

AGRICULTURAL SITUATION IN INDIA

MAY, 2012



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Agricultural Situation in India

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Articles on the State of Indian Agriculture and allied sectors are accepted for publication in the Directorate of Economics & Statistics, Department of Agriculture & Cooperation's monthly Journal "Agricultural Situation in India". The Journal intends to provide a forum for scholarly work and also to promote technical competence for research in agricultural and allied subjects. The articles, not exceeding five thousand words, may be sent in duplicate, typed in double space on one side of fullscape paper in Times New Roman font size 12, addressed to the Economic & Statistical Adviser, Room No.145, Krishi Bhawan, New Delhi-11 0001, alongwith a declaration by the author(s) that the article has neither been published nor submitted for publication elsewhere. The author(s) should furnish their e-mail address, Phone No. and their permanent address only on the forwarding letter so as to maintain anonymity of the author while seeking comments of the referees on the suitability of the article for publication.

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Abbreviations used

N.A. —Not Available.

N.Q. —Not Quoted.

N.T. —No Transactions.

N.S. —No Supply/No Stock.

R. —Revised.

M.C. —Market Closed.

N.R. —Not Reported.

Neg. —Negligible.

Kg. —Kilogram.

Q. —Quintal.

(P) —Provisional.

Plus (+) indicates surplus or increase.

Minus (–) indicates deficit or decrease.

LIST OF PUBLICATIONS

Journal

Agricultural Situation in India (Monthly)

Periodicals

Agricultural Prices in India

Agricultural Wages in India

Cost of Cultivation of Principal Crops

District-wise Area and Production of Principal Crops in India

Land Use Statistics at a Glance

Year Book of Agro-Economic Research Studies

Farm Harvest Prices in Principal Crops in India

Agricultural Statistics at a Glance

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A. General Survey

(i) Trends in Foodgrain Prices :

During the month of April, 2012 the All India Index Number of Wholesale Price (2004-05=100) of Foodgrains increased by 1.19 per cent from 185.3 in March, 2012 to 187.5 in April, 2012 .

Similarly, the Wholesale Price Index Number of Cereals showed an increase of 1.45 per cent from 179.9 to 182.5 and Pulses showed an increase of 0.38 per cent from 210.2 to 211.0.

The Wholesale Price Index Number of Wheat and Rice increased by 1.63 per cent from 1.09 per cent respectively during the same period.

Weather, Rainfall and Reservoir Situation during May, 2012

1. Rainfall (Pre-Monsoon Season) reported for the country as a whole during 1st March to 30th May, 2012 is around 89.4 mm which is 31 per cent less than Long Period Average (LPA). Rainfall (as % departure from normal) reported in the broad geographical divisions of the country during the above period was

North West India (-35%), Central India (-53%), South Peninsula (-16%) and East and North East India (-28%).

2. The total live storage in 84 important reservoirs in different parts of the country as on 31st May, 2012 was 30.48 BCM against 38.12 BCM in the corresponding period of last year. Current live storage is 20 per cent of live capacity at Full Reservoir Level (FRL) as against 25 per cent in the corresponding period of last year.

All India production of food grains: As per the 3rd advance estimates released by Ministry of Agriculture on 23-04-2012, production of foodgrains during 2011-12 is estimated at 252.56 million tonnes compared to 244.78 million tonnes in 2010-11 (final estimates).

Procurement : Procurement of rice as on 2nd April, 2012 (Kharif Marketing Season 2011-12) at 29.25 million tonnes represents an increase of 16.12 per cent compared to the corresponding date last year. Wheat procurement during Rabi Marketing Season 2012-13 is 0.79 million tonnes as compared to 0.42 million tonnes during the corresponding period last year.

TABLE 1—PROCUREMENT IN MILLION TONNES

	2009-10	2010-11	2011-12	2012-13
Rice (Oct.-Sept.)	32.03	34.20	30.80*	0
Wheat (Apr.-Mar.)	25.38	22.51	28.34	28.78**
Total	57.41	56.71	60.14	28.78

* Position as on 1-3-2012. ** Position as on 14-05-2012.

Off-take: Off-take of rice during the month of March, 2012 was 27.01 lakh tonnes. This comprises 19.55 lakh tonnes under TPDS and 7.56 lakh tonnes under other schemes. In respect of wheat, the total off take was 20.89 lakh tonnes comprising of 14.63 lakh tonnes under TPDS and 6.26 lakh tonnes under other schemes.

Stocks : Stocks of foodgrains (rice and wheat) held by FCI as on April 1, 2012 were 53.30 million tonnes, which is higher by 20.64 per cent over the level of 44.18 million tonnes as on April 1, 2011.

TABLE 2—OFF-TAKE AND STOCKS OF FOODGRAINS (MILLION TONNES)

	Off-take			Stocks	
	2009-10	2010-11	2011-12	1-Apr., 2011	1-Apr., 2012
Rice	27.37	29.93	32.12	28.82	33.35
Wheat	22.35	23.07	24.26	15.36	19.95
Total	49.72	53.00	56.38	44.18	53.30

Growth of Economy

As per the latest Revised Estimates (RE) of Central Statistics Office (CSO), the growth in real Gross Domestic Product GDP at factor cost at constant (2004-05) prices was estimated at 6.5 per cent in 2011-12 as compared to 8.4 per cent in 2010-11 (Quick Estimate). At disaggregated

level, this (RE 2011-12) comprises growth of 2.8 per cent in agriculture and allied activities, 3.4 per cent in industry and 8.9 per cent in services as compared to a growth of 7.0 per cent, 7.2 per cent and 9.3 per cent respectively during 2010-11. The growth in GDP is placed at 5.3 per cent in the fourth quarter of 2011-12; agriculture grew by 1.7 per cent; industry by 1.9 per cent and services by 7.9 per cent.

TABLE 3—GROWTH OF GDP AT FACTOR COST BY ECONOMIC ACTIVITY

(at 2004-05 Prices)

Industry	Growth			Percentage Share in GDP		
	2009-10	2010-11 QE	2011-12 RE	2009-10	2010-11 QU	2011-12 RE
1. Agriculture, forestry and fishing	0.1	7.0	2.8	14.7	14.5	14.0
2. Industry	8.4	7.2	3.4	28.1	27.8	27.0
a. Mining and quarrying	6.3	5.0	-0.9	2.3	2.2	2.1
b. Manufacturing	9.7	7.6	2.5	16.0	15.8	15.3
c. Electricity, gas and water supply	6.3	3.0	7.9	2.0	1.9	1.9
d. Construction	7.0	8.0	5.3	7.9	7.9	7.8
3. Services	10.5	9.3	8.9	57.2	57.7	59.0
a. Trade, hotels, transport and communication	10.3	11.1	9.9	26.6	27.2	28.1
b. Financing, insurance, real estate and business services	9.4	10.4	9.6	17.1	17.4	17.9
c. Community, social and personal services	12.0	4.5	5.8	13.5	13.1	13.0
4. GDP at factor cost	8.4	8.4	6.5	100.0	100.0	100.0

(QE): Quick Estimates; (RE): Revised Estimates

TABLE 4—QUARTERLY ESTIMATE OF GDP

(Year-on-year in per cent)

Items	2010-11				2011-12			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Agriculture, forestry & fishing	3.1	4.9	11.0	7.5	3.7	3.1	2.8	1.7
Industry	8.3	5.7	7.6	7.0	5.6	3.7	2.5	1.9
2. Mining & quarrying	6.9	7.3	6.1	0.6	-0.2	-5.4	-2.8	4.3
3. Manufacturing	9.1	6.1	7.8	7.3	7.3	2.9	0.6	-0.3
4. Electricity, gas & water supply	2.9	0.3	3.8	5.1	8.0	9.8	9.0	4.9
5. Construction	8.4	6.0	8.7	8.9	3.5	6.3	6.6	4.8
Services	10.0	9.1	7.7	10.6	10.2	8.8	8.9	7.9
6. Trade, hotels, transport and communication	12.6	10.6	9.7	11.6	13.8	9.5	10.0	7.0
7. Financing, insurance, real estate and bus.	10.0	10.4	11.2	10.0	9.4	9.9	9.1	10.0
8. Community, social & personal services	4.4	4.5	-0.8	9.5	3.2	6.1	6.4	7.1
9. GDP at factor cost (total I to 8)	8.5	7.6	8.2	9.2	8.0	6.7	6.1	5.3

B. Articles

Yield and Monetary Benefits of Improved Jute (*Corchorus Olitorius*) Production Technologies

RAJENDRA R. CHAPKE*

Introduction

Jute provides raw material to a major industry and contributes significantly to country's economy especially of the eastern states such as West Bengal, Bihar, Assam, Orissa and Eastern Uttar Pradesh. Jute has faced a severe competition with synthetic fibre during the last two decades, but it has now revived its importance and has got a wider prospect in national as well as international perspectives due to its nature friendly significance. It is fact that without efficient market structure and functions and support of marginal support price, jute could not be competing with the synthetic fibre (Sen and Hazra, 2007). The cultivation of jute is being done in about 8.7 lakh hectares spread over 87 districts of India, producing about 100 lakh bales of raw jute. About 4 million farmers, 0.25 million industrial workers and 0.5 million traders find gainful employment in jute sector (Das *et. al.*, 2006).

Jute is mainly grown by small (25%) and marginal (65%) farmers. The contribution of West Bengal in jute production of India, is nearly 77%. The average national productivity of jute is 2346 kg/ha during 2005-06 (Anonymous, 2006). There is large scope for increasing the productivity of the crop by adopting improved production practices. Efforts, however, were made to generate technologies for increasing the productivity of jute and improving quality of fibre and disseminate the same by Central Research Institute for Jute and Allied Fibres (CRIJAF), Barrackpore with advancement in technological innovations. The frontline demonstrations (FLDs), one of the powerful tools in disseminating technology, were conducted by CRIJAF on jute with latest technologies and study on impact of FLDs conducted since 1996 were reviewed to know the potential performance of the production technologies and its impact which have been described in this paper.

Keywords: Jute (*Corchorus olitorius*) production technology, frontline demonstration, fibre yield, cost of cultivation, economic return.

Materials and Methods

Frontline demonstrations were conducted during 2006 to evaluate the performance of jute production

technologies, developed by the institute recently, and demonstrate the same for wide dissemination. In all, 150 demonstrations covering 20 ha area were conducted through seven extension centers of CRIJAF at *Tababeria, Basudeopore, Belle-Shankarpore and Kadambogachi villages* of North 24-Parganas district; *Berabari village* of Hoogly district, and Panchkahonia and Alaipore of Nadia district, all in West Bengal. The demonstrations were conducted on technology components viz., (i) varietal performance, (ii) chemical weed control, (iii) line sowing by manual seed-drill and (iv) improved agronomic practices of jute cultivation on the farmers' fields. Locally cultivated variety (generally undescribed marketed as Nabin i. e. JRO-524) which was practiced with farmers' own management, was used as check. Materials for the present study were, six high yielding jute varieties viz. JRO-524, JRO-8432, JRO-66, JRO-128, S-19 and JRO-524E (energized seed of JRO-524 with N:20, P₂O₅: 10, K₂O: 10 kg/ha fertilizer dose without plant protection measure) with recommended package of practices. Sowing was done in the month of April-May, while harvesting in the month of August-September. Fertilizer schedule was N: 60, P₂O₅: 30 and K₂O: 30 kg/ha for all the varieties except for JRO-524E as recommended. Use of chemicals for plant protection was need-based. The programmes were executed under the direct supervision of scientists and extension personnel of CRIJAF and care was taken to organize interpersonal discussion, group interactions, field visits, farmers' day and scientist-farmer interactions for effective sharing of information with the farmers. These apart, a study on impact of the frontline demonstrations (FLDs) on jute conducted earlier by CRIJAF during 1996 to 2005 in different villages of West Bengal, was made during 2006-07 in two villages at Kairapore and Devok in North 24-Parganas district. The participating farmers were selected and categorized them in three groups, viz., pre-demonstration, during demonstration and post-demonstration (after withdrawal from FLD) for the purpose of evaluating impact of demonstrations. Simple statistical tools like, frequency, mean and percentage were used to analyze the data.

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Results and Discussion

Performance of the demonstrated high yielding varieties of jute over the years

During the last six years (2001-02 to 2006-07), 823 demonstrations were conducted at fifteen different villages of North 24-Parganas, Nadia and Hooghly districts of West Bengal on improved varieties of jute (*Corchorus olitorius*). Sowing, weeding, harvesting, retting and fibre extraction were done manually as per the farmers' practices. Results (Table 1) reveals that the yield of JRO-524 was highest in all the years as compared to the others, irrespective of locations. It may be the reason for the wider adoption of this variety in West Bengal till date even though the extent of genetical purity of the seeds marketed is uncertain. It is mentioned that most of the seeds of jute come from outside West Bengal mainly, Maharashtra and Andhra Pradesh. Genetical purity of seeds used in the

demonstrations and adoption of improved agronomic practices have led to high of fibre yield than average productivity. The variation in benefit: cost ratio was limited to 10-15 per cent only. This signifies the uniform management including timely supply of critical inputs in all the years. The exception of JRO 524E showing higher B: C ratio in spite of its lower yield was due to the use of one-third of fertilizer doses applied in other cases. Less involvement of cost of cultivation due to lesser dose of fertilizer used and no plant protection measures that was required helped to generate higher monetary return on the input cost with JRO-524E. The demonstration also points to the importance of an optimum fertilizer application in sustaining jute yield and timely crop husbandry practices. Overall, JRO-524 is found the most popular variety among the farmers, and spread over about 90 per cent area under jute cultivation with different local names, supported by Das *et. al.* (2006).

TABLE 1—MEAN FIBRE YIELD OF DIFFERENT JUTE VARIETIES OVER YEARS

Variety	Fibre yield (kg /ha)						Mean	B:C ratio*
	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07		
JRO-524	2886	2898	3094	3066	3042	3158	3024 ±1.09	1.63
JRO-128	* *	**	2955	3061	2798	3048	2965 ±1.21	1.55
JRO-8432	2739	2817	3022	2952	2889	3113	2922 ±1.36	1.57
JRO-524E	**	**	2860	2866	2909	2826	2865 ±0.34	1.70
S-19	2747	**	**	**	2794	3021	2854 ±1.46	1.65
JRO-66	2600	2687	2987	2727	2810	3079	2815 ±1.84	1.53
Mean	2743 ±1.17	2767 ±1.07	2858 ±1.46	2880 ±1.45	2878 ±1.32	2920 ±1.48	2918 ±1.38	

*Data pertaining to 2003-04 to 2006-07.

**Trials were not undertaken. Source : Chapke, 2007.

Component-wise Impact of Jute Production Technology

Frontline demonstrations were conducted at the farmers' fields of three major jute growing district, North 24-Parganas, Hoogly and Nadia of West Bengal in the crop year 2006-07 with latest high yielding varieties of jute, chemical weed control, line sowing by four-row seed

drill machine and improved agronomic practices. Comparative performance of each component with the farmers' practices in terms of fibre yields and additional return obtained from different components were evaluated. All the practices in farmers' method except demonstrated component were kept same as FLD plots. Results are presented in Table 2.

TABLE 2—IMPACT OF COMPONENT DEMONSTRATION OF JUTE PRODUCTION TECHNOLOGY UNDER FLD DURING 2006-07

Sl. No.	Technology	Fibre yield (kg /ha)		Additional benefit		
		FLD	Farmers' practice	Increased fibre yield over FP (kg/ha)	Net return (Rs./ha)	B:C ratio
1.	Varietal evaluation	3041	2821#	220	3533	0.12
2.	Chemical herbicides for weed control*	2966	2858	108	2088	0.15
3.	Line sowing by seed drill of CRIJAF	2798	2732**	66	3147	0.24
4.	Improved agronomic practices***	3005	2821	184	8392	0.55

Undescript variety locally used in the name of JRO-524, * Human labour cost reduced by Rs. 2088 per ha;

** Broadcasting; *** Timely sowing, inter-cultural operations including recommended crop husbandry practices.

Source :Anonymous, 2007

Varietal Evaluation and Return

On an average performance of the jute varieties gave more fibre yield (3041 kg /ha) over the farmers' practice (2821 kg/ha). Varietal characteristics reflected in differential yield among the varieties. Cost of cultivation under farmers' practice was low (Rs. 26226/ha) due to inadequacy of implementation of the recommended practices that resulted in lower productivity. Consequently net return (Rs. 15077/ha) and B:C ratio (1.57:1) were lower than that obtained with the demonstrated practices.

Chemical Weed Control

The application of pre-emergence weedicide i.e. Trifluraline (@ 0.75 kg. a. i./ha one day before sowing) and post-emergence weedicide, namely, quizalofop ethyl [5% E. C. (*Targa Super*) @ 1.5 ml/liter], were demonstrated on the farmers' fields. Use of the chemical herbicides in jute crop resulted in around one quintal higher fibre yield over the farmer's practice which fetched additional net return of Rs. 2088 and also benefit cost ratio increased by 0.15: 1 than the farmers' practice.

Line Sowing by Seed Drill

Adopting line sowing method by seed drill of CRIJAF, the cost of human labour was less by Rs. 2121 per ha and eventually increased the net profit by Rs. 3147/ha over the farmers practice. Line sown crop offered advantage in the field management of the crop that reduced requirement of human laborer. This indicated that line sowing method using seed drill was beneficial to increase profitability of jute cultivation even though the productivity may remain same.

Improved Agronomic Practices

The demonstrations on improved agronomic practices of jute cultivation were conducted on the fields

at seven different villages. The improved agronomic practices were consist of timely management of all recommended practices such as, seed rate, its treatment, line sowing, use of chemical weed control, need-based plant protection measures and inter-cultural operations. These resulted in higher fibre yield by 184 kg/ha over those of farmers' practices. The net return increased by Rs. 8392/ha as well as benefit cost was 0.55 more than the farmers' practices. The advantage in fibre yield of improved agronomic practices over local check revealed that increase in yield under FLD varied from 0.92 per cent at Alaipur to 14 per cent at Beraberia (Table 3). Across the locations, yield increase under FLD was about 14 per cent over the check yield (Fig. 1). Demonstrated yield was higher than the check yield in all the seven locations. It also determined that the realizable fibre yield gap was 188 kg/ha which varied from location to location ranging from 28 kg/ha at Alaipur to 393 kg/ha at Beraberia.

However, it was reported that during the study period, the crop was affected due to scarcity of rainfall and unavailability of the irrigation facilities at the age of 30-45 days. At some places, the crop suffered from intensive broad leaf weeds, which could not be controlled due to paucity of human labourer. It indicated that the timely and systematic implementation of improved practices gave better response even in the different climatic situations. It is also inferred that yield of jute fibre can be enhanced by 14 per cent by following simple agronomic practices such as appropriate seed rate, line sowing, balance fertilizer use and need-based abiotic control measures. That improved management practice can improve the fibre yield of jute was earlier reported by Biswas *et al.*, (2004).

TABLE 3—FIBRE YIELD OF JUTE UNDER IMPROVED AGRONOMIC PRACTICES COMPARED WITH FARMERS' PRACTICE

Sl. No.	Location	Yield (Kg/ha)		Increase in yield (%)	Yield gap (Kg /ha)
		FLD	Farmer's practice		
1.	T ababeria	3087	2858	7.42	229
2.	Basudeopur	3025	2800	7.44	225
3.	Bellesankarpur	3003	2962	1.36	041
4.	Kadambogachi	3122	2866	8.20	256
5.	Panchkahonia	2989	2842	4.92	147
6.	Alaipur	3048	3020	0.92	028
7.	Beraberi	2762	2369	14.23	393
Mean		3005	2817	6.35	188

Source: Anonymous, 2007.

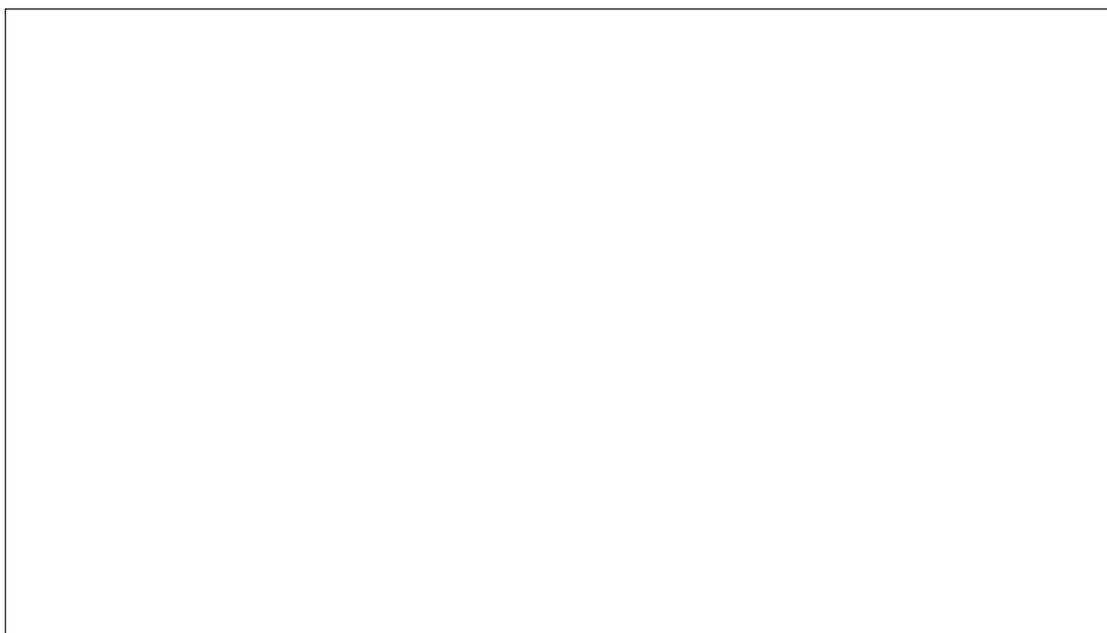


Fig. 1 Fibre yield of improved agronomic practices under FLD and farmers' practice

Impact of Technology Transfer through Frontline Demonstrations

Impact assessment of frontline demonstrations on jute was done in two villages at *Kairapore and Devok* in North 24-Parganas district of West Bengal where the demonstrations were conducted since 1996. The results obtained are presented below.

Fibre Yield

Fibre yield of jute obtained (Fig. 2) by the farmers was 2473 kg /ha before adoption for demonstration.

The demonstrated yield of jute fibre obtained by the farmers during adoption was 2875 kg/ha, which was maintained by the farmers after withdrawal from the demonstrations (2876 kg/ha). This was possible as the farmers continued to adopt recommended seed rate @ 6 kg/ha and almost balanced fertilizer use. However, the farmers continued to use JRO-524 variety and sowing by broadcasting method. Pest management was done need-based, generally application of insecticides twice or thrice was adequate.

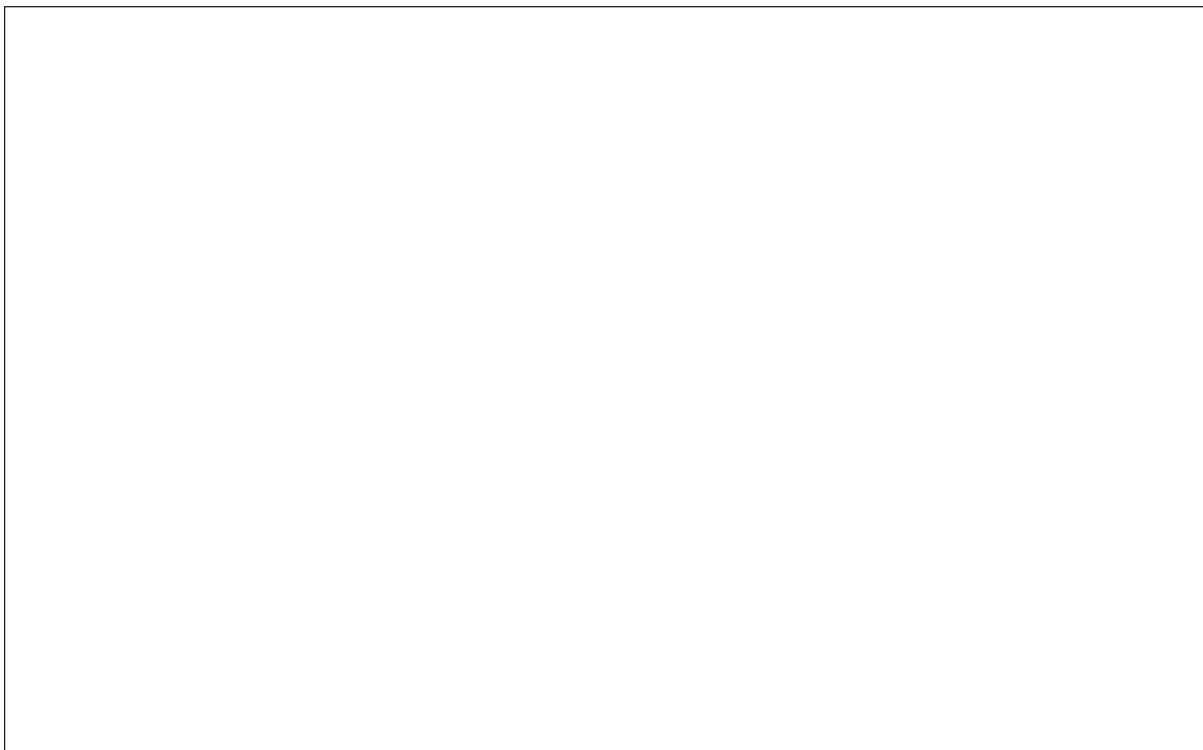


Fig. 2 Year-wise yield of jute fibre

Economic Surplus

From the data presented in Fig. 3, it is evident that the increased production of jute fibre by about 400 kg/ha provided advantage to the farmers by about Rs. 5000 per ha. The post-demonstration period falls mostly under the year 2005 and 2006 in which the market price of the jute fibre was higher as compared to other years with an average of Rs. 12.50 per kg. Additional inputs cost as required for improved practices was recovered by increasing gross and net return substantially, which resulted in more benefit cost ratio than the farmers' practice. Trend in increase in productivity of jute at state and national levels was also observed.

Jute in North 24-Parganas District

In addition to conducting demonstrations with improved technologies, these centers organized awareness camps for wider dissemination of technologies and provided advisory services by visiting the fields and meeting the farmers. Further, CRIJAF organized Farmers' Day each year at the Institute's headquarter, which were participated by the farmers of major jute growing districts. All these efforts have helped to enhance productivity of jute as can be seen from the data presented in Table 4 for North 24-Parganas, which is considered as a productive jute growing district, producing higher yield per unit area over the state and national average. The average yield of

jute fibre in the district ranged from 2494 to 3171 kg/ha during 1999-00 and 2003-04 as compared to the national average that ranged between 20.05 to 2346 kg /ha during the year 1999-00 and 2005-06, respectively. The yield of jute (cv.. JRO-524) under demonstration ranged from 2726 kg/ha in 1999-00 to 3262 kg/ha in 2003-04 thereby registering an increase in yield by 0.73 to 15.76 % over the yield of district average. In this context, the national scenario is encouraging which reveals that productivity of jute has increased from about 104 kg/ha in 1951 to 2346 kg/ha during 2005-06.

It is ascertained that the use of latest production technologies with timely systematic management would increase productivity of jute up to 14% and income of the small and marginal farmers by Rs. 5000 per ha who are mainly associated with this crop. It was mainly increased due to availability of quality seeds, timely use and adoption of improved crop management practices pertaining to nutrient and pest management, which are the resultants of multi-organizational efforts on research, development and extension of technologies. These technologies may be popularized with full package of practices to explore the potential under field conditions and mitigate the yield gap. Simultaneously efforts need to be made to reduce the yield gap by building up confidence of the farmers through the results of the demonstrations.

TABLE 4—PRODUCTIVITY OF JUTE IN NORTH 24-PARGANAS DISTRICT OF WEST BENGAL

Year	Area (‘000 ha)	Producti- vity (Dist.) (kg/ha)	Productivity under FLD (cv. JRO- 524) (kg/ha)	% increase in yield under FLD over district	State average yield (kg/ha)	National average yield (kg/ha)
1999-00	57.06	2494	2726	9.26	2227	2005
2000-01	55.82	2505	2901	15.76	2181	2026
2001-02	61.41	2599	2882	10.89	2440	2182
2002-03	60.58	2892	2903	0.73	2407	2139
2003-04	54.78	3171	3262	2.87	2427	2173
2004-05	50.89	3143	3169	0.83	2448	2186
2005-06	48.19	3070	3158	3.16	2572	2346
Mean		2839	3000	6.22	2386	2151

Source: Chapke *et. al.*, 2006

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Productivity Differentials and Cotton Cultivation—Empirical Evidence from the Foot Hills of Western Ghats

DR. S. RAJENDRAN* AND P. SATHESWARAN**

Introduction

India is the third largest producer of cotton in the world behind China and the US, accounts for 25 per cent of the world acreage but only 14 per cent of world production, perhaps due to severe pest attack. Controlling pests like bollworms is a major as well as persistent problem throughout different regions in the country. Available estimates show that out of the total pesticides, consumption of pesticides (worth Rs. 2800 crores) in Indian agriculture about Rs. 1600 (57 per cent) crore was spent on cotton alone, of which Rs. 1100 crore were spent only to control bollworms (Alagh, 1998).

The *Bacillus Thuringiensis* (Bt) cotton introduced 2002 for commercial cultivation considered to be an important variety, which can overcome the problems of bollworms in cotton (Mayee *et al.*, 2001). One of the agronomic benefits of Bt Cotton is good control of bollworm species in different growing areas. Global adoption of Bt cotton has risen dramatically from 800,000 ha, in 1996 to 5.7 m.ha (alone and stacked with herbicide - tolerant cotton) in 2003. In 2002, Bt cotton was grown commercially in the US, Mexico, Argentina, South Africa, China, India, Australia and Indonesia and precommercial plantings were grown in Colombia. Bt cotton (known as ball guard) has been one of the widely adopted and effective transgenic crops grown worldwide was first introduced in the US on 7.3 lakh ha in 1996. Since its introduction in 2002, the area under Bt cotton in India has expanded from a mere 50,000 ha to 9.6 m.ha in 2009. Bt cotton's success is also borne out by the fact that between 2002 and 2009, the country's cotton lint output has more than doubled to over 30 million bales, with average yields rising from 300 to 550 kg per ha due to Bt variety.

Dev and Rao (2007) and Narayanamoorthy and Kalamker (2006) concluded that production, income and employment of Bt cotton is high as compared to non-Bt cotton varieties. Relationship a number of studies is available in India (Bharadwaj, 1974). A detailed report on the Bt brinjal in Down To Earth (Mishra and Awasthi, 2009) brought out the detailed adverse impact of Bt on environment and health. The Monsanto, which is spear heading Bt crops, admitted that Bt cotton is ineffective as the pink bollworms become resistance to crop (Jebaraj, 2010). With regard to farm size and productivity. Using

aggregated data relating to individual districts for the period between 1954 and 1957, Bharadwaj (1974) investigated the relationship between productivity and size of farm and found that in the majority of cases, an inverse relationship existed however, it was not statistically significant.

Though there are stiff opposition for new technology including genetically modified (GM) crops, Bt cotton has been introduced and picking up fairly faster. Against this, an empirical verification has been taken up to examine the level of productivity among cotton growers in Western Ghats of Tamil Nadu. Here it is decided to explore the differentials with regard to Bt and Tt (Traditional) cotton varieties.

Methodology

As per records available from the agricultural office 2009 is a normal year and field work was done for one agriculture year. The primary data were gathered from 90 sample farmers by canvassing a well structured household schedule of 90 sample and 45 grow Bt cotton and the remaining 45 rose Tt cotton.

In Salem district next to Attur block, Kolathur block occupies more area under Bt cotton in Salem district. Hence, this block has been selected where the Bt cotton and Tt cotton varieties are grown almost equally. In this block, Alamarathupatty revenue village was selected as cotton is grown largely among different villages in Kolathur. Mostly both the set of farms do have similar socio-economic features. The farmers are interested to cultivate the Bt cotton compared to the Tt cotton in the study village. Sixty per cent of the area comes under the Bt cotton cultivation and remaining 40 per cent comes under the classification of Tt cotton in the study village. Extensive and in-depth field work was done to analyze the data empirically. While elucidating data, a cross section of farmers, officials and other stakeholders were contacted for a detailed analysis. The sample farmers are classified in to three categories—small, marginal and large farmers based on land holdings. In the present study, the farmers holding less than four acres of land are marginal farmers; those hold 4.1-7 acres of land as small farmers and above 7.2 acres of land as large farmers (Satheswaran, 2009).

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Findings and Discussion

Most of the farmers in the study village prefer to cultivate Bt cotton as it yields comparatively more than traditional cotton. The local farmers opine that Bt cotton reduces the financial burden and increases profit. A cross section of farmers revealed while the Tt cotton is cultivated here for more than one and half decades and the Bt variety has been in use for the past five years. After knowing this variety, a huge chunk of farmers switch over to Bt cotton as it is free from bollworms. The transformation of farmers from the Tt to Bt is more visible in 2008-09.

The origin of Bt cotton (2004) in the study village is interesting to explore. Initially the farmers hesitate to cultivate a new variety (Bt cotton) due to the rumors about the yield and adverse health and livestock impact. Hence, the seed company field officers¹ canvassed through the sample cultivation. They themselves selected 50 per cent land and cultivated the Bt cotton to show the results. In the process after seeing the performance of experimental plots, most of the farmers tried in their land. It gives snow balling effect to the entire village and it has been spreading to neighbouring villages as well.

The farmers can get seeds from agricultural office, local markets and outside markets from within and other

districts. In Tt cotton-MCU-5 and Surabhi are the two important and often used seed varieties and these are considered as High Yielding Variety Seeds (HYS). Bayer, Nujiveedu and Rasi are well known agri business companies supplying the Bt seeds directly to the farmers in Kolathur Block. Bt is of two types—Bt I and Bt II. Dhanno (Bt I) and 540 (Bt II) from Bayer Company, Malliga (Bt II) and Panni (Bt II) from Nujiveedu Company and Rasi II (Bt I), Shreenidhy (Bt I), Rasi —530 (Bt II) from Rasi Company are the available seed varieties for Bt cotton. The farmers in the study village prefer Bt II only as it yields more. Due to sudden demand for seeds, the distributors use this quasi demand and fix above the normal price and get a price advantage. Without proper market intelligence the farmers pay more for seeds. As often insisted by the opponents of GM crops, the seed companies dictate the price for seeds.

Before getting onto a detailed analysis on the economic dimensions of cotton cultivation, brief profile of the sample farmers is given (Table-1). It is estimated that little more than 5 acre of land is operated on an average in the study village. From the table it is very clear that around 46 per cent of the total cultivated area has been grown with cotton. Interestingly this table also highlights the fact that marginal farmers allocate more area for cotton and it steadily declines as the size class increases.

TABLE—1 PROFILE OF THE CULTIVATED AREA IN THE STUDY VILLAGE

Attributes	Area under cotton cultivation			
	Marginal N=31	Small N=40	Large N=19	Total N=90
Total cropped area. (Average size of cropped area)	77 (2.48)	191.45 (4.79)	186 (9.79)	454.45 (5.05)
Total cotton (percentage of cotton to total cropped area)	54.5 (70.780)	92.5 (48.32)	61 (32.80)	208 (45.77)
Total traditional cotton (percentage of Tt to total cotton)	27 (49.54)	43.5 (47.03)	14.5 (23.77)	85 (40.87)
Total Bt cotton (percentage of the Bt to total cotton)	27.5 (50.46)	49 (52.97)	46.5 (76.23)	123 (59.13)

Similar trend is noticed for Tt cultivation. Nevertheless, there is clear indication that as the size of land holding increases the area under Bt cotton is also increases. This demonstrates that larger farmers with strong resource base including capacity to invest more willing to take risk for venturing new technology like Bt.

While the duration for the Bt crop is 5-6 months for Tt it is 6 months. It was found that the soil here in the village is ideal for growing cotton. It is fairly loose stone,

which is rich in minerals. Here in this village farmers cultivate cotton during Kharif season as the south west monsoon is active. All the farmers depend on either tube well or open well for irrigation. In fact the highly subsidized supply of electric power helps sustain the cotton cultivation here. At the same time, the sample farmers confessed that erratic power supply affects them.

Maize, sunflower, groundnut, banana, sugarcane and chilli are the other major crops cultivated in the study village.

¹There are three seed companies in Salem district which control the Bt cotton seed market.

Multiple cropping is possible in cotton cultivation. Turmeric is usually interspersed with cotton. Farmers confessed that while crops are interspersed with other crops, pests and disease do not occur. Bayer company seeds are suitable to this because of nature of the growth is straighter than compared to other company seeds which grow branches (cannopy).

As the study village is surrounded by the foothills of Western Ghats, the farmers are not free from the wild bores, pigs and peacocks. These cause damage to field crops. When the cotton crop is fruit bearing stage, these wild creatures spoil the crop.

Generally the farmers report that the livestock do not eat the Bt cotton leaves and stalk as the taste is poor. In fact the livestock eat Tt leaves and stalk and nonetheless, stalk

is used as source of firewood. Cost advantage plays a pivotal role in propagating any technology. In fact analysis shows that input cost is more for Bt as compared to Tt. In the case of operational cost, the Bt cotton farmers spend more than Tt cotton as shown in table - 2. Consequently, the yield from Bt cotton is more. During the furrowing, the farmers use organic manures and in the study village, livestock rearing is common and penning of livestock is prevalent here. However, this is not enough for their demand and they buy manure from fellow farmers. In the case of fertilizer usage, the Bt cotton absorbs more fertilizers than Tt cotton. Pest and diseases are common in the cotton cultivation. Yellow mosaic disease is a severe problem in both varieties like that of bollworm in Tt variety. The sample farmers in the study village reveal that Bt cotton encountered the yellow mosaic disease only this year.

TABLE 2—INPUT COST PER ACRE (IN RS.)

Operations	Bt Cotton	Tt Cotton
Ploughing, Ridging and Furrowing	2198 (20)	1945 (24)
Seed	1865 (17)	374 (5)
Manuring and Fertilizer	1247 (11)	1261 (15)
Pesticide	677 (6)	598 (7)
Seed Sowing	215 (2)	200 (2.5)
Weeding	1781 (16)	1415 (18)
Harvesting	2492 (23)	1886 (24)
Transporting	467 (4.4)	305 (4)
Diesel	180 (1.5)	210 (2.5)
Total	11122 (100)	8194 (100)

NOTE: Figures in parentheses show percentage share to total cost.

Operation wise cost structure shows that (Table 2) harvesting consumes almost one fourth of the total cost followed by initial operations. With regard to cost on seed, as is expected it is quite more for Bt and less for Tt. For both types of cotton, weeding also takes a considerable proportion of cost. However, it is to be remembered that depending upon the season, rainfall and availability of water the cost would slightly varies between these two types of cotton.

In the agricultural field, marketing occupies a predominant place. In the study village, farmers willing to sell the cotton only in the primary agricultural cooperative marketing society and regulated markets than local and outsiders as they offer fair price. Occasionally petty businessmen procure the cotton in small quantity and sell the it in the society. At the time of final harvest the farmers sell their smaller quantities to petty traders.

To overcome the financial problem, farmers borrow from informal and indigenous banking sources like relatives, friends and local money lenders than institutional banking. An enquiry with the farmers reveals that banking institutions unnecessarily prolong the processing and this forced the farmers to opt credit from informal sources. This shows an important point that still the institutional source has not fully cater the rural needs.

It was found that the district / taluk level agriculture machinery did not extend any support to cotton growers. Farmers by themselves based on trail and error grow cotton. In fact the crop insurance scheme is completely absent here. As is known crop insurance is to protect the farmers from unforeseen impact on crop husbandry. Unfortunately such protective mechanism is non-exist. Proper guidance regarding crop insurance including the formalities for

premium has to be provided to cotton growers. Bank and extension officials shall educate the farmers on this issue.

From the field investigation, it is observed that only a few farmers complained that Bt cotton has an adverse effect on health like skin disease. However, this need to be verified scientifically as skin allergy may be due to a number of inters related and complex reasons. But it was found that livestock do not feed on the Bt cotton leaves. Some farmers also revealed that the soil fertility started declining in the Bt cotton plots. This was as farmers opined noticed when others crops, raised on the Bt cotton plots. Overall in

the study village, Bt growers allocated amount 50 of cropped area to Bt cotton. On the remaining land, farmers grow banana, sugarcane and maize.

The cost structure of Bt cotton in the study village is depicted in table 3. It is found that many farmers prefer to grow cotton as it generates good income and yields more. However, the farmers reported that this year the yield was affected due to spurious seed supplied by seed companies.² Enquiries with seed companies reveal different picture and officials report that crop failure in some cases is due to climatic changes.

TABLE 3—DISTRIBUTION OF BT COTTON IN THE STUDY VILLAGE

Farm size	Total area in acre	Bt area in acre	Production in bags 1 bag=40kg	Total income in Rs.	Total Expenditure in Rs.	Net Income in Rs.
Marginal (14)	32 (2.28)	27.5 (1.96)	588	543000	2,12,540	3,30,460 (12,016.72)
Small (18)	85.45 (4.74)	49 (2.72)	1100	1029000	4,68,610	5,60,390 (11,436.53)
Large (13)	134 (10.30)	46.5 (3.57)	1210	1149000	3,84,690	7,64,310 (16,436.77)
Total (45)	251.45	123	2898	2721000	10,66,040	16,54,960 (13,454.97)

NOTE : Numbers in the parentheses are averages.

An estimate on the net return of the Bt cotton shows that on an average one acre of cotton yielded worth of Rs.13455. Of course there is no clear pattern of returns when it is associated with size classes. But certainly large farmers get more income as compared to small and marginal size holdings. This is as a common feature, due to resource endowment in the large farms. In the study village large farmers not only depend on farming alone but also income is earned from service activity including employment³.

Converse to this, small farmers obtained more income with regard to Tt cultivation in the sample village. Roughly

one acre of Tt cotton generates Rs. 9500. Here the large farmers get less return (Rs. 7400) as compound to small (Rs.11000) and medium size farmers (Table-4).

The Tt cotton occupies little more than 40 per cent of total cropped area in this village. Other crops grown are groundnut, maize and banana. Depending upon the availability of water and other factor endowments, farmers allocate land for different crops. On an average one acre of land yielded Rs. 9528 worth of Tt cotton. Here the small farmers obtained more returns followed by marginal and large farmers.

² The local political parties want to score the point on this issue. While the ruling party depended the companies, the opposition parties offended on the ground that farmers were duped.

³ More liquid case (from employment) enables the farmers to spend on the procurement of timely inputs including seed and chemicals.

TABLE 4—DISTRIBUTION OF Tt COTTON IN THE STUDY VILLAGE

Farm size	Total area in acre	Tt cotton in acre	Production in bags 1 bag=45kg	Total value in Rs.	Total Expenditure in Rs.	Net Income in Rs.
Marginal (17)	45 (2.64)	27 (1.58)	461	449000	2,25,500	2,23,500 (8,277.77)
Small (22)	106 (4.81)	43.5 (1.97)	718	699500	2,20,530	4,78,970 (11,010.80)
Large (6)	52 (8.66)	14.5 (2.41)	200	189000	81,570	1,07,430 (7,408.96)
Total (45)	203	85	1379	137500	5,27,600	8,09,900 (9,528.23)

NOTE: Numbers in the parentheses are averages.

A cursory look at the comparative economies shows that Bt cotton generates more in one acre as compared to Tt cotton. The above analysis shows that Bt cotton gives fairly good returns in the study area.

Conclusion

Stride in science and technology has revolutionized agriculture sector across nook and corner in India. Despite the fact that there is a stiff opposition for GM crops, Bt cotton has been allowed for large scale cultivation. Through there are adverse impacts on the Bt cotton, this has been widely accepted across India. The area has been increasing faster and it may supersede the Tt cotton. Salem is ideal for cotton crop area and under Bt is increasing steadily. The present analysis shows that Bt is remunerative and pest free. However, a few farmers is sceptical about this as they suspect the integrity of the seed companies. No the seed companies, surprisingly admitted that Bt cotton becomes ineffective against pink bollworm in Gujarat. It is true that livestock do not feed on Bt cotton leaves, despite the returns (income) is more. As has been done for Bt brinjal still scientific studies with different environment conditions had to be done in India before taking this crop to every nook and corner.

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Dairy Enterprise and it's Production Potential in Assam

S. BORAH*, N. BORTHAKUR** AND C. HAZARIKA**

Introduction

Milk production is the most important agricultural activity in Indian Agricultural sector. At the national level, around 17 per cent of the total value of agricultural production is derived from this sector. The milk sector generates a high proportion of agricultural output, especially in the northern and western part of the country. Dairy production in Assam is mostly characterized by rural smallholder production (Value need) using indigenous cattle and buffalo. The milk production of the state has shown a gradual increase from 1986-87 to 2005-06. The production however, decreased to 751 million tons during 2006-07 from 821 million tonnes in the year 2005-06. The per capita availability of milk during 2006-07 was 70 gm/day in comparison to the all India figure of 246 gm/day. As per 2003 livestock census the total milch bovine population of the state is 2.8 million. Considering per capita availability and suggested nutritional requirement as well as population based demand projection milk production in Assam leave a huge gap with demand. As demand grows, traditional dairy activity in many pockets has transformed to small and medium scale commercial dairy activity. Commercial dairy farming plays significant role in generating grateful employment in the rural sector, particularly among the landless, small and marginal farmers and women besides providing cheap nutrition to the growing human population. Looking from these points, the present study has worked out as on the status and growth of dairy sector in Assam.

Materials and Method

1. Source and nature of data

Census wise bovine population in Assam over the period from 1982 to 2005 and time series secondary data on production and per capita availability of milk in Assam for the period 1997-98 to 2006-07 were collected from various issues of "Dairy Statistics" published by Directorate of Dairy Development, Assam.

2. Exponential trend equation

The data were analyzed by fitting the exponential function to study the trends in population and production

of dairy enterprise and per capita availability of milk in Assam. Along with the study of trend, Compound Growth Rates (CGR) of milk production and per capita availability were also computed using exponential function.

$$Y_t = ab^t$$

$$\log Y_t = \log a + t \log b$$

The CGR was worked out as,

$$r = (\text{antilog 'b'} - 1) \times 100$$

where, Y_t = Production of milk/per capita availability

a = Intercept

b = Regression co-efficient

t = Time period in years

The significance of growth rate was tested by applying student 't' test and the same was compared with the factorial value of 't' from standard value of 't' distribution.

$$t = \frac{r}{S.E(r)} \text{ With } (n-2) \text{ d.f}$$

Where r = Growth rate

n = Number of years under study

Results and Discussion

Trends in population, production and productivity of dairy enterprise

Table 1 presents the census wise bovine population in Assam over the period from 1982 to 2005. It was observed from the Table that number of cattle population in Assam had increased from 67.50 lakh in 1982 to 86.46 lakh in 2005. The percentage increase in cattle population was found to be 28.09 per cent. During the same period, number of buffalo population had increased from 5.58 lakh in 1982 to 6.74 lakh in 2005. The percentage increase in buffalo population was 20.79 per cent. In the overall level, the percentage change of livestock population was 27.53 per cent. It indicated that growth of cattle population was more than the buffalo population over the years.

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TABLE 1—GROWTH AND COMPOSITIONAL CHANGES IN LIVESTOCK POPULATION (000' Nos.)

Particulars	1982	1988	1994	1997	2003	2005	Per cent change in 2005 over 1982
Cattle	6750 (92.36)	7278 (92.11)	7777 (92.26)	8030 (91.69)	8640 (92.91)	8646 (92.77)	28.09
Buffalo	558 (7.64)	623 (7.89)	652 (7.74)	728 (8.31)	659 (7.09)	674 (7.23)	20.79
Total	7308 (100)	7901 (100)	8429 (100)	8758 (100)	9299 (100)	9320 (100)	27.53

Figures in the parentheses indicate percentage to total. *Source:* 1. Report on livestock census Assam 2. Statistical Handbook of Assam

Milk production in Assam is still not commensurate with the huge potentiality that exists. Table 2 presents the year wise break up of milk production and per capita availability in the state for the period from 1997-1998 to 2006-2007. The total milk production in the state increased to 751 thousand tones in 2006-2007 from 719 thousand tones in 1997-1998. It was observed that the percentage growth in milk production was not satisfactory in the initial years of the study which gradually increased in the recent years.

The percentage increase in milk production was found to be 4.45 per cent over the years. It was observed from the Table that milk production in the State gradually increased from the year 2002-2003 to 2006-2007. It might be

due to fact that Government sponsored schemes enhanced the production of milk from different breeds of milch animals.

The milk production of Assam leaves a huge gap with the actual demand. Per capita availability of milk during 2006-2007 was 70 gm/day in comparison to all India figure of 246 gm/day. The per capita availability of milk in the State decreased to 70 gm/day in 2006-2007 from 78 gm/day in 1997-1998. It was observed that per capita availability of milk was not satisfactory over the years. It indicated that with increase in milk production per capita availability was not increasing. The percentage change of per capita availability was -10.26 per cent during the period 1997-2007.

TABLE 2—PRODUCTION AND PER CAPITA AVAILABILITY OF MILK IN ASSAM

Year	Production ('000 tonnes)	Percentage change during 1997-2007	Yearly (%)	Per capita availability (gm/day)	Yearly (%)	Percentage change during 1997-2007
1997-1998	719		—	78	—	
1998-1999	725		0.83	79	1.28	
1999-2000	667		-8.00	71	-10.13	
2000-2001	683		2.40	69	-2.82	
2001-2002	682	4.45	-0.15	70	1.45	-10.26
2002-2003	705		3.37	71	1.43	
2003-2004	727		3.12	71	—	
2004-2005	739		1.65	72	1.41	
2005-2006	747		1.08	72	—	
2006-2007	751		0.54	70	-2.78	

Source: Directorate of Dairy Development, Assam.

The compound Growth Rate of milk production and per capita availability of milk in Assam for the period 1997-1998 to 2006-2007 are presented in Table 3. The growth rate of production of milk was (0.82 per cent) over the years. This indicated slow increase in milk production in the State. The compound growth rate of per capita availability of milk had shown a negative trend during the period 1997-2007. The growth rate of per capita availability of milk was (-0.88 per cent). This clearly indicated that as comparison to milk production of the state per capita availability of milk declined over the year. It was observed that growth in milk production was not influenced by per capita availability. Comparison

of 't' values of compound growth rates with the theoretical 't' values revealed that growth rate of milk production and per capita availability of milk were statistically significant. Considering per capita availability, milk production in the state leaves a huge gap with actual demand.

Fig 1 shows the percentage contribution of different breeds of milch animals to total milk production for the period from 1999-2000 to 2005-2006. It was observed from the figure that total milk production in Assam increased from 667 thousand tonnes in 1999-2000 to 747 thousand tonnes in 2005-2006, registering an increase of 12 per cent.

TABLE 3—TREND ESTIMATES OF PRODUCTION AND PER CAPITA AVAILABILITY OF MILK IN ASSAM

	R ²	CGR (%)
Milk Production	0.35	0.82** (0.015)
Per capita availability of milk	0.34	-0.88** (0.017)

Figures in the parentheses indicate value standard error. CGR: Compound Growth Rate **Significant at 5 per cent probability level

Similarly, cow milk, buffalo milk and goat milk increased by 72 thousand, 6 thousand and 2 thousand tonnes respectively in 2005-2006 over 1999-2000 production figures. The percentage increase in cow, buffalo and goat milk was 12.97 per cent, 6.90 per cent and 8.00 per cent, respectively during 1999-2006. The percentage contribution of cow, buffalo and goat milk to total milk production in Assam were 83.94 per cent, 12.45 per cent and 3.61 per cent, respectively in 2005-2006. This proportion of percentage contribution of cow, buffalo and goat milk to total milk production did not change appreciably during the period 1999-2006.

The Compound Growth Rates of milk production of crossbreed and non-descript cows in Assam for the period 1999-2000 to 2005-2006 are presented in Table 4. The growth rate of milk production from crossbreed cow increased significantly by 2.84 per cent. This indicated slow increase

in milk production from crossbreed cows in the State over the years. In case of non-descript cows growth rate was lower than crossbreed cows being 1.90 per cent. It was observed that during the period 1999-2000 and 2005-2006 the number of animals in milk increased from 100 thousand to 124 thousand in crossbreed cows and 1369 thousand to 1382 thousand in non-descript cows, while average milk production was found to be nearly constant over the years in both the cases. Hence, increase in number of animals in milk was the main contributor to the increased milk production during the period under study.

The compounds Growth Rate of milk production of buffalo and goat in Assam for the period 1999-2000 to 2005-2006 are presented in Table 5. The growth rate of milk production from buffalo was 1.19 per cent. This indicated slow growth of milk production from buffaloes over the years.

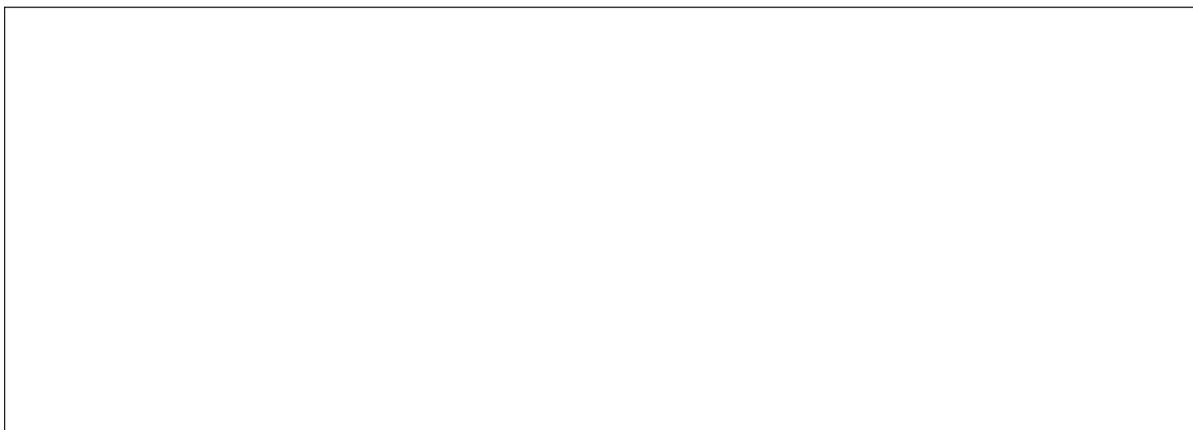


Fig 1. Share of milk production by Cow (series1), Buffalo (series 2) and Goat (series 3) in Assam

TABLE 4—TREND ESTIMATES OF MILK PRODUCTION FROM CROSSBREED AND NON DESCRIPT COWS IN ASSAM (1999-2000 TO 2005-2006)

	R ²	CGR (%)
Production of milk from crossbreed cows	0.88	2.84*** (0.011)
Production of milk from non descript cows	0.93	1.90*** (0.005)

Figures in the parentheses indicate value standard error

CGR: Compound Growth Rate

* * * Significant at 1 per cent probability level

In case of goat, growth rate of milk production was 2.32 per cent. It was observed that during the period 1999-2000 and 2005-2006 the number of animals in milk increased from 134 thousand to 146 thousand in buffalo and 365 thousand to 385 thousand in goats, while average milk

production was found to be nearly constant over the years in both the cases. Hence, increase in number of animals in milk was the main contributor to the increased milk production during the period under study.

TABLE 5—TREND ESTIMATES OF MILK PRODUCTION FROM BUFFALO AND GOAT IN ASSAM (1999-2000 TO 2005-2006)

	R ²	CGR (%)
Production of milk from buffalo	0.7756	1.19*** (0.007)
Production of milk from goat	0.3473	2.32* (0.033)

Figures in the parentheses indicate value standard error CGR: Compound Growth Rate

*Significant at 10 per cent probability level

*** Significant at 1 per cent probability level

Conclusion and Policy Implications

The growth of dairy sector during the last couple of decades have been very impressive as the bovine population increased by about 34.00 per cent, the production of milk has been doubled during the last two decades. The Government policy adopted for development of dairy sector believed to be the key factor for this impressive growth. With the objective of increasing milk production Intensive Cattle Development Project (ICDP), Key Village Scheme etc, under the Operation Flood Programme and later on Integrated Dairy Development Project (IDDP) are the key factors for the growth and development of the dairy sector. In spite of possessing huge potentiality for augmenting milk production, milk production in Assam is still not commensurate with the huge potentiality that exists. Dairy production in Assam is mostly characterized by rural smallholder production (Value need) using indigenous cattle and buffalo. With pockets of more specialized dairy production while increasing farm level production and productivity will (value need) require more improved animals, improved fodder/feed technology and access to livestock services, access of smallholders to

reliable markets to absorb more milk at remunerative prices may remain a critical constraint. Organized marketing of milk in Assam remains relatively in significant, despite past efforts to develop and promote collective market mechanisms. The traditional markets for fresh liquid milk and traditional dairy products such as sweets account for the market opportunities for farmers. The findings of the study sufficiently established that the composition of livestock population with adequate number of crossbreed animals can boost up milk production. The economic analysis of crossbreed cows establishes that income over the annual recurring expenditure is much higher than the indigenous cows. The dairy enterprise in the study area has been able to improve the economic condition and standard of living of the sample dairy farmers.

The proceeding discussions clearly elicited the need for an affective management's policy to the problems existing in the sample area in the light of this, following policies are suggested which might be helpful to formulate appropriate strategies by the farmers.

- (1) To improve the productivity of dairy animals, the existing production procedures used by the

farmers require modification and upgradation. Hence, the same should be encouraged and advocated in order to increase income germination from the dairy enterprise.

- (2) Some infrastructural development like road communication and transport should be needed for transportation of fodder, feed concentrates, veterinary medicines and transportation of milk to the consuming centers round the year.
- (3) To increase the milk production in the study area composition of dairy cattle should be changed with induction of adequate number of cross breed cows.

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AGRICULTURAL PRICES IN INDIA

It is an old adage that Agricultural prices mirror the economy of a country. It is more true in the case of an agricultural country like India. Viewed from this angle, it is quite an important publication. It gives information on index numbers, farm (Harvest) prices, wholesale and retail prices of various agricultural commodities, etc.

Alternative to Tobacco Crop Cultivation in Rabi Season: A Cost Benefit Analysis

E. KRISHNA RAO¹ AND G. NANCHARAI AH²

Abstract

Tobacco is an important cash crop cultivated in rabi season of India. It provides employment to about 36 million people and contributes as much as Rs. 8,000 crores through excise duty and Rs.1362 crores in terms of foreign exchange to the national exchequer. Among the tobacco growing states, particularly FCV, Andhra Pradesh occupied the first place in area and 2nd place in production. Besides to its economic potential and labour absorption area under tobacco (including all types of varieties) has been decreasing significantly. The reasons for declining of tobacco cropped area are mainly diminishing of market prices, high cost of production, decline of tobacco demand and prices in international market etc. in addition to this, the government policies, particularly, health policies at international level has one of the main reason for the deterioration of tobacco cultivation-in India. Thus adequate knowledge of cost structure of major crops has become essential for providing suitable incentives to the farmers and also assesses the relative competitiveness of respected season in the important tobacco growing states like Andhra Pradesh. In view of this, an attempt has been made in this paper to examine the economics of tobacco compare with other competing crops under different sizes at micro level that is at village level. The field study was conducted during 2007 and 2009 in the selected villages.

This study found that the paddy and bengalgram are more profitable crops than the tobacco. In both the villages, an inverse relationship has been found between the size of holding and cost of production in all crops cultivation. At the end it can be concluded that the cultivation of bengalgram and paddy is more lucrative than the tobacco cultivation in the selected villages. At present the central and state governments are planning to discourage tobacco cultivation and its consumption in the health point of view. Thus the government may disseminate the economics of these rabi crops and motivate the farmers to drop the tobacco cultivation slowly. However precaution should be taken to preserve the labour employment as the tobacco is more labour intensive crop than bengalgram and paddy.

I. Introduction :

The analysis of cost is of pivotal importance in agriculture and it provides the apt information and essential

knowledge to formulate and evolve the economic policies both at micro and macro levels (Murugan, D *et al.*, 2005). Crop-wise information on costs and returns is required for the farmers to decide on allocation of their available limited resources. Further, the cost of cultivation of individual crops is useful for the purpose of modeling the response of agricultural area and production to change in the prices of outputs and inputs. Moreover cost of production is one of the most important factors in the determination of procurement/minimum support prices by government. It is a well established fact that the advent of new technology in agriculture has not only elevated the level of output, but also escalated the cost of input. It is imperative to observe that, in recent times farmers are becoming more capital investment conscious and entail risk as farm entrepreneurs for putting into practice more and more farm machineries (Chennat Gopalakrishna *et al.*, 1985). Further for attaining a technological change, first of all the system of cultivation has assimilated to modern needs. By and large, the technological change accompanies an increase in the cost composition which varies from crop to crop, area to area and with land sizes. Thus the cost of cultivation is one of the important factors for the farmer's choice of crop cultivation (Madan Lal Gujrat *et al.* 2005). Cost structure as reflected by the share of various inputs in the total cost of cultivation.

Tobacco is an important cash crop cultivated in rabi season. Though the cultivation of Tobacco is restricted to 0.19 percent of the total cultivated area, it provides employment to about 36 million people on the one hand (CMIE, 2006). On the other hand, indirectly it contributes as much as Rs 8,000 crores through excise duty and Rs.1362 crores in terms of foreign exchange to the national exchequer. Tobacco being a labour intensive crop provides employment to more than 60 lakhs people who are engaged in the farming curing, redrying, packaging, grading, manufacturing distribution, export and retailing activities (GOI, 2005). Even though the cultivation of Tobacco is spread all over the country, the commercial cultivation of Tobacco is concentrated in States like Andhra Pradesh, Karnataka, Gujarat, Maharashtra, Bihar, Tamilnadu and West Bengal etc. among the tobacco growing states, particularly FCV, Andhra Pradesh occupied the first place in area and 2nd place. in production. Besides to its economic potential and labour absorption area under tobacco

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(including all types of varieties) has been decreasing significantly. At national level, area under tobacco declined from 1.69 lakh hectares in 1980-81 to 1.29 lakh hectares in 2004-05, whereas it was declined from 0.45 lakh hectares to 0.37 lakh hectares at Andhra Pradesh state level during the same period (GOI 2005). The reasons for declining of tobacco cropped area are mainly diminishing of market prices, high cost of production, decline of tobacco demand and prices in international market etc.

The previous studies conducted on shifts in the cropping pattern reveals that among the factors affecting the shifts in the cropping pattern, cost of production, prices and net returns are the important. The cost studies on agricultural production by taking kharif and rabi or irrigated and unirrigated are conspicuous by their absence in tobacco crop. Moreover, majority of the studies conducted on cost of production are limited to the macro level. Thus adequate knowledge of cost structure of major crops has become essential for providing suitable incentives to the farmers and also assesses the relative competitiveness of respected season in the important tobacco growing states like Andhra Pradesh. In view of this, an attempt has been made in this paper to examine the economics of tobacco compare with other competing crops under different sizes at micro level that is at village level. It also analyses the changes in structure of cost of tobacco and paddy at state level.

II. Study Area:

As mentioned earlier, Andhra Pradesh is one of the important tobacco growing state in India. In Andhra Pradesh about 84 per cent of tobacco was produced in Costal Andhra, remaining 16 per cent had been produced in Telangana (6 per cent) and in Rayalaseema (10 per cent) regions in 2004-05 (GoAP, 2006). Even in Costal Andhra, Prakasam district has occupied the first place in area as well as in production. Thus Jayavaram and R.C.Puram villages from Prakasam district of Andhra Pradesh are selected for this study being a major tobacco growing areas in their respective mandals and intensity of cropping pattern shifts. Jayavaram (Tangutur mandaI), is an un-irrigated village and totally depends upon rainfall for the agriculture and tobacco and bengalgram are the important crops. Ramachandra Puram (Jarugumalli mandaI) is an irrigated village; paddy and tobacco are the important crops. In both the villages, crops are cultivated during two seasons such as kharif and rabi. It is observed that the rabi season is economically significant for farmers as well as for the labourers, as it generates higher levels of income. The tobacco and paddy are the major rabi crops in R.C.Puram and the cropping has been shifting from tobacco to paddy, whereas in Jayavaram tobacco and bengalgram are the important rabi crops and cropping pattern has been shifting from tobacco to bengalgram. Most over in both the villages, majority of land is being cultivated under the commercial crops.

III. Sample Design:

Jayavaram village is inhabited by 318 households and Ramachandra Puram is inhabited by 272. Total households have been classified in to three categories such as small, medium and large on the basis of their **land size**¹. From each size 36 per cent of sample has been taken on the basis of random sampling method (lottery method). Totally sample comprises-123, of which 73 households from Jayavaram and 50 households- from Ramachandra Puram. In Jayavaram, out of 73 sample households, small farmers' households are 50, medium farmers households are 13 and large farmers' households are 10. In the village of Ramachandra Puram, out of 58 sample households, small farmers' households are 38, medium farmers' households are 11 and large farmers' households are 9. The head of the household is interviewed to get the necessary data. In addition, agricultural labourers (44 from Jayavaram and 42 from R.C.Puram) also interviewed to get accurate labour wage data.

IV. Methodology:

Tobacco, paddy and bengalgram are the important crops in these villages and the farm operations are varied in each crop. In the case of tobacco, the cost of cultivation includes the expenditure incurred on different operations starting from land preparation till marketing in the government boards. The operations involved in tobacco cultivation are ploughing, applying pesticides, manure, fertilizers, weeding, plant protection, depesticization with hand, harvesting, curing, *kachha* grading. "Most of the people opined that the grading operation falls under the off-farm activity. In this context, it is interesting to note that there are two types of grading operations in tobacco cultivation process: (i) farm grading (*kachha* grading) and (ii) Ag-mark grading. Before selling their final product in the tobacco boards, farmers use to go for *kachha* grading to separate same colour leaves after curing. But the traders who buy the product in tobacco boards through auction system usually go for Ag-mark grading on the basis of their export **order**"². In this connection, the cost of *kachha* grading in the tobacco cost of cultivation is also included. Just as tobacco, paddy cost of cultivation includes the expenditure incurred for different operations starting from land preparation till getting the final product. The costs included in the paddy cultivation are ploughing, applying manure, preparation of seedbeds, pesticides and manures, transplantation, weeding, reaping, heaping, plucking and threshing. And the costs included in bengalgram cultivation are cost of seeds, manure, pesticides, fertilizers, labour cost, imputed value of family labour, interest on working capital, rental values of owned land, depreciation, land revenue and interest on fixed capital.

The total field labour has been classified into human labour, bullock labour, machine labour and calculated the costs on the basis of local wage market. Moreover, all inputs

which are required in cultivating tobacco and paddy crops are calculated at the village level rates unlike the manufacturing industry production in which the inputs are initially supplied by the farm family such as seeds, manure, human labour, bullock labour etc. Hence the factor payment for such items constitutes cost as well as income. The opportunity cost of these family supplied inputs and wages are calculated equal to the market cost. Transport and storage costs are also included in the total cost of production. In the selected village the farmers are using fertilizers like Urea, 20-20, DAP and phosphate in different quantities per acre, their average values are taken into account.

The interest on working capital is calculated at 13.5 per cent for small farmers and 12.5 per cent for medium and large farmers for half of the period of crop in R.C. Puram. Contrary to R.C. Puram village, in Jayavaram interest on working capital has been calculated at 14 per cent for small holdings and 13 per cent for medium and 12.5 for large holdings for half of the period of crop on the basis of prevailing interest rate in this village. The distinction between small and large farmers is because of small farmers mostly depend upon private money lenders for their investment, who would demand higher interest rates. In other words, the medium and large land holders have the advantage access to cheaper credit from the financial institutions, besides the capacity to bear risk due to their wealth, financial position, access to scarce inputs such as water, seed, insecticides, fertilizers, access to information etc. At the same time, the small farmers do not usually approach the institutional sources due to procedural delays, psychological pressure and partly due to the feeling of inferiority. However the CACP has been calculating 12.5 per cent for all size of holdings. As CACP (Commission for Agricultural Costs and Prices) the rate of interest on fixed capital is calculated at 10 per cent per annum applied on the value of capital stock. Moreover total individual sample costs on the basis of land size have been pooled and taken the average cost per acre in both the crops.

V. Data Source:

The present study is mainly based on the primary data and collected from the villages through interviewing the heads of the selected households and a separate questionnaire used for each household. The interviews were held both at the farmer's houses and also in the fields. The household survey was conducted during the years 2007 and 2009 in the selected villages. In addition to this, the focus group discussion (FGDs) was conducted with the village community in order to acquire more accurate qualitative information and data. The primary data is supplemented by the data collected from these secondary sources such as Reports of Cost of Cultivation of Principal crops in India, Reports of Commission for Agricultural Costs and Prices and various publications of Directorate of Economics and Statistics.

VI. Cost Concepts:

Several inputs have been included in the calculation of a crop cost of production. Broadly these costs are classified into two categories such as:

Cost-A:(Variable cost/Operational cost): it includes the cost of human labour, Bullock labour, Machine labour cost of seeds/plants (included farm produced and purchased), insecticides and pesticides, manure (owned and purchased), fertilizers, Irrigation charges, fuel (owned and purchased)—only for tobacco, bamboo, twine, bags, Interest on working capital, and Miscellaneous cost—which have not come under main category

Cost-B :(Fixed cost): Rental value of owned land, Land revenue, Depreciation on implements and farm buildings, Interest on fixed capital

Cost-C: Total cost of Production (Cost A+ Cost B)

CASE-I: R.C. PURAM VILLAGE:

(a) Tobacco Cost of Production:

Tobacco and paddy are the important crops in this village and occupied major proportion- of the area during the rabi season. Thus, the costs of cultivation tables are prepared only for tobacco and paddy. The per acre optimal cost structures of tobacco crop size wise and pooled farms are furnished in table 1. It could be seen from the table that an inverse relationship between farm size and cost of cultivation. Among the total cost, variable costs occupied major proportion and scanty proportion has been incurred by fixed costs. The human labour cost (including imputed labour cost) component ranges between 29.71 per cent for small farmers, 28.93 per cent for medium and 29.13 per cent for large farmers. The involvement of family labour in the agriculture operations is the major reason for slight high proportion of human labour cost for the small farmers. It is interesting to note that the cost of plants seems to be exorbitant in the total production small farmers are spending more on the plants than medium and large farmers. The spurt in tobacco nursery cultivation in the neighboring village made more availability of tobacco plants at cheaper rates. It is observed that even though tobacco plants are available in the nearest places, some of the sample farmers use to get the plants from Rajahmundry seeking good quality. Tobacco cultivation involved more operations than other crops and the cost on curing is important one. Among this fuel cost is the major item, it recorded clear tendency to decline with the increase in the size of holdings.

(b) Paddy Cost of Production:

Among the selected village cropping pattern, paddy is another major crop, which accounted for about 67 per cent of share in total sample household cropped area during 2005- 06. The table 4 demonstrates the per acre optimal cost structures of paddy crop interms of land holding size

in the selected village. The data presented in the table indicates that an inverse relationship exists between farm size and cost of cultivation. Among the total cost of production, operational cost as well as fixed cost registered major proportion but total operational cost is slightly higher than total fixed cost. More family labour absorption in the agricultural process resulted in the major proportion of labour cost in case of small farmers. It is also noted that comparatively family labour involvement is high in paddy than in tobacco crop cultivation. The use of fertilizers, pesticides and manure per acre shows a clear tendency to increase with the increase in the size of holdings.

(c) Economics of Tobacco and Paddy Crops Cultivation in R.C. Puram:

The costs and returns of paddy and tobacco cultivation and variation between net returns of these two crops have been presented in the tables 3 & 4. To calculate total output value of respective crop production, the prevailing village market prices of tobacco and paddy have been taken into account. The positive relationship between size of holding and productivity in both the fields has been observed in this village.

Table 3 demonstrates that the average yield in poled farms is 5.30 quintal and there are marginal variations between the size groups. The net returns are concerned large farmers are getting more profit over cost C (Rs. 2586.38/-) followed by medium farmers (Rs. 1971.41/-) and small farmers (Rs. 1056.52) respectively. The table 4 reveals that the input-output ratio in terms of operational cost (Cost A) is Rs.1.60/- for large farmers, Rs.1.55/- for medium farmers and Rs.1.47/- for small farmers over rupee spent on tobacco cultivation in study area. Calculating the input-output ratio in terms of total cost of production (Cost C), it is found that the large farmers gained Rs. 1.13/-, whereas the medium farmers gained Rs. 1.10/- and a small farmer gained only Rs. 1.05/-, over a rupee spent on cultivation. If we exclude rental value of owned land and imputed labour cost in total production cost, the input-output ratios worked out at Rs. 1.43/- for small farmers, Rs. 1.49/- for medium farmers and Rs. 1.53/- for large farmers, over a rupee spent on the tobacco cultivation. It is observed that the large farmers cost of production for tobacco is less than other size of holdings and getting more returns comparatively other land holding sizes.

Table 3 further explains the income from paddy crop cultivation among different size groups. The difference of yield of paddy among the different land holding sizes is substantial. The small farms are getting in an average 30.75 bags, while medium farmers are getting 31.15 bags, large farmers are getting 32.08 bags respectively. With the advent of low cost of production and high receiving price for their product the large farmers incurred high returns than the small and medium farmers. It is interesting to note that the income variations among the different size of land holdings is not due to cost of production, it is more due to variation

in the yield of paddy. The table 4 reveals that the input-output ratio in terms of operational cost (Cost A) is Rs. 1.98/- for small farmers, Rs. 2.09/- for medium farmers and Rs.2.20/- for large farmers, over a rupee spent on paddy crop cultivation. Whereas the input-output ratios calculated in terms of total production cost (Cost C) per acre is found Rs. 1.25/- for large farmers, Rs. 1.21/- for medium farmers and Rs. 1.17/- for small farmers respectively. Thus it is found from the analysis of net returns from paddy and tobacco crop cultivation large farmers are enjoying more returns comparatively other landholding size groups. However all sizes of landholdings are getting more returns from paddy crop cultivation in comparison to tobacco crop cultivation.

CASE-II: JAYAVARAM:

(a) Bengalgram Cost of Cultivation:

This village cropping pattern is dominated by tobacco and bengalgram in rabi season. The cost of production details of bengalgram has been furnished in the table 5. The data indicates inverse relationship between landholding size and cost of production. Among the total cost of production operational cost proportion is more in the case of all size groups. The proportion of total operation cost is 54.87 per cent in case of small farmers, 53.88 per cent for medium farmers and 52.59 per cent for large farmers. In the total operational cost, labour cost occupies the major proportion, whereas the rental value of own land occupies the major proportion in total fixed costs.

The labour cost component ranges between 18.23 per cent for small farmers and 15.50 per cent for large farmers. It further reveals that the absorption of family labour is very low comparatively in bengalgram in comparison with tobacco crop, which is also cultivated in this village. The use of bullock labour per acre shows a clear tendency of inverse relationship between cost and size of holding. The cost of fertilizers, pesticides and manure is also occupied a mammoth share in the total cost of production and has shown a clear tendency to increase with the increase in the size of holding.

(b) Tobacco Cost of Cultivation:

The costs incurred in cultivation of tobacco for different size groups and averages (pooled farms) of all size groups in selected village are presented in the table 6. The total cost of cultivation of tobacco as a whole amounted to Rs. 20522.41/- per acre, which is marginally varied among the size groups. As bengalgram, the production cost of tobacco has also registered the inverse relationship with landholding size. On an average among the production cost of tobacco total operational cost constituted the highest proportion (71.13 per cent). The total fixed cost is 29.87 per cent and same tendency also registered among the different land size groups. Among the different size groups, the total operational cost is higher (Rs. 14781.06/-) for small farmers than medium (Rs. 14286.21/-) and large farmers (Rs. 14112.36/-). Contrary to this tendency

the total fixed cost is higher (Rs. 6231.68/-) for large farmers than medium (Rs. 6156.65/-) and small farmers (Rs. 5999.32/-) respectively. The total operational cost, human labour has occupied major cost share in operational cost, whereas the rental value of owned land has occupied the major cost share in total fixed cost.

(c) The Economics of Tobacco and Bengalgram Crop Cultivation:

The production cost and returns on different size of landholdings of tobacco and bengalgram crops have been presented in the tables 7 and 8. As R.C.Puram village, total output value of each crop has been calculated on the basis of prevailing local village market **prices**⁴. The productivity levels among different size groups have gone under radical changes after the green revolution with the advent of new technology large farms became more productive than other size of holdings. There is a significant variation in the prices received for their final product among different size groups. Moreover the variation either in productivity or in price for final product is varying from place to place and crop to crop (Abhijit Sen *et al* 2004). It is found from the household survey that in this village there is a slight variation among landholding sizes in case of price for final produce in both the crops. As far as the yield is concerned for tobacco large farmers are getting the higher yields followed by medium farmers and small farmers. Low cost of production and high yielding has resulted in the higher returns for large farmers than medium and small farmers. The data presented in the table 8 reveals that the input-output ratio per acre in terms of operational cost (Cost A) is Rs. 1.65 for large farmers, Rs. 1.59 for medium farmers and Rs. 1.52 for small farmers over rupee spent on tobacco cultivation in the study area. The input-output ratio in terms of total cost of production (Cost C) is found to be Rs. 1.15/- in case of large farmers, whereas it is Rs. 1.11/- in case of medium farmers and Rs. 1.08/- in case of small farmer, over a rupee spent on cultivation.

The yield variation among size groups is meager and large farmers registered highest yield followed by small farmers and medium farmers in the case of bengalgram cultivation. It is observed that due to their immediate economic needs, small farmers sell their product at an earlier stage than the large farmers even if they don't receive remunerative prices or not. But the large farmers who have extensive storage facilities and have bargaining power could wait till they get profitable prices for their product. After the practice of bengalgram crop cultivation in the surrounding areas of Tangutur, several cold storages have been established in this town and mostly this facility was utilized by the large farmers. But in the selected village that most of the sample farmers are utilizing their own storage facilities and meager percentage of sample farmers are utilizing private storage facilities like cold storage. The input-output ratio in terms of operational cost (Cost A) is Rs. 2.33 for small farmers, Rs. 2.50 for medium farmers and Rs. 2.65 for large farmers, over a rupee spent on bengalgram

crop cultivation. Whereas the input-output ratios are calculated in terms of total production cost (Cost C) per acre is found Rs. 1.39 for large farmers, Rs. 1.35 for medium farmers and Rs. 1.28 for small farmers respectively.

The net returns either over cost A or cost C from the cultivation of bengalgram is remarkably higher than the tobacco crop returns for all sizes of farmers. Moreover the net income variation between tobacco and bengalgram is more in the case of medium farmers and they are receiving Rs. 2209.39/- more than the tobacco returns, followed by large farmers (Rs. 2036.00/-) and small farmers (Rs. 1893.22/-) respectively. The data on cost and net returns reveals that bengalgram cultivation is giving more returns at a low cost of production than tobacco and hence became lucrative crop in the selected village.

IX. Conclusions:

The analysis on cost of production and returns of tobacco, paddy and bengalgram crop cultivation in the selected villages reveal that the paddy and bengalgram are more profitable crops than the tobacco. Comparatively the tobacco crop cultivation requires more investment than paddy and bengalgram. Moreover in both the villages, an inverse relationship has been found between the size of holding and cost of production in all crops cultivation. Further a significant variation between the two selected villages is found in the tobacco crop (which is growing in two selected villages) production cost, prices and productivity due to the variation in labour wage rates, land rents and quantity of inputs. As per the data, on an average Jayavarm village a farmer is investing Rs. 458.9/- more than the R.C.Puram farmer for the cultivation of one acre of tobacco crop high labour wage rates, high land rents and the high quantity of inputs have caused the higher investment in Jayavarm village. In both the villages large farmers are enjoying higher yield as well as higher prices for their product than the small and medium farmers in all the crops. At the end it can be concluded that the cultivation of bengalgram and paddy is more lucrative than the tobacco cultivation in the selected villages. At present the central and state governments are planning to discourage tobacco cultivation and its consumption in the health point of view. Thus the government may disseminate the economics of these rabi crops and motivate the farmers to drop the tobacco cultivation slowly. However precaution should be taken to preserve the labour employment as the tobacco is more labour intensive crop than bengalgram and paddy.

NOTES:

1. Small farmers- all those who possess 0.01 acres to 5.0 acres of land. (ii) Medium farmers—those who possess 5.0 acres to 10.0 acres of land. (iii) Large farmers- this category has the highest possession of land with 10 acres and above. The upper limit of class interval has not been included while lower limit is included.
2. Information collected from farmers and experienced tobacco buyers. The researcher also consulted the Tobacco Board authorities of Kondepi and Tangutur as a reference and cross check.

3. After the harvesting of tobacco crop, some farmers use to sell the straw and seeds(by-product) and some are not, the value of seeds is meager, even though it is also included in the total returns value.
4. As per the data published by Directorate of Economics and Statistics, Government of Andhra Pradesh in 2005-06, tobacco average wholesale prices are Rs.35/- per kg, but as per Tobacco Board Annual report it is 36.16/-. Moreover there is significant variation between state and Prakasam district tobacco prices. Hence it is reliable to take village market prices.

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TABLE 1—TOBACCO COST OF CULTIVATION IN R. C. PURAM

(Rs/acre)

Costs	Small	%	Medium	%	Large	%	Average	%
Seed	875.00	4.31	850.00	4.24	750.00	3.78	825.00	4.11
Manure	60.00	0.30	60.00	0.30	125.00	0.63	81.67	0.41
Pesticides	823.00	4.05	856.00	4.27	1015.00	5.12	898.00	4.48
Fertilizers	1425.00	7.02	1570.00	7.83	1675.00	8.45	1556.67	7.76
Labour cost*	5380	26.48	5156	25.71	5438	27.42	5324.66	26.54
Applying pesticides	575.00	2.83	605.00	3.02	656.00	3.31	612.00	3.05
Applying fertilizers & Manure	100.00	0.49	100.00	0.50	175.00	0.88	125.00	0.62
Transplantation	525.00	2.58	550.00	2.74	633.00	3.19	569.33	2.84
Weedout	300.00	1.48	313.00	1.56	385.00	1.94	332.67	1.66
Harvesting	2300.00	11.32	2150.00	10.72	2025.00	10.21	2158.33	10.76
Bullock labour	675.00	3.32	450.00	2.24	385.00	1.94	503.33	2.51
Machine labour	905.00	4.46	988.00	4.93	1179.00	5.95	1024.00	5.10
Cost on curing	5148	25.35	4975	24.81	4410.65	22.24	4844.55	24.14
Labour cost	1350.00	6.65	1298.00	6.47	1195.00	6.03	1281.00	6.38
Fuel	2550.00	12.56	2493.00	12.43	2035.00	10.26	2359.33	11.76
Bamboo	98.00	0.48	90.00	0.45	85.00	0.43	91.00	0.45
Twine	85.00	0.42	73.00	0.36	70.00	0.35	76.00	0.38
Bags	140.00	0.69	140.00	0.70	140.00	0.71	140.00	0.70
Kachha grading	500.00	2.46	489.00	2.44	550.00	2.77	513.00	2.56
Transport & storage	400.00	1.97	356.00	1.78	300.00	1.51	352.00	1.75
Miscellaneous	25.00	0.12	36.00	0.18	35.65	0.18	32.22	0.16
Total Family Labour	385.00	1.90	296.00	1.48	158.00	0.80	279.67	1.39
Interest on working capital	468.13	2.30	421.76	2.10	415.26	2.09	435.05	2.17
I. Total operational cost	14564.13	71.71	14184.76	70.75	13986.91	70.53	14245.27	71.00
Rental value of owned land	5000.00	24.62	5000.00	24.94	5000.00	25.21	5000.00	24.92
Land revenue	50.00	0.25	50.00	0.25	50.00	0.25	50.00	0.25
Depreciation on implements & farm buildings	198.00	0.97	346.50	1.73	375.00	1.89	306.50	1.53
Interest on fixed capital	498.28	2.45	467.25	2.33	419.75	2.12	461.76	2.30
II. Total Fixed Cost	5746.28	28.29	5863.75	29.25	5844.75	29.47	5818.26	29.00
Total Cost(I+II)	20310.41	100.00	20048.51	100.00	19831.66	100.00	20063.53	100.00

Source: Household Survey. * The imputed labour cost is not included and calculated in separately.

TABLE 2—PRODUCTION COST OF PADDY IN R. C. PURAM

(Rs/acre)

Cost	Small	%	Medium	%	Large	%	Average	%
Seeds	450.00	3.13	450.00	3.15	400.00	2.82	433.33	3.03
Manure	125.00	0.87	170.00	1.19	205.00	1.44	166.67	1.17
Pesticides	485.00	3.38	530.00	3.71	564.00	3.97	526.33	3.69
Fertilizers	1075.00	7.49	1126.00	7.88	1189.00	8.38	1130.00	7.91
Irrigation cost	350.00	2.44	300.00	2.10	275.00	1.94	308.33	2.16
Labour cost*	5680	39.55	5463	38.2	5215	36.75	5452.65	38.18
Applying manure & fertilizers	225.00	1.57	225.00	1.57	268.00	1.89	239.33	1.68
Applying pesticides	500.00	3.48	500.00	3.50	525.00	3.70	508.33	3.56
Transplantation	595.00	4.14	634.00	4.43	655.00	4.62	628.00	4.40
Weedout	280.00	1.95	280.00	1.96	305.00	2.15	288.33	2.02
Reaping	700.00	4.88	715.00	5.00	725.00	5.11	713.33	4.99
Heaping	305.00	2.12	250.00	1.75	263.00	1.85	272.67	1.91
Threshing	1300.00	9.05	1200.00	8.39	1068.00	7.53	1189.33	8.33
Miscellaneous	39.00	0.27	43.00	0.30	48.00	0.34	43.33	0.30
Bullock labour	685.00	4.77	568.00	3.97	405.00	2.85	552.67	3.87
Machine labour	628.00	4.37	700.00	4.90	835.00	5.88	721.00	5.05
Total family Labour	423.00	2.95	348.00	2.43	118.00	0.83	296.33	2.07
Interest on working capital	304.33	2.12	258.79	1.81	236.45	1.67	266.52	1.87
I. Total Operational Cost(A)	8469.33	58.98	8297.79	58.04	8084.45	56.98	8283.86	58.00
Rental value of own land	5250.00	36.56	5250.00	36.72	5250.00	37.00	5250.00	36.76
Depreciation on farm buildings	85.60	0.60	195.00	1.36	298.00	2.10	192.87	1.35
Land revenue	200.00	1.39	200.00	1.40	200.00	1.41	200.00	1.40
Interest on fixed capital	353.56	2.46	354.80	2.48	356.50	2.51	354.95	2.49
II. Total Fixed Cost (B)	5889.16	41.02	5999.80	41.96	6104.50	43.02	5997.82	42.00
Total Cost (I+II)C	14358.49	100.00	14297	100.00	14188.95	100.00	14281.68	100.00

Source: Household Survey. * The imputed labour cost is not included and calculated in separately.

TABLE 3—COST STRUCTURE AND RETURNS IN PADDY AND TOBACCO CULTIVATION IN R. C. PURAM

(Rs/acre)

Costs/Size of Holdings	Paddy				Tobacco			
	Small	Medium	Large	Average	Small	Medium	Large	Average
Total operational cost (A)	8469.33	8297.79	8084.45	8283.86	14564.1	14184.76	13986.9	14245.27
Total fixed Cost (B)	5889.16	5999.80	6104.50	5997.82	5746.28	5863.75	5844.75	5818.26
Total Cost of Production (C)	14358.5	14297.59	14188.9	14281.6	20310.4	20048.51	19831.6	20063.53
Productivity (in bags)*	30.75	31.15	32.08	32.33	520.5	532.00	538.00	530.19
Price received	520.00	530.00	530.00	526.67	40.95	41.31	41.58	41.28
Gross Returns**	16740.0	17303.50	17765.4	17269.6	21366.9	22019.92	22418.0	21934.96
Net return over Cost A	8270.67	9005.71	9680.95	8985.78	6802.80	7835.16	8431.13	7689.70
Net Return Over Cost C	2381.51	3005.91	3576.45	2987.96	1056.52	1971.41	2586.38	1871.44
Net return Over excluding owned land rent and imputed Value	8054.51	8603.91	8944.45	8534.29	6441.52	7267.41	7744.38	7151.10
Input-out ratio over Cost A	1.98	2.09	2.20	2.08	1.47	1.55	1.60	1.54
Input-output ratio over Cost C	1.17	1.21	1.25	1.21	1.05	1.10	1.13	1.09
Input-output ratio excluding owned land rent and imputed labour cost	2.08	2.01	1.99	2.02	1.43	1.49	1.53	1.48

Source: Household Survey, Note: * 1 bag =75kgs ** included the paddy straw value of Rs.750/- for small farmers, Rs. 794/- for medium farmers and Rs. 763/- for large farmers ** included the tobacco seed³ value of Rs.50/- for small farmers, Rs. 43/- for medium farmers and Rs.48/- for large farmers and the gross value of product is calculated on the basis of prevailed local village market prices.

TABLE 4—INCOME VARIATIONS IN TOBACCO AND PADDY CROP CULTIVATION IN R. C. PURAM

(Rs/acre)

<i>Income Variations Over Cost C</i>				
Size	Small Farmers	Medium Farmers	Large Farmers	Average
Paddy	2381.51	3005.91	3576.45	2987.96
Tobacco	1056.52	1971.41	2586.38	1871.44
Variation	1324.99	1034.50	990.07	1116.52
<i>Income Variations Over Cost A</i>				
Size	Small Farmers	Medium Farmers	Large Farmers	Average
Paddy	8270.67	9005.71	9680.95	8985.78
Tobacco	6802.80	7835.16	8431.13	7689.70
Variation	1467.87	1170.55	1249.82	1296.08
<i>Income Variation Excluding owned Land Rent and Imputed Value of Labour</i>				
Size	Small Farmers	Medium Farmers	Large Farmers	Average
Paddy	8054.51	8603.91	8944.45	8534.29
Tobacco	6441.52	7267.41	7744.38	7151.10
Variation	1612.99	1336.50	1200.07	1383.19

Source: Computed from table 3.

TABLE 5—BENGALGRAM COST OF CULTIVATION IN JAYAVARAM VILLAGE

(Rs/acre)

Cost type	Small	%	Medium	%	Large	%	Average	%
Seeds	650.00	5.02	650.00	5.09	500.00	3.93	600.00	4.68
Manure	125.00	0.96	170.00	1.33	220.00	1.73	171.67	1.34
Pesticides	650.00	5.02	650.00	5.09	750.00	5.90	683.33	5.33
Fertilizers	1150.00	8.87	1225.00	9.60	1400.00	11.01	1258.33	9.82
Labour cost*	4277	33	3967	31.1	3616	28.46	3953.32	30.85
Seed Sowing	100.00	0.77	100.00	0.78	100.00	0.79	100.00	0.78
Applying Manure and Fertilizers	325.00	2.51	350.00	2.74	358.00	2.82	344.33	2.69
Applying Pesticides	325.00	2.51	325.00	2.55	250.00	1.97	300.00	2.34
Weedout	360.00	2.78	330.00	2.59	340.00	2.67	343.33	2.68
Harvesting	625.00	4.82	634.00	4.97	568.00	4.47	609.00	4.75
Threshing	350.00	2.70	348.00	2.73	245.00	1.93	314.33	2.45
Miscellaneous	89.00	0.69	85.00	0.67	103.00	0.81	92.33	0.72
Bullock Labour	550.00	4.24	500.00	3.92	475.00	3.74	508.33	3.97
Machine Labour	1275.00	9.84	1100.00	8.62	1068.00	8.40	1147.67	8.96
Total Family Labour	278.00	2.14	195.00	1.53	109.00	0.86	194.00	1.51
Interest on Working Capital	258.98	2.00	213.05	1.67	199.45	1.57	223.83	1.75
Total operational cost(A)	7110.98	54.87	6875.05	53.88	6685.45	52.59	6890.49	53.79
Rental value of own land	5375.00	41.47	5375.00	42.12	5375.00	42.29	5375.00	41.96
Depreciation on farm buildings & Implements	79.65	0.61	115.35	0.90	239.80	1.89	144.93	1.13
Land Revenue	45.00	0.35	45.00	0.35	45.00	0.35	45.00	0.35
Interest on Fixed Capital	349.96	2.70	350.23	2.74	365.98	2.88	355.39	2.77
Total Fixed Cost(B)	5849.61	45.13	5885.58	46.12	6025.78	47.41	5920.32	46.21
Total CostC(A+B)	12960.59	100.00	12760.63	100.00	12711.23	100.00	12810.82	100.00

Source : Household Survey. *Imputed labour cost has not included and calculated in separately.

TABLE 6—PRODUCTION COST OF TOBACCO IN JAYAVARAM VILLAGE

(Rs/acre)

Costs	Small	%	Medium	%	Large	%	Average	%
Seed	915.00	4.40	890.00	4.35	825.00	4.06	876.67	4.27
Manure	83.75	0.40	98.35	0.48	139.00	0.68	107.03	0.52
Pesticides	1023.76	4.93	1075.56	5.26	1239.50	6.09	1112.94	5.42
Fertilizers	1425.00	6.86	1570.00	7.68	1675.00	8.23	1556.67	7.59
Labour cost*	5200.35	25.02	4980.13	24.36	5231.5	25.72	5137.33	25.03
Applying pesticides	175.00	0.84	205.00	1.00	256.00	1.26	212.00	1.03

TABLE 6—PRODUCTION COST OF TOBACCO IN JAYAVARAM VILLAGE—Contd.

(Rs/acre)

Costs	Small	%	Medium	%	Large	%	Average	%
Applying fertilizers & Manure	200.00	0.96	200.00	0.98	275.00	1.35	225.00	1.10
Transplantation	595.35	2.86	623.78	3.05	732.75	3.60	650.63	3.17
Weedout	200.00	0.96	213.00	1.04	295.00	1.45	236.00	1.15
Harvesting	2400.00	11.55	2250.00	11.01	2125.00	10.45	2258.33	11.00
Bullock labour	725.00	3.49	500.00	2.45	368.00	1.81	531.00	2.59
Machine labour	905.00	4.36	988.35	4.83	1179.75	5.80	1024.37	4.99
Cost on curing	5230.6	25.17	4905.01	23.99	4446.31	21.86	4860.63	23.68
Labour cost	1395.75	6.72	1296.56	6.34	1185.56	5.83	1292.62	6.30
Fuel	2450.50	11.79	2295.75	11.23	2015.50	9.91	2253.92	10.98
Bamboo	95.50	0.46	93.70	0.46	83.75	0.41	90.98	0.44
Twine	89.85	0.43	86.50	0.42	81.50	0.40	85.95	0.42
Bags	140.00	0.67	140.00	0.68	140.00	0.69	140.00	0.68
Kachha grading	549.00	2.64	535.50	2.62	508.00	2.50	530.83	2.59
Transport & storage	475.00	2.29	415.00	2.03	379.00	1.86	423.00	2.06
Miscellaneous	35.00	0.17	42.00	0.21	53.00	0.26	43.33	0.21
Total Family Labour	395.75	1.90	308.00	1.51	135.00	0.66	279.58	1.36
Interest on working capital	506.85	2.44	459.16	2.25	421.05	2.07	462.35	2.25
I. Total operational cost (A)	14781.06	71.13	14286.21	69.88	14112.36	69.37	14393.21	70.13
Rental value of owned land	5375.00	25.87	5375.00	26.29	5375.00	26.42	5375.00	26.19
Land revenue	45.00	0.22	45.00	0.22	45.00	0.22	45.00	0.22
Depreciation on implements and farm buildings	215.75	1.04	391.50	1.92	493.35	2.43	366.87	1.79
Interest on fixed capital	363.57	1.75	345.15	1.69	318.33	1.56	342.35	1.67
II. Total Fixed Cost (B)	5999.32	28.87	6156.65	30.12	6231.68	30.63	6129.22	29.87
Total Cost(I+II)C	20780.38	100.00	20442.86	100.00	20344.04	100.00	20522.43	100.00

Source: Household Survey. * imputed labour cost has not included and calculated in separately.

TABLE 7—COST STRUCTURE AND RETURNS OF BENGALGRAM AND TOBACCO CULTIVATION IN JAYAVARAM

(Rs/acre)

Costs/Size of Holdings	Bengalgram				Tobacco			
	Small	Medium	Large	Average	Small	Medium	Large	Average
Total operational cost(A)	7110.98	6875.05	6685.45	6890.49	14781.06	14286.21	14112.36	14393.21
Total fixed Cost(B)	5849.61	5885.58	6025.78	5920.323	5999.32	6156.65	6231.68	6129.27
Total Cost of Production (C)	12960.59	12760.63	12711.2	12810.82	20780.38	20442.86	20344.04	20522.43

TABLE 7—COST STRUCTURE AND RETURNS OF BENGALGRAM AND TOBACCO CULTIVATION IN JAYAVARAM—Contd.

(Rs/acre)

Costs/Size of Holdings	Bengalgram				Tobacco			
	Small	Medium	Large	Average	Small	Medium	Large	Average
Productivity (Kgs)	753.85	751.65	765.85	756.33	532.65	538.69	545.75	536.33
Price received (Rs. per Kg)	21.98	22.85	23.15	22.66	42.15	41.95	42.65	42.25
Gross Returns	16569.62	17175.20	17729.4	17138.51	22496.20	22648.05	23326.24	22823.49
Net return over-cost A	9458.64	10300.15	11043.9	10248.02	5999.32	6156.65	6231.68	6129.22
Net Return Over Cost C	3609.03	4414.57	501.20	4327.70	1715.82	2205.19	2982.20	2301.07
Net return Over excluding owned land rent & imputed Value	9379.78	10097.57	10528.2	9982.28	7368.82	7775.19	8466.20	7870.07
Input-out ratio over cost A	2.33	2.50	2.65	2.49	1.52	1.59	1.65	1.59
Input-output ratio over cost C	1.28	1.35	1.39	1.34	1.08	1.11	1.15	1.11
Input-output ratio excluding owned land rent and imputed labour cost	2.30	2.43	2.46	2.39	1.49	1.52	1.57	1.53

Source: Household Survey, **Note:** The gross value of product is calculated on the basis of prevailed local village market prices. **The gross returns of tobacco** the tobacco seed, which use to sell after the harvesting, value of Rs- 45/- for small farmers, Rs. 50/- for medium farmers and Rs. 50/- for large farmers.

TABLE 8—INCOME VARIATIONS IN TOBACCO AND BENGALGRAM CROP CULTIVATION IN JAYAVARAM

(Rs/acre)

<i>Income Variations Over Cost C</i>				
Size	Small Farmers	Medium Farmers	Large Farmers	Average
Bengalgram	3609.03	4414.57	5018.20	4327.70
Tobacco	1715.82	2205.19	2982.20	2301.07
Variation	1893.22	2209.39	2036.00	2026.63
<i>Income Variations Over Cost A</i>				
Size	Small Farmers	Medium Farmers	Large Farmers	Average
Bengalgram	9458.643	10300.15	11043.98	10248.02
Tobacco	5999.32	6156.65	6231.68	6129.217
Variation	3459.323	4143.503	4812.298	4118.803
<i>Income over excluding land rent & imputed cost of owned labour in total cost of production</i>				
Size	Small Farmers	Medium Farmers	Large Farmers	Average
Bengalgram	9379.783	10097.57	10528.20	9982.28
Tobacco	7368.818	7775.186	8466.19	7870.067
Variation	2010.97	2322.39	2062.01	2112.213

Source: Household Survey, computed from table 7

C. Agro-economic Research

Impact of Nrega on wage Rates, Food Security and Rural Urban Migration—A Study in Assam*

1. Introduction

India is a country of villages and about 50 per cent of the villages have very poor economic condition. In Assam, a large percentage of population i.e. more than 85 per cent of the total population still lives in rural areas. Indebtedness, unemployment, unproductive expenses, low level of productivity, lack of adequate basic needs and minimum services are very common problems of the villagers of Assam. In the state, there are more than 26,312 villages constituting 4.12 per cent of the total numbers of villages in India as per 2001 census. The Directorate of Panchayat and Rural Development, Assam has two wings. One is Panchayat Wings and other is Rural Development Wings. Both the wings have been implementing various state and centrally sponsored schemes through 21 Zila Parishad, 219 blocks, 189 Anchalik Panchayat and 2202 Gram Panchayat, covering 27 districts.

Keeping in view to this large chunk of rural population, the father of nation, Mahatma Gandhi had given much emphasis to the concepts “*gram swaraj*”, which deals with economic, political and cultural freedom of the villagers for all rounds of developments of rural India. His concept of *Swaraj* is associated with more political freedom for socio-economic development of the village people through Panchayati Raj. Although the Panchayats have historically been an integral part of rural life in India, but Panchayati Raj was formally introduced only in 1959. In 2009-10, it has been rechristened as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). The act aims at enhancing at least one hundred days of guaranteed wage in a financial year to every household whose adult members volunteer to do unskilled manual work. The Act also emphasises to uplift the rural economy in terms of livelihood, income, employment and income distribution. In addition to this, it has taken a special care to empower women by reducing gender differences in wages and their children. The Act also mandates 33 per cent participation for women in NREGA work programmes.

The NREGA implemented by the Ministry of Rural Development is the flagship programme of the Central Government that directly touches the lives of the poor and promotes inclusive growth. The National Rural Employment Guarantee Act was notified on September 7, 2005 and was the first of its kind in the world. It was brought under per view of an act for rural employment at an unprecedented scale in order to provide employment when other employment alternatives are scarce or inadequate. The Act came into force on February 2, 2006 and was implemented in a phased manner. Phase-I (notified in 200 districts with effect from February 2nd 2006), Phase-II

(extended to 130 districts in the financial year 2007-08) (113 districts from April 1st, 2007 and 17 districts of UP were notified with effect from May 15th, 2007) and Phase-III (remaining districts in all the States/UTs were notified from April 1st, 2008).

2. Main Objectives of the Study

Keeping in view to the above observations, the present study was carried out in Assam with the following objectives—

1. Measure the extent of manpower employment generated under NREGA, their various socio-economic characteristics and gender variability in all the districts implementing NREGA since its inception in the selected states.
2. To compare wage differentials between NREGA activities and other wage employment activities.
3. Effect on NREGA on the pattern of migration from rural to urban areas.
4. To find out the nature of assets created under NREGA and their durability.
5. Identification of factors determining the participation of people in NREGA scheme and whether NREGA has been successful in ensuring better food security to the beneficiaries.
6. To assess the implementation of NREGA, its functioning and to suggest suitable policy measures to further strengthen the Programme.

3. Database and Methodology

The study is based on both primary and secondary data. As per guidelines, five districts viz., Sonitpur, Cachar, Dibrugarh, Bongaigaon and Nagaon have been selected from the North, South, East, West and Central location of the state, respectively. From each district, two villages were selected keeping into account their distance from the Head Quarter. One village is selected from the nearby periphery of around 5 kilometers of the district Head Quarter and the second village is selected from a further location of 15 kilometers or more. From each selected village, primary survey is carried out on 20 participants in NREGA and 5 non-participant workers as wage employed. In this fashion, altogether 10 villages are surveyed in detail to construct a baseline for the sake of comparison. For selecting participant households, a list of all beneficiaries (participants) in the village is obtained from the Gram Panchayat or Programme Officer in the village along with

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the information of caste factor of the workers. After getting the list, a Stratified Random Sampling Method is adopted for selection of the participant households giving proportionate representation of the Caste, i.e. (i) Schedule Caste, (ii) Schedule Tribe, (iii) Other Backward Caste, (iv) Forward Castes (other). In this regard, a point to be noted here is that the population of villages of Assam usually is homogeneous in caste structure. Therefore, caste wise stratification could not be done. But utmost care is taken to include different caste in selection of samples as a whole. Due attention is also paid to the gender factor. for the selection of non participants, no such list is available, Therefore, the non-participant households are selected randomly from those households that are not participating in NREGA but constitute the similar caste and gender characteristics as that of selected participant households to maintain the uniformity and to avoid the selection bias. While selecting the districts, prescribed guidelines are followed.

In addition to household questionnaire, a village schedule is also designed to capture the general changes that have taken place in the village during the last one decade and to take note of increase in labour changes for agricultural operations after the implementation of NREGA. The village schedules also have qualitative questions relating to change in life style of the villagers that are taking place during the period under reference. One village schedule in each village is filled up with the help of a Group Discussion with the Panchayat Members, Officials, educated person and other well informed inhabitants of the villages.

4. Total Employment Generated under NREGA—their Socio-economic Characteristic in Assam

In Assam, (Table-1) a cumulative number of job cards were issued to 29.71 lakh households in 2008-09. It was increased substantially to 36.11 lakh households in 2009-10

and then it was further increased to 43.70 lakh households by 2010-11. It was an increase of 32.02 per cent over 2008-09. The highest numbers of job cards were issued to other category followed by SCs and STs. It might be happened due to demographic structure of the population. Of the total (cumulative) number of households having job cards, 72.56 per cent, 59.23 per cent and 41.37 per cent were demanded employment in 2008-09, 2009-10 and 2010-11, respectively. However, the employment generated was to the extent of 87.10 per cent in 2008-09 which was decreased to 59.23 per cent in 2009-10 and 41.37 per cent in 2010-11 against the total number of job cards issued to the households. But actual employment was provided to 87.10 per cent in 2008-09 which was decreased to more than half (41.16%) in 2010-11 against the total number of job cards issued to the households. The numbers of households working under NREGA during reporting month were also decreased from 24.88 per cent in 2008-09 to 12.40 per cent in 2010-11. It seems that the state NREGA needs a significant improvement in employment generation. In 2008-09, the district Karbi-Anglong showed the best performance in providing employment under NREGA and the district Kokrajhar showed the best performance in providing employment under NREGA during 2009-10 and 2010-11 amongst 27 districts of Assam. In this regard, the lowest performance was recorded in the district Kamrup Metro in the 3 reference years. The reasons for not participating in NREGA work even after having job cards could be summarised as follows. As the NREGA is at the beginning stage, job card holders were not fully aware of it or the time period at which the NREGA work started, they had sufficient employment in other works that too, at a higher wage rate than that of the wage rate of the NREGA or amount of works were not sufficient enough to meet the demand for employment. At the same time, administrative delay in starting the work cannot be denied.

TABLE 1—EMPLOYMENT GENERATED THROUGH NREGA AND ITS SOCIO-ECONOMIC CHARACTERISTICS IN ASSAM

(Combining 27 districts)

Particular	*Cumulative No. of Households issued job cards			**Cumulative No. of Households			No. of Households working under NREGA during the reporting month
	SCs	STs	others Total	Demanded Employment	Provided Employment		
2008-09	326252 (10.98)	656166 (22.09)	1988104 (66.93)	2970522 (100.00)	2155349 (72.56)	1877393 (87.10)	739111 (24.88)
2009-10	454656 (12.59)	738780 (20.46)	2418278 (66.96)	3611714 (100.66)	2139111 (59.23)	2137270 (59.18)	708448 (19.62)
2010.2011	357230 (8.18)	1257748 (28.78)	2754583 (63.04)	4369561 (100.00)	1807788 (41.37)	1798372 (41.16)	541762 (12.40)

NOTE: *Figures in the parentheses represent per cent to total

** Figures in the parentheses represent per cent to total Cumulative No. of Households Issued job cards

5. Employment generated through NREGA in Assam

In 2008-09, a total of 751.09 lakh cumulative person days were generated, out of which 204.00 (27.16%) lakh days were generated for women (Table-2). Of the total person days, 10.41 per cent belonged to SCs Category, 34.46 per cent belonged to STs Category and 55.13 per cent belonged to Others Category. In 2009-10, the total 733.00 lakh cumulative person days were generated and 203.00 (27.16%) lakh days were generated for women. Of the total person days, 12.15 per cent belonged to SCs Category, 31.02 per cent belonged to STs Category and 56.83 per cent belonged to Others Category. In 2010-11, the total 470.60 lakh cumulative person days were

generated and 124.70 (26.50%) lakh days were generated for women. Of the total person days, 10.99 per cent belonged to SCs Category, 27.26 per cent belonged to STs Category and 56.83 per cent belonged to Others Category. The extent employment generation through NREGA revealed a decreasing trend over 2008-09. The highest person days were generated by the district of Kokrajhar and the lowest by the district of Kamrup Metro in all the 3 reference years consecutively. In respect of generation of women days, the district of Kokrajhar occupied the top position in all the 3 reference years. The lowest performance was recored by Kamrup Rural in 2008-09, Karimganj in 2009-10 and Bongaigaon in 2010-11.

TABLE 2—CUMULATIVE PERSON DAYS GENERATED (LAKHS) THROUGH NREGA IN ASSAM

(Combining 27 districts)

Particulars	Cumulative person days generated(In lakh person days)				
	SCs	STs	Others	Total	Women
2008-09	78.19 (10.41)	258.80 (34.46)	414.10 (55.13)	751.09 (100.00)	204.00 (27.16)
2009-10	89.03 (12.15)	227.40 (31.02)	416.60 (56.83)	733.03 (100.00)	203.00 (27.69)
2010-11	51.74 (10.99)	128.30 (27.26)	290.60 (61.75)	470.60 (100.00)	124.70 (26.50)

NOTE: Figures in the parentheses represent percent to total person days.

Table 3 reveals that the person days generated per household came down from 40.01 per cent in 2008-09 to 26.17 per cent in 2010-11. It also showed a declining trend

in case of person days generated per job card house hold from 25.29 per cent to 10.77 per cent in 2010-11. The cumulative number of households who completed 100 days

TABLE 3—EMPLOYMENT GENERATED UNDER NREGA

Year	*Person days generated per household	Person days generated per job card household	Cumulative No. of households completed 100 days of employment	Households completing 100 days of employment as % of total households provided employment
2008-09	40.01	25.29	176778	9.42
2009-10	34.30	20.30	130457	6.10
2010-11	26.17	10.77	45490	9.83

NOTE: *Figures are calculated by dividing the total cumulative number of person days by the total cumulative number of households provided employment.

of employment under NREGA was 1.77 lakh households in 2008-09 which decreased drastically to around 0.46 lakh households in 2010-11 (decreased by 74.27%), while only 9.42 per cent, 6.10 per cent and 9.83 per cent of the households could complete 100 days of employment out of the total households provided employment in 2008-09, 2009-10 and 2010-11, respectively. Very few households could complete the norms of 100 person days in a year. The performance of all other districts was very insignificant.

The district of Kokrajhar occupied the top position in completion of 100 day employment in 2008-09, 2009-10 and 2010-11 while the lowest performance was shown by the district Jorhat in 2008-09 and by thy district Karimganj in the year 2009-10,

6. Works Completed/ Progress under NREGA

In Assam, as many as 918 works were completed and 23,340 nos. of works were reported to be ongoing works in

2009-10 and in 2010-11, the number of completed works stood at 5,797 with 44,876 ongoing works. The total expenditures incurred were to the tune of Rs. 4157.60 lakh in completed works and 45,485 lakhs in ongoing works during 2009-10 and in 2010-11 Rs. 8884.8 lakh in completed and 77,764.00 lakhs in ongoing works. In 2009-10, among the 27 districts, Karbi Anglong occupied top position by completing 182 works along with 2091 no. of ongoing projects and the lowest performance was shown by Cachar and Tinsukia by completing only one project during the reference year with ongoing works of 1335 nos. and 395 nos., respectively. In case of expenditure, the district of Sonitpur showed the highest amount of expenditure of Rs.774.90 lakh against the completed projects in aggregate with an ongoing expenditure of 2025.00 lakh in 2009-10 and the lowest expenditure of Rs. 1.325 lakh. was done by the district Cachar against all completed projects. Among the 27 districts, Kokrajhar occupied top position by completing 2898 works along with 7830 ongoing projects and the lowest performance was shown by Goalpara completing only one project during 2010-11 with ongoing works 2,296. In case of expenditure, the district Kokrajhar recorded the highest amount of expenditure to the tune of Rs. 2483.00 lakh against completed projects in aggregate with an ongoing expenditure of 6702.00.00 lakh in 2010-11 and the lowest expenditure of Rs. 19.26 lakh was done by the district of Goalpara against all completed projects.

7. Social Auditing and Inspection of NREGA Work

To ensure transparency and accountability, social auditing and inspection of NREGS works are undertaken as per provisions of the Act. It monitors the registration and issuance of job cards and timely payment of wages. If a Job Cardholder has a problem, he can first approach the Gram Panchayat. If this does not help, he can submit the complaint to the Programme Officer at the Block level. It is his duty to register the complaint and take action within 7 days. In this regard, there is adequate provision to redress the grievances of the applicant. The Gram Sabha and the Social Audit Forum shall provide a platform for public hearing so that grievances may quickly be redressed. Social Audit, a Mandatory Agenda of NREGA to be conducted by Gram Sabha. It must be read out publicly in the Gram Sabha and people are allowed to

put question on any kind of clarification, and minutes must be recorded in prescribed format.

Table 4 depicts a picture of social auditing and inspection of NREGS in Assam during 2008-09, 2009-10 and 2010-11. Under Muster Roll verification, 100 per cent verification is needed as per administrative guidelines. In this regard, 58.29 per cent, 82.71 per cent and 89.64 per cent verification were recorded in the state as a whole in the respective years. In case of social audit, it was 57.48 per cent in 2008-09, 93.90 per cent in 2009-10 and 95.00 per cent in 2010-11.

In 2008-09, 586 complaints were received and 499 (85.15%) complaints were settled. In the year, there was no complaints received from 14 districts viz., Kokrajhar, Lakhimpur, North Cachar Hills, Baksa, Chirang, Dhubri, Dibrugarh, Jorhat, Kamrup Rural, Kamrup Metro, Karimganj, Sivasagar, Sonitpur and Udalguri. The highest numbers (167) of complaints were reported from the district of Darrang and 123 complaints were settled and the lowest no. of complaints (3) were lodged in 2 districts viz., Nalbari and Tinsukia and were settled accordingly.

In 2009-10, 387 complaints were received and 342 (88.37%) complaints were settled. In the year, there was no complaints received from 11 districts viz., Bongaigaon, Kokrajhar, North Cachar Hills, Baksa, Chirang, Dibrugarh, Jorhat, Kamrup Rural, Karimganj, Sivasagar and Sonitpur. The highest numbers (71) of complaints were reported from the district of Darrang and the lowest with (1) in Karbi Anglong. Almost all the districts having complaints were disposed off during the year 2009-10.

In 2010-11, 273 complaints were received and 246 (90.11 %) complaints were settled. In this year, there was no complaints received from 13 districts viz., Goalpara, Karbi Anglong, Kokrajhar, Lakhimpur, North Cachar Hills, Baksa, Dibrugarh, Golaghat, Jorhat, Kamrup Rural, Karimganj, Sivasagar and Sonitpur. The highest numbers (80) of complaints were reported from the district of Dhemaji and the lowest each with 2 in Bongaigaon and Chirang. Almost all the districts having complaint were disposed off during the reference year.

TABLE 4—SOCIAL AUDITING AND INSPECTION OF NREGA WORK (COMBINING 27 DISTRICTS)

Year	No. of Muster Roll		Total Grain Panchayats	Social Audit		Complaints	
	used	Percentage of verification		No. of Social audit	% of social Audit	No. received	No. disposed
2008-09	511543	58.29	2434	1319	57.48	586	499 (85.15)
2009-10	588412	82.71	2721	2555	93.9	387	342 (88.37)
2010-11	590906	89.64	2360	2242	95.00	273	246 (90.11)

NOTE: Figures In parentheses Indicate percentages.

8. Wage Payment Process

As per the Act, all payments of NREGS wages have been paid through Banks and Post Offices. Accounts are opened as individual accounts for each NREGA labourer against each Job Card and there is a provision of opening joint accounts in the name of the different household members (e.g. husband and wife). As reported, distance from the working place to location of the institute is a determining factor for opting a bank or a post office for transactions, The total number of accounts stood at 17.67.888 and Rs. 16.155 lakh were disbursed in the state in 2008-09. In 2009-10 the total number of accounts stood at 28. 24.164 and Rs. 48.490.00 lakh were disbursed. In 2010-11 the total number of accounts stood at 28, 10.115 and Rs. 46238.00 lakh were disbursed in the state.

9. Work Projection under NREGA

During 2010-11, the highest numbers of spill over works from previous year Were recorded to be 4,892 under rural connectivity and the lowest (2) was under Bharat Nirman Rajiv Gandhi Sewa Kendra. The highest numbers of works taken up in 2010-11 were at 14,489 under rural connectivity and the lowest at 1 was found under Bharat Nirman Rajiv Gandhi Sewa Kendra. The highest number of works likely to spill over to the next financial year Were at 7,703 under rural connectivity and the lowest (3) was found again under the same scheme as mentioned above. The highest number of new works proposed for the next financial year were 20,598 and the lowest (4) was under the same scheme. The state projected a total of 1871.75 lakh Person days to be generated from these proposed works. Among the 10 schemes, the scheme, rural connectivity generated the highest (41.95%) person days. It might be due to the prevailing poor road connectivity in the villages of Assam. for which it assumed top priority among all the ongoing schemes under NREGA while the lowest with 0.01 per cent was found under the Bharat Nirman Rajiv Gandhi Sewa Kendra.

10. Household Profile of the Respondents

There were altogether 200 beneficiaries and 50 non beneficiaries households in 5 selected districts of Assam— Sonitpur from the north, Cachar from the south, Dibrugarh from the east, Bongaigaon from the west and Nagaon from the central location of the state. Selection of sample has been done as per the given directives by the co-ordinating centre,.

Average household size is 4.92 in case of beneficiaries and 5.22 in case of non beneficiaries. Combining both, it stands at an average of 4.98.

Average number of earners per beneficiary household is about 1.52 and it is about 1.62 in case of non beneficiaries and in aggregate, it stands at 1.54.

From the point of gender differences, male population is about 54.02 per cent and 52.49 per cent in respect of beneficiaries and non beneficiaries, respectively. Female population stands at 45.98 per cent in respect of beneficiaries and 47.51 per cent in respect of non-beneficiaries. In aggregate, it stands at 53.70 percent for male and 46.30 for female population. Male population is dominating over female population in both the categories.

Educational status is a major socio-economic indicator of a family. Most of the families were very poor living below poverty line. Health hazard was also very common among them on account of inadequate nutrition and sanitation, It seemed that they were not able to afford minimum expenditure in education for the family. Obtaining higher education was simply impossible for them. Still it has been observed that most of the sample households were very much conscious about education and they tried to send their children to the school. in this regard, the role of ongoing educational schemes cannot be denied. Of the total population, illiteracy rate was 18.21 per cent for beneficiaries and 19.54 per cent for non-beneficiaries and 18.49 per cent in aggregate. Up to primary education, the literacy rate was 56.15 per cent for beneficiaries and 45.21 per cent for non beneficiaries and 53.86 per cent in aggregate. Up to secondary education, the literacy rate is 21.36 per cent for beneficiaries and 30.27 per cent for non beneficiaries and 23.23 per cent in aggregate. Up to graduation level, the literacy rate is 3.87 per cent for beneficiaries and 4.21 per cent for non beneficiaries and 3.94 per cent in aggregate and above graduation; the literacy rate is 0.41 per cent for beneficiaries and 0.77 per cent for non beneficiaries and 0.48 per cent in aggregate.

Of the 200 beneficiary respondents, 34 per cent belonged to SC, 10.50 per cent belonged to ST, 26.00 per cent belonged to OBC and 29.50 per cent belonged to General category and in case of non beneficiary, 34 per cent belong to SC, 10 per cent belonged to ST; 36 per cent belonged to OBC and 20.00 per cent belonged to General category. In aggregate, 34 per cent belonged to SC, 10.40 per cent belonged to ST; 28 per cent belonged to OBC and 27.60 per cent belonged to General categories.

During field survey, among the 200 beneficiary respondents and 50 non beneficiary respondents, no card holders have been found under in fall AAY. It does not mean that among the respondents, there is none coming under the Poorest of the poor possibly the scheme is yet to reach them for some reasons or other.

Of the total number of beneficiary respondents, there were 148 respondents under BPL card holders (74 per cent) and for the non beneficiaries, there were 22 respondents under the BPL card holders constituting 44.00 per cent which resulted in 68.00 per cent aggregate. It indicates that a higher percentage of job card holders are living under BPL in case of beneficiary respondents as compared to non beneficiary respondents.

Nearly, 19 per cent and 40 per cent of the respondents were APL card holders in case of beneficiary and non beneficiary Category, respectively with an aggregate of 23.20 per cent. The percentage of respondents who did not possess any card was 7.00 per cent in case of beneficiary and 16 per cent in case of non beneficiary respondents with an aggregate 8.80 per cent.

The role of male counterpart is significantly high as decision maker of the family. It was 97.00 per cent and 100.00 per cent in respect of beneficiary and non beneficiary respondents, respectively with an aggregate of 97.60 per cent.

Regarding migration of workers, 60.80 per cent occurred in case of beneficiaries and it was 82.00 per cent in case of non beneficiaries. In aggregate, it stood at 64.80 per cent.

11. Employment Status of the Sample Districts

The main occupations of the beneficiary respondents were farming, self business, salaried/pensioners and wage earners. Wage earners were the highest with 79.50 per cent followed by salaried/pensioners (9.50 per cent), farming (8.00 per cent), and self business (3.00 per cent). In case of non beneficiary respondents, a large majority (60.00 per cent) were found as wage earners followed by farming (22.00 per cent), salaried/pensioners (14.00 per cent) and self business (4.00 per cent). Here, occupations of the non beneficiary respondents were at higher side in respect of farming, self business and salaried/pensioners as compared to beneficiary respondents. In aggregate, the highest (75.60%) number of respondents earned their livelihood as wage earners followed by 10.80 per cent in farming, 10.40 per cent in salaried/pensioners and 3.20 per cent from self businesses. Migration of workers were recorded in 121(60.50%) and 41(82.00) households in case of beneficiaries and non beneficiaries, respectively. Combining both, the aggregate percentage stood at 64.80 per cent.

Occupation wise man days were also worked out during the reference year with percentage to the total man days for beneficiaries (69,319) and non-beneficiaries (17,325) engaged under the different activities. In case of beneficiaries, the highest man days *i.e.* 41.09 per cent had

been found against Non Agricultural Casual Labour followed by 13.92 per cent in work under NREGA, 12.25 per cent in Self-Employed Non Farming, 10.01 per cent in Regular / Salaried job, 9.73 per cent Self Employed in Livestock, 6.50 per cent in Self Employed in Agriculture 3.84 per cent as migrant workers and 2.66 per cent in Agricultural Casual Labour. In case of non beneficiaries, the highest man days *i.e.* 36.27 per cent had been found against Non Agricultural-casual labour followed by 29.43 per cent in Self-Employed Non Farming, 14.75 per cent in Regular/Salaried job, 7.73 per cent Agricultural Casual Labour, 5.92 per cent in Migrant Workers, 3.66 per cent Self Employed in Livestock and 2.24 per cent Self Employed in Agriculture. In both the cases, almost similar trend of working days has been observed. In aggregate, the highest number of man days (40.13%) were found in Non Agricultural Casual labour followed by 15.69 per cent Self Employed Non Farming, 11.13 per cent in Work under NREGA. 10.95 per cent in Regular/Salaried job, 8.52 per cent Self-Employed in Livestock and 5.65 per cent Self Employed in Agriculture, 4.25 per cent as migrant workers and 3.68 per cent Agricultural Casual Laborers.

12. Household net Income

Due to implementation of NREGA, there was an additional increase of Rs. 4,154 in average household income of beneficiary households. The coefficient of variations were found much greater in all the occupations which indicated that income distribution of the households in each occupation were less uniform, less stable and less homogeneous. Income of migrant workers from wages in non, agricultural activities was calculated after subtracting the transportation cost, while income from agriculture included income from hiring out assets. Similar trends of income were noticed for beneficiary and non beneficiary as well, The highest annual per household income of Rs. 62,859 (23.54%) and Rs. 61,357 (27.33%) were found from the occupation of Regular Job/Salaried/Pensioner for beneficiary and non beneficiary respectively with an aggregate income of Rs. 62,559 (24.20%) followed by annual income of Rs 25,888 (19.39%) for beneficiary and Rs. 20,271 (18.06 %) for non-beneficiaries from Self Employed in Non Farming occupation with an aggregate income of Rs. 24,7649 (19.16%), Rs. 16,826 (33.75%) for beneficiary and Rs. 11,017 (35.34%) for non beneficiary with aggregate income of Rs 15,396 from wages in Non Agriculture, Rs. 10,735 (7.03%) for beneficiary and Rs. 8,043(9.21 %) for non beneficiary with an aggregate income of Rs. 10,012 (7.41%) from Agriculture/Livestock, Rs. 4,154 (11.11%) for beneficiary from NREGA and Rs.3,118 (1.67%) from agricultural wages for beneficiary, Rs. 2,581 (3.78%) for non beneficiary with an aggregate income of Rs. 2,922 (2.03%)

and Rs. 2,168 (3.51%) for beneficiary and Rs. 2,402 (6.27%) for non beneficiary with an aggregate income of Rs. 2,227 (3.99%) from Wages as Migrant Workers.

13. Household Consumption

Rice is the principal food crop of Assam. Almost each and every household takes two major meals in a day where rice is the major item. Wheat is all occasional food item usually taken as breakfast. Other cereals are also taken proportionately with rice. It may be mentioned here that quantities of other items solely depend upon the income of the house hold. It was also reported that one meal (lunch) is usually provided by the wage bearer at free of cost which curtails the expenditure in food of the wage earners.

Per capita per month consumption of rice was at 10.413 kg, for beneficiary and 10.544 kg. for non beneficiary with an aggregate amount of 10.440 kg which was below the NSS data of 12.12 kg. for 1993-94 and 13.20 kg for 1999-00. In case of total cereal consumption, it stood at 11.796 kg. for beneficiaries, 11.450 kg. for non beneficiaries with an aggregate consumption of 11.723 kg. And the NSS data for 1993-94 and 1999-00 were reported to be 12.60 kg. and 13.70 kg., respectively. Consumption of vegetables was 6.540 kg. for beneficiary and 8.670 kg. for nonbeneficiary with an aggregate consumption of 6.987 kg. In both the cases, consumptions were much higher than the NSS data. In case of edible oil, consumption was at 0.544 lit. for beneficiary and 0.498 lit for non beneficiary with an aggregate consumption of 0.535 lit which were also in the higher side as compared to the NSS data for the reference years (0.300-0.350 kg.), In case of protein rich items like poultry meat, egg, fish, etc., per capita per month consumption was at 0.330 kg for beneficiary and 0.420 kg. for non beneficiary with an aggregate consumption of 0.349 kg. which were also in much higher side than the NSS data for the reference years, There was no report of any expenditure under the item “Confectionary”.

15. Monthly Consumption Expenditure of Households

Coefficient of variation among the items is very high for beneficiaries as well as non beneficiaries, but there exists a similarity in consumption pattern of each food and non food item across the sample households. Per capita monthly consumption expenditure for total food was Rs. 444.62 for beneficiaries and Rs. 467.48 for non beneficiaries while per capita per month non food expenditure was Rs. 144.22 for beneficiaries and Rs. 71.45 for non beneficiaries. Food and non-food expenditure putting together, it stood at Rs. 588.84 for beneficiaries and Rs. 538.93 for non beneficiaries. Per capita per month expenditure was marginally higher in respect of beneficiaries might be due to impact of NREGA. In aggregate, per capita expenditure exceeded the

expenditure recorded in NSS data for 2003-04. It might be due to time gap between observed data and NSS data.

15. Variability (CV) and Gini Ratios in Income and Consumption

Average household income during the reference year was Rs. 36,079 for beneficiaries and Rs. 29,456 for non beneficiaries with an aggregate of Rs. 34,755. Average household consumption stood at Rs. 21,007 for beneficiaries and Rs. 20,207 for non beneficiaries with an aggregate consumption of Rs. 20,487. Coefficient of variation of income across the households were found at 80.29 per cent for beneficiaries and 71.78 per cent for non beneficiaries and the aggregate coefficient of variation stood at 79.73 per cent which indicates that there was much variation in income among the households. The coefficients of variation in consumption were found at 38.29 per cent for beneficiaries and 30.71 per cent for non beneficiaries with an aggregate variation of 37.03. It indicates that the consumption pattern differed more in beneficiaries than non beneficiaries. It has been observed that all the households had surplus income when compared with consumption; but it is to be noted here that about 35 per cent households had deficit income for beneficiaries and about 40 per cent households had deficit income for non beneficiaries. Greater coefficients of variations also indicate the same. Gini ratio in income and expenditure were also worked out for beneficiaries, non beneficiaries and at aggregate level. Gini coefficient of income stood at 29.19 per cent for beneficiaries, 41.69 per cent for non beneficiaries and 31.26 per cent in aggregate while in consumption, it stood at 16.25 per cent for beneficiaries, 17.16 per cent for non beneficiaries and 16.17 per cent in aggregate.

16. Determinants of Participation in NREGA—Functional Analysis

An attempt is made here to analysis the determinants of participation in NREGA using Logit modal of multiple regressions (Table-5). The result of the logit regression revealed that only the variable asset and the constant had a significant effect on the participation of households in NREGA and the rest of the variables such as Employment Other than NREGA, HH Income Other than NREGA, HH Size, Dummy Land ownership, Dummy BPL Card Holding, Dummy SC, Dummy ST and Dummy OBC did not have significant effect on the household level participation in NREGA. The NREGA helped workers in creation of household assets as they got the money at a time after a week or fortnightly and it can be considered as forced saving as the transaction is done through bank and post office. The worked out Chi-square was found significant at 1 per cent probability level.

TABLE 5—DETERMINATION OF PARTICIPATION IN NREGA (LOGIT FUNCTION)
(Dependent Variable; Participation (=1) and non participation (=0) in NREGA)

Variables	Coefficient	t' value
Employment Other than NREGA	0.08623	1.22699
HH Income Other than NREGA	0.00000	-0.38054
HH Size	-0.04923	-0.98471
Dummy Land ownership	0.06314	0.47602
Value of Assets	0.00000***	-1.60198
Dummy BPL Card Holding	-0.01306	-0.07977
Dummy SC	0.13443	0.79659
Dummy ST	-0.04480	0.20561
Dummy OBC	-0.05055	0.29427
Constant	-4.62359*	-14.06734
No. of observations	250	
Loglikelihood function	-125.1	
χ^2	591.3*	
Cox & Snell-R ²	0.075	
Negelkerke-R ²	0.119	

NOTE: * indicates 1% level, ** indicates 5% level, *** indicate 10% level.

TABLE 6—DETERMINATION OF PARTICIPATION IN NREGA (OLS)
(Dependent Variable: No. of days per HH worked in NREGA)

Variables	Coefficient	t' value
Employment Other then NREGA	-1.79052	-1.23335
HH Income Other then NREGA	-0.00020*	-3.33523
HH Size	2.18004**	1.92951
Dummy Land ownership	1.79151	0.57896
Value of Assets	6.4569E-05* * *	1.28627
Dummy BPL Card Holding	-4.11172	-1.05553
Dummy SC	4.54488	1.19660
Dummy ST	13.05740*	2.38519
Dummy OBC	7.07329**	1.72008
Constant	43.13490*	6.03251
No. of observations	200	
F	2.35010	
R ²	0.10017	

NOTE: *, ** and*** indicate Significant at 1%, 5% and 10% Probability level respectively.

In addition to legit regression analysis, two OLS methods of multiple regressions were also run for determination of participation in NREGA using numbers of days worked under NREGA as household level as well as at member level as dependent variables. It has been

observed that HH Income Other than NREGA, HH Size, Value of Assets, Dummy St, Dummy OBC and Constant had a significant effect on dependent variable, But positive effects were found against HH Size, value of assets, Dummy ST, Dummy OBC and Constant.

TABLE 7—DETERMINATION OF PARTICIPATION IN NREGA (OLS)
(Dependent Variable: No. of days per member worked in NREGA)

Variables	Coefficient	t' value
Wage rate NERGA	0.10488	0.61293
Age	-0.16052	-1.24439
Education	.036089	-0.13574
HH size	1.05485*	1.01360
Dummy BPL	-1.24225	0.33246
Dummy Sex	5.43351***	1.37305
Dummy SC	0.46977	0.11689
Dummy ST	10.73182**	1.91514
Dummy OBC	2.85400	0.68398
Constant	29.85465**	1.79941
No. of Observations	200	
F	0.98108	
R ²	0.04441	

NOTE: * indicates 1% level, ** indicates 5% level, *** indicate 10% level.

17. Work Profile under NREGA

Work profile under NREGA has been given in Table-8. Number of members Per household employed in aggregate during the year 2009 was 1.45 persons each in Bongaigaon and Cachar district, 1.23 persons in Dibrugarh

district, 1.13 persons in Nagaon district and 1.00 persons in Sonitpur district with a state average of 1.25 combining all caste components of the sample districts. In each district, on an average, 0.45 woman were employed per household.

TABLE 8—THE WORK PROFILE UNDER NREGA

(Reference period—Jan.-Dec. 2009)

Characteristics		Dist.-1	Dist.-2	Dist.-3	Dist.-4	Dist.-5	State
		Bongaigaon	Cachar	Dibrugarh	Nagaon	Sonitpur	
No. of Members	Aggregate	1.45	1.45	1.23	1.13	1.00	1.25
Per HH	General	0.25	0.54	0.18	0.25	0.43	0.33
Employed during the year	SC	0.73	0.58	0.34	0.39	0.25	0.46
	ST	0.00	0.00	0.15	0.17	0.08	0.08
	OBC	0.47	0.33	0.55	0.31	0.25	0.38
	Men	0.65	0.75	0.90	0.88	0.85	0.81
	Women	0.80	0.70	0.33	0.25	0.15	0.45
% of HH worked for 100 or more days in a year		5.00	0.00	0.00	2.50	0.00	1.50

TABLE 8—THE WORK PROFILE UNDER NREGA—Contd.

(Reference period—Jan.-Dec. 2009)

Characteristics		Dist.-1	Dist.-2	Dist.-3	Dist.-4	Dist.-5	State
		Bongaigaon	Cachar	Dibrugarh	Nagaon	Sonitpur	
No. of days Per	Aggregate	36.10	52.28	55.30	55.73	41.75	48.23
HH Employed during the year	General	5.35	19.70	10.65	11.75	16.83	12.86
	SC	19.55	24.60	14.35	20.30	8.98	17.56
	ST	0.00	0.00	8.73	8.98	4.05	4.35
	OBC	11.20	7.98	21.58	14.70	11.90	13.47
	Men	21.95	38.53	51.00	46.23	37.05	38.95
	Women	14.15	13.75	4.30	9.50	4.70	9.28
	Wage Rate	Aggregate	86.33	93.38	87.64	80.65	82.13	86.12
Obtained (Rs.)	General	83.35	91.62	90.91	80.56	81.46	86.13
	SC	89.62	94.61	88.74	80.00	83.60	88.03
	ST	0.00	0.00	92.11	83.27	88.78	87.84
	OBC	82.01	93.95	83.48	80.02	79.71	83.05
	Men	87.94	92.78	88.43	80.65	82.20	86.20
	Women	83.82	95.07	78.22	80.63	81.60	85.76
Average distance from Residence to where Employed (in Kms.)		1.10	0.98	1.20	1.16	1.09	1.11

In aggregate, number of days employed during the year combining all the caste components was 36.10 days in Bongaigaon district, 52.28 days in Cachar district, 55.30 days in Dibrugarh district, 55.73 days in Nagaon district and 41.75 days in Sonitpur district resulting in 48.23 days for the state as a whole. Women were employed for 9.28 days per household in the state combining all the sample districts.

During field investigation, three different wage rates were obtained, In the first part of the year, it was Rs. 77; in the mid of the year it was raised to Rs. 80 and then it was again raised to Rs. 100.00 per day. In aggregate, wage rate per day, stood at Rs. 86.33 in Bongaigaon district, Rs. 93.38 in Cachar district, Rs. 87.64 in Dibrugarh district, Rs. 80.65 in Nagaon district, and Rs. 82.13 in Sonitpur district with a state average of Rs. 86.12. Only 5 (2.50%) registered households has got 100 days employment of the 200 sample households, 3 households in Nagaon and 2 households in Bongaigaon district. No much variation had been observed in average distance from the residence to the work place. In aggregate, it was at 1.11 kms.

18. Nature of Assets Created and their Durability

It has been observed, NREGA is giving more stress in paying wages to the workers than the volume and quality of works. At the same time, it is difficult to assess the quality of work by the non technical persons. From eye estimation, it may be mentioned that the quality of work in some areas were not up to the mark. As a result, in some areas, it failed to create durable assets and wherever created, it was reported that there is no as such provision for post care of the created assets under NREGA. However, from the opinion of the interviewees, Dibrugarh district showed better performance among the 5 sample districts in creating quality assets created; 32.50 per cent of the respondents found the essers to be "very good", 47.00 per cent as "Good" and 20.00 per cent as "Bad".

19. Wage Differential under NREGA and its Comparison with Minimum Wage Act

The daily rates of minimum wages for agricultural workers has been fixed at Rs. 106.71 by the state administration of Assam under the Minimum Wage Act of 1948. (Agricultural Statistics at a glance, 2010, DES, MOA, GOI). As per the data collected by the Directorate of

Economics and Statistics, Government of Assam, the average daily wage rate for un-skilled labourer In rural areas was at Rs. 84.65 for field labour ploughman, Rs. 82.72 for herdsman, Rs.82.55 (Man), Rs. 66.76 (Women) for reaper and harvester and Rs. 83.47 (Man) and Rs. 66.60 (Women) for other agricultural labourer in 2008-09. (Economic Survey , Assam, 2009-10) while wage rate of State NREGA on an average, was found at Rs.86.56.

20. Wage Differential in Different Activities, Among Beneficiaries and None Beneficiaries

Wage rate did not show much difference between beneficiaries and non beneficiaries. Female wage rates were lower in different occupations. Coefficient of variation in respect of female is much higher in case of beneficiaries as compared to non beneficiaries. Wage rate of migrant workers was on the higher side as compared to wage rate under NREGA and coefficient of variation was also found lesser. In aggregate, wage rate for agricultural casual labour were at Rs. 71.18 for male and .Rs. 63.24 for female; wage rate for non agricultural casual labour were at Rs. 96.29 for male and Rs. 67.10 for female; wage rate earned by migrant worker was of Rs. 97.33 and there was no report of migrant female worker and wage rate under NREGS were at Rs. 86.12 for male and Rs. 86.33 for female. There was no report of any workers of the households participating in public work programme.

21. How has NREGA Affected Labour Migration (labour Migrating Back into Village and Migrated out of Village), Direction of Migration (Rural to Urban and Vice-Versa)

Among the sample villages surveyed, out migration was observed in almost all the villages; main reason being that NREGA was not able to provide employment to all the job card holders for all un skilled workers of the households. Besides, other workers who did not participate in NREGA also migrated to nearby towns in search of works. It was also reported that they opted for migration due to higher wage rate as compared to that of NREGA. Of the total population (983), there were 447(45.57%) workers in the beneficiary households and NREGA provided employment to 251(25.53%) workers only and that too for 48.23 days on an average for each household during the reference year.

The NREGA in the state is going at a very slow pace and was not in a position to speed up its activity to provide the targeted employment of 100 days for each household in the reference year. It was also reported that activity of NREGA in the state was seasonal on account of prevailing weather condition. Therefore, migration of workers from the village was found to be a common phenomenon in the sample areas. There was no report of labour migrating back into village for NREGA. There was no report of female migrant workers. The out migration incidents was recorded at 64.80 per cent for beneficiaries and 82.00 for non-

beneficiaries during the reference period *i.e.* Jan.—Dec. 2009. The extent migration incidents were found of 0.54 persons per household. They reported that migration depends upon the demand for unskilled labour and felt that it is decreasing on account of extensive use of modern machinery.

22. Assets Position of the Sample Households

Household assets are also one of the measuring sticks to judge the economic status of a household to know whether they are living above the poverty line or below the poverty line. Land is a permanent asset of every household. Division of family reduces the size of holding of owned land among all the households. Also selling of land is becoming a very common phenomenon among the poor people. Whenever acute financial crisis appears, they have no option but to sell their land as last resort to overcome their plight which further reduces the size of owned holding. It has been observed that almost an the household possess homestead area. Only a few households have extra crop land of their own. Land value is ever increasing irrespective of its location. In general, land value is much higher nearby the city or town areas. Therefore land was the most valuable assets for beneficiaries and non beneficiaries.

23. Households' Status on Borrowings and their Financial Vulnerability

Financial vulnerability was observed among the sample households. Majority of the households (34.69%) prefers to borrow from traders-cum -money lenders. In aggregate, the borrowing per household stood at Rs. 2652.00. Rate of interest was 10 per cent per month. In aggregate, the highest amount of loan (32.81) per cent was availed off for purchasing of land, live stock and other assets followed by 32.80 per cent for construction of dwelling houses, 23.83 per cent for social ceremony, 9.35 per cent for medical care and 3.32 per cent for daily consumption.

24. Some Important Qualitative Aspects of the NREGA

It is based on the interaction with the sample respondents during field investigations. There was no report of paying any fee charges or bribe to get the job card. However, some irregularities such as incomplete entry, no entries, over writing, blank signature column etc, were observed; 70 per cent of the job card holders got job within 15 days from the date of application. There was no report of paying unemployment allowances in case of failure to provide work within 15 days. There was no record of getting wages within 7 days. There were no reports of wage, paying lower than the fixed wage rate and 72 per cent of the beneficiaries did not have any negative comment over the transparency of the whole work. Neraly, 83 per cent had positive reply on usefulness of the NREGA work. In case of durability of the work, beneficiaries had different types

of comments. Labour migration was there amongst the family members as NREGA is unable to provide adequate employment. Regarding potential benefit of NREGA, a large percentage did not have satisfactory comments. Some suggestions as put forwarded by the respondents are furnished herewith.

1. Wage rate may be enhanced keeping parity with the existing market rate of wage labour.
2. Period of employment may be enhanced to more than 100 days.
3. More transparency on the matter of sanctioned of work and financial involvement therein.
4. Any kind of political intervention should be stopped/discouraged.
5. During kharif crop season, a large segment of the households remain occupied in farm activities. Therefore, they suggested to start NREGS during lean season as well.

25. Infrastructure of the Sample Villages

Regarding infrastructure available within the sample villages, interviewees reported that not all connecting roads were all weatherproof. All the sample villages and nearest villages had all the facilities such as road connectivity, Post Offices, Bank services, School, Agricultural Produce Market, Primary health Centre, Hospital/dispensary, Gram Panchayat Offices, Fair Price Shops, etc., within the vicinity of 0.50 km to 2.50 km.

26. Concluding Remarks and Policy Suggestion

The NREGA can be considered as a new life line of the rural people who earn their livelihood as wage earners. It gears up the social relationship among the rural people which is a pre requisite condition to build a strong society or a nation. It also reduces the gender differences for some selected works. It is also observed that female workers, both urban and rural, received lesser wages than that of their male counterparts for doing the same set of jobs. The Act of the NREGS removed the gender difference in wages. The participation of women folk in works was made compulsory as per the Act of NREGA. Accordingly, there must be at least 33 per cent participation for women. The provision for caring minor children in the work site of the NREGS is an extra advantage. It has been observed during field investigation that most of the households earned their livelihood as unskilled casual labourers. Only, a few households possess own cultivated land. They usually go for *Kharif* paddy cultivation and a few households go for *Rabi* crops, mainly vegetables to meet the household need only. Very few households could sell their produce as the production was not sufficient due to inadequate coverage of area and low yield rate.

It was observed that the state NERGS was giving more emphasis in paying wages to the workers than the volume and- quality of works to be performed. From eye estimation, it may be mentioned here that the quality of work in some areas were not up to the mark.

Asset positions of most of the households were in a pathetic condition, They had no option other than to go for wage earning or to act as petty vegetable vendors. Even as wage earners, they do not get work for every day. They have to sit idle for at least for 3 to 4 days in a week. Most of the households lived below the poverty line.

Other socio-economic indicators were also far from satisfactory level. However, BPL rice at subsidized rate under the scheme and Antyodaya Anna Yojana (AAY) are giving a relief to the selected families to overcome the food shortage. But from their physical appearances, they seemed to be suffering from nutritional deficiency. In spite of all odds, the NREGS gave a new life to these categories of the people as it provided hard cash to purchase other essential items for their food basket.

In Assam, about 22.30 per cent people are still living under poverty line. The implementation of NREGS activated the Panchayati Raj system which was almost in a dormant state prior to its introduction. Age group wise classification of sample households, a sizable share of population is in the age group 60 and above. It proves that expectancy of life is increasing on account of improvement of medical care, etc. By and large, the NREGS is a ray of hope for this section people and it is an opportunity for them to take part in the development agenda of the country with dignity.

However, the NREGS may have an adverse effect on availability of labourers for agricultural operations. Since labourers prefer to work under NREGA on account of less supervision and less work, that too, in groups with some other facilities the farmers are bound to compete among themselves to offer higher wages to meet the shortage labourers in peak season which consequently increase the cost of production. If the farmers fails to bear the rising expenditure incurred in farming, they will have no option but to switch over from farming to other activities to earn their livelihood. Probable consequences arising out of this situation need to be assessed properly so that the NREGA cannot stand as an obstacle for farming community. However, there would be a positive effect on farming community if the NREGS increases the purchasing power of labourers as a whole.

From the observations and personal interviews, it can be inferred that the scheme could not fulfill its commitment of providing 100 days of employment in a year to the rural workers and it failed to create assets convincingly as desired but it seemed to have paid good political dividends for the Governments.

Some suggestions are incorporated here on the basis of field observations and interactions with enlightened village people.

1. All the programmes under NREGS must be well planned well ahead of time with a definite time frame for completion so that the problem of spill over work to the next year could be minimized.
2. Stare NREGS has much more to do to strengthen the Panchayati Raj system, minimization of direct intervention of other departments or agencies associated with it, would be a welcome step in this regard. The village administration should be brought down to the Taluk level so that all the development programmes under NREGA can reach the villages situated at a distance from Development Block.
3. In Assam, there are more than 26 lakh farmers of which about 85 per cent belong to marginal and small categories. They can earn some amount of additional income from NREGS. It is possible only after completion of planting and harvesting process. Therefore some works under NREGA programme can be planned during leisure (free) time of the farmers so that they can earn some additional income besides crop cultivation.
4. Present target of 100 days of employment per house hold should be increased to at least 150 days in a phased manner.
5. Wage rate should have a parity with outside rate and ongoing price hike which would reduce the migration of labour from village to nearby township or city.
6. In Assam, there are abundant lands lying as cultivable waste land. Such land having crop potential could be brought under cultivation through NREGA programme. Such venture would be beneficial for state economy as well as wage earners.
7. More transparency is needed about the sanctioned work and financial involvement therein.
8. A third party auditing may be done through an extra Government agency in addition to Gram Panchayat to check mishandling of fund.
9. Financial autonomy may be given to the Panchayats and job responsibility should judiciously be distributed to all the elected members. Provision may also be made under the

NREGS to provide honorarium to the elected panchayat members for discharging their duties. The contractual appointment under the NREGA may be regularized for smooth functioning of all official works.

10. Any kind of political intervention should be stopped/discouraged.
11. During kharif crop Season, a large segment of the households remain occupied in farm activities. Therefore, they suggested to start NREGS during lean season as well.
12. All natural water bodies and forest areas should be brought under NREGA programme to make it as income generating units.
13. The activities of the Panchayats seem very weak as financial control still rests with the District Rural Development Agency and many a times, it hampers a lot in proper implementation of the developmental programmes as decided in gram sabha. Absence of technical person in gram Panchayat also stands as a major hindrance in estimating project proposal on time to place it before the appropriate authority for release of grants, and even if it is granted, they simply get the information and they are not empowered to spend it independently which breaks down the working spirit of the elected body of the Panchayats.

At the end, it may be concluded that if all the loopholes in distribution of job cards and payment of wages, miss-use of fund, etc. could be brought under strict vigilance, there will be no doubt that NREGA would be a boon against rural poverty. At the same time, all the programmes under NREGA must have definite dimension to lead the rural masses to a better economic standing. Otherwise it would remain as an adhoc arrangement to provide meals to needy people through creating employment only. It is imperative to disseminate the information among all the people in general and rural people in particular that the NERGA does not stand to create employment only out also provides an opportunity to all of them to serve their villages, their state and their country as a whole. It would be possible only when the NREGS continues to maintain transparency in each and every aspect of programme implementation. It is often said that poverty is a rural phenomenon which must be negated through judicious implementation of the flagship programmes like NREGS.

D. Commodity Reviews

(i) Foodgrains

During the month of April 2012 the Wholesale Prices of foodgrains displayed a rising trend. Wholesale Price Index (Base 2004-05=100) of foodgrains and pulses Cereals

rose by 1.19 per cent 0.38 per cent and 1.45 per cent respectively over the previous month.

ALL INDIA INDEX NUMBER OF WHOLESALe PRICES

(Base : 2004-2005=100)

Commodity	Weight (%)	WPI for the Month of April 2012	WPI for the Month of March 2012	WPI A year ago	Percentage change during	
					A month	A year
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rice	1.793	176.8	174.9	167.3	1.09	5.68
Wheat	1.116	174.7	171.9	169.2	1.63	3.25
Jowar	0.096	236.8	238.0	218.5	-0.50	8.38
Bajra	0.115	209.5	204.4	188.6	2.50	11.08
Maize	0.217	225.2	219.3	202.8	2.69	11.05
Barley	0.017	210.2	200.6	165.3	4.79	27.16
Ragi	0.019	223.5	218.7	184.6	2.19	21.07
Cereals	3.373	182.5	179.9	172.5	1.45	5.80
Pulses	0.717	211.0	210.2	189.6	0.38	11.29
Foodgrains	4.09	187.5	185.3	175.5	1.19	6.84

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

Behaviour of Wholesale Prices

The following Table indicates the State wise trend

of Wholesale Prices of Cereals during the month of April, 2012.

Commodity	Main Trend	Rising	Falling	Mixed	Steady
Rice	Mixed	Uttar Pradesh West Bengal	Jharkhand	Kerala Haryana Karnataka	Gujarat Delhi Assam Tamil Nadu
Wheat	Mixed	Rajasthan Jharkhand Haryana	Maharashtra Karnataka	Gujarat Uttar Pradesh	
Jowar	Mixed	Tamil Nadu A.P. Karnataka	Maharashtra	Gujarat Rajasthan	U.P.
Bajra	Mixed	Gujarat	A.P.	Rajasthan Maharashtra	Karnataka U.P.
Maize	Mixed	U.P. Jharkhand	Gujarat A.P. Rajasthan	Uttar Pradesh Haryana	Karnataka M. Pradesh

Procurement of Rice

1810 thousand tonnes of Rice (including paddy converted into rice) was procured during April 2012, as against 1576 thousand tonnes of Rice (including paddy converted into rice) procured during April 2011. The total

procurement of Rice in the current marketing season i.e 2011-2012, upto 30-04-2012 stood at 30895 thousand tonnes, as against 26638 thousand 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 2011-12 (up to 30-04-12)		Corresponding Period of last Year (2010-11)		Marketing Year (October-September)			
	Procure- ment	Percentage to Total	Procure- ment	Percentage to Total	2010-11		2009-10	
					Procure- ment	Percentage to Total	Procure- ment	Percentage to Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Andhra Pradesh	5410	17.51	4722	17.73	9610	28.10	7555	23.58
Chhatisgarh	4113	13.31	3520	13.21	3743	10.95	3357	10.48
Haryana	1981	6.41	1659	6.23	1687	4.93	1819	5.68
Maharashtra	149	0.48	161	0.60	308	0.90	229	0.71
Punjab	7731	25.02	8634	32.41	8635	25.25	9275	28.95
Tamil Nadu	1531	4.96	1203	4.52	1543	4.51	1241	3.87
Uttar Pradesh	3267	10.57	2316	8.69	2554	7.47	2901	9.06
Uttarakhand	332	1.07	357	1.34	422	1.23	375	1.17
Others	6381	20.65	4066	15.26	5695	16.65	5282	16.49
Total	30895	100.00	26638	100.00	34197	100.00	32034	100.00

Source: Department of Food and Public Distribution.

Procurement of Wheat

The total procurement of wheat in the current marketing season i.e 2012-2013 upto April, 2012 is 19724

thousand tonnes against a total of 17459 thousand tonnes of wheat procured during last year. The details are given in the following table.

PROCUREMENT OF WHEAT

(in thousand tonnes)

State	Marketing Season 2012-13 (up to 30-04-2012)		Corresponding Period of last Year (2011-12)		Marketing Year (April-March)			
	Procure- ment	Percentage to Total	Procure- ment	Percentage to Total	2011-12		2010-11	
					Procure- ment	Percentage to Total	Procure- ment	Percentage to Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Haryana	6559	33.25	5558	31.83	6928	24.45	6347	28.19
Madhya Pradesh	3913	19.84	2900	16.61	4965	17.52	3539	15.72
Punjab	8021	40.67	8315	47.63	10958	38.67	10209	45.35
Rajasthan	528	2.68	312	1.79	1303	4.60	476	2.11
Uttar Pradesh	567	2.87	330	1.89	3461	12.21	1645	7.31
Others	136	0.69	44	0.25	720	2.54	298	1.32
Total	19724	100.00	17459	100.00	28335	100.00	22514	100.00

Source : Department of Food and Public Distribution.

(ii) Commercial Crops

OILSEEDS AND EDIBLE OILS

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 177.9 in April, 2012 showing a rise of 4.5 per cent and 16.7 per cent over the previous month and over the previous year.

The Wholesale Price Index (WPI) of all individual oilseeds showed an increasing trend except Copra which decreased by 5.0 per cent over the month. The WPI of Groundnut seed (1.7 per cent), Rape and Mustard (6.1 per cent), Cottonseed (2.6 per cent), Gingelly seed (7.8 per cent), Niger Seed (5.4 per cent), Safflower seed (1.7 per cent), Sunflower seed (0.7 per cent) and Soyabean (13.3 per cent) increased over the previous month. The Wholesale Price Index (WPI) of Edible Oils as a group stood at 144.1 in April, 2012 showing a rise of 1.9 per cent and 11.1 per cent over the previous month and over the previous year. The Wholesale Price Index (WPI) of all individual Edible Oils showed an increasing trend except Copra Oil which decreased by 3.5 per cent over the previous month. The WPI of Groundnut Oil (3.8 per cent), Cottonseed Oil (1.1 per cent), Mustard Oil (2.7 per cent), Soyabean Oil (2.3 per cent), Sunflower Oil (0.9 per cent) and Gingelly Oil (3.3 per cent) increased compared to the previous month.

FRUITS AND VEGETABLE

The Wholesale Price Index (WPI) of Fruits & Vegetable as a group stood at 214.7 in April, 2012 showing a rise of 18.6 per cent and 10.7 per cent over the previous month and over the previous year.

POTATO

The Wholesale Price Index (WPI) of Potato stood at 167.4 in April, 2012 showing a rise of 40.3 per cent and 53.4 per cent over the previous month and over the previous year.

ONION

The Wholesale Price Index (WPI) of Onion stood 137.9 in April, 2012 showing an increase of 1.6 per cent over the previous month. However, it decreased by 12.1 per cent over the previous year.

CONDIMENTS AND SPICES

The Wholesale Price Index (WPI) of Condiments & Spices (Group) stood at 207.8 in April, 2012 showing a fall of 2.9 per cent and 14.6 per cent over the previous month and year respectively. The Wholesale Price Index of Black Pepper increased by 0.6 per cent over the previous month. However, the WPI of Chillies (Dry) and Turmeric decreased by 5.2 per cent and 7.6 per cent over the previous month.

RAW COTTON

The Wholesale Price Index (WPI) of Raw Cotton stood at 198.6 in April, 2012 showing an increase of 1.3 per cent over the previous month. However, it decreased by 35.0 per cent over the previous year.

RAW JUTE

The Wholesale Price Index (WPI) of Raw Jute stood at 222.2 in April, 2012 showing a fall of 1.6 per cent and 7.3 per cent over the previous month and year respectively.

WHOLESALE PRICE INDEX OF COMMERCIAL CROPS FOR THE MONTH OF APRIL, 2012

(Base Year : 2004-05=100)

Commodity	Latest	Month	Year	Percentage Variation over the	
	April, 2012	Mar, 2012	April, 2011	Month	Year
Oil Seeds	177.9	170.3	152.5	4.5	16.7
Groundnut Seed	230.5	226.6	183.6	1.7	25.5
Rape & Mustard Seed	173.3	163.3	130.1	6.1	33.2
Cotton Seed	146.1	142.4	139.9	2.6	4.4
Copra (Coconut)	95.3	100.3	121.7	-5.0	-21.7
Gingelly Seed (Sesamum)	256.1	237.5	198.1	7.8	29.3
Niger Seed	183.8	174.4	147.5	5.4	24.6
Safflower (Kardi Seed)	134.9	132.6	142.4	1.7	-5.3
Sunflower	168.9	167.7	166.0	0.7	1.7
Soyabean	182.7	161.2	139.8	13.3	30.7
Edible Oils	144.1	141.4	129.7	1.9	11.1
Groundnut Oil	187.7	180.9	149.7	3.8	25.4
Cotton Seed Oil	152.7	151.1	146.1	1.1	4.5
Mustard & Rapeseed Oil	151.6	147.6	122.7	2.7	23.6
Soyabean Oil	157.8	154.2	140.4	2.3	12.4
Copra Oil	116.2	120.4	116.5	-3.5	-0.3
Sunflower Oil	134.4	133.2	126.4	0.9	6.3
Gingelly Oil	156.7	151.7	141.8	3.3	10.5
Fruits and Vegetables	214.7	181.1	193.9	18.6	10.7
Potato	167.4	119.3	109.1	40.3	53.4
Onion	137.9	135.7	156.9	1.6	-12.1
Condiments and Spices	207.8	214.0	243.4	-2.9	-14.6
Black Pepper	483.3	480.6	330.0	0.6	46.5
Chillies (Dry)	236.1	249.0	277.9	-5.2	-15.0
Turmeric	145.5	157.4	323.9	-7.6	-55.1
Raw Cotton	198.6	196.1	305.5	1.3	-35.0
Raw Jute	222.2	225.8	239.8	-1.6	-7.3

PART II—Statistical Tables

A. Wages

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

(in Rupees)

State/Distt.	Village	Month and Year	Normal Daily Working Hours	Field Labour			Other Agri. Labour			Herdsman			Skilled Labour		
				Man	Wo-man	Non Adult	Man	Wo-man	Non Adult	Man	Wo-man	Non Adult	Car-penter	Black-smith	Cob-ler
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
<i>Andhra Pradesh</i>															
Krishna	Ghantasala	Dec., 2011	8	250.00	100.00	—	250.00	130.00	—	—	—	—	—	—	—
Guntur	Tadikonda	Dec., 2011	8	200.00	175.00	110.00	200.00	160.00	110.00	160.00	—	—	—	—	—
Rangareddy	Arutla	Dec., 2011	8	200.00	120.00	—	150.00	120.00	—	150.00	120.00	—	220.00	200.00	—
<i>Karnataka</i>															
Bangalore	Harisandra	July to Sep., 2011	8	200.00	150.00	—	200.00	150.00	—	250.00	180.00	—	300.00	300.00	—
Tumkur	Gedlahali	July to Sep., 2011	8	150.00	150.00	—	140.00	145.00	—	150.00	—	—	150.00	150.00	—
<i>Maharashtra</i>															
Nagpur	Mauda	Dec., 2009	8	100.00	80.00	—	—	—	—	—	—	—	—	—	—
Ahmednagar	Akole	June, 2009	8	80.00	70.00	—	—	—	—	—	—	—	83.5	85.00	85.00
<i>Jharkhand</i>															
Ranchi	Gaintalood	May, 2011 & June, 2011	8	100.00	100.00	—	90.00	90.00	—	58.00	58.00	—	170.00	150.00	—

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

(in Rupees)

State/Distt.	Centre	Month and Year	Type of Labour	Normal Daily Working	Plough-ing	Sow-ing	Weed-ing	Harvest-ing	Other Agri. Labour	Herds-man	Skilled Labour		
											Car-penter	Black-smith	Cob-ler
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
<i>Assam</i>													
Barpeta	Loharapara	Feb., 11	M	8	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
			W	8	—	—	120.00	120.00	120.00	—	—	—	—
<i>Bihar</i>													
Muzaffarpur	Bhalui Rasul*	Feb. & March, 2010	M	8	104.00	104.00	104.00	104.00	104.00	—	150.00	150.00	150.00
			W	8	—	104.00	104.00	104.00	104.00	—	—	—	—
Shekhpura	Kutaut	May & June, 2010	M	8	150.00	—	—	—	150.00	—	220.00	—	—
			W	8	—	—	—	—	—	—	—	—	—
<i>Chhattisgarh</i>													
Dhamtari	Sihaba	Jan., 2012	M	8	300.00	100.00	—	120.00	80.00	80.00	150.00	80.00	70.00
			W	8	—	—	—	80.00	70.00	—	—	—	—
<i>Gujarat</i>													
Rajkot	Rajkot	Nov., 2011	M	8	179.00	200.00	138.00	156.00	125.00	125.00	275.00	275.00	245.00
			W	8	—	137.00	133.00	134.00	125.00	87.00	—	—	—
Dahod	Dahod	Nov, 2011	M	8	71.00	71.00	71.00	71.00	71.00	—	143.00	150.00	150.00
			W	8	—	71.00	71.00	71.00	71.00	—	—	—	—
<i>Haryana</i>													
Panipat	Ugarakheri	Jan 2011	M	8	180.00	180.00	180.00	200.00	180.00	—	—	—	—
			W	8	—	150.00	150.00	180.00	150.00	—	—	—	—

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

(in Rupees)

State/Distt.	Centre	Month and Year	Type of Labour	Normal Daily Work-ing Hours	Plough-ing	Sow-ing	Weed-ing	Harvest-ing	Other Agri. Labour	Herds-man	Skilled Labour		
											Car-penter	Black-smith	Cob-bler
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
<i>Himachal Pradesh</i>													
Mandi	Mandi	Nov, to Dec. 2010	M	8	300.00	110.00	110.00	110.00	110.00	110.00	200.00	200.00	—
			W	8	—	110.00	110.00	110.00	110.00	110.00	—	—	—
<i>Kerala</i>													
Kozhikode	Koduvally	Nov., 2011	M	4 to 8	670.00	450.00	—	450.00	560.00	—	500.00	—	—
			W	4 to 8	—	—	350.00	350.00	400.00	—	—	—	—
Palakkad	Elappally	Nov., 2011	M	4 to 8	400.00	300.00	—	275.00	356.3	—	400.00	—	—
			W	4 to 8	—	—	150.00	200.00	155.00	—	—	—	—
<i>Madhya Pradesh</i>													
Hoshangabad	Sangakherakalan	March., 2012	M	8	150.00	—	150.00	150.00	100.00	100.00	350.00	350.00	—
			W	8	—	—	150.00	150.00	100.00	100.00	—	—	—
Satna	Kotar	March, 2012	M	8	120.00	—	—	120.00	120.00	120.00	180.00	180.00	180.00
			W	8	—	—	—	120.00	120.00	120.00	—	—	—
Shyampur Kala	Vijaypur	March, 2012	M	8	100.00	100.00	—	100.00	150.00	50.00	150.00	150.00	150.00
			W	8	—	100.00	—	100.00	150.00	50.00	—	—	—
<i>Orissa</i>													
Bhadrak	Chandbali	Dec., 2011	M	8	—	—	—	200.00	170.00	50.00	230.00	—	—
			W	8	—	—	—	140.00	135.00	40.00	—	—	—
Ganjam	Aska	Dec., 2011	M	8	300.00	120.00	120.00	120.00	138.3	120.00	250.00	250.00	250.00
			W	8	—	60.00	100.00	100.00	100.00	100.00	—	—	—
<i>Punjab</i>													
Ludhiana	Pakhowal	June, 2008	M	8	—	—	90.00	95.00	—	99.44	—	—	—
<i>Rajasthan</i>													
Barmer	Vishala	Aug., 2011	M	8	N. A.								
			W	8	N. A.								
Jalore	Panwa	Aug., 2011	M	8	—	—	—	—	—	150.00	100.00	150.00	—
			W	8	—	—	—	—	—	—	—	—	—
<i>Tamil Nadu</i>													
Thanjavur	Pulvarnatham	Feb., 2012	M	6	N. R.								
			W	5	N. R.								
Tirunelveli	Malayakulam (Kurvikulam)	Feb., 2012	M	8	—	—	—	—	—	—	—	—	—
			W	8	—	—	—	—	—	—	—	—	—
<i>Tripura</i>													
Agartala	Govt. Agri. Farm				N. R.								
<i>Uttar Pradesh*</i>													
Meerut	Ganeshpur	Jan., 2012	M	8	182.00	182.00	179.00	182.00	182.00	—	289.00	—	—
			W	8	—	158.00	154.00	153.00	158.00	—	—	—	—
Chandbali	Dhanpur	Jan., 2012			N. R.								
Chandauli	Chandauli	Jan., 2012	M	8	120.00	140.00	120.00	124.30	120.00	—	172.90	—	—
			W	8	—	140.00	120.00	—	120.00	—	—	—	—

M-Man, W-Woman, N. A. —Not Available

N. R. —Not Reported

B. PRICES

2. WHOLESALE PRICES OF CERTAIN AGRICULTURAL COMMODITIES AND ANIMAL HUSBANDRY

PRODUCTS AT SELECTED CENTRES IN INDIA

(Month-end Prices in Rupees)

Commodity	Variety	Unit	State	Centre	Apr.-12	Mar.-12	Apr.-11
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wheat	PBW 343	Quintal	Punjab	Amritsar	1285	1240	1120
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1150	1120	NA
Wheat	—	Quintal	Madhya Pradesh	Sagar	1500	1400	NA
Jowar	—	Quintal	Maharashtra	Mumbai	2300	2300	2775
Gram	—	Quintal	Punjab	Abohar	NA	NA	NA
Maize	Yellow	Quintal	Uttar Pradesh	Bahraich	1110	1040	990
Gram Split	—	Quintal	Maharashtra	Mumbai	4400	4350	3487
Gram Split	—	Quintal	Bihar	Patna	5000	4950	3100
Arhar Split	—	Quintal	NCT of Delhi	Delhi	5700	5600	5650
Arhar Split	—	Quintal	Maharashtra	Mumbai	5050	5300	6116
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	5600	5500	5200
Arhar Split	—	Quintal	Bihar	Patna	6275	6200	6000
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2450	2350	2250
Gur	Sort II	Quintal	Tamil Nadu	Chennai	2900	2900	2700
Gur	—	Quintal	Maharashtra	Mumbai	3250	3250	2841
Mustard seed	Rai UP	Quintal	West Bengal	Kolkata	4000	4000	2800
Mustard Seed	Raira	Quintal	West Bengal	Kolkata	NA	NA	NA
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	3075	2870	2225
Linseed	—	Quintal	Maharashtra	Nagpur	4100	3900	NA
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	3275	3480	2700
Cotton Seed	Superior	Quintal	Maharashtra	Jalgaon	NA	NA	NA
Castor Seed	—	Quintal	Andhra Pradesh	Badepalli	NA	NA	NA
Sesamum Seed	Black	Quintal	Tamil Nadu	Chennai	4500	4500	4500
Cotton Seed	—	Quintal	Maharashtra	Mumbai	NA	NA	NA
Copra	FAQ	Quintal	Kerala	Alleppey	4375	5000	6650
Groundnut	—	Quintal	Maharashtra	Mumbai	5900	5900	5941
Groundnut	TMV 7	Quintal	Tamil Nadu	Chennai	4280	4280	4280
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1450	1475	1040
Mustard Oil	—	15 Kg.	Uttar Pradesh	Kanpur	1163	1119	908
Groundnut Oil	—	15 Kg.	Maharashtra	Mumbai	1800	1800	1227
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1875	1650	1283
Linseed Oil	—	15 Kg.	Uttar Pradesh	Kanpur	1320	1329	923
Castor Oil	—	15 Kg.	Uttar Pradesh	Kanpur	NA	NA	NA
Sesamum Oil	Agmark	15 Kg.	Tamil Nadu	Chennai	2040	2040	1875
Sesamum Oil	—	15 Kg.	Maharashtra	Mumbai	NA	NA	1163
Coconut Oil	—	15 Kg.	Kerala	Cochin	960	960	1478
Mustard Cake	—	Quintal	Uttar Pradesh	Kanpur	1300	1150	1080
Groundnut Cake	—	Quintal	Uttar Pradesh	Kanpur	NA	NA	NA
Cotton/Kapas	F414	Quintal	Punjab	Abohar	NA	NA	NA
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Thiruppur	NA	NA	NA
Wool	Fine	Quintal	Madhya Pradesh	Dabra	NA	NA	NA
Jute Raw	TD5	Quintal	West Bengal	Kolkata	2315	2475	3200

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

(Month-end Prices in Rupees)

Commodity	Variety	Unit	State	Centre	Apr.-12	Mar.-12	Apr.-11
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Jute Raw	W5	Quintal	West Bengal	Kolkata	2315	2475	3220
Oranges	—	100 No.	Maharashtra	Mumbai	NA	NA	NA
Oranges	Nagpuri	100 No.	West Bengal	Kolkata	NA	NA	NA
Oranges	Big	100 No.	Tamil Nadu	Chennai	550	540	600
Banana	Basarai	100 No.	Maharashtra	Jalgaon	400	320	851
Banana	Singapore	100 No.	West Bengal	Kolkata	NA	NA	NA
Cashewnuts	—	Quintal	Maharashtra	Mumbai	40000	40000	45916
Almonds	—	Quintal	Maharashtra	Mumbai	40000	40000	34958
Walnuts	—	Quintal	Maharashtra	Mumbai	50625	47083	62500
Kishmish	—	Quintal	Maharashtra	Mumbai	11833	12000	16250
Peas Green	—	Quintal	Tamil Nadu	Chennai	6000	4200	2300
Tomatoes	—	Quintal	Tamil Nadu	Chennai	1700	2150	1000
Ladyfinger	—	Quintal	Tamil Nadu	Chennai	2200	3400	1000
Cauliflower	—	100 No.	Tamil Nadu	Chennai	1200	1200	800
Potatoes	Red	Quintal	Bihar	Patna	750	600	720
Potatoes	Desi	Quintal	West Bengal	Kolkata	1040	900	600
Potatoes	Sort I	Quintal	Tamil Nadu	Mettupalayam	NA	NA	1389
Onions	Bombay	Quintal	West Bengal	Kolkata	NA	NA	NA
Turmeric	Erode	Quintal	West Bengal	Kolkata	NA	NA	NA
Turmeric	Nadan	Quintal	Kerala	Cochin	7200	7500	14000
Chillies	—	Quintal	Bihar	Patna	8400	8350	8100
Black Pepper	Palai	Quintal	Kerala	Alleppey	NT	NT	NT
Ginger	Dry	Quintal	Kerala	Cochin	8100	8500	16000
Cardamom	Big	Quintal	West Bengal	Kolkata	95000	95000	120000
Cardamom	Small	Quintal	West Bengal	Kolkata	70000	70000	140000
Milk	Cow	100	NCT of Delhi	Delhi	3400	3300	3000
Milk	Buffalo	100	West Bengal	Kolkata	3200	3200	2600
Ghee Deshi	Agmark	Quintal	West Bengal	Kolkata	NA	NA	NA
Ghee Deshi	—	Quintal	Uttar Pradesh	Khurja	NA	NA	NA
Ghee Deshi	—	Quintal	Maharashtra	Mumbai	25500	26500	23500
Fish	Rohu	Quintal	West Bengal	Kolkata	NA	NA	NA
Fish	Sea Prawns	Quintal	Tamil Nadu	Chennai	18000	20000	28000
Eggs	Madras	1000 No.	West Bengal	Kolkata	3100	3200	2400
Tea	Medium	Quintal	Assam	Guwahati	NA	NA	13000
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	13000	13000	14000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	28000	30000	25000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	13200	12400	12000
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	2225	2300	2400
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	2150	2215	2300
Tobacco	Bidi /Tobacco	Quintal	West Bengal	Kolkata	4000	3500	2750
Rubber	—	Quintal	Kerala	Kottayam	19000	19350	23000
Arecanut	Rashi	Quintal	Tamil Nadu	Chennai	30000	30000	24000

NA :—Not Available

NT :—Not Transaction

C. CROP PRODUCTION

3. SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING JUNE, 2012

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Winter Rice, Jowar (K), Bajra, Maize (K), Ragi (K), Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Ginger, Groundnut, Sesamum, Cotton, Turmeric.	Autumn rice.
Assam	Winter Rice, Castorseed.	Autumn Rice, Summer Potato (Hills).
Bihar	Autumn Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Sesamum, Cotton, Jute, Mesta, Sannhemp.	Summer rice.
Gujarat	Winter Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Ginger, Chillies (Dry), Groundnut, Seasmum, Cotton, Turmeric, Sannhemp.	—
Himachal Pradesh	Summer Rice, Maize, Ragi, Small Millets (K), Urad (K), Mung (K), Other Kharif Pulses, Ginger, Chillies (Dry), Tobacco, Groundnut, Seasmum, Turmeric.	Wheat, Winter Potato (Hills), Onion.
Jammu & Kashmir	Autumn Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Urad (K), Mung (K), Other Kharif Pulses, Potato, Chillies (Dry), Tobacco, Groundnut, Sesamum (Late) Jute, Sannhemp.	Wheat, Barley, Small Millets (R), Tobacco, Rapeseed and Mustard, Onion.
Karnataka	Autumn Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Chillies (Dry), Groundnut, Castorseed, Sesamum, Cotton, Mesta, Sweet Potato, Turmeric, Sannhemp, Nigerseed, Onion, Tapioca.	—
Kerala	Autumn Rice, Ragi, Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Sweet Potato.	Tapioca.
Madhya Pradesh	Autumn Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Summer Potato, Ginger, Chillies (Dry), Tobacco, Groundnut, Castorseed, Sesamum, Cotton, Jute, Mesta, Sweet Potato, Turmeric, Sannhemp.	Onion.
Maharashtra	Winter Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Chillies (Dry), Groundnut, Castorseed, Sesamum, Cotton, Mesta, Turmeric, Sannhemp, Nigerseed.	—
Manipur	Autumn Rice, Winter Rice, Tur (K), Groundnut Castorseed, Sesamum, Cotton.	—
Orissa	Autumn Rice, Winter Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Chillies (Dry), Tobacco, Groundnut, Castorseed, Cotton, Jute, Mesta.	Summer Rice, Chillies (Dry).
Punjab and Haryana	Autumn Rice, Summer Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Chillies Dry Groundnut, Castorseed, Cotton, Sweet Potato, Turmeric, Sannhemp.	Wheat, Potato (Hills), Summer Potato Tobacco, Onion.

C. CROP PRODUCTION—Contd.

3. SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING JUNE, 2012

State	Sowing	Harvesting
(1)	(2)	(3)
Rajasthan	Jowar (K), Bajra, Maize, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Chillies (Dry), Tobacco, Groundnut, Castorseed, Cotton, Sannhemp.	Small Millets (R).
Tamil Nadu	Autumn Rice, Jowar (K), Bajra, Ragi, Small Millets (K), Summer Potato (Hills) Sugarcane, Chillies (Dry), Castorseed, Sesamum, Cotton, Turmeric, Sannhemp, Onion, Tapioca.	Summer Rice, Jowar (R), Sugar, Chillies (Dry), Cotton, Sannhemp, Onion.
Tripura	Winter Rice, Urad (K), Mung (K), Sesamum, Mesta.	—
Uttar Pradesh	Autumn Rice, Winter Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses (Moth), Ginger, Chillies (Dry), Groundnut, Castorseed, Cotton, Jute Mesta, Sweet Potato, Sannhemp, Nigerseed.	Sugarcane, Onion.
West Bengal	Autumn Rice, Maize, Tur (K), Ginger, Chillies (Dry), Mesta.	Chillies (Dry), Sesamum.
Delhi	Jowar (K), Bajra, Cotton.	
Andaman & Nicobar	Autumn Rice, Winter Rice.	

(K)—Kharif. (R)—Rabi.

METRIC WEIGHTS AND MEASURES

SIMPLE CONVERSION TABLES

I. WEIGHTS

Tons to metric Tonnes

Tons	..	..	1	2	3	4	5	6	7	8	9	10
Metric tonnes	..	..	1.02	2.03	3.05	4.07	5.08	6.10	7.11	8.13	9.14	10.16

Pounds (av.) to Kilograms

Pounds	..	..	1	2	3	4	5	6	7	8	9	10
Kilograms	..	..	0.45	0.91	1.36	1.81	2.27	2.72	3.18	3.63	4.08	4.54

Tolas to grams

Tolas	..	..	1	2	3	4	5	6	7	8	9	10
Grams	..	..	11.66	23.33	34.99	46.66	58.32	69.98	81.65	93.31	104.97	116.64

Seers to Kilograms

Seers	..	..	1	2	3	4	5	6	7	8	9	10
Kilograms	..	..	0.93	1.87	2.80	3.73	4.67	5.60	6.53	7.46	8.40	9.33

Maunds to Quintals

Maunds	..	..	1	2	3	4	5	6	7	8	9	10
Quintals	..	..	0.37	0.75	1.12	1.49	1.87	2.24	2.61	2.99	3.36	3.73

II. LENGTHS

Miles to Kilometres

Miles	..	..	1	2	3	4	5	6	7	8	9	10
Kilometres	..	..	1.61	3.22	4.83	6.44	8.05	9.66	11.27	12.87	14.47	16.09

Yards to Metres

Yards	..	..	1	2	3	4	5	6	7	8	9	10
Metres	..	..	0.91	1.83	2.74	3.66	4.57	5.49	6.40	7.32	8.23	9.14

Inches to Millimetres

Inches	..	..	1	2	3	4	5	6	7	8	9	10	11	12
Millimetres	..	..	25.40	50.80	76.20	101.60	127.00	152.40	177.80	203.20	228.60	254.00	279.40	304.80

III. AREA

Acres to Hectares

Acres	..	..	1	2	3	4	5	6	7	8	9	10
Hectares	..	..	0.40	0.81	1.21	1.61	2.02	2.43	2.83	3.24	3.64	4.04

Square Yards to Square Metres

Square Yards	..	..	1	2	3	4	5	6	7	8	9	10
Square Metres	..	..	0.84	1.67	2.51	3.34	4.18	5.02	5.85	6.69	7.53	8.36

IV. CAPACITY

Gallons (Imperial) to Litres

Gallons	..	..	1	2	3	4	5	6	7	8	9	10
Litres	..	..	4.55	9.09	13.64	15.14	22.73	27.28	31.82	36.37	40.91	45.44