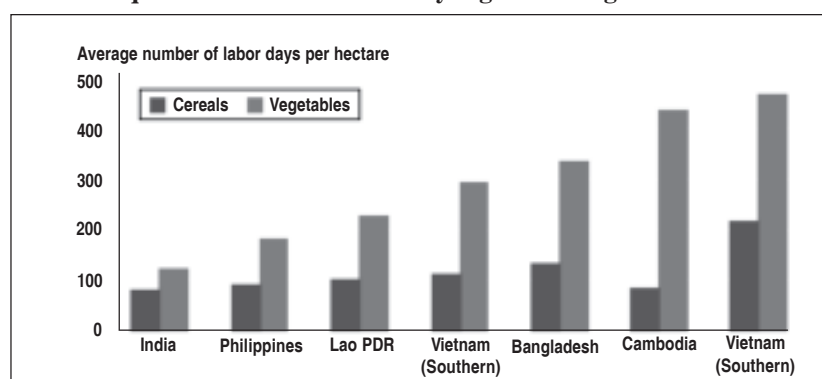
Source: WDR 2008, p. 209.

Further, there are ecological benefits as well, as diversified agriculture needs much less ground water at the level of production.

Next we turn to some of the offsetting effects of extensive agricultural diversification induced by the entry of big capital in agricultural production and distribution intended to capture the high-value food markets. Few adverse effects are even noted in the WDR 2008 itself (ibid. p. 127). First of all, it is seen that in general the small and marginal farmers are not capable of undertaking extensive crop-diversification on their own because HVC farming requires high cost inputs of production and access to modern supply and retail chain. Not only the inadequate farm size but also the lack of access to physical, human, and social assets: to education, irrigation, transport, roads, and such other physical assets as wells, cold chains, greenhouses, good quality irrigation water (free of contaminants), vehicles, and packing sheds constrain the small and marginal farmers from venturing into large-scale diversification towards HVC and livestock farming. On the other hand, in case of supermarket driven and large processing firm led 'diversification' it is found that these big players generally prefer the large farmers as suppliers of HVC rather than the smaller ones to reduce transaction cost. Thus, extensive HVC farming can take place through firm-farm contract, but the small farmers are generally kept out of such 'contract farming'. Consequently, the asset-poor farmers are excluded from these processes of diversification and the benefits are generally appropriated by the wealthy ones.

"The modernization of procurement systems affects farmers differently across countries and products. Some recent studies of selected commodities find that the modern procurement systems exclude asset-poor farmers. Supermarket buying agents prefer to source from large and medium-size farmers if they can (for example, for tomatoes in Mexico and potatoes in Indonesia); if large and medium-size farmers have sufficient quantities, smallholders are not included…………The most important determinant of small farmers' participation is not always farm size. Instead, it can be access to physical, human, and social assets: to education, irrigation, transport, roads, and such other physical assets as wells, cold chains, greenhouses, good quality irrigation water (free of contaminants), vehicles, and packing sheds………..Most farmers lacking these assets are excluded. In Guatemala, lettuce farmers participating in modern supply chains have twice the farm size (two hectares versus one) and 40 percent more education than nonparticipating farmers, and are nearly twice as likely to have irrigation, four times as likely to have a truck, and twice as likely to be close to paved roads……." WDR, 2008, p. 127.

Secondly, it is seen that even the small processing firms are unable to compete with the large/modern ones. Moreover, the supermarkets prefer to collect the processed food-products from the large processing companies having the capacity for bulk production. Large firms are also preferred for long-term stable contracts. Thus, small labour-intensive food processing firms are replaced with large corporations increasing concentration in food processing sector. On the other hand, it is also observed that the supermarket revolution creates large scale displacement of the petty retailers. Though initially the supermarkets enter into the large cities gradually they spread their operations to rural towns. Similarly, though supermarkets start their business with processed food they increasingly target the fresh food market as well (ibid. p. 126). This gradual expansion of supermarket chain may cause mass eviction of the petty retailers.

Some studies have found that smaller processing firms were left out of the supply chain, with medium-size and large processors preferred for long-term contracts. The number of small retail stores often declined with rising market share for supermarkets—with implications for employment. In urban Argentina, from 1984 to 1993, the most intense period of supermarket takeoff, the number of small food shops declined from 209,000 to 145,000. WDR, 2008, p. 127.

"There are no Wal-Mart stores in five of the country's largest 25 cities — New York City, San Francisco, Detroit, Seattle or Boston. That is a total of 11.23 million consumers that Wal-Mart cannot reach. Adding in Newark and Jersey City, N.J., and Arlington, Va., brings the total to nearly 12 million (1.2 crore!!). Reasons for the absence vary, but local businesses often fight Wal-Mart's entry into their market and many consumers share that objection. ……… Others object to the company's low-wage scale, which rouses significant union opposition in cities like New York, San Francisco, Detroit and Boston. Local governments elected by local residents listen carefully to these objections. The city council of New York recently sent a letter to the company requesting that Wal-Mart stop making charitable contributions in the city. ……. In a survey last year, most Boston residents said they would rather see a casino in their city than a Wal-Mart. …… The opposition to Wal-Mart is not just to the massive stores, but in cities like New York and San Francisco even the smaller stores are not welcome. This is a real problem for Wal-Mart ……..."*http://247wallst.com/retail/2014/06/16/eight-largest-cities-without-walmart/*

Crop-diversification and the Rural Non-farm Economy (RNFE)

The literature on farm - non-farm linkage notes that the pattern of agricultural growth has significant influence on

the course of development of RNFE. Hence, it seems quite likely that crop-diversification as well should have serious implications for non-farm progress. We here try to put forward few propositions regarding the probable effects of crop-diversification on the dynamics of RNFE. We propose, contrary to the usual belief that the particular type of agricultural growth based on diversification towards HVC can affect the labour intensive petty RNF activities rather adversely.

> "Rural non-farm enterprises are transforming the employment structure in rural areas. Most enterprises are small, with 80-90 percent relying exclusively on family labor…… In Sri Lanka, the average number of workers in a rural non-farm enterprise is 2.4, with 79 percent of firms having only one or two people. In Tanzania, 58 percent of the firms are one-person enterprises, and in Bangladesh 45 percent are….." (WDR, 2008, p. 209-10). In India, at present the agro-processing is majorly done by small-scale non-farm units (99.4%) where 86.8% of total processing sector employment is generated (Dev and Rao, 2005).

We have argued above that HVC and modern livestock farming could serve well the course of globalization by providing (primary and processed) food to the relatively well-off population engaged in modern sectors and through supply of raw material for sophisticated processing meant primarily for exports (see also, Singh, 2004; Sidhu, 2005). On the other hand, we have also seen earlier that high-value-generating cultivation could be a better option for the large farmers (see also, Sen and Raju, 2006). Thus, the HVC cultivating and modern animal husbandry segments can easily get integrated with the so-called modernisation process. Nevertheless, it may de-link a large part of agriculture and allied activities from the rural labour intensive petty non-farm sector with far reaching implications.

The whole chain of crop-diversification — processing — packaging — retailing can be organised through firm - farm contract. However, it is seen above (WDR, 2008) that, generally, the large processing companies and the supermarkets favour big farmers for undertaking contract farming, perhaps due to high transaction cost involved in case of the smaller counterparts (see also, Singh, 2004; Dev and Rao, 2005;

Kumar, 2006). Conversely, the large farmers happen to use finer (modern) products produced in formal industry for production and consumption purposes. Contract farming itself ensures use of modern inputs and modern farm services creating diversion of purchasing power in favour of 'big city' products and thereby initiating substantial leakage of potential demand away from the labour intensive non-farm sector.

It has been noted in the literature that there is a very close relation between the small farms based agriculture engaged in traditional crop farming and the labour intensive petty RNFE. In fact, there is mutual interdependence between the two sectors through demand as well as supply side channels (Radhakrishna, 2002; WDR, 2008). Consequently, with crop-diversification, if agriculture shifts away from traditional food crop production, it may adversely affect the vast non-farm economy as many of the demand and supply side channels may get constricted/blocked.

When the small and marginal farmers get involved in the process of crop-diversification as a survival strategy, they have to face great hurdles / uncertainties (Sen and Raju, 2006). Only huge investments in collection, transportation, storage, processing, packaging and finally retailing could effectively realise the potentials of crop-diversification (Rao et. al, 2006; Sen and Raju, 2006).[2] Hence, entry of big capital in this elaborate chain of activities becomes imminent either through spot contracts or through the integrated institution of contract farming.[3] The diversified HVC and modern livestock products are siphoned off for 'big city' consumption and/or for exports and on the other hand, modern inputs and modern farm services are introduced into the agricultural sector. The same channel could even be used to sell 'big city' consumer products in rural areas. Thus, the entry of big capital displaces the non-farm population, only a part of which could be internalised into the agricultural modernisation and its associated processes.

Agricultural diversification may also jeopardize macro, micro and especially, local and household level food security. As the non-farm households lose their work they are doubly affected. They neither have the access to local food supply nor do they have sufficient entitlement to exchange with. Erosion of local level food security may seriously affect the very existence of RNFE as it depends

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[2] Production especially processing of HVC seems to be more capital intensive even across Africa. In fact, Haggbade et.al. (1989) report that activities like oil extraction, sugar production, tea drying and packaging etc. are often performed in rural areas by large scale enterprises. WDR 2008 notes that, "(m)ost food products in this new agriculture are perishable, and quality and safety standards are tighter, thus increasing the vertical integration of food systems…." (p. 58).

[3] "The horticulture revolution, unlike the green revolution, has been driven largely by the private sector and the market. This has implications for the organization of value chains, with specialized agribusinesses and supermarkets increasing their share in these markets, especially in the urbanized countries. Grades and standards make it more difficult for smallholders acting alone to participate in these markets, giving rise to contract farming and collective action by producer organizations……."(WDR, 2008, p. 59).

significantly on local supply of cheap food.

In support of our hypothesis that crop diversification towards HVC leads to contraction of the petty rural non-farm sector, we draw the following diagrams and run the subsequent regressions based on Indian data.

We take up the dependent variables: aggregate value added in rural unorganized (a proxy for informal) manufacturing (vaumrl); aggregate employment in rural unorganized manufacturing (wkumrl); aggregate value added in the (vast) self-employment (own-account) segment of rural unorganized manufacturing (vaoamerl); and aggregate employment in this self-employment segment of rural unorganized manufacturing (wkoamerl).

On these variables, data are collected for 16 major Indian states and pooled over the three post-liberalization rounds (1994-95; 2000-01, and 2005-06), for which comparable statistics are available from NSSO, Government of India. We also take/calculate corresponding data for net state domestic product (ndp) and ndp from agriculture as a share of ndp (ndpagr_ndp), and, most importantly, calculate the state-level values for Simpson Crop-Diversification Index (sdi); all these data are collected/calculated using information provided by CMIE, Economic Intelligence Service. We convert nominal values into real ones by using price index data from Reserve Bank of India.
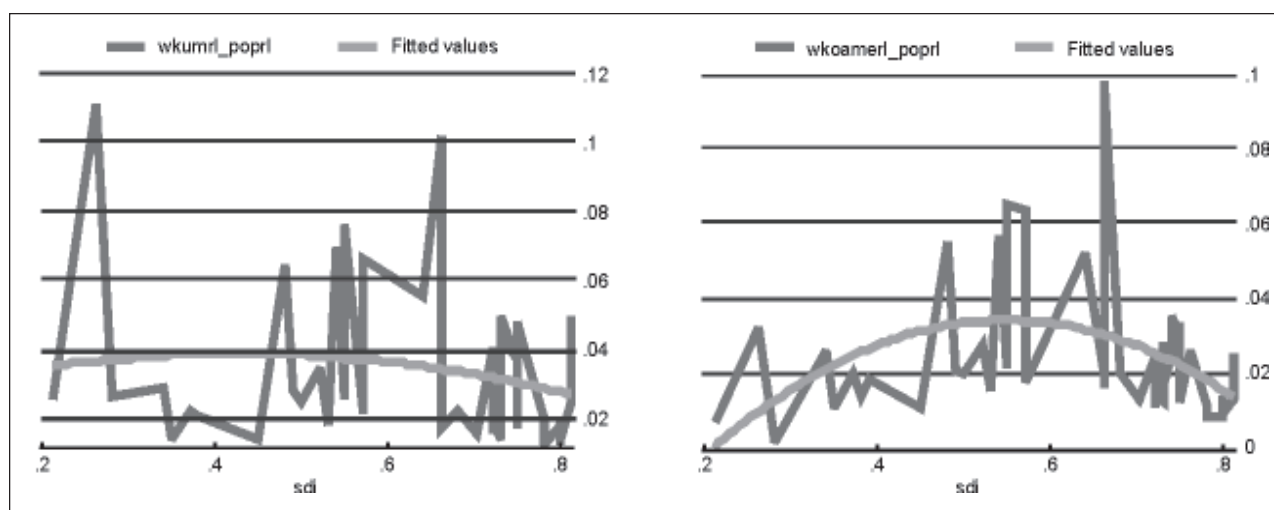
Now, simple pooled regressions are run using ordinary least squares (OLS) method with robust standard errors. The question that is addressed is whether the Crop-Diversification Index, sdi, can adversely affect the overall rural informal/unorganized manufacturing sector and its self-employment segment as well, i.e., unfavorably affects

the variables: vaumrl, wkumrl and vaoamerl, wkoamerl respectively, controlling for the state-level aggregate and agricultural outputs. Our above-mentioned hypothesis seems to be supported by the following four pooled regressions. Diversification of agriculture may adversely affect the activities of the petty (unorganized) RNFE:

1. regress wkumrl on sdi, ndpagr_ndp, ndp

Regression with robust standard errors

Number of obs = 48
Prob > F = 0.0010
R-squared = 0.3159

wkumrl	Coef.	Robust Std. Err.	t	P > |t|
sdi	-1558056	788707.8	-1.98	**0.055**
ndpagr_ndp	4352663	1222403	3.56	0.001
ndp	17.36243	5.957524	2.91	0.006
_cons	112672.3	455809.4	0.25	0.806

2. regress vaumrl on sdi, ndpagr_ndp, ndp

Regression with robust standard errors

Number of obs   =   48
Prob > F   = 0.0035
R-squared   = 0.4399

		Robust		
vaumrl	Coef	Std. Err.	t	P>|t|
sdi	-623.6395	440.0925	—1.42	0.164
ndpagr_ndp	1672.637	698.6953	2.39	0.021
ndp	.0139394	.0039146	3.56	0.001
_cons	77.25707	303.3643	0.25	0.800

3. regress wkoamerl on sdi, ndpagr_ndp, ndp

Regression with robust standard errors

Number of obs   = 48
Prob > F   = 0.0004
R-squared   = 0.3071

		Robust		
wkoamerl	Coef.	Std. Err.	t	P>|t|
sdi	-1604861	670083.8	-2.40	0.021
ndpagr_ndp	3965182	1019396	3.89	0.000
ndp	13.3298	4.557551	2.92	0.005
_cons	195438.8	385861.6	0.51	0.615

4. regress vaoamerl on sdi, ndpagr_ndp, ndp

Regression with robust standard errors

Number of obs   = 48
Prob > F   = 0.0001
R-squared   = 0.4323

		Robust		
vaoamerl	Coef.	Std. Err.	t	P>|t|
sdi	-782.8171	296.792	-2.64	0.011
ndpagr_ndp	1672	426.6006	3.92	0.000
ndp	.0079732	.0021085	3.78	0.000
_cons	110.4568	198.5433	0.56	0.581

Crop-diversification and Food-security

Now we turn to the issue of impact on food-security due to production-diversification in agriculture and allied sector. That diversification may lead to erosion of micro food security especially for the small and marginal farmers could be hypothesised given the following observations. Lanjouw and Shariff (2004) note that marginal expenditure on local products is about eighty per cent in all Asian countries surveyed. Of this forty five per cent is spent on local food. The remarks of the NSSO report 424 could also be noted in this context: Proportion of growers' consumption out of own produce is found to be 64 per cent for rice, 69 per cent for wheat, 53 per cent for jowar and bajra, and 68 per cent for maize considering India as a whole. For each of these crops, the proportion of growers'

consumption of 'other cereals' from home produce works out to about 55-65 per cent at the all-India level. Similarly, NSSO report 474 points that the proportion of all rural households consuming only from home grown stock is relatively high for rice (24 per cent) and wheat (30 per cent) and it is also noted (NSSO report 512) that, in rural areas the households self-employed in agriculture shows the lowest percentage of seasonal inadequacy of food. All these indicate that a major objective of traditional food-crop based agriculture is self-consumption. Hence, market-driven crop-diversification may generate serious problems for micro food-security. It is evident from the following table that crop-diversification is bound to affect the food security of low-income earning farmer households who spend a large part of their income on basic food items such as cereals, pulses etc.

Monthly per capita consumer expenditure (MPCE) [along with the corresponding shares (%)] over two groups of 'food' items for farmer households across different MPCE classes (All-India) (in Rs.)

Items / MPCE class (Rs.)	0-225	225-255	255-300	300-340	340-380	380-420
Cereals, cereal substitutes, gram, pulses and their products	75.05 (61.61)	88.18 (57.59)	96.86 (55.13)	103.76 (52.18)	108.93 (49.38)	114.45 (47.01)
Vegetables, fruits (fresh), fruits (dry), beverages, refreshments and processed food	17.88 (15.55)	24.76 (16.84)	29.19 (16.61)	34.19 (17.19)	39.19 (17.76)	44.19 (18.15)

Items / MPCE class (Rs.)	420-470	470-525	525-615	615-775	775-950	950+
Cereals, cereal substitutes, gram, pulses and their products	119.1 (44.65)	126.1 (42.92)	130.97 (39.94)	137.8 (36.33)	145.23 (32.69)	158.53 (27.87)
Vegetables, fruits (fresh), fruits (dry), beverages, refreshments and processed food	49.22 (18.45)	54.49 (18.54)	63.41 (19.34)	74.14 (19.55)	87.79 (19.76)	52.07 (18.68)

Source: NSSO 59th Round report no. 495 (59/33/4) pg. A84. Note: Numbers in the parentheses represent the corresponding shares (%).

Crop-diversification not only erodes the (micro) food security of small and marginal farmers and of those engaged in RNFE, it may also create a significant loss of macro food security by shifting resources from subsistence crop production towards HVC and modern livestock. Notably, crop-diversification is taking place largely through crop-substitution rather than increase in cropping intensity. For example, in India crop-substitution's contribution to diversification is 63.37 per cent, whereas for whole of South Asia it is 57.02 per cent (Joshi et. al., 2004). This may lead to immiserization for the net buyers of food. It has been found that the basic cereal production is a key determinant of the level of poverty in the LDCs. Thus, it is noted that "increasing staple crop productivity usually reduces poverty overall, because in addition to the urban poor, more than half of poor rural households are typically net food buyers…."(WDR, 2008, p. 32), as represented in the following diagram.

Cereal yields are up and poverty is down in South Asia, but cereal yields and poverty were unchanged in Sub-Saharan Africa (Source: WDR 2008, p. 27)
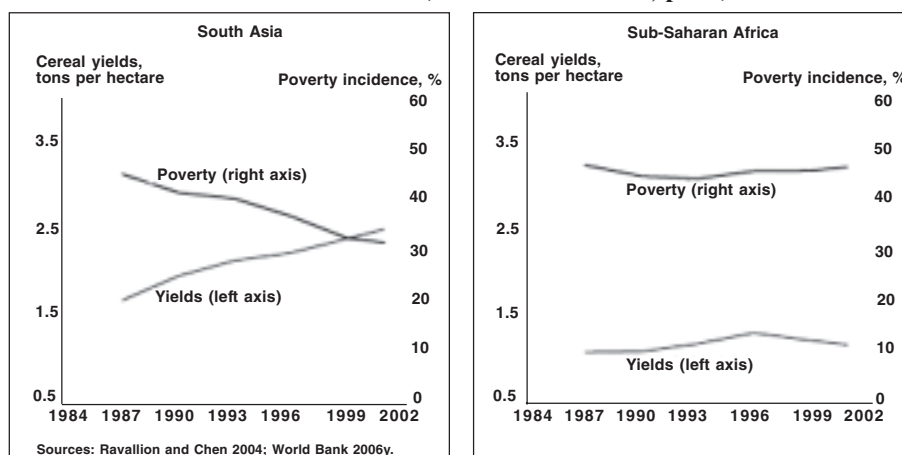
For 27 Indian states, we locate an interesting observation from the diagram as below and the subsequent correlation-matrix as well. We find that poorer the state, larger the share of total expenditure of farmer households on cereals. Hence, we see, once again, that the poor (even the poor farmers who are relatively better off than the agricultural labourers) largely depend on the basic crop rather than the high-value items. Consequently, a process of large-scale crop-diversification may lead to a major food-insecurity problem.
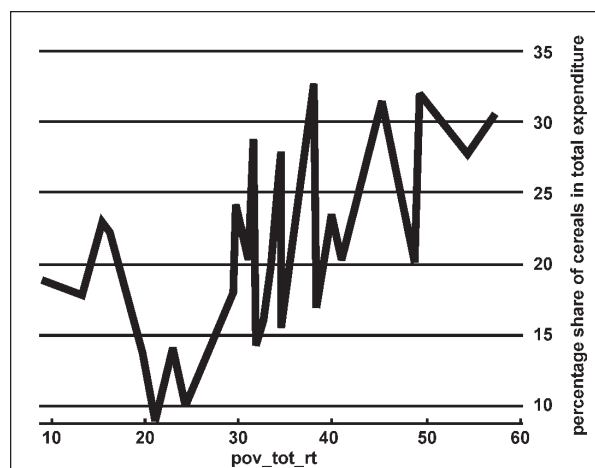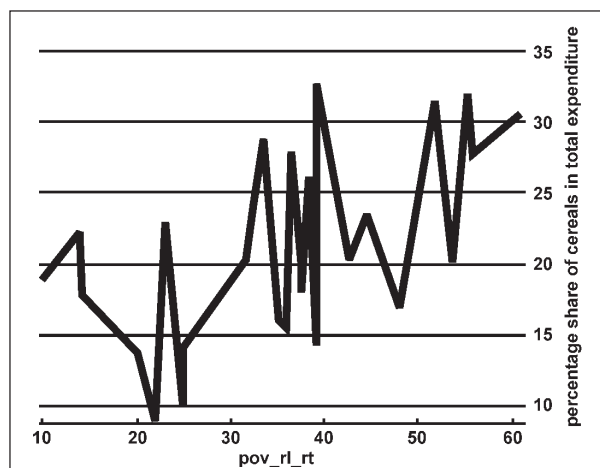
Percentage share of cereals in total expenditure of farmer households and rural (rl) & general (tot) poverty (pov) rates (rt) for 27 states of India during 2003 and 2004-2005, respectively.

Data sources: NSSO report no. 495: Consumption Expenditure of Farmer Households 2003, pp. 13-14; And, Planning Commission, Government of India 2004-2005 (Tendulkar methodology for poverty measure) (Diagram by the author).

Correlations of poverty: rural rate (pov_rl_rt) and overall rate (pov_tot_rt), with the share of cereal in total expenditure of farmer households (sh_crl_texp) for 27 Indian states, at 1% level (*) of significance.

	sh_crl_texp
pov_tot_rt	0.5573*
pov_rl_rt	0.5340*

Data sources: NSSO report no. 495: Consumption Expenditure of Farmer Households 2003, pp. 13-14; And, Planning Commission, Government of India 2004-2005 (Tendulkar methodology for poverty measure).

Concluding Remarks And Policy Implications

Diversification of agriculture and allied production processes intended for the high-value domestic and export markets may create a scope for intervention of big capital in agriculture through variety of contracts. In fact, in many cases product-diversification away from subsistence farming occurs through the inducements of supermarket chains and large agri-business corporations. However, this entry of big capital in the fields of agricultural production and distribution may displace the petty production based RNFE having a symbiotic relation with the traditional subsistence agriculture. Extensive production of the HVC and modern livestock may necessitate the entry of modern capital-intensive supply and retail chain, as the labour-intensive petty RNFE may not be capable of providing many of the inputs of HVC production and modern animal husbandry and may not be able to support the modern production system with the complementary chain of sophisticated handling - storing - processing - packaging and retailing. Consequently, the economic space of the labour-intensive petty RNFE is engulfed by the big capital which displaces a very large section of the rural poor as well.

A change in the cropping pattern and diversion of resources towards modern animal husbandry may initiate an inclusion of a large part of agriculture and allied activities into the growing global economy, but it may break the close links between subsistence agriculture and petty RNFE. Thus, probable inclusion of a part of the rural economy into the expanding global market may create exclusion and eviction elsewhere. Furthermore, the population engaged in urban food retailing may also be displaced by the entry of the supermarket chains. Last but not the least, if crop-diversification is undertaken through large-scale substitution of basic cereal production it could seriously affect the micro and macro food security leading to immiserization of the rural and urban poor.

The overall 'balance sheet' owing to diversification of agriculture and allied activities towards high-value crops (horticulture, agro-fuel feedstock etc) and sophisticated animal husbandry products can be represented succinctly as below. The policy makers should take into account this probable balance-sheet while considering modernization/globalization of agriculture as a way out of the persistent agrarian crisis in the global south.

Crop Diversification: Inclusion vs. Exclusion

■ *Inclusion:*

\# farmers' income   \# employment in production

■ *Exclusion:*

\# Exclusion of asset-poor farmers

\# Crop substitution ⇒ Exclusion in production as HVC is more modern input dependent compared to subsistence crop

\# Crop substitution ⇒ Net exclusion in processing as HVC processing less labour-intensive compared to subsistence crop

\# Net exclusion in retailing as supermarkets replace small shops

\# Immiserization of net buyers of subsistence crop

Faced with such trade-offs, the governments should frame the policy judiciously, so that the possibilities/potentials and positive/inclusive effects of large-scale crop-diversification are realized and the probable adverse/in-equalizing impacts are checked as much as possible.

First of all, the basic policy stance should be that, we need to have a "hybrid economy" with co-existence of both small and large economic agents/units. Experiences of the last fifty years or so have shown that, the innumerable small/petty producers (in agriculture as also non-agriculture) could not be fully accommodated within the very core of the modern/capitalistic sector itself. Hence, the focus of development in general has shifted — away from the traditional (Lewisian) task of completely internalizing the 'outsiders' into the core/modern sector —towards a contemporaneous policy-position of (economic) uplifting of this 'outside' by integrating/linking it with the broader global market. The idea that is being increasingly propounded is that, with this linking of the petty agrarian/non-agrarian producers with the global-exchange-networks (with comprehensive policy support) these small-agents/units could also appropriate the benefits of growth of the globalised modern sector and thereby an inclusive growth process could be ensured; however, this does not mean/require incorporation of the 'outsiders' within the core itself — global market may act as a bridge between the core/modern-capital and the policy-driven dynamic petty-producers.

Within this broad policy domain, we could highlight certain crucial policy-outlines, given the trade-offs of large-scale crop-diversification as enlisted above:

1. A basic problem of large-scale crop-diversification is that, it may occur through uncontrolled crop-substitution (moving away from basic cereals/foods) leading to a macro food-insecurity crisis. This could be handled with a well-directed policy-framework:

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[4]"What is needed, most fundamentally, is a new economic paradigm: a model of a hybrid economy that em-braces the traditional and the modern, the small scale and the big scale, the informal and the formal. What is needed is an economic model that allows the smallest units and the least powerful workers to operate alongside the largest units and most powerful economic players. That allows home-based producers in global value chains to be able to bargain with dominant players in those chains for their rightful share of value added. That allows street vendors to operate alongside retailers and wholesalers—alongside shops, wholesale markets, and malls—in central business districts. That allows waste pickers to access waste and to bid for solid waste management contracts alongside large corporations. That allows informal construction workers to gain some of the protections and benefits of formal construction workers. That allows informal transport workers to be integrated on equitable terms in public and private transport systems. That allows small holders and agricultural day labourers to compete on equitable terms with large holders and corporate farms. That allows small-scale producers to compete in export markets on fair terms alongside large-scale commercial farms.

Some years ago, the world embraced *bio* diversity—and still does. Today, the world needs to embrace *economic* diversity. Both are needed for sustainable and inclusive development" (Martha A. Chen, August 2012, pp. 20;

arid regions (suitable mainly for fruits, flowers and vegetables, as these require much less water) are given special incentives/supports (physical/financial/institutional) for HVC cultivation, while fertile regions should be promoted further for basic cereal production. Thus, policy-design with diversified support/incentive-structures should take care of the locational heterogeneities in terms of agro-climatic, physical/infrastructural and institutional conditions. Instead of a fit-all framework, a diversified policy-structure is extremely essential to equalize marginal benefits for the stake-holders (across HVC and LVC production zones/networks) and thereby a balanced cereal—non-cereal production expansion could be ensured. Not only the physical/financial/institutional supports should be diversified across the HVC and LVC intensive zones, but also there should be a variety of policy-interventions in the input-output markets. Essentially, the policy should promote production of both HVC and LVC, so that benefits of globalization could be reaped, but not at the cost of basic food-security.

2. Given that large-scale crop-diversification requires capital-intensive sophisticated inputs, infra-structural- supports and farm-services, there is a high possibility of entry of big capital. However, the policy-makers' objective should be to take necessary steps so that small-units'/agents' interests are not compromised; rather, on the contrary, these small-agents/units could reap the benefits of crop-diversification in particular and agrarian modernization in general. Therefore, careful policy-design is required with a view to segregate the economic spaces of the big and the small players. There should be well-defined areas 'reserved' for the small-agents/units. Further, these units should be provided with adequate (physical/financial/institutional) support to make them dynamic and also interlinked with the big, so that the small could have a level playing field as also a bargaining position *vis-à-vis* the big. Consequently, regulation of the market in general and of big-capital in particular is extremely essential along with the promotion of the small, to have an inclusive growth. Using market and non-market based instruments big capital should be closely monitored by the administrators. Moreover, big capital could also be induced (with appropriate incentive/monitoring-structure) to undertake promotional activities targeted towards the small; such promotional mechanisms could in fact benefit both.

3. If big capital is not monitored, there is a high possibility of exclusion (and even eviction) of asset-poor farmers, of petty farm-input and farm-service providers, of small processors and of micro-traders/retailers (as discussed earlier). A fundamental hurdle for the petty farmers is that, in many of the cases, the property rights are not well-defined and hence, in a contract between the big and the small the latter's interests are compromised or cannot be provided with proper safeguards. Hence, rights in general and land-rights in particular should be made more specific/transparent. So far as the small processing-packaging-retailing firms are concerned, they should be provided with a transparent non-hierarchical market environment with adequate safeguard for their property rights too.

4. However, more important in this context should be the question of asymmetric bargaining power of the small units/agents vis-à-vis the big capital. Hence, the proposition of clustering of farms/small-farmers and of other players (like small processors, traders etc.) is of supreme importance. Clustering not only gives the small players an edge over the bigger ones, but also benefits the small with economies of scale and synergic effects; the small-in-cluster could cooperate in terms of input-output market-sharing, physical inputs/outputs, technology, infrastructure, information etc. and reap the synergic benefits. The governments should promote such clusters involving small farms, on the one hand and small processing-packaging-retailing firms, on the other. Thus, both horizontal and vertical clustering should be encouraged and governmental bodies should actively take part in building such clusters where both individual as well as collective objectives could be fulfilled. Further, such clustering could reduce overall transaction costs as well involving both the big and small players.

5. Furthermore, the interests of the vast worker-population (engaged in both farming and non-farm activities and in both big and small units) should be taken care of; the issues of wage, labour-contracts, safety-standards, health/general insurance etc. are of significant importance.

6. The question of rights in general and bargaining power of the small producers and workers in particular *vis-à-vis* the big capital (and even the bigger players within the traditional segments) should bring in the issue of political intervention. Hence, not only the governments, but also the political organizations should be aware of the trade-offs of agrarian modernization and act accordingly. Without an appropriate political environment the designing of scientific frameworks and the acts of balancing of such trade-offs by the researchers and administrators would surely face serious hurdles.

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Agrarian Distress: Case of Maharashtra

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Abstract

The state of Maharashtra is one of the top economic performers with respect to per capita income which is 1.5 times that of All India (2013-14). Although on an average, 52.71 percent of workforce is engaged in agriculture in the state, which is below national average, the disaggregated picture indicates that in case of 50 percent of the districts, the share of workforce in agriculture is above 70 percent. While agriculture is the dominant economic activity, the sector suffers from low productivity thus causing agrarian distress. An attempt is made in this paper to explain how Maharashtra is a high cost state which finally leads to agriculture being economically unviable and also leading to negative returns in certain years. Policy prescription calls for strengthening input supply, protective irrigation, and finally promoting rural non-farm employment. The government must also avoid undue interference in trade of agricultural commodities such as export ban, so that farmers can benefit from market prices.

Key words: workforce, cost of production, un-remunerative, yield, farmers' suicides

1. Backdrop

The state of Maharashtra is one of the top economic performers with respect to per capita income which is 1.5 times that of All India (2013-14). The relatively high per capita income in the state, however, conceals the enormous urban-rural contrast and the regional disparities in per capita income. This gets reflected from the fact that in 2013-14, the per capita district domestic product for Mumbai was 1.6 times that of state average. Only 18 percent of districts, three in Konkan region (Mumbai, undivided Thane and Raigarh), in addition to Pune, Nagpur and Kolhapur had per capita income above state average. The remaining 82 percent of districts have per capita district domestic product below state average and in case of 41 percent of these districts, it is below national average. It is in these districts that agriculture is the main economic activity.

In Table 1, the share of workforce in agriculture and per capita district domestic product are indicated. The contribution of each district to the state domestic product and district income as percentage of state income is also observed. From Table I the urban-rural contrast can be easily noted. Mumbai which is by and large urban contributes to 23.48 percent of the state domestic product while the per capita district domestic product is 161.2 percent of state income. Out of 34 districts in the state, three urban districts namely Mumbai, undivided Thane and Pune contribute to 48.66 percent of state income and have per capita district domestic product above state average. Although on an average, 52.71 percent of workforce is engaged in agriculture in the state, which is below national average, the disaggregated picture presents an entirely different scenario. In case of 50 percent of the districts, the share of workforce in agriculture is above 70 percent and in case 76 percent of districts, the share of workforce in agriculture is above 60 percent. Their contribution to state domestic product is also very low as can be observed from Table 1 and so is the per capita district domestic product.

TABLE 1: District wise Percentage Share of Workforce in Maharashtra and Per Capita District Domestic Product (2013-14)

Name	Share of cultivators in workforce	Share of agricultural labourers in workforce	Share of workforce in agriculture	Percentage contribution to State Domestic Product	Per capita Monthly Net District Product(Rs)	District Income as Percentage of State Income
Mumbai	0.43	0.55	0.95	23.48	15728	161.2
Thane	7.79	9.3	17.09	13.81	14429	147.9
Raigarh	19.29	17.82	37.11	2.47	11009	112.8
Ratnagiri	41.58	21.44	63.02	1.27	7519	77.1

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TABLE 1: District wise Percentage Share of Workforce in Maharashtra and Per Capita District Domestic Product (2013-14)—CONTD.

Name	Share of cultivators in workforce	Share of agricultural laborers in workforce	Share of workforce in agriculture	Percentage contribution to State Domestic Product	Per capita Monthly Net District Product Product(Rs)	District Income as Percentage of State Income
Sindhudurg	35.95	23.57	59.52	0.68	8645	88.6
Nashik	35.01	26.43	61.43	4.54	9226	94.5
Dhule	25.54	45.87	71.41	1.20	7142	73.2
Nandurbar	26.72	55.32	82.04	0.57	4710	48.3
Jalgaon	20.62	50.29	70.91	2.53	6812	69.8
Ahmednagar	45.95	25.36	71.31	2.83	7236	74.2
Pune	21.9	10.24	32.13	11.37	14303	146.6
Solapur	33.57	29.41	62.98	2.95	7402	75.9
Satara	43.24	21.94	65.18	2.15	7793	79.8
Sangli	39.55	23.92	63.47	2.25	8632	88.5
Kolhapur	38.78	15.61	54.39	3.70	9982	102.3
Aurangabad	35.21	25.18	60.39	2.66	8982	92.1
Jalna	45.01	32.33	77.33	0.90	6438	65.9
Bid	48.29	29.75	78.04	1.08	5447	55.8
Latur	31.69	39.79	71.49	1.24	6696	68.6
Osmanabad	38.42	38.7	77.13	0.79	5886	60.3
Nanded	29.98	42.33	72.31	1.49	5638	57.8
Parbhani	35.86	38.63	74.48	0.85	5952	61.0
Hingoli	42.45	39.79	82.24	0.39	4482	45.9
Buldana	31.6	49.46	81.06	1.17	5644	57.8
Akola	16.88	50.58	67.46	1.14	6652	68.2
Washim	29.06	54.44	83.5	0.58	6797	70.1
Amravati	16.08	54.03	70.11	1.68	6662	68.3
Yavatmal	24.59	54.55	79.15	1.30	5524	56.6
Wardha	21.86	46.39	68.26	0.89	7246	74.3
Nagpur	11.06	22.67	33.73	4.80	10301	105.5
Bhandara	20.61	52.27	72.87	0.67	6314	64.7
Gondiya	28.03	42.29	70.32	0.65	5722	58.6
Chandrapur	20.88	44.79	65.68	1.59	7492	76.7
Gadchiroli	38.57	42.42	80.99	0.38	4884	50.1
Maharashtra	25.43	27.28	52.71	100	9758	100

Source : Census 2011 and Economic Survey of Maharashtra, 2013-14, Government of Maharashtra.

From Table 1, it was noted that 52.71 percent of workforce depends upon agriculture as their main economic activity. However, the contribution of this sector to state domestic product is fast declining over the years and is presently a single digit figure. The same can be observed from Table 2.

Sector	1980-81	1990-91	2000-01	2013-14
Primary	28	21.4	14.2	8.0
Secondary	35	36.6	33.5	27
Tertiary	36.8	42	52.3	65

Source: Various issues of Economic Survey of Maharashtra.

The share of the primary sector which was 28 percent has declined to 8 percent from 1980-81 to 2013-14, *i.e.*, a decline of 71 percent. However, with respect to workforce in agriculture, the decline was only 14 percent. In 1981, the share of workforce in agriculture in Maharashtra was 61.6 percent and this share has declined to 52.7 percent in 2013-14. This clearly reveals the lack of opportunities outside the agricultural sector as well as low productivity in the sector. The low productivity of the sector is largely explained by poor irrigation facilities in the state.

A dismal feature of the agricultural economy of Maharashtra is the dependence on monsoons. Agriculture in the state is mainly rain-fed with only 18.7 percent of gross cropped area under irrigation. The rainfall varies greatly across regions, with Konkan and western ghat regions receiving as much as 2700 to 3000 mm of rainfall, while Marathwada region (which comprises the districts of Aurangabad, Beed, Osmanabad, Nanded, Latur, Parbhani and Hingoli) receives as low as 650 to 800 mm of rainfall. Vidarbha (comprises the districts of Akola, Amravati, Bhandara, Buldhana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Washim and Yeotmal) receives an annual rainfall of 1113 mm and rainfall is more in the eastern parts of the region. By and large, one-third area of the state falls under rain shadow region, with scanty rainfall. In fact rainfall is uncertain in all regions except Konkan region. The state has the distinction of having more than 24 percent of drought prone area of the country and almost 73 percent of the area of the state falls in the semi-arid region. Failure of rainfall especially at critical stages of plant growth results into drought conditions and thereby crop failure. Though the average rainfall of the state is relatively higher as compared to many states in India, its timeliness and spread across months as well as across regions is not very favourable.

As is well known, irrigation is the most important element in the steady growth of the agricultural sector. It not only increases agricultural production but also minimizes the uncertainty due to unpredictable rainfall. Limited availability of irrigation is one of the main constraints that affect the growth of agriculture in Maharashtra.

2. Cropping Pattern in Maharashtra

The Net Sown Area (NSA) in Maharashtra is 17.39 million hectares and due to poor irrigation facilities, the cropping intensity is low. The Gross Cropped Area (GCA) is normally 20.59 million hectares and hence cropping intensity is 118 percent. Out of GCA, normally 70 percent is sown in Kharif season. However, in years when rainfall is deficient or delayed, there is change in cropping pattern and also potential area under Kharif crops is not realized. For example, in the present year - 2015, Maharashtra suffered from deficient rainfall of 27 percent. The deficit in rainfall was of greater magnitude in different parts of the state. In Marathwada region the deficit was 40 percent while in Vidarbha it was 11 percent. A district-wise picture of deficiency in rainfall reveals that in certain districts of Marathwada such as Osmanabad and Parbhani, the deficit rainfall was as much as 46 percent and 54 percent respectively. Even Konkan region experienced a deficit rainfall of 31 percent. Due to deficit rainfall, the area under Kharif crops which is normally 14.35 million hectares was reduced to 13.3 1 million hectares in 2015. Thus only 93 percent of potential area was sown. In Table 3, the district-wise percentage area under Kharif crops is indicated.

It can be observed from Table 3 that in the Kharif season, the share of food grains is 39.9 percent, oilseeds is 30.2 percent and that of cotton is 28.8 percent. It can be further observed that kharif jowar occupies 3.3 percent of area under Kharif crops. Further, cereals are mostly concentrated in Konkan region and also in the districts of Gondia, Chandrapur and Gadchiroli where paddy is the dominant crop. Maize is also gaining importance as a cereal crop, especially in Nasik region. An important point to note is that the cropping pattern in several districts of Marathwada and Vidarbha is dominated by commercial crops such as soya bean and cotton. In fact these two crops together contribute to more than 70 percent of the Net Sown Area under kharif crops in Jalna, Nanded, Parbhani, Hingoli, Buldhana, Washim, Akola, Amravati and Nagpur.

TABLE 3—District-Wise Area under Crops during Kharif 2015 in Maharashtra (Percentage)

District	Paddy	Maize	Jowar	Total Cereals	Total Pulses	Total Food -grains	Soya bean	Total Oilseeds	Sugar-cane (Planted)	Cotton	Total Kharif Crops
Thane	92.33	0.00	0.00	97.23	2.61	100.00	0.00	0.16	0.00	0.00	100.00
Palghar	72.83	0.00	0.00	91.97	6.16	98.13	0.00	1.87	0.00	0.00	100.00
Raigad	91.60	0.00	0.00	97.96	1.78	99.75	0.00	0.25	0.00	0.00	100.00

TABLE 3 DISTRICT-WISE AREA UNDER CROPS DURING KHARIF 2015 IN MAHARASHTRA (PERCENTAGE)—CONTD.

District	Paddy	Maize	Jowar	Total Cereals	Total Pulses	Total Food -grains	Soya bean	Total Oilseeds	Sugar-cane (Planted)	Cotton	Total Kharif Crops
Ratnagiri	83.63	0.00	0.00	97.35	1.81	99.28	0.00	0.72	0.00	0.00	100.00
Sindhudurg	92.66	0.00	0.00	95.36	2.99	98.35	0.00	0.60	1.05	0.00	100.00
Nasik	12.44	33.11	0.09	72.60	6.20	78.82	9.63	14.91	0.46	5.81	100.00
Dhule	1.12	13.64	5.60	39.70	6.91	46.61	5.67	8.74	0.45	44.20	100.00
Nandurbar	8.24	12.70	11.68	37.89	13.96	51.85	9.57	11.44	0.61	36.11	100.00
Jalgaon	0.00	13.24	6.58	21.99	9.88	31.88	4.81	5.75	1.27	61.10	100.00
Ahmednagar	3.89	4.98	0.08	42.95	15.84	58.79	11.35	12.90	8.36	19.92	100.00
Pune	26.07	7.45	0.42	55.92	15.04	70.96	8.49	17.87	11.17	0.00	100.00
Solapur	0.10	11.12	0.05	27.56	47.29	74.85	14.41	18.38	6.09	0.68	100.00
Satara	12.20	4.70	7.29	48.69	16.31	65.00	18.66	27.68	7.29	0.03	100.00
Sangli	7.77	10.47	25.20	56.55	10.10	66.65	20.10	29.27	3.70	0.37	100.00
Kolhapur	43.32	0.92	1.85	55.46	3.44	58.90	18.01	38.58	2.52	0.00	100.00
Aurangabad	0.00	24.72	0.31	30.81	5.52	36.33	2.22	2.92	0.00	60.74	100.00
Jalna	0.00	8.77	0.09	12.03	16.22	28.25	22.89	23.34	1.07	47.34	100.00
Beed	0.03	1.75	1.75	13.80	11.04	24.85	27.34	28.20	0.00	46.95	100.00
Latur	0.27	1.70	8.26	10.84	21.18	32.00	66.45	67.55	0.00	0.44	100.00
Osmanabad	1.18	6.88	4.08	14.90	33.07	47.97	43.89	47.34	0.00	4.69	100.00
Nanded	0.08	0.09	7.24	7.42	14.84	22.26	38.35	38.62	2.05	37.08	100.00
Parbhani	0.00	0.36	2.53	3.52	19.22	22.74	39.39	39.70	0.00	37.56	100.00
Hingoli	0.00	0.80	2.47	3.30	17.62	20.92	58.46	59.77	1.36	17.96	100.00
Buldhana	0.00	2.96	2.14	5.60	14.41	20.02	57.29	57.78	0.05	22.14	100.00
Akola	0.00	0.02	3.62	3.64	20.50	24.14	52.68	53.16	0.02	22.68	100.00
Washim	0.00	0.12	2.01	2.19	18.87	21.06	71.28	71.30	0.05	7.59	100.00
Amravati	1.19	0.77	2.35	4.31	18.89	23.19	48.88	49.04	0.04	27.72	100.00
Yavatmal	0.00	0.41	3.44	3.86	14.43	18.29	28.80	28.85	0.65	52.20	100.00
Wardha	0.00	0.02	0.44	0.46	14.93	15.39	29.62	29.74	0.00	54.90	100.00
Nagpur	19.22	0.39	1.01	20.63	11.24	31.87	26.82	27.33	0.00	40.80	100.00
Bhandara	93.14	0.01	0.00	93.14	5.29	98.43	1.26	1.26	0.00	0.31	100.00
Gondia	95.86	0.05	0.00	95.91	3.63	99.54	0.00	0.46	0.00	0.00	100.00
Chandrapur	36.98	0.02	0.69	37.69	8.17	45.87	20.06	20.20	0.00	33.94	100.00
Gadchiroli	88.41	0.74	0.00	89.15	4.15	93.30	1.88	2.16	0.00	4.55	100.00
State Total	11.25	5.76	3.32	26.22	13.70	39.92	28.36	30.20	1.13	28.75	100.00

SOURCE : Commissionerate of Agriculture, Government of Maharashtra, Pune.

TABLE 4 SHARE OF DISTRICTS (PERCENTAGE) IN THE AREA UNDER MAJOR CROPS IN MAHARASHTRA

District	Paddy	Maize	Jowar	Total Cereals	Total Pulses	Total Food -grains	Soya bean	Total Oilseeds	Sugar-cane (Planted)	Cotton	Total Kharif Crops
Thane	3.78	0.00	0.00	1.71	0.09	1.15	0.00	0.00	0.00	0.00	0.46
Palghar	5.21	0.00	0.00	2.82	0.36	1.98	0.00	0.05	0.00	0.00	0.80
Raigad	7.21	0.00	0.00	3.31	0.12	2.21	0.00	0.01	0.00	0.00	0.89

District	Paddy	Maize	Jowar	Total Cereals	Total Pulses	Total Food-grains	Soya bean	Total Oilseeds	Sugar-cane (Planted)	Cotton	Total Kharif Crops
Ratnagiri	4.64	0.00	0.00	2.32	0.08	1.55	0.00	0.01	0.00	0.00	0.62
Sindhudurg	4.13	0.00	0.00	1.83	0.11	1.24	0.00	0.01	0.47	0.00	0.50
Nasik	4.87	25.35	0.11	12.21	2.00	8.71	1.50	2.18	1.80	0.89	4.41
Dhule	0.32	7.59	5.41	4.85	1.62	3.74	0.64	0.93	1.27	4.93	3.21
Nandurbar	1.36	4.08	6.52	2.68	1.89	2.41	0.63	0.70	1.00	2.33	1.85
Jalgaon	0.00	11.96	10.33	4.36	3.75	4.16	0.88	0.99	5.87	11.06	5.20
Nasik Dn.	6.55	48.99	22.38	24.11	9.26	19.01	3.65	4.80	9.93	19.20	14.67
Ahmednagar	0.95	2.39	0.07	4.52	3.19	4.07	1.10	1.18	20.47	1.91	2.76
Pune	3.69	2.06	0.20	3.40	1.75	2.83	0.48	0.94	15.80	0.00	1.59
Solapur	0.01	1.50	0.01	0.82	2.68	1.46	0.39	0.47	4.20	0.02	0.78
Satara	2.77	2.09	5.62	4.75	3.04	4.16	1.68	2.34	16.53	0.00	2.56
Sangli	1.40	3.69	15.43	4.38	1.50	3.39	1.44	1.97	6.67	0.03	2.03
Kolhapur	6.89	0.29	1.00	3.79	0.45	2.64	1.14	2.29	4.00	0.00	1.79
Aurangabad	0.00	20.95	0.45	5.74	1.97	4.44	0.38	0.47	0.00	10.31	4.88
Jalna	0.00	6.64	0.11	2.00	5.16	3.09	3.52	3.37	4.13	7.18	4.36
Beed	0.01	1.44	2.49	2.48	3.80	2.93	4.54	4.40	0.00	7.69	4.71
Latur	0.10	1.21	10.26	1.70	6.37	3.30	9.65	9.21	0.00	0.06	4.12
Osmanabad	0.31	3.56	3.67	1.69	7.20	3.58	4.61	4.67	0.00	0.49	2.98
Nanded	0.04	0.09	11.85	1.54	5.88	3.03	7.34	6.94	9.87	7.00	5.43
Parbhani	0.00	0.21	2.54	0.45	4.67	1.90	4.63	4.38	0.00	4.35	3.33
Hingoli	0.00	0.39	2.11	0.36	3.63	1.48	5.82	5.59	3.40	1.76	2.82
Latur Dn.	0.45	5.47	30.45	5.73	27.75	13.29	32.06	30.79	13.20	13.67	18.68
Buldhana	0.00	2.82	3.53	1.17	5.77	2.75	11.08	10.49	0.27	4.22	5.48
Akola	0.00	0.01	3.58	0.46	4.91	1.98	6.09	5.77	0.07	2.59	3.28
Washim	0.00	0.07	1.86	0.26	4.21	1.61	7.69	7.22	0.13	0.81	3.06
Amravati	0.53	0.68	3.58	0.83	6.98	2.94	8.72	8.22	0.20	4.88	5.06
Yavatmal	0.00	0.48	7.05	1.00	7.16	3.11	6.90	6.49	3.93	12.33	6.79
Wardha	0.00	0.01	0.41	0.05	3.38	1.20	3.24	3.05	0.00	5.92	3.10
Nagpur	6.20	0.25	1.11	2.85	2.98	2.90	3.43	3.28	0.00	5.15	3.63
Bhandara	11.88	0.00	0.00	5.10	0.55	3.54	0.06	0.06	0.00	0.02	1.44
Gondia	12.51	0.01	0.00	5.37	0.39	3.66	0.00	0.02	0.00	0.00	1.47
Chandrapur	10.78	0.01	0.68	4.72	1.96	3.77	2.32	2.19	0.00	3.87	3.28
Gadchiroli	10.39	0.17	0.00	4.50	0.40	3.09	0.09	0.09	0.00	0.21	1.32
State Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Area under irrigation %	26.1	5	9.5	19.7	8.7	16.4	0.4	3.6	100	2.7	18.7

SOURCE : Commissionerate of Agriculture, Government of Maharashtra, Pune.

It can also be observed from Table 4 that area under irrigation in Maharashtra is only 18.7 percent. The crop wise irrigated area presents a more dismal picture. It is only sugarcane crop that is entirely irrigated crop while other crops are mainly dependent upon rainfall. Soya bean and cotton which are major commercial crops are more or less dependent upon monsoons and only 0.4 percent of soya bean and 2.7 percent of cotton is irrigated. Failure in monsoons leads to severe fall in productivity. This leads to low net returns and thereby making agriculture highly un-remunerative.

3. Cost of Production and Net Returns from Agriculture

As mentioned earlier, agriculture in Maharashtra is a gamble of the monsoons and any deficit in rainfall leads to crop failure. In Table 5, cost A2+FL and net returns from major crops for Maharashtra as well as average of states is indicated.

TABLE 5: Net Returns from Major Kharif Crops (Average 2010-11 to 2012-13)

(Rs. per hectare)

Crop	Cost A2+FL (Average of States)	Net Returns per hectare (Average of States)	Cost A2+FL Maharashtra	Net Returns per hectare Maharashtra	Percentage by which cost A2+FL is higher in Maharashtra as compared with average of states
Paddy	30070	4356	38158	-4024	27
Jowar	19358	-66	22938	-438	18
Tur	23008	5505	35810	7284	56
Moong	13688	1126	22351	-2889	63
Soya bean	18342	7871	24280	5904	33
Cotton	39983	12734	46044	3319	15

Source : Price Policy for Kharif Crops, Commission of Agricultural Costs and Prices, Ministry of Agriculture, New Delhi, March 2015.

Note : Cost A2+FL includes value of hired human and animal labor, value of owned animal labor, value of owned machinery labor, charges of hired machinery, value of seed (farm grown and purchases) value of insecticides, pesticides, manure (owned and purchased), fertilizers, depreciation on implements and farm buildings, irrigation charges, land revenue and other taxes, interest on working capital, rent paid for leased land, miscellaneous charges like payment to artisans and imputed value of family labor.

It can be observed from Table 5 that net returns per hectare for selected crops are much lower in Maharashtra except in case of tur. The cost of cultivation per hectare is also higher in Maharashtra as compared to other states.

Further, in Table 6 the cost of production per quintal in Maharashtra and average of states is indicated and compared with Minimum Support Price (MSP).

TABLE 6: Cost of Production and MSP for Major crops (Rs. per quintal) 2012-13

Crop	Per quintal cost of production (A2+FL) (Average of states)	Per quintal cost of production in Maharashtra (A2+FL) Variable Cost + Family Labor	MSP	Percentage by which cost of production is higher than MSP in Maharashtra	Percent by which per quintal cost in Maharashtra is higher than average of states
Paddy	918	2611	1250	52	84
Jowar	2277	2444	1500	39	7
Tur	2965	2616	3850	-47	-12
Soya bean	1356	1500	2200	-46	10
Cotton	2714	4836	3600	26	78

Source : Calculated from data in Price Policy for Kharif Crops, Commission of Agricultural Costs and Prices, March, 2015 and Agricultural Statistics at a glance, Ministry of Agriculture, New Delhi.

It can be easily observed that Maharashtra is a high cost state and in case of major crops such as jowar and cotton the MSP is not covered. In case of paddy also the cost of production per quintal is much higher than that of the average of all states and 52 percent higher than MSP. However, with respect to paddy and cotton, farmers in other states experience cost of production lower than MSP. This is mainly because of low yields in Maharashtra as compared to other states.

It can also be observed that with respect to soyabean the MSP is higher than cost of production which means that farmers are making positive returns in the cultivation of soya bean.

However, the important point to note is that while the average yield of soya bean (2012-13) is 1451 kgs per hectare, the yield varies greatly across districts. In a number of districts mainly in Vidarbha, the yield of soya bean is much below average. For example, in Amravati where 48.9 percent of the NSA is under soya bean the yield is 33 percent below state average. In Wardha, Nagpur and Chandrapur which are also major soya bean growing districts, the yield is 54 percent, 71 percent and 58 percent, respectively, below state average. Another important point to note is that soya bean is entirely a rain-fed crop, with only 0.4 percent area in the state being irrigated. Thus any failure in monsoon leads to drastic fall in yield levels. For example, 2007-08 was a year of normal monsoons and the yield of soya bean in Amravati was 1700 kgs per hectare. However, in the following year 2008-09 there was severe drought in the district and the yield of soya bean declined to 333 kgs per hectare, i.e. a fall of 80.4 percent. A similar situation was observed in Yavatmal and Buldhana. Field observation as well as discussion with government officials revealed that some farmers did not even harvest the soya bean crop because the cost of hiring labour would exceed that of the value of harvest. Further, the quality of the crop was also very poor. Again 2015 is a year of severe drought in Maharashtra. The second advanced estimates on yield of soya bean in Maharashtra is expected to be 725 kgs per hectare (*www.spoa.org*) which is 36 percent below the long term average yield. Obviously farmers will suffer huge losses and may not be able to cover their cost of production.

With respect to cotton, it can be observed that while farmers in other states have net returns on an average of Rs. 12734/- per hectare, the farmers in Maharashtra on an average earn Rs. 3319/- per hectare, *i.e.* 74 percent less than their counterparts in other states. The per quintal cost in Maharashtra is 78 percent higher than that in other states and while MSP is higher than cost of production in other states, farmers in Maharashtra have cost which is 34 percent higher than MSP. Lack of protective irrigation is an important factor that is responsible for low levels of yield. In 2012-13, the yield of cotton in Maharashtra was 314 kgs per hectare, while that of the neighboring state of Gujarat was 603 kgs per hectare. The All India average yield of cotton was 486 kgs per hectare which is 55 percent higher than that of Maharashtra. While 2.7 percent area under cotton is irrigated in Maharashtra, the corresponding figure for All India is 35.9 percent.

From the above analysis, it can be observed that cost of production from agriculture is much higher in Maharashtra than other states. Although agrarian distress is observed in many states in India, the spate of suicides among farmers is observed to be more in Maharashtra.

4. Suicides among farmers across states

In Table 7, the number of suicides among farmers across states is indicated.

TABLE 7: State-wise suicides among farmers

Year	Maharashtra	Andhra Pradesh (undivided)	Karnataka	Madhya Pradesh	All India
2000	3022	1525	2630	2660	16603
2001	3536	1509	2505	2824	16415
2002	3695	1896	2340	2578	17971
2003	3836	1800	2678	2511	17164
2004	4147	2666	1963	3033	18241
2005	3926	2490	1883	2660	17131
2006	4453	2607	1720	2858	17060
2007	4238	1797	2135	2856	16632
2008	3802	2105	1737	3152	16796
2009	2872	2414	2282	3197	17368
2010	3141	2525	2585	2363	15964

TABLE 7: State-wise suicides among farmers—contd.

Year	Maharashtra	Andhra Pradesh (undivided)	Karnataka	Madhya Pradesh	All India
2011	3337	2206	2100	1326	14027
2012	3786	2572	1875	1172	13754
2013	3146	2014	1403	1090	11772
2014	2568	1058	321	826	5650
2015 (till September 2015)	2234	-	-	-	-

It is clear from Table 7 that number of suicides in Maharashtra is higher than that in other states. It has already been observed that farmers in Maharashtra are not able to cover their cost of production for several crops. Suicides in the state are more common in Vidarbha and Marathwada where cotton is a major crop. Cotton constitutes 30 percent of the NSA in Amravati division while the share in soya bean is 48.5 and hence together these two crops occupy 78.7 percent of Kharif NSA (2015). In case of Aurangabad division the share of cotton is 47 percent while that of soya bean is 17.2 percent, thus constituting 64.2 percent. In Latur division, the share of these two crops is 70 percent. Farmers are thus shifting their cropping pattern from food grains to commercial crops.

Increase in area under cotton was possibly due to Bt cotton technology which started gaining popularity and presently almost the entire area under cotton is under Bt seeds. While other states did benefit from increase in yields due to use of Bt seeds, the potential yield from this technology was not experienced in Maharashtra due to poor irrigation facilities. In 2006-07, when Bt cotton started gaining popularity, the yield in Maharashtra was 274 kgs per hectare, while that in Gujarat was 733 kgs per hectare and All India average was 521 kgs per hectare. There are three factors which affect the remuneration of a crop — its yield, its price and the cost of cultivation. In case of cotton, the yield level in Maharashtra which was less than 200 kgs per hectare prior to the use of Bt seeds did increase after adoption of Bt seeds but so did the cost of cultivation coupled with unsatisfactory prices. Data presented by Commission on Agricultural Costs and Prices revealed that net returns for the period 2010-11 to 2012-13 from cotton cultivation was to the amount of Rs. 3319/- per hectare. However, at the disaggregated level, there are large number of farmers who are unable to cover their cost of production. Data on ruling market prices of cotton (*www.agricoop.nic.in*) indicate that in Amravati which is a major cotton growing district, the ruling market price is Rs. 4785/- per quintal in September 2015. However, the cost of production of cotton is much higher than ruling market prices as the cost is by and large about Rs. 5000/- per quintal. The average cost of production per quintal for 2010-2013 itself was Rs. 4863/- per quintal and with rise in labor and other costs, it is likely to be much higher over the years. Higher cost of production can be largely explained by low yields in Maharashtra which is much below the national average. In Table 8 the yield of cotton in Maharashtra since 2005-06 is indicated and compared with national average.

TABLE 8: Yield of cotton in Maharashtra and National Average
(Yield Kg per hectare)

Year	Maharashtra	India
2003-04	191	399
2004-05	176	470
2005-06	207	472
2006-07	274	521
2007-08	330	554
2008-09	335	524
2009-10	319	503
2010-11	379	517
2011-12	313	512
2012-13	314	486
2013-14	374	532
2014-15	345	518
2015-2016 (forecast)	315	531

It can be observed that in Maharashtra the yield of cotton is below national average. Maharashtra occupies approximately one-third of the area of the country under

cotton and the low average yield pulls down the national average. It can be observed that in 2003-04 and 2004-05 when Bt cotton seeds were not used, the yield was much lower. However, since 2005-06 cotton season, when farmers began to switch over to Bt seeds, they did increase yields but the potential yield was not realized as cotton continued to be rain-fed. States such as Punjab and Haryana which had entire area irrigated experienced cotton yields that were almost double that of Maharashtra. States such as Gujarat had about 57 percent cotton area under irrigation and experienced yields which were about 85 percent higher than that of Maharashtra. The low yields in Maharashtra often explain high cost of production.

To add fuel to the fire, the high cost of production of cotton in Maharashtra was not always accompanied by higher prices. The wholesale price index of raw cotton is indicated in Table 9 (2004-05 =100).

TABLE 9 WHOLESALE PRICE INDEX OF RAW COTTON (2004-05=100)

Year	Wholesale Price Index of Raw Cotton
2011-12	225.19
2012-13	206-04
2013-14	236.53
2014-15	206.07

Source : www.rbi.org

It can be observed from Table 9 that the wholesale price index showed fluctuations but declined from 225.19 in 2011-12 to 206.07 in 2014-15. It is obvious that during this period the cost of production increased. Obviously farmers are likely to face negative returns thus leading to being defaulters in loan repayment and eventually causing distress.

In 2015, which was a year of severe deficient rainfall in Marathwada, 766 cases of suicide were reported in the district, while in the cotton belt of Vidarbha, as many as 1108 cases of suicides were reported (till October 2015). These figures are higher than the figures in 2014 in the corresponding period (Indian Express, October 10th, 2015).

Farmers have switched their cropping pattern from food grains to commercial crops such as soya bean and cotton with the hope of earning higher returns. However, while both crops do have potential to improve earnings of farmers, the dependence on monsoons and lack of protective irrigation causes destruction to the crop and finally puts the farmer in a debt trap.

5. Policy Implications

An important issue to which policy must be directed and which can salvage the situation in Maharashtra is to increase the irrigation coverage on a war footing. This will go a long way in helping the farmers to realize the full potential of technology and thus increase yield. Needless to state that watershed strategies and completion of pending irrigation projects assume importance.

The real answers to prevent agrarian distress lies in increasing productivity levels of all crops. Any comparison of yields in Maharashtra of major crops with that of other states or yield comparisons in India with that in several countries indicates that much can be done to rescue the farmers from distress. Policy prescription to overcome distress is needed on all fronts - strengthening input supply, competition in marketing, sound infrastructure and unwarranted interventions by government which sometimes distort input and output markets. Equally important is promoting non-farm employment as the agricultural sector can no longer sustain the workforce. Overall, a holistic approach may help to tackle agrarian distress.

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Proverbial Vagaries Causing Agrarian Distress

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Abstract

Tremendous growth in production and productivity of crops in Indian agriculture has been achieved after independence. Between 1950-51 and 2013-14, production of food grains and oilseeds increased from 51 to 264.77 and 5.16 to 32.88 million tones (mt) respectively. Similar growth has also been achieved in other crops. Farmers' suicides, indebtedness, crop failures, non-remunerative prices for crops and poor returns over cost of cultivation are the prominent features of India's agriculture today due to decline in public investment and farm income in agriculture sector, trade liberalization, withdrawal of subsidies, poor extension services, risk taking, natural calamities, lop sided flow of institutional credits, growing informal credit, rising costs, adulterated and spurious inputs, psychological and socio economic causes (illness, gambling and break up of joint families, etc.). Agriculture constitutes a significant part of the unorganized sector, rise of small and marginal farmers (85%) which despite an acute crisis of viability, continues to grow in number and marred by a long silent crisis, manifesting itself in the form of farmers' suicides. The aforesaid factors including slow diffusion of modern technologies non-remunerative prices and distress sale of farm products are causing agrarian crisis. This is also a result of a range of historical, political and economic factors that have shaped the trajectory of agricultural development process in the country.

Above crisis can be reverted to development process with the access to adequate institutional credit on time, implication of Market Intervention Scheme (MIS), enhancement of Marketing efficiency through recently introduced Online National Agriculture Market, facilitating public-private linkages for promotion of rural entrepreneurship and in establishment and effective functioning of SHGs, cooperatives, Small Farmers' Estates, other rural groups and community based organizations, agri-clinics and agribusiness centres for access of quality inputs and fair markets to provide the power of economies of scale and to create synergy and convergence among various actors and stakeholders. Integrated Farming Systems must also be promoted to realize better productivity, profitability and sustainable production systems. The youth can be attracted and retained in farming only if farming becomes economically rewarding and intellectually satisfying. Primary as well as secondary processing of various agricultural commodities at farm gate/village level must be promoted to fetch better prices.

Key words: Farmers' suicide, indebtedness, crop failure, market intervention scheme, productivity, profitability

Introduction

Indian agriculture has achieved tremendous growth in production and productivity of crops after independence. Between 1950-51 and 2013-14, production of food grains increased from 51 to 264.77 million tones (mt), while oilseeds production increased from 5.16 to 32.88 mt. Similar growth has also been achieved in sugarcane, cotton, fruits, vegetables and other crops (Government of India, 2014). Per capita availability of these commodities has also increased. The increased volume of crop output which resulted from the intensification of agriculture after the introduction of green revolution during the mid-sixties, helped to increase the wage rate and generate more employment opportunities in the rural areas particularly for the landless labourers (Dev and Ranade, 1998; Saleth, et. al., 2003; Narayanamoorthy and Deshpande, 2003). The incidence of rural poverty has also reduced considerably from 56.44 per cent during 1972-73 to 25.70 per cent in 2011-12 mainly because of the improved production of agricultural commodities, as proved by number of studies (Ahluwalia, 1978; Narayanamoorthy, 2001; Saleth et. al., 2003; Hussain and Hanjra, 2003; 2004). These achievements would not have been possible without the incisive role of Indian farmers (Swaminathan, 2008).

Present Scenario

Despite these achievements, there are no great news from the farm sector since the early 1990s. Recently major changes have taken place in this sector. Farmers' suicides, indebtedness, crop failures, non-remunerative prices for crops and poor returns over cost of cultivation are the prominent features of India's agriculture today. Farmers committing suicides were not common before the early 1990s, but it has became a wide spread phenomenon today in many States in India. Over 3 lakh farmers committed suicides in India during last 20 years. Outbreak of farmers' suicide indicates that there is an agrarian crisis. Reasons

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for such situation as identified by several empirical studies (Deshpande, 2002; Deshpande and Prabhu, 2005; Reddy and Galab, 2006; Mishra, 2006; Vaidyanathan, 2008) are indebtedness, decline in public investment and farm income in agricultural sector, trade liberalization, withdrawal of subsidies, poor extension services, crop failure, risk taking, natural calamities, lop sided flow of institutional credits, growing informal credit, rising costs, adulterated and spurious inputs, psychological and socio economic causes (illness, gambling and break up of joint families, etc.).

There is a sharp decline of credit share in agriculture and the number of agricultural loan accounts has declined. Indian farmers seem to be getting disillusioned and disgruntled and perhaps not able to cope up with the changing environment. This crisis is being manifested in the form of non- remunerative prices, volatile economy and absence of a protective market and also by way of burning standing crop in the field and throwing the agriculture produce on roads by the farmers. Nevertheless, growing incidences of farmers' suicide are recent phenomena never experienced in the past. Hence, there is a need to review and analyze critically the impact and outcome of our agricultural policies with appropriate policy measures.

Various Committees have been constituted to deal with the situation such as the Expert Group on Agricultural Indebtedness headed by R. Radhakrishna (2007) and National Commission on Farmers under the Chairmanship of M. S. Swaminathan (2005) and Working Group on Distressed Farmers headed by S. Johl (2006). By and large, immediate relief package remained the primary concern of all these Committees and preventive measures remained the secondary concern. And even today lots of funds are channelized for immediate relief package.

Agriculture constitutes a significant part of the unorganized sector, which is marred by a long silent crisis, manifesting itself in the form of farmers' suicides. A curious feature of this sector is the growing number of small and marginal farmers either owning tiny pieces of land or leasing tiny holdings, participating in fully commercialized agriculture drawing all the inputs from market and producing for the market, and getting subjected to primary accumulation by the rest of the capitalist system. This class, despite an acute crisis of viability, continues to grow in number.

Does this class of small and marginal farmers, apparently living under a crisis, continues to grow in number? Further, is this rise momentary or a durable feature of the current development model? Can the capitalist sector absorb the surplus labour that is likely to result from those who leave the agrarian sector? How do those who are trapped in agriculture survive and subsist? What are mechanisms of subsistence within and outside for this class? Here efforts have been made to raise some such rhetorical questions and search for answers in a political economy framework.

Increase in Number of Marginal and Small Farmers

A glaring feature of current structure of Indian agriculture, as stated above, is the rise of small and marginal farmers who now constitute 85 per cent of the total farmers and own over 44 per cent of land in India. If the land under tenancy is included, whose details are officially fully not available, the share of operational holdings could be even greater. Big farmers or landlords have dwindled in number and disposed considerable share of their holdings, though they even own 56 per cent of land in 2010-11. There could be some diversity across regions with different agro-climatic conditions, irrigation endowments, etc, but the common feature emerging is that agriculture is predominantly done by small and marginal peasantry. Faster urban sector growth in recent decades led to a steady migration. Landed big farmer class are exiting from agriculture, leasing good part their lands to small farmers in several parts of the country. Growth of non-agricultural sector and education further provides opportunities to many to migrate. The 55th round of NSS data shows that 40 per cent of rural incomes are diversified, which implies growth of non-agricultural opportunities enabling some structural transformation in the rural areas. In spite of migration of rural workers, the number of small and marginal farmers has been on an increase. Even though the per capita landholding size is decreasing, the overall share of operational holdings of the class in question is rising.

Status of Land Holding and Operated Area

During the last three decades, the number of smallholder farmers increased by 77 per cent from about 66 million in 1980-81 to 117 million in 2010-11.They now account for about 85 per cent of all the landholdings in India, compared to 75 per cent in 1980-81 (Table 1). Though their number is significantly higher, they control only 44.40 per cent of the total operated area in 2010-11 compared to a mere 26.2 per cent in 1980-81. Conservative estimates show that if the current trend remains unchecked, India will have more than 155 million smallholders by 2020-21, controlling about 51 per cent of the total operated area. Coming to the medium and large holdings, their share has declined during the last three decades from 26 per cent in 1980-81 to 15 per cent in 2010-11. It is important to remember that 56 per cent of the total operated area is still cultivated by medium and large farmers, meaning very few farmers are cultivating significantly larger areas.

TABLE 1 LAND HOLDINGS AND OPERATED AREA IN INDIA BY FARM GROUP

Size Group	Holding (per cent)		Operated area (per cent)		Size of holding (ha)	
	1980-81	2010-11	1980-81	2010-11	1980-81	2010-11
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Marginal and Small(< 2 ha)	74.50	84.90	26.20	44.40	0.65	0.61
Medium (2 to 10 ha)	23.10	14.20	50.80	44.90	4.05	3.61
Large (> 10 ha)	2.40	0.70	23.00	10.60	17.41	17.38
All India	100 (88.90)	100 (138.3)	100 (163.80)	100 (159.60)	1.84	1.15

Source: Government of India, Agricultural Census, Department of Agriculture and Cooperation, New Delhi (various issues).

Note: Figures in parentheses are total holdings (in million), and operated area (in million ha).

On an average, the size of landholding in India declined from 1.84 ha in 1980-81 to 1.15 ha in 2010-11. The average size of landholdings of a smallholder is 0.61 ha compared to 3.61 ha for a medium farmer and 17.38 ha for a large farmer. Further disaggregating the smallholders, the share of marginal farmers (those holding less than 1 ha in the category of smallholders) in total holdings has increased significantly from 56 per cent in 1980-81 to 63 per cent in 2010-11; however they control only about 22 per cent of the area, with an average size of just 0.39 ha.

The Agrarian Crisis

The contemporary agrarian crisis that began in the mid-nineties is much more than a mere outcome of neoliberal policies adopted since 1991 as contemplated by some scholars (Reddy and Mishra, 2009). But the neoliberal reforms have certainly accentuated the crisis. Ecological strain resulting from an intensive mono-cropping and an extensive use of groundwater has imposed externalities (Reddy and Dev, 2001). As a result, the growth of agriculture considerably slowed down and its share in GDP declined to 13.9 per cent in 2013-14. The labour as well as land productivity have fallen by half in the last three decades and capital-labour ratio has doubled in agriculture (Behera, 2012) which tend to decelerate employment growth to 0.16 per cent. This causes distress followed by migration of rural workers. Absence of adequate non-farm opportunities to migrate, forces them to become subsistence farmers. The vulnerability of losing subsistence lies in the small quantity production of various agricultural commodities by marginal and small farmers which depends on private borrowing at high interest rates, buys inputs in small quantum at higher prices and cannot afford high investments. Thus gets trapped in a low equilibrium trap with limited ability to bear market and production risks due to poor capital base in the short run but fails to earn the viability as an economic unit in the long run.

Vulnerable Issues

Over three lakh farmers have committed suicide during the last twenty years across India, including in states like Andhra Pradesh, Maharashtra, Karnataka, M.P., U.P., C.G., Punjab, Haryana and Kerala. Most of the victims belong to small and marginal farmers, and many belonging to backward class and scheduled castes. According to the data available from National Bureau of Crime Record, the number of farmers' suicides has been on increase year after year (Sainath, 2012). Several scholars who have analyzed the farmers' suicides contend that these suicides are the legacy of the economic reforms (Parthasarathy, 2013; Mishra 2009)]. Micro details of suicides apart, the big picture in the neoliberal phase is the rise of small and marginal farmers' undertaking high risk crops, with degraded resources, and unsupported institutional structures. The farmer faced with market, spurious inputs, technology and credit related vulnerabilities among others, which are described as under:

A MATRIX OF ISSUES

ISSUES	DEMAND	SUPPLY
OUTPUT/ PRICE/ INCOME	* Yield risk because of weather, water and power unavailability, pests, and spurious quality of inputs among others.	* Increased volatility due to global prices.
	* Cultivation is not profitable.	* Price distortion through subsidies by developed countries.
	* Income not sufficient. It is difficult to meet higher education need of wards, medical requirements of family members and other social obligations.	* Low tariff in India. * Minimum support price not always functional. * Futures market - a virtual platform with price volatility being the basis through which hedger/speculator can operate.
INPUT	* Supplier-induced-demand is on the rise. This is credit-intensive and an important reason for putting the farmer in a quagmire of indebtedness.	* No link between publicly funded research and its extension. This is particularly missing for crops/ cultivation in rain fed/dry land areas.
	* There is deskilling. With new technology come new methods of cultivation. Social capital of cultivation knowledge is rendered redundant. A case is the introduction of Bacillus thuringiensis (Bt) Cotton.	* Technological change is substantial and there is an increasing reliance on the unregulated private suppliers.
	* Greater investments in assets like bore wells in Andhra Pradesh not only increases cost, but has also led to a tragedy when the investments failed.	* Inadequate public investment in agriculture (spread of irrigation in arid regions has been a casualty).
CREDIT	* Formal sources not timely.	* Formal sources: Decline in the number of branches, decline in agricultural credit/direct finance to agriculture as a percentage of net bank credit, and there is a shift to value addition activities.
	* Repayment difficult during crop loss and price shocks.	* Increasing dependence on informal sources - relatively more among smaller farmers.
	* Instead of getting them out of credit, the system draws them into it.	* Interlinked credit, input and output markets.
	* Difficulties in meeting consumption requirements and other social Obligations.	* Non-farm income opportunities limited.
	* An increase in market induced consumerism.	
	* Political dominance of moneylender and/or input dealer and output buyer.	
OTHERS	* Higher family size: more daughters - greater dowry burden.	* Public health response to occupational health hazards of' farrning is wanting.
	* Lack of social support.	* Easy availability of pesticides and other hazardous substances.

Source: Reserve Bank of India (2006)

Agricultural Situation in India

The deflationary macroeconomics and 'structural reforms' of neoliberal state do not allow it to extend institutional protection to agriculture, institutional credit, affordable technology through public sector, disaster management and so on. Terms of trade are allowed to drift against the sector.

Slow diffusion of Modern Technologies

Minimum support prices no longer cover the cost of cultivation of a capitalist farmer with meager/no profit. Thus the prevailing market price which depends on the minimum support price set out by the state gives only subsistence to a self-exploiting farmer, not any re-investible surplus. If the flow of income from crop cultivation is irregular and inadequate, farmers may not be able to repay their debts which would lead to increased indebtedness. (Darling, 1925; NSSO, 2005b; Narayanamoorthy and kalamkar, 2005; Government of India, 2007; Reddy and Mishra, 2009; Deshpande and Arora, 2010). This also means the prevailing prices do not allow a capitalist farmer to cultivate in the present technological conditions — a serious issue.

Non-remunerative Prices and Distress Sale of Farm Products

The complacency of the state comes from the fact that the much needed marketed surplus for the modern sector is still unaffected by non-remunerative prices, thanks to the teeming marginal and small farmers producing small quantity of agricultural produce trapped in the sector who are ready to do agriculture with lot of difficulties. Under the conditions of free market forces, untamed private moneylenders and manipulative monopolistic market structures, the marginal and small producers are only going to be distressed more and more, reproducing perpetual indebtedness. The paradox to this condition is the ever increasing army of small and marginal farmers, a putative antediluvian category under classical theory, but marching into the suicidal enterprise of agriculture.

The issue of agrarian constraint to capitalist growth is well-debated during the planning era. It was a widely prevalent view that modern sector's growth suffered an accumulation crisis during mid-sixties when no palpable agrarian surplus was forthcoming. Worse, the supply shortfalls in food grain production in the economy posed an inflationary barrier to growth. Indian state resolved the problem to some extent through a technological means called Green Revolution. Institutional interventions were built to enable the necessary market surplus for the capitalist sector which ensure some basic viability for the farmer and productivity growth for the sector. We need to search for structural explanations for this putative paradox of Indian political economy and make a prognosis about its future in order to attempt any emancipation project.

Capitalist Development and Production in Small Quantity

What is the future of marginal and small farmers producing small quantity of various agricultural commodities under neo-liberalism? If we assume that institutional support structures built during the planning era gave the essential viability of agriculture, can the marginal and small producers survive in their absence? Part of Indian agriculture still receives support in terms of fertilizer subsidies, power subsidies, minimum support prices (for rice, wheat, and sugarcane), procurement of food grains, etc. Various studies have brought clearly the fact that in spite of such support, the viability of farming has been severely affected (Ramanamurthy and Mishra, 2012). In fact, most agricultural households survive with kinship support. Therefore, the poor agricultural households survive and subsist from multiple support structures such as direct state support to agriculture, kinship relations and the state sponsored social welfare schemes such as MNREGA, public distributions, old age pensions, public education and public health. Therefore, the tenacity of the subsistence peasantry is rooted in complex social and political mechanisms.

Conclusion

The growing number of small and marginal farmers-self-exploiting subsistence small quantity producers in a thriving capitalist system is perhaps the paradox to stay here for a long time to come. This is a result of a range of historical, political and economic factors that have shaped the trajectory of Indian development process. The present capitalist system has no capacity to transform this non-capitalist sector or absorb its dependents. Capitalist sector uses agricultural sector to produce food grains and raw materials, managed by the tiny subsistence producers; who are systematically pauperized in the exchange. However, the large section of people the sector for being stakeholders in the liberal political system, their subsistence gets addressed in a different way. State, under neoliberal phase, is no longer in a mood to set parity in prices, give subsidies or intervene in the markets as it did earlier. Capitalist development inevitably results in primitive accumulation, displacement and impoverishment. Poverty generated by the structural conditions of dualist economy becomes a subject of political management for the state. The liberal state reproducers its hegemony through transferring welfare to prevent any large scale upheavals. Optimized welfare distribution through new governmental technologies marks a departure from stance developmental state. Economy will be decided by markets and state peddles welfare. Whether or not the neoliberal capitalism fumbles in this gamble, it is important to analyze the transition and push it towards more radical ends.

Way Forward

- Lack of access to adequate institutional credit on time has forced the farmers to rely on non-institutional sources to meet their credit requirements for crop cultivation in most places in India, though the situation has been improving in the recent years. Since the rate of interest charged by the money lenders is exorbitant and the returns from crop cultivation is also very low, farmers are unable to repay the loan in time, which reportedly in many cases led to suicide of farmers.

- The Working Group on Agriculture Production headed by Haryana Chief Minister Shri Bhupinder Singh Hooda (Business Line, 2010) have suggested that the government should announce the Minimum Support Price (MSP) for crops at 50 per cent more than the actual cost of Production (Cost C3). Minimum Support Prices announced every year for various crops should also be linked with the wholesale price index so as to protect the farmers from the possible inflationary pressure. To protect the farmers from the distress sale, there is also a need to closely watch the price behavior of sensitive commodities especially during the glut periods for making swift intervention through the Market Intervention Scheme (MIS).

- There is also a need to regulate both input and output markets in an effective manner to facilitate improvement in the income level of the farmer households. It is reported that the use of spurious inputs (seeds, fertilizers and pesticides) in cultivation is one of the major reasons for the crop failure or low output. The sale of spurious inputs must be stopped by all possible means. Another reason for the low income of farmer households could be the dominant role played by the middlemen in the market. Farmers are not able to get 40 per cent of the consumer rupee for various agricultural commodities in the market.

- Unless the issue of profitability of crops is addressed immediately, we may not be able to rescue the agriculture from its current mire. Finally, it is appropriate to conclude with a quote from the National Commission on Farmers (2005): "Economic growth which bypasses a large population is joyless growth and not sustainable in the long run. We cannot be silent onlookers to a situation where 30 per cent of India is shining and 70 per cent is weeping, 40 per cent of the farmers wish to quit farming".

- The concerned ministries and departments should facilitate public-private linkages for promotion of rural entrepreneurship and in establishment and effective functioning of SHGs, cooperatives, Small Farmers' Estates, other rural groups and community based organizations, agri-clinics and agribusiness centres to facilitate access to quality inputs and to fair markets to provide the power of economies of scale and to create synergy and convergence among various actors and stakeholders and among various processes of production, processing and marketing. Using an end-to-end approach, there is an urgent need to establish strong backward linkages with technology, inputs, services and credit and other institutional supports and forward linkages with remunerative markets, income generation and profit sharing.

- As compared to cooperatives benefits like income tax exemption, non-taxable welfare income exemption, land lease at nominal rates or free, fertilizer allocation to PACS, foundation seed supply and marketing support to seed cooperatives, state agency grants to cooperatives, export incentives and provision of distribution outlets for selling products are not available to Farmers Producer Companies/ Organizations (FPCs/FPOs). There is need to provide such benefits to FPCs/FPOs in niche marketing of various farm products for regular supply on sustainable basis.

- Integrated Farming Systems must be promoted to realize better productivity, profitability and sustainable production systems that would help to solve the fuel, feed and energy crisis, create more employment avenues, risk coverage, ensure regular income and encourage agricultural oriented industry.

- The youth can be attracted and retained in farming only if farming becomes economically rewarding and intellectually satisfying. Hence, young graduates should be duly trained for specialized production of the various products and dynamically linked with the world information on their agri-business along with quality and trade literacy. Knowledge and skill empowerment is the need of the hour which requires world-class infrastructure and critical agri-business analysis along with linking science, technology, industry and market.

- Primary as well as secondary processing of various agricultural commodities at farm gate/village level must be promoted to fetch better prices.

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A Case Study of a Village in Telangana on Small Holding Farmers

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Abstract

Agriculture is an important livelihood for the people who are in a rural area. In agriculture, there exists farming communities which hold different sizes of land holdings, which are marginal, small, medium and large. In Indian agriculture, more than 80 per cent of the farmers are marginal and small holdings farmers. Present study is mainly based on the primary data of the case study of a village, it focuses mainly on small and marginal farmers' productivity, cost of cultivation, credit compared to the medium and large farmers. By the end of the study, it was found that small and marginal farmers are less productive, have higher cost of cultivation and are more dependent on the non-institutional credit rather than the medium and large farmers. Small and marginal farmers are in severe distress and they are committing suicides compared to the medium and large farmers. They are not getting sufficient employment opportunities in off-farm activities and that is the reason which makes them highly dependent on agriculture.

Keywords: agriculture, marginal, small, medium, large farmer, distress

Introduction

Agriculture is the most important sector in the Indian economy and it is the one of the prime sources of employment to the people who are living in rural areas. Agriculture is gradually losing its significance in India's economic growth. It contributes around 17.8 percent of the share of the GDP. It provides employment opportunity to around 49 percent of the workforce of the country. With the continuing technological innovations in the agricultural sector, India's food grain production has more than doubled over the decades to a record 265 million tons in 2014, but the similarity is not being capitalized to increase the revenue and profit margins of the farmers. There is still a huge dependency on rainfall and other climatic conditions for good yield, and post-harvest logistics remain an area of concern. When Shri P.V. Narasimha Rao was Prime Minister and Shri Manmohan Singh was Finance Minister, the economic reforms in India were introduced in the 1990s to solve the structural problems and to stabilize the market. These reforms in India made lots of changes in the Indian economy. It increased the Indian growth rate, exports, service sector growth, improvement in the telecommunications, etc. Increase trends in the growth rates in different sectors made the Indian economic growth rate around 8.5 percent per annum during the period of 2004-05 to 2008-09. In the period of economic reforms not many specific policies were undertaken to improve agriculture. Post reforms, share of the agriculture to the GDP has been rapidly decreasing, but workforce dependence on the agricultural sector is not decreasing as much as the share of agriculture to GDP. There has been a decline in government backing in the form of declining investments in the agriculture, post 1990s. The declining State support has led to too much dependence of farmers on private sources. There has also been mounting trend in the cases of farmer suicides over the years, and the victims were mainly marginal and small farmers. Increasing costs of cultivation, leading to higher indebtedness, crop failures and inability to face the price rise with greater liberalization of the agricultural sector have forced the farmers to take this extreme step.

Review of literature

A number of studies conveyed that during 1960s and 1970s, productivity for per unit of land deteriorated with an upsurge in farm size. Some of studies revealed that there is no inverse relationship between small holdings and productivity. To know the productivity debate, following literature were reviewed.

Sen A. K. (1962) listed three results "found to be broadly valid in Indian agriculture", one of which was, "by and large, productivity per acre decreases with the size of holding". Dipak Mazumdar (1963) noted that in peasant agriculture, as the size of farms decreases the output per acre increases. Hanumantha Rao (1966) in a study noted that the percentage of cultivated area cropped more than once dwindled sharply with an increase in the size of the holding. The percentage of holding irrigated invariably deteriorated with an increase in the size of holding. Farm Management Study (1966) also showed the inverse relation between farm size holdings and productivity per acre in Indian agriculture. (Saini (1971) "In Indian agriculture, inverse relationship between farm size and productivity is an accepted phenomenon and its statistical validity is founded by the analysis of disaggregated data". Manabendu Chattopadhyay Ashok

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Rudra (1976), "It is our view that the factors driving a poor peasant towards more intensive effort are more important than the factors permitting him to be the same". In other words, to the extent the smaller farms in many parts of India yield higher output per hectare than the larger farms, it is somewhat misguiding to treat the phenomenon as one of relative efficiency rather than of distress and affluence. Ghose (1979) claimed that an important requirement for the existence of the inverse relationship phenomenon is technical backwardness implying that with the advances in technology the inverse relationship will die out. Rudra and Sen (1980) tried to analyze the main findings - both analytical as well as empirical. The general conclusion was the diversity of Indian agriculture with regard to the relationship between size and productivity was so large that the negative relation could hold in certain parts of the country at certain times but not everywhere and not at every time. Even when the inverse relationship held, "it may hold in certain ranges but not in others, and in many cases it is particularly noticeable only for small size classes". Deolalikar (1981) observed that the inverse size-productivity relationship cannot be rejected at low levels of agricultural technology in India, but can be rejected at higher levels. Rudra (1983) concluded that: "there is no scope for propounding a general law (for an inverse relationship or even for a positive relationship)." Bhalla and Roy (1988) detected that the inverse relation between farm size and productivity deteriorated and wiped out when the soil quality variable was included in their study.

Dyer (1997) claimed that the inverse relationship is neither a product of superior efficiency on the part of small farms nor is it due to superior excellence land on the small farms, but arises from the despondent struggle for poor farmers for survival on below subsistence plots of land.

One can sum up from the whole literature that the differences in the farm holdings are the main reasons for the difference in the productivity. One of the arguments that small farmers increase the cropping intensively in their fields and family labor works very hard on their farms, therefore, there is an increase in the yield for an acre or hectare. Various studies carried out by different experts between the farm size and productivity showed contradictory results. Studies taken on the basis of aggregated level data disclosed the existence of an inverse relationship between the farm size and productivity. Studies on disaggregated data failed to confirm this. Inverse relationship between farm size and productivity existed for certain types of farms, but could not be generalized for the whole. The relationship need not be true for all size groups, for all regions and for all crops.

Hypothesis

1. Are small and marginal farmers more productive than medium and large farmers?

2. To find if small and marginal farmers are more

productive, if they are, then what are the factors behind them, if they are not, what are their conditions?

Methodology

To solve the objectives, one village was selected as a case study. This study was mainly based on the primary data. The entire collected data was divided into four farm size groups, marginal farmers those with (less than the 2.5 acres), small farmers (between 2.5 to 5.0 acres), medium farmers (between 5 to 10 acres), and large farmers (above the 10 acres). 203 households were farming families out of the 232 households in the village.

Village under the study

The village Chalmeda is a fluorosis affected area and agriculture is the main occupation of the people. Chalmeda and a few surrounding villages had a history of Naxal movements and struggle against landlords and razakars. This Village consists of 232 households in which SCs were 48, constituting around 20.69 percent and OBC households were 161, as much as 69.39 percentage and others comprising of 23 households which is 9.92 percentage of households in the total. Since there are only 3 households from STs we have considered the SC households and ST households together.

The total literacy rate in the village is 61.38 percentage, which is less than the average literacy rate of Nalgonda district (64.20). 66.07 per cent of males are literate, which is less than the total literacy rate of the males in the district (70.10), and literacy rate of the females is 64.72 percent, incidentally, it is more than the total literacy rate of females in the district (54.19).

If we observe the literacy rate by social group wise, the total literacy rate of the SCs is 60 per cent, 67.5 per cent of males and 53.84 per cent of females are literate. The total literacy rate of OBCs is 60.3 percent of which 60.61 per cent of males and 59.32 percent of females are literate in OBC community. The total literacy rate of the others is 77.95 per cent and within this the literacy rate of males is 78.95 per cent and that of females is 77.95 per cent. Agriculture is the primary occupation in this village, majority of the households depends on agriculture as cultivators or as agricultural labor. The total number of the working population in the village constitutes a percentage of 73.7 per cent. Amongst the total working population, agricultural working population constitutes 80.39 per cent. In addition to agriculture and other allied works, most of the households in the village are part of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2005. Total number of households participating in the MGNREGA is around 188 households. Total number of persons who participated in MGNREGA are 346 persons. Among all the social groups in MGNREGA, the number of SC households are 41, OBCs households are 142 and others are merely 5. If we observe

the participation of the persons in the MGNREGA by the social group wise, participation of a number of persons in SC households is 75, which constitute to 21.68 percentage of the total participants. As many as 265 OBCs are getting benefited from MGNREGA, which comprises 76.59 per cent of the total participants. Participation of the number of persons in MGNREGA by others is 6, which is to the tune of 1.73 percentage. Hence the participation of a number of households and persons in MGNREGA is the highest in OBCs, followed by SCs and Others. It clearly shows that OBCs and SCs depend on social security measures.

TABLE 1 Population and Characteristics of Chalmeda village

	Total No. of households is 232		Percentage
SC	48		20.69
OBC	161		69.39
Others	23		9.92
Total population	831		
Male	370		44.53
Female	350		42.11
Children	111		13.58
SC	170		20.45
OBC	593		71.35
Others	68		8.19
Literacy rate	Male literacy	Female literacy	Total
Total village literacy	66.07	64.72	61.38
SC	67.5	53.84	60
OBC	60.61	59.32	60.3
Others	78.95	76.67	77.95
Workers category	No. of workers		Percentage of workers
Cultivators	180		35.29
Agricultural laborers	230		45.10
Others labors	100		19.61
Total	510		100
MGNREGA WORKERS	No. of households	No. of participants	Percent of participants
SC	41	75	21.68
OBC	142	265	76.59
Others	5	6	1.73
TOTAL	188	346	100
Type of ration cards	Social groups		

	SC	OBC	Others	TOTAL CARDS
White	40	153	0	193
Pink	0	0	23	23
Anthyodaya	6	04	0	10
No Cards	2	4	0	6
Total households	48	161	23	226
				232

Source: Field Survey, 2014.

It can be observed that 226 out of the 232 households have ration cards. 193 households possess white ration cards, and 23 pink cards, 10 households are having Anthyodaya card holders and the remaining 6 households are not having any card. If observe from the social group wise, 2 households in SC do not have any type of ration card. In the OBCs out of 161 households, 153 households have the white cards. In the other category, all the 23 households have pink ration cards.

Agricultural situation in the village

In the village of Chalmeda, principal crops grown are Cotton and Paddy. The irrigation is weather or rain dependent. The most common source for irrigation is Bore wells and Tube wells. Amongst the total working population, agricultural working population constitutes 80.39 per cent. The total area under agriculture production in the village is 1445 acres, of which cotton crop constitutes highest acreage with 1391 acres, amongst remaining area, 59 acres is under cultivation of paddy. Total area operated is 1445 acres, while the total area of the village is 1191 acres and the remaining area is leased-in by the villagers from neighbouring villages.

TABLE 2 Total Production and Average Productivity of Cotton, Paddy Among the Different Size of the Farmers

Category of farmers	No. of farmers	Land holdings (In acres)	Production of cotton (Quintals)	Average Productivity of cotton for acre (in Quintals)	No. of farmers	Numb. of acres	Production of paddy (in Quintals)	Average productivity of paddy for acre (in Quintals)
Marginal	40 (19.7)	65	350	5.38	8	5	51	10.2
Small	57 (28.07)	214	1400	6.54	12	14	139	9.92
Medium	51 (25.13)	346	2500	7.28	17	15	183	12.2
Large	55(27.09)	766	5850	7.63	22	25	400	18.19
Total	203 (100)	1391	10100	7.26	59	54	773	14.31

Source: Field Survey, 2014. Figures in parentheses indicate percentage.

According to the cropping pattern of the year 2014, the majority of the farmers cultivated cotton, few amongst cotton growers also cultivated paddy. Hence, for the present study cotton and paddy, its productivity amongst various classes and size of holdings is undertaken. Table 2 describes that the total average productivity of cotton for all farmers in the village of Chalmeda for 2014 was 7.26 quintals. In the class of marginal farmers, their average productivity of cotton (APC) per acre was 5.38 quintals, for small farmers APC per acre was 6.54 quintals, for medium farmers APC per acre was 7.28 quintals and

in the class of large farmers APC per acre was 7.63 quintals. The data available suggests that an average farmer from the class of marginal holdings produces relatively lesser than small farmer, and a small farmer, on an average produces lesser output than large farmer, thus indicating transitivity among producing capacities of marginal, small and large farmers. Small and marginal farmers are less productive than the medium and large farmers in the case of cotton and paddy. These results show that the aggregate study of the village farmers based on the size groups, there is no inverse size relationship between the small holdings and productivity.

TABLE 3 Average Cost of Cultivation of Cotton and Paddy Among all the Sizes of Farmers

S. No.	Size of farmers	Average cost of cultivation of cotton per acre	Average income of cotton per acre(P* average production of different size farmers)	Average cost of cultivation of paddy per acre	Average income of paddy per acre(P*average production of different size farmers)
1.	Marginal	25008	21520	13500	12024
2.	Small	25283	26160	13200	11904
3.	Medium	26101	29120	12500	14424
4.	Large	26081	30520	12000	21828
5.	Total	25618	29040	12800	17172

Source: Field Survey, 2014.

Note: Here the price per quintal of cotton is Rs.4000 as reported by farmers. Price per quintal of paddy is Rs.1200.

A farmer's profitability in agriculture can be better off, when cost of cultivation is lower, productivity and market prices are higher. The study brings in that the marginal and small farmers are vulnerable both in terms of lower productivity as well as higher cost of cultivation. This leads to reduced incomes, which eventually results in either reduced savings or reduced consumption, amongst which both are unwarranted situation for a producer?

In case of a marginal farmer, the costs are higher than other classes, eventually leading to losses and ending up in a situation of borrowing loans, and a small farmer receives a relatively higher amount of income than marginal farmer, but also a less income to sustain in the productive activities. The Larger farmers get an edge over everyone in reaping profitability through his/her farm.

Table 3 shows that income to the small farmers is slightly more than the cost of cultivation, this difference of Rs. 877 is very small. The small farmers are not getting an average wage for them. Income in the medium and large farmers are more than the cost of cultivation and this difference is very high. Marginal and small farmers are getting losses and some level gain. However, medium and large farmers are gaining from the cultivation.

To the marginal farmers, average cost of cultivation of paddy per acre is Rs.13,500 and average income of the paddy per acre is Rs.12,024. To the small farmers, an average cost of cultivation of paddy per acre is Rs.13,200, average income of the paddy per acre is Rs. 11,904. To the medium farmers, an average cost of cultivation of paddy per acre is Rs.12,500, average income of the paddy per acre is Rs.14,424. To the large farmers, an average cost of cultivation of paddy per acre is Rs.12,000, average income of the paddy per acre is Rs.21,828. Total average cost of cultivation of paddy per acre is Rs. 12,800 and total average income of the paddy per acre is Rs. 17,172. Income from the paddy per acre to the marginal and small farmers is less than the cost of cultivation of paddy per acre. Income from the paddy per acre to the medium and large farmers is more than the cost of cultivation of paddy per acre. Thus medium and large farmers are gaining from the cultivation whereas the marginal small farmers are becoming poorer. The cost of cultivation are higher for the marginal and small farmers than the medium and large farmers. Large farmers not only have greater access to machinery, but they also have lower expenditure on machinery per acre.

TABLE 4 Sources of credit to the farmers for cultivation

Size of farmers	Only Institutional credit	Only Non-institutional Credit	Both institutional/ non institutional credit	Total farmers
Marginal	0	29	11	40
Small	4	18	35	57
Medium	0	9	42	51
Large	0	11	44	55
Total	4	67	132	203

Source: Field Survey, 2014.

From the table 4, we can notice that the availability of credit to all sizes of farmers. Total marginal farmers are 40 members, among this, 29 members of marginal farmers depended on the non-institutional credit, 11 members of farmers depended on the both institutional and non-institutional sources. Total members of small farmers are 57 members, among this, 4 farmers depended on only institutional credit, 18 farmers depended on non-institutional credit, 35 farmers depended on both institutional and non-institutional credit. Total medium farmers are 51, among this, 9 farmers are depended on non-institutional credit, 42 farmers depended on both institutional and non-institutional credit. Total Large farmers are 55, among this, 11 farmers depended on institutional credit, 44 farmers were depending on both institutional and non-institutional credit. Most of the marginal and small farmer's sources of credit are from the non-institutional sources like money lenders, fertilizer dealers. If we observe from table 4.12, we find that for small and marginal cultivators, cost of cultivation of cotton and paddy was more than the income from the cotton and paddy, and most of the marginal and small farmers depended on the non-institutional credit. Recently about 3 months back in the Chalmeda village, one young small cotton farmer committed suicide in his field through consumption of fertilizers. His name was Ganganaboina Parmesh. The main reason for his death was that he had cultivated 5 acres of cotton in 2013-14; he had borrowed 2 lakhs rupees for the cultivation, however, finally his cotton crop was damaged by pests attack. He could not pay the money to lenders and finally he committed suicide.

The study tells that the small and marginal farmers are less productive than medium and large farmers. Following are the reasons behind the increase in cost of cultivation and lower productivity of marginal and small farmers.

- Most of the marginal and small farmers are illiterate and they do not know, how much the fertilizers and

pesticides has to be used for an acre of land. Sometimes over use of the pesticides destroys the crops and sometimes under use of it.

- Most of the small and marginal farmers belong to SCs and OBCs. These farmers land holdings are unproductive, so when farmers cultivate their land, the growing cost of cultivation and dwindling productivity per acre are seen compared to medium and large farmers.

- The Indian agriculture is mostly based on the rainfall; any delay in rainfall decreases the productivity of crops. Recently fluctuations and insufficient rainfall in Telangana state, farmers had to sow the seeds two or three times in their fields, thereby increasing the cost of cultivation. Moreover, rain fluctuations and the cost of cultivation became causes of committing suicides. The ongoing drought situation in Telangana State may be increasing the number of farmer suicides.

- Marginal, small and tenant farmers do not have sufficient inputs for the cultivation at the time of need to use in the crop area. Many times they depend on medium and large farmers for inputs. For example, at the time of weeding, they have to use the cow plough otherwise increase in the grass around the plant effects productivity. This causes delay in using the inputs timely and increases the cost of cultivation.

- Most of the marginal, small and tenant farmers are lagging the credit sources. So they are approaching the fertilizer dealers for the buying of seeds and fertilizers and then become victims of the high rate of price paid on the seeds and fertilizers..

Conditions of the small and marginal farmers

There is number of evidence to suggest that small and marginal farmers are becoming vulnerable, which is divesting them of their livelihood and wellbeing. They have higher exposure to a multiplicity of risks at individual or household level. Some of them are (i) harvest risks, life cycle risks, social risk and special risks for vulnerable groups.(ii) Health shocks like illness, injury, accidents, disability. (iii) Labor market risk: many work in informal sector and have high risk of unemployment and underemployment. (vi) Community risks such as floods, cyclones, droughts, structural adjustment policies etc. Small and marginal farmers are vulnerable to all these risks. Most of the households suffer from proverbial problems such as spending from savings, borrowing, assistance from relative's families and government sale of assets, prolonged labor supply, child labor, bonded labor, decreasing consumption, migration etc.

Conclusion

Agriculture in India is the main occupation of the people who live in rural areas. But nowadays it has worsened the condition of farmers who are the cultivators of small and marginal land holdings. In the study, small and marginal farmers are benefitting less from the agriculture compared to the medium and large farmers. Small and marginal farmers are depending highly on the moneylenders and private lending institutions compared to medium and large farmers. This is the situation which is leading the small and marginal farmers to suicides. In the study, most of the small and marginal farmers were from the SC and OBC communities. They are poor and most of them are having the antodaya ration cards or are working in the MGNREGA. But working in MGNREGA is not giving them regular income generation. Even though a lot of policy initiatives have been taken by government to reduce the agony of the small and marginal farmers, but these policies are only offering a temporary solution not for a long term solution to the problem. Farmers who are Small and marginal -holders, they are under continuous pressure to increase production from their limited land source. Government has implemented policies and strategies to help diversify on-farm and off-farm activities and in that way augment sustainability and productivity. For the small and marginal farmers job opportunities in the off-farm sectors need to be created to increase their income, standard of living and reduction of poverty. There is a need, for the transfer of people who are dependent on agriculture from agricultural sector to non-agricultural sectors, through the effective establishment of rural manufacturing sectors of the public and private institutions. Then only we can reduce the hunger in the farming communities in agriculture. Finally, the study also reveals that there is no inverse size relationship between the small size and productivity.

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A Study on Problems in Agricultural Lending for Sugarcane Cultivation: A Case in Villupuram District of Tamil Nadu

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Abstract

The study assesses the flow of agricultural credit and also evaluates the problems in agricultural lending. A survey on 45 crop loan borrowers, 15 term loan borrowers and 30 non-borrowers were conducted in Villupuram district of Tamil Nadu. The demand and supply of agricultural credit for sugarcane cultivation were evaluated. The Credit Gap refers to the difference between the scale of finance as fixed by the banks and the credit requirement and the Credit Gap II refers to the difference between the credit requirement and the actual credit amount supplied by the bank. The study found out that small farmers depend more on institutional sources for borrowing than the other category of farmers. Whereas, Term Loans for farm investments were largely given to medium and large farmers and not to the marginal farm category. The study also observed that Credit gap II was more in LT borrower farms (37 percent) than that of ST borrower farms (24 percent) and the credit Gap I was lesser than Credit Gap II in both the cases of ST and LT borrower farms indicating that the scale of finance was fixed at higher level and the credit supplied was lesser than the scale of finance. The credit supplied to sugarcane growers had a positive impact on the net income per ha realized, i.e., Rs. 37,381 in ST borrower farms, Rs. 44,600 in LT borrower farms and the net income was more than that of the non-borrower farms (Rs. 33,249). Thus, the study found out that agricultural lending has positive impact on income of the farmers. Non-flexibility in repayment schedule, delayed sanctioning of loan amount and very high transaction cost in getting loan from institutional sources are the major problems faced by the farmers in borrowing.

Key words: Short-term, long-term loan, Credit gap, scale of finance, transaction cost.

Introduction

Agricultural credit assumes a vital role in the agriculture and socio-economic development of the agrarian community of the country. It augments the productivity of scarce resources, strengthens farming business and leads to increased farm income and livelihood status of the farmers through investment on farm assets and other supporting infrastructure which is provided by large-scale financial activities. Agricultural credit not only enhances farm productivity, it also improves livelihood security of farming community (Mohan, 2004). The success of Green Revolution in Indian agriculture was mainly through institutional credit support to agriculture by means of supply of inputs, investment on irrigation structures, capital formation, etc. Agricultural credit helped the farmer for purchase of inputs and other services through short-term credit and the long-term credit for investment purposes. In all these, institutional credit played a very important role in the development of agricultural sector.

The banking network in the State, as on 31 March 2014, comprised 45 Commercial Banks, 2 RRBs, Tamil Nadu State Cooperative Bank (TNSCB) with 23 affiliated District Cooperative Banks (DCBs). Banking services in the State are provided through a network of 9696 branches, of which 6207 branches comprised rural/semi urban branches. The share of agriculture advances was 18.15 percent in Tamil Nadu as against the national norm of 18 percent. The achievement under ACP was 108 percent under Farm Sector and 101 percent under Non-Farm sector and 104 percent under other priority sector. The bankers are issuing loans to the farmers based on the Encumbrance Certificate issued by the State Government, only to the land owners and not to the tenant farmers and they have to depend on informal sources of credit for taking up cultivation.

Of the total Agricultural credit, only 4.0 percent had been utilized for infrastructure development in 2012-13. There is need for bringing tenant farmers and other landless cultivators into banking fold and facilitate provision of credit for farming operations. (NABARD, 2015)

Sugarcane, a commercial crop required more of inputs and heavy investments and thus demanded a very high expenditure such that borrowing is inevitable in sugarcane cultivation. It has also been observed from a study conducted in Tamil Nadu that the financial institutions preferred to finance for sugarcane cultivation, dairying, etc., as there was a tie-up arrangement between banks, and sugar mills and co-operative milk producers' societies so that loan recovery was easier to the bankers. In order to address wide ranging issues relating to agricultural credit delivery mechanism, the present study has been attempted with the following specific objectives:

Objectives

1. To estimate the flow of agricultural credit for sugarcane cultivation.

2. To identify the problems in agricultural lending by institutional agencies. The main focus of the study was to assess the lacunae in agricultural lending. Hence, the study covers the borrowers who cultivated the sugarcane, as major crops. From the secondary source of information, Villupuram district found to have the largest area under sugarcane in Tamil Nadu.

Review of Literature

Bilgrami (1995), in a study, employed the Cobb-Douglas production function to assess the factors contributing to credit demand and observed existence of positive relationship with demand for credit and area cultivated, investment on irrigation and expenditure on fertilizer.

Kumar *et al.,* (2007) attempted to evaluate the performance of rural credit and factors affecting the choices of credit sources. He found out that the factors such as age, gender, household size, farm size and education level had positively influenced the decision of the households to have access to agricultural credit (KCC Mahadeva and Venna (2008) studied the impact of agricultural credit distributed through institutional sources in Chamarajnagar district in Karnataka). Timely receipt and utilization of loans was a significant variable in assessing the benefit of loans.

Sumarbin Umdor (2008) investigated the demand and use of credit in North East Uplands in India (Assam, Manipur and Meghalaya) and found out that about 80 percent of the total amount borrowed by the households was from the institutional sources. Among the informal sources, friends and relatives were the main sources of credit and they provided for 14 percent of the total amount of loans. Low income households borrowed from informal source, while higher income households were seen to be borrowing from formal sources. Loans from formal source were used for productive purpose, while loans from informal source were for consumption purposes.

Joshi *et al.,* (2005) studied the requirement and repayment of credit in Punjab agriculture. The results revealed that the major component of the total loan was comprised of crop loan covering about three-fourth of the total loans. As far as credit gap was concerned, about 29 percent of the amount fell short of loan requirement. There was also a direct relationship between loan required and farm size.

Gandhimathi and Vanitha (2010) conducted a study at Tamil Nadu, identified nine socio-economic characteristics namely, education, land holding size, crop loan amount, family size, non-farm income, household expenditure per annum, utilization of credit, cost of production, and family labour which affected the borrowings from commercial and co-operative banks. It was revealed that the borrowers from commercial banks possessed bigger size of land holdings, had higher non-farm income, and more farm and household expenditure per annum, whereas the borrowers from co-operative banks had taken higher amount of loan and possessed more family labour and higher education level.

Methodology

Selection of the Study Area

Villupuram district of Tamil Nadu state was selected for the study as it had the largest area under sugarcane, i.e., 16.28 percent of the total area was under the sugarcane crop in the state. The area under sugarcane cultivation was mainly determined by the availability of irrigation water. Also, the proximity to sugar mills determined area under the crop. In the area near the sugar mills, sugarcane cultivation is registered and the harvested canes are supplied for milling under a tie-up arrangement. This is a tri-partite agreement among the sugarcane growers, banks and sugar mills, such that the farmers will register the sugarcane cultivation with the sugar mill, borrow crop loans from banks and cultivate and supply the harvested canes to the mill which in turn would settle the crop loan borrowed by the concerned farmer with the sale proceeds in the bank. Banks also provide such loans for the cultivation of sugarcane as the recovery of loan amount was very easy due to the agreement with the sugar mills. Apart from these, the minimum support price and availability of cheap labour (labour cost was the major component of the cost of cultivation) were the other reasons for taking up sugarcane cultivation in the district.

Sampling Technique

Forty five short - term, i.e., crop loan borrowers for sugarcane crop were randomly selected for the study. Apart from these crop loan borrowers, in order to study the issues relating to disbursement and recovery of term loans, 15 term loan borrowers were interviewed for the study. Further, 30 non-institutional borrowers were selected for studying the constraints faced in getting institutional finance and/or the reasons for not availing institutional finance by them. Thus, 90 sample farmers were randomly surveyed.

Farmers were categorized into three groups, viz., marginal farmers who owned a land area of less than one ha; small farmers who owned 1.01 -2.00 ha; and medium and large farmers having more than 2.00 ha. Extent of holdings, livestock position, cost of cultivation, demand and supply of credit and so on were separately analyzed for these three categories of farmers. Simple percent analysis were used to analyze the data.

Results and Discussions

General Characteristics of Sample Farm Households

The category-wise no. of farms surveyed was depicted in Table 1.

TABLE 1: NUMBER OF FARM CATEGORY - WISE SAMPLE BORROWER AND NON -BORROWERS FARMS

Farm Category	Number of Farmers			
	Short Term Borrowers	Long Term Borrowers	All Borrowers	Non-Borrowers
Marginal (< 1Ha)	13 (28.89)	0 (0.00)	13 (21.67)	14 (46.67)
Small 1-2 (Ha)	22 (48.89)	7 (46.67)	29 (48.33)	8 (26.67)
Medium & Large (> 2.1 ha)	10 (22.22)	8 (53.33)	18 (30.00)	8 (26.67)
Total	45 (100.00)	15 (100.00)	60 (100.00)	30 (100.00)

From the table, it could be observed that among the short-term loan borrowers, small farmers depended more on institutional sources for borrowing (48.89 percent) than the marginal and large farmer's category. Term loans which was availed for land development and other investments on farms were largely given to medium and large farmers only and not to the marginal farmers. Similarly among the non-borrowers, marginal farmers constituted the highest share (46.67 percent) than that of the other categories of farm. Because, due to lack of owning proper land documents, problem in transfer of ownership of the ancestral property as hierarchy of the land is difficult and thus they could not avail loan from institutional agencies.

The category-wise average extent of farm holding is given in Table 2. It can be seen from the table that the average net farm operated area (NOA) of the term loan borrowers was larger (2.56 ha) when compared to that of short term borrowers (1.67 ha). It can also be observed that the average NOA in both borrower and non-borrower farms was more or less similar in cases of small (1.52 and 1.54 ha) and medium and large (3.24 ha and 3.59 ha) farms.

Farm assets consist of land (which included wet, garden and dry lands), irrigation structures, open well and bore well, machineries, tools and equipment, and livestock. The asset position of the sample farmers per ha of owned land was estimated and the results are given in Table 3. The land was the major asset to the farmers and its value ranged between 76.91 percent in borrower farms and 80.61 per cent in non-borrower farms. The value of buildings, machineries and livestock in borrower farms constituted 9.19 percent, 11.50 percent and 2.40 percent of the total asset value, while they were 10.35 percent, 6.54 percent and 2.50 percent respectively in non-borrower farms. The shares of machineries and tools to the total asset value were more in borrower farms obviously due to addition of more of these assets with borrowed funds. Hence borrowing improved the asset position of farmers and the asset value was more in borrower farms (Rs. 860670 per ha) when compared with that of non-borrower farms (Rs. 827431 per ha) of owned farm land and the difference between these two categories of farms was due to more of machineries and tools value in borrower farms.

TABLE 2: LAND HOLDING PATTERN OF THE SAMPLE FARMERS

Crop/ Farm Category	Short Term Borrowers				Long Term Borrowers					All Borrowers					Non-Borrowers				
	Net Owned	Leased in	Leased-out	Net Operated	Net Owned	Leased-in	Leased-out	Net Operated	Net Owned	Leased-in	Leased out	Net Operated	Net Owned	Leased-in	Leased-out	Net Operated			
Marginal	0.72	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.72	0.69	0.00	0.00	0.69			
Small	1.46	0.06	0.00	1.52	1.68	0.00	0.00	1.68	1.52	0.04	0.00	1.56	1.54	0.00	0.00	1.54			
Medium & Large	3.93	0.00	0.69	3.24	3.69	0.00	0.35	3.34	3.82	0.00	0.54	3.28	3.59	0.00	0.00	3.59			
Total	1.79	0.03	0.15	1.67	2.75	0.00	0.19	2.56	2.03	0.02	0.16	1.89	1.69	0.00	0.00	1.69			

TABLE 3: Average Asset Value (Rs.) per Hectare of Net Owned Area

Crop/ Farm Category	Short Term Borrowers					Long Term Borrowers				
	Land	Buildings	Machinery & Tools	Livestock	Total	Land	Buildings	Machinery & Tools	Livestock	Total
Marginal	757415	138806	36313	62516	995050	0	0	0	0	0
Small	698563	93836	56911	26000	875309	788164	95261	40473	39919	963818
Medium & Large	524769	56553	123346	8447	713115	724037	67699	155470	10273	957479
Total	620846	80893	86838	21675	810253	742269	75535	122775	18702	959281
% to total	76.62	9.98	10.72	2.68	100.00	77.38	7.87	12.80	1.95	100.00
Marginal	757415	138806	36313	62516	995050	671803	139097	28880	63011	902790
Small	722511	94217	52517	29720	898966	640030	87093	14178	19606	760906
Medium & Large	610337	61339	137141	9231	818048	676915	66995	79855	6769	830534
Total	661925	79080	98996	20670	860670	666973	85668	54145	20644	827431
% to total	76.91	9.19	11.50	2.40	100.00	80.61	10.35	6.54	2.50	100.00

TABLE 4: Area (Ha) under Different Crops Cultivated per farm—Crop wise, Farm Category-wise and Borrower-wise

Crop details	ST- borrowers				L-T Borrowers				All Borrowers				Non Borrowers			
	Marginal	Small	Medium & Large	Total	Marginal	Small	Medium & Large	Total	Marginal	Small	Medium & Large	Total	Marginal	Small	Medium & Large	Total
Sugarcane	0.67	1.28	2.27	1.32	0.00	1.62	2.63	2.16	0.67	1.36	2.43	**1.53**	0.55	1.14	2.20	**1.15**
Paddy	0.03	0.14	1.17	0.34	0.00	0.06	0.96	0.54	0.03	0.12	1.08	0.39	0.22	0.43	1.21	0.54
Black gram	0.03	0.06	0.10	0.06	0.00	0.00	0.25	0.13	0.03	0.04	0.17	0.08	0.04	0.08	0.13	0.07
Groundnut	0.02	0.11	0.32	0.13	0.00	0.00	0.20	0.11	0.02	0.08	0.27	0.12	0.01	0.10	0.40	0.14
Maize	0.00	0.04	0.04	0.03	0.00	0.06	0.35	0.22	0.00	0.04	0.18	0.07	0.04	0.00	0.56	0.17
GCA	0.75	1.62	3.91	1.88	0.00	1.73	4.40	3.16	0.75	1.65	4.13	**2.20**	0.87	1.75	4.50	**2.07**
NOA	0.72	1.52	3.24	1.67	0.00	1.68	3.34	2.56	0.72	1.56	3.28	1.89	0.69	1.54	3.59	1.69
CI (%)	104.35	106.67	120.63	112.40	0.00	103.45	131.82	123.16	104.35	105.83	125.68	116.04	125.00	113.11	125.35	122.31

Note: GCA-Gross Cropped Area; NOA-Net includes cultivated uncultivated area provided part of it is put to agricultural use Area Operated; CI - Cropping Intensity Ratio of net sown area to the total cropped area

From Table 4, it can be seen that the area under sugarcane accounted the highest share in the borrower and non-borrower farms respectively. The average area under sugarcane was more in the large borrower farms (2.43 ha), followed by small (1.36 ha) and marginal farms (0.67 ha). Paddy, groundnut, maize and black gram were the other major crops cultivated in the study area. The borrowers had larger gross cropped area (2.2 ha) than that of the non-borrowers (2.1 ha).

The credit supplied to the sugarcane growers is given in Table 5.

Bank/ Category		Short Term Borrowers				Long Term Borrowers - Crop Loan			
	Crop	Marginal	Small	Medium & Large	All Farmers	Marginal	Small	Medium & Large	All Farmers
Co-op	Sugarcane	52097	46904	53538	50393	0	51067	45302	46455
	Paddy	32123	29652	22239	23320	0	0	18886	18886
	Total	51298	46596	46471	47364	0	51067	35569	37683
Commercial Banks	Sugarcane	60865	51244	57142	54599	0	37362	35912	36571
	Paddy	0	24710	26122	25808	0	24710	0	12355
	Total	60865	50038	51574	51798	0	36875	35912	35721
Total	Sugarcane	55971	49527	55598	52782	0	38830	38595	38689
	Paddy	32123	25698	24181	24637	0	24710	18886	17434
	Total	55429	48699	49314	49864	0	38343	35779	36267

From the Table, it is observed that the crop loan was given for sugarcane and paddy cultivation in Villupuram district. Although the scale of finance for sugarcane was fixed at Rs.56,833 per ha, the average amount of credit supplied for sugarcane was much lesser in cases of both ST borrowers (Rs. 52,782 per ha) and LT borrowers (Rs. 38,689 per ha). The crop loan provided by the commercial banks was higher than that of the co-operatives for ST borrowers but it was reverse in case of LT borrowers. Among ST borrowers, marginal farmers received larger amount of sugarcane loan per ha (Rs.55, 971) and they were followed by medium and large farmers (Rs. 55,598) and small (Rs. 49,527).

In case of ST borrowers, 9 farmers (20 percent of the total number of the selected borrowers) received loan cultivating paddy apart from availing sugarcane loan.

Among the LT borrowers, 12 out of 15 selected farmers borrowed sugarcane loan and among these, 6 farmers (50 percent of those who availed sugarcane loan) also availed paddy loan.

As far as term loan (Table 6) was concerned, more number of farmers (6) borrowed for deepening of well and they were followed by farmers who borrowed for establishing drip irrigation system for sugarcane field (5), purchase of tractor (3) and harvester (1). Co-operatives provided loan for only two out of the 15 selected farmers and that too for deepening of well and the per farm average loan amount supplied by co-operatives was far lesser (Rs.42,500) than that of the commercial banks (Rs. 2,46,154). It could also be seen from the table that the costlier investments like tractor and harvester were made only by medium and large farms and no small and marginal farm made investment on these machineries.

TABLE 6: Term Loan Availed (Rs. per Farm) by Sugarcane Farmers

Type of Loan/ Category/ Bank/	Number/ Amount (Rs/Farm)	Marginal			Small			Medium & Large			All Farmers		
		Co-op	Comm-ercial	Total	Co-op	Comm-ercial	Total	Co-op	Commer-cial	Total	Co-op	Commer-cial	Total
Well Deepening	Number	0	0	0	1	4	5	1	0	1	2	4	6
	Amount	0	0	0	35000	37500	37000	50000	0	50000	42500	37500	39167
Drip Irrigation System	Number	0	0	0	0	2	2	0	3	3	0	5	5
	Amount	0	0	0	0	50000	50000	0	83333	83333	0	70000	70000
Tractor	Number	0	0	0	0	0	0	0	3	3	0	3	3
	Amount	0	0	0	0	0	0	0	466667	466667	0	466667	466667
Harvester	Number	0	0	0	0	0	0	0	1	1	0	1	1
	Amount	0	0	0	0	0	0	0	1300000	1300000	0	1300000	1300000
All Purposes	Number	0	0	0	1	6	7	1	7	8	2	13	15
	Amount	0	0	0	35000	41667	40714	50000	385714	375000	42500	246154	219000

The demand for crop loan is determined by factors like cost of cultivation, cost of capital, farm size, cropping pattern, area under irrigation, income earned through off-farm and non-farm sources, family size, educational status and risk bearing ability of the farmers. More specifically, the cost of cultivation of different crops likely to be incurred in the ensuing season determined the quantum of crop loan amount.

Although the scale of finance or the credit ceiling for different crops was fixed by the committee of experts considering the cost of cultivation prevailing in the different districts, many farmers often make a complaint that the scale of finance was quite inadequate to meet the actual cost of cultivation. Also, there is a marked difference between the scale of finance and the actual crop loan amount disbursed to the farmers. This difference is called as credit gap and there are two types of credit gaps prevailed at present.

The Credit Gap I referred as the difference between the scale of finance as fixed by the banks and the credit requirement. The credit requirement was estimated by multiplying the cost of cultivation, i.e., working capital for the select crops as estimated from the primary data collected from the sample farm households, and the factor which was to represent the income and savings levels of the borrowers, i.e., 90 percent, 70 percent and 50 percent for marginal, small and large farmers respectively. The Credit Gap II referred as the difference between the credit

requirement and the actual credit amount supplied by the bank.

To know the credit requirement the cost of cultivation is calculated and presented in Table.8. As could be seen from Table.7 the working capital for cultivating sugarcane per ha was more in the farms of LT borrowers (Rs.1,36,457) followed by ST borrowers (Rs.1,32,125) and non-borrowers (Rs. 1,30,398). This difference was mainly due to the fact that LT borrowers applied larger quantity of fertilizer and used more of machine power and human labour when compared to that of ST borrowers. This larger quantity of inputs used in LT borrower farms resulted in the realization of more yield (116 tonnes per ha) than that of ST borrower farms (111 tonnes per ha) and non-borrower farms (108 tonnes per ha). Despite larger working capital incurred, LT farms availed lesser crop loan amount per ha (Rs. 36,267) than that of ST borrowers (Rs. 49,864). This was due to the usage of more of owned capital in LT borrower farms and their crop loan requirement per ha was estimated at Rs.57,902 which was lesser than that of the ST borrower farms (Rs. 65,639). Credit gap (difference between the credit requirement and supplied) was also more in LT borrower farms (37 percent) than that of ST borrower farms (24 percent). It could also be observed that the credit Gap I (difference between the credit requirement and scale of finance) was lesser than Credit Gap II in both the cases of ST and LT borrower farms indicating that the scale of finance was fixed at

TABLE 7: Cost of Cultivation of Sugarcane and Other Crops

(Rs. per ha)

Short Term Loan Borrowers

Particulars	Marginal Farms		Small Farms		Medium & Large Farms		All farms	
	S.Cane	All Crops	S.Cane	All Crops	S.Cane	All Crops	S.Cane	All Crops
Working Capital	125855	116040	132147	110360	134506	90800	132125	101961
Total Cost	162454	152923	163945	139268	175419	119222	168098	131562
Productivity (Tonnes/ha)	107.00	-	106.29	-	117.95	-	110.83	-
Gross Return	209814	193619	205811	173970	232892	158223	216713	168943
Net Return	47360	40696	41866	34702	57473	39001	48615	37381
Credit Requirement	113269	104436	92503	77252	67253	45400	85921	65639
Scale of Finance	56833	-	56833	-	56833	-	56833	-
Credit Supplied	55971	55429	49527	48699	55598	49314	52782	49864
Credit Gap -I	56436 (49.82)	47603 (45.58)	35670 (38.56)	20419 (26.43)	10420 (15.49)	-11433 (-25.18)	29088 (33.85)	8806 (13.42)
Credit Gap-II	57298 (50.59)	49007 (46.93)	42976 (46.46)	28553 (36.96)	11656 (17.33)	-3914 (-8.62)	33139 (38.57)	15774 (24.03)

Long Term Loan Borrowers

Particulars	Marginal Farms		Small Farms		Medium & Large Farms		All farms	
	S.Cane	All Crops	S.Cane	All Crops	S.Cane	All Crops	S.Cane	All Crops
Working Capital	-	-	133235	126466	138192	94683	136457	102832
Total Cost	-	-	170007	163168	173063	122197	171993	132702
Productivity (Tonnes/ha)	-	-	111.11	-	119.27	-	116.41	-
Gross Return	-	-	220122	210364	236617	165902	230844	177302
Net Return	-	-	50115	47196	63555	43705	58851	44600
Credit Requirement	-	-	93265	88526	69096	47341	77555	57902
Scale of Finance	-	-	56833	-	56833	-	56833	-
Credit Supplied	-	-	38830	38343	38595	35063	38689	36267
Credit Gap -I	-	-	36432 (39.06)	31693 (35.80)	12263 (17.75)	-9492 (-20.05)	20722 (26.72)	1069 (1.85)
Credit Gap-II	-	-	54435 (58.37)	50183 (56.69)	56833 (82.25)	12278 (25.93)	38866 (50.11)	21634 (37.36)

higher level and the credit supplied was lesser than the scale of finance. The credit supplied to sugarcane growers had a positive impact on the net income per ha realized, i.e., Rs. 37,381 in ST borrower farms, Rs. 44,600 in LT borrower farms and the net income was more than that of the non-borrower farms (Rs. 33,249). This would show that larger the working capital incurred, more would be the net income and for crop loan would be more helpful in application of more of cash farm inputs by way of for incurring more of working capital.

The farmers in general and small and marginal farmers in particular prefer to borrow from institutional lending agencies owing to better terms of credit - more specifically, the lower interest rate, waiver of loan in case of crop damage due to natural calamities and so on.

However, farmers expressed several problems in availing loan amount from institutional agencies. The borrowers felt that the Inadequacy of loan amount, non-flexibility of repayment period even in cases of genuine reasons like delay in harvesting the crop or delay in payment by sugar mills. Farmers also expressed that delay in sanctioning the loan amount and a very high transaction cost in getting loan from institutional sources are the other pressing problems in institutional lending. Borrowers of commercial banks expressed that the interest subvention as in the case of co-operatives was not available to them and demanded to implement it in all the banks.

Conclusion

Among the ST Loan borrowers small farmers borrowed

more from institutional sources than the other category of farmers. Whereas, Term Loans for small farm investments were largely given to medium and large farmers and not to the marginal farm category. In contrast, marginal farmers accounted the highest share in non-borrowing category of farm house holds. This implies that they depend more on their own fund or from other non-institutional sources like money lenders, friends and relatives etc., The credit supplied to the sugarcane growers had a positive impact on improved asset position and net income per ha and it was found to be more than the non-borrower farm category. This shows the positive relationship between credit supplied and income of the farmers.

Delayed disbursement of loan due to want of several documents especially in Long-term lending for farm investments may be rectified by connecting all the required documents electronically with basic information of agrarian communities such that it would speed up verification of documents and other clearances.

In crop loan lending, especially at Co-operatives the allocation of funds to the village level PACS from head offices was delayed which forced the banking officials to disburse the entire sanctioned loan amount to the customary farmers and not to the newer applicants. This type of lending excludes the newer applicants from borrowing which discouraged them in approaching banking institutions further. This should be taken care of by the banking officials to expand their lending widely and enhance their financial services effectively. Credit gap

(difference between the credit requirement and supplied) was more in LT borrower farms (37 percent) than that of ST borrower farms (24 percent). Existences of Credit Gap in both the cases of crop loan and term loan-borrower farms indicated that the scale of finance was fixed at higher level and the credit supplied was lesser than the scale of finance. This should be augmented for getting better income to the farming community.

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An Inter-District Analysis of Income and Inequality among Farmers in Rural Bihar

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Abstract

An attempt is made in the present study to estimate the income distribution pattern among the different farm-size categories in the rural Bihar during the year 2010-11. The present study is based mainly on primary data collected from the four districts of Bihar covering all the agro-climatic zones. The data was collected from the 40 villages of the state and interviewed 528 farming households from Sheohar, Purnia, Lakhisarai and Bhojpur districts falling under the different agro-climatic zones in the state. The study revealed that the FBI (Farm Business Income) is the major source of income of the farming community across the sampled districts. The overall household income from agriculture has been estimated to be ` 62588.28 with highest of ` 68368.96 from Bhojpur district and lowest of `56808.65 earned by the farmers in Sheohar district. Agriculture is dominating in the total income especially for the small farmers in the state. The same situation was noticed for the inequality prevailing among the sampled districts. The inequality prevailing among the farmers with Gini's ratio and Lorenz curve has also been analyzed. Finally, a policy suggestion for sustainable livelihood for the current situation has been outlined.

Keywords: Agriculture, income, farmers, sustainable livelihood, inequality in incomes.

Introduction

Bihar is one of the Indian states where about 90 per cent of the population living in the rural areas directly or indirectly depends on agriculture which is the only major source of income for their livelihood. The state has one of the highest poverty ratios and one out of three of India's 400 million poor live in Bihar and UP (Rasul and Sharma, 2014). If we carefully concentrate on 2004-05 NSSO data, then clearly it points out that why Bihar is having more poverty than other states. It is primarily due to the land holding structure. If agriculture were to be the sole source of income for the small holders, the majority of them would have remained poor (Chand *et al.* 2011). The state of Bihar is characterized by heavy population pressure on land over a very long period. The Bihar agriculture is dominated by small holdings, and the average size of land holding shrunk to 0.39 ha in 2011 from 0.87 ha in 1995. In the state of Bihar, the land distribution is highly skewed and uneven where the marginal and small farmers accounts for about 93 per cent of farm households and 65 per cent of the area operated while, at the all India level these farm-size categories account for 83 per cent of the farm households with 42 per cent of the area operated. In contrast, large farmers comprising only 0.26 per cent of the total landholdings, accounts for only 4.75 per cent of the area operated in Bihar. For marginal and small farmers, that is, for 93 per cent of the agricultural households, though agriculture is the main occupation, their livelihood depends on multiple sources like non-agriculture, agricultural labour and others labour. Consequently, about one-third of rural households of Bihar in 2002-03 were landless and another 15 percent operated holdings smaller than 400 m2 (NSS report No. 492, 2002-03, p. 176, cited in Mishra, 2007). After bifurcation of Jharkhand in 2000, now it is totally dependent on agriculture as major natural resources has gone to the later state.

At the national level, it is being recognized that Bihar is a sleeping giant as far as potential for agriculture growth is concerned. The tate is lacking behind in the term of the productivity of the major crops as compared to the major states of the countryside as well as at the national average (Pandey, 2012). The large population base, predominance in the economy so far of self-employed persons, and dependence on agriculture with its use of traditional methods of production introduces, apart from unemployment, a fair measure of underemployment. In recent years, growth has not reflected itself in sufficient generation of employment opportunities (Tomar, 2012). Increase in agricultural productivity is the key to improving living condition of farming community and promoting non-farm activities through forward and backward linkages (Singh, 2013). It is now widely recognized that high growth in agriculture is essential for stimulating high productivity of the non-agricultural sector to bring the desire improvement in the socio-economic conditions of the large section of the population (Kumar, 2011).

In a study, Coppard (2001) have reported that 'non-farm farm diversification is important for the landless and

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small holders, and a growing non-farm sector can be reduce rural poverty, but may be accompanied by worsening income distribution because of differential access of the poor and the rich to the non-farm income source'. Even, due to the small land holding and agriculture is the main occupation of these people in the absence of industrialization; they are engaged themselves as disguised unemployed in the agriculture sector and marginal productivity from them is equal to zero with adverse land-man ratio which is also cause for low productivity of the state. This is one of the reasons for the highest migration of people from the state.

The most appropriate measure of farmers' well-being is the level of farm income. However, appropriate estimates of farm income are not available in most countries, including India. In the absence of this information, conclusions on the state of farmers and their income are drawn by alluding to policies or indicators that directly or indirectly affect agriculture and farmers' income, or, by using indicators that are proxies for farmers' income (Chand, 2015). Poverty as a concept is closely related to inequality. Given the average income level, a higher level of inequality will tend to be associated with a higher level of poverty (Sen, 1974). The existence of large disparities in living standards between regions and between classes of people is widely believed to be an attempt cause of prevailing social tension and unrest (vaidyanathan, 1974).

In the above context, the present paper has analyzed the levels of income of the farmers from the different sources. Distribution of income or inequality of income and livelihood issues of different farming community has been also analyzed, which is one of the main problems persisting in the state. The discussion has covered levels of income by different farming communities and composition of income source. Finally, a policy suggestion for the improvement of income level of the farming segment which can improve the levels of living of the farming community in the rural Bihar.

Materials and Methods

The Data

The present study, based on multi-stage stratified random sampling technique related to year 2010-11. At the first stage, three agro climatic zones have been selected in which third zone has two sub-zones. This means that altogether four agro-climatic zones were taken. Keeping in view the differences in agro-climatic conditions, one district from each zone has been selected, *i.e.,* Sheohar district from Zone-I, Purnia district from Zone-II, Lakhisarai district from zone-III (A) and Bhojpur district from Zone-III (B). From each selected districts, every blocks have been chosen and from each selected blocks,

one village was selected randomly. From these villages, a comprehensive list of the different group of farmers household was prepared. From this list, five percent of farm households were selected randomly from each farm-size categories. Thus total sample consists of four districts, forty blocks, forty villages and 528 farm households. Out of the total farm household surveyed, 78 were landless, 257 were marginal, 119 were small, 52 were medium and remaining 22 were large farmers. The details on households, cropping pattern, yield and income from the different sources were collected through a structured questionnaire.

Methodology

A simple average, percentages as well as Gini's coefficient with Lorenz curve have used to analyze the data for the study. Lorenz curve is also widely used device for analyzing income and wealth inequality. In this study, the axis X-axis of the Lorenz curve includes value of cumulative percentage of households and Y- axis includes value of cumulative percentage of per capita income. For complete equality of income the Lorenz curve would be straight line; it become more curved as inequality increases. Gini's coefficient, which is a widely used to measure inequality, because of its certain desirable properties. It is the ratio of the area between diagonals and the Lorenz curve to the total area under the diagonals. It expressed as:

Gini's coefficient = $\{(X_i)^* (Y_{i+1})\} - \{(X_{i+1})^* (Y_i)\}$

Where,

X_i is cumulative percentage of households

Y_i is cumulative percentage of per capita income

X_{i+1} is cumulative percentage of household log on

Y_{i+1} is cumulative percentage of per capita income log on

The larger the value of Gini's coefficient or closer to the coefficient value to unity i.e. 1 the greater is inequality.

However, Farm Business Income (FBI) calculated as:

Farm Business Income (FBI) = GVTO - TIC

Where, GVTO is Gross Value of Total Production/ Output including value of Bio-products as well and TIC is Total Input Cost incurred for production from all the sources.

Results and Discussion

Levels of Household Income: District-wise

The mean values of income earned by the different farm-size categories across the districts in rural Bihar are

shown in Table 1. There are considerable variations in the income levels of the different farm-size categories across the districts. An average farming household in the Sheohar and Purnia districts earned almost the same income, *i.e.,* ₹ 56,808.65 and ₹ 57,846.27 respectively, whereas the household income of an average farming household in the Lakhisarai district is ₹ 64,471.13 and in Bhojpur district is ₹ 68,368.96. By virtue of being farmers, the farm business income is the major source of income of all the farming categories across the sampled districts.

The landless farming households earned ₹ 31,807.14, ₹ 32,682.78, ₹ 36,784.62 and ₹ 30,665.38 in the Sheohar, Purnia, Lakhisarai and Bhojpur districts respectively. Apart from income from farm business; income from dairying, remittances, and hiring-out labour in agriculture are also important sources of income for the landless farmers in all the selected districts. The table reflects that income from remittances is the highest in Lakhisarai district among all the sampled districts under study which clearly shows that the proportion of migrant labourers is relatively more in this district as compared to others.

The average household income of the marginal farm-size category is the highest in Bhojpur district, *i.e.,* ₹ 49,154.71 and the lowest ₹ 33,128.97 in Purnia district. Major sources of income in all the selected districts are farm business income and hiring out agricultural machinery and equipment. It is pertinent to note that average per household income from poultry is negligible in Bhojpur and Sheohar districts, i.e., about ₹ 11 and ₹ 57.69, while the situation is marginally better in Purnia and Lakhisarai districts where the contribution from this source is ₹ 292.89 and ₹ 309.28 respectively. It may be due to the production of maize crops in these districts are more as compared to two other districts, which is required for the feeding poultry and lechery. It has been also pointed out during the field survey that minority groups were more in these districts and they have engaged in this activity. So, the income from this source was high in these districts as compared to Lakhisarai and Bhojpur districts.

Average household income of the small farm-size category is the highest in Bhojpur district, *i.e.,* ₹ 82,076.74, followed by Lakhisarai (₹ 74,432.61), Purnia (₹ 71,881.86) and Sheohar (₹ 57,195.45) districts. Farm business income is a major source of income for the small farm-size category in the four districts. Apart from this, income from pensions appears at the second rank for the small farm-size category in Sheohar district, followed by income from remittances. Income from hiring out agricultural machinery and equipment appears at the second rank in the other three districts for the small farm-size category.

TABLE 1 INCOME LEVELS OF FARMERS IN RURAL BIHAR: DISTRICT-WISE

(Mean Values in ₹ per Annum)

S. No.	Sources of Income	Sheohar District						Purnia District					
		Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers	Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers
1.	Farm Business Income	20250.00	30638.89	34495.45	49140.00	120000.00	35272.12	24451.53	22123.81	45736.62	69258.82	131488.89	36599.98
2.(i)	Poultry*	0.00	111.11	0.00	0.00	0.00	57.69	359.38	398.97	130.95	117.65	0.00	292.89
(ii)	Dairying*	2842.86	4400.00	4363.64	7800.00	0.00	4340.38	2325.00	1776.29	2257.14	8647.06	2666.67	2601.52
(iii)	Hiring-out labour in agriculture sector	2828.57	518.52	0.00	0.00	0.00	650.00	3587.50	984.54	0.00	0.00	0.00	1067.51
(iv)	Hiring-out agricultural machinery & equipment	1142.86	907.41	2954.55	19000.00	19000.00	3807.69	687.50	2652.58	10280.95	13970.59	44888.89	6865.99
(v)	Leased-out land	0.00	0.00	0.00	10000.00	50000.00	2884.62	0.00	0.00	809.52	3352.94	25555.56	1629.44
(vi)	Salaries	0.00	888.89	1818.18	0.00	0.00	846.15	0.00	515.46	0.00	1647.06	26666.67	1614.21
(vii)	Pensions	0.00	2777.78	8000.00	0.00	0.00	3134.62	0.00	494.85	1666.67	8470.59	0.00	1329.95
(viii)	Remittances	4428.57	3000.00	5181.82	4600.00	0.00	3692.31	875.00	2835.05	5309.52	5470.59	7668.67	3492.48
(ix)	Other Sources**	314.29	3222.22	381.82	3400.00	0.00	2123.08	396.88	1347.42	5690.48	3882.35	1666.67	2352.28
	Sub-total	11557.14	15825.93	22700.00	44800.00	69000.00	21536.54	8231.25	11005.15	26145.24	45558.82	109113.11	21246.28
	Total Income	31807.14	46464.81	57195.45	93940.00	189000.00	56808.65	32682.78	33128.97	71881.86	114817.65	240602.00	57846.27

(Mean Values in ₹ per Annum)

S.No.	Sources of Income	Lakhisurai District						Bhojpur District					
		Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers	Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers
1.	Farm Business Income	18900.00	24690.63	42650.00	60911.11	145050.00	36496.91	19242.31	30707.65	49216.28	114780.95	137157.14	41962.36
2. (i)	Poultry*	0.00	625.00	0.00	0.00	0.00	309.28	76.92	0.00	0.00	0.00	0.00	10.99
(ii)	Dairying*	4884.62	4250.00	5347.83	8222.22	14750.00	5396.91	2903.85	2894.12	1093.02	5761.90	10857.14	2689.56
(iii)	Hiring-out labour in agriculture sector	2692.31	479.17	695.65	0.00	0.00	762.89	2750.00	694.12	0.00	0.00	0.00	717.03
(iv)	Hiring-out agricultural machinery & equipment	0.00	1687.50	7565.22	18222.22	58750.00	6742.27	230.77	5211.76	15000.00	23476.19	35142.86	8719.78
(v)	Leased-out land	0.00	0.00	2173.91	10000.00	15000.00	2061.86	0.00	117.65	2860.47	25619.05	25000.00	3686.81
(vi)	Salaries	4615.38	937.50	3130.43	0.00	0.00	1824.74	0.00	564.71	8325.58	4761.90	14285.71	2780.22
(vii)	Pensions	0.00	1750.00	6739.13	0.00	15000.00	3082.47	0.00	4258.82	2232.56	7666.67	12571.43	3401.10
(viii)	Remittances	5692.31	8270.83	5434.78	4666.67	0.00	6577.32	4884.62	3470.59	2325.58	0.00	0.00	2868.13
(ix)	Other Sources**	0.00	1812.50	695.65	1666.67	0.00	1216.49	576.92	1235.29	1023.26	5476.19	0.00	1532.97
	Sub-total	17884.62	19812.50	31782.61	42777.78	103500.00	27974.23	11423.08	18447.06	32860.47	72761.90	97857.14	26406.59
	Total Income	36784.62	44503.13	74432.61	103688.89	248550.00	64471.13	30665.38	49154.71	82076.74	187542.86	235014.29	68368.96

Source: Field Survey, 2010-11.
Note: *Net income is taken
**It includes income from hiring out labour in non-agricultural sector and income from small businesses
like shop-keeping etc.

Average household income of the medium farm-size category is the highest in Bhojpur district, i.e., ₹ 1,87,542.86 and the lowest in Sheohar district, i.e., ₹ 93,940.00. Apart from farm business income, income from hiring-out agricultural machinery and equipment appears at the second rank in Sheohar, Purnia and Lakhisarai districts for the medium farm-size category. Average income from leasing-out land appears at the second rank for the medium farm-size category in Bhojpur district.

The average annual income of the large farm-size category is the highest in Lakhisarai district, i.e., ₹ 2,48,550.00 and the lowest in Sheohar district, i.e., ₹ 1,89,000.00. Farm business income is a major source of income for the large farm-size category in the four selected districts. Apart from this, the large farm-size category in Sheohar district earns ₹ 50,000.00 and ₹ 19,000.00 from leasing-out land and hiring-out agricultural machinery and equipment respectively. In Purnia district, average income from hiring out agricultural machinery and equipment and salaries is ₹44,888.89 and ₹ 26,666.67 respectively for the large farm-size category. In Lakhisarai and Bhojpur districts, income from hiring out agricultural machinery and equipment, and leasing out land appears at the second and third ranks respectively for the large farm-size category.

Pattern of Household Income: District-wise

The relative shares of income from the different sources are exhibited in Table 2. The table reveals that for an average farming household the relative share of farm business income in the total income is the highest in Purnia district, i.e., 63.27 percent followed by Sheohar (62.09 percent), Bhojpur (61.38 percent) and Lakhisarai (58.61 percent) districts. The share of income from hiring out agricultural machinery and equipment in the total income is the highest in the Bhojpur district, i.e., 12.75 percent followed by the Purnia (11.87 percent), Lakhisarai (10.46 percent) and Sheohar (6.70 percent) districts. The table also depicts that the share of income from dairying in the total income is the highest in Lakhisarai district, i.e., 8.37 percent followed by the Sheohar (7.64 percent), Purnia (4.50 per cent) and Bhojpur (3.93 percent) districts.

In the case of landless farm-size category, relative share of farm business income is the highest in Purnia district (74.81 percent) followed by Sheohar (63.66 percent), Bhojpur (62.75 percent) and Lakhisarai (51.38 percent) districts. The share of income from dairying is the highest (13.28 per cent) for the landless farm-size category in Lakhisarai district followed by Bhojpur, Sheohar and Purnia districts. The share of income from hiring-out agricultural labour in the total income for the

landless farm-size category is the highest in Purnia district, i.e., 10.98 percent and the lowest in Lakhisarai district, i.e., 7.32 percent. The share of income from remittances for the landless farm-size category is the highest (15.93 per cent) in Bhojpur district followed by Lakhisarai, Sheohar and Purnia districts.

In the case of marginal farm-size category, relative share of farm business income is the highest in Purnia district (66.78 percent) followed by Sheohar (65.94 percent), Bhojpur (62.47 percent) and Lakhisarai (55.48 percent) districts. The field survey revealed that the highest contribution of FBI in total income in Purnia district because majority of people working as cultivators and agricultural labourers due to the lack of non-agriculture sector employment opportunities as majority of them are illiterate and unable to get employment in other sectors also. The literacy rate of the Muslim population in the district is further lower as well as combined literacy as compared to other sampled districts. The share of income from dairying is the highest (9.55 percent) for the marginal farm-size category in Lakhisarai district followed by Sheohar, Bhojpur and Purnia districts. The share of income from remittances is the highest (18.58 percent) for the marginal farm-size category in Lakhisarai district followed by Purnia, Bhojpur and Sheohar districts.

The relative share of farm business income in total income for the small farm-size category is 63.63, 60.31, 59.96 and 57.30 percent in Purnia, Sheohar, Bhojpur and Lakhisarai districts respectively. In Sheohar district, other important sources of income for the small farm-size category are income from pensions and dairying. In Purnia district, the second and third ranks in the income pattern go to the income from hiring out agricultural machinery and equipment as well as other sources respectively. In Lakhisarai district, the second and third ranks in the income pattern go to the income from hiring-out agricultural machinery and equipment and pensions respectively. In Bhojpur district, income from hiring out agricultural

machinery and equipment, and salaries get the second and third ranks in the income pattern respectively.

An average medium farming household earns 63.24, 60.32, 58.74 and 52.31 percent of the total income as farm business income in Bhojpur, Purnia, Lakhisarai and Sheohar districts respectively. Apart from farm business income, the medium farm-size category gets 20.23 and 10.65 percent income from hiring out agricultural machinery and equipment and leasing-out land respectively in Sheohar district. In Purnia district, the medium farm-size category gets 12.17 and 7.53 percent income from hiring-out agricultural machinery and equipment, and dairying respectively. The medium farm-size category in Lakhisarai district gets 17.57 and 9.64 percent from hiring-out agricultural machinery and equipment, and leasing-out land respectively. In Bhojpur district, the medium farm-size category gets 15.83 percent and 10.77 percent income from leasing-out land, and hiring-out agricultural machinery and equipment respectively.

The share of farm business income in the total income earned by the large farm-size category is 63.49 percent in Sheohar district, 58.36 percent each for Lakhisarai and Bhojpur districts and 54.65 percent in Purnia district. In Sheohar district, the large farm-size category gets 26.46 and 10.05 percent income from leasing-out land and hiring-out agricultural machinery and equipment respectively. In Purnia district, large farm-size category earns 18.66 percent income from hiring-out agricultural machinery and equipment followed by income from salaries (11.08 percent) and leasing-out land (10.62 per cent). In Lakhisarai district, these farmers get 23.64 percent income from hiring-out agricultural machinery and equipment followed by income each from leased-out land and pensions, i.e., 6.04 and dairying (5.93 percent) respectively. In Bhojpur district, the large farm-size category gets 14.95 and 10.64 percent income from hiring out agricultural machinery and equipment and leasing-out land respectively.

TABLE 2 INCOME PATTERN OF FARMERS IN RURAL BIHAR: DISTRICT-WISE

(Percentage of Total Income)

S. No.	Sources of Income	Sheohar District						Purnia District					
		Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers	Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers
1.	Farm Business Income	63.66	65.94	60.31	52.31	63.49	62.09	74.81	66.78	63.63	60.32	54.65	63.27
2. (i)	Poultry*	0.00	0.24	0.00	0.00	0.00	0.10	1.10	1.20	0.18	0.10	0.00	0.51
(ii)	Dairying*	8.94	9.47	7.63	8.30	0.00	7.64	7.11	5.36	3.14	7.53	1.11	4.50
(iii)	Hiring-out labour in agriculture sector	8.89	1.12	0.00	0.00	0.00	1.14	10.98	2.97	0.00	0.00	0.00	1.85
(iv)	Hiring-out agricultural machinery & equipment	3.59	1.95	5.17	20.23	10.05	6.70	2.10	8.01	14.30	12.17	18.66	11.87

(Percentage of Total Income)

S.No.	Sources of Income	Sheohar District						Purnia District					
		Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers	Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers
(v)	Leased-out land	0.00	0.00	0.00	10.65	26.46	5.08	0.00	0.00	1.13	2.92	10.62	2.82
(vi)	Salaries	0.00	1.91	3.18	0.00	0.00	1.49	0.00	1.56	0.00	1.43	11.08	2.79
(vii)	Pensions	0.00	5.98	13.99	0.00	0.00	5.52	0.00	1.49	2.32	7.38	0.00	2.30
(viii)	Remittances	13.92	6.46	9.06	4.90	0.00	6.50	2.68	8.56	7.39	4.76	3.19	6.04
(ix)	Other Sources**	0.99	6.93	0.67	3.62	0.00	3.74	1.21	4.07	7.92	3.38	0.69	4.07
	Sub-total	36.34	34.06	39.69	47.69	36.51	37.91	25.19	33.22	36.37	39.68	45.35	36.73
	Total Income	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

S.No.	Sources of Income	Lakhisurai District						Bhojpur District					
		Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers	Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers
1	Farm Business Income	51.38	55.48	57.30	58.74	58.36	56.61	62.75	62.47	59.96	63.24	58.36	61.38
2. (i)	Poultry*	0.00	1.40	0.00	0.00	0.00	0.48	0.25	0.00	0.00	0.00	0.00	0.02
(ii)	Dairying*	13.28	9.55	7.18	7.93	5.93	8.37	9.47	5.89	1.33	1.96	4.62	3.93
(iii)	Hiring-out Labour in Agriculture	7.32	1.08	0.93	0.00	0.00	1.18	8.97	1.41	0.00	0.00	0.00	1.05
(iv)	Hiring-out Agricultural Machinery & equipment	0.00	3.79	10.16	17.57	23.64	10.46	0.75	10.60	18.28	10.77	14.95	12.75
(v)	Income from Leased-out Land	0.00	0.00	2.92	9.64	6.04	3.20	0.00	0.24	3.49	15.83	10.64	5.39
(vi)	Salaries	12.55	2.11	4.21	0.00	0.00	2.83	0.00	1.15	10.14	0.00	6.08	4.07
(vii)	Pensions	0.00	3.93	9.05	0.00	6.04	4.78	0.00	8.66	2.72	3.18	5.35	4.97
(viii)	Remittances	15.47	18.58	7.30	4.50	0.00	10.20	15.93	7.06	2.83	0.00	0.00	4.20
(ix)	Other Sources**	0.00	4.07	0.93	1.61	0.00	1.89	1.88	2.51	1.25	5.01	0.00	2.24
	Sub-total	48.62	44.52	42.70	41.26	41.64	43.39	37.25	37.53	40.04	36.76	41.64	38.62
	Total Income	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Calculated from Table 1.
Note: *Net income is taken.
**It includes income from hiring out labour in non-agricultural sectors and income from small businesses like shop-keeping, etc.

Per Capita Income: District-wise

The average family-size of the sample farming households in rural Bihar is 7.71. However, there are variations in the family-size across the sampled districts. In Sheohar district, the average family-size is 8.19, whereas it is 7.60, 8.05 and 7.50 for the Purnia, Lakhisarai and Bhojpur districts respectively. As a result, it becomes relevant to analyze the per capita income levels. Table 3 shows that per capita income for an average farming household is the highest in Bhojpur district, i.e., ₹ 9,115.86 followed by Lakhisarai (₹ 8,007.30), Purnia (₹ 7,602.21) and Sheohar (₹ 6,934.39) districts. The highest per capita

income has been worked out from farm business income. It comes to ₹ 5,594.98, ₹ 4,810.00, ₹ 4,532.91 and ₹ 4,305.52 for the four respective districts. Apart from farm business income, per capita income from hiring-out agricultural machinery and equipment appears at the second rank in Bhojpur, Lakhisarai and Purnia districts. In Sheohar district, per capita income from dairying appears at the second rank followed by income from hiring out agricultural machinery and equipment.

In the case of landless farm-size category, the highest per capita income is found in Lakhisarai district followed by Bhojpur, Purnia and Sheohar districts respectively.

However, the per capita income of the marginal farm-size category is the highest in the Bhojpur district followed by Sheohar, Lakhisarai and Purnia districts respectively. The small farm-size category earns Rs. 10,229.86 per capita annually in the Bhojpur district and Rs. 9,354.92 in Lakhisarai district. It further declines from Rs. 8, 958.57 in Purnia district to Rs. 6,990.56 in Sheohar district. The per capita income of the medium farm-size category is found to be the highest in Purnia district, i.e., Rs. 16,131.40 followed by Rs. 13,333.14, Rs. 10, 726.44, and Rs. 9,785.42 for Bhojpur, Lakhisarai and Sheohar districts respectively. The per capita income of the large farm-size category is Rs. 25,179.28 in the Purnia district followed by Rs. 22,595.45, Rs. 21,091.03 and Rs. 16,434.78 for Lakhisarai, Bhojpur and Sheohar districts respectively.

TABLE 3 PER CAPITA INCOME OF FARMERS IN RURAL BIHAR: DISTRICT-WISE

(In ₹ Per Annum)

S.No.	Sources of Income	Sheohar District						Purnia District					
		Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers	Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers
1.	Farm Business Income	2286.29	4075.12	4216.11	5118.75	10434.78	4305.52	3155.04	3035.37	5700.11	9730.58	13760.47	4810.00
2. (i)	Poultry*	0.00	14.78	0.00	0.00	0.00	7.04	46.37	54.74	16.32	16.53	0.00	38.49
(ii)	Dairying*	320.97	585.22	533.33	812.50	0.00	529.81	300.00	243.71	281.31	1214.88	279.07	341.89
(iii)	Hiring-out Labour in Agriculture	319.35	68.97	0.00	0.00	0.00	79.34	462.90	135.08	0.00	0.00	0.00	140.29
(iv)	Hiring-out Agricultural Machinery & equipment	129.03	120.69	361.11	1979.17	1652.17	464.79	88.71	363.93	1281.31	1962.81	4697.67	902.33
(v)	Income from Leased-out Land	0.00	0.00	0.00	1041.67	4347.83	352.11	0.00	0.00	100.89	471.07	2674.42	214.14
(vi)	Salaries	0.00	118.23	222.22	0.00	0.00	103.29	0.00	70.72	0.00	231.40	2790.70	212.14
(vii)	Pensions	0.00	369.46	977.78	0.00	0.00	382.63	0.00	67.89	207.72	1190.08	0.00	174.78
(viii)	Remittances	500.00	399.01	633.33	479.17	0.00	450.70	112.90	388.97	661.72	768.60	802.53	458.98
(ix)	Other Sources**	35.48	428.57	46.67	354.17	0.00	259.15	51.21	184.87	709.20	545.45	174.42	309.14
	Sub-total	1304.84	2104.93	2774.44	4666.67	6000.00	2628.87	1062.10	1509.90	3258.46	6400.83	11418.81	2792.21
	Total Income	3591.13	6180.05	6990.56	9785.42	16434.78	6934.39	4217.13	4545.28	8958.57	16131.40	25179.28	7602.21

Sl. No.	Sources of Income	Lakhisurai District						Bhojpur District					
		Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers	Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers
1.	Farm Business Income	2700.00	3151.99	5360.38	6301.15	13186.36	4532.91	2960.36	4343.01	6134.20	8431.98	12308.97	5594.98
2. (i)	Poultry*	0.00	79.79	0.00	0.00	0.00	38.41	11.83	0.00	0.00	0.00	0.00	1.47
(ii)	Dairying*	697.80	542.55	672.13	850.57	1340.91	670.29	446.75	409.32	136.23	261.63	974.36	358.61
(iii)	Hiring-out Labour in Agriculture	384.62	61.17	87.43	0.00	0.00	94.75	423.08	98.17	0.00	0.00	0.00	95.60
(iv)	Hiring-out Agricultural Machinery & equipment	0.00	215.43	950.82	1885.06	5340.91	837.39	35.50	737.10	1869.57	1436.05	3153.85	1162.64

(In ₹ Per Annum)

Sl. No.	Sources of Income	Lakhisurai District						Bhojpur District					
		Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers	Landless Farmers	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers	All Sampled Farmers
(v)	Income from Leased-out Land	0.00	0.00	273.22	1034.48	1363.64	256.08	0.00	16.64	356.52	2110.47	2243.59	491.58
(vi)	Salaries	659.34	119.68	393.44	0.00	0.00	226.63	0.00	79.87	1037.68	0.00	1282.05	370.70
(vii)	Pensions	0.00	223.40	846.99	0.00	1363.64	382.84	0.00	602.33	278.26	424.42	1128.21	453.48
(viii)	Remittances	813.19	1055.85	683.06	482.76	0.00	816.90	751.48	490.85	289.86	0.00	0.00	382.42
(ix)	Other Sources**	0.00	231.38	87.43	172.41	0.00	151.09	88.76	174.71	127.54	668.60	0.00	204.40
	Sub-total	2554.94	2529.25	3994.53	4425.28	9409.09	3474.39	1757.39	2608.98	4095.65	4901.16	8782.05	3520.87
	Total Income	5254.95	5681.25	9354.92	10726.44	22595.45	8007.30	4717.75	6952.00	10229.86	13333.14	21091.03	9115.86

Source: Calculated from Table 1

Note: *Net income is taken.

 **It includes income from hiring out labour in non-agricultural sectors and income from small businesses like shop-keeping, etc.

District-wise Distribution of Household Income

District-wise distribution of household income is presented in Table 4 and Lorenz curve in Figure 1. Among the four sampled districts, Bhojpur district shows more inequalities in household income distribution in comparison to the other districts. Bottom 10 percent of the farming household's claim 3.98 percent of the total income in Bhojpur district. The corresponding figures for Sheohar, Purnia and Lakhisarai districts are 4.09, 4.15 and 3.53 percent respectively. In contrast top 10 percent farming households share the highest income in the Bhojpur district, *i.e.,* 26.65 percent, followed by the Purnia (20.92 percent), Lakhisarai (19.04 percent) and Sheohar (15.03 percent) districts.

TABLE 4 Distribution of Household Income of Farmers in Rural Bihar: District-wise

Cumulative Percentage of Households	Cumulative Percentage of Household Income			
	Sheohar District	Purnia District	Lakhisarai District	Bhojpur District
10	4.09	4.15	3.53	3.98
20	10.01	10.09	10.28	9.13
30	16.86	17.24	17.42	14.95
40	25.85	25.41	25.02	21.59
50	35.52	34.48	33.45	28.48

Cumulative Percentage of Households	Cumulative Percentage of Household Income			
	Sheohar District	Purnia District	Lakhisarai District	Bhojpur District
60	47.21	44.37	43.21	37.06
70	58.97	55.07	54.48	46.59
80	71.61	66.59	67.07	58.10
90	84.97	79.08	80.96	73.35
100	100.00	100.00	100.00	100.00
Gini Coefficient	0.18	0.23	0.23	0.31

Source: Field Survey, 2010-11.

A clear picture emerges when we compare the bottom 40 per cent farming households with the top 10 percent farming households. Bottom 40 percent households share only 25.85, 25.41, 25.02 and 21.59 percent of the total income in the Sheohar, Purnia, Lakhisarai and Bhojpur districts respectively. Whereas top 10 per cent farming households from these respective districts claim 15.03, 20.92, 19.04 and 26.65 percent of the total income. The values of Gini coefficient also support our earlier evidence that concentration of household income is slightly higher in the Bhojpur district and lower in Sheohar district. The value of Gini coefficient is 0.31 for Bhojpur district, whereas these values are 0.23 each for Lakhisarai and Purnia district and 0.18 for Sheohar district.

Fig. 1 Lorenz Curve of Households

Comulative Percentage of Per Capita Income (y-axis)
Comulative Percentage of Farmers (x-axis)

Legend:
- Equality
- Sheohar
- Purnia
- Lakhisarai
- Bhojpur
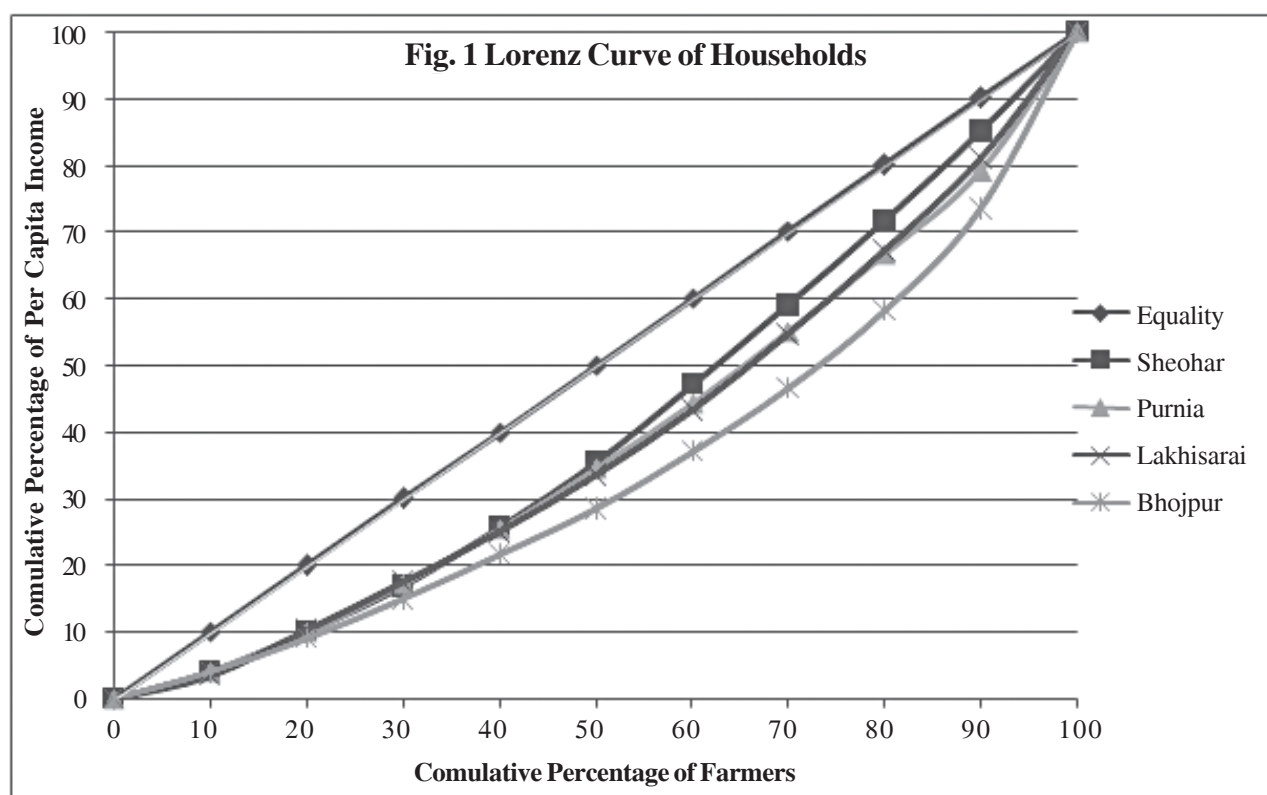
District-wise Distribution of Per Capita Income

The distribution of per capita income among the farmers in the different districts is presented in Table 5. There are more disparities in the distribution of per capita income in comparison to inequalities for the household income distribution among the sampled districts. If we compare the distribution pattern of per capita income among the four sampled districts, the concentration of per capita income in Bhojpur district is more than that of the other three districts. The bottom 10 per cent of the farmers claims 2.35 per cent of the total per capita income in Bhojpur district. This share is 2.71, 2.89 and 2.47 per cent in Lakhisarai, Purnia and Sheohar districts respectively. Whereas the top 10 per cent farmers share 39.25 per cent of the total per capita income in Bhojpur district followed by Purnia (28.18 per cent), Lakhisarai (23.00 per cent) and Sheohar (18.86 per cent) districts.

TABLE 5 Distribution of Per Capita Income of Farmers in Rural Bihar: District-wise

Cumulative Percentage of Persons	Cumulative Percentage of Per Capita Income			
	Sheohar District	Purnia District	Lakhisarai District	Bhojpur District
10	2.47	2.89	2.71	2.35
20	7.38	7.32	7.03	5.85
30	13.75	12.78	12.98	10.17
40	21.81	19.08	20.70	15.23
50	30.61	26.28	28.00	21.23
60	40.25	34.83	37.39	28.16
70	51.35	44.96	48.18	36.51
80	65.05	57.11	61.02	46.82
90	81.14	71.82	77.00	60.75
100	100.00	100.00	100.00	100.00
Gini Co-efficient	0.27	0.34	0.31	0.44

Source: Field Survey, 2010-11.

Fig. 1 Lorenz Curve of Per Capita
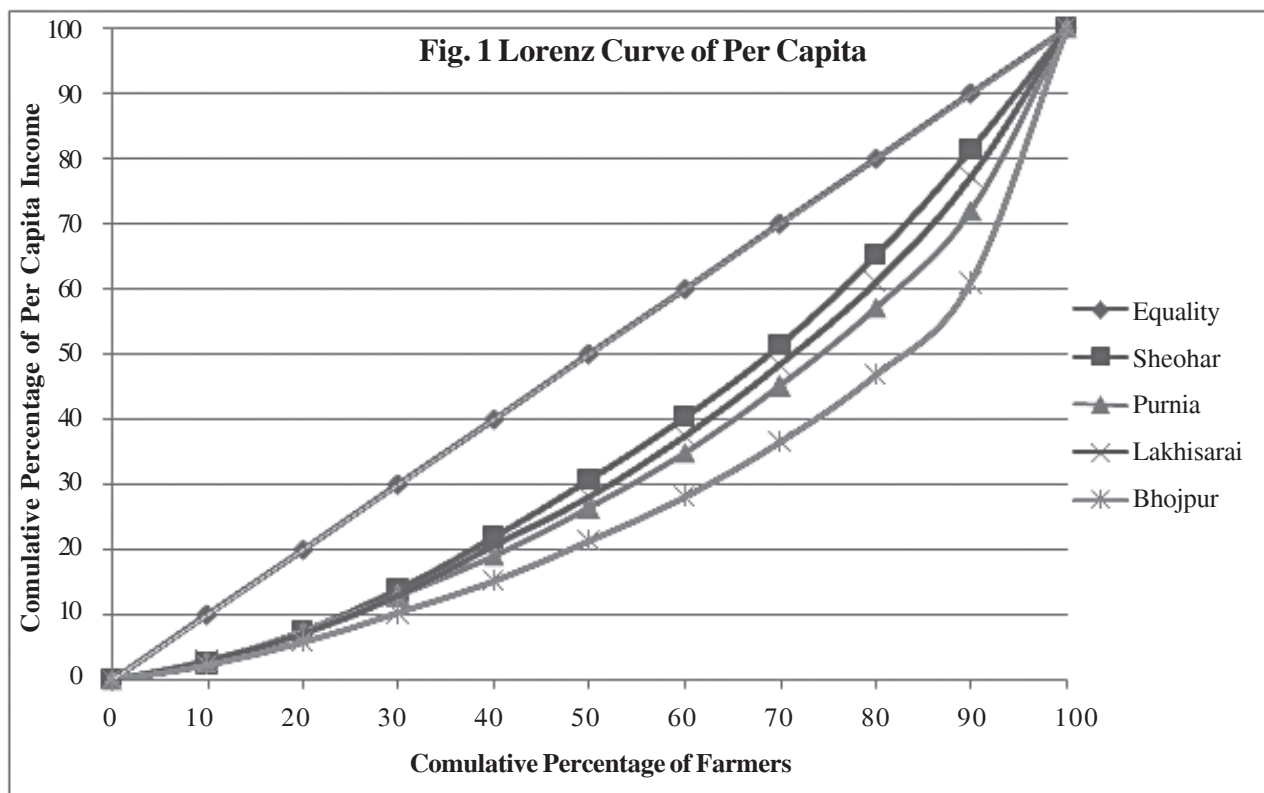
The Bottom 50 percent farmers just share 30.61, 26.28, 28.00 and 21.23 percent of the total income in Sheohar, Purnia, Lakhisarai and Bhojpur districts respectively. The top 20 percent farmers share 34.95, 42.89, 38.98 and 53.18 percent of the total income in Sheohar, Purnia, Lakhisarai and Bhojpur districts respectively. Even in Bhojpur and Purnia districts, share of the bottom 50 per cent of farmers is less than the share of top 10 percent of farmers in these districts. The value of Gini coefficient shows that concentration of per capita income is relatively more in Bhojpur district in comparison to the remaining three districts. A relatively fair distribution of per capita income has been observed in Sheohar district. The value of Gini coefficient is as high as 0.44 in Bhojpur district followed by Purnia (0.34), Lakhisarai (0.31) and Sheohar (0.27) districts.

Conclusion and Suggestions

From the above discussion, it has been cleared that per capita income from all the sources is positively correlated with the farm-size categories across the sampled districts in the rural Bihar. The study found that while the small farmers in Bihar superior in terms of production performance; it is weak in terms of generating adequate income and substaining livelihood; the present study also supports the findings of Bhalla (2008) study in which he has used the data of NSS survey 2003. It has been calculated that an average farming household in Sheohar and Purnia districts earned almost the same income, whereas the household income of an average farming

household in the Lakhisarai and Bhojpur Districts varied somehow. The analysis of income pattern shows that the farm business income is a major source of income for all farm-size categories across the sampled districts. As far as income from hiring-out agricultural machinery and equipments is concerned then it has been found the highest in Bhojpur district. Per capita income for an average farming household is the highest in Bhojpur district, followed by Lakhisarai Purnia and Sheohar districts. Among the four sampled districts, Bhojpur district shows more inequalities in household income and per capita income distribution in comparison to the other districts. The value of Gini coefficient for household income is the highest (0.31) for Bhojpur district and the lowest (0.18) for Sheohar district.

Serious steps should be taken to create employment avenues for small holders outside agriculture. Increase in agricultural productivity is the key to improving living condition of farming community and promoting non-farm activities through forward and backward linkages (Singh, 2013). Small as well as marginal farmer's supplementary sources of income i.e., poultry and dairying etc, can directly increase their income level; because income from these sources is very small in the total income of the farming community. The potential of animal husbandry has not been fully tapped in the state. Scientific management and development of livestock resources is a big hope need to be promoted in a big way. In theory, titling is supposed to improve farm productivity by providing secure security for inputs loans for small land

holder farmers. Better credit and subsidies directly to small land holders means more and better inputs and thus improved productivity. Like government of Punjab, Bihar should also provide facilities like electricity free of cost or at very subsidized rates to the farmers, which can directly reduce the cost of irrigation for the small and marginal farmers. Rural electrification is one state initiative which can provide major boost to agriculture in Bihar. It can bring down the cost of irrigation and improve the working capital situation of small farmers. This seems to be the better way to achieve higher productivity and sustain agricultural growth together with augmenting the income of small holders for improving their levels of living.

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Assessment of Pre and Post harvest Losses of Rice and Red Gram in Karnataka*

Elumalai Kannan, Pramod Kumar, Kedar Vishnu and Hanna Abraham

I. Introduction

In India, the green revolution technology introduced in the late 1960s, brought out significant changes incrop-pest complexes. The process of agricultural development changed the commodity production system; from a multi commodity production system to a specialised system, encompassing use of new technology in cultivation practices, intensive application of fertilisers, pesticides and irrigation water. These developments, among others, have led to an increase in pest and diseases, and therefore a consequent increase in the use of pesticides, to raise the crop productivity. The increased use of pesticides has resulted in developing resistance by insects and disease, which further led to reduction in crop yield.

Although estimates of crop losses caused by pests and diseases are available from the controlled experimental field trails, but the knowledge on the subject of crop loss at the farm level is very much limited. The estimation of crop loss due to pests and diseases is a complex subject and it is difficult to assess the loss caused by the individual pest as a particular crop may be infested by the pest complex in the farmers' field conditions. Further, the extent of crop loss depends on the type of variety, stage of crop growth, pest population and weather conditions. The crop loss estimates derived from experimental treatment approach to do not reflect the actual field conditions. Further, these estimates may not be useful for extrapolation over a geographical area. On the other hand, crop loss estimates collected directly from the farmers through sample survey may be reliable and can be used for extrapolation in similar geographical settings. In addition to losses that occur during the crop growth period, there is a huge quantity of grains lost during the process of harvesting, threshing, transportation and storage. In India, availability of reliable crop loss estimates at different stages of post harvesting is scanty. Both the quantity and quality losses are encountered during harvest and post harvest stages. The present study has attempted to estimate the pre and post harvest losses in paddy and red gram in Karnataka.

The present study has focused on the following objectives.

1 To estimate the physical losses caused by pests and diseases in rice and tur at farm level.

2. To examine the measures of pest and disease management to reduce the crop loss due to pests and diseases at farm level.

3. To arrive at post harvest losses in rice and tur under different agro climatic conditions.

4. To identify factors responsible for such losses and suggest ways and means to reduce the extent of losses in different operations in order to increase national productivity.

This study has mainly relied on the data collected through a primary survey of paddy and red gram farmers conducted during 2011-12 in Karnataka. Two major districts (Mysore and Shimoga for paddy; Gulbarga and Bidar for red gram) were selected for each reference crop based on their area share. From each district, one taluk was selected based on the highest share of area under reference crops within the district. The districts and taluks were chosen in such a way that they fall in different agro climatic zones. For rice, sample districts of Mysore and Shimoga fall under Southern Dry Zone and Southern Transition Zone, respectively. For red gram, while Gulbarga falls under North-Eastern Dry Zone, Bidar comes under North-Eastern Transition Zone. From each taluk/ district, two villages with one nearby the market/mandi centre and one far off from the market centre were selected for canvassing the household interview schedule. In total, four villages and from each village random sample of 40 farmers were selected. A total sample of 160 farmers surveyed for each crop.

II. Main Findings

Area, Production and profitability of Selected Crops in Karnataka

During 1971-72 to 1980-81, growth in area and yield of rice was positive, which resulted in the annual production growth of 1.63 per cent. In case of tur, growth in area was impressive with 3.36 per cent and it was statistically significant. Correspondingly, growth in yield of tur was high at 2.19 per cent. A high growth in area and yield has resulted in appreciable growth (5.54 per cent) in production of tur. However, during 1981-82 to 1990-91, growth in yield of tur was negative and significant, which

led to fall in production. Similarly, growth in yield of rice decelerated during this period, which resulted in lower growth in output.

During 1991-92 to 2000-01, most crops had registered positive and statistically significant growth in production. The trend annual growth in rice production was 2.97 per cent in tur production it was 8.23 per cent. High growth in production was mainly contributed by high growth in yield. Interestingly, this high growth momentum also continued during 2000s. Trend growth in production of tur was high at 9.69 per cent, which was contributed by significant growth in area and yield. Trend growth in rice production was 4.24 per cent, which was mainly contributed by area. Growth in rice yield was not significant as compared to the previous period.

Among the rice growing districts, Raichur accounted for 11.4 per cent of total area and 12.5 per cent of production in TE 2009-10. Raichur, therefore, has emerged to be dominant district in rice cultivation in Karnataka. The other important districts occupying considerable area under rice cultivation during TE 2009-10 are Shimoga (8.9 per cent), Mysore (8.4 per cent), Bellary (8.2 per cent) and Davangere (7.8 per cent). In case of red gram, Gulbarga district alone occupied about 61 per cent of area under tur in Karnataka. The other important districts growing tur are Bijapur (12.3 per cent) and Bidar (10.4 per cent).These three districts had accounted for about 84 per cent of the total area under tur during TE 2009-10. As far as tur production is concerned, Gulbarga accounted for about 61.6 per cent of the total production in the state. Bidar occupied the second position with 14.3 per cent followed by Bijapur (8.1 per cent).

Analysis of input cost structure of paddy showed that human labour accounted for the highest proportion of paid out cost during TE 1985-86 to TE 2009-10. Manure and fertilisers constituted the second highest proportion of paid cost followed by animal labour. Trend in farm business income of rice has fallen continuously from 1980-81 to 1992-93 and thereafter it improved till 1996-97 but declined again in the subsequent years. It has been found out that fall in value of output and gradual increase in input costs have led to decline in farm business income of rice.

For red gram, trend in cost share of human labour has declined from 40.2 per cent in TE 1987-88 to 35.6 per cent in TE 2000-01 and then to 23.2 per cent in TE 2009-10. Cost of manure and fertilisers has accounted for the second highest proportion with 24.6 per cent in TE 2009-10. Cost share of pesticide has also showed increasing trend over time. Both the gross value of output and farm business income showed wide fluctuations from 1988-89 onwards. However, increase in value of gross output has led to increase in farm business income of red gram since early 2000s.

Household Characteristics, Cropping Pattern and Production Structure

Of the total sample households chosen for the study, marginal farmers accounted for the highest proportion (38.4 per cent) followed by small farmers (26.6 per cent), medium farmers (18.8 per cent) and large farmers (16.3 per cent). The distribution of operational holdings is skewed towards medium and large farmers. The medium farmers and large farmers owned about 7.06 acres and 16.51 acres per household, respectively. Large farmers leased in relatively a high amount of land as compared to the other farmer categories. However, per cent net irrigated area was higher for marginal and small holdings than medium and large farm holdings. As a result, cropping intensity is worked out higher for marginal and small farm households. Area irrigated through canal water was relatively high for marginal farmers (95.18 per cent), whereas far large farmers it was only 64.69 per cent indicating that resource poor marginal farmers have access to government controlled canal water. However, large farmers have access to capital intensive tube well technology irrigating about 28 per cent of the net cropped area.

Paddy and red gram are the sample crops selected for the present study. These two crops accounted for about three-fourth of the gross cropped area (GCA) of the sample farmers. Marginal farmers and small farmers had allocated relatively a high proportion of area for the cultivation of paddy with 72.78 per cent and 53.66 per cent, respectively. In case of red gram, large farmers allocated about 52.34 per cent and small farmers about 35.5 per cent of the gross cropped area.

Average yield of major crops grown by the sample farmers has varied among farm size groups. Yield of major crops was more or less high among small farmers as compared to other groups. Further, relationship between farm size and land productivity is not very clear among the farm size categories. The value of aggregate output per household has increased with increase in farm size. However, in terms of output per acre, it increased with increase in farm size to a particular level and then it has tapered off. Similarly, value of marketed surplus increased from marginal size holdings to medium size holdings and then decreased for large size holdings. These results broadly suggest that there exists a direct relationship between land productivity and farm size up to particular level only.

Pre Harvest Loss of the Reference Crops

Crop losses are caused by biotic and abiotic factors that constrain the growth of crops resulting in loss of yield. Among the constraints identified in the cultivation of paddy, incidence of pests and diseases emerged to be a serious problem with a reporting of 95.63 per cent followed

by high cost of inputs, which was reported by 90.0 per cent of the sample farmers. While a quarter of the sample farmers reported water deficiency as the constraint, less than one third of farmers reported poor seed quality affecting the performance of the paddy. In terms of severity, a high proportion of sample farmers identified pests and diseases as the most important problem. In the cultivation of red gram also, incidence of pest and diseases emerged to be a serious problem in the study area. Water deficiency has been reported as the second most serious problem followed by high cost of inputs.

Among the insect pests of paddy, incidence of yellow stem borer was ranked very severe followed by green leaf hopper. In fact, 74.84 per cent of sample farmers considered yellow stem borer as the major pest causing yield loss in paddy followed by green leaf hopper, leaf roller and case worm. About 30 per cent of the sample farmers have reported that yellow stem borer causes production loss of over 25 per cent. Green leaf hopper and case worm also cause considerable loss of yield. With respect to paddy diseases, 93.08 per cent of the sample farmers reported blast as the most serious disease followed by udbatta disease and sheath blight. In terms of severity of attack, about 60.38 per cent of sample farmers considered blast disease as very severe and 19.50 per cent as severe. In fact, over 40 per cent of the sample farmers mentioned that blast disease caused the yield loss of over 25 per cent and 30 per cent of the farmers had indicated over 50 per cent loss. However, the extent of yield loss due to weed infestation appears to be low as compared to insect pests and diseases.

In the cultivation of local variety of red gram, infestation by black headed caterpillar is found to be very serious factor affecting the yield followed by green leaf hopper and red headed caterpillar. Stem borer is also found to be affecting the yield performance in both local and HYVs of red gram. In terms of severity of attack, about 22.5 percent and 21.9 percent of sample farmers reported black headed caterpillar and green leaf hopper as very severe, respectively. About 28.8 per cent of farmers reported that black headed caterpillar caused yield loss of over 25 per cent. In the cultivation of HYV of red gram also, black headed caterpillar and green leaf hopper reported to be serious pests. On diseases of red gram, about 71.9 per cent of the sample farmers mentioned sterility mosaic as a serious problem followed by stem rot and wilt. A high proportion of sample farmers mentioned that sterility mosaic causes yield loss of over 50 per cent.

Among farm size groups, yield loss of paddy for marginal farmers is found to be high. The overall paddy yield loss is estimated at 16.2 per cent of normal production. However, in terms of actual production, physical loss has been worked out at 19.3 per cent. For red gram, aggregate yield loss of local varieties was higher than that of high yielding varieties. Yield loss as percentage of normal production was 44.7 for local varieties and 43.9

for high yielding varieties. In terms of actual production, production loss has been estimated as high as 80.8 per cent in local varieties and 78.3 per cent in HYVs.

Among various methods of pest control, chemical method has been predominantly used by the sample farmers. Use of weedicide in paddy field is found to be low with average number of one spray per farmer household and in terms of per acre, it is negligible. The average number of sprays of insecticide and fungicide was about two per household. The total cost of application of chemicals has varied across farm size groups.

The effectiveness of any method used to control pests and diseases depends on scientific way of applying it. In case of paddy, a high proportion of sample farmers (87.5 per cent) relied on government extension agents for seeking advice on controlling pests and diseases. The second major source of information was the private input dealers. The fellow farmers emerged as the third major source of information among the sample farmers. For red gram growers, fellow farmers are the major source of information about controlling pest and disease. The private input dealers have emerged as the second major source of advice followed by government extension agents in the third place. Analysis shown that the sample farmers largely relied on the informal sources of information for controlling pests and diseases in paddy and red gram.

Post Harvest Losses of the Reference Crops

Post harvest loss is captured through loss during harvesting, threshing, winnowing, transportation and storage. The time of harvest after the crop reaches the maturity affects quantum of loss of grains at different stages of post harvest operations. About 87.4 per cent of the sample area under paddy has been harvested during mid period, which is also considered as delayed harvesting. It has been estimated a high quantity of loss of grains per acre during late harvesting followed by mid harvesting and early harvesting. In terms of total quantity harvested, harvesting loss was found to be the highest at 1.92 per cent for mid-harvest and lowest at 1.74 per cent for early harvest.

For red gram, per cent loss in terms of total quantity harvested was worked out high for late harvesting. For both the local and HYVs of red gram, a high proportion of area has been harvested during the mid period. The per cent loss in terms of total quantity harvested has been estimated high for late harvesting with 8.3 per cent for local variety and 6.6 per cent for HYV.

About 91.30 per cent of the paddy farmers mentioned low loss of grains under mechanical threshing (carried out by combine harvester) as compared to manual threshing. In terms of quantity threshed the average loss is estimated at 1.16 Kg/quintal for mechanical threshing as compared to 1.24 Kg/quintal for manual threshing. Similarly, manual winnowing of paddy grains is found to be causing more loss than mechanical winnowing.

For local variety of red gram, mechanical threshing methods produce more loss of grains than manual methods. But, for HYV mechanical threshing is found to be more efficient than manual threshing. The average loss has been estimated at 2.16 per cent for manual threshing and 3.59 per cent for mechanical threshing. In case of HYV of red gram, average loss of gram is worked out at 1.54 per cent for manual threshing and 0.37 per cent for mechanical threshing. For winnowing of both local variety and HYV of red gram, mechancial procedure produces relatively less of grains.

Among the modes of transportation of paddy, average quantity transported through tractor trolley was relatively high followed by truck and bullock cart. The transportation loss for truck has been estimated high at 0.80 Kg/quintal and for trolley it is 0.64 Kg and for bullock cart 0.62 Kg. Similarly, handling loss has been worked out high for using truck when compared to other modes of transport.

For red gram, tractor trolley emerges was a predominant mode of transportation among the sample farmers. In terms of average quantity lost through transport, it has been estimated highest for truck (2.24 Kg) followed by head load (1.99 Kg) and bullock cart (1.57Kg). Further, average quantity of red gram lost during handling was high when transported through head load.

The type of storage structures and location of storage used has varied by farm size groups and crops. Out of the total amount of paddy stored in kutcha house and pucca house, almost 100 per cent and 96.36 per cent of them were stored in gunny/plastic bags, respectively. In godown about 68.18 per cent of total amount of paddy was stored in kothi/bin and 31.82 per cent in gunny/plastic bags. Storage loss due to reduction in weight has been estimated high in scientific godown as compared to other places of storage. But, storage loss of paddy due to rodents and fungus was relatively high at 4.32 Kg and 0.37 Kg in kutcha house and pucca house, respectively. In case of red gram, out of total amount shored in Kutcha house about 76.09 per cent was kept in gunny/plastic bags and 23.91 per cent in open spaces. But, in pucca house and in godown, the entire amount was stored in gunny/plastic bags. The storage loss due to reduction in weight was high at 3.71 Kg in kutcha house followed by godown (1.87 Kg) and pucca house (1.49 Kg) Surprisingly, storage loss due to rodents was estimated relatively high in godown as compared to other storage types. For the entire sample of paddy farmers, total post harvest loss is estimated at 6.87 Kg/quintal of production. For red gram, total post harvest is worked out at 11.15 Kg/quintal of production.

III. Conclusions

Based on the analysis of data and summary of findings, the following conclusions have been drawn.

(i) Among the constraints faced in the cultivation of paddy, about 54.38 per cent and 30.63 per cent

of the sample farmers reported incidence of pest and diseases, and high cost of inputs, respectively were the most important problems affecting yield performance. In the cultlivation of red gram, 89.38 per cent reported incidence of pests and diseases, and 87.5 per cent considered water deficiency were the major constraints.

(ii) Most sample farmers ranked incidence of yellow stem borer in paddy as very severe followed by green leaf hopper. About 30 per cent of the farmers reported that yellow stem borer caused production loss of over 25 per cent. In case of disease, 93.80 per cent of the sample farmers reported blast as the most serious problem followed by udbatta disease and sheath blight. In fact, over 40 per cent of the sample farmers mentioned that blast disease cause the yield loss of over 25 per cent and 30 per cent of the farmers have indicated over 50 per cent loss. However, extent of yield loss due to weed infestation is low.

(iii) In the cultivation of local varieties of red gram, about 22.5 per cent and 21.9 per cent of sample farmers reported severe infestation by black headed caterpillar and green leaf hopper, respectively. About 28.8 per cent of farmers reported that black headed caterpillar cause yield loss of over 25 per cent. For HYV, black headed caterpillar and green leaf hopper are reported to be serious pests. On diseases of red gram, about 7.19 per cent of the sample farmers mentioned sterility mosaic as a serious problem followed by stem rot and wilt. Sterility mosaic causes yield loss of over 50 per cent.

(iv) Overall yield loss of paddy due to all pests, diseases and weeds are estimated at 16.2 per cent of normal production. Yield loss appears to be high among marginal farmers. For red gram, overall yield loss of local variety is 44.7 per cent and that of HYV is 43.9 per cent.

(v). Among different sources of information, 87.5 per cent of paddy sample farmers relied on governmet extension agents followed by private input dealers (78.1 per cent) for seeking advice on controlling pests and diseases. For red gram growers, fellow farmers (83.1 per cent) emerged to be a major source of information followed by private input dealers (80.0 per cent).

(vi). Overall harvesting loss of paddy is estimated at 1.9 per cent, which is found to be relatively high among the marginal farmers (2.32 per cent). Grain loss during threshing and winnowing is worked out at 0.28 per cent. Loss of paddy during transportations and handling is found to be high

among the marginal farmers. The respective overall loss is 0.57 per cent and 0.28 per cent. The storage loss is estimated at 3.83 per cent, which is relatively high for medium farmers.

(vii) Total post harvest loss of paddy is estimated at 6.87 per cent, which can potentially be avoided through efficient management. Post harvest loss is found be the highest for marginal farmers with 8.11 per cent followed by medium farmers (7.69 per cent) and small farmers (6.64 per cent).

(viii) Harvesting loss of red gram is found to be 3.72 per cent, which is much higher at 5.85 per cent for marginal farmers. Loss during threshing, winnowing, transport, handling and storage is also found to be high for marginal farmers. Next to harvesting loss (3.72 per cent), a significant proportion of red gram is wasted during threshing and storage with 2.02 per cent and 2.42 per cent, respectively.

(ix) Overall post harvest loss of red gram is estimated at 11.15 per cent, which is relatively high among the marginal farmers with 19.48 per cent. Post harvest loss for small farmers has been worked out at 13.40 per cent, for medium farmers at 10.62 per cent and for large farmers at 9.82 per cent.

V. Policy Recommendations

(i) Amount of pre and post harvest losses caused by biotic and abiotic factors is found to be substantial. These are avoidable losses, which actually amounts to the quantity of grains saved for the economy. In order to reduce these losses, scientific knowledge on cultivation practices and post harvest operations need to be imparted to the farmers. For this, advantages of information and communication technology (ICT) should be tapped to provide practical advice for control of insect pests, diseases and weeds.

(ii) Pests and diseases occur in a complex way affecting the crop yield performance. Infestation of weeds along with insect pests and diseases compounds further the pest control strategy. However, evidences show that adoption of integrated pest and disease management practices is promising for control of pests. Therefore, an integrated approach, which at present is lacking, needs to be promoted for effective control of pests.

(iii) Rural infrastructure will play an important role in reducing avoidable post harvest losses. However, most surveyed villages lacked basic agricultural infrastructure facilities like threshing floor, drying yard, proper roads and warehouses. Government regulated markets are located far away from villages, which ranged from 12 Km to 25 Km in the study areas. Therefore, there is a need to step up not only the amount of public and private investment in building rural agricultural infrastructure, but also quality of such investments.

(iv). Mechanisation of different agricultural operations is progressing faster for timely completion of works and also for overcoming the labour shortages. But, timely availability of agricultural machineries and implements is crucial to avoid delay in operations and also reduce losses of grains at post harvest stages. Therefore, local bodies like grama panchayats should be facilitated to own and hire out the machineries to the village farmers.

(v) Reliable database on crop loss estimates helps to make proper planning for monitoring and controlling of pests in different crops. Therefore, it is necessary that all the available published estimates should be compiled and published regularly for use by different stakeholders.

Commodity Reviews

Foodgrains

During the month of October, 2015 the Wholesale Price Index (Base 2004-05=100) of pulses increased by 9.17%, cereals increased by 0.43% & foodgrains increased by 2.43% respectively over the previous month.

ALL INDIA INDEX NUMBER OF WHOLESALE PRICES

(Base: 2004-2005=100)

Commodity	Weight (%)	WPI for the Month of October 2015	WPI for the Month of September 2015	WPI A year ago	Percentage change during	
					A month	A year
1	2	3	4	5	6	7
Rice	1.793	238.6	238.3	247.0	0.13	-3.40
Wheat	1.116	219.3	216.8	209.5	1.15	4.68
Jowar	0.096	278.5	271.9	293.3	2.43	-5.05
Bajra	0.115	255.7	254.3	252.4	0.55	1.31
Maize	0.217	245.6	249.8	230.5	-1.68	6.55
Barley	0.017	229.1	222.9	233.0	2.78	-1.67
Ragi	0.019	326.6	326.9	330.0	-0.09	-1.03
Cereals	3.373	234.8	233.8	235.4	0.43	-0.25
Pulses	0.717	364.4	333.8	238.2	9.17	52.98
Foodgrains	4.09	257.5	251.4	235.9	2.43	9.16

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

The following Table indicates the State wise trend of Wholesale Prices of Cereals during the month of October, 2015.

Commodity	Main Trend	Rising	Falling	Mixed	Steady
Rice	Mixed	A.P. West Bengal	Jharkhand	Haryana Karnataka U.P.	Gujarat
Wheat	Rising	Gujarat Haryana Jharkhand Maharashtra Rajasthan	Karnataka	M.P. U.P.	
Jowar	Mixed	A.P.	Maharashtra	Gujarat Rajasthan	Karnataka
Bajra	Falling		Haryana Maharashtra Rajasthan	Gujarat	Karnataka
Maize	Falling	M.P.	Gujarat Haryana Karnataka	Rajasthan	U.P.

Procurement of Rice

The total procurement of Rice in the current marketing season i.e 2015-2016, up to 30.10.2015 stood at 8.24 million tonnes, as against 6.56 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 2015-16 (upto 30.10.2015)		Corresponding Period of last Year 2014-15		Marketing Year (October-September)			
					2014-15		2013-14	
	Procure-ment	%age to Total	Procure-ment	%age to Total	Procure-ment	%age to Total	Procure-ment	%age to Total
1	2	3	4	5	6	7	8	9
Andhra Pradesh	0	0.00	0	0.00	3591	11.17	3722	11.76
Chhattisgarh	0	0.00	0	0.00	3423	10.64	4290	13.56
Haryana	2471	29.96	1556	23.69	2015	6.27	2406	7.60
Maharashtra	0	0.00	0	0.00	199	0.62	161	0.51
Punjab	5650	68.49	4950	75.37	7786	24.21	8106	25.62
Tamil Nadu	0	0.00	0	0.00	1049	3.26	684	2.16
Uttar Pradesh	51	0.62	2	0.03	1698	5.28	1127	3.56
Uttarakhand	17	0.20	1	0.01	465	1.45	463	1.46
Others	60	0.73	59	0.90	11936	37.11	10678	33.75
Total	8249	100.00	6568	100.00	32162	100.00	31637	100.00

Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat in the current marketing season i.e 2015-2016 up to July, 2015 is 28.09 million tonnes against a total of 27.17 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 2015-16 (upto 13.7.2015)		Corresponding Period of last Year 2014-15		Marketing Year 2014-15		(April-March) 2013-14	
	Procure-ment	%age to Total	Procure-ment	%age to Total	Procure-ment	%age to Total	Procure-ment	%age to Total
1	2	3	4	5	6	7	8	9
Haryana	6778	24.13	6414	23.61	6495	23.20	5873	23.41
Madhya Pradesh	7309	26.02	7188	26.46	7094	25.34	6355	25.33
Punjab	10344	36.83	10775	39.66	11641	41.58	10897	43.43
Rajasthan	1300	4.63	2155	7.93	2159	7.71	1268	5.06
Uttar Pradesh	2267	8.07	628	2.31	599	2.14	683	2.72
Others	90	0.32	6	0.02	6	0.02	16	0.06
Total	28088	100.00	27166	100.00	27994	100.00	25092	100.00

Source: Department of Food & Public Distribution.

Commercial Crops

Oilseeds and Edible Oils

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 219.0 in October, 2015 showing an increase of 0.9 % and 6.5 % over the previous month and year, respectively. The WPI of soyabean increased by 13.6 %, cotton seed by 5.8 %, rape & mustard seed by 3.7 % and sunflower seed by 0.5 % over the previous month. However, the WPI of groundnut seed decreased by 8.7 %, copra by 5.2 % and gingelly seed by 0.8 % over the previous month. The WPI of safflower seed and niger seed remained unchanged over the month. The wholesale price index (WPI) of edible oils as a group stood at 150.0 in October, 2015 showing an increase of 1.4 % and 4.5 % over the previous month and year, respectively. The WPI of soyabean oil increased by 3.7 %, mustard & rapeseed oil by 2.4 %, cotton seed oil by 1.5 %, groundnut oil by 1.3 % and sunflower oil by 1.1 % over the previous month. However, the WPI of gingelly oil decreased by 1.0 % and copra oil by 0.1 % over the previous month.

Fruits & Vegetable

The Wholesale Price Index (WPI) of fruits & vegetable as a group stood at 269.5 in October, 2015 showing an increase of 0.1 % over the previous month. However, it is lower by 1.2 % over the previous year.

Potato

The Wholesale Price Index (WPI) of potato stood at 173.7 in October, 2015 showing a decrease of 1.1 % and 58.9 % over the previous month and year, respectively.

Onion

The Wholesale Price Index (WPI) of onion stood at 629.2 in October, 2015 showing a decrease of 17 % over the previous month. However, it shows an increase of 85.7 % over the previous year.

Condiments & Spices

The Wholesale Price Index (WPI) of condiments & spices (group) stood at 346.2 in October, 2015 showing an increase of 1.7 % and 14.3 % over the previous month and year, respectively.The WPI of chillies (dry) increased by 6.1 %, black pepper by1.2 % and turmeric by 0.3 % over the previous month

Raw Cotton

The Wholesale Price Index (WPI) of raw cotton stood at 183.9 in October, 2015 showing a decrease of 4.8 % and 5.8 % over the previous month and year, respectively.

Raw Jute

The Wholesale Price Index (WPI) of raw jute stood at 400.9 in October, 2015 showing an increase of 7.9 % and 44.7 % over the previous month and year, respectively.

Commodity	Latest	Month	Year	% Variation Over the	
	October,15	September,15	October,14	Month	Year
OIL SEEDS	219.0	217.1	205.6	0.9	6.5
Groundnut Seed	239.9	262.7	217.3	-8.7	10.4
Rape & Mustard Seed	232.4	224.2	193.9	3.7	19.9
Cotton Seed	213.7	201.9	181.1	5.8	18.0
Copra (Coconut)	146.7	154.7	193.0	-5.2	-24.0
Gingelly Seed (Sesamum)	304.8	307.3	435.6	-0.8	-30.0
Niger Seed	354.1	354.1	203.9	0.0	73.7
Safflower (Kardi Seed)	148.4	148.4	124.2	0.0	19.5
Sunflower	195.2	194.3	184.2	0.5	6.0
Soyabean	220.3	194.0	181.0	13.6	21.7
EDIBLE OILS	150.0	148.0	143.5	1.4	4.5
Groundnut Oil	198.0	195.5	163.3	1.3	21.2
Cotton Seed Oil	184.6	181.9	177.1	1.5	4.2
Mustard & Rapeseed Oil	185.7	181.3	156.1	2.4	19.0
Soyabean Oil	149.7	144.3	151.5	3.7	-1.2
Copra Oil	150.1	150.2	138.6	-0.1	8.3
Sunflower Oil	131.5	130.1	122.0	1.1	7.8
Gingelly Oil	164.1	165.7	174.7	-1.0	-6.1
FRUITS & VEGETABLES	269.5	269.3	272.8	0.1	-1.2
Potato	173.7	175.7	423.1	-1.1	-58.9
Onion	629.2	758.0	338.9	-17.0	85.7
CONDIMENTS & SPICES	346.2	340.4	302.8	1.7	14.3
Black Pepper	740.7	731.7	759.1	1.2	-2.4
Chillies(Dry)	365.2	344.3	298.7	6.1	22.3
Turmeric	246.1	245.4	225.4	0.3	9.2
Raw Cotton	183.9	193.2	195.3	-4.8	-5.8
Raw Jute	400.9	371.5	277.1	7.9	44.7

STATISTICAL TABLES

Wages

1. Average Daily Agricultural Wages in some States (Category-wise)

(In Rs.)

State	District	Centre	Moth & Year	Daily Normal Working Hours	Field Labour		Other Agri. Labour		Herdsman		Skilled Labour		
											Car-penter	Black Smith	Cobbler
					M	W	M	W	M	W	M	M	M
Andhra Pradesh	Krishna	Ghantasala	July,15	8	325	150	300	150	250	200	NA	NA	NA
	Guntur	Tadikonda	July,15	8	313	200	NA	NA	250	NA	NA	NA	NA
Telangana	Ranga Reddy	Arutala	March, 15	8	260	190	300	NA	NA	NA	NA	NA	NA
Karnataka	Bangalore	Harisandra	June,15	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tumkur	Gidlahali	June,15	8	168	160	180	180	180	180	180	180	180
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	Plou-ghing	Sowing	Weed-ing	Harves-ting	Other Agri Labour	Herds-man	Skilled Labours		
												Car-penter	Black Smith	Cobbler
Assam	Barpeta	Laharapara	June,15	M	8	250	250	250	250	250	200	300	300	250
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bihar	Muzaffarpur	Bhalui Rasul	June,14	M	8	310	210	210	260	250	210	350	360	310
				W	8	NA	NA	NA	250	210	NA	NA	NA	NA
	Shekhpura	Kutaut	June,14	M	8	220	NA	NA	NA	220	NA	280	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chhattisgarh	Dhamtari	Aug,15	June,15	M	8	NA	NA	150	NA	150	150	250	200	100
				W	8	NA	NA	125	NA	100	100	NA	80	80
Gujarat*	Rajkot	Rajkot	Apr,15	M	8	221	213	160	183	150	190	442	442	350
				W	8	NA	169	150	180	138	125	NA	NA	NA
	Dahod	Dahod	Apr,15	M	8	186	157	157	157	129	NA	257	207	207
				W	8	NA	157	157	157	129	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	Aug,15	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	Dec,13	M	8	NA	162	162	162	162	NA	260	240	240
				W	8	NA	162	162	162	162	NA	650	NA	NA
Kerala	Kozhikode	Koduvally	July,15	M	4-8	1230	660	NA	660	957	NA	760	NA	NA
				W	4-8	NA	NA	460	510	510	NA	NA	NA	NA

Agricultural Situation in India

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily Working Hours	Plou-ghing	Sowing	Weed-ing	Harves-ting	Other Agri Labour	Herds-man	Skilled Labours		
												Car-penter	Black-smith	Cobbler
	Palakkad	Elappally	July,15	M	4-8	500	500	NA	NA	467	NA	600	NA	NA
				W	4-8	NA	NA	300	NA	300	NA	NA	NA	NA
Madhya Pradesh	Hoshangabad	Sangarkhera	Aug,15	M	8	200	200	200	NA	200	150	400	400	NA
				W	8	NA	200	200	NA	150	150	NA	NA	NA
	Satna	Kotar	Aug,15	M	8	200	200	200	200	200	150	300	300	300
				W	8	NA	200	200	200	200	200	NA	NA	NA
	Shyopurkala	Vijaypur	Aug,15	M	8	NA	300	NA	300	NA	250	300	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Odisha	Bhadrak	Chandbali	June,15	M	8	250	250	200	NA	250	250	350	300	200
				W	8	NA	200	200	NA	200	200	NA	NA	NA
	Ganjam	Aska	June,15	M	8	300	200	200	250	200	200	400	400	200
				W	8	NA	100	100	150	100	100	NA	NA	NA
Punjab	Ludhiyana	Pakhowal	July,14	M	8	300	300	300	NA	365	NA	395	395	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rajasthan	Barmer	Kuseep	July,15	M	8	NA	NA	NA	NA	NA	300	700	500	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jalore	Sarnau	July,15	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tamil Nadu*	Thanjavur	Pulvarnatham	Aug,15	M	8	500	319	NA	287	326	NA	NA	NA	NA
				W	8	NA	NA	115	118	114	NA	NA	NA	NA
	Tirunelveli	Malayakulam	Aug, 15	M	8	NA	NA	NA	300	484	NA	NA	NA	NA
				W	8	NA	150	154	159	300	NA	NA	NA	NA
Tripura	State Average		Apr, 14	M	8	287	263	264	277	261	270	305	212	285
				W	8	NA	197	201	209	197	200	NA	NA	NA
Uttar Pradesh*	Meerut	Ganeshpur	June,15	M	8	283	271	272	NA	266	NA	385	NA	NA
				W	8	NA	200	200	NA	200	NA	NA	NA	NA
	Aurraiya	Aurraiya	June,15	M	8	150	150	150	160	150	NA	250	NA	NA
				W	8	NA	NA	NA	160	150	NA	NA	NA	NA
	Chandauli	Chandauli	June,15	M	8	NA	200	200	200	200	NA	350	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA

M-ManW-Woman

NA- Not Available* States reported district average daily wages

Prices

(Month end Prices in Rupees)

Commodity	Variety	Unit	State	Centre	Oct-15	Sep-15	Oct-14
Wheat	PBW 343	Quintal	Punjab	Amritsar	1600	1600	1500
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1590	1470	1480
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1535	1425	1650
Jowar	-	Quintal	Maharashtra	Mumbai	2300	2300	2400
Gram	No III	Quintal	Madhya Pradesh	Sehore	4370	4426	2400
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1300	1360	1230
Gram Split	-	Quintal	Bihar	Patna	6200	5750	4445
Gram Split	-	Quintal	Maharashtra	Mumbai	6500	5800	3800
Arhar Split	-	Quintal	Bihar	Patna	15500	10000	6890
Arhar Split	-	Quintal	Maharashtra	Mumbai	14750	11000	6750
Arhar Split	-	Quintal	NCT of Delhi	Delhi	12500	9650	6060
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	14000	12500	7800
Gur	-	Quintal	Maharashtra	Mumbai	3000	3100	4600
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4000	4000	4300
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2500	NA	2500
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4050	4000	3300
Mustard Seed	Black	Quintal	West Bengal	Raniganj	5100	4500	3600
Mustard Seed	-	Quintal	West Bengal	Kolkata	5400	4950	3900
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	4380	4240	4150
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4020	3980	3860
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	2100	2000	1400
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	2000	2000	2000
Castor Seed	-	Quintal	Telangana	Hyderabad	3700	3950	3900
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	13565	13500	13400
Copra	FAQ	Quintal	Kerala	Alleppey	7150	7800	9900
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	4500	4500	4500
Groundnut	-	Quintal	Maharashtra	Mumbai	5800	6500	5300
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1440	1369	1173
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1755	1575	1230
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1395	1650	1320
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1845	1920	1260
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1414	1391	1425
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1200	1283	1268
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1375	1890	1870
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1725	1800	2700
Coconut Oil	-	15 Kg.	Kerala	Cochin	1530	1650	2175
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2160	2055	1810

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

Commodity	Variety	Unit	State	Centre	Oct-15	Sep-15	Oct-14
Groundnut Cake	-	Quintal	Telangana	Hyderabad	3929	4071	3243
Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	3950	4000	3750
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	4800	4400	2955
Jute Raw	W 5	Quintal	West Bengal	Kolkata	4750	4350	2905
Oranges	-	100 No	NCT of Delhi	Delhi	650	NA	667
Oranges	Big	100 No	Tamil Nadu	Chennai	500	500	580
Banana	-	100 No.	NCT of Delhi	Delhi	333	375	333
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	505	502	483
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	80000	65000	59000
Almonds	-	Quintal	Maharashtra	Mumbai	95000	73000	67000
Walnuts	-	Quintal	Maharashtra	Mumbai	80000	72000	66000
Kishmish	-	Quintal	Maharashtra	Mumbai	23000	20000	20000
Peas Green	-	Quintal	Maharashtra	Mumbai	4100	4100	4600
Tomatoes	Ripe	Quintal	Uttar Pradesh	Kanpur	1650	1750	1400
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	2500	1500	2300
Cauliflower	-	100 No.	Tamil Nadu	Chennai	2200	1350	2200
Potatoes	Red	Quintal	Bihar	Patna	850	780	2030
Potatoes	Desi	Quintal	West Bengal	Kolkata	730	660	1800
Potatoes	Sort I	Quintal	Tamil Nadu	Mettuppalayam	—	—	2778
Onions	Pole	Quintal	Maharashtra	Nashik	3100	3800	1100
Turmeric	Nadan	Quintal	Kerala	Cochin	12500	12500	11000
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	8000	8100	8800
Chillies	-	Quintal	Bihar	Patna	9400	9400	9170
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	66000	NT	65500
Ginger	Dry	Quintal	Kerala	Cochin	20000	20000	24000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	130000	131000	140000
Cardamom	Small	Quintal	West Bengal	Kolkata	105000	105000	120000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	3600	3600	3600
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	32016	30015	30682
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	47000	47000	39000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	35450	34600	33440
Fish	Rohu	Quintal	NCT of Delhi	Delhi	9500	9600	11000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	32000	33000	29200
Eggs	Madras	1000 No.	West Bengal	Kolkata	4000	4250	4200
Tea	-	Quintal	Bihar	Patna	21100	21100	21150
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	33000	33000	
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	30000	31000	30000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	12500	13000	15500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	4400	4600	4600
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	3500	3600	3600
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	NA	NA	3900
Rubber	-	Quintal	Kerala	Kottayam	10400	9800	11400
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	31500	31500	29800

3. Month-End Wholesale Prices of Some Important Agricultural Commodities in International Markets during Year 2015

Commodity	Variety	Country	Centre	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
CARDAMOM	Guatmala Bold Green	U.K.	-	Dollar/MT	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	12000.00	9000.00
				Rs./Qtl	74160.00	74100.00	75396.00	75948.00	76596.00	76212.00	76944.00	79272.00	79464.00	58896.00
CASHEW KERNELS	Spot U.K. 320s	U.K.	-	Dollar/lbs	3.60	3.62	3.64	3.68	3.85	3.75	3.70	3.72	3.64	-
				Rs./Qtl	49034.59	49267.11	50405.74	51332.75	54162.31	52491.02	52288.58	54161.80	53125.39	
				Dollar/MT	7877.32	7932.59	7644.65	8194.35	8431.63	8251.98	8257.78	8050.66	8015.47	7921.18
				Rs./Qtl	48681.84	48983.74	48031.34	51862.04	53819.09	52408.32	52948.89	53182.66	53078.44	51836.20
CASTOR OIL	Any Origin ex tank Rotterdam	Netherlands	-	Dollar/MT	1700.00	1525.00	1434.00	1434.00	1434.00	1575.00	1539.00	1540.00	1500.00	1540.00
				Rs./Qtl	10506.00	9416.88	9009.82	9075.79	9153.22	10002.83	9868.07	10173.24	9933.00	10077.76
CHILLIES	Birds eye 2005 crop	Africa	-	Dollar/MT	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00
				Rs./Qtl	25338.00	25317.50	25760.30	25948.90	26170.30	26039.10	26289.20	27084.60	27150.20	26830.40
CLOVES	Singapore	Madagascar	-	Dollar/MT	10500.00	10500.00	10500.00	10500.00	11200.00	11200.00	11200.00	11200.00	11200.00	7000.00
				Rs./Qtl	64890.00	64837.50	65971.50	66454.50	71489.60	71131.20	71814.40	73987.20	74166.40	45808.00
COCONUT OIL	Crude Phillipine/ Indonesia cif Rotterdam	Netherlands	-	Dollar/MT	1080.00	1140.00	1040.00	1085.00	1125.00	1105.00	1070.00	950.00	1050.00	-
				Rs./Qtl	6674.40	7039.50	6534.32	6866.97	7180.88	7017.86	6860.84	6275.70	6953.10	-
COPRA	Phillipines cif Rotterdam	Phillipine	-	Dollar/MT	679.50	726.00	657.00	682.50	714.00	701.50	679.50	597.00	652.50	669.00
				Rs./Qtl	4199.31	4483.05	4127.93	4319.54	4557.46	4455.23	4356.95	3943.78	4320.86	4377.94
CORRIANDER		India	-	Dollar/MT	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00
				Rs./Qtl	12360.00	12350.00	12566.00	12658.00	12766.00	12702.00	12824.00	13212.00	13244.00	13088.00
CUMMIN SEED		India	-	Dollar/MT	2250.00	2250.00	2250.00	2250.00	2250.00	2250.00	2250.00	2380.00	2380.00	2450.00
				Rs./Qtl	13905.00	13893.75	14136.75	14240.25	14361.75	14289.75	14427.00	15722.28	15760.36	16032.80
GINGER	Split	Nigeria	-	Dollar/MT	2250.00	2250.00	2250.00	2250.00	2250.00	2250.00	2250.00	2250.00	2250.00	-
				Rs./Qtl	13905.00	13893.75	14136.75	14240.25	14361.75	14289.75	14427.00	14863.50	14899.50	-
GROUNDNUT	kernels US 2005, 40/50	European Ports	-	Dollar/MT	1350.00	1350.00	1350.00	1320.00	1250.00	1250.00	1270.00	1280.00	-	-
				Rs./Qtl	8343.00	8336.25	8482.05	8354.28	7978.75	7938.75	8143.24	8455.68	-	-
GROUNDNUT OIL	Crude Any	U.K.	-	Dollar/MT	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00
				Rs./Qtl	7416.00	7410.00	7539.60	7594.80	7659.60	7621.20	7694.40	7927.20	7946.40	7852.80
MAIZE	Origin cif Rotterdam	U.S.A.	Chicago	C/56 lbs	373.25	375.75	395.00	372.50	349.50	366.50	367.75	361.75	383.25	376.00
				Rs./Qtl	906.53	911.86	975.34	926.52	876.73	914.76	926.70	939.16	997.39	966.99
OATS		CANADA Winnipeg		Dollar/MT	365.75	341.64	352.54	315.21	297.89	313.24	325.14	286.62	302.46	299.70
				Rs./Qtl	2260.34	2109.63	2215.01	1994.96	1901.43	1989.39	2084.80	1893.41	2002.89	1961.24
PALM KERNAL OIL	Crude Malaysia/ Indonesia cif Rotterdam	Netherlands	-	Dollar/MT	945.00	1070.00	980.00	990.00	945.00	880.00	850.00	650.00	815.00	850.00
				Rs./Qtl	5840.10	6607.25	6157.34	6265.71	6031.94	5588.88	5450.20	4293.90	5396.93	5562.40
PALM OIL	Crude Malaysian/ Sumatra, cif Rotterdam	Netherlands	-	Dollar/MT	630.00	678.00	658.00	655.00	648.00	670.00	625.00	480.00	533.00	560.00
				Rs./Qtl	3893.40	4186.65	4134.21	4145.50	4136.18	4255.17	4007.50	3170.88	3529.53	3664.64
PEPPER (Black)	Sarawak Black lable	Malaysia	-	Dollar/MT	10000.00	11000.00	11000.00	11000.00	12000.00	12000.00	12000.00	11200.00	11200.00	10000.00
				Rs./Qtl	61800.00	67925.00	69113.00	69619.00	76596.00	76212.00	76944.00	73987.20	74166.40	65440.00
RAPESEED	Canola	CANADA Winnipeg		Can Dollar/MT	449.80	458.50	460.60	445.10	468.90	511.90	493.30	469.70	466.30	465.40
				Rs./Qtl	2204.02	2264.53	2319.12	2318.97	2408.74	2636.29	2431.97	2352.26	2314.71	2314.43
	UK delivered rapeseed,	U.K.	-	Pound/MT	242.00	240.00	233.00	242.00	247.00	238.00	243.00	230.00	230.00	237.00
	delivered Erith(buyer)			Rs./Qtl	2254.96	2285.04	2175.06	2305.29	2414.92	2380.00	2431.22	2341.86	2319.09	2376.87
RAPESEED OIL	Refined bleached and deodorised ex-tanks,broker price	U.K.	-	Pound/MT	577.00	586.00	601.00	587.00	607.00	639.00	611.00	565.00	599.00	619.00
				Rs./Qtl	5376.49	5579.31	5610.34	5591.76	5934.64	6390.00	6113.06	5752.83	6039.72	6207.95
SOYABEAN MEAL	UK produced 49% oil & protein ('hi-pro') ex-mill seaforth UK bulk	U.K.	-	Pound/MT	334.00	319.00	317.00	306.00	294.00	280.00	278.00	273.00	263.00	258.00
				Rs./Qtl	3112.21	3037.20	2959.20	2914.96	2874.44	2800.00	2781.39	2779.69	2651.83	2587.48
SOYABEAN OIL		U.S.A.	-	C/lbs	30.34	31.71	31.04	31.56	31.73	33.27	30.21	26.12	26.33	28.11
				Rs./Qtl	4132.53	4315.64	4298.34	4402.34	4463.82	4657.00	4269.29	3802.97	3842.83	4054.30
	Refined bleached and deodorised ex-tanks,broker price	U.K.	-	Pound/MT	756.00	611.00	593.00	558.00	595.00	590.00	564.00	539.00	569.00	582.00
				Rs./Qtl	7044.41	5817.33	5535.66	5315.51	5817.32	5900.00	5642.82	5488.10	5737.23	5836.88
SOYABEANS		U.S.A.	-	C/60 lbs	970.25	1007.75	978.75	970.50	927.00	981.75	983.00	877.75	863.75	881.50
				Rs./Qtl	2200.59	2283.79	2256.86	2254.22	2171.55	2288.28	2313.20	2128.02	2099.15	2117.05
	US NO.2 yellow	NetherlandsChicago		Dollar/MT	420.90	409.40	418.00	392.80	380.90	397.30	387.20	363.80	363.40	378.80
				Rs./Qtl	2601.16	2528.05	2626.29	2486.03	2431.28	2523.25	2482.73	2403.26	2406.43	2478.87
SUNFLOWER SEED OIL	Refined bleached and deodorised ex-tanks,broker price	U.K.	-	Pound/MT	664.00	656.00	665.00	672.00	715.00	694.00	686.00	700.00	680.00	710.00
				Rs./Qtl	6187.15	6245.78	6207.78	6401.47	6990.56	6940.00	6863.43	7127.40	6856.44	7120.59
TALLOW	High grade delivered	U.K.	London	Pound/MT	295.00	295.00	290.00	330.00	335.00	335.00	350.00	310.00	300.00	-
				Rs./Qtl	2748.81	2808.70	2707.15	3143.58	3275.30	3350.00	3501.75	3156.42	3024.90	-
Wheat		U.S.A.	Chicago	C/60 lbs	505.25	497.75	519.00	498.75	487.75	518.00	496.25	489.75	507.50	506.00
				Rs./Qtl	1145.94	1128.01	1196.74	1158.47	1142.58	1207.36	1167.78	1187.35	1233.36	1215.23

Foreign Exchange Rates

Currency	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Can Dollar	49.00	49.39	50.35	52.10	52.93	51.50	49.30	50.08	49.64	49.73
UK Pound	93.18	95.21	93.35	95.26	98.73	100.00	100.05	102.71	100.83	100.29
US Dollar	61.80	61.75	62.83	63.29	64.08	63.51	64.12	66.06	66.22	65.62

Crop Production

4. Sowing and Harvesting Operations Normally in Progress During January, 2016

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Summer Rice, Ragi, (R), Small Millets (R) other Rabi, Pulses, Sugarcane, Onion	Winter Rice, Jowar (K), Maize (R), Ragi, (K), Tur (K), Urad (K), Mung (K), Winter Potato (Plains), Sugar cane, Groundnut, Castorseed, Cotton, Mesta, Sweet Potato, Garlic.
Assam Bihar		Winter Rice, Winter Potato, Sugarcane, Sesamum, Cotton.
Bihar	Summer Rice, Winter Potato (Plains), Sugarcane	Winter Potato (Plains), Sugarcane, Groundnut, Rapeseed & Mustard, Linsed.
Gujarat	Sugarcane	Small Millets (R), Tur (K), Sugarcane Ginger, Chillies, Tobacco, Castorseed, Cotton, Turmeric
Himachal Pradesh	Winter Potato (Hills), Onion	—
Jammu & Kashmir	Onion	Winter Potato, Chillies (Dry).
Karnataka	Summer Rice, Ragi (R), Urad, Mung (R) Potato (Plains) Sugarcane	Winter Rice, Jowar (R), Bajra (K), Ragi (K), Wheat, Barley, Small Millets (K), Gram, Tur (K), Mung (K), Other Kharif Pulses Potats (Plains) Sugarcane Black Pepper, Chillies (Dry) Tobacco Castorseed, Rapeseed & Mustard, Linseed, Cotton, Mesta, Sweet Potato, Turmeric, Kardiseed, Tapioca.
Kerala	Summer Rice, Sugarcane, Sesamun (3rd Crop)	Winter Rice, Ragi, Tur, (K) Other Kharif Pulses, (Kulthi), Urad (R) Other Rabi Pulses, Sugarcans, Ginger, Black Pepper, Seamum (2nd Crops) Sweet, Potato, Turmeric, Tapioca.
Madhya Pradesh	Sugarcane, Onion	Jowar (K), Small Millets (R), Tur (K), Urad (R) Mung (R), Other Rabi, Pulses, Sugarcane, Ginger, Chillies (Dry), Tabacco, Castorseed, Rapeseed & Mustard, Cotton, Mesta, Sweet Potato, Turmeric, Sannhemp.
Maharashtra	Sugarcane	Winter Rice, Jowar Gram, Urad (R) Mung (R), Sugarcane, Chillies (Dry), Tobacco, Cotton Turmeric, Sannhemp.
Orissa	Summer Rice, Chillies (Dry).	Winter Rice, Winter Potato (Plains), Sugarcane, Chillies (Dry), Tobacco, Castorseed, Nigerseed.
Punjab and Haryana	Potato, Tabacco, Onion.	Potato, Sugarcane, Sweet Potato.
Rajasthan	Sugarcane, Tobacco	Tur (K), Winter Potato (Plains), Sugarcane, Chillies (Dry).
Tamil Nadu	Winter Rice, Jowar (R), Sugarcane, Tur (R), Tobacco, Groundnut, Sesamum, Onion, Bajra (R)	Rice, Jowar (K), Bajra (K), Ragi, Small Millets (K) Gram, Tur (K) Urad (K) Mung (K), Other Kharif Pulses Winter Potato (Hills), Sugarcane, Black Pepper, Groundnut, Castorseed, Sesamum, Cotton, Turmeric, Onion.
Tripura	Summer Rice	Winter Rice Gram, Winter Potato (Plains), Sugarcane, Rapeseed & Mustard, Sweet Potato.
Uttar Pradesh	Summer Rice, Sugarcane, Jute Onion Tobacco (Late).	Tur (K), Winter Potato (Plains), Sugarcane, Tobacco (Early), Castorseed Rapeseed & Mustard, Cotton, Sweet, Potato, Turmeric, Tapioca.
West Bengal	Summer Rice, Sugarcane.	Tur (K), Urad (R), Mung (R) Other Rabi Pulses, Winter Potato (Plains), Sugarcane, Ginger, Chillies (Dry), Sesamum, Rapeseed & Mustard.
Delhi	Winter Potato (Plains) Onion	Summer Potato (Plains), Sugarcane, Chillies (Dry), Onion.
Andaman & Nicobar Inlands	—	Winter Rice.

(K)—Kharif (R)—Rabi