AGRICULTURAL SITUATION IN INDIA

DECEMBER, 2013

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Agricultural Situation in India

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Part I

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NOTE TO CONTRIBUTORS

Articles on the State of Indian Agriculture and allied sectors are accepted for publication in the Directorate of Economics & Statistics, Department of Agriculture & Cooperation'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 in Hard Copy as well as soft copy in MS word, 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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PART II

STATISTICAL TABLES

Abbreviations used

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

A. General Survey

- Cumulative Post-Monsoon (October to December) Rainfall for the country as a whole during the period 1st October to 31st December, 2013 is 18% more than LPA. Rainfall in the four broad geographical divisions of the country during the above period was higher than LPA by 76% in Central India & 21 % in East & North East India and lower than LPA by (-)10% in North West India & (-) 3% in South Peninsula.
- Out of a total of 36 meteorological sub-divisions, 22 sub-divisions received excess/normal rainfall, 13 sub-divisions received deficient rainfall and one sub-division received scanty rainfall.
- Central Water Commission monitors 85 major-reservoirs in the country which have a total live capacity of 154.88 BCM at Full Reservoir Level (FRL). Current live storage in these reservoirs as on 2nd January, 2014 was 105.15 BCM as against 84.92 BCM on 2.01.2013 (last year) and 85.17 BCM of normal storage (average storage of the last 10 years). Current year's storage is 124% of the last year's and 123% of the normal storage.
- As per latest information available on sowing of crops, around 97% of the normal area under Rabi crops have been sown upto 3.01.2014. Area sown under all rabi crops taken together has been reported to be 591.99 lakh hectares at All India level as compared to 562.58 lakh hectares average area on the corresponding date. Area coverage (as compared to average area) is higher by 23.3 lakh ha. in Wheat, 1.7 lakh ha. in Maize, 8.6 lakh ha. in Gram and 3.9 lakh ha. in Rapeseed & Mustard. Area coverage is lower (compared to average area) by (-) 6.1 lakh ha. under Jowar and (-)2.3 lakh ha. under Sunflower.
- A statement indicating comparative position of area coverage under major Rabi crops during 2013-14 (upto 3.01.2014) and the corresponding period of last year is given in the following table.

ALL INDIA CROP SITUATION - RABI (2013-14) AS ON 3-01-2014

Crop Name	Normal Area	Normal Area as on date	Area sown reported (In lakh hectares)			Absolute Change-over (+/–)	
			03-01-14	% of Normal	03-01-13	Average as on date	Last Year
Wheat	286.36	278.79	302.09	105.5	286.38	23.30	15.7
Rice	44.30	3.77	3.25	7.3	2.72	-0.5	0.5
Jowar	42.77	41.94	35.89	83.9	38.47	-6.1	-2.6
Maize	12.30	10.93	12.63	102.7	12.22	1.7	0.4
Barley	6.56	7.63	7.27	110.8	7.71	-0.4	-0.4
Total Coarse Cereals	61.63	61.04	56.49	91.7	59.14	-4.5	-2.6
Total Cereals	392.29	343.60	361.83	92.2	348.23	18.2	13.6
Gram	82.18	86.75	95.39	116.1	90.33	8.6	5.1
Lentil	14.64	15.18	15.17	103.6	14.74	0.0	0.4
Peas	7.16	7.70	8.26	115.4	7.93	0.6	0.3

Crop Name	Normal Area	Normal Area as on date	Area sown reported (In lakh hectares)			Absolute Change-over (+/–)	
			03-01-14	% of Normal	03-01-13	Average as on date	Last Year
Kulthl (Horse Gram)	2.10	4.80	4.31	205.0	5.17	-0.5	-0.9
Urad	7.61	6.52	6.17	81.0	7.52	-0.4	-1.4
Moong	6.66	3.63	4.56	68.5	4.88	0.9	-0.3
Lathyrus	5.16	4.10	4.01	77.6	3.93	-0.1	0.1
Others	3.45	6.97	8.53	247.4	8.15	1.6	0.4
Total Pulses	128.97	135.65	146.40	113.5	142.65	10.7	3.7
Total Foodgrains	521.26	479.25	508.22	97.5	490.88	29.0	17.3
Rapeseed & Mustard	61.01	65.86	69.75	114.3	65.05	3.9	4.7
Groundnut	9.09	4.20	4.40	48.3	4.20	0.2	0.2
Safflower	2.79	2.15	1.70	60.8	1.34	-0.4	0.4
Sunflower	8.59	5.93	3.65	42.5	4.80	-2.3	-1.1
Sesamum	2.50	0.57	0.58	23.0	0.49	0.0	0.1
Linseed	3.80	3.83	3.33	87.5	2.56	-0.5	0.8
Others	0.00	0.78	0.38	#DIV/O1	0.51	-0.4	-0.1
Total seeds (Nine)	87.79	83.33	83.77	95.4	78.95	0.4	4.8
All-Crops	609.05	562.58	591.99	97.2	569.83	29.4	22.2

Source: Croos & TMOP Divisions DAC

Agriculture :

Rainfall : With respect to rainfall situation in India, the year is categorized into four seasons: winter season (January-February); pre monsoon (March-May); south west monsoon (June-September) and post monsoon (October-December). South west monsoon accounts for more than 75 per cent of annual rainfall. The actual rainfall received during the winter season 2013, as on 15.01.2014 has been 5.1 mm as against the normal at 8.5 mm.

All India production of food grains : As per the 1st advance estimates released by Ministry of Agriculture on 24.9.2013, production of Kharif food grains during 2013-14 is estimated at 129.32 million tonnes compared to 117.18 million tonnes (1st advance estimates) in 2012-13.

Procurement : During the Kharif Marketing Season 2012-13, which spanned from October, 2012 to September, 2013, the procurement of rice was 34.02 million tonnes (as on 1st November 2013) as against 34.92 million tonnes procured last year in the corresponding period. This represents a decrease of 2.58 per cent. Wheat procurement during Rabi Marketing Season 2013-14, which spans from April, 2013 to March, 2014, is 25.09 million tonnes as on 1st August, 2013.

TABLE 1— PROCUREMENT IN MILLION TONNES

Item	2010-11	2011-12	2012-13	2013-14
Rice	34.20	35.04	34.03	12.83#
Wheat	22.51	28.34	38.11	25.09*
Total	56.71	63.38	72.14	37. 92

* Position as on 1-8-2013.

\# Position as on 13-12-2013.

Off-take : Off-take of rice during the month of October 2013 was 24.28 lakh tonnes. This comprises 20.42 lakh tonnes under TPDS and 3.86 lakh tonnes under other schemes. In respect of wheat, the total off take was 21.98 1akh tonnes comprising of 17.53 lakh tonnes under TPDS and 4.45 lakh tonnes under other schemes.

Stocks : Stocks of food-grains (rice and wheat) held by FCI as on December 1, 2013 were 45.28~million tonnes, which is lower by 33.66 per cent compared to the level of 68.26 million tonnes as on December 1, 2012.

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

	Off-take			Stocks	
	2011-12	2012-13	2013-14 (Up to Oct. 2013	Dec. 1, 2012	Dec. 1, 2013
Rice	32.12	32.64	16.82	30.61	14.22
Wheat	24.26	33.21	14.52	37.65	31.06
Total	56.38	65.85	31.34	68.26	45.28

Economic Growth

As per the Provisional Estimates of the Central Statistics Office (CSO), the growth in real Gross Domestic Product (GDP) at factor cost at contant (2004-05 prices) is estimatesd at 5.0 per cent in 2012-13 with agriculture, industry and services registering growth rates of 1.9 per cent, 2.1 per cent and 7.1 per cent respectively. The growth in GDP is placed at 4.4 per cent in and 4.8 per cent respectively in the first and second quarter of 2013-14.

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

(at 2004-05 Prices)

Sector	Growth (in per cent)			Percentage Share in GDP		
	2010-11	2011-12 1R	2012-13 PE	2010-11	2011-12 (1R)	2012-13 13 (PE)
1. Agriculture, forestry & fishing	**7.9**	**3.6**	**1.9**	**14.5**	**14.1**	**13.7**
2. Industry	9.2	3.5	2.1	28.2	27.5	26.7
a. Mining & Quarrying	4.9	-0.6	-0.6	2.2	2.1	2.0
b Manufacturing	9.7	2.7	1.0	16.2	15.7	15.1
c Electricity, Gas & Water Supply	5.2	6.5	4.2	1.9	1.9	1.9
d Construction	10.2	5.6	4.3	7.9	7.9	7.8
3 Services	**9.8**	**8.2**	**7.1**	**57.3**	**58.4**	**59.6**
a Trade, Hotels, Transport & Communication	12.3	7.0	6.4	27.3	27.5	27.8
b Financing, Insurance, Real Estate & Business Services	10.1	11.7	8.6	17.2	18.1	18.7
c Community, Social & Personal Services	4.3	6.0	6.6	12.8	12.8	13.0
4 GDP at factor cost	**9.3**	**6.2**	**5.0**	**100.0**	**100.0**	**100.0**

1R: 1st Revised Estimates; PE: Provisional Estimates. Source: CSO

TABLE 4—QUARTERLY GROWTH RATE OF GDP (Per cent)

Sector	2011-12				2012-13				2013-14	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1 Agriculture, forestry & fishing	**5.4**	**3.2**	**4.1**	**2.0**	**2.9**	**1.7**	**1.8**	**1.4**	**2.7**	**4.6**
2 Industry	5.7	3.8	2.6	2.1	1.8	1.3	2.5	2.7	0.2	2.4
a Mining & Quarrying	-0.4	-5.3	-2.6	5.2	0.4	1.7	-0.7	-3.1	-2.8	-0.4
b Manufacturing	7.4	3.1	0.7	0.1	-1.0	0.1	2.5	2.6	-1.2	1.0
c Electricity, Gas & Water Supply	6.6	8.4	7.7	3.5	6.2	3.2	4.5	2.8	3.7	7.7
d Construction	3.8	6.5	6.9	5.1	7.0	3.1	. 2.9	4.4	2.8	4.3
3 Services	**8.9**	**8.5**	**8.3**	**7.3**	**7.7**	**7.6**	**6.7**	**6.6**	**6.6**	**5.9**
a Trade, Hotels, Transport & Comm.	9.5	7.0	6.9	5.1	6.1	6.8	6.4	6.2	3.9	4.0
b Financing, Insurance, Real Estate & Business Services	11.6	12.3	11.4	11.3	9.3	8.3	7.8	9.1	8.9	10.0
c Community, Social & Personal Services	3.5	6.5	6.8	6.8	8.9	8.4	5.6	4.0	9.4	4.2
4 GDP at factor cost	**7.5**	**6.5**	**6.0**	**5.1**	**5.4**	**5.2**	**4.7**	**4.8**	**4.4**	**4.8**

Source: CSO.

B. Articles

Agriculture Diversification towards Horticulture : Trends and Prospects

RAMESH CHAND, S.S. RAJU AND SONIA CHAUHAN.

Introduction

Agriculture diversification in general parlancerefers to the shift in allocation of land resources in a geographic location from one set of crops to another set of crops. It may involve redistribution of area over the existing crops and/or replacement of some or all crops by another set of crops.Diversification involves diverse goals. These could be related to output growth, income enhancement. risk reduction, natural resource sustainability, labor scarcity or any other consideration (Chand and Sonia, 2002).

Diversification is driven by demand side factors or supply side factors, or both. Sometimes supply side factors aid or enhance demand led diversification. Diversification towards horticultural crops in India is a good example of demand led diversification supported by supply side factors. Due to changes in taste, preferences and food habits, the consumption pattern in India has been shifting towards fruits and vegetables. Such changes are also happening globally. Thus both domestic demand as well as export demand is shifting in favor of horticultural crops. In supply side, production of horticultural crops shows much higher growth than other crops/groups like foodgrains, oilseeds, and sugar.

Technological developments in horticultural crops have facilitated this in several ways. Varieties of horticultural crops have been developed for cultivation in off season, under diverse climatic conditions and with various attributes to attract consumers. Despite favorable demand side and supply side factors area under horticultural crops in the country has remained below 7per cent and this area has expanded slowly. There are also concerns related to effect of area shift towards horticultural crops on basic food security and staple food production. In thi background the present paper examines patterns and progress of horticulture in the country and discusses prospects of diversification towards horticulture.

Diversification Trends and Pattern

Diversification towards horticulture (fruit and vegetables plus condiments and spices) was seen from area share, growth in production and production shares. During the decade following 1995- 96 gross area under cultivation in the country increased by 5.3 million hectares. In the next 6 years, area expansion was more than what was realized during previous 10 years. One fourth increases in area under cultivation during 1995-96, 2005-06 was due to expansion of horticulture activities. After this, share of horticulture in incremental area under cultivation declined to meager 3.5 per cent. It looks like that scheme like National Food Security Mission has much stronger effect on area shift in recent years compared to market related factors. This is supported by the fact that area as well as the share of pulses in Gross Cropped Area, which was moving on a downward trend, witnessed large increase between 2010-11 and 2005-06. As a result, area share of horticulture followed a small decline and total area under horticulture remained almost stagnant and area under fruits and vegetables followed a small decline. This sudden check on diversification towards horticulture militates against changes in demand and dietary pattern which show strong preference of consumers in favor of horticultural products. This could be one of the factors for high inflation in vegetables in the country in the recent years.

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*Director, Principal Scientist And Technical Officer, respectively.

National Centre For Agricultural Economics And Policy Research (NCAP), New Delhi

TABLE 1— ALL INDIA AREA SHARE BY CROP GROUPS (Per cent).

Crop group	Area (million ha)			Area share (Per cent)		
	1995-96	2005-06	2010-11	1995-96	2005-06	2010-11
Cereals	97.09	99.21	100.27	51.79	51.47	50.39
Pulses	23.92	22.39	26.40	12.76	11.62	13.27
Oilseeds	25.96	27.86	27.22	13.85	14.46	13.68
Sugarcane	4.15	4.20	4.88	2.21	2.18	2.46
Cotton	9.04	8.68	11.24	4.82	4.50	5.65
Horticulture	10.23	12.81	13.03	5.46	6.65	6.55
(a) Condiments & Spices	2.67	2.90	3.31	1.42	1.50	1.67
(b) Fruits & Vegetables	7.56	9.92	9.71	4.03	5.15	4.88
Others	17.09	17.58	15.93	9.11	9.12	8.00
All crops	187.47	192.74	198.97	100.00	100.00	100.00

Source: Land Use Statistics, Ministry of Agriculture, Government of India, New Delhi .

It is interesting to observe that despite slowdown in diversification towards horticultural crops after 2005-06, their output witnessed acceleration in growth. Also, growth rate witnessed in horticulture groups was for higher than the other groups and total crop sector (Table 2). Growth rate in horticulture crops after 2005-06 was almost double the growth rate in non- horticultural crops despite the fact that area under horticulture did not witness significant incrase whereas area under non horticulture crops increased by 3 per cent between 2010-11 and 2005-06.

TABLE 2— ALL INDIA CROP GROUPS WISE GROWTH IN PRODUCTION (Per cent)

Crop group	1985-86 to 1995-96	1995-97 to 2005-06	2005-06 to 2010-11
Cereals	3.00	0.46	1.99
Pulses	0.70	0.25	3.75
Oilseeds	6.97	0.53	1.34
Sugarcane	4.43	-1.30	1.22
Cotton	6.08	1.55	5.95
Horticulture	3.33	3.52	5.14
(a) Fruits & Vegetables	3.26	3.35	5.03
(b) Condiments & Spices	3.89	4.84	5.92
All crops	2.98	1.92	2.82

Source: National Account Statistics, Central Statistical Organization Government of India, New Delhi (various issues).

It was further explored whether high growth in production of horticultural crops was due to changes in productivity of these crops. It is interesting to observe from table 3 that production differentials between horticulture and non-horticulture crops have remained very high and are the main factors for diversification towards horticulture. Average productivity in India at 2004-05 prices was close to Rs. 20 thousand per hectare in year 1995-96. It increased to Rs. 25 thousand in year 2005-06 and Rs. 29 thousand in year 2010-11, at 2004-05 prices. Compared to this productivity of horticulture group was Rs. 89 thousand in 1995-96, Rs. 108 thousand in year 2005-06 and Rs. 138 thousand in year 2010-11. The productivity differential between horticulture and other crops increased considerably after 2005-06. This has been the driver of diversification towards horticulture and also for horticulture led agriculture growth.

TABLE 3— ALL INDIA PRODUCTIVITY OF VARIOUS CROP GROUPS (Rs./Ha)

Crop group	At 2004-05			At current prices
	1995-96	2005-06	2010-11	2010-11
Cereals	13194	14623	16557	29471
Pulses	7763	9212	9958	19209
Oilseeds	16342	18945	22128	36807
Sugarcane	80854	74420	75344	140045
Cotton	15117	21793	25110	57713
Horticulture	88694	108118	137833	166816
(a) Fruits & Vegetables	106786	123002	161865	168725
(b) Condiments & Spices	37351	57150	67332	157156
All crops	19976	25142	28956	52867

Source: Same as in Table 2

High growth rate during the last two decades raised the share of horticulture crops in total crop output significantly. It is noted here the share of cereals and pulses is declining over time whereas the share of horticulture group has increased in a big way between 1985-86 and 2010- 11. The share was around 22 per cent during pre-liberalization period and it increased to around 28 per cent during recent years. The share of fruits and vegetables was 19.3 per cent in the year 1985-86 which rose to 25.4 per cent in the year 2005-06 (Table 4). As shares are estimated at current prices therefore some changes are mere result of price change not captured by growth rate data.

TABLE 4— ALL INDIA CROP GROUPS SHARE IN PRODUCTION AT CURRENT PRICES (Per Cent)

Crop group	At 2004-05			At current prices
	1995-96	2005-06	2010-11	2010-11
Cereals	37.09	33.62	29.69	28.56
Pulses	6.59	5.56	4.69	4.82
Oilseeds	9.87	11.07	9.70	9.52
Sugarcane	4.60	5.22	6.65	6.50
Cotton	3.04	5.14	3.61	6.17
Horticulture	21.96	22.97	28.81	28.26
(a) Fruits & Vegetables	19.31	19.81	25.39	23.86
(b) Condiments & Spices	2.65	3.16	3.42	4.39
All crops	100.00	100.00	100.00	100.00

Source: Same as in Table 2

Price Trends

Price movement in different crop groups during last 10 years with base 2004-05 = 100 are presented in Table 5. The table shows that prices of horticultural crops increased by 22 percentage points during 2000-01 to 2004-05 which is much larger than price increase for crop sector as a whole, which was only 17 percentage points. Even after 2004-05, horticulture crops and its sub-components like fruits, vegetables and condiments and spices followed much higher increase in prices compared to total crop sector. Except pulses and cotton all other crops/groups registered lower increase in prices compared to horticulture group. Relatively higher increase in prices of horticultural crops compared to non-horticulture crops despite much higher increase in output of former compared to latter is strong evidence of demand shifts towards horticultural crops.

TABLE 5—ALL INDIA CROP GROUP WISE MOVEMENT OF RELATIVE PRICES AT 2004-05 PRICES

Crop group	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Cereals	97.25	95.62	97.53	99.10	100.00	105.99	116.74	127.86	143.09	161.18	169.67
Pulses	102.98	108.49	103.56	101.26	100.00	113.34	149.18	144.93	155.84	190.76	196.86
Oilseeds	71.52	76.11	88.61	98.34	100.00	90.36	94.49	113.22	131.17	134.97	141.33
Sugarcane	75.74	81.86	88.20	96.50	100.00	100.15	100.92	101.66	10 1.30	106.55	156.44
Cotton	94.99	89.79	85.81	109.06	100.00	90.18	96.63	111.80	141.19	138.55	199.32
Horticulture	78.35	92.51	93.14	95.79	100.00	108.00	111.78	124.63	134.86	147.76	172.05
Condiments & Spices &	107.66	100.00	103.14	108.98	100.00	94.54	136.71	142.93	151.24	182.68	243.98
Fruits	76.15	86.85	91.66	97.39	100.00	103.27	109.68	114.38	129.08	136.17	163.17
Vegetables	81.47	100.35	95.21	93.57	100.00	113.71	114.28	137.07	141.89	161.80	182.83
All Crops	83.13	86.12	89.05	93.91	100.00	104.47	111.35	116.63	126.02	130.81	143.32

Source: Ministry of Commerce and Industry, Government of India, New Delhi

State wise Picture of Horticulture Diversification

Diversification in favor of horticulture at state level and relative importance of different states in all India area and production of horticulture are presented in Table 6. Kerala tops and Odisha comes second in terms of diversification towards horticulture. The least diversified state in horticulture is Rajasthan. Though there is lot of importance given to arid horticulture but its impact on ground is not visible. Again, except Rajasthan horticultural crops constitute more than 10 per cent value of crop output. Due to variation in composition of horticulture and large differences in prices of different horticultural crops, share of horticulture in value of crop sector shows different patterns as compared to the pattern observed in area share. For instance, horticulture occupies 7.6 and 11.8 per cent share in area in Jammu & Kashmir and Himachal Pradesh, respectively, and contributes 67 percent of crop output. In Kerala, horticulture occupy 17.4 percent area but contribute only 21.5 per cent of crop output.

North Western plains and central region of the Country require more emphasis on horticulture in terms of diversification. Horticulture covers more than half of crop economy of Himachal Pradesh, Jarnmu and Kashmir, Jharkhand and West Bengal. Horticulture is also quite significant in Odisha, Uttarakhand, Bihar and Chhattisgarh. Productivity differentials between horticulture and other crops are more pronounced at state level. This is evident from divergence between area shares and value shares of horticulture in total crop sector. In some of the states like Haryana and Madhya Pradesh horticulture occupy less than 1.5 per cent area but accounts for more than 10 per cent of value of crop output.

TABLE 6— SHARE OF FRUITS AND VEGETABLES IN AREA AND OUTPUT OF CROP SECTOR IN MAJOR STATES FOR THE YEAR 2010-11 (Per cent)

State	Share in state		Share in All India	
	Area	VCO	Area	VCO
Andhra Pradesh	7.17	27.53	10.72	8.57
Assam	10.58	35.02	4.53	2.50
Bihar	6.03	43.63	4.47	3.14
Chhattisgarh	2.26	39.85	1.32	2.22
Gujarat	3.70	18.35	4.66	6.97
Haryana	1.12	10.89	0.75	3.75
Himachal Pradesh	11.80	66.98	1.15	0.99
Jammu & Kashmir	7.63	66.88	0.90	1.15
Jharkhand	7.45	57.30	0.96	1.20
Kamataka	5.02	29.41	6.75	7.21
Kerala	17.42	21.50	4.75	2.19
Madhya Pradesh	1.41	16.06	3.19	6.40
Maharashtra	5.36	23.70	13.27	11.21
Odisha	16.11	48.10	5.87	3.35
Punjab	2.18	11.59	1.77	5.18
Rajasthan	0.67	3.98	1.80	5.93
Tamil Nadu	10.71	35.00	6.34	4.14
Uttar Pradesh	4.33	20.61	11.31	14.19
Uttarakhand	4.02	40.50	0.48	0.78
West Bengal	16.10	52.89	15.85	7.48
All India	4.88	27.28	100.00	100.00

Source: Same as in Table 1.

Another way to look at importance of states in horticulture is their share in all India area and production. Four states of the Country namely West Bengal, Maharashtra, Uttar Pradesh and Andhra Pradesh account for 50 per cent of area and over 40 per cent output in value terms. Higher share of a state in all India output relative to area share indicate higher productivity of horticulture in that state. It is observed that horticulture productivity is relatively lower in states with relatively large share in area except Uttar Pradesh.

Consumption pattern

Trend in consumer expenditure on fruits and vegetables is presented in Table 7. It shows that expenditure on fruits and vegetables increased at a faster rate than the increase in total food expenditure. In year 1993-94, in rural areas, 12.32 per cent of total food spending was on fruits and vegetables. This share increased to 14.47 in year 2004-05 and 14.50 during 2009-10. Similarly, in urban areas fruits and vegetables constituted 14.86 per cent share in total food expenditure in year 1993-94 which increased to 15.67 per cent in year 2009-10. These changes in consumption expenditure reveals rising preference towards horticultural products.

TABLE 7—SHARE OF MONTHLY PER CAPITA EXPENDITURE OF FRUITS AND VEGETABLES

Particulars	Year	Rural	Urban
Per capita expenditure (Rs.)			
Total Food	1993-94	177.80	250.30
	2004-05	307.60	447.40
	2009-10	497.09	727.49
Fruits and Vegetables	1993-94	21.90	37.20
	2004-05	44.50	70.50
	2009-10	72.08	114.03
Share of fruits and Vegetables in total food expenditure (Per cent)	1993-94	12.32	14.86
	2004-05	14.47	15.76
	2009-10	14.50	15.67

Source **:** NSSO Report No. 509 and 538 : Household Consumption of various Goods and Services in India, 2004-05;Level of Pattern of Consumption Expenditure, 2009-10

Trade in Horticulture

India is believed to have great potential for export of fruits and vegetables. The export of fresh fruits during 2001-02 to 2011-12 increased from US $ 85 million to US $ 528 million. Export of vegetables in the same period increased from US $ 120 million to over US $ 600 million (Table 8). Export of fruits and vegetables put together increased five times in the last 10 years. Simultaneously, imports of fruits into the country have also witnessed steep increase. India's import of fruits and nuts excluding cashew nuts increased fromUS $ 159 million in 2001-02 to US $ 943 million. The export of total fresh fruits and vegetables has witnessed annual growth of 20 per cent during the last decade in US $ terms. Imports of fruits and vegetables in the same period have increased by close to 22 per cent. The trade in horticulture show that imports of fruits into the country have ruled higher than exports of fruits from India. It is also observed that import of fruits increased at a much faster rate than export of fruits after 2003-04. Despite 5 per cent growth in domestic production, import of fruits has risen faster than export which is a clear pointer to the vast scope of demand for fruits in India. Similarly, overseas demand has also been rising by close to 20 per cent per year. Thus, both, domestic as well as overseas demand strongly favors diversification towards horticulture in the country (Chandet al., 2008).

TABLE 8- TRADE IN IMPORTANT HORTICULTURAL PRODUCTS (US $ MILLION)

	Import		Export	
Year	Fruits and nuts excluding cashew nut	Fresh Fruits	Fresh Vegetables	Total fruits and Vegetables
2001-02	159.00	84.98	120.27	205.25
2002-03	132.61	92.43	132.82	225.25
2003-04	174.59	170.62	207.59	378.21
2004-05	245.00	192.07	192.07	384.13
2005-06	314.03	253.13	207.76	460.89
2006-07	422.46	312.24	341.51	653.75
2007-08	461.59	359.30	367.08	726.38
2008-09	515.92	422.94	533.59	956.53 .
2009-10	605.93	478.54	620.40	1098.93
2010-11	797.91	477.02	558.59	1035.61
2011-12	942.97	528.08	603.21	1131.29
Growth rate 2001-02 to 2011-12 (%/year)	21.79	20.73	19.62	20.07

Source: Computed from various Issues of Agncultural Statistics at a Glance, Ministry of Agriculture, Government of India, New Delhi

Conclusions

Indian agriculture is diversifying towards horticultural crops but at a slow rate. The pace of diversification slow down after 2005-06 as Government initiatives like National Food Security Mission and other public policies strongly pushed cultivation of pulses and cereals during 11th five year plan. Despite stagnation in area' after 2005-06 growth rate in production of fruits and vegetables and condiment and spices witnessed sharp acceleration. Annual growth rate in horticulture output showed twice the growth rate of non-horticultural crops. This could happen due to very high differentials in productivity of horticulture crops relative to non-horticultural crops and strong demand for the former. It is evident from price trend that prospects of demand lead growth of horticultural crops are very high. Despite double the growth rate in output horticulture group witnessed much higher increase in prices compared to non-horticultural crops. High potential for expansion of horticulture particularly fruits is evident from a very sharp increase in their imports. Similarly, overseas demand for horticulture exports also shows spectacular growth. Both domestic as well as overseas demand strongly favors diversification towards horticulture in India.

Area under horticulture in some states is awfully low- less than 1.5 per cent. A small shift in crop pattern towards horticulture crops will bring large increase in production which will contribute to increase in agriculture productivity and higher growth in output.

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Production, Employment, Marketing and on Farm Processing

A Case of Selected Horticultural Crops in Karnataka

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Abstract

Using field survey data of 212 horticultural farmers drawn from four districts in Karnataka, this paper looks into the economics of production and resources use as well as marketing and on farm processing of horticultural crops. The selected horticultural crops include, grapes, pomegranate, flowers and aromatic and medicinal plants. The economics of production indicates that except medicinal and aromatic crops, profitability from the horticultural crops was higher compared to profitability from the foodgrains and other oilseed and commercial crops. Similarly, comparing horticulture with traditional crops, the total numbers of days of employment generated per acre was much higher from the former compared to the latter. Thus, horticultural crops had advantage over traditional food crops not only in terms of higher productivity, value addition' and net profitability but they also provided better employment to the households in comparison to all other crops grown on the field. The market for horticultural crops in Karnataka was not well established and the farmers depended in many cases on merchants and intermediaries who were exploitative in nature. The horticultural crops were mostly sold without indulging into any processing except the case of grapes where few farmers were found undertaking some processing at the field level. The infrastructure especially that of post harvest management was found lacking in the state although some attempts were made in that direction .

1. Introduction :

Agriculture has remained the backbone of Karnataka and is still the mainstay of the state economy. The agriculture and allied sectors' contribution to Karnataka's GSDP was around 43 percent in 1980-81 which came down to 26 percent in 2001-02 and 14.5 percent in 2008- 09. Despite the declining share of primary sector in GSDP, agriculture remains the primary activity and main livelihood source for the rural population in the state. Agriculture is highly dependent on the vagaries of the southwest monsoon as out of the net area sown, only 25 per cent is irrigated. As per the land utilization statistics for 2008-09, out of total 1.90.5 lakh hectares geographical area of the state, total cropped area was 123.7 lakh hectares that was 64.9 percent of the total geographical area. The net area cropped constituted around 53 percent of the total geographical area and the fallow land was around 10.6 percent of the geographical area. Around 16 percent of the area was covered under forest. 7.2 percent land was under non agricultural uses, 4.1 percent land was barren and uncultivated and 2.2 percent land was cultivable waste. Permanent pastures, grazing land and miscellaneous tree crops constituted around 6.3 percent of the total geographical area of the state. There are no indications of any increase in cropping intensity in the state since the beginning of the decade and the recorded cropping intensity in 2008-09 was 121.6[1].

The topography, soil and climate immensely support the agricultural activities in the state. Agriculture is considered to be one of the primary occupations for the inhabitants of Karnataka. The state also has high potential for horticultural crops and the state ranks fourth in area under horticultural crops. Horticulture generates 40 percent of the total income of the state. Horticulture has taken a front line position in Karnataka agriculture and the sector is growing at a rapid pace. As a result, there is an increasing trend in the area under horticulture crops. During the year 2008-09 an area of 18.00 lakh hectares was covered by horticultural crops and production was 136.38 lakh tonnes. Karnataka stands fourth in area and fifth in production of horticultural crops in India. The state has 8.4 percent share of area under horticultural crops and produces 6.8 percent of total output of horticultural crops in the country. There are a number of horticultural crops grown in the state including fruits, vegetables, plantation, flowers and aromatic and medicinal plants. The state is preparing strategies to ensue more flexibility and advancement in

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1 Economic Survey of Karnataka 20 I 0-11, Government of Karnataka, Bengaluru.

cultivating various fruits, vegetables and other horticultural crops which is adding value to Karnataka's economy to a great extent.

This paper presents economics of production, employment and marketing of selected horticultural crops in the state based on primary survey data drawn from four districts in Karnataka. The paper is organised in the following way: Section two presents data base followed by a section on demographic profile of the selected households. Section four presents economics of production and resource use efficiency. Section five is mainly concentrated on labour use in horticultural crops. Section six presents marketing channels followed by the selected farmers and section seven puts forth aspects of on farm processing in selected horticultural crops. Last section presents the conclusions and policy prescriptions.

2. Data Base

In order to work out economics of production of horticultural crops at the household level, a household survey was carried out among a selected number of households. For this study, we selected four main crops namely, grapes, pomegranate, flowers and aromatic-medicinal plants. Four districts were selected for the detailed primary survey. These districts are Bijapur, Bagalkot, Bangalore Rural and Tumkur. From each districts, two villages were selected, keeping into account the cropping pattern in each of these districts taking one village near the periphery of district headquarters or accessible mandi/ market and one village from a distant place to realize' the effect of distance factor in the findings. For the selected districts, a list of total number of horticultural farmers was obtained from the concerned district/block level authorities. From each selected village, 25 horticultural farmers were selected using random' sampling method for detailed household survey. In this way, a total number of 212 horticultural. farmers were surveyed in details. While selecting the sample care was taken to represent 'all the section of the society such as small and marginal farmers, SC/ST farmers and women folk. The detail of selected districts and farmers is given in Annex. Table lA. The reference period for the selected sample was 2008-09 while survey was carried out in March-April 2010. Our analysis in this paper would be classified into farm size categories, viz., marginal farmers, small farmers, medium farmers, large farmers and aggregate of all classes. The households from all the four districts are clubbed together and analysis is done for individual crops and crop groups.

3. Demographic Profile of Selected Households

Table 1 presents demographic profile of the selected households. All households have been clubbed together and analysis is done across various operational categories. Out of the selected 212 households, 59 were marginal farmers with operational holdings between 0.00 to 2.50, acres; 63 were small farmers with operational area between 2.50 to 5.00 acres; 35 were medium farmers operating between 5.01 to 10.00 acres and rest, 55 were large farmers operating above 10.00 acres of land. The categorization was done on the basis of operational holdings rather than ownership holdings. On an average, household size (number of members per family) was 6.9 members and it was lowest (5.4) among the marginal farmers and highest 9.2 among the large farmers. There was a clear positive relation between the family size and holding size as families were nuclear at the lower holding size (marginal and small) while medium and large farmers were mostly combined families. Similar to household size, number of earning members in the family also had a direct relationship with the holding size. The average numbers of earners were 2.7 and 2.9 among marginal and small holding size and increased to 3.3 and 4.2 in the case of medium and large farmers.

The gender characteristics were same among all size of holdings. On average, the percentage of male was 54 and percentage of female was 46 while 2/3rd members of the family were in the working age and rest were children below 16 years and senior citizens (above 60 years). On the educational status, more than 1/5th households were illiterate and another 1/5th households were literate up to primary level, while half of the selected farmers were educated up to secondary' level. Only 5 percent members were educated up to graduate level and only 1 percent were educated above graduate. Across farm size holdings, there was no significant difference in terms of education standards. Looking at the socio characteristics of the selected households, majority of the farmers belonged to the Backward Castes (OBC) 1/4th were from the General Category and only 6 percent belonged to Scheduled Castes and 1 percent that of Scheduled Tribes. More than 80 percent occupation of the selected households belonged to farming alone. The other activities like self business, regular salary and daily wage earnings occupied around 5 percent, each in the total occupation. The proportion of wage earning was highest (13 percent) among marginal farmers and small farmers (7.6 percent) while it was almost negligible among large (2.7 percent) farmers. On the opposite, proportion of salaries and self business was higher among large farmers (around 7 percent, each) as compared to marginal farmers (around 4 percent, each).

Table 1: Demo Graphic Profile Of The Selected Farmers (% of households)

Characteristics		Marginal	Small	Medium	Large	Total
No of HH		59	63	35	55	212
Household size (numbers)		5.44	5.56	8.31	9.22	6.93
Average numbers of earners		2.73	2.87	3.31	4.16	3.24
Gender (% of	Male	52.02	56.29	51.89	55.03	54.05
members)	Female	47.98	43.71	48.11	44.97	45.95
Age group of	<16	23.70	19.79	23.64	25.97	23.51
the members	16-60	67.05	70.31	66.45	65.86	67.32
(%)	>60	9.25	9.90	9.90	8.16	9.17
Identity of	Head	61.02	74.60	74.29	81.82	72.64
respondent (%)	Others	38.98	25.40	25.71	18.18	27.36
Education	Illiterate	25.87	21.70	20.08	19.24	21.46
status of the	Up to primary	22.73	22.96	22.49	17.23	20.85
members (%)	Up to secondary	48.24	52.52	50.20	53.24	51.39
	Up to graduate	1.75	2.83	6.43	8.50	5.23
	Above graduate	1.40	0.00	0.80	1.79	1.08
Caste (% of	SC	6.78	4.76	8.57	7.27	6.60
households)	ST	0.00	4.76	0.00	0.00	1.42
	OBC	72.88	68.25	62.86	65.45	67.92
	General	20.34	22.22	28.57	27.27	24.06
Decision maker	Male	93.22	95.24	100.00	98.18	96.23
(% of hh)	Female	6.78	4.76	0.00	1.82	3.77
Main	Farming	79.08	86.55	86.84	83.33	83.79
occupation	Self business	4.58	1.17	3.51	6.76	4.24
(% of working	Salaried/pensioners	3.27	4.68	5.26	7.21	5.30
members)	Wage earners	13.07	7.60	4.39	2.70	6.67
Involved in migration during year 2009 (% of members)		0.35	0.31	0.00	2.68	1.08

Source: Own Field Survey

4. Economics of Production, Cost and Resource Use

This section presents economics of production, cost and resource use for the four selected crops of grapes, pomegranate, flower and aromatic & medicinal plants based on the primary survey of 212 beneficiary farmers in Karnataka. The four selected districts were Bijapur, Bagalkot, Bangalore Rural and Tumkur. Fruits and vegetables constituted around 27 percent of the total crop area and floriculture and medicinal (and aromatic) crops shared around 7 percent of the gross cropped area by the selected farmers.

Table 2a presents net returns per acre realized by the selected farmers growing grapes crop. Per household area planted under grapes by marginal farmers was miniscule as only one farmer cultivated grapes crop. Among small farmers, area planted was less than half acre and only 9 farmers were growing grapes. Per household area under grapes in the case of medium and large farmers was 1.6 and 2.6 acres. Around 17 medium and 30 large farmers cultivated grapes crop. The output produced per acre averaged at 55 quintals and it varied between 50 to 58 quintals per' acre among different farm size classes. The average revenue earned per acre was ₹. 92 thousand that varied from ₹. 98 thousand in the case of large farmers to ₹. 65 thousand in the case of marginal farmers.

The cost incurred consists of two components, fixed cost and variable cost. The fixed cost of perennial crops consists of initial planting and gestation period cost. The variable cost is the running cost every year at the time of plant bearing fruit[2]. The major components of variable costs in grapes were topping and pruning, manure and fertilizer and harvesting and collection. Out of total cost,

[2] For details on cost of cultivation among perennial crops see, Gupta and George (1974), Subrahrnanyarn and' Mohandoss (1982), Misra (1992), Sarma (1996) and Sharma et. al. 200 I.

variable cost consisted 84 percent and fixed cost (amortized into the life period of the plant[3]) was 16 percent. On average, total variable cost was measured at ₹. 55 thousand out of which ₹. 24 thousand was for the labour cost (44 percent) and rest of ₹. 31 thousand (56 percent) was for the material cost. Fixed cost including planting material, field preparation and supporting material as well as the labour cost amortized over the life period of the plant (15 years in the case of grapes) was measured at ₹. 11 thousand. Thus, overall cost of cultivation of grapes was measured at ₹. 66 thousand per acre.

Across various farm size categories, marginal farmers incurred higher amount on transportation and packing as they had to hire transportation, whereas large and medium farmers had better availability of these sources. Large and medium farmers, on other hand, incurred higher amount on chemical fertilizers and topping and pruning. Marginal farmers also bore higher fixed cost as compared to large farmers. Total cost per acre was highest, ₹. 94 thousand for the small farmers; ₹. 73 thousand for medium farmers, ₹. 60 thousand for large farmers and lowest, ₹. 55 thousand for the marginal farmers. Thus, it is difficult to conclude any specific category of farmers having advantage in cultivation of grapes over the other categories.

Looking at the profitability per acre, total revenue obtained by the farmers by selling their crop exceeded total variable cost among all categories of farmers without any exception. However, if one adds up the fixed cost also, the total cost exceeded total revenue in the case of small farmers and the latter were in net loss of ₹. 8.8 thousand per acre. All other categories of farmers were able to recover their fixed as well as variable costs and had overall profitability in growing grapes. Per acre net profits (over total cost) varied from ₹. 7 thousand for medium farmers, ₹. 10 thousand marginal farmers and ₹. 38 thousand for large farmers. Overall profit per acre was measured at ₹. 26 thousand. Thus, profit on grapes far exceeded profit obtained from the field crops like cereals, pulses, oilseeds and most of the other commercial field crops[4], It is, however, noted here that although cost includes depreciation, interest on working capital as well as imputed family labour cost but it does not include imputed value of owned land cultivated by the farmers.

In the case of pomegranate, area cultivated per household was 0.07 acres by the marginal farmers less than half acre by the small farmers and slightly above 1 acre by the medium and large farmers, respectively. Around 4 marginal farmers, 18 small farmers, 12 medium farmers and 15 large farmers cultivated pomegranates during the reference year. The yield obtained by the farmers quite fluctuated over time and across different farm size holdings. On average,' productivity of pomegranate was found 16 quintals per acre for the selected farmers during the reference year[5]. Like grapes, cost of pomegranates was also found highest for topping and pruning, followed by cost of manure and fertilizer and the same was true not only for the large farmers but also for the marginal and small farmers (Table 2b). The total variable cost per acre was found ₹. 26 thousand with labour component consisting of ₹. 12 thousand (47 percent) and material cost accounting for ₹. 21 thousand (53 percent).

The variable cost was highest, ₹. 48.5 thousand for marginal farmers followed by ₹. 32 thousand for large farmers, ₹. 23 thousand for medium farmers and ₹. 22.5 thousand for the small farmers. The fixed cost amortized over a period of 30 years in the case of pomegranates was measured at ₹. 4 thousand for the reference period. Thus, total cost per acre, on an average, was observed at ₹. 30 thousand. Total revenue exceeded total variable as well as fixed cost for all category of farmers except small farmers who incurred a loss of ₹. 4 thousand over variable cost and ₹. 7 thousand over variable plus fixed cost. Thus, small farmers were not able to recover even their variable cost while they survived on the family labour working on the field. The net profitability defined as revenue minus total cost was measured at ₹. 13.5 thousand per acre from pomegranate' and it varied from ₹. 23 thousand for large farmers to ₹. 13 thousand for marginal farmers and ₹. 5 thousand for the medium farmers. Like grapes, even in the case of pomegranate, overall profitability was better than the traditional field crops of cereals, pulses and oilseeds.

Among our selected horticultural crops, marginal and small farmers preferred growing flowers and aromatic crops as these crops hardly had any gestation period and

[3] Following Subrahmanyam and Mohandoss (1982) annual amortization method given below was used for calculating annual value of fixed cost:-

$$P = B \frac{i}{1-(1+i)^{-n}}$$

Where P = is the amount of annual payment

B = is the initial amount

n = is number of years (life period of plantation)

i = is the interest or discount rate (10% in the present case)

[4] This observation is based on returns obtained by the sample farmers from other field crops they had grown while' the data is not presented in the text keeping the overall objective of the paper into account.

[5] However, the productivity was low during the year 2008. Average productivity of the selected households was highest 26 quintals during the year 2006-07 and it fluctuated between 10 to 26 quintals during the last five years.

these crops were more labour intensive. In comparison, grapes and pomegranate had much higher gestation period, had longer bearing life time and required much larger capital investment. The area planted per household of flower crops was measured at 0.42 acres by the marginal farmers, much higher compared to their area under grapes and pomegranate. Among other categories, area cultivated per household was 0.33 acres by the small farmers, only 0.19 acres by the medium farmers and 0.38 acres by the large farmers while the last two categories had much lower area under flowers compared to their area under grapes and pomegranates.

TABLE 2a: NET RETURNS PER ACRE FROM. HORTICULTURAL CROPS - **Grapes**

(Rs. per acre)

Farm Size	Marginal	Small	Medium	Large	Total
Preparatory tillage	0	0	36	126	91
	(0.0)	(0.0)	(0.0)	(0.2)	(0.1)
Manure & fertilizer	0	8980	6638	7242	7143
	(0.0)	(9.5)	(9.1)	(12.1)	(10.8)
Transplanting & gap filling	0	0	181	49	77
	(0.0)	(00)	(0.2)	(0 I)	(0 1)
Irrigation, canal, electricity and diesel	0	9136	3291	670	2052
	(0.0)	(9.7)	(4.5)	(1.1)	(3.1)
Weeding and Inter cultural operations	0	0	0	559	363
	(0.0)	(0.0)	(0.0)	(0.9)	(0.5)
Topping / pruning	1667	14148	21938	9043	12612
	(3.0)	(15.0)	(30.1)	(15.1)	(19.1)
Plant protection, pesticides etc.	0	0	181	0	45
	(0.0)	(0.0)	(0.2)	(0.0)	(0.1)
Repair, maintenance and depreciation@	315	527	998	282	444
	(0.6)	(0.6)	(1.4)	(0.5)	(0.7)
Harvesting and collection	0	10442	0	6634	5215
	(0.0)	(11.1)	(0.0)	(11.1)	(7.9)
Grading, storage, transport, packing	15000	2287	4747	1372	2481
	(27.3)	(2.4)	(6.5)	(2.3)	(3.8)
Market/mandi fee etc.	0	731	408	56	202
	(0.0)	(0.8)	(0.6)	(0.1)	(0.3)
Interest on Working Capital#	136	279	648	212	283
	(0.2)	(0.3)	(0.9)	(0.4)	(0.4)
Variable labour cost	20833	35126	22205	23562	24190
	(38.0)	(37.3)	(30.5)	(393)	(36.6)
Total Variable Cost	37951	81655	61271	49806	55197
	(69.2)	(86.7)	(84.0)	(83.0)	(83.6)
Fixed cost including planting material, field preparation cost,supporting material and irrigation setup including material and labour (Amortized over the life time)##	16910 (30.8)	12521 (13.3)	11650 (16.0)	10170 (17.0)	10836 (16.4)
Total Cost	54861	94176	72922	59976	66033
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
Yield rate (quintals per acre)	50.00	50.93	51.04	57.65	55.34
Total Revenue	65000	85305	79902	98317	92261
Total Revenue - Total Cost	10139	-8871	6980	38341	26227
Total Revenue - Variable Cost	27049	3650	18631	48512	37064

Source: Own Field Survey

Note : All variable cost items consist of two components, namely material cost and labour cost

@ Repair, maintenance and depreciation is 10% discounted value of agricultural assets holdings including tractor & implements and tubewell motor etc. that is divided in proportionate to each crop sown during the year.

Interest on working capital is interest paid on the loans/borrowing divided in proportionate to each crop sown during the yer

Life time for grapes was considered 15 years

TABLE 2b: NET RETURNS PER ACRE FROM. HORTICULTURAL CROPS - **POMEGRANATES**

(Rs. per acre)

Farm Size	Marginal	Small	Medium	Large	Total
Preparatory tillage	0	0	0	30	9
	(0.0)	(0.0)	(0.0)	(0.1)	(0.0)
Manure & fertilizer	6725	2800	3268	3912	3440
	(12.4)	(11.0)	(12.6)	(9.9)	(11.5)
Transplanting & gap filling	0	86	0	0	24
	(0.0)	(0.3)	(0.0)	(0.0)	(0.1)
Irrigation, canal, electricity and diesel	900	1477	249	589	714
	(1.7)	(5.8)	(1.0)	(1.5)	(2.4)
Weeding and Inter cultural operations	0	429	0	423	252
	(0.0)	(1.7)	(0.0)	(1.1)	(0.8)
Topping / pruning	15667	35.21	4899	8746	6034
	(29.0)	(13.8)	(18.9)	(22.1)	(20.2)
Plant protection, pesticides etc.	0	55	150	151	120
	(0.0)	(0.2)	(0.6)	(0.4)	(0.4)
Repair, maintenance and depreciation@	630	1600	1452	130	424
	(1.2)	(6.3)	(5.6)	(0.3)	(1.4)
Harvesting and collection	0	1374	0	2341	1116
	(0.0)	(5.4)	(0.0)	(5.9)	(3.7)
Grading, storage, transport, packing	763	598	1453	1495	1210
	(1.4)	(2.3)	;(5.6)	(3.8)	(4.0)
Market/mandi fee etc.	17	240	199	45	157
	(0.0)	(0.9)	(0.8)	(0.1)	(0.5)
Interest on Working Capital#	272	848	943	98	270
	(0.5)	(3.3)	(3.6)	(0.2)	(0.9)
Variable labour cost	23593	9534	10645	14937	12055
	(43.6)	(37.3)	(41.1)	(37.7)	(40.3)
Total Variable Cost	48567	22563	23257	32899	25824
	(89.8)	(88.3)	(89.7)	(83.0)	(86.2)
Fixed cost including planting material, field preparation cost, supporting material and irrigation setup including material and labour (Amortized over the life time)##	5540 (10.2)	3000 (11.7)	2672 (10.3)	6723 (17.0)	4117 (13.8)
Total Cost	54107	25563	25929	39622	29942
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
Yield rate (quintals per acre)	29.50	11.63	21.69	12.81	15.79
Total Revenue	62000	18251	28247	55988	39356
Total Revenue - Total Cost	7893	-7311	2318	16366	9414
Total Revenue - Variable Cost	13433	-4311	4990	23089	13532

Source: Own Field Survey

Note : All variable cost items consist of two components, namely material cost and labour cost

@ Repair, maintenance and depreciation is 10% discounted value of agricultural assets holdings including tractor & implements and tubewell motor etc. that is divided in proportionate to each crop sown during the year.

Interest on working capital is interest paid on the loans/borrowing divided in proportionate to each crop sown during the year

. ## Life time for Pomegranates was considered 30 years

TABLE 2C: NET RETURNS PER ACRE FROM HORTICULTURAL CROPS - **FLOWERS**

Rs. per acre

Farm Size	Marginal	Small	Medium	Large	Total
Preparatory tillage	28	478	0	486	240
	(0.1)	(l.4)	(0.0)	(1.9)	(0.8)
Manure & fertilizer	2120	3286	5767	2967	2766
	(6.5)	(9.8)	(9.8)	11.3)	(9.4)
Transplanting & gap filling	34	341	588	2402	694
	(0.1)	(1.0)	(1.0)	(9.2)	(2.3)
Irrigation, canal, electricity and diesel	2923	146	0	0	1446
	(9.0)	(0.4)	(0.0)	(0.0)	(4.9)
Weeding and Inter cultural operations	0	98	0	0	23
	(0.0)	(0.3)	(0.0)	(0.0)	(0.1)
Topping / pruning	1741	2376	10588	4776	3033
	(5.3)	(7.1)	(18.0)	(18.2)	(l0.3)
Plant protection, pesticides etc.	82	0	0	0	40
	(0.3)	(0.0)	(0.0)	(0.0)	(0.1)
Repair, maintenance and depreciation@	4493	564	77	41	178
	(13.8)	(1.7)	(0.1)	(0.2)	(0.6)
Harvesting and collection	948	3893	0	0	1360
	(2.9)	(11.6)	(0.0)	(0.0)	(4.6)
Grading, storage, transport, packing	654	778	71	1095	759
	(2.0)	(2.3)	(0.1)	(4.2)	(2.6)
Marketlmandi fee etc.	461	668	588	1095	665
	(l.4)	(2.0)	(1.0)	(4.2)	(2.3)
Miscellaneous	7	0	0	0	4
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Interest on Working Capital#	1938	299	50	31	114
	(5.9)	(0.9)	(0.1)	(0.1)	(0.4)
Variable labour cost	11124	12870	23332	9242	11668
	(34.1)	(38.2)	(39.6)	(35.3)	(39.5)
Total Variable Cost	26551	25795	41061	22i36	‘22987
	(81.4)	. (76.6)	(69.7)	(84.5)	(77.8)
Fixed cost including planting material, field preparation cost, supporting material and irrigation setup including material and labour (Amortized over the life time)##	6067 (18.6)	7888 (23.4)	17824 (30.3)	4052 (15.5)	6575 (22.2)
Total Cost	32618	33683	58885	26188	29562
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
Yield rate (quintals per acre)	12.90	11.21	28.24	27.24	17.65
Total Revenue	50302	28530	55882	53405	45292
Total Revenue - Total Cost	17684	-5153	-3002	27217	15730
Total Revenue - Variable Cost	23751	2735	14821	31269	22305

Source: Own FIeld Survey.

Note : All variable cost items consist of two components, namely material cost and labour cost.

@ Repair, maintenance and depreciation is 10% discounted value of agricultural assets holdings including tractor & implements and tubewell motor etc. that is divided in proportionate to each crop sown during the year.

interest on working capital is interest paid on the loans/borrowing divided in proportionate to each crop sown during the year .

Life time for flowers was considered 10 years.

Table 2d: NET RETURNS PER ACRE FROM. HORTICULTURAL CROPS - **Aromatic and medicinal plants**

(Rs. per acre)

Farm Size	Marginal	Small	Medium	Large	Total
Preparatory tillage	941	262	0	500	393
	(3.4)	(0.9)	(0.0)	(2.4)	(1.7)
Manure & fertilizer	3260	3945	251	4050	3046
	(11.6)	(14.0)	(1.5)	(19.4)	(12.8)
Transplanting & gap filling	1059	272	0	650	446
	(3.8)	(1.0)	(0.0)	(3.1)	(1.9)
Irrigation, canal, electricity and diesel	672	1188	0	0	652
	(2.4)	(4.2)	(0.0)	(0.0)	(2.7)
Weeding and Inter-cultural operations	0	0	0	0	0
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Topping / pruning	1748	2183	861	1200	1668
	(6.2)	(7.7)	(5.2)	(5.8)	(7.0)
Plant protection, pesticides etc.	0	0	0	0	0
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Repair, maintenance and depreciation@	1563	787	252	20	136
	(5.6)	(2.8)	(1.5)	(0.1)	(0.6)
Harvesting and collection	1	699	4665	6600	2239
	(0.0)	(2.5)	(28.4)	(31.7)	(9.4)
Grading, storage, transport, packing	34	224	280	0	160
	(0.1)	(0.8)	(1.7)	(0.0)	(0.7)
Marketlmandi fee etc.	0	14	0	0	6
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Interest on Working Capital#	674	417	164	15	86
	(2.4)	(1.5)	(1.0)	(0.1)	(0.4)
Variable labour cost	11983	10391	3039	4470	8345
	(42.7)	(36.7)	(18.5)	(21.4)	(35.1)
Total Variable Cost	21934	20382	9512	17504	17178
	(78.1)	(72.1)	(58.0)	(84.0)	(72.2)
Fixed cost including planting material, field preparation cost, supporting material and irrigation setup including material and Labour (Amortized over the life time)##	6139 (21.9)	7899 (27.9)	6895 (42.0)	3346 (16.0)	6628 (27.8)
Total Cost	28073	28281	16406	20850	23806
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
Yield rate (quintals per acre)	44.24	54.98	49.14	69:00	'53.47
Total Revenue	29546	31979	24191	22670	28429
Total Revenue - Total Cost	1473	3698	7784	1820	4622
Total Revenue - Variable Cost	7612	11597	14679	5166	11251

Source: Own Field Survey.

Note : All variable cost items consist of two components, namely material cost and labour cost.

@ Repair. maintenance and depreciation is 10% discounted value of agricultural assets holdings including tractor & implements and tubewell motor etc. that is divided in proportionate to each crop sown during the (------) year.

Interest on working capital is interest paid on the loans/borrowing divided in proportionate to each crop sown during the year .

. ## Life time for aromatic and medicinal plants was considered 5 years.

The realized yield of floriculture crops averaged at 18 quintals per acre and fluctuated widely among various farm size holdings. The realized yield was higher for medium and large farmers but much lower for the marginal and small farmers. A part of the reason in difference of productivity might be different varieties of flowers grown by these farmers. There were many different varieties and breed of flowers grown by the selected farmers. The major ones were rose, chrysanthemum, buttans, white lemon, sevanthi, kanakambaram (crossandra), jasmine (kakada), lily and marry-gold.

Among the cost components, manure and fertilizer, topping and pruning, harvesting, collection and transportation constituted the major cost among all size classes (Table 2c). Out of total variable cost, material and labour cost constituted almost same proportion. The total variable cost per acre was measured at 23 thousand out of which ₹11.7 thousand consisted of labour cost and rest ₹11.3 thousand was that of material cost. Thus, whereas labour cost was less than material cost in the case of grapes and pomegranates, the farmer exceeded the latter in the case of flowers, indicating that flowers were more labour intensive and thereby small and marginal farmers had comparative advantage over the large size holdings as was indicated above.

Total variable cost was highest ₹ 41 thousand for the medium farmers, ₹ 26 thousand for the marginal and small farmers and ₹ 22 thousand for the large farmers. The fixed cost amortized over the life span of 10 years, on average for all flower crops was measured at ₹ 6.5 thousand. The total revenue obtained by the farmers exceeded total variable cost among all categories of farmers in the case of flowers. However, when the fixed cost was added to the variable cost, small and medium farmers were found having ended up in net losses as their total cost exceeded total revenue. Realized profit over variable cost averaged at ₹ 22 thousand per acre that was highest at ₹ 31 thousand for large farmers and lowest at ₹ 2.7 thousand for the small farmers. The net profitability covering the fixed and variable cost together averaged at ₹ 15.7 thousand whereby only large and marginal farmers had positive profit amounting to ₹ 27 thousand and ₹ 17.7 thousand, respectively while small and medium farmers incurred losses amounting to ₹ 5 thousand and ₹ 3 thousand respectively. However, losses incurred by small and medium farmers during the reference period was over the fixed cost that is long run cost but they earned net profit over the variable cost which is the running cost and comparing their returns with the field crops, farmers growing flower crops were still better off compared to returns from the foodgrains and oilseeds.

The main medicinal/aromatic crops grown by the selected farmers included Sweet flag and Davana. Sweet flag is also known by its scientific name of acorus calamus. It is a perennial plant that grows in wetlands with aromatic leaves and roots used in medicines and as an alternative to ginger, cinnamon and nutmeg. It's been used as a stimulant, as a digestive aid and for fevers and coughs. The root is also chewed for toothache, and the powered roots inhaled to treat congestion. Davana known by its scientific name, artemisia pallens, is a native aromatic herb, grown mainly in Karnataka and some parts of Tamil Nadu and Maharashtra. Total area under this crop in Karnataka is 2000 hectares. Its foliage and floral tops produce a viscous essential oil, emitting a delicate, persistently fruity fragrance which is used in floral decorations, bouquets and cosmetics. On dilution, the oil imparts a sweet, refreshingly pleasant odor. It is also used in flavoring of cakes, pastries, beverages and tobacco products (Chadha 2001). Most of the oil produced in the country is exported to USA.

Like flowers, area cultivated of aromatic/medicinal crops was higher in the case of marginal and small farmers compared to medium and large farmers. Cultivated area per household was 0.25 and 0.45 acres respectively by marginal and small farmers compared to 0.40 and 0.18 acres by the medium and large farmers respectively. The numbers of farmers who cultivated aromatic/ medicinal crops were 12 marginal farmers, 18 small farmers, 8 medium farmers and 3 large farmers during the reference year. The yield rate of aromatic crops was around 53 quintals per acre that fluctuated from 69 quintals for large farmers, 55 quintals for small farmers, 49 quintals for medium farmers and 44 quintals for the marginal farmers. Manure and fertilizer, topping and pruning and harvesting and collection were the major running cost items.

In the total variable cost, material cost consisted of 65 per cent while share of labour cost was only 35 per cent (Table 2d). Variable cost averaged at ₹17 thousand and it was highest ₹ 22 thousand for marginal farmers and lowest ₹ 9.5 thousand for medium farmers. The fixed cost amortized over the life span of medicinal/aromatic crops of five years averaged at ₹ 6.6 thousand. The percentage of variable and fixed cost in the sum total cost was 72 and 28 respectively. Comparing cost and revenue per acre from aromatic/medicinal crops, revenue exceeded both variable as well as total (variable + fixed) cost across all holdings without any exception. The net profit over variable cost averaged at ₹11 thousand and net profit over total cost averaged at ₹ 4.6 thousand. The overall profit (over total cost) was highest ₹ 7.8 thousand for medium farmers followed by ₹ 3.7 thousand for small farmers, ₹1.8 thousand for large farmers and ₹ 1.5 thousand for the marginal farmers. Thus, all size classes growing aromatic and medicinal crops although observed net profits over and above the total cost, but the amount of profitability was less than the other three horticultural crops grown namely, grapes, pomegranate and flowers. The returns from medicinal and aromatic crops were not even better than the traditional field crops of foodgrains and oilseeds, although profitability was higher for the medicinal/aromatic crops if one doeś not account for the fixed cost which includes planting material and other long term investment.

5 Use of human labour in horticultural versus non horticultural crops

One of the objectives of promotion of Horticultunal is to create opportunities for employment generation for skilled and unskilled persons, especially unemployed youth in the villages in addition to enhancing horticultural production, improving nutritional security and providing income support to farm households. From the analysis done in the previous section it was seen that value of productivity as well as net returns were higher from the horticultural crops as compared to traditional foodgrains, pulses and oilseeds and other commercial crops. In this section, we discuss labour absorption in various activities among our four selected horticultural crops namely, grapes, pomegranate, flowers and aromatic and medicinal plants. This section presents labour absorption among the selected commodities and concludes with a comparison of labour absorption among field and horticultural crops.

In the horticultural crops, labour requirement is higher compared to field crops as in the plantation crops labour is required for initial plantation, during the gestation period and during the period when plant is bearing fruit. The labour is required for initial land preparation, digging pits, lining, sowing nursery, refilling top soil, planting nursery and other miscellaneous activities. During the gestation period labour uses include inter-culture operations, manure and fertilizers,' insecticides, weeding, irrigation, mulching, shading and other miscellaneous activities. The manpower requirement at the time of fruit bearing includes topping and pruning, manure and fertilizers, weeding, harvesting and collection, grading, storage and marketing.

Table 3a presents use of human labour in cultivation of grapes by the selected households. Labour is required for preparation of the field, plantation and fixing up irrigation and other permanent structure; labour use to carry out various activites during the gestation period; and recurring activities undertaken every year during the life span of the grape plants. The mandays used for field preparation, seedling, putting up supporting material and laying permanent irrigation including labour involved during the gestation period, averaged at 47 days per acre. The annual labour absorption during the fruit bearing period was around 80 days per acre for the harvesting, collection, grading storage, transportation, packing and marketing activities. Numbers of days averaged at 36 for weeding and inter cultural operations, 27 days for topping and pruning, 20 days for irrigation, 17 days for manure-fertilizer and plant protection, each. Thus, the recurring activities involved 202 man days per acre and fixed activities absorbed around 47 man days per acre. At the aggregate, the labour absorption in grapes was 248 man days per acre per annum. Comparing across various farm size holdings, man days use was, highest among small farmers, 342 days followed by large farmers, 246 days, medium farmers, 225 days and marginal farmers 201 days. As variable cost constituted 84 percent of total cost while share of fixed cost was around 16 percent in grapes, similarly the share of labour force in recurring activities was more than 80 percent while fixed activities amortised over life time of the plant contributed around 20 percent share in labour use. There was no particular trend visible in the labour use in different activities and the size of farmers' holdings.

Labour use in pomegranate was much less compared to grapes, especially for the fixed activities (Table 3b). Total labour use for fixed activities averaged around 6 man days while in recurring activities it was around 100 days. Labour use in field preparation and supporting material was around 40 days in grapes while in pomegranate it was only 3 days. Grape planting involves higher manpower as it requires support material for the plant like iron angles, fencing and other activities like digging and pit making, growing nursery, stem cuttings, soaking as well as putting up permanent irrigation like laying down drip irrigation. Pomegranate, on the other hand, can be planted by square system and all the cultural operations can be performed more conveniently. Pomegranates also do not require pruning except removal of ground suckers and water shoot cross branches. The crop also requires much less amount of labour for harvesting,' grading and packing as compared to grapes. The recurring activities namely, labour ·days in harvesting collection, grading and marketing was more than 80 days in grapes while the number of man days in those activity in pomegranate was less than half of that (around 36 days only). On the aggregate, per acre man days employed in pomegranate averaged at 106 days with marginal famers having 204 man days followed by large farmers 132 days, medium farmers 94 days and small farmers occurring at the bottom with 84 days.

Mandays employment in flowers was closer to pomegranate while medicinal and aromatic crops had much less numbers of work days (Tables 3c and 3d). The fixed activities involved around 6 to 7 amortized man days per acre in both flower and medicinal crops. In the recurring activities, around 45 days per acre of employment was generated in the activities of harvesting, collection, grading, storage and marketing in the case of flowers while it was around 25 man days per acre in the case of medicinal and aromatic crops. Irrigation, weeding and inter cultural operations were the other activities that involved around 21 and 16 man days per acre, respectively in flowers and 15 and 12 man days per acre, respectively in medicinal and aromatic crops. At the aggregate, 103 days per acre man days were absorbed in the flower crop and around 76 days per acre were employed in the medicinal and aromatic crops. Employment generation was highest 217 days by the medium farmers in flower crops and 105 days by the marginal farmers in the case of medicinal and aromatic crops. On the opposite, only 83 man days were created in flower crops in the category of large farmers while in the case of medicinal and aromatic crops minimum days of employment was created around 32 man days in the category of medium farmers. In all the four selected crops, there was no particular trend in man days generated and farm size holdings.

TABLE 3a: USE OF HUMAN LABOUR IN HORTICULTURAL CROPS BY ACTIVITIES - GRAPES

(man days per acre)

Farm Size	Marginal	Small	Medium	Large	Total
(A) Recurring activities undertaken every year #					
Preparatory tillage	0	3	5	6	5
Manure & fertilizer	0	23	20	15	17
Transplanting & gap filling	0	0	2	0	0
Irrigation, electricity and diesel	0	23	17	21	20
Weeding and inter cultural operations	14	57	31	35	36
Topping / pruning	6	51	40	19	27
Plant protection, pesticides etc.	56	35	22	13	17
Harvesting and collection	28	56	33	42	41
Grading, storage, transport, packing	71	43	17	46	39
Miscellaneous	0	0	0	0	0
Total Recurring	**174**	**293**	**185**	**196**	**202**
(B) Fixed activities undertaken during the plantation year ##					
Planting material like seedling, nursery etc	2	3	2	2	2
Field preparation-digging, pit making,fencing etc	9	17	15	17	16
Supporting material-bamboo, iron angles, etc	14	24	18	26	24
Laying down of permanent irrigation	2	5	4	4	4
Any other	0	0	0	0	0
Total fixed days	27	49	40	50	47
Gross total	**201**	**342**	**225**	**246**	**248**

Source: Own Field Survey

Note: # Mandays are calculated by dividing the labour cost by the prevailing wage rate during the year in which cost was incurred for example, for the bearing period wage rate is for 2008-09 but for gestation period wage rate is during the gestation year.

Mandays are calculated, dividing labour cost by the prevailing wage rate during the year of plantation.

TABLE 3b: USE OF HUMAN LABOUR IN HORTICULTURAL CROPS BY ACTIVITIES-POMEGRANATE

(man days per acre)

Farm Size	Marginal	Small	Medium	Large	Total
(A) Recurring activities undertaken every year #					
Preparatory tillage	3	4	3	2	3
Manure & fertilizer	36	6	11	9	10
Transplanting & gap filling	0	1	0	0	0
Irrigation, electricity and diesel	42	23	13	9	15
Weeding and inter cultural operations	35	15	10	25	17
Topping / pruning	12	6	7	13	9
Plant protection, pesticides etc.	35	5	8	18	11
Harvesting and collection	25	9	7	19	12
Grading, storage, transport, packing	8	12	30	30	24
Miscellaneous	0	0	0	0	0
Total Recurring	**197**	**79**	**89**	**124**	**100**
(B) Fixed activities undertaken during the plantation year ##					
Planting material like seedling, nursery etc	1	1	1	1	1
Field preparation-digging, pit making, fencing etc	3	2	2	3	2
Supporting material-bamboo, iron angles, etc	0	1	0	1	1
Laying down of permanent irrigation	3	1	2	2	2
Total fixed days	7	5	5	8	6
Gross total	**204**	**84**	**94**	**132**	**106**

Source: **Own Field Survey**

Note: # Mandays are calculated by dividing the labour cost by the prevailing wage rate during the year in which cost was incurred for example, for the bearing period wage rate is for 2008-09 but for gestation period wage rate is during the gestation year.

Mandays are calculated, dividing labour cost by the prevailing wage rate during the year of plantation.

TABLE 3C: USE OF HUMAN LABOUR IN HORTICULTURAL CROPS BY ACTIVITIES-FLOWERS

(man days per acre)

Farm Size	Marginal	Small	Medium	Large	Total
(A) Recurring activities undertaken every year #					
Preparatory tillage	2	5	6	4	3
Manure & fertilizer	4	6	10	7	6
Transplanting & gap filling	0	1	2	4	1
Irrigation, electricity and diesel	31	12	39	4	21
Weeding and inter cultural operations	15	14	39	14	16
Topping / pruning	3	5	6	7	4
Plant protection, pesticides etc.	2	1	0	2	1
Harvesting and collection	20	34	31	25	25
Grading, storage, transport, packing	15	29	60	11	19
Miscellaneous	0	0	0	0	0
Total Recurring	**93**	**107**	**194**	**77**	**97**
(B) Fixed activities undertaken during the plantation year ##					
Planting material like seedling, nursery etc	1	3	1	2	2
Field preparation-digging, pit making, fencing etc	2	4	15	2	3
Supporting material - bamboo, iron angles, etc	0	0	3	0	0
Laying down of permanent irrigation	0	1	4	2	1
Any other	0	0	0	0	0
Total fixed days	3	8	23	6	6
Gross total	**96**	**115**	**217**	**83**	**103**

Source: Own Field Survey

Note: # Mandays are calculated by dividing the labour cost by the prevailing wage rate during the year in which cost was incurred for example, for the bearing period wage rate is for 2008-09 but for gestation period wage rate is during the gestation year.

Mandays are calculated, dividing labour cost by the prevailing wage rate during the year of plantation.

TABLE 3d: USE OF HUMAN LABOUR IN HORTICULTURAL CROPS BY ACTIVITIES-AROMATIC AND MEDICINAL PLANTS

(man days per acre)

Farm Size	Marginal	Small	Medium	Large	Total
(A) Recurring activities undertaken every year #					
Preparatory tillage	5	8	0	1	5
Manure & fertilizer	6	7	1	5	5
Transplanting & gap filling	5	6	0	4	4
Irrigation, electricity and diesel	29	18	1	3	15
Weeding and inter cultural operations	11	19	4	4	12
Topping / pruning	3	2	0	3	2
Plant protection, pesticides etc.	0	0	0	0	0
Harvesting and collection	35	24	19	18	24
Grading, storage, transport, packing	6	2	1	0	2
Miscellaneous	0	0	0	0	0
Total Recurring	100	87	25	37	70
(B) Fixed activities undertaken during the plantation year ##					
Planting material like seedling, nursery etc	3	3	5	3	3
Field preparation-digging, pitmaking, fencing etc	2	4	2	1	3
Supporting material - bamboo, iron angles, etc	0	0	0	0	0
Laying down of permanent irrigation	0	1	0	0	1
Any other	0	0	0	0	0
Total fixed days	5	8	6	5	7
Gross total	**105**	**95**	**32**	**42**	**76**

Source: **Own Field Survey**

Note: # Mandays are calculated by dividing the labour cost by the prevailing wage rate during the year in which cost was incurred for example, for the bearing period wage rate is for 2008-09 but for gestation period wage rate is during the gestation year.

Mandays are calculated, dividing labour cost by the prevailing wage rate during the year of plantation.

TABLE 4: LABOUR USE IN ALL CROPS (NUMBER OF DAYS PER ACRE)

Name of the crop	Marginal	Small	Medium	Large	Total
Paddy	17	34	32	7	21
Wheat	-	19	13	7	9
Coarse cereals	24	14	13	10	12
Pulses	32	8	7	8	8
Oilseeds	16	17	5	8	8
Sugarcane	-	-	24	24	24
Vegetable	88	67	82	33	61
Fruit	83	129	94	106	106
Plantation	21	36	24	11	24
Floriculture and medicinal crops	80	58	63	66	67
Cotton	-	2	16	14	12
Fodder	122	30	-	4	60
All crops	**61**	**55**	**53**	**30**	**38**

Source: Own Field Survey

Table 4 depicts a comparative statistics of number of days of labour employed for all activities including sowing, transplanting, growing, harvesting and marketing of a crop by our selected households. The total numbers of days of employment per acre generated on the traditional foodgrain crops varied from 21 days for paddy, 9 days for wheat, 12 days for coarse cereals and 8 days for pulses and oilseeds, respectively. In the case of commercial crops, employment generated varied from 24 days per acre on sugarcane to only 12 days in cotton. Compared to these crops, man days of employment generated was much higher, 61 days in vegetable crops, 106 days in all fruit crops including the above discussed two fruit crops and 67 days on floriculture and aromatic and medicinal crops. Only fodder crops stood somewhat closer to horticultural crops with average 60 man days per acre. In the latter case, more number of days of employment was on account of manual harvesting, collection, transportation, chopping and feeding the animals. Thus, horticultural crops had advantage over traditional food crops not only in terms of higher productivity, value addition and net profitability but they also provided better employment to the households in comparison to all other crops grown on the field. There was possibility of further value addition and more employment generation in case farmers preferred to undertake some processing of the horticultural crops at the field level.

6 Marketing channels of horticultural crops

After harvesting and packing where do farmers market their produce is seen in this section. Marketing of agricultural commodities in India, especially that of grains is mostly done through the network of regulated markets under the Agricultural Produce Marketing Committee Act (APMC) that hitherto was binding on both the sellers and the buyers until recently when the Act was liquidated and direct entry of buyers is allowed to procure the produce from the farm. However, in the case of horticultural crops, generally there is no provision in the regulated mandis for handling of horticultural crops such as fruits and vegetables. Therefore, there is a separate network of wholesale markets for the horticultural crops. However, like grains, all the horticultural crops are not sold through regulated or wholesale markets and there are multiple players in the sale of horticultural crops.

In Karnataka, Agricultural Produce Marketing Committee Yards and APMC Act includes the marketing of horticultural produces also. But in practice only few horticultural products that are less perishable like coconut, areca-nut potato and onions are marketed through APMC's that is around 6 percent of the total production of horticultural crops. Most of the vegetables and fruits in larger cities and towns are traded in the central market area, usually municipal market. The wholesale trade of fruits and vegetables is carried out by small auction sales or negotiated sales in terms of basketslbags etc. In Karnataka, some special efforts mentioned below have been made to improve marketing of horticultural products. Establishment of horticultural produces co-operative marketing society (HOPCOMS). It is a Cooperative body engaged in marketing of fruits and vegetables in three districts namely, Bangalore urban, Bangalore rural and Kolar districts. At present about 100 metric tonnes of fruits and vegetables are handled per day. At the district level, processing societies have been established in the state. The main objective of these societies is procurement of fruits and vegetables directly from the farmers and sell to the consumers directly through its outlets situated in the cities and towns at a reasonable price. At state level, as an apex federal body namely, Karnataka State Horticultural Co-operative Federation (KHF) has been established to perform the activities similar to that of Karnataka Milk Federation. KHF has drawn market promotional plans for its member societies. Through NCDC it is planned to support the credit requirement of the societies. There is also Raithara Santhe Karnataka State Agricultural Marketing Board, a State Government organization initiative towards marketing of fruits and vegetables. The board had created infrastructure for marketing fruits and vegetables directly from the growers to the consumers without any middlemen or commission agent. At present this is in action at Yelahanka town near Bangalore city.

The Department of Agriculture Marketing, a state government department opened a new market complex near Bangalore City exclusively for marketing of fruits. Safal fruit and vegetable auction market is a new project implemented by the National Dairy Development Board. This is a vast project developed in an area of 60 acres of land distribution centers, wholesale and retail sale counters. This project will also develop cash and carry stores in prime localities of cities. At present about 300 metric tones of fruits and vegetables are handled per day. In selected districts village level growers associations have been organized with backward and forward linkages. The task set under NHM Action Plan for Karnataka is to provide linkages to train the farmers on production and post harvest management of fruits and vegetables.

However, the initiatives as mentioned above concentrate mostly in Bangalore and other big city centres and there is generally a lack of backward linkage up to the producers in the villages. Table 5 presents marketing channels thorough which selected horticultural crops were being sold by our selected households. There were mainly four or five channels through which our selected horticultural crops were being sold including wholesale market, local market, government agency and merchants and pre arranged contracts.

In the case of grapes, around 15 percent of the total sale was done through whole sale market, local market in the nearby town and intermediaries at the farm gate level, each. Around 35 percent of grapes were sold through government agencies and remaining 20 percent were sold through pre arranged contracts with the buyer, the merchant and by other means. Similar to grapes, around 1/3rd share of total marketed surplus of pomegranates was sold through government agency and another 15 percent was sold through some sort of cooperative marketing. Around 27 percent of the produce was sold through pre arranged contract with the merchants and rest of the product was sold in the wholesale/local market and through intermediaries at the farm gate level.

TABLE 5: MARKETING CHANNELS THROUGH WHICH HORTICULTURAL PRODUCTS WERE SOLD BY THE SELECTED\ HOUSEHOLDS (PERCENTAGE OF HOUSEHOLDS)

	Whole sale market	Local market	Village directly	Coop-erative	Govt . agencies	Intermediar-ies at the farm gate	Merchant-or pre arranged Contract	Others	Aggre-gate
					Grapes				
Marginal	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
Small	0.0	42.9	0.0	0.0	28.6	0.0	28.6	0.0	100.0
Medium	28.6	0.0	0.0	0.0	42.9	28.6	0.0	0.0	100.0
Large	15.8	10.5	0.0	0.0	31.6	15.8	21.1	5.3	100.0
Total	**14.7**	**14.7**			**35.3**	**14.7**	**17.7**	**2.9**	**100.0**
					Pomegranate				
Marginal	0.0	0.0	0.0	0.0	33.3	0.0	66.7	0.0	100.0
Small	10.0	0.0	0.0	10.0	30.0	10.0	30.0	10.0	100.0
Medium	14.3	0.0	0.0	28.6	14.3	0.0	14.3	28.6	100.0
Large	7.7	7.7	0.0	15.4	38.5	7.7	23.1	0.0	100.0
Total	**9.1**	**3.0**	**0.0**	**15.2**	**30.3**	**6.1**	**27.3**	**9.1**	**100.0**
					Floriculture				
Marginal	56.4	2.6	7.7	0.0	10.3	2.6	15.4	5.1	100.0
Small	55.0	25.0	0.0	5.0	15.0	0.0	0.0	0.0	100.0
Medium	20.0	0.0	40.0	0.0	40.0	0.0	0.0	0.0	100.0
Large	33.3	16.7	16.7	0.0	0.0	0.0	0.0	33.3	100.0
Total	**51.4**	**10.0**	**8.6**	**1.4**	**12.9**	**1.4**	**8.6**	**5.7**	**100.0**
					Aromatic and medicinal plants				
Marginal	14.3	0.0	0.0	0.0	14.3	28.6	0.0	42.9	100.0
Small	18.2	0.0	9.1	0.0	18.2	9.1	36.4	9.1	100.0
Medium	14.3	14.3	0.0	0.0	28.6	14.3	28.6	0.0	100.0
Large	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	100.0
Total	**15.4**	**3.9**	**3.9**	**0.0**	**19.2**	**19.2**	**23.1**	**15.4**	**100.0**

Source: Own Field Survey

Half of the produce of flowers was sold through wholesale market and rest of the half was sold in local market, through government agency and through merchants and pre arranged contracts. In the case of aromatic and medicinal crops, there was no specific set of marketing channels and the produce was sold through all the above channels with major amount being sold through merchants, intermediaries at the farm gate level and through wholesale market where ever it existed. Thus, horticultural crops were mostly sold without indulging into any processing except the case of grapes where few farmers were found undertaking some processing at the field level. The market for horticultural crops in Karnataka was not well established and the farmers depended in many cases on merchants and intermediaries who were exploitative in nature.

7. On farm processing activities in horticultural crops.— The horticultural crops have limited shelf period and most of them come under perishable commodities. Being perishable in nature they need special attention in packing and transportation and generally have much higher post harvest losses compared to traditional grain crops. To reduce post harvest losses and keep their original quality, colour and taste of these products intact, they need special handling, packing and refrigerated transportation. As refrigerated transportation, cold storage and warehousing lacks at the production place, the best alternative is undertaking some primary processing at the farm level to increase shelf life of these products and also make some value addition. This process not only reduces post harvest losses but also adds nutritive value to the product and generates additional employment at the farm level. There is a developed processing industry. However, at the farm level widely practiced method of fruits and vegetable processing is the direct sun drying of the product. The example of the same is preparing resins from grapes after drying it in the sun light. There are a numbers of products traditionally prepared after primary processing of the fruits and vegetables like juice, pickles, jams, jelly, marmalades, chutney, purees, pastes etc. The advanced processing with high technology involves preparation of fermented wines, nectars, vinegar, spirits, medicinal products, oils and aromatic products. The magnitude of post harvest losses of fresh fruits and vegetables in developing countries, according to Madakadje et al (2004), goes up to 25 percent. According to a joint study conducted earlier by Confederation of Indian Industry and McKenzie, at least 50 percent of the produced fruits and vegetables in the country are lost due to wastage and value destruction. The processing of horticultural crops not only adds more value to the product. it also creates additional employment and income for the farmers and reduces post harvest losses.

TABLE 6: PROCESSING ACTIVITIES UNDERTAKEN BY THE CULTIVATORS IN GRAPES PREPARING RAISIN (RS. PER HOUSEHOLD OF PROCESSING HOUSEHOLDS ONLY)

Farm size	Raw material used	Fine product prepared	Processing cost	Net profit	Profit as a percentage of raw material	Percentage of household who undertook Processing
Marginal	35000	60000	15000	10000	28.6	100.0
Small	64632	133000	22600	45768	70.8	55.6
Medium	86175	192850	55450	51225	59.4	58.8
Large	178214	397357	121143	98000	55.0	42.4
Total	**123830**	**273883**	**79283**	**70770**	**57.2**	**50.0**

Source: Own Field Survey

The main aim of the Horticultural Mission that is in operation since 2005 onwards is to ensure end-to-end holistic approach covering production, post harvest management, processing and marketing to assure appropriate returns to growers/producers and promote R&D technologies for production, post-harvest management and processing. Despite emphasis on promotion of processing activities under the National Horticultural Mission, however hardly any specific facility was being provided to the households to facilitate them undertaking some sort of processing at the farm level. We tried to collect information from our selected horticultural farmers whether they do under take any primary processing at the field level and details related to the value addition done at the field level.

Table 6 presents the processing activities undertaken by the selected households. Only in the grapes crop, we observed that farmers were processing their primary grape crops into raisins. In Karnataka, most of the grapes produced in the state are sold in the local market as fresh fruits as seen in the previous section and a small quantity is processed as raisins. The fresh grapes are spoilt very fast, and therefore farmers are liable for economic losses if the produce is not sold in the internal markets immediately. Among our sample farmers, some farmers in each category used a part of their output to process their product into raisin rather than selling the whole amount in the local market at a much lower price. Among marginal farmers, there was only one farmer who was growing grapes and was also indulged in processing activities. In other categories, around half of the farmers used on-farm processing of grapes to prepare raisins. The value addition

on the raw material was quite high as after covering the cost of processing households earned above 50 percent net profit that varied from 29 percent for the marginal farmers, 71 percent for small farmers, 59 percent for medium farmers and 55 percent for the large farmers. Thus, it appears that farmers are ready for taking up available opportunities for adding value to their product on the farm. As it was easy to take such activities in the case of grapes there was overwhelming response from the farmers. The same was not the case with other selected crops, namely pomegranate, flowers and medicinal crops for which simple sun-dry was not sufficient and it required large investment for undertaking primary processing. Thereby, farmers were selling their product in. the raw form mostly in the local market.

8. Conclusion and Policy Suggestions

Using field survey data of 212 horticultural farmers drawn from four districts in Karnataka,' this paper looks into the economics of production and resources use as well as marketing and on farm processing of horticultural crops. The economics of production indicates that not only horticultural crops have better profitability, but they also generate more employment compared to traditional food and cash crops. The findings of the paper are summarized below.

The output produced per acre of grapes crop averaged at 55 quintals and it varied between 50 to 58 quintals per acre among different farm size classes. The average revenue earned per acre was ₹92 thousand. The overall cost of cultivation of grapes was measured at ₹ 66 thousand per acre. Overall profit from the grape crop per acre was measured at ₹ 26 thousand. In the case of pomegranate, yield obtained by the farmers quite fluctuated over time and across different farm size holdings and average productivity of pomegranate was found 16 quintals per acre. Total cost per acre, on an average, was observed at ₹30 thousand. The net profit was measured at ₹13.5 thousand per acre from pomegranate. Marginal and small farmers preferred growing flowers and aromatic crops as these crops were more labour intensive. The realized yield of floriculture crops averaged at 18 quintals per acre and fluctuated widely among various farm size holdings. The net profitability covering the fixed and variable cost together averaged at ₹15.7 thousand per acre whereby only large and marginal farmers had positive profit amounting to ₹27 thousand and ₹ 17.7 thousand, respectively while small and medium farmers incurred losses amounting to ₹5 thousand and ₹3 thousand, respectively. The net profit over variable cost in the case of aromatic and medicinal crop averaged at ₹11 thousand and net profit over total cost averaged at ₹ 4.6 thousand. Overall, except medicinal and aromatic crops, profitability from the horticultural crops was higher compared to profitability from the foodgrains and other oilseed and commercial crops. Similarly, comparing horticulture with traditional crops, the total numbers of days of employment generated per acre was much higher from the former compared to the latter. Only fodder crop was found closer to horticultural crops in employment generation. Thus, horticultural crops had advantage over traditional food crops not only in terms of higher productivity, value addition and net profitability but they also provided better employment to the households in comparison to all other crops grown on the field. The market for horticultural crops in Kamataka was not well established and the farmers depended in many cases on merchants and intermediaries who were exploitative in nature. The horticultural crops were mostly sold without indulging into any processing except the case of grapes where few farmers were found undertaking some processing at the field level.

The infrastructure especially that of post harvest management was found lacking in the state although some attempts were made in that direction. There were large numbers of farmers who expressed their dissatisfaction regarding marketing facilities especially for flowers and aromatic crops. Demand for pack house and cold storage was expressed by most of the farmers given the perishable nature of horticultural crops. Kamataka is endowed with congenial agro-climatic conditions making it possible to grow different varieties of horticultural crops. The planned efforts over the past decade for systematic development of horticulture sector in the state have started producing inspiring results. However, there are several challenges that have to be addressed properly so as to strengtlien the horticulture sector. There is a need for mechanization to bring efficiency and competence, post harvest infrastructure and processing for better value addition to the horticultural products, transfer of technology by making the extension systems more accountable and better accessible and precision farming to venture into new opportunities and promotion of genetically modified organisms GMOs) in horticultural crops.

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ANNEX TABLE 1 A: DETAILS OF HOUSEHOLDS SELECTED

District	Marginal	Small	Medium	Large	Total
	Numbers of households				
Bagalkot	5	10	14	23	52
Bijapur	3	17	10	25	55
Tumkur	25	17	4	4	50
Bangalore Rural	26	19	7	3	55
Aggregate	59	63	35	55	212
	Percentage of households				
Bagalkot	9.6	19.2	26.9	44.2	100.0
Bijapur	5.5	30.9	18.2	45.5	100.0
Tumkur	50.0	34.0	8.0	8.0	100.0
BangaloreRural	47.3	34.5	12.7	5.5	100.0
Aggregate	27.8	29.7	16.5	25.9	100.0

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Potential of Diversification through Horticultural Development in Uttrakhand

USHA TUTEJA* AND DIVYA TUTEJA

Abstract

This paper examines current status and prospects of diversification towards horticulture crops in Uttrakhand. It is based on macro level data collected from secondary sources. Findings show that contribution of Uttrakhand in all India production of horticulture crops is lower than its share in area due to poor productivity which needs to be improved by providing technology and infrastructure. Second, the state has 5.47% of total area under cultivable waste lands which can be brought under horticulture crops without reducing area under foodgrain crops by incentivizing farmers through policy interventions.

Key words: Diversification, fruits, vegetables, spices and productivity.

Introduction:

Food security, nutritional security, sustainability and profitability are the main focus of present and future agricultural development. The high value agriculture, particularly horticultural crops are the catalysts for the next wave of growth in the farm sector since, share of cereals and pulses in the per capita food expenditure in India has reduced from 40 to 28 per cent between 2000 and 2010 while that of high value products including fruits and vegetables rose from 36 per cent to 42 per cent during the same period (Economic Survey, 2011-12; Mittal,2009; Chand et.al 2008; Singh & Mathur, 2008: Birthal et.al, 2008). Therefore, future of agriculture and food sector will rest on crop diversification towards high value crops and higher value addition. In addition, increase in agriculture sector's share in the export pie will also come from this sector. Despite the overwhelming importance of horticultural sector and India being the leading producer of fruits and vegetables, available literary evidences are scant for all India and in particular for Uttrakhand. In this back drop, this paper examines important aspects related to horticultural development in Uttrakhand. The analysis is largely based on macro level data collected from secondary sources such as Agricultural Statistics at a Glance (Ministry of Agriculture, Government of India). Statistical Diary of Uttrakhand and Hand Book of Horticulture Data (Government of Uttrakhand).

Need for Diversification towards Horticulture in Uttrakhand:

Development of horticulture has good potential in Uttarakhand due to favorable agro-climatic conditions. Diversification from traditional crops to horticultural crops is the best option. for farmers due to several advantages. First, horticultural crops produce higher biomass than field crops per unit of area resulting in efficient utilization of natural resources. Second, horticulture has potential of area expansion by utilizing waste lands through proper policy. Third, horticultural crops require less water than several field crops. Fourth, these are high value' crops with higher potential of value addition. Fifth, horticultural crops are relatively remunerative and thus, can help in increasing income, employment and nutritional security of the farmers in hill dominated state of Uttarakhand. Sixth, some of the horticultural products are in great demand in domestic and international markets. The country can earn foreign exchange through exports of these products.

In view of above advantages and government support, a visible shift from traditional crops to these crops could be noticed in many regions of India including Uttarakhand. As a result of the above efforts, significant progress has been made in area expansion resulting in higher production. Besides, gradual adoption of improved technology has not brought improvement in productivity of horticultural crops in Uttarakhand during the past one decade.

Agriculture is the mainstay of the economy of Uttarakhand. Around 58 per cent of the population of the state depends on this sector for food and livelihood security. The main crops grown are rice, wheat, maize among cereals, urad and masoor among pulses, mustard among oilseeds and sugarcane as commercial crop. Now, horticulture is one of the important sub-sector of agriculture and thus, one of the major economic activities of population involved in agriculture. Mango, apple, litchi and citrus are the principal fruit crops while potato, beans, vegetable pea, tomato, cauliflower, etc. are the major vegetables grown in the plain and hilly areas of Uttarakhand. Among vegetables, off season vegetables constitute important component due to favorable climatic conditions.

The tiny size of operational holdings in most of the hilly districts of Uttarakhand puts a severe constraint in development of crop farming. The average size of land holding in the state was 0.70 ha during 2010-11. The land holdings are even smaller in hilly region (0.69 ha) except in one district namely, Udham Singh Nagar (1.33 ha), Bageshwar has smallest size of holdings (0.43 ha). The share of net sown area to geographical area ranges from 3.73 per cent in Uttarkashi to around 50 per cent in Udham Singh Nagar district. Similarly, there are wide variations in percentage of net sown area as irrigated. The net irrigated area as percentage of net area sown is the highest in Dehradun district (48.27 per cent) and lowest in Chamoli

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district among hilly districts while in plain districts of Udham Singh Nagar and Haridwar, more than 90 per cent of net sown area is irrigated. In the hilly region of the state, farmers devote a large proportion of their land to cereal crops for their subsistence. The horticultural crops are gradually picking up due to advantage in climate, good price and demand from other states.

Uttarakhand is known for its horticultural crops, which include fruits, vegetables, off-season vegetables and floricultural crops, medicinal and aromatic plants. In temperate zone of the state, only kharif crop is taken due to very cold climate. Thus, agriculture in this part of Uttarakhand is characterized by subsistence farming. The policy should focus on improving food, nutrition and livelihood security. Given the climatic conditions, mixed farming seems a practical approach that should include dairying, horticulture, agro-forestry and organic farming.

Thus, horticulture development can become an effective tool for accelerating development in the hill areas as well as boosting the income of farmers beyond the subsistence level that they manage from traditional agricultural crops. Area under horticultural crops can be increased particularly if cultivable wasteland and farms belonging to absentee landlords are utilized to grow these crops.

Results and Discussion

Now, we analyse current status of horticulture in Uttrakhand. In particular we will include aspects such as contribution of Uttrakhand in India and details of area, production and yield of horticultural crops grown in Uttrakhand. We further, examine investment in the operational schemes and their achievements.

A. Contribution of Uttrakhand in All India:

After analyzing need for diversification towards horticultural crops in Uttrakhand, it would be appropriate to gauge the status of Uttrakhand in all India horticulture Table-1 presents these results. Uttarakhand shared 2.81 per cent of all India area under fruits. A wide gap could be noticed in share of area and production. The proportion in production was around one third. It was due to poor level of productivity in the state. Uttarakhand registered low level of yield (below national average) of fruits. The gap in the yield between first ranking state of Tamil Nadu (30966 kgs/ha) and Uttarakhand (4009kgs./ha) was high and equal to around 26000 kgs./ha during 2010-11.

The share of Uttarakhand in all India area of vegetables was negligible and around 1 per cent during 2010-11 while proportion in production was less than 1 per cent. It was again due to poor level of productivity (12015 kgs./ha) that was below the all India average of 17253 kgs./ha it may be pointed out that level of productivity of vegetables in Tamil Nadu was 29859kgs./ha which was more than double of the productivity of vegetables in Uttarakhand.

The scenario of area, production and yield of spices in Uttarakhand appeared to be encouraging and contrary to fruits and vegetables. The share of Uttarakhand in all India area under spices was as low as 0.25 per cent but contribution in production was triple due to higher productivity of 5776kgs./ha against all India average of 1819kgs./ha during 2010-11. The state emerged as a second ranking state in terms of yield rate of spices. Arunachal Pradesh was the only state which registered productivity of spices higher than that of Uttarakhand. A robust policy implication can be drawn from this result that area expansion under spices should be encouraged in the state through proper incentives to the producers.

Floriculture is emerging as a potential sub-sector of horticulture in the state of Uttarakhand. It shared 0.63 per cent of all India area under flowers while contributed only one- third of this to the production.

After aggregating all the sub-groups of horticultural sector, we observed that Uttarakhand shared 1.25 per cent of all India area under horticultural crops and contributed only 0.74 per cent in production. This resulted from low productivity of these crops. The yield level of horticultural crops in Uttarakhand was 6560 kgs./ha against the all India average of 11017kgs./ha during 2010-11. This level is abysmally low and efforts should be made to improve productivity of horticultural crops in Uttarakhand to make this sector a success story.

Considering the structure of hill agriculture and the constraints it faces, the strategies should be formulated based on ground realities. The variations in altitude and climate may be utilized for gains through diversification. The traditional and scientific resources/know-how should be blended and disseminated to improve the agricultural economy of hills. It is essential to integrate the available natural resource, tap the untapped potential of crops/ varieties and technical know-how in an eco-friendly manner to enhance agricultural productivity for food and nutritional security as well. Introduction of vegetable crops in the crop sequence is capable of enhancing profitability by 2-3 times. Therefore, serious attempts should be made in this direction.

B. Growth of Horticulture in Uttrakhand:

Having analysed status of Uttrakhand in all India area and production under horticulture Crops, we look into variations in area, production and yield of horticulture crops in Uttrakhand during the past one decade.

Composition of Horticultural Crops

Horticultural crops comprise a large variety of crops including fruits, vegetables, spices, and flowers, medicinal and aromatic plants. In view of the large genetic base available, crops adapt to diverse conditions of soil and climate. Table-2 presents share of individual crops in total area and production of horticultural crops in Uttarakhand. The scenario is dominated by fruits. The share of fruits in

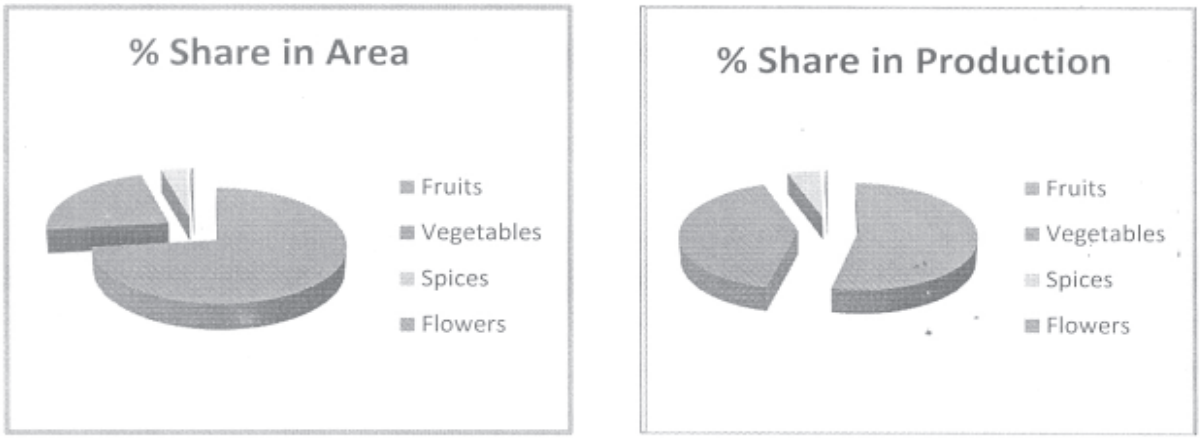
area and production of horticultural crops was as high as 73.12 and 53.61 per cent respectively. Vegetables occupied second rank with 22.65 per cent share in area and 41.04 per cent share in production. A.higher contribution in production indicates better productivity of vegetable crops in the state. A gap was observed in the share in production and area in case of fruits. Therefore, there is an urgent need to augment productivity of fruit crops in the state. Increase in productivity has to come from improvement in technology.

Spices are well known as appetizers. These are also considered essential in the culinary art all over the world. Some of the spices possess anti-oxidant properties and others are used as preservatives. India is the largest producer as well as consumer of spices in the world. Even in Uttarakhand, there is no cuisine without addition of one or more spices. Spices formed around 3.73 per cent of area under horticultural crops and contributed 4.95 per cent to total production . The higher contribution in production could be due to good yield.

In Uttarakhand, floriculture is getting popular among the farmers. These are being grown near the places of pilgrimage and peri-urban areas. Around, 0.50 per cent of area under horticultural crops was devoted to flowers and thus, a marginal share of total area under horticultural crops was devoted to them. The floriculture contributed 0.40 per cent in production of horticultural crops. The yield of flowers in Uttarakhand was 4.36 mtlha during 2010-11 which is below the national average.

Fig. 1

Share of Fruits, Vegetables, Spices and Flowers in Total Area, Production & Yield of Horticultural Crops in Uttarakhand during 2010-11



Variations in Area, Production and Yield of Horticultural Crops

So far, we have analyzed area, production and yield of horticultural crops at one point of time in Uttarakhand. The importance of year to year percentage change in area, production and yield of horticultural crops has over whelming importance for analyzing development of these crops. Table-3, illustrates year to year percentage change in area, production and yield of fruits, vegetables spices, flowers **and** horticultural crops from 2002-2003 to 2010-11 and coefficient of variation.

The acreage under fruits shows wide variations in percentage change from year to year in Uttarakhand during this period. It was as high as around 135 per cent in 2004-05 over 2003-04 while, it was observed negative in 2003-04 over 2002-03. The lowest change was observed in 2009-10 over 2008-09. The year to year percentage change in production of fruits in Uttarakhand also indicates significant variations. It was found highest, around 32 per cent in 2005-06 over 2004-05 while, it was recorded negative in 2009-10. The year to year percentage change in yield of fruit crops in Uttarakhand during 2002-2003 to 2010-11 was found mixed. The maximum increase in yield was observed in 2005-06 over 2004-05 whereas, it was found negative in 2009- 10 over 2008-09 and in 2004-05 over 2003-04. The decline in yield of fruits during the second year was around 50 per cent. It could be due to severe change in climate related factors.

Table-3 also depicts year to year percentage change in area, production and yield of vegetable crops in the state during the above stated period. Like fruits, year to year percentage change in these parameters in case of vegetables is significant. The highest positive change in area was observed in 2004-05 over 2003-04. This year also recorded significant increase production of vegetables due to acreage expansion but yield declined by of more, than 10 percent. A negative change in area, production and

yield was recorded during 2005-06 over 2004- 05 and 2003-04 over 2002-03. The yield increased at differential rates in these years and the highest positive change was observed during 2003-04 over 2002-03.

Having analyzed year to year percentage change in area, production and yield of fruits and vegetables in Uttarakhand, we analyze the same for spices which indicate wide variations in these indicators. The percentage change in acreage under this group was as high as around 841 per cent in 2009-10 over 2008-09 while; it was recorded negative in 2003-04, 2004-05 and 2010- 11. The yield also indicated huge year to year variations. The maximum positive change was observed during 2010-11 while it was negative during the previous year.

The cultivation of flowers has picked up well in Uttarakhand after the new millennium. As a result, area has increased from 618 ha in 2004-05 to 1346 ha in 2010-11. The highest percentage change in area could be noticed in 2005-06 over 2004-05. The rising trend in production since 2006-07 was due to area expansion and yield increase. The maximum increase in yield of flowers was recorded in 2006-07 while, it was found negative in 2005-06.

An examination of year to year percentage change in area, production and yield of horticultural crops in Uttarakhand between 2002-03 and 2010-11 indicates wide variations like individual groups. The highest change in acreage could be noticed in 2004-05 over 2003-04 and negative in 2010-11 over 2009-10. The yield has also shown negative as well as positive variations which affected production. The highest positive change in production of horticultural crops was observed during 2004-05 over 2003-04. However, it was recorded negative in some years.

We have computed coefficient of variations for area, production and yield of fruits, vegetables, spices, flowers and all horticulture crop (Table-3). Results show that area and production of flowers has shown higher variations in comparison to other groups. The coefficients were as high as 79 and 72% respectively between 2002-03 and 2010-11.

Share of Individual Horticultural Crops in Area, Production and Yield

Since vegetable and fruit crops together constituted around 96 per cent of area and production of horticultural crops in Uttarakhand, it would be useful to examine share of individual crops in total area allocation. Table-4 reveals that mango (19.68 per cent), apple (16.66 per cent) and citrus together occupied around 50 per cent of area under fruit crops in the state during. 2010-11. The major citrus fruits of Uttarakhand are malta, orange, lime, etc. This group of fruits has good potential in the state on account of share in production, longer availability and amenability for processing. However, the data on different citrus fruits are not available which are required in order to evolve strategies for further development of these species. Next ranking fruits are walnut, pear and litchi. The fruits such as guava and aonla do not appear to be popular among farmers and therefore, proportion of area under these crops is less than one per cent.

A perusal of share of the individual crops in production of fruit crops indicates that mango, apple and citrus contributed around 51 per cent of total production. It would be useful to mention that contribution of pear was almost double in comparison to area. Peach also showed a higher share in production. The yield of fruit crops in Uttarakhand was 3.99 mt/ha during 2010-11. Pear followed by guava and peach indicated higher yield rates in comparison of other crops It is discouraging to note that yield rates of fruits in Uttarakhand are much below the national level. Hence, all efforts should be made to improve the yield of various fruit crops in Uttarakhand.

Table-4 also provides information about variety wise area, production and yield of vegetable crops in Uttarakhand during 2010-11. Vegetable pea, tomato and cabbage are the major vegetable crops of Uttarakhand and constituted around 42 per cent of total area under vegetables in the state. A significant gap was observed in the share in area and production in case of beans, okra and capsicum. The productivity of vegetables was 9.88 mt/ha in Uttarakhand during 2010-11.

In view of agro-climatic suitability of vegetable crops cultivation in Uttarakhand, urgent steps are needed to increase productivity to potential levels through research and development in area specific varieties of vegetable crops. The productivity of cauliflower, radish, cabbage, brinjal, tomato and onion was more than 10 mt/ha. The overall scenario of yield rates was not found encouraging in the state.

In the hills of Uttarakhand, there is a lot of potential for growing off, season/organic vegetables. More than 57 per cent of the total vegetable production in the state is from the hilly districts of the state, which can be termed as off-season vegetables for the plain regions.

An examination of Table-4 indicates that major spices of Uttarakhand are ginger, chilli and coriander. These crops occupied around 77 per cent of total area under spices and contributed almost the same share in production. Turmeric and garlic are also cultivated by farmers. These contributed 21 per cent of total spice production in the state. Ginger followed by turmeric recorded the highest yield.

Among flowers, marigold, gladiolus and rose are popular with around 84 per cent of total area under flowers in the state. Nevertheless, these varieties contributed only 29 per cent in production due to low yield. Among flowers, gerbera followed by carnation registered higher productivity in comparison to other varieties.

C. Problems and Prospects of Horticulture Development in Uttarakhand

We have already stated that diversification towards horticultural crops is a viable option for improving livelihood security of farmers in Uttrakhand. It is estimated that Uttrakhand has 5.47% of total area as cultivable waste land which can be brought under horticultural crops because several of them can be grown under rainfed conditions without reducing area under foodgrains crops. Further, it can help in improving income of farmers in hilly areas where non- farm sources of income are extremely limited. In particular vegetables and flowers can be grown throughout the year. The women farmers can cultivate roses, gladiolus, gerbera, orchids, carnations, etc, which have higher demand in urban areas.

The availability of infrastructure is the backbone of agricultural growth in general and horticultural development in particular in Uttarakhand dominated by hilly areas. Normally, production and distribution bottlenecks created by deficiencies in roads, telecom, etc., create a drag on growth in the long run. What is less appreciated though is that infrastructure investment itself is a source of growth through stimulating demand, particularly, for inputs such as labour. However, infrastructure development in Uttarakhand in terms of connectivity of roads, telecom, etc., is inadequate. This has influenced availability of technology related inputs, marketing and storage facilities for horticultural crops which are mostly perishable in nature. These factors together affect productivity negatively and reduce returns from cultivation of these crops which in turn influence farmer's decisions in area allocation. However, recent policy measures for development of horticultural crops in Uttarakhand helped in area expansion but productivity of most of the horticultural crops still remains low in the state in comparison to the all India level.

Indeed, Uttarakhand has great advantage of agro-climatic diversity for growing a large variety of horticultural crops. This natural advantage should be exploited to the benefit of farmers. Hence, improving infrastructure and removing bottlenecks hindering growth of productivity of horticultural crops hold prime importance for achieving the desired level of horticulture development in the state. The easy availability of planting material including region specific improved variety of seedlings needs urgent attention in policy. Thus, resolving the inputs and infrastructure conundrum will definitely make the difference to horticultural development not only for the future but even the present.

Conclusions and Policy Implications:

Findings of this paper show that area and production of horticultural crops has improved during the past one decade in Uttarakhand, but yield performance was observed to be poor in most of the horticultural crops. Therefore, serious policy efforts are needed to harness the potential. The non-availability of comprehensive data on basic parameters at the disaggregate level puts a serious limit in designing and planning for improved productivity through extension, input supply and efficient marketing logistics. This should given priority.

In order to improve prospects of horticulture in Uttarakhand (i) provision of infrastructure (markets, storage and roads), (ii) availability of region specific improved varieties for each horticultural crop, (iii) easy availability of planting material and easy access to extension assume special significance for success.

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TABLE-1 SHARE OF IMPORTANT STATES IN ALL INDIA PRODUCTION OF FRUITS AND VEGETABLES DURING 2010-11

State	Fruits			Vegetables			Spices			flowers			others			Total		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Andhra Pradesh	10.12	12.58	14575	7.67	8.08	18193	9.84	19.98	3697	11.42	12.96	-	8.52	6.79	2636	8.86	9.7	12064
Arunachal Pradesh	1.13	0.14	1499	0.05	0.03	9167	0.34	1.15	6099	0.63	0	-	0	0	.	0.4	0.09	2377
Assam	2.15	2.36	12826	3.06	1.99	11248	303	4.15	2490	0	0	-	2.32	1.3	1846	2.63	2.11	8818
Bihar	4.64	5.22	13193	9.95	9.98	17314	0.44	0.23	962	0.1	0.22	-	0	0	0	5.29	7.71	16072
Chhattisgarh	2.77	2.7	8868	407	2.89	12287	0.4	0.15	709	3.61	2.63	-	1.17	0.71	2004	2.69	2.47	10139
Gujarat	5.48	9.68	20706	6.07	6.4	18181	16.31	14.81	1653	6.55	4.8	-	0.6	1.02	5622	6.36	7.32	12743
Haryana	0.76	0.48	7702	4.08	3.17	13422	0.51	1.45	5159	3.25	5.85	-	0.02	0	600	1.9	2.14	12397
Himachal Pradesh	3.36	1.38	4800	0.95	1.01	18345	0.22	0.37	2970	0.37	0.06	-	0	0	-	1.39	1.05	8351
Jammu & Kashmir	5.1	2.97	6820	0.82	1.06	22370	0.13	0.02	231	0.05	0.02	-	0	0	-	1.83	1.57	9469
Jharkhand	1.13	1.04	10828	3.06	2.84	15847	0	0	-	0.84	2.13	-	0	0	0	1.53	2.04	14748
Karnataka	5.92	8.38	16606	5.49	6.18	19422	8.81	8.6	1777	14.14	19.77	-	19.28	14.3	2451	855	7.4	9538
Kerala	4.72	3.35	8325	1.76	2.31	22694	7.98	2.11	482	0	0	-	25.57	33.15	4290	7.9	4.27	6141
Madhya Pradesh	2.07	4.51	25499	3.34	2.52	13037	9.78	7.73	1439	4.03	0.58	-	0.89	1.6	5944	3.46	3.2	10325
Maharashtra	24.08	12.07	6189	7.19	5.12	12282	3.96	1.88	864	9.17	8.83	-	5.35	2.63	1623	11.39	7.3	7055
Rajasthan	0.8	0.93	13603	1.65	0.6	6308	20.37	12.48	1115	2.83	0.94	-	7.47	1.16	513	4.98	0.99	2224
Tamil Nadu	5.04	13.31	30966	3.26	5.65	29859	4.57	6.38	2541	16.76	23.98	-	14.62	30.36	6864	6.06	9.43	17126
Uttar Pradesh	5.09	7.18	16528	9.76	12.06	21316	1.92	3.75	3546	5.45	1.71	-	3.5	0.13	100	6.21	9.68	17182
Uttarakhand	2.81	0.96	4009	1.01	0.7	12015	0.25	0.75	5776	0.63	0.22	-	0	0	-	1.25	0.74	6560
West Bengal	3.31	3.94	13955	15.8 9 10.8	18.24	19801	3.29	3.61	1991	12.1	5.74	-	1.34	2.2	5435	7.94	12.56	17438
Other States	9.52	6.82	8400	7	9.17	14552	7.85	10.4	2411	8.07	9.56	-	9.35	4.65	1645	9.38	8.23	9271
Total	100	100	11732	100	100	17253	100	100	1819	100	100		100	100	3305	100	100	11017

*Others include remaining horticultural crops.

Source: Agricultural Statistics at a Glance, 2012

TABLE-2 SHARE OF FRUITS, VEGETABLES, SPICES AND FLOWERS IN TOTAL AREA, PRODUCTION & YIELD OF HORTICULTURAL CROPS IN UTTARAKHAND DURING 2010-11

S.No.	Item	Area (ha)	% Share	Production (MT)	% Share	'Yield (mt/ha)'
1	Fruits	198160	73.12	792077	53.61	3.99
2	Vegetables	61392	22.65	606508	41.04	9.88
3	Spices	10107	03.73	73101	04.95	7.23
4	Flowers	1346	00.50	5869	00.40	4.36
	Total	271005	100.00	1477555	100.00	5.45

Source: Horticulture Production Data (From 2002·03 to 2010·11), Department of Horticulture & Food Processing, Uttarakhand

TABLE-3 YEAR TO YEAR PERCENTAGE CHANGE IN AREA, PRODUCTION AND YIELD OF HORTICULTURAL CROPS IN UTTARAKHAND DURING 2002-03 TO 2010-11

Year	Fruits			Vegetables			Spices			Flowers			Total		
	Area (ha)	Production (mt)	Yield (mt/ha)	Area (ha)	Production (mt)	Yield (mt/ha)	Area (ha)	Production (mt)	Yield (mt/ha)	Area (ha)	Production (mt)	Yield (mt/ha)	Area (ha)	Production (mt)	Yield (mt/ha)
2002-03	69875	443193	6.34	38282	392384	10.25	8551	54246	6.34	NA	NA	NA	116708	889823	7.62
2003-04	66588	449451	6.75	29940	348430	11.64	6822	49220	7.22	NA	NA	NA	103350	847101	8.2
	(-4.70)	(1.41)	(6.46)	(-21.79)	(-11.20)	(13.56)	(-20.21)	(-9.26)	(13.88)	(-)	(-)	(-)	(-11.44)	(-4.80)	(7.61)
2004-05	156277	525677	3.36	50845	521850	10.26	5605	44382	7.92	618	698	1.13	213345	1092607	5.12
	(134.69)	(16.95)	(-50.22)	(69.82)	(49.77)	(-11.85)	(-17.83)	(-9.82)	(9.69)	(-)	(-)	(-)	(106.42)	(28.98)	(-37.56)
2005-06	180145	692650	3.84	50723	461073	9.09	6091	46852	7.69	3553	576	1.16	240512	1201151	4.99
	(15.27)	(31.76)	(14.28)	(-0.23)	(-11.64)	(-11.40)	(8.67)	(5.56)	(-2.90)	(474.91)	(-17.48)	(2.65)	(12.73)	(9.93)	(-2.53)
2006-07	186060	716527	3.85	53969	524244	9.71	6552	50462	7.7	671	1670	2.49	247252	1292903	5.23
	(3.28)	(3.44)	(0.26)	(6.39)	(13.70)	(6.82)	(7.56)	(7.70)	(0.13)	(-81.11)	(189.93)	(114.65)	(2.80)	(7.63)	(4.80)
2007-08	190688	735161	3.86	56239	560742	9.97	7302	56407	7.73	783	2423	3.09	255012	1354733	5.31
	(2.48)	(2.60)	(0.25)	(4.20)	(6.96)	(2.67)	(11.44)	(11.78)	(0.38)	(16.69)	(45.09)	(24.09)	(3.13)	(4.78)	(1.53)
2008-09	193047	747009 .	3.87	57547	575040	9.99	7425	53637	7.22	886	3796	4.28	258905	1379482	5.33
	(1.23)	(1.61)	(0.25)	(2.32)	(2.54)	(0.20)	(1.68)	(-4.91)	(-6.59)	(13.15)	(56.66)	(38.51)	(1.53)	(1.83)	(0.38)
2009-10	193785	723504	3.73	58449	564281	9.65	69833	65941	0.94	1274	4421	3.47	323341	1358147	4.2
	(0.38)	(-3.14)	(-3.61)	(1.56)	(-1.87)	(-3.40)	(840.51)"	(22.93)	(-86.98)	(43.79)	(16.46)	(-18.93)	(24.88)	(-1.55)	(-21.20)
2010-11	198160	792077	3.99	61392	606508	9.88	10107	73101	7.23	1345.52	5869.27	4.36	271004.51	1477555.27	5.45
	(2.25)	(9.47)	(7.24)	(5.03)	(7.48)	(2.38)	(-85.53)	(10.86)	(669.15)	(5.61)	(32.76)	(25.65)	(-16.19)	(8.79)	(29.76)
C.V· *	0.33	0.21	0.28	0.20	0.17	0.07	1.47	0.17	0.33	0.79	0.72	0.47	0.32	0.18	0.23

Source: Horticulture Production Data (From 2002-03 to 2010-11), Department of Horticulture & Food Processing, Uttarakhand

*Coefficient of Variation NA: Not Available, Figure in parentheses depict year to year percentage change.

TABLE-4 AREA, PRODUCTION AND YIELD OF HORTICULTURAL CROPS IN UTTARAKHAND DURING 2010-11

I. Fruits :

S. No.	Fruits	Area (ha)	% Share	Production (MT)	% (Share)	Yield (mt/ha)
1.	Mango	38994	19.68	135320	17.08	347
2	Apple	33023	16.66	135894	17.16	4.12
3	Citrus	27400	13.83	134463	16.98	4.91
4	Walnut	19483	9.83	21706	2.74	1.11
5	Pear	14916	7.53	108582	13.71	7.28
6	Litchi	9585	4.84	18732	2.36	1.95
7	Peach	8843	4.46	48530	6.13	5.49
8	Plum	9581	4.83	41155	5.19	4.29
9	Aonla	399	0.20	653	0.08	1.64
10	Apricot	9008	4.55	32064	4.05	3.56
11	Guava	1472	0.74	8926	1.13	6.06
12	Others	25456	12.85	106052	13.39	4.17
	Total	**198160**	**100**	**792077**	**100**	**3.99**

II Vegetables:

S. No.	Vegetables	Area (ha)	% Share	Production (MT)	%(Share)	Yield (mt/ha)
1 .	Vegetable pea	11187	18.22	86937	14.33	7.77
2.	Radish	4614	7.52	56931	9.39	12.34
3.	French Bean	5176	8.43	38112	6.28	7.63
4	Cabbage	5609	9.14	70461	11.61	12.56
5	Cauliflower	2550	4.15	33966	5.6	13.32
6	Onion	3779	6.15	37993	6.26	10.05
7	Capsicum	2319	3.78	12739	2.11	5.49
8	Okra	3251	5.30	27085	447	8.33
9	Tomato	8783	14.31	97077	16.01	11.05
10	Brinjal	2138	3.48	25870	4.26	12.1
11	Others	11986	19.52	119337	19.68	9.96
	Total	**61392**	**100.00**	**606508**	**100.00**	**9. 88**

III.Spices:

S. No.	Spices	Area (ha)	% Share	Production (MT)	% (Share)	Yield *(mt/ha)*
1	Turmeric	798	07.90	6651	09.10	8.33
2	Chili	2092	20.70	7626	1043	3.65
3	Coriander	1476	14.60	7148	09.78	4.84
4	Garlic	1267	12.54	8457	11.57	6.67
5	Ginger	4153	41.09	41944	57.38	10.1
6	Others	321	03.17	1275	01.74	3.97
	Total	**10107**	**100.00**	**73101**	**100.00**	**7.23**

IV Flowers:

S. No.	Flowers	Area (ha)	% Share	Production (MT)	% (Share)	Yield *(mt/ha)*
1	Gerbera	75.37	05.60	3480.3	59.30	46.18
2	Rose	146.84	10.91	141.19	0240	0.96
3	Gladiolus	390.79	29.05	695.36	11.85	1.78
4	Marigold	586.54	43.59	883.37	1505	1.51
5	Carnation	29.48	02.19	561.03	09.56	19.03
6	Others	116.5	08.66	108.02	01.84	0.93
7	**Total**	**1345.52**	**100.00**	**5869.27**	**100.00**	**4.36**

Perceived Panorama and Desirability of Diversification in Agriculture : Evidences from Bihar and Jharkhand

Dr. Rajiv Kumar Sinha*

BROACHING

One of the key factors for agricultural growth is remunerative prices to the farmers, which should ultimately lead to 'Diversification in the cropping pattern towards non- cereals. The development of markets and post - harvest infrastructure were not able to keep pace with the growth in agricultural production over time. In several states, due to the existence of underdeveloped agricultural markets', red-tapism in purchase of paddy and wheat by PACS/ LAMPS/FSS, unnecessary presence of a large number of middlemen, Commission Agents and brokers in the marketing chain- farmers have to sell even Rice and Wheat Crops at much below 'the Minimum Support Price (MSP)':

Under the above described background, farmers, overtime, have diversified production towards 'High Value Crops', especially, fruits and vegetables (Joshi et al. 2007; Chand et.al. 2008; Dev 2908).

The share of fruits and vegetables in the total value of crop output increased from 16 per cent in 1980-1 to 28 per cent in 2009-10 with its share in total gross cropped area being about 7.3 per cent in 2009-10 (Table No.-1). The share of food grain crops in the total value of output was only 33.5 per cent although it occupied about 63 per cent of the gross cropped area in 2009-10 (Table No.- 1). Therefore, the value of output from per unit of land for fruits and vegetables is about five times than that of food grains. The percentage area under sugarcane, cotton, and fruits and vegetables increased in the post-reform period as compared to the pre-reform period (Table No. -1).

The diversification of agriculture is primarily led by diversification of diet. However, to sustain diversification towards high-value commodities and leveraging it towards benefiting the farmers, good infrastructure in terms of an assured market, better road connectivity, cold storage, post-harvest technology, and a supportive policy to attract private players are required. Participation of the private sector is very crucial for developing these agricultural sub-sectors, as huge investments are required to improve and upscale backward and forward linkages with the farmers (Gulati and Ganguly 2010). Farmers can hedge against price risk by opting for contract farming in the context of increasing the number of supermarkets and food-processing companies (Birthal et al. 2007; Singh 2008).

Further, vertical integration of services related to farming, warehousing, and other logistical, processing, and retailing can help direct farm-firm linkages by lowering transaction and transportation costs and strengthening the supply chain to enhance value- addition. Earlier such direct linkages were not permitted as agricultural produce transaction outside the regulated markets (mandis), were restricted. Nevertheless, to promote diversification of agriculture and the participation of private players, an amendment to 'the Agriculture Produce Marketing Committee (APMC)' Act known as 'APMC Model Act' was enacted in 2003. The Amendment allowed direct transactions between producers and retailers in several states through various institutional mechanisms, such as cooperatives, producers' association, and contract farming.

Diversification in Agriculture should not, therefore, be taken as a distress, occupational shift in activities, but it may be taken as 'one of the optional opportunities of earning higher 'returns within the similar operational framework' without the pre-requisite of having some other expertise in the activities being opted for.

Table No.-1 Crop Group's Share in Value of Output at 2004-05 Prices

Crop group	1980-1	1990-1	2000-1	2009-10
Cereals	37.2	34.5	32.8	29.1
	(59.5)	(54.5)	(53.2)	(51.2)
Pulses	6.4	6.8	4.5	4.4
	(13.5)	(12.4)	(11.6)	(11.7)
Oil seeds	8.4	12.9	6.9	9
	(10.7)	(14.2)	(11.9)	(13.8)
Sugarcane	5.7	4.8	4.6	3.6
	(1.8)	(2.1)	(2.3)	(2.4)
Cotton	3.6	3.7	2.6	4.5
	(4.5)	(4.2)	(4.8)	(4.8)
Fruits and	15.9	17.2	25.3	27.8
Vegetables	(2.8)	(4.6)	(5.4)	(7.3)

Note: Figures in parenthests are % of Gross Crpped Area (GCA) under the crop.

Source: cso (2012 aand 2012 b):Indiastat (2012); and MoA (200.8 and 2012b)

Understanding Contour

The finality of diversification (particularly in the wide perspective of agriculture)- can not be confined to 'shift of crop-growing activities' to allied sector based activities or enterprises' only. But, it provides scope for loose fitting of shifts or change in areas within crops, or particular types of activities also. Diversification is a widely advocated means for agricultural and rural development. In agriculture, diversification implies -'shift from subsistence farming to commercial farming' and/or from low value food/non-food crops to high value food or non-food crops and switch over from local to high yielding varieties. It also includes

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shift from agriculture to-Animal Husbandry (AH), pisciculture, poultry, agro-forestry, horticulture, etc., or vertical diversification, i.e.; shift to non-farm economic activities, or shift to such agro-product based commercial activities' that enable the farmers to get higher net returns with lower degree of risks involved. Change in cropping pattern is an integral part, and a popular mode of diversification, which has far reaching impacts on development of agriculture and alleviation of rural poverty.

During the past century, an unprecedented increase in population - has been experienced by the world with a billion people added every decade during the last more than three decades (1978-2011). Dramatic shifts in production and consumption of food have accompanied this population explosion - including a surge in grain production, spectacular rise in meat production and consumption, and the emergence of an increasingly vital role for international trade (Rose grant, et.al; 2001).

Despite several measures to check population explosion, India's population is still rapidly increasing. 'The standards of living (both in urban and rural areas)' have been rising and slated to rise faster than in the past. It can be practically dilated that as the living standards' rise, both 'calorific intake' and 'diversification of diet' will, no doubt, increase siqnificantly. Although a portion of this increase can and is likely to be obtained from abroad, a fulfilling VISION OF INDIA, 2020 evidences India with its: (i) Conducive and varied climate, (ii) the largest irrigated area in the world, and (iii) a vast farming population-as a major food exporter.

In the endeavour to achieve 'the goal of food security for all our people' and with the objective to earn foreign currency by exporting 'agro-based products', contriver measures may be adopted amidst 'varied climate' and 'increasingly diversified diet'. Both as a challenge and as an opportunity, India can and must do much more to modernize and diversify its agriculture. to meet 'the increased domestic and international demand for a wide variety of food products. Though agricultural diversification in India -has been about a continuous increase in the share of allied activities and decline in the share of crop sector - since 'the late sixties', however, within crop sector, trend of diversifications has, been changing periodically. In spite of these periodic shifts in crop acreage, proportionate area under fine cereals has been increasing over a long period of time. There can he various reasons for such trend. Though in some of the states, this trend/ practice continues, the recent trend in crop diversification shows decline in percent area under fine cereals and increase in percent area under non-food grain crops.

Overview (Bihar and Jharkhand)

Before inferring any/some factors and causes for diversification in agriculture or agricultural practices in the States of Bihar and Jharkhand - it will be desirable to briefly explicate the profiles of both the states. Bihar and Jharkhand both are faced with almost similar incidence of poverty (41.40% and 40.3%) respectively as against 27.5 per cent of the all- India poverty level (as per Planning Commission - 2004-05 Report). So, if diversification in Agriculture doesn't take place there, ensuring better/higher net returns to the farmers (particularly Marginal, Small and Semi-medium farmers)- than the traditional crops' growing activities, then the rural and agrarian economies of these states will be languid in the long-run.

Bihar : A Brief Profile of the State:

Bihar is the third most populous state in India with a population of 10,38,04,637 persons {(Census-2011 (P)} contributing 8.58 percent to total population of the country. Out of the total population, 52.20 per cent are male and 47.80 per cent female. The state is a densely populated region, with no less than 11.02 persons living per sq.km. of its area, which is much above the national average (3.82 persons/sq km.). About 41.40 per cent of the population lived below the poverty line (Planning Commission in 2004-05). As 9 out of 10 people, on an average, live in villages, poverty is more visible in rural areas.

Traditionally, Bihar's economy is dominated by the agricultural sector. The state has a geographical area of 93.60 lakh hectares. Bihar falls in the riverine plane of the Ganga basin area. Because of the topographical nature, the proportion of total land put to agricultural use here is high as compared to other states of India. In 2008-09, the area under forest was estimated at 6.60 per cent and the area under non-agricultural uses at 17.80 per cent. The Net Sown Area (NSA) is 59.60 per cent. Cropping intensity is 1.38 per cent. The total irrigated area is 49.20 lakh hectares the accounts for about 88.00 per cent of NSA. But, irrigation efficiency of MMI schemes was 42.50 per cent in 2010-11.

Jharkhand : A Brief Profile of the State

Jharkhand state was carved out from Bihar in 2000. It has a geographical area of 79.71 lakh hectares with a population of 329.66 lakh (Census-2011 (P), contributing 2.72 per cent of total population of the country. Out of the total population, 51.36 persons per cent are male and 48.64 per cent female. The population density is 414 persons per square km. The sex ratio is 947 female per 1000 male. Jharkhand is mostly rural with 78 per cent of the state's population residing in village. According to NSSO 61st round (2004-05), and Planning Commission, the incidence of poverty is estimated at 40.3 per cent in the state, as compared to national average of 27.5 per cent. Population of the state consists of about 28 per cent scheduled tribes, 12 per cent scheduled castes and 60 per cent others. The state has 5 administrative divisions, 24 districts, 260 blocks, 4462 gram panchayats and 32615 revenue villages. Out of the total geographical area, 28.08 per cent are NSA, 29.20 per cent forests, and 8.60 per cent is in non-agricultural uses. The percentage of irrigated area is about 9 per cent and the cropping intensity is 116 per cent. The state comes under agro climatic zone- Vii and is Zones XII & XIII as per agro-ecological characteristics of the country. The state receives rainfall of about 1200-1500 mm/annum.

During the 8 years' period (2000-01 (to 2008-09) - percentage changes of coverage under different crops in BIHAR suggest diversification of pulses, fibrecrops, oilseeds and cereals also - towards sugarcane (19.64% increase in area). As far the case of JHARKHAND is concerned, 'diversification of agriculture within crops' during the eight years' period (2001-02 to 2008-09) - disillusions farmers' preference towards paddy (with only 9.85% increase in area). Rather, it suggests the farmers to have been growing fascination towards; Oilseeds, pulses, maize and wheat (74.12%,73.66%,54.46%) and 52.75%) respectively.

Diversification of 'agriculture within crops' in the states of Bihar and Jharkhand might have caused due to some constraints e.g.; natural, agro-ecological factors, absence of remunerative and 'exploitation-free markets' for' surplus production, lack of adequate storage facilities, non-availability of sufficient number of 'Agro- Processing Industries (APls), and so on.

In the above backdrop, and based on available secondary data, this paper seeks to examine the objectives noted below: (i) Diversification withirr crops in Bihar, (ii) to find out factors responsible for such crop diversification; (iii) to examine the trend of diversification within crops in Jharkhand, (iv) to discuss the consequent effect of such diversification, (v) to discuss the sustainability component of little change in area under paddy crop in Jharkhand; and (vi) to suggest apposite Action Points.

Factors Responsible for Diversification

There are several factors responsible for diversification of crops, diversification in regard to area; activities and otherwise. It can vary across the regions, states and 'agro climatic zone wise'. During the last more than 25 years, the diversification of agriculture in lndia has remained a big issue. Much progress has not been made in this regard due to various technological, social, economic and institutional factors. The eastern region of the country has about 77 percent of the gross cropped area (GCA) under foodgrains' No doubt, foodgrains, production more than doubled from 102 million tonnes in triennium ending 1973 to 227.3 million tonnes (MTs) in 2007-08. Virtually all of the increase in production resulted from yield gains, rather than expansion of cultivated area under foodgrains that remained stagnant at around 124 million hectares (MH) in India. However, per capita per day availability of foodgrains in India can also be taken to be stagnant. It was 468.8 gm/ capita/day in 1971 that decreased to 462.4 in 2004. The strength of India being one of the leading nations of the world in regard to production of fruits, vegetables and milk could have been utilized to reduce the extent of poverty by creating 'additional employment opportunities'-based on 'agro-processing activities/industries (APls)' of these products.

Despite some of the impressive growth and development on quite a few fronts in recent past, India is still home to the largest number of poor people in the world. With more than 251 million below poverty line population (BPL), India accounts for about 1/5th of the world's poor (Kumar, 2005). Because of high population pressure, India's land and other resources to meet its food and development needs - are under severe pressure. These all factors (combined together in various proportions) l.... have led to change in 'the structure of food basket'. As diets are diversifying from 'basic cereals' to : fruits, milk and milk products,meat, fish and eggs, etc: (i) the population growth, (ii) rise in per capita income, (iii) urbanization, (iv) change in taste and preferences, (v) overall economic growth, and (vi) infrastructural development could be responsible for change in the supply and demand for food items.

Now, it is a matter to be seen and discussed that apart from the above factors directly or indirectly responsible for 'diversificatlon of agriculture' on all India level, what are the constraints/factors that could be instrumental for ‘diversification of agriculture within crops' in the states of BIHAR and JHARKHAND.

DIVERSIFICATION WITHIN CROPS (BIHAR)

Nine years' data showing areas under; (i) Cereals, (ii) Pulses, (iii) Oil seeds (iv) Fibre Crops, and (v) Sugarcane - from 2000-01 to 2008-09, percentage change of areas under these crops in the year 2008-09 over 2000-01 and 'percentage change in triennium average (TA) - (2006-07 to 2008-09) over TA (2000-2001 to 2002-03) -have been taken into consideration for assessing the increase and /decline in areas of these crops and to see the diversification towards a particular or some crops.

A glance on table reveals that area under cereals (taken as a whole) declined by 66,410 hectares (ha.) during the period 2000-01 to 2008-09. It was 6,400.15 thousand ha. in the year 2000-01 in Bihar that came down to 6,333.74 thousand ha. in 2008-09. It means, there was a decline of 1.04 percent in area under cereals (Table No2).

As far area under pulses in concerned, there was a significant decline of 1,30,510 ha. during the period. It came down from 714.88 thousand ha. of 2000-01 to 584.37 thousand ha. in 2008-09. Thus, a 18.26 percent decline in area under pulses could be seen in the state (table No.- 2)

Oilseed crops witnessed a decline of 15,620 ha. only during the period. It fell down from 153.70 thousand ha. in the initial year to 138.08 thousand ha. in the year 2008-09. In physical terms, it might not be much larger, but in percentage terms, the decline in 'oilseeds area' was as high as 10.16.

In case of fibre crops, a little more decline than the oilseed crops could be seen. There was a decline of 18,690 ha. in area. It was 169.66 thousand ha. in 2000-01 that came down to 150.97 thousand ha. in 2008-09. In percentage terms, the decline was of 11.02 (Table - 2)

Contrary to above, the area under cash crop

(sugarcane) increased significantly in the state during the period. There was an increase of 18,370 ha. in its area. It was 93.53 thousand ha. in 2000-01 that increased to 111.90 thousand ha. in the year 2008-09. In this way, an encouraging increase of 19.64 percent could be noticed in area under sugarcane.

Having analysed data in the table (en-masse), analysis may lead to divulge that nearly 7.95 percent of the total are under: Cereals, pulses, oilseeds and fibre crops have shifted towards sugarcane. However, on overall level, the percentage decline in areas of all crops (taken together) - was to the lower extent of 2.83 during the period. But, it was 2,12,860 ha. in area. Actually, area under all crops, that was 7531.92 thousand ha. in 2000-01 declined to 7319.06 thousand ha. in 2008-09 (Table - 2)

TABLE-2 BIHAR : COVERAGE/AREA

(Area in 0000 ha)

Year	Cereals	Pulses	Oilseeds	Fibre Crops	Sugarcane	Total
2000 - 01	6400.15	714.88	153.70	169.66	93.53	7531.92
2001 - 02	6362.26	694.26	147.89	160.56	113.44	7442.41
2002 - 03	6346.45	696.88	137.23	172.07	107.27	7459.90
2003 - 04	6282.71	680.88	140.53	178.04	103.60	7385.76
2004 - 05	5838.80	658.06	131.88	154.39	101.24	6884.37
2005 - 06	5959.71	566.94	137.90	148.77	104.19	6917.51
2006 - 07	6237.12	610.07	143.11	154.30	117.18	7261.78
2007 - 08	6304.68	581.50	142.05	154.25	107.04	7289.52
2008 - 09	6333.74	584.37	138.08	150.97	111.90	7319.06
%Change in 08-09 over 2000-01	-1.04	-18.26	-10.16	-11.02	19.64	-2.83
TA (2000 - 01 to 2002-03)	6357.62	702.01	146.27	167.43	104.75	7478.08
TA (2003-04 to 2005-06)	6027.07	635.29	136.77	160.40	103.01	7062.55
TA (2006-07 to 2008-09)	6291.85	591.98	.141.08	153.17	112.04	7290.12
% Change in TA (2006-07 to 2008 09)over T A(2000-01 to 2002-03)	-1.04	-15.67	-3.55	-8.52	6.96	-2.51

Source: Economic Survey (Bihar): 2010-11, Government of Bihar

NOTE: Percentage change, Triennium Average (TA) and percentage change in TA (2006-07 to 2008-09) over TA (2000-01 to 2002-03) have been calculated on the basis of data presented in above table.

Apart from other factors, some of the identified State Specific Constraints (SSCs) that could have possibly led to such decline/diversifications within crops in Bihar - can be mentioned.

Identified Major SSCs (BIHAR)

(i) Low productivities of major crops of Rice and Wheat.
(ii) Low Seed Replacement Ratio (SRR),
(iii) Flash floods causing inundation; and
(iv) Pest and diseases' attacks.

It is to be noted here that due to : (i) lack of assured irrigationfacility, (ii) lack of required storage/godown facilities, (iii) unremunerative prices of cereals (in case of good harvests) particularly maize and (iv) in absence of desired number of APls in the state -the areas under some cereals and pulses have shifted towards 'Iow cost crops.

Further, water resources sector is most vital for the development of Bihar. It would determine the trend of diversification in Bihar. No doubt, the problem of development and management of water resources is highly complex. It is more so in case of Bihar as the state encounters different kinds of problems, sometimes opposite in nature. (i) Flood, (ii) drought and (iii) water logging occur frequently in 73%, 17% and 10% of the geographical areas of the State respectively. Flood is a big menace, mainly in North Bihar, and agriculture is badly affected, though the land is very fertile. Frequent flood in major part of North Bihar has also led to diversification of quite a large area towards 'non cereals crops', particularly during Kharif season.

Diversification Within Crops (JHARKHAND)

Having a look on data in the table, it is revealed that in Jharkhand, there are marked increase in areas under : (i) Paddy, (ii) Wheat, (iii) Maize, (iv) Pulses and (v) Oilseeds during the 8 years' period of 2001-02 to 2008-09. Percentage changes in the year 2001-02 to 2008-09. Percentage changes in the year 2008-09 over 2001-02 - for the above crops could be estimated at : (i) 9.85, (ii) 52.75, (iii) 54.46, (iv) 73.66 and (v) 74.12 respectively. On overall level, the percentage change in area under all crops (taken together) - is calculated at 23.45 - (Table:3). Paddy, the main cereal crop of Jharkhand-

had witnessed increase of 1,49,720 hectares during the period. Out of the total geographical area of 79,70,080 ha.: (i) 23,33,550 ha. (29.28%) is under forest area. Land put to : (ii) non-agricultural practices were estimated at 6,88,270 ha. (8.64%), (iii) Barre & unutilized land - 5,75,780 ha. (7.22%), (iv) permanent pasture & other grazing land - 87,460 ha. (1.10%), (v) Cultivable wasteland 2,83,620 ha. (3.56%), (vi) land under miscellaneous trees - 1,24,270 ha. (1.56%), (vii) Current fallow - 13,63,050 ha. (17.10%), (viii) Net Area Sown (NAS) being - 17,62,470 ha. (22.11 %) and (ix) Area sown more than once - were estimated at 2,63,040 ha. (3.30%) - as per the Statistical Profile of Jharkhand (2006).

Constraints

Further, in the state of Jharkhand, though crops are grown in four seasons, namely, ; (i) Bhadai, (ii) Aghani, (iii) Rabbi, and (iv) Garma. However, total irrigated areas under different crops in each of the four seasons (were 1971.60 ha., 68,357.36 ha.,74827.36 ha. and 12,302.33 ha. respectively. In this way, total irrigated area under different crops in the four seasons were - 1 ,57,458.65 ha. (i.e.; only 8.93% of the NSA) is having irrigation facility in Jharkhand. In such an irrigation scarce state' like Jharkhand, growing wheat, paddy, rabi maize, and garma paddy like cereal crops - is not an 'easy to operate business' (rather it may be an 'sceptic activity'). But, the other side of the scenario is also to be kept in mind that 'Jharkhand' is a state with undulatedwhole year except rainy season (for shorter duration only).

The above factors provide sufficient ground to understand that - in a large part of the state (particularly in the foothills and upland areas around long and small mountain ranges,: where no irrigation can be provided and no irrigation facilities are available - rain water based paddy and Arhar, Moong, Ghaghra like pulse crops can only be grown. A substantial fact here to be urgently noted is that with rapid deforestation in the state - areas under paddy, maize, pulses and oilseeds might have increased to some extent.

S S Cs In Jharkhand

Besides above constraints and specific natural characteristics, Jharkhand is also cursed with the following 'State Specific Constraints (SSCs) :

(i) Lack of irrigation facilities.
(ii) Large 'rice fallow area' (75% of NSA)', which remain uncultivable in Rabi season due to lack of irrigation facilities.
(iii) Low remunerative upland rice production
(iv) Acidic Soils; and
(v) Low Weed Replacement Ratio (LWRR).

Reasons of area increase

Despite the above noted constraints, if there are evidences of diversification within crops (means larger increases in areas under oilseeds - 74.12%, pulses - 73.66%, maize - 54.46%, wheat - 52.75% and comparatively lower increase in area under
paddy - 9.85 percent only (Table No.- 3), then the main reasons for this may be attributed to the following interventions by the Government:

TABLE No. - 3 JHARKHAND : COVERAGE/AREA

(Area in '000 ha)

Year	Paddy	Wheat	Maize	Pulses	Oilseeds	Total
2001 - 02	1520.61	65.38	139.88	211.64	74.96	2012.48
2002 - 03	1383.23	67.88	157.60	242.95	94.41	1946.08
2003 - 04	1363.86	74.56	187.51	301.89	101.07	2028.91
2004 - 05	1276.42	64.50	191.24	290.91	94.26	1917.34
2005 - 06	1354.72	57.90	181.24	291.07	84.84	1969.88
2006 - 07	1623.62	84.31	240.86	376.63	144.68	2470.11
2007 - 08	1643.78	86.34	237.41	393.66	124.34	2485.54
2008 - 09	1670.33	99.84	216.06	367.53	130.52	2484.33
%Change in 2008-09 over 2001-02	9.85	52.75	54.46	73.66	74.12	23.45
TA (2003-04 to 2005-06)	1331.67	65.68	186.66	294.62	93.39	1972.04
TA (2006-07 to 2008-09)	1645.91	90.17	231.44	379.27	133.18	2480.00
% Change in TA (2006-07 to 2008-09) Over T A(2003-04to 2005-06)	23.60	37.29	23.99	28.73	42.61	25.76

Source: (i)Crop-wise data for the year 2001-02 to 2008-09 have been obtained from the Directorate of Agriculture, Government of Jharkhand, Ranchi.
(ii)Percentage Change, figures on TA and percentage change in TA have been calculated on the basis of data presented in above table.

Note: TA indicates triennium average.

(i)Construction of irrigation and 'rain water harvesting structures' in the forms of
(a) Tube Well irrigation, and (b) Dug Well to increase the irrigated area and ensure water availability with the help of convergence with Micro irrigation, band MGNREGA.

(ii) Intensive cultivation of Rice for 17 Non NFSM districts of Jharkhand.
(iii) Intensive pulses production in NFSM districts.
(iv) Maize and Wheat Development Progamme : MMA

pattern of assistance has been launched in 24 districts of the state for maize and wheat in order to reduce yield gaps; and

(v) Bridging Knowledge Gaps/Training : Under this strategy, mass. media support is being provided to bridge the knowledge gap of the ·farmers.

The above endeavours of the Government through its programmes/specific schemes could have led to 'diversification of agriculture within crops' - in terms of greater or lower increases in areas of different crops in the state of Jharkhand.

Suggested Action Points:

(i) In view of the fact that large proportion of cultivable land falls in the riverine plane of the Ganga basin area in Bihar - which remains inundated under flood water almost every year for about a full crop duration (August-mid November)- emphasis can be given on developing fisheries in 'flood prone areas' - by constructing suitable structures in potential regions.

(ii) As in the state of Jharkhand, the Net Sown Area (NSA) is only 28.08 per cent of the total geographical area with only 9 percent of it under irrigation, having lower cropping intensity of 116 per cent - so in the light of the availability of 'cattle-feed' and 'poultry feed' in different areas of the State, suitable Action Plans' should be devised for the development of 'allied agricultural activities.'

(iii) In view of the likely rise in calorific intake and 'diversification of diet (as a result of rise in 'general income level' and various disease-related compulsions)' - policy makers', 'Agricultural Research Centres' and the Government will have to let the farmers know/advise to undertake shifts in cropping pattern (as per the demand of the domestic and international markets).

(iv) With the objectives of generating additional income by enhancing 'employment opportunities in rural areas. (on sustainable basis)'- farmers need to be incentivised and encouraged to under take those 'non-food crops' also, which have greater potentiality of 'value-addition'.

(v) In view of the fact that major part of the increase in production had resulted from yield gains' rather than expansion in area, special efforts need to be made for increasing productivities of major crops in eastern region of India - by promoting use of green manures and cowdung. It is more so desirable with a view to save cultivable land from degradation to save it from the threat of being barren and sustain fertility of top soil.

(vi) In view of nearly 8 percent shift of areas under; cereals, pulses, oilseeds and fibre crops (taken together) - towards sugarcane - Processing Industries (APls) - based on particularly this crop - need to be rejuvenated and installed in good number in Bihar in the areas/ regions of its surplus production.

(vii) By adopting both structural and non-structural measures for the management of flood, and through development of BIHAR's mega water resources assured irrigation coverage can be sufficiently increased.

(viii) Watershed Development Programmes/lnitiatives will have to be largely carried out in foothills and uplands of mountain ranges of Jharkhand. It is desirable in the state with a view to expand 'ensured irrigation facility' in 'large rice fallow area' (nearly 75% of NSA).

(ix) Constructed Rain Water Harvesting Structures' need to be surrounded by plants and trees (of fruits) around these, so that incidence of 'loss of water through evaporation' may be reduced and 'deforested areas' in Jharkhand could be compensated to some extent. Besides irrigation purpose, such 'water reservoirs' should be sued for fisheries and duckery also.

(x) In view of very poor irrigation facility in Jharkhand 'allied agricultural activities, (viz; livestock , dairy, piggery, poultry, fishery, bee-keeping, silk worm rearing, APls based on Minor Forest Produces, i.e.; MFls) - should be emphasized, promoted and developed.

(xi) If as a result of 'diversification within crops', such excess production of a particular crop is achieved, which has no local, domestic and/international market demand at ‘at least remunerative prices', and which as no ' value-addition facility, at the local/regional level, in that case, it will be advisable to encourage the farmers to undertake 'allied agricultural activities' in those particular areas of their land.

(xii) If low cost crops are getting good market demand or are able to bring enhancement in 'the general standard of living of the farmers', then such diversification within crops' may be allowed.

(xiii) Diversification of food crops towards horticultural crops may be promoted in Jharkhand & Bihar states by providing all pronounced facilities to Micro Small & Medium Enterprises (MSMEs) available under various programmes of Horticultural Development. Such Entrepreneurs coming forwards to undertake processing of Horticultural Crops/ Vegetables - need to be provided extra credit & training Plus Supervision Related Incentives by the Formal Credit Institutions & Agricultural Experts respectively.

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Prospects of Nano-biofertilizer in Horticultural Crops of Fabaceae

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Abstract

Due to the restriction in arable lands and water resources as a result of increasing population, the development of agronomy could be achieved by technology based cultivation of commercial crops i.e, horticulture. Horticultural crops are largely full of nutrition especially of family Fabaceae. The leguminous plants are given much importance due to rhizobacteria i.e. biofertilizers in their root nodules. These biofertilizers are the consortium of beneficial microorganisms found in rhizosphere which are enhancing the crop yields in different ways. But the nutritional supply to increasing population can be achieved by enhancing the efficacy of biofertilizers by introducing nanoparticles such as Gold nanoparticles leading towards the development of nano biofertilizers. These nano biofertilizers are showing very good growth promotion in vitro studies.

Key words: Horticulture, Rhizosphere, biofertilizers, nanoparticles, root nodule, nano- biofertilizers etc.

Introduction

The basic needs of human beings from prehistoric time were bread, clothes and home but as the living status developed nutritional requirement for happy life also increased. Nutrition and decoration are important factor in pleasant living for which horticultural crops can be taken into practice. Horticulture is defined as a science and technology used for cultivation of plants for human welfare which can be taken into the practice from individual to industries of multinational. It requires knowledge, skills with little efforts and an intense production of stuffs of non human food occurred. Our country is full of horticultural plants because of its wide variability in climate and soil.

A foremost effort was laid in getting the ample food stuff by the Government of India after independence in 1947 resulting in form of green revolution in the late sixties and seventies. Indian policy also showed that the topographical and agro-climatic condition of our country is well suited for horticultural crops which can be an ideal achievement in sustainable development by small farmers. For development of Horticultural crops the National Horticulture Board (NHB) in Gurgaon (Haryana) was set up in 1984 which is an autonomous society under the Societies Registration Act, 1860. Horticulture development in India was very low ebb till the third five year plan and was not given the sufficient attention. The horticultural growth was accelerated after eighth five year plan. Since then several developmental programs were launched for the significant and sustainable economic growth. The regional centres were also allocated for better yield of important horticultural plants such as in Jammu & Kashmir, Tamil Nadu, Sikkim, Mizoram, Karnataka, Gujarat etc (Anon, 2001).

The horticultural crops can be grown well in the natural as well as artificial environment such as in glass houses, poly houses etc. Crops are cultivated with fertilizers for better yield. The efficiency of these fertilizers can be enhanced by nanotechnology. Nanotechnology is a new fast growing field in different areas and is expected to turn-out new equipments for agricultural purpose in large quantity. Nanoparticles, very minute materials enough to fall within the nanometric range are less than few hundred nanometers (lnm= 10-9m). Newer nanotechnologies are frequently applied in Agriculture to improve the production of crops and nano particles are employed in cultivation (Dikshit et al., 2013) communicating some advantageous effect to crops creating a new field, Nano-Agriculture. These nanoparticles can be used for the better growth of horticultural crops.

Horticultural Crops -

Horticulture is made up of two Latin words i.e. Hortus (garden) and Cultura (cultivation) means technology based cultivation. Horticultural crops are the commercially cultivated plants of human use at individual to industrial level. They are propagated vegetative, produced in nurseries and sold to the formers, fully characterized by seedlings/ grafts after a long developmental stage. Horticulture can be studied under five major heads:

1. Floriculture (cultivation of flowering and ornamental plants)
2. Olericulture (cultivation of non woody vegetable crops)
3. Pomology (cultivation of fruits)
4. Landscape horticulture (design of agricultural land for cultivation)
5. Post harvest physiology (maintenance and prevention the spoilage of plants)

These five branches involve the whole horticultural practices. Floriculture is used for cultivation of all types of ornamental flowers which plays an important role in the nation's economy and also provides a lot of employment opportunities. Olericulture provides the fulfillment of requirement of food in the form of vegetable crops for human being. In same way as Floriculture and Olericulture, Pomology involves the cultivation and production of

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different varieties of fruits which is also an important medium of healthy living. For luxuriant production of these 3 types a special type of cultivation land is required known as landscape horticulture which provides the strategy for well production of flowers, vegetables and fruits. Post harvest physiology manages the different types of spoilage of cultivated plants for achieving a best quality and yield.

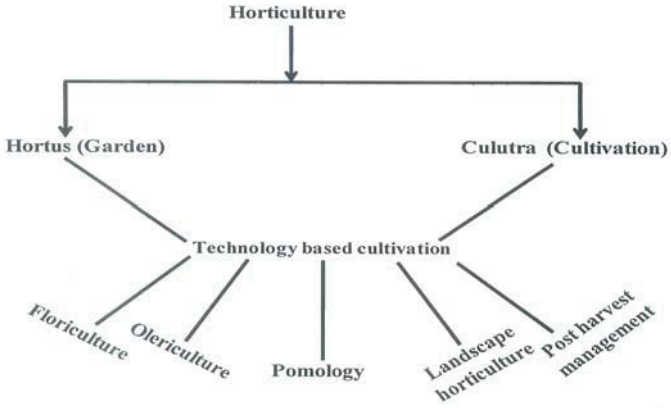

Figure 1- A diagrammatic representation of Horticulture and their types

This sector contains a wide range crops such as ornamental crops, medicinal and aromatic crops, potato and tuber crops, fruit crops and vegetable crops etc. Some crops also expand the scope of horticulture like mushroom and bamboo. For getting economical yields horticulture has emerged as an important part of agricultural practice which offers large scales to the formers for crop diversification. These crops contribute nearly 28% of the GDP from about 14% of the area and 37% of the total exports of agriculture.

Some common Horticultural Plants of family Fabaceae

Fabaceae (Leguminosae) third largest family of the flowering plant which is consisting more than 15000 described species which comprises both wild as ornamental plants. The plants of this family are known for their high protein contents. Few plants are given below in the Table1.1, 1.2 and in 1.3 which are of horticultural values. The plants in their families are given according to the International Code of Nomenclature for algae, fungi, and plants (ICBN), Article 18 Para 5.

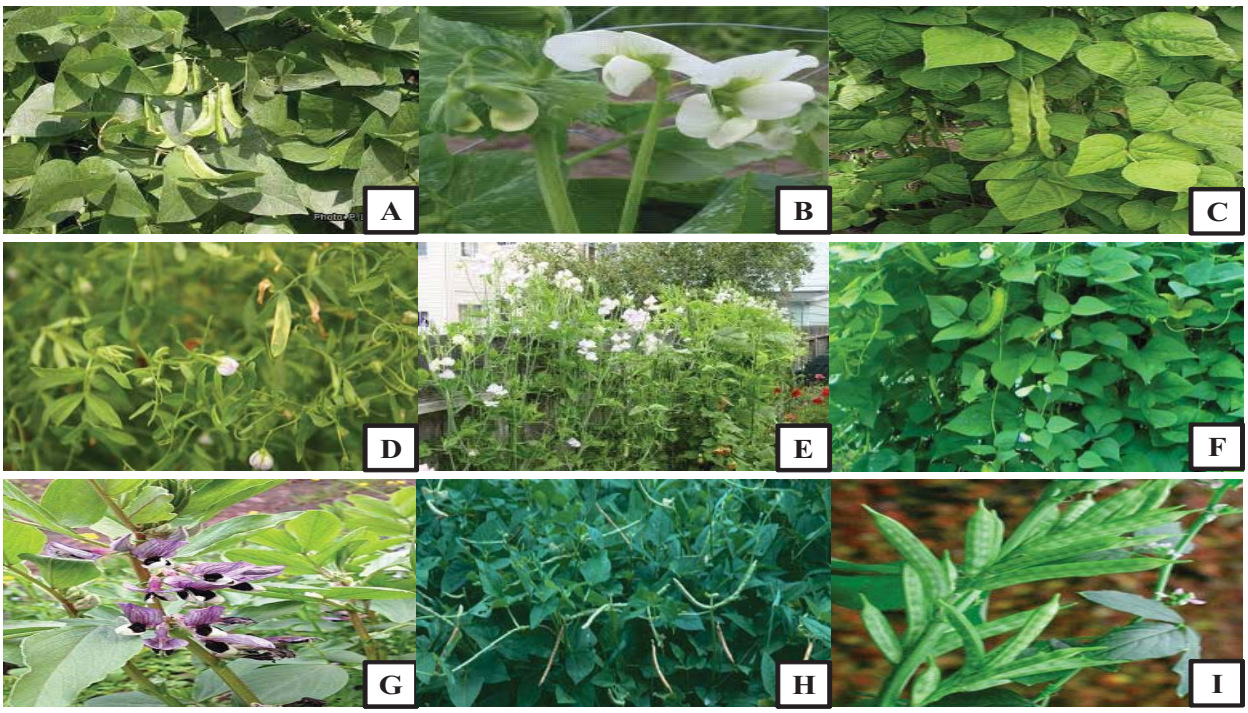

Figure 1- Plants of Sub family Papelionaceae (A) Phaseolus lunatus; (B) Pisum sativum; (C) Phaleolus vulgaris; (D) Lens culinaris; (E) Lethyrus odoratus; (F) Phosphocarpus tetragonolobus; (G) Viciafaba; (H) Vigna unguiculata; (1) Cyamopsis tetragonoloba

TABLE 1.1 SOME COMMON PLANTS OF FAMILY PAPELIONACEAE

Phaseolus lunatus L. (vern. Lima bean)	Pisum sativum L. (vern. Common Pea)	Phaleolus vulgaris L. (vern. French bean)
Lens culinaris Mill. (vern. Lentil)	Lethyrus odoratus L. (vern. Sweet pea)	Phosphocarpus tetragonolobus L. (DC) (Vern. Asparagus pea)
Vicia faba L. (vern. Broad bean)	Vigna unguiculata L. (Walp) (vern. Cow's pea)	Cyamopsis tetragonoloba DC. (vern. Cluster bean)

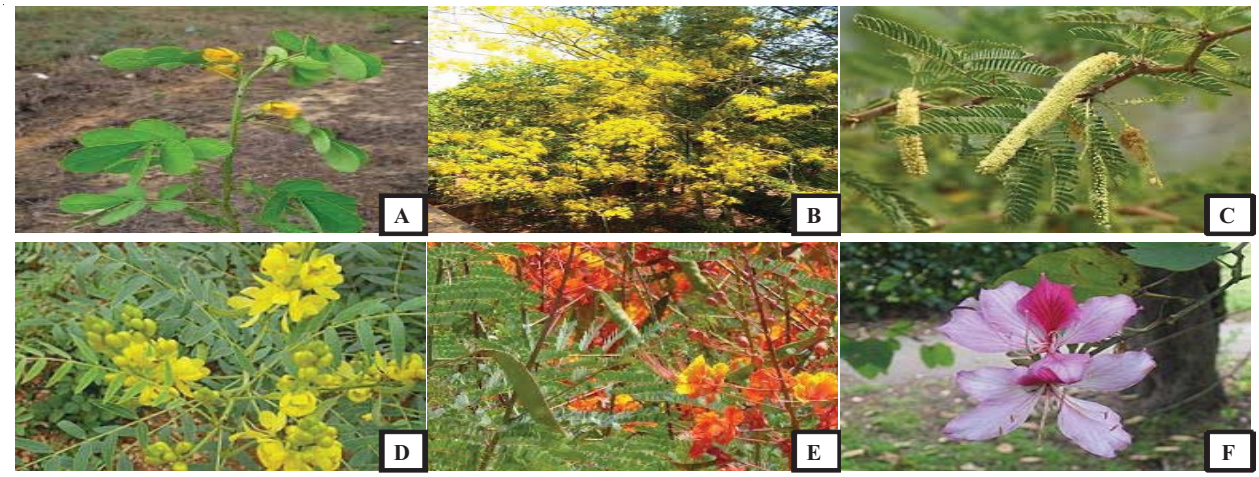

Figure 2- **Plant of Sub Family Caesalpinaceae (A) Casia tora; (B) Casia fistula; (C) Prosopis juliflora; (D)Senna alexandrina; (E) Caesalpina pulchirrima; (F) Bauhinia variagata**

Table 1. 2 Some common crops of family Caesalpinaceae

Casia tora L. (vern. Tarota)	Cassia fistula L. (vern. Amaltas)	Prosopis juliflora Sw. (DC) (vern. Sami)
Senna alexandrina Mill. (vem. Alexandrian Senna)	Caesalpinia pulcherrima L. (Sw) (vern. Barbados Pride)	Delonix regia (Boj ex Hook) Raf. (vern. Flamboyant)
Bauhinia variegata L. (vern. Kachnar)		

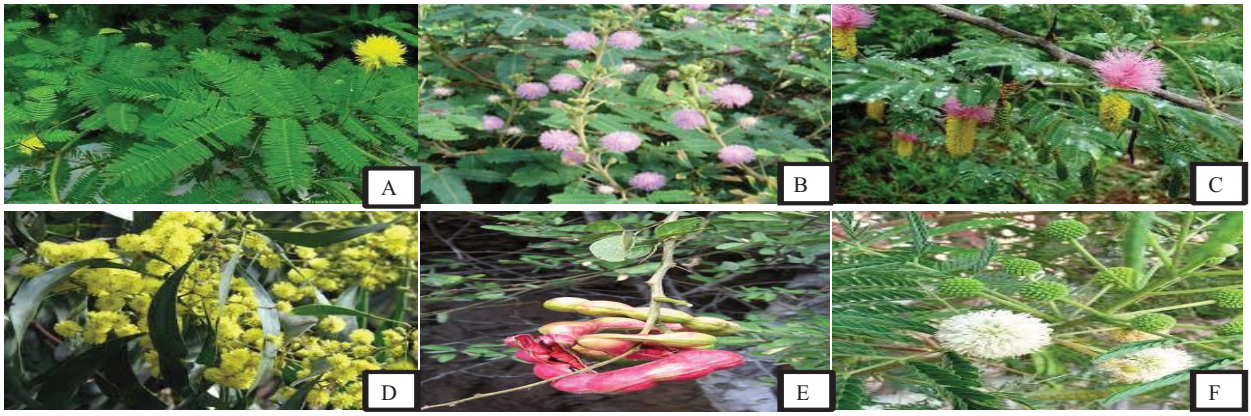

Figure 3- Plants of subfamily Mimmosaceae (A) Neptunia oleracea; (B) Mimmosa pudica; (C) Dicrostachys cinera; (D) Acacia pycnantha; (E) Pithecellobium sp.; (F) Leucaena leucocephala

Table 1.3 Some common horticultural plants of sub family Mimosaceae

Neptunia oleracea Lour. (water mimosa)	Mimosa pudica L. (Lajwanti)	Dicrostachys cinera Wight et Arn. (Sicklebush)
Acacia pycnantha Benth. (Golden Wattle)	Pithecellobium sp. Mart. (blackbeads)	Leucaena leucocephala Lam, (white leadtree)

Problems of Horticulture

The available land for cultivation is being hassled by industrial growth; urbanization and global competition have also nearly finished the probability of agricultural practice in the cultivated lands in the form of horizontal expansion so in a limited area the vertical growth could be an important and convenient method. After green revolution in country, food was produced in ample amount but the nutritional requirement of population could not be fulfilled. For nutritional requirement, production of fruits, vegetables, spices with tuber crops came into the practices. Apart from these achievements there are certain problems in the development of horticultural crops. Horticultural crops are suffered by the price fluctuation because of overproduction, underproduction; indiscriminate exports and lacks of storage facilities for a long period. The governmental policy is required to given sufficient attention for horticulture so that it can play a vital role in per capita income of country. Policy should consist of development of facilities to the centers evolved in the production, cultivation and preservation of the horticultural crops. Quality is also a major problem of a crop, for making our horticultural product spirited in the world market quality should be improved by using different types of' fertilizers specially biofertilizers which are coming under a group called as Plant growth promoting.rhizobacteria (PGPRs). Cost benefit analysis should be also taken into the consideration as a result of execution of World Trade Organization (WTO) the cost of exported horticultural crops should be foreseeable to avoid the danger of large scale import.

Marketing strategies are very important factors for the success of any policy but the lacks of knowledge and understanding about the domestic and export trade one could not predict the potentiality of different areas of a market. The information services through the internet are unavailable from the most area of the country so that all major towns and mandi are not connected with each other properly resulting as a loss of per capita income of the nation. The infrastructure facilities are also a part of good marketing strategy but in our country the facilities like cold chains, cold storage, refrigerated trucks & wagons etc. are few in numbers and at most of the districts not available (Anon, 2001). The plant clinics, soil analysis laboratories, pest control regulation and the financial assistance for these things are not in a good position.

Figure 4- Diagrammatic representation of Problems of Horticulture section.

The role of Human Resource Development in the field of horticulture is very important because it ensures the transfer of new technologies to farmers for implication in the cultivation. The data base of horticultural crops is in a nascent stage, training programs should be organized by the horticultural institutions, short and long training programs for the farmers are not in a regular routine. Organizational support is the backbone for success of any training programs such as National Horticulture Board and Coconut Development Board are providing a lot of initiative to the horticultural crops. Other issues such as the shelf life of the fruits, certification of the horticultural products under Hazard Analysis Critical Control Points (HACCP)1 non- discrimination, reciprocity, market access and fair competition etc. should be improved.

Application of biofertilizers in cultivation of horticultural crops of family Fabaceae

Our available agricultural land is being harassed by the indiscriminate use of chemical fertilizers, synthetics, pesticides and herbicides (Dikshit et al., 2013) which are the one of the most expensive inputs in the horticulture as well as the agriculture. Uncontrolled use of these synthetic chemical in the commercial crops made the soil sick, polluted and unsuitable for the production. These danger conditions could be routed out with the use of biofertilizers which are important sources of natural fertilizers such as PGPRs and which are comprise of symbiotic nitrogen fixing bacteria such as Azotobacter sp., Azospirillum sp. and Beijerinckia sp. and some free living nitrogen fixing bacteria such as Pseudomonas sp. to improve crop productivity. These bacteria are found in the root nodules of leguminous crops and rhizospheric zone of several crops. The crops of Fabaceae are very important for the good agricultural condition because most bacteria, used as biofertilizers are found in the root nodules of these crops which are converting the atmospheric nitrogen into the. usable and significant nitrates. These biofertilizers are less expensive, eco- friendly and easy in handling.

Nanobiofertilizer and their uses in the horticultural crops of Fabaceae

With the increase in the world population food supply is the global concern. To achieve this with a scientific gateway modem technologies and tools can be taken into practices. Since horticulture is the alternate way to the fulfillment the nutritional requirement new technologies such as Nanotechnology would be a very good option which is also the demand of present scenario in different field of science (Dikshit et al., 2013). The surfacing of nanotechnology and the development of new Nanodevices and Nanomaterials opened up the prospective of new applications of biotechnology in agriculture (Srilatha, 2011) and in our daily life. Fertilizers are key factor for the production of any crop production in both developed and developing countries and their importance becomes double when high yielding and fertilizer responsive crop varieties are introduced in the field. The yield of some crops starts to decline after the excessive use of chemical fertilizers because this made the cultivated land sick and polluted. The fertility of these lands could be retrieved by using organic bio-fertilizers. But with the enormous growth of population; to achieve large scale of production more and more nitrogen and phosphorous are amount introduced to improve the efficacy of these fertilizers but by doing this eutrophication like phenomenon as a side effect of over consumptions of Phosphorous and nitrogen will be problematic (Shaviv, 2000; Chinnamuthu and Boopathi, 2009).

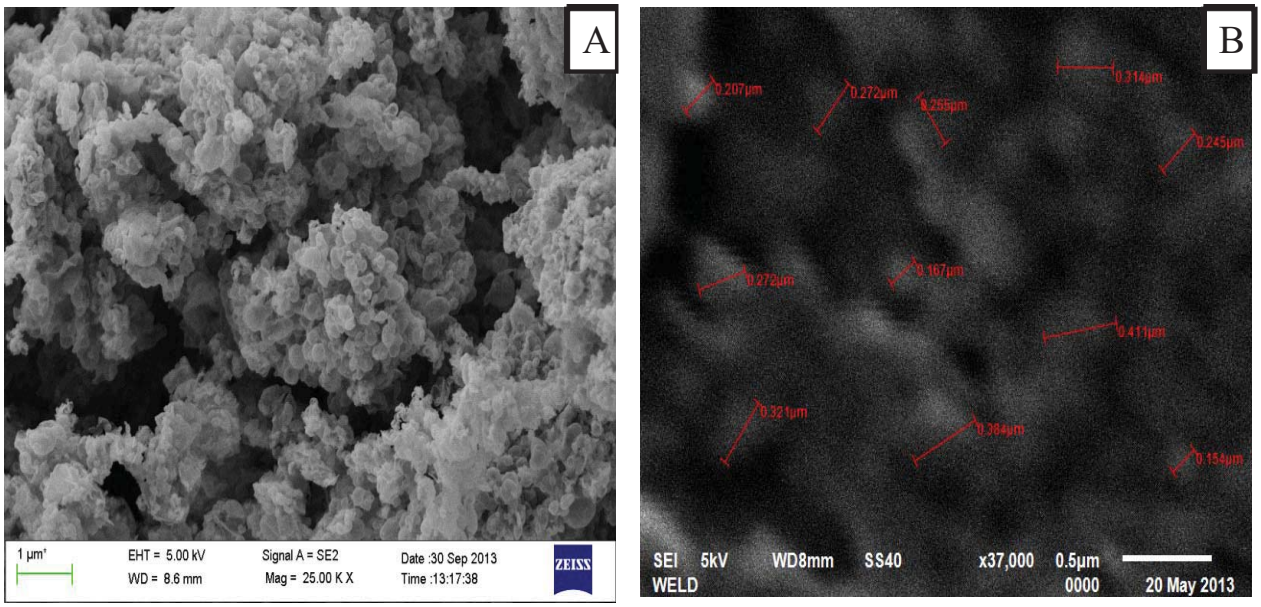

Figure 5- Scanning Electron Micrographs of (A) Silver nanoparticles and (B) Gold nanoparticles.

To avoid the situation in the limited availability of land and water resources and development of horticultural crops of Fabaceae, use of nanomaterials such as Silver and Gold nanoparticles, as a growth promoting materials (Zaidi et al., 2012) could be effective (Dikshit et al., 2013). But use of these nanoparticles directly as fertilizers will be having their own side effect but when these nanoparticles are interacted with biofertilizers such as Pseudomonas fluorescens, Bacillus subtilis and Paenibacillus elgii showing very good growth promotion in vitro condition. These nano-biofertilizers are required in very minute amount in comparison to other fertilizers and their costs are bearable as one litre of nano-biofertilizers can be used in several hectares of crops.

Conclusion

As a result of population explosion, a lot of arable land is stressed due to the urbanization and rest of is being harassed by the uncontrolled use of chemical fertilizer. Food security was achieved after Green revolution, but with the nutritional fulfillment is in the state of suspicions. To achieve the nutritional security in the limited land in the form of vertical production ofvegetables, fruits and flowers by technology based cultivation known as horticulture in the crops are cultivated in the commercial level from individuals up to the industrial level.Fabaceae is one of the most important Families of dicotyledons and crops of this family are largely known for their high nutritional values. These crops are also very useful in the view point of improvement of agricultural land because the symbiotic bacteria which are associated with their root nodules and rhizospheric zones, converts the atmospheric nitrogen into the useful form of nitrates such as Rhizobium sp., Pseudomonas sp. Bacillus sp. There are some major problems in the development of horticultural crops such as improper policy, marketing issues, high prices, not getting good support from organizations etc.

Apart from these, yield as well as the quality of horticultural crops can be improved by using the biofertilizers which are composed of beneficial rhizospheric microbes such as Pseudomonas fluorescens, Bacillus subtilis, Paenibacillus elgii and several species of Rhizobium. For getting higher yield by increasing the efficacy of biofertilizers; over consumption of Phosphorous and Nitrogen are being done resulting in the eutrophication. For avoiding this situation eco-friendly nanoparticles (Silver and gold nanoparticles) are employed along with the biofertilizers as a production of nano-biofertilizers. They are showing very good growth promotion with increase in the concentration such as the nano-biofertilizers made up of with the interaction of Gold nanoparticles and Pseudomonas fluorescens. Since the dosage requirement for the crops is very low and the production of the nanobiofertilizers is cost effective; hence the future of the nano- based horticulture improvement is very bright and will prove to be not only an eco-friendly approach but also an economical methods in sustainable agriculture.

Source of the images- Robert W. Freckmann Herbarium, University of Wisconsin, main street Stevens Point, WI. (Link- http://wisplants.uwsp.edulscripts/familygenera.asp?Family=Fabaceae)

Acknowledgements

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C . A GRO-ECONOMIC RESEARCH

Impact of Mgnrega on Wage Rate, Food Security and Rural Urban Migration: A Consolidated Report *

National Rural Employment Guarantee Act, now Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA from October 2, 2009) was passed in the year 2005. The basic objective of the Act is to ensure livelihood and food security by providing unskilled work to people through creation of sustainable assets. The Ministry of Rural Development strives to implement the Scheme in the most transparent and effective way. Under the provisions of the Act, the state has to ensure enhancement of livelihood security to the households in rural areas by providing at least one hundred days of guaranteed wage employment to every household whose adult members volunteer to do unskilled work. In- built with various transparency and accountability measures and provisions for social audits this Act for the first time brings the role of the State as provider of livelihood. The programme was implemented in 100 most backward districts in the country in the first phase during the financial year 2006-07. The second phase started from the beginning of the next financial year (l st April 2007) whereby another 100 backward districts were added into the list of district where MGNREGA was under implementation. From the beginning of the next financial year, i.e., 1st April 2008, the whole country including the Union Territories were brought under the umbrella of MGNREGA Act. Thus from the financial year 2008-09, MGNREGA has been implemented in the whole country.

The MGNREGA Scheme has high expectations in terms of employment generation, alleviation of poverty, food security, halting migration and overall rural development. As the scheme has already completed 6 years of its functioning, there is a need for a study to evaluate the scheme for its impact on rural poor. Based on this background the study is conceptualized with the following objectives:

Main Objectives

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

The study is based on both primary and secondary data. Primary data was collected from the selected villages and households in 16 states as per the guidelines of the Ministry. From the each selected state, five districts were selected, one each from the north, south, east, west and central locations of the state. From each districts, two villages were selected keeping into account their distance from the location of the district or the main city/town. From each selected village, primary survey was carried out on 20 participants in MGNREGA and 5 non- participants working as wage employed. In this fashion, from each state, 10 villages were selected and a total number of 250 households were surveyed in detail with the help of structured household questionnaire In this way around 200 participants and 50 non participants were selected from each state and data was collected in 16 states. The total sample consists of 3166 participants and 839 non participants. The selected states were, Karnataka, Andhra Pradesh and Kerala in the South, Himachal Pradesh, Uttar Pradesh, Haryana and Punjab in the North, Madhya Pradesh and Chhattisgarh in the Central, Maharashtra, Gujarat and Rajasthan in the West, Bihar and West Bengal in the East and Sikkim and Assam in the North-east. The data was collected through structured questionnaires. The data pertain to the Reference Period of January to December 2009.

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In addition to household questionnaire. a Village Schedule was 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 charges for agricultural operations after the implementation of MGNREGA. The village schedule also has qualitative questions related to change in life style of the villagers taking place during the last one decade. One village schedule in each village was filled up with the help of a 'Group Discussion' with the Pachayat Members, Officials, educated and other well informed people available in the village being surveyed.

Main Findings

Total Employment Generated and Their Socio economic Characteristics

In the three phases of MGNREGA implementation in India from 2006-07 to 2013-14 (up to October) 81 crore households were issued job cards at the country as a whole out of which around 34 crore households were provided employment averaging around 4.5 crore households working in MGNREGA per annum that constitutes roughly around 30 per cent of the rural households in the country as a whole. Andhra Pradesh, Uttar Pradesh and Rajasthan each employed more than 3 crore households during this period. A total number of 1.5 thousand crore man days of employment was generated by MGNREGA during the above mentioned time period. The share of Scheduled. Castes and Scheduled Tribes in the total person days generated was 26.9 and 22.0 per cent, respectively while share of women in the total employment was 48.0 per cent.

At the aggregate, a total number of 45 person days of employment was provided by MGNREGA whereas the target set under the programme is 100 days of employment per household. Highest number of 54 days of employment that is slightly above 50 per cent of the target was achieved only in the year 2009-10. Among the states, highest numbers of days of employment (60 to 70 days) was provided by the north-eastern states of Mizoram, Nagaland, Tripura, Sikkim and Manipur. Rajasthan, Madhya Pradesh and Andhra Pradesh provided between 50 to 60 days of employment. The other states like Chhattisgarh, Himachal Pradesh, Tamil Nadu, Karnataka, Maharashtra, Uttar Pradesh, Jharkhand and Odisha provided 40 to 50 days of employment while Haryana, Jammu & Kashmir, Uttarakhand, Gujarat, Kerala and Assam provided 30 to 40 days of employment. The states that lied at the bottom included Bihar (31 days), Arunachal Pradesh, West Bengal and Punjab (28 days, each) and Goa only 25 days of employment.

Out of the total 34 crore households working in MGNREGA during its full tenure, only 2.9 crore households completed 100 days of employment. Around 25 per cent households working in MGNREGA completed 100 days in Mizoram, 20 per cent in Tripura, 18 per cent in Sikkim and Nagaland each, 16 percent in Rajasthan and 14 per cent in Manipur. Tamil Nadu and Andhra Pradesh were the other states where around 10 to 13 per cent households completed hundred days of employment. Goa, Punjab and West Bengal were at the bottom where only less than 2 per cent households completed hundred days of employment. At the all India aggregate, only 8.4 per cent households completed hundred days of employment during the entire period of MGNREGA in operation up till October 2013.

Number of Projects Completed and Total Amount Spent

Water conservation was the leading activity which occupied around 24 per cent projects under MGNREGA followed by rural connectivity projects 17 per cent, provision of irrigation 14 per cent, drought proofing 13 per cent, land development 10 per cent each, renovation of traditional water bodies and Micro irrigation 6 per cent and flood control 3 per cent.

During the entire period of MGNREGA, a total number of 1 crore projects were completed and around 2.9 crore were ongoing. Thus, out of total 4 crore projects taken up under MGNREGA around 30 per cent were completed and rest of 70 per cent were in progress. A total amount of Rs. 2,35,084 crore was spent on the MGNREGA with an average of slightly less than Rs. 30 thousand crore every year. Working out the total expenditure incurred per project it turns out around Rs. 59 thousand per project for all MGNREGA works undertaken so far at the aggregate.

During the whole period of implementation of MGNREGA a total amount of Rs. 75 thousand crore was spent on rural connectivity, Rs. 45 thousand crore on water conservation, Rs. 27 and Rs. 25 thousand crore on renovation of traditional water bodies and drought proofing, respectively, Rs. 17 thousand crore on provision of irrigation, Rs. 16 thousand crore on land development, Rs.12 thousand crore on micro irrigation,

Rs.11 thousand crore on flood control and around Rs. 6 thousand crore on other activities. At the aggregate, the highest amount per project was spent on renovation of traditional water bodies Rs.121 thousand per project that was closely followed by Rs. 12 thousand per project on rural connectivity. Expenditure on flood control lied on the third place with an expenditure of Rs.79 thousand per project. Micro irrigation had a spending of Rs.53 thousand per project, followed by drought proofing Rs. 49 thousand per project, water conservation Rs. 47 thousand per project, land development Rs. 40 thousand per project and provision of irrigation Rs. 29 thousand per project. Thus, whereas water conservation topped in" the total numbers of projects undertaken but spending on per project was much less on water conservation compared to rural connectivity that topped among all projects not only in the total amount spent but also amount spent per project. State wise highest amount per project was spent in Manipur Rs.297 thousand followed by Nagaland Rs. 245 thousand), Mizoram (Rs. 269 thousand), Tamil Nadu (Rs. 255 thousand), Assam (Rs. 191 thousand) and Maharashtra (Rs. 160 thousand). The states that lied at the bottom in spending per project were Andhra Pradesh (Rs.18 thousand), Gujarat (Rs. 41 thousand), Karnataka and Goa (Rs. 48 thousand), Kerala (Rs. 49 thousand), and Uttar Pradesh (Rs. 54 thousand) only.

Qualitative Indicators of MGNREGA Performance

During 2008-09 to 2013-14 (up to October), a total number of 10.52 crore muster rolls were opened in the country out of which around 85 per cent were verified by the authorities who carried out the auditing work. Social auditing of MGNREGA work of the Gram Panchayats (GP) was held in around 87 per cent of the GPs during the above mentioned period. The social audit was held in above 90 per cent GPs in Tamil Nadu, Madhya Pradesh, Kerala and Nagaland whereas, it was held in less than 60 per cent GPs in Arunachal Pradesh, around 60 to 65 per cent GPs in Jammu & Kashmir and Karnataka. The percentage of works inspected at the district level was very low only 12 per cent whereas the works inspected at the block level was as high as 81 per cent. Almost half of the works were inspected at the district levelin Arunachal Pradesh while proportion of inspected works was half to 1/3rd in Assam, Sikkim, Nagaland and Kerala. In rest of the states, less than 1/3rd works were being inspected at the district level. Complaint redressal system was adopted under MGNREGA and a total number of 215542 complaints were registered in all the states out of which around 84 per cent were redressed. Complaint redressal was 100 per cent in Goa, Arunachal Pradesh, and Mizoram. It was less than 80 per cent in Madhya Pradesh, Maharashtra, Odisha, West Bengal and Gujarat while in rest of the states above 80 per cent complaints were redressed during the above mentioned period.

The Gram Panchayats are encouraged to make payments to the workers through banks or post office. A total number of 41 crore individual and joint accounts were operative in banks and post offices through which payments were made for MGNREGA works during the period 2008-09 to 2012-13. It is interesting to note that out of total amount paid through banks and post offices in MGNREGA during the period 2008-09 to 2012-13, the average amount paid through bank/post office per account was 1.97 lakh. State wise, the highest amount paid per account was in Nagaland (Rs. 24 lakh), Meghalaya (Rs. 9.5 lakh), Mizoram (`6 lakh), Sikkim (Rs.5.8 lakh) and Tripura (Rs.3.8 lakh). The lowest amount was paid in Tamil Nadu (onlyRs.3 thousand), Bihar (Rs.1 lakh) and Gujarat (Rs.1.2 lakh). According to the legislation on MGNREGA, if a member of a household has not been provided employment after issuing him/her a job card after a lapse of 15 days, the GPs are supposed to provide unemployment allowance and such amount would be borne by the concerned state government. During the period 2007-08 to 2013-14 (up to October) unemployment allowance was due for 4.83 crore person days for which employment was not provided to the job card holders but only 2478 days of allowance was paid that makes only 0.01 per cent days of unemployment allowance paid and it was not more than 0.04 per cent in any state.

Household Characteristics Their Income and Consumption Pattern

The average household size was 4.75 with participants having average family size of 4.7 and non participants 4.9. The average numbers of earners in the family were 2.2 members among participating families and 2.6 members among the non participating families. Similarly, the number of members in working age (i.e., 16-60 years) was 74.4 per cent among participants and 73.7 per cent among non participants. Looking at the education status among the selected households, the percentage of illiterate was around 1/3rd among the participants and less than 1/3rd among the non participants. On the overall, non participants were better educated compared to participant household members. Looking at the caste

distribution among the participating households, the percentage of households belonging to Scheduled Caste (SC), Scheduled Tribes (ST) and Other Backward Castes (OBC) was 34, 17 and 34 per cent, respectively while General category had only 16 per cent proportion among the selected households.

The trends in occupation depict that among the participating households, the proportion of work provided by MGNREGA was only a small proportion of their aggregate employment. Out of the total man days employed per household including all the working members, the share of MGNREGA varied between 12 to 32 per cent among different states. It was less than 15 per cent in Karnataka, Kerala, Assam, Gujarat and West Bengal. Its proportion was between 15 to 25 per cent in Uttar Pradesh, Sikkim, Madhya Pradesh, Chhattisgarh, Maharashtra, Himachal Pradesh, Rajasthan, Haryana and Punjab. The share of MGNREGA in total employment was above 25 per cent only in two states namely Bihar and Andhra Pradesh. At the aggregate, MGNREGA provided 18 per cent share in the total employment among our selected households. Casual labour in agriculture and non agriculture sector constituted more than 40 per cent share in employment. Self employment in agriculture and livestock constituted around 20 per cent share and self employment in business and regular salary had around 5 and 10 per cent share, respectively in the total employment among the selected participants.

A glance on the household income statistics reveals that the estimated per household income of non participant households was higher compared to participant households. On an average, the selected non participant households earned Rs.70 thousand per annum compared to Rs.59 thousand earned by the participating households. Comparing the sources of income across different activities, wage income constituted a lion's share in the income of both participating as well as non participating households. Earnings from agricultural wages contributed around 17 per cent followed by wage earnings from non agricultural activities 22 per cent, while wage earnings in MGNREGA activities contributed only 12 per cent share in the total household income of participants. In addition to wage earnings, income from self employment in agriculture and livestock constituted around 17 per cent share of their household income while regular salaried job contributed around 14 per cent share in the household income of the participating households. Trends in share of various sources were somewhat similar in the case of non participating households.

Majority of the states observed household income less than the aggregate average of Rs.59 thousand. Ironically, the states that observed highest household income namely Kerala and Assam, however, had much lower percentage coming from the MGNREGA activity less than 7 per cent in Kerala and only 3 per cent in Assam in the aggregate income. Highest share contributed by MGNREGA in total household income was observed in Maharashtra (29 per cent), followed by Haryana and Sikkim (25 per cent, each), Andhra Pradesh and Punjab (18 per cent, each), West Bengal, Rajasthan, Madhya Pradesh and Uttar Pradesh (each having above 13 per cent share). The dispersion of income across households was highest for agriculture and livestock income for both participant and non participant households while it was comparatively less in MGNREGA activities indicating lesser amount of wage rate differentials in MGNREGA as compared to casual wage rate in agriculture and non agricultural activities.

On average, per capita cereal consumption satisfied the 1200-calorie norm, i.e., total cereal consumption surpassed 10.5 kgs per capita per month by both the participant and non participant households. The average cereal consumption was measured at 11.1 kg per capita per month in the case of participants and 11.6 kg per capita per month in the case of non participants. The states that reported less than 10.5 kg cereal consumption were Bihar, Punjab, Maharashtra and Rajasthan among both participants and non participants. Pulses consumption varied between 0.5 to 3 kg per capita per month among different selected states and it averaged around 1 kg among both the participants and non participants. The diversification of consumption from cereals and pulses towards edible oils, milk and high value products was visible from our data. The quantity of high value commodities like milk and milk products, fruits and vegetables was higher for non participant households compared to participant households as non participants income was also higher compared to participant households.

Total monthly food expenditure among our selected sample averaged at Rs. 421 for the participants and Rs.455 for the non participants whereas NSS food expenditure for all India averaged around Rs.600. The difference between participants and non participants was much higher in the non food expenditure, especially in education, clothing and other items including medical and health. The overall non food expenditure was Rs.237

per capita per month among the participants compared to Rs.271 among the non participants. Our non food expenditure was under estimated as is clear from the much above NSS amount of Rs.453. The difference could be due to under reporting and may be few items missing in our questionnaire like conveyance, consumer services, various entertainment goods, rent, taxes and other durable goods. Comparing food and non-food expenditure, the proportion of food in total expenditure was 64 per cent among the participants and 63 per cent among the non participants. In comparison, share of food expenditure in the NSS data was 57 per cent of total expenditure that also indicate that our non food expenditure was slightly under estimated. Looking at the concentration ratio, the Gini coefficient of income was mostly higher than that of consumption for both participants and non participants. The, higher variation in income compared to consumption shows the more vulnerability of the household in the case of an external shock to the household income and the necessity of households to search for some formal or informal sources of consumption smoothening.

Determinants of Participation in MGNREGA

The logit function provided us the probabilities of the participation of a household in MGNREGA activities. State level regression results showed that the households who had alternate employment opportunities and those who had higher income contribution from other activities had less incentive to work in MGNREGA. The coefficient for employment other than MGNREGA was negative and significant in Sikkim, Haryana, Madhya Pradesh and Chhattisgarh. Coefficient of income other than MGNREGA was significant and negative in Madhya Pradesh, Chhattisgarh, Punjab, Maharashtra and Himachal Pradesh. The household size had significant and positive sign in Karnataka, Andhra Pradesh, Kerala, Haryana, Madhya Pradesh, Chhattisgarh, Punjab, Maharashtra and West Bengal indicating with increase in family size there was more probability of household members working in MGNREGA among the selected households. Household size had significant but negative relationship in Uttar Pradesh and Himachal Pradesh indicating low participation at higher family size in these two states.

The value of assets and land ownership had negative sign in the regression indicating household members with land ownership or better assets accumulation had less probability of participating in MGNREGA activities. The coefficient was significant with a negative sign in Karnataka, Uttar Pradesh, Sikkim, Madhya Pradesh, Assam, Punjab and West Bengal. On the opposite, if a household owned an AA Y or BPL card or if they belonged to Scheduled Caste or Scheduled Tribe community they had higher possibility of entering into MGNREGA work. The coefficient of dummy BPL was found positive and significant in Karnataka, Sikkim and in Haryana. Similarly, coefficient of social characteristics (household belonging to SC, ST and OBC) was found significant and positive in Sikkim, Andhra Pradesh, Chhattisgarh and Maharashtra. From the household OLS regression, the most important and significant variable emerged was wage rate in MGNREGA with a positive sign in almost all the states indicating that with higher wage rate households preferred to work in MGNREGA.

Some interesting relations were observed in the member level logit regression. Among the members in a household, those who worked in MGNREGA had a direct and significant relationship with age and negative relationship with education. The implication is that older age and less educated people preferred to work in MGNREGA as the latter is known providing soft wages. Similarly, the dummy on sex indicates that the male members had higher probability of working in MGNREGA compared to female members although female proportion in total work force constituted around 45 per cent varying in its degree from state to state. The members with BPL and AA Y cards and members belonging to SC and ST community had better probability of working in MGNREGA. The above findings were generally true across the states.

Work Profile under MGNREGA, Wage Structure and Migration Issues

According to our survey data, on average, less than two members (1.7) per family were employed under MGNREGA. Among the selected states, the average exceeded 2 members per family working in MGNREGA in Sikkim, Gujarat, Chhattisgarh and Andhra Pradesh. It was between 1.5 and 2 members in Karnataka, Haryana, Madhya Pradesh, Maharashtra and West Bengal. The states that employed less than 1.5 members per family were Uttar Pradesh, Bihar, Kerala, Assam, Punjab, Himachal Pradesh and Rajasthan. The highest numbers of members employed under MGNREGA among the selected households was found 2.8 members in Sikkim and lowest, 1.07 in Kerala. Out of 1.68 members employed under MGNREGA at the aggregate, 0.98 members belonged to male households and 0.70 members belonged to female

households. Only in Gujarat and Rajasthan, the numbers of female member per household working in MGNREGA exceeded that of male and in Sikkim and Maharashtra their percentage was same. Against the average of 1.68 aggregate members per family, the average was 1.47 for the SCs, 1.67 for STs and 1.53 for the OBCs. The SC and ST households' average was highest 2.63 and 2.53 members in Gujarat and lowest 0.22 and 0.19 members in Bihar, respectively.

On an average, 68 days per household employment was generated among our selected participants. The states that topped in employment generation among our selected participants included Maharashtra (100 days), Haryana (94 days), Himachal Pradesh (92 days) and Rajasthan, Sikkim and Gujarat (slightly above 80 days). The states that were slightly above or below the national average were Madhya Pradesh, Karnataka, Kerala and Uttar Pradesh (between 80 to 60 days). The states that lied at the bottom were Bihar (32 days), Andhra Pradesh (43 days) and Assam (48 days). Looking at the ratio of employment among the male and female workers, numbers of days of employment was shared by male (37 days) and female (30 days) with a per cent share of 56 for male and 44 for female.

Out of 16 states for which analysis is done only in 10 states information about households completing 100 days of employment was available. Among these ten states, the percentage of households who completed 100 days, only in Himachal Pradesh their percentage was exceptionally high (85 per cent). In Haryana and Rajasthan, 48.5 and 44.5 per cent households completed 100 days. In Karnataka and Sikkim around 1/4th of the participant households completed 100 days of employment. In Bihar, Assam, Gujarat and West Bengal only less than 5 per cent households completed 100 days and in Uttar Pradesh around 10 per cent households completed 100 days. At the aggregate, only 1/4th of the selected participants in these 10 states completed 100 days. In other words, MGNREGA was not quite successful in providing social security to the households as households had to depend on other activities for earning their livelihood as MGNREGA provided only 18 per cent share of the total employment to the selected households.

Looking at the wage rate on which employment was provided, average wage rate at the aggregate was recorded at Rs.1 00 and it was not particularly different among male and female. The highest wage was recorded in Haryana (Rs.150), followed by Kerala (Rs.125), Punjab (Rs.123) and Himachal (Rs.110). Among the selected states lowest wage rate was paid in Rajasthan (Rs.80), Chhattisgarh (Rs.83) West Bengal (Rs.84) and Karnataka (Rs.86). However, in most of the states actual wage rate obtained under MGNREGA was below the stipulated minimum wage rate fixed by the states under the Minimum Wages Act 1948. The difference between the actual payment and minimum stipulated wages was specifically high in Karnataka (Rs.33), Maharashtra (Rs.22), Rajasthan and Assam (Rs.21), Madhya Pradesh (Rs.19), Andhra Pradesh and Punjab (Rs.14), Gujarat and Haryana (Rs.12) and Bihar (Rs.10). Last but not the least, the average distance of work place from the residence or village of the households was less than 2 kilometers in all the states with few exceptions.

Among the surveyed households, the highest work under MGNREGA was concentrated on rural connectivity which shared around 40 per cent of the total employment followed by water conservation and water harvesting which shared 17 per cent of employment under MGNREGA. Land development (12 per cent), renovation of traditional water bodies (11 per cent), flood control and protection (8 per cent) and micro irrigation (5 per cent) were the other major activities of employment under MGNREGA. On the question of how was the quality of the assets created through MGNREGA work, a little less than half of the households indicated that the assets created were very good while another half of them indicated that assets created were of the good quality. Only less than 3 per cent households pointed out that the assets created were bad or worst in quality. We enquired the selected households whether after registration if they did not get employment did they receive any unemployment allowance, households indicated that they did not receive any such allowance except in Maharashtra and West Bengal where households received only a poultry amount as unemployment allowance.

Our statistics on migration indicates that around 0.20 members per family (with average size of 4.7 members) migrated because of not getting work under MGNREGA. Out of the selected states, the numbers of per family members migrated because of not getting work averaged at 0.54 in Assam, 0.44 in Rajasthan, 0.31 in Madhya Pradesh and Maharashtra each, 0.20 in Andhra Pradesh, Chhattisgarh and Himachal Pradesh, each and less than 0.1 members in rest of the selected states. Thus, incidences of villagers' migration in search

of work despite having been registered for MGNREGA were still recorded in the surveyed villages. However, there were also incidences whereby around 0.12 members per family among the participant households returned back to the village to work under MGNREGA at the aggregate who hitherto were working elsewhere before the implementation of this Programme. The members retuning back to work under MGNREGA was highest in the state of Bihar where around 0.65 members per family returned back to work under MGNREGA after the implementation of the Act. Among other states, the incidence was recorded in Andhra Pradesh, Rajasthan, Madhya Pradesh and Maharashtra where, on average, 0.1 to 0.2 members per family returned back to work in MGNREGA after implementation of the Act. Punjab, Haryana and Assam were the only states where no such reverse migration incidences were recorded. On the overall, it 'is difficult to say whether the MGNREGA programme has been successful in cutting down the incidences of labour migration from villages in search of job. The majority of the households who returned back to work in MGNREGA pointed out that they were now better off compared to earlier working as a migrant labourer.

The Functioning of MGNREGA- Qualitative Aspects- (Field Survey)

The analysis of assets and borrowing points that participant households were much more vulnerable compared to non participant households. Whereas, participant households owned assets less than half that of non participant households, their borrowing level was almost double that of non participant households. Not only was the loan amount higher for the participants, their proportion of non institutional loan was also much higher. Checking with the financial strength on borrowing, around 10 per cent of participating households indicated that they are doing wage work for those with whom they are indebted, whereas 8 per cent of the non participating households indicated the same. Around half of the selected households pointed out that there was a cooperative society in their village but less than 1/4th of the households were members of such society within their village. Similarly more than 2/3rd majority of the household agreed that there was at least one informal credit society or self help group in their village but only 1/3rd of the selected households were members of such societies. More than 3/4th of all selected households had an account in the bank or post office but only 2 per cent of the selected households had any financial assets, like stock, bond or share of a company. Similarly, less than 15 per cent participant households and around 20 per cent non participant households had a life insurance policy.

On the qualitative questions, a majority of the households indicated that they did not have to pay any bribe to get a job card issued. Regarding irregularities in the job card around 15 per cent households at the aggregate indicated that either, no entry was made in the job card about the work performed under MGNREGA or entries were missing or fake; entries were over written or signature column was blank, while clear cut majority observed no such irregularities. Around 80 per cent of the household were given employment in response to their application for work. All households who did not get work within 15 days indicated that they did not get any unemployment allowances in lieu of not getting work within the period of 15 days after putting up their application for work under MGNREGA.

On the system of payment of wages almost all participating households agreed that wage rate for male and female was same. The payment system was both daily-wage basis and piece rate/task wage basis. In majority of cases, work was measured on collective or team management basis while in a thin majority it was measured on individual work basis. A majority of participant households pointed out that wages were paid either fortnightly or monthly basis but around 12 per cent participants pointed out that they had to wait for a longer period or at least more than a month to realize their wages from MGNREGA work. It is interesting to note that majority of the participants (more than half of them) obtained their wages through bank. Another 40 per cent of the participant indicated that they obtained wage through the post office. Only 5 per cent of the interviewed household obtained their wages through Sachiv/Contractor/Others and this fact makes MGNREGA programmes different from all other employment generation programmes under operation in different states. Further with a few exceptions, the bank accounts were on the individuals' name working in MGNREGA. Among the irregularities in wage payments, the participant households indicated that there was delay in wage payments after the work was finished; the wage paid was less than the task performed and the participants faced problem in accessing post office or bank account and lastly they were not aware on what basis wages were determined in case of those whom wages were not paid on daily wage basis. Delay in wage

payment was reported by highest numbers of participants in Andhra Pradesh, Chhattisgarh, Madhya Pradesh, Gujarat and Rajasthan.

Regarding information about the work to be performed and facilities available at the worksite, around 2/3rd majority of participants pointed out that they were given requisite details of the work to be performed. About the facilities available at the worksite, around 3/4th of the participants agreed that drinking water facility was provided at the worksite. About the facilities like shade for period of rest; child care facilities; first aid kit and primary medicines available at the worksite around 40 to 50 per cent participants replied that these facilities were not available on the work site. Lack of drinking water, child care and medicine facility at the work place was mostly reported by participants in Karnataka, Haryana, Madhya Pradesh and Punjab. around 2/3rd majority of participants pointed out that they were given requisite details of the work to be performed. About the facilities available at the worksite, around 3/4th of the participants agreed that drinking water facility was provided at the worksite. About the facilities like shade for period of rest; child care facilities; first aid kit and primary medicines available at the worksite around 40 to 50 per cent participants replied that these facilities were not available on the work site. Lack of drinking water, child care and medicine facility at the work place was mostly reported by participants in Karnataka, Haryana, Madhya Pradesh and Punjab.

On the monitoring of the MGNREGA functioning more than 80 per cent participants indicated that the work was being monitored through some authority but majority of them did not know whether any auditing of the accounts take place or not. In Haryana around 80 per cent participants indicated that there was no monitoring taking place while 16 per cent expressed their unawareness and only 4 per cent participants indicated that monitoring of MGNREGA work was being held. In all other states more than 60 per cent participants indicated that the work was being monitored. Very few participants lodged any complaint and even who indicated that they lodged a complaint only 7 per cent of them said that their complaints were taken care of.

Around 90 per cent of the participated households pointed out that the work done was useful to the villagers. Only less than 10 per cent households pointed out that the work done was not particularly useful for the villagers. To the question of how long the constructed structure may last, around 30 per cent opined that it may not last more than one year while around 40 per cent expressed hope that the structure will last up to five years. More than 3/4th majority of the participant households pointed out that it was worth to create the structure or in other words, created structure would be useful for the villagers. Similarly, slightly above 2/3rd majority of the households indicated that the structure created was adequate with due attention being paid to it.

Some incidents of migration out of the village as well as migration back to the village (to work under MGNREGA) were cited, but the extent of the same was only miniscule, not leading to the conclusion that MGNREGA had any conclusive evidence of affecting labour migration into any particular direction. Some household members migrating out for job after implementation of MGNREGA among the selected states was observed comparatively higher in Bihar, Gujarat, Assam, Rajasthan and Maharashtra. However, in Bihar and Maharashtra the incidence of family members migrating back to village to work under MGNREGA was also found higher than the other states indicating the reverse migration occurring along with the incidence of migration among the participant households. Regarding the question of villagers' awareness about 'Mahatma Gandhi National Rural Employment Guarantee Act' under implementation in the village, a clear 2/3rd majority of the respondents pointed out that people in the village were aware about the same. However, households were hardly aware about the provision of unemployment allowance under MGNREGA. Similarly, majority of the respondents were not aware about provision of the worksite facilities, mandatory availability of muster rolls at the worksite and list of permissible works under the MGNREGA.

To understand how the MGNREGA programme has affected the general life of villagers we enquired few questions related to participants' day-to-day life. Around 67 per cent participants were of the view that MGNREGA has enhanced food security of the villagers by providing them employment and thus purchasing power to have better access to food. Around 60 per cent participants pointed out that MGNREGA has given' greater independence to women. Around 65 per cent agreed that MGNREGA provided protection against extreme poverty. On the migration issues, around 49 per cent indicated that MGNREGA has helped to reduce distress migration from the village to cities. Similarly, around 50 to 60 per cent pointed out that MGNREGA has reduced indebtedness by generating purchasing power at the local economy.

We further probed the food security issues among the participants. To our question did your family get full two square meals throughout the reference year, around 24 per cent households answered in negative. If the households did not have sufficient food how did they cope up with the situation? Around 37 per cent affected households indicated that they borrowed from some sources to cope up with the situation. Around 13 per cent pointed out that they reduced the numbers of meals during the crisis period while others took other measures like catching fishes or rats etc. The states where maximum number of households indicated not having two square meals among the selected states were the poor

states of Assam and Bihar while in the states of Haryana and Andhra Pradesh no household reported not having sufficient meal during any month of the reference year.

Some Quantification of Qualitative Questions

A 3/4 of majority of those who did not have job card with them did not know the real reason for not having card with themselves while around 1/4th of them replied that the head of the Panchayat (Sarpanch) or contractor had kept it with themselves to make entries in the card or for security reasons. To our question who monitored the functioning of MGNREGA? Around 11 per cent participants said it was supervisor while around the same numbers also indicated that the person was some government official at the block or district level. However, a clear majority (around 50 per cent) named the Gram Panchayat or Panchayat Secretary mainly functioning for the monitoring work of MGNREGA. The rest of the participants (less than 1/3rd) were not knowing whether there was any monitoring being carried out or if so who carries out the same.

On the question how MGNREGA has enhanced food security, a majority of the participants pointed out that by providing employment MGNREGA has helped 'their food security during the working days, moreover by saving some money when they are employed, they now have better food security when they are not employed in MGNREGA as well. However, overwhelming majority indicated that MGNREGA can ensure better food security by guaranteeing at least 100 days employment to every household and the programme would be more useful in ensuring food security if they are also provided food at the work place.

To the question how MGNREGA provided protection against extreme poverty, the respondents were of the view that although MGNREGA provided extra purchasing powerand reduced migration but it could be more effective if it could provide full 100 days work; provide wage on daily basis; stipulated minimum wage are ensured; and poorest people are given top priority. To the question of migration, a significant number of respondents pointed out that to some extent MGNREGA has been successful in reducing the distress migration but it can be more effective in stopping unnecessary migration if 1.00 days work and minimum stipulated wages are ensured. Similarly, respondents agreed that indebtedness to informal sources would also be checked if MGNREGA provides employment to people at higher wage rate compared to prevailing wage rate within the village.

MGNREGA Impact on Village Economy

The surveyed villages had mixed picture with some villages having perfect infrastructure like road, post office, bank, SHG, school, primary health centre, FPS etc., while others had to travel some distance to approach the same. During the last ten years there has been a slight change in the occupation structure in the selected villages. The prevailing wage rates in agriculture were fluctuating widely. Prevailing wage rate in non agricultural sector were much higher compared to the agricultural sector and the level of skilled wages were almost double that of unskilled wages.

Comparing the wage rate over the last five years, i.e. since the time MGNREGA has come into implementation, the wage rate in agriculture sector has increased by slightly less than 50 per cent for male and slightly above 50 per cent for the female. By the same estimates, wage rate for unskilled as well as skilled labour in the non agricultural sector increased by slightly less amount compared to agriculture labour except the wage rate in mining during the same time period. The wage rate for unskilled labour in non agriculture and construction work increased slightly less than the wage rate increase in agriculture while wage rate for skilled labour in mining increased slightly more than agriculture. The wage rate for technical work like electrician, plumber and pump set boring increased by less than that of agriculture (between 35 to 47 per cent). Thus, increase in wage rate in agriculture more than most of the other activities within the village indicate the enhanced demand for wage labourers due to employment works in MGNREGA that goes parallel with the agriculture sector thereby causing a competition in the labour market for the agriculture sector. Increases in charges for agricultural operations per acre on an average were almost similar to increase in agricultural wages as overall wages observed an increase of around 49 per cent compared to around 46 per cent increase in cost of per acre agricultural operations as per our group discussion data.

A majority of the villages indicated shortage of agricultural labour has increased afterthe implementation of MGNREGA. In majority of the villages the shortage of labour was observed during the sowing and harvesting months of kharif and rabi seasons especially in the months of July, August and September and March and April. This was more so after the implementation of MGNREGA. A majority of villagers were of the view that after MGNREGA implementation cost of production in agriculture has increased by 10 to 20 per cent because of scarcity of labour.

On the question, whether workers who earlier migrated out of the village to work in city are now coming back to work in MGNREGA, the trend of villagers returning back to the village to work in MGNREGA was found more prevalent in Andhra Pradesh, Himachal Pradesh, West Bengal, Bihar and Karnataka while reverse was the case in Gujarat and Kerala. But a majority of participants in the discussion indicated that MGNREGA has not made any significant changes in the migration pattern in the village.

Another point of debate was how the MGNREGA has affected living standards of villagers, a clear majority indicated that MGNREGA has not been successful in raising their living standards or their consumption level and the reasons was quoted that the programme has not provided enough numbers of days of work to make a significant dent on the poverty level, although a minority of them were of the view that MGNREGA has been successful in doing so, to some extent. The latter ones indicated that MGNREGA has improved living standards by providing work within the village and by ensuring same wage rate to female as equal to that of male. To another question, whether MGNREGA has changed the trend of attached labour in agriculture, a significant majority said yes as people. were getting better payments within the village compared to agricultural work so the trends of attached labour for the agricultural work were declining. However, MGNREGA has certainly increased people awareness towards Government schemes through increase in the showcasing by television, newspaper, Gram Panchayat and Gram Sabhas and by other means. Among the selected states, in Sikkim, Andhra Pradesh, Kerala, Rajasthan, West Bengal, Uttar Pradesh, Maharashtra and Gujarat, a clear majority of the discussants expressed that the household consumption as well as enrollment· of children in the school have increased after implementation of MGNREGA that has provided extra purchasing power in the hands of the villagers. On the question of awareness almost all states observed increased awareness of the households towards existing government schemes because of their participation in the gram sabha and also because of joint working opportunities in MGNREGA. a significant majority said yes as people. were getting better payments within the village compared to agricultural work so the trends of attached labour for the agricultural work were declining. However, MGNREGA has certainly increased people awareness towards Government schemes through increase in the showcasing by television, newspaper, Gram Panchayat and Gram Sabhas and by other means. Among the selected states, in Sikkim, Andhra Pradesh, Kerala, Rajasthan, West Bengal, Uttar Pradesh, Maharashtra and Gujarat, a clear majority of the discussants expressed that the household consumption as well as enrollment· of children in the school have increased after implementation of MGNREGA that has provided extra purchasing power in the hands of the villagers. On the question of awareness almost all states observed increased awareness of the households towards existing government schemes because of their participation in the gram sabha and also because of joint working opportunities in MGNREGA. "

Villagers' Suggestions to Raise Efficacy of MGNREGA

Among the steps needed to ensure better implementation of MGNREGA, the major ones suggested by the discussants included: increasing working days and wage rate; providing food within the programme; allowing private land development through MGNREGA work for longevity of the programme; and by providing proper information on various aspects of the programme; implementation should be carried out though local bodies and job card should be given in the hands of the workers; quick payment after work.

Policy Suggestions

In the light of above discussion following policy suggestions can be made to improve the functioning of MGNREGA.

➢The MGNREGA has not been successful in providing stipulated 100 days employment to all the registered persons. The reasons expressed by the Panchayat and district officials were many including lack of funds; money not being provided from the Central authorities on time; the gap with which money reaches to the Panchayat officials; and money being provided only for few months and not the whole year. The results of the household survey clearly indicate that unless participants are given work for the stipulated 100 days, MGNREGA shall not be able to make any significant dent on the rural poverty and would fail in its basic objective. Therefore provision of 100 days employment to all the participants should be made mandatory and strict action should be taken against the Panchayats which fail in fulfilling this target. The issue of timely provision of money to the Panchayats should be looked into so that MGNREGA work does not suffer because of lack of funds with the Panchayats.

➢ Another big anomaly was found in the wage rate paid under MGNREGA. Whereas under the MGNREGA Act, Panchayats are ordained to pay at least equal to the minimum wage determined for the state during a particular period. However, the actual wages paid under MGNREGA were found much lower. Among participants in Karnataka, those who were paid equal to or above the stipulated minimum wage, their percentage was only 1.4. Those who were paid Rs. 1 00 or above constituted only 22 per cent and those who were paid between Rs. 80 and Rs. 1 00 their per centage was 63, while the percentage of those paid less than Rs. 80 was around 15. Thus, above 40 per cent of the selected participants were paid less wages by 50 per cent or more compared to the stipulated minimum wage in the state during the reference period. Among the corrections suggested by the households, almost all of them wanted that the minimum stipulated wages should be ensured for all participants irrespective to the nature of work they were involved in.

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paid less than Rs. 80 was around 15. Thus, above 40 per cent of the selected participants were paid less wages by 50 per cent or more compared to the stipulated minimum wage in the state during the reference period. Among the corrections suggested by the households, almost all of them wanted that the minimum stipulated wages should be ensured for all participants irrespective to the nature of work they were involved in.

- In the village analysis it was observed that there seems to be a conflicting interest between the MGNREGA and the farming community. Farmers across the board are feeling that they are facing labour shortage for agricultural activities because of the diversion of labour caused by MGNREGA activities. With a meticulous planning, this problem can be solved without affecting anyone adversely. In our secondary analysis, we saw that MGNREGA has provided not more than 45 days of employment per household at the all India and all states failed in providing stipulated hundred days of employment to all households working in the programme. Even if the stipulated hundred days employment is provided by the MGNREGA, still there is enough scope for the labour force to work in the agricultural sector. There is however need to plan the MGNREGA work at the Panchayat level in such a way that it does not clash with the sowing and harvesting season in agriculture when the demand for agriculture labour is highest. The projects taken up under MGNREGA should be planned in such a way that labour is strictly employed for the project after the sowing and harvesting season of main rabi and kharif crops is over. This planning has to be done at the Panchayat Block and District level depending upon the cropping pattern of the respective regions. It not only would provide necessary labour force for agricultural operations but also would increase employment and income opportunities for the villagers during the off-season including that of marginal and small farmers who do not have enough work at the farm in the off-season.

- Another reason for authorities not being able to provide stipulated days of employment to the participants, as was observed during the field survey, was that many a times Panchayat (or other concerned authorities) ran out of ideas as in what activity labour force should to engaged to keep them working. In many a cases labour force under MGNREGA was used just for digging, clearing jungle, sweeping, dust- cleaning, collecting waste and filling mud into the tractor and so forth as there was no long term durable asset creation work available with the Gram Panchayats. In the qualitative questions, most of the participants appeared to be worried for continuity of the MGNREGA works and suggested for allowing the private farm work under MGNREGA. The idea seems to be quite rational. In the villages where Pachayats fail to have any utility work to be taken up under MGNREGA, rather than making payment for unproductive works which make no value addition, it is better to take up development work on the private farms. The terms and conditions of work can be planned in an intelligent way. The farmer has to pay to the Panchayat for the work done by the labourers at the prevailing rate in the village. The residual amount (difference of the wage paid by the farmer and the stipulated minimum wage for MGNREGA) would be paid to the labourers by the Panchayat. This is a win-win situation for both farmers as well as Panchayat as the amount saved by the Panchayat from the MGNREGA fund can be used for other development work of the village. This will also partly solve the problem of labour shortage in agriculture as being faced at the present. Already provision of irrigation facility, horticulture plantation and land development facilities to land owned by households belonging to the Schedule Castes; Schedule Tribes; BPL families; beneficiaries of land reforms; and beneficiaries under the Indira Awas Yojna have been granted under the Act. Further, the benefits of works on individual lands have been extended to small and marginal farmers vide notification dated 22.7.2009. These should be encouraged by the Panchayat officials and permission should also be granted for land development works for all other farmers as well, the facility to the latter one may be granted on payment basis as explained above.

- Proper punishment system should be put up in place for the unscrupulous officials who are found guilty of indulging in corruption and other untoward activities. Similarly, those Gram Panchayats that work efficiently in running the MGNREGA system should be rewarded and felicitated appropriately.

- The provision of food/grain at the work place and easy institutional credit can attract more villagers, especially the poor ones towards working in MGNREGA and also ensures better food security to the participants.

- The Unique Identification (UID) should be used for the better functioning of MGNREGA Anderson et al (2013). Bank accounts for MGNREGA workers will be linked to the unique biometric id. As a result, the actual transfer of payments will immediately reach the hands of who it is intended for. This would drastically reduce the alleged inherent corruption in the current system and increase the amounts and reliability of payments to the workers.

D. Commodity Reviews

(I) Foodgrains

The rainfall from south-west monsoon (June-September), for the country as a whole, for the period 1 st June to 30th September, 2013 was 106 percent of its Long Period Average (LPA). It was 92 percent of the Long Period Average for the country as a whole in 2012 and 101 percent of the LPA in 2011.

The production estimates of principal crops during 2012-13 are as under:

Crop	Production (in Million tonnes)			
	Normal	2012-13	2011-12	2010-11
Rice	94.02	104.40	105.31	95.98
Wheat	77.04	92.46	94.88	86.87
Coarse Cereals	36.47	40.06	42.04	43.68
Pulses	14.31	18.45	17.09	18.24
Nine Oilseeds	26.92	31.01	29.80	32.48
Sugarcane	312.44	338.96	361.04	342.38
Cotton *	22.66	34.00	35.20	33.00
Jute**	10.27	10.68	10.74	10.01

* Million bales of 170 Kgs each.

** Million bales of 180 Kgs each.

Rice

The production of rice during 2012-13 estimated at 104.40 million tonnes, is lesser by 0.90 million tonnes than last year. The production estimates for kharif and rabi seasons are 92.76 and 11.64 million tonnes respectively.

Wheat

The wheat production during 2012-13 estimated at 92.46 million tonnes, is 2.42 million tonnes less than last year's production.

Coarse Cereals

The production of coarse cereals during 2012-13 estimated at 40.06 million tonnes, is 1.95 is less than the previous year's production. The production for kharif season is estimated at 29.54 million tonnes and for rabi season it is estimated at 10.52 million tonnes.

Pulses

The total pulses production during 2012-13 estimated at 18.45 million tonnes, is 1.36 million tonnes more than last year. The production of gram and tur is estimated at 8.88 and 3.07 million tonnes respectively.

Oilseeds

The production of nine oilseeds during 2012-13 estimated at 31.01 million tonnes is 1.21 million tonnes less than last year. The production of groundnut, soyabean, sunflower, rapeseed and mustard is estimated at 4.75, 14.68, 0.58 and 7.82 million tonnes respectively.

Sugarcane

The sugarcane production is estimated at 338.96 million tonnes, as compared to 361.03 million tonnes last year, i.e. 22.07 million tonnes less than last year.

Cotton

The cotton production is estimated at 34.00 million bales of 170 kgs. each, as against 35.20 million bales last year, an decrease of 1.20 million bales

Jute

Jute production is estimated at 10.68 million bales of 180 kg each against 10.73 million bales last year showing decrease of 0.05 million bales.

1.Wholesale Price Indices

A statement giving all India monthly index number of wholesale prices of foodgrains (Base 2004-2005=100) is given at Annexure-I. On a point to point basis the Wholesale Price Index (WPI) of foodgrains, cereals, rice, wheat and pulses showed a rising trend in 2012-13 as compared to the previous year.

The annual fluctuations are as under:-

Crop/Commodity	**Annual Variation (%) 2012-13(April-March)**
Foodgrains	(+) 14.62
Cereals	(+) 13.42
Rice	(+) 12.69
Wheat	(*.) 15.51
Pulses	(+) 19.57

2. Minimum Support Prices (MSPs)

The Government's price policy for agricultural commodities seeks to ensure remunerative prices to the growers for their produce with a view to encourage higher investment and production, and to safeguard the interest of consumers by making available supplies at reasonable prices. The price policy also seeks to evolve a balanced and integrated price structure in the perspective of the overall needs of the economy. Towards this end, the Government announces each season Minimum Support Prices (MSPs) for major agricultural commodities and organizes purchase operations through public and cooperative agencies.

The Government decides on the support price for various agricultural commodities taking into account the recommendations of the Commission for Agricultural Costs and Prices (CACP), the views of State Governments and Central Ministries as well as such other relevant factors which, are considered important for fixation of support prices.

The Government has fixed the Minimum Support Price (MSPs) of kharif crops of 2013-14 season.The MSPs of paddy (Common)has been fixed at Rs.1310 per quintal and that of Paddy (GradeA) at Rs. 1345 per quintal. The MSP of Arhar (Tur) has been fixed at Rs. 4300 per quintal while that of Moong fixed at Rs. 4500 per quintal.In addition, similar to last year, an additional incentive has been declared Rs.500 per quintal.The MSP of Groundnut-inshell has been fixed at Rs. 4000 per quintal raising it by Rs. 300 per quintal.

The MSPs of Rabi Crops of 2012 - 2013 season to be marketed in 2013 -2014 have been raised over their previous years MSPs. The MSP of Wheat has been raised to Rs. 1400 per quintal and of Barley to Rs. 1100 per quintal. MSP of Gram has been raised by Rs. 120 per quintal and of Masur by Rs. 50 per quintal and fixed at Rs. 3000 per quintal and 2950 per quintal respectively. MSP of Rapeseed / Mustard has been raised to Rs. 3050 per quintal from Rs. 3000 per quintal. Recent trends in the MSPs of different crops may be seen from the statement given at Annexure - II.

3. Procurement

One of the main ingredients of Government's Food Management Policy is procurement of foodgrains, of which, rice and wheat form the bulk of grains procured. These are procured not only with a view to meet the requirements of PDS but also for building up stocks for imparting stability of supplies and prices. While Food Corporation of India is the designated central nodal agency for undertaking price support operations of paddy/rice, wheat and coarse grains, NAFFED undertakes price support operations of pulses and oilseeds.

During 1st October, 2012 to 30th September, 2013, 34028 thousand tonnes of rice was procured as against 35060 thousand tonnes procured during the corresponding period of the previous season. The total procurement of rice during 2011-12 season stood at 35060 thousand tonnes as against 34198 thousand tonnes procured during 2010-11 season.

The procurement of wheat during 2013-14 marketing season till 1st August, 2013 stood at 25092 thousand tonnes as against 38148 thousand tonnes during 2012-13. During 2011-12, procurement of Wheat stood at 28335 thousand tonnes.

Similarly, the procurement of coarse cereals during 2010-11 season up to 30th September 2011 is about 128 thousand tonnes. Where as the procurement of coarse cereals during 2009-10 season was 407 thousand tonnes.

Details regarding state-wise procurement of rice (including paddy converted in rice) during the 2011-12 and wheat during the 2012-13 marketing season etc. are given in the statement at Annexure- III and IV respectively.

Central Issue Prices

Wheat and rice are issued from the central pool to the State "Governments at uniform Central Issue Prices (CIP) for distribution under the TPDS (Targetted Public Distribution System). The CIPs of rice and wheat were not revised during the year under review and stand as under.

Central Issue Price of Foodgrains :

Rice

(Rupees per Quintal)

	APL		BPL	AAY (*)
PERIOD	COMMON*	GRADE "A"	COMMON/ GRADE "A"	
12.7.2001 TO 31.3.2002	795	830	565	300
1.4.2002 TO 30.6.2002	695	730	565	300
1.7.2002 TO TILL DATE	795	830	565	300

* Applicable only to J&K, Himachal Pradesh, N. E. States, Sikkim & Uttaranchal

Wheat

	APL	BPL	AAY(*)
12.7.2001 TO 31.3.2002	610	415	200
14.2002 TO 30.6.2002	510	415	200
1.7.2002 TO TILL DATE	610	415	200

Coarsegrains

	APL	BPL	AAY(*)
with effect from 16.11.2005	70 % of Economic cost	50% of Economic cost	Rs.2.00 Per kg
KMS2008-2009	Rs 4.50 per kg	Rs 3.00 per kg	Rs 1.50 per kg
KMS2009-2010	Rs 4.50 per kg	Rs 3.00 per kg	Rs 1.50 per kg
KMS2010-2011	Rs 4.50 per kg	Rs 3.00 per kg	Rs 1.50 per kg

- Applicable only to J & K, H.P., N.E states, Sikkim and Jharkhand
- APL - Above Poverty Line
- BPL - Below Poverty Line

(*) with effect from December,2000

4. Imports and Exports of Agricultural Commodities

The following statement shows the imports and exports of foodgrains during the Year 2011-12 (Apr. - March) and 2012-13(Apr. - March)

Quantity & Value of Exports and Imports
(2011-12 and 2012-13)
Exports

Quantity in '000 tonnes
Value : Rs. In crores

Commodity	April, 2011- March, 2012		April, 2012- March, 2013(P)	
	Quantity	Value	Quantity	Value
Pulses	174.20	1065.84	201.65	1279.90
Rice Basmati	3178.18	15449.60	3456.52	19391.31
Rice (other than Basmati	3997.72	8659.73	6663.66	14416.90
Wheat	740.75	1023.27	6471.98	10488.35
Other Cereals	4073.69	5492.92	5463.44	8217.22
Total Exports		**1465959. 39**		**1634672.95**

Imports

Commodity	**April, 2011- March, 2012**		**April, 2012- March, 2013(P)**	
	Quantity	Value	Quantity	Value
Pulses	3364.80	8931.24	3837.56	12738.64
Wheat	0.02	0.08	2.94	6.03
Rice	1.06	5.48	0.70	3.94
Other Cereals	15.36	30.04	45.15	110.60
Total Imports		**2345463.24**		**2669839.78**

P-Provisional

Source: DGCI&S, Ministry of Commerce, Kolkata.

5. Buffer Stocks

The stocks of foodgrains held by the government agencies as on 1st January, 2014 stood at 427.45 lakh tonnes as against 666.04 lakh tonnes during the corresponding period of last year. A total minimum stock of 319.00 lakh tonnes is required to be maintained as on 1 st July, under the buffer stocking policy.

ANNEXURE

MONTHLY AVERAGE OF WHOLESALE PRICE INDEX

(Base 2004-05 =100)

COMMODITY	WEIGHT	YEAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	AVERAGE
FOOD GRAINS	4.08982	2010-11	171.8	172.2	173.4	174.2	174.4	174.0	173.4	174.4	175.2	176.4	178.2	175.6	174.4
		2011-12	175.5	176.7	177.0	178.6	180.2	180.8	182.9	182.4	182.1	183.3	183.5	185.6	180.7
		2012-13	188.9	190.4	193.3	199.8	207.6	212.0	214.1	215.3	'215.8	216.3	216.0	216.1	207.1
		2013-14	216.5	216.8	221.4	224.4	226.1	228.2	229.2	229.8					
CEREALS	3.37323	2010-11	165.2	165.0	166.3	167.4	168.7	169.3	169.0	171.7	172.6	173.5	175.0	172.3	169.7
		2011-12	172.5	174.5	174.7	176.1	177.4	176.3	176.3	175.4	175.6	177.4	178.2	180.3	176.2
		2012-13	184.3	184.3	186.3	190.3	196.5	201.6	205.0	206.7	209.1	210.4	211.4	212.5	199.9
		2013-14	212.9	213.7	219.6	224.0	227.1	228.7	229.6	230.1					223.2
Rice	1.79348	2010-11	163.5	163.5	164.3	165.9	164.4	166.6	168.7	170.3	171.1	170.6	170.4	167.0	167.2
		2011-12	167.3	169.7	169.0	169.9	172.9	173.3	176.3	175.4	173.1	172.2	173.0	175.4	172.3
		2012-13	177.3	178.0	181.6	186.8	190.8	195.1	202.7	202.2	202.7	202.8	203.7	206.2	194.2
		2013-14	207.6	210.9	218.7	226.3	231.5	231.4	234.5	232.5					224.2
Wheat	1.11595	2010-11	168.9	168.1	168.8	167.8	172.5	171.6	168.2	172.7	173.3	175.2	177.1	173.1	171.4
		2011-12	169.2	167.4	168.7	170.8	168.9	166.9	165.3	164.3	166.6	169.2	170.1	172.1	168.3
		2012-13	179.3	178.7	180.1	181.8	190.8	198.4	198.0	202.5	204.3	206.2	207.2	205.4	194.4
		2013-14	203.6	200.8	205.2	206.6	208.7	212.9	213.6	217.1					208.6
PULSES	0.71662	2010-11	202.5	206.2	206.8	205.8	201.7	196.5	194.1	187.2	187.2	189.9	193.4	191.0	196.9
		2011-12	189.6	187.2	187.5	190.4	193.1	202.2	214.0	215.2	212.9	210.8	208.6	210.3	201.8
		2012-13	211.0	218.6	226.1	244.8	259.8	260.8	256.5	255.6	247.5	244.3	237.7	233.1	241.3
		2013-14	233.2	231.6	229.7	226.6	221.6	225.8	227.8	228.6					228.1

Annexure II

(According to Crop Year) (As on 17-10-2013)

SI. No	Commodity	Variety	MSP 2012-13 2009-10	2010-11	2011-12	2012-13	(#) increase in MSP 2012-13 over 2011-12	MSP 2013-14 2013-14	(#) increase in MSP 2013-14 over 2012-13
	KHARIF CROPS								
1	PADDY	Common	950$	1000	1080	1250	170(15.7)	1310	60(4.8)
		Grade 'A'	980$	1030	1110	1280	170(15.3)	1345	65(5.1)
2	JOWAR	Hybrid	840	880	980	1500	520(53.1)	1500	-
		Maldandi	860	900	1000	1520	520(52.0)	1520	-
3	BAJRA		840	880	980	1175	195(19.9)	1250	75(6.4)
4	MAIZE		840	880	980	1175	195(19.9)	1310	135(11.5)
5	RAGI		915	965	1050	1500	450(4'2.8)	1500	-
6	ARHAR(Tur)		2300	3000¶	3200¶	3850	650(20.3)	4300	450(11.7)
7	MOONG		2760	3170¶	3500¶	4400	900(25.7)	4500	100(2.3)
8	URAD		2520	2900¶	3300¶	4300	1000(30.3)	4300	-
9	COTTON	Medium Staple	2500[a]	2500[a]	2800[a]	3600	800(28.6)	3700	100(2.8)
		Long Staple	3000[a a]	3000[a a]	3300[a a]	3900	600(18.2)	4000	100(2.6)
10	GROUNDNUT IN SHELL		2100	2300	2700	3700	1000(37.0)	4000	300(8.1)
11	SUNFLOWER SEED		2215	2350	2800	3700	900(32.1)	3700	-
12	SOYABEEN	Black	1350	1400	1650	2200	550(33.3)	2500	300(13.6)
		Yellow	1390	1440	1690	2240	550(32.5)	2560	320(14.3)
13	SESAMUM		2850	2900	3400	4200	800(23.5)	4500	300(7.1)
14	NIGERSEED		2405	2450	2900	3500	600(20.7)	3500	-
	RABI CROPS								
15	WHEAT		1100	1120$	1285	1350	65(505)	1400	50(3.7)
16	BARLEY		750	780	980	980	0(0.00)	1100	120(12.2)
17	GRAM		1760	2100	2800	3000	200(7.14)	3100	100(3.3)
18	MASUR (LENTIL)		1870	2250	2800	2900	100(3.57)	2950	50(1.7)
19	RAPESEED/MUSTARD		1830	1850	2500	3000	500(20.00)	3050	50(1.7)
20	SAFFLOWER		1680	1800	2500	2800	300(12.00)	3000	200(7.1)
21	TORIA		1735	1780	2425	2970	545(22.47)	3020	50(1.7)
	OTHER CROPS								
22	COPRA	Milling	4450	4450	4525	5100	575(12.7)	5250	150(2.94)
	(Calender Year)	Ball	4700	4700	4775	5350	575(12.0)	5500	150(2.80)
	DE-HUSKED COCONUT								
23	(Calender Year)		1200	1200	1200	1400	200(16.7)	1425	25(1.79)
24	JUTE		1375	1575	1675	2200	525(31.3)	2300	100(4.55)
25	SUGARCANE*		129.84	139.12	145.00	170	25(17.2)	210.00	40(23.5)

Figures in brackets indicate percentage increase.

$ An additional incentive bonus of Rs. 50 per quintal was payable over the Minimum Support Price(MSP).

[a] Staple length (mm) of 24.5 - 25.5 and Micronaire value of 4.3 - 5.1

[a a] Staple length (mm) of 29.5 - 30.5 and Micronaire value of 3.5 - 4.3

¶ Additional incentive at the rate of Rs. 500 per quintal of tur, urad and moong sold to procurement agencies was payable during the harvest arrival period of two months.

* Fair and remunerative price.

Procurement of Rice

Annexure III
(000 Tonnes)

STATE	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14*
Andhra Pradesh	9061	7555	9609	7548	6471	2039
Assam	3	8	16	23	20	0
Bihar	1083	890	883	1534	1303	45
Chandigarh	10	14	10	13	12	12
Chhatisgarh	2848	3357	3746	4115	4804	4076
Haryana	1425	1819	1687	2007	2609	2396
Jharkhand	135	23	0	275	215	0
Karnataka	107	86	180	356	59	0
Kerala	237	261	263	376	240	0
Madhya Pradesh245	255	516	635	898	925	
Maharashtra	261	229	308	190	192	81
Orissa	2790	2496	2465	2866	3613	880
Punjab	8553	9275	8635	7731	8558	8105
Rajasthan	11	0	0	0	0	0
Tamil Nadu	1199	1241	1543	1596	481	104
Uttarakhand	349	375	422	378	497	193
Uttar Pradesh	3687	2901	2554	3357	2286	555
West Bengal	1667	1240	1310	2041	1766	344
Others	14	9	51	19	4	0
Total:	**33685**	**32034**	**34198**	**35060**	**34028**	**19755**

*** -As on 22.01.2014**

Source: Department of Food and Public Distribution.

Procurement of Wheat

Annexure IV
(000 Tonnes)

State/Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14*
Bihar	500	497	183	556	772	0
Chandigarh	10	12	9	7	17	8
Gujarat	415	75	1	105	156	0
Haryana	5237	6924	6347	6928	8665	5873
Madhya Pradesh	2410	1968	3538	4965	8493	6355
Punjab	9941	10725	10209	10958	12834	10897
Rajasthan	935	1152	476	1303	1964	1268
Uttar Pradesh	3137	3882	1645	3461	5063	683
Uttarakkhand	85	145	86	42	139	5
Others	19	2	20	10	45	3
TOTAL	22689	25382	22514	28335	38148	25092

* - As on 1.08.2013

Source: Department of Food and Public Distribution.

(ii) Oilseeds and Vegetable Oils

Introduction

India is among the largest oil economies in the region/ world. The country also occupies a distinct position in terms of diversity in annual oilseed crops. The prevailing agro-ecological conditions have been favorable for growing several important oilseeds, including edible oilseeds namely, groundnut, rapeseed- mustard, soybean, sunflower, safflower, sesame and niger and non-edible oilseeds namely, castor and linseed. In addition, a wide range of other minor oilseeds and oil bearing tree species add to the diversity as well as oilseed production in the country. Among the oilseed crops, groundnut, rapeseed- mustard and soybean recorded a major share, in terms of both area (82 per cent) and production (90 per cent), of oilseeds in the country.

The annual vegetable oilseeds are cultivated in 20 states· of which eight states, namely, Madhya Pradesh, Rajasthan, Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Uttar Pradesh and Tamil Nadu accounted for nearly 90 per cent of the oilseeds area and production in the country.

Area and Production

Area under Nine oilseeds increased from 26308.0 thousand hectares in 2011-12 to 26484.42 thousand hectares in 2012-13 registering a rise of 0.67 percent over the previous year.

The production of Nine Oilseeds increased from 29798.6 thousand tonnes in 2011-12 to 30941.19 thousand tonnes in 2012-13 thereby registering an increase of 3.83 percent compared to the previous year. Area and Production of nine oilseeds in the country for the year 2011-12 and 2012-13 are given in the following table:-

Area, Production and Yield of Oilseeds

Crop	Area (000 Hectares)		Production (000 Tonnes)	
	2011-12	2012-13	2011-12	2012-13
Groundnut	5263.7	4721.05	6963.7	4695.30
Castor seed	1470.9	1233.59	2294.9	1963.47
Sesamumseed	1901.5	1705.76	810.3	685.10
Niger seed	364.4	310.41	98.1	100.83
Rapeseed & Mustard	5893.5	6362.59	6603.7	8028.93
Linseed	322.6	296.27	152.5	148.59
Safflower seed	250.4	183.55	145.3	108.51
Sunflowerseed	731.9	830.51	516.6	544.09
Soyabean	10109.1	10840.73	12213.5	14666.45
Total Nine Oilseeds	**26308.0**	**26484.42**	**29798.6**	**30941.19**

Source: DES, Ministry of Agriculture

Prices of Oilseeds

The annual average variation in WPI of oilseeds and edible oils as a group in 2012-13 exhibited an increase of 23.2 percent and 6.7 percent, respectively over the previous year. The wholesale price indices of oilseeds and edible oils during the year 2011-12 and 2013 are given in the following table:-

Index Number of Wholesale Prices of Oilseeds and Edible Oils (Group)

(Base Year: 2004-05=100)

Months	Oilseeds			Edible Oils		
	2011-12	2012-13	% variation over the previous year	2011-12	2012-13	% variation over the previous year
July	156.2	196.0	25.5	133.7	148.2	10.8
August	161.3	207.8	28.8	135.6	1504	10.9
September	160.3	207.0	29.1	136.3	150.9	10.7
October	154.5	196.6	27.2	135a	148.1	9.4
November	154.6	201.9	30.6	135.4	148.5	9.8
December	156.9	204.0	30.0	137.0	149.6.	9.2
January	163a	207.6	27.1	139.2	149.7	7.5
February	164.3	204.3	24.3	139.3	149.1	7.0
March	171.3	205.1	19.7	141.6	146.7	3.6
April	178.0	210a	18.2	144.2	147.1	2.0
May	183.8	207.3	12.8	145.8	147.1	0.9
June	184.1	202A	9.9	146.1	146.2	0.1
Average	165.7	204.2	23.2	139.1	148.5	6.7

Source: Office of Economic Adviser

Range of wholesale prices of some of the important oilseeds and oils at important centres during the last two years (July- June) are given in the following table:-

Wholesale Price of Important Oilseeds and Oils

(Rs. Per Quintal)

Commodity/Centre	Centre	Variety	2011-12		2012-13	
			Min	Max	Min	Max
Groundnut						
Gujarat	Rajkot	With-Shell	3100	4840	3875	5360
Groundnut OIL (15 KG)						
Gujarat	Rajkot		1433	2120	1680	2200
RAPESEED & MUSTARD						
Uttar Pradesh	Kanpur	Black	2660	3450	3160	4190
DELHI		Laha	2950	3865	3390	4475
MUSTARD OIL (15 KG)						
Uttar Pradesh	Kanpur	K.G	998	1256	1170	1380
DELHI			1100	1450	1150	1500
SESAMUM SEED						
ANDHRA PRADESH	Hyderabad		3800	5500	6000	7500
SESAMUM OIL (15 KG)						
ANDHRA PRADESH	Hyderabad		1320	1500	1575	2000
TAMILNADU	Chennai		1575	1875	1913	3300
Coconut Oil						
KERALA	Kozhikode	Clean	885	1500	900	1140
Tamil Nadu	Chennai	KPL	1320	1755	1245	1470
Cottonseed						
Haryana	Rohtak		1550	1550	1550	1550

Source : DES

Minimum Support Price (MSP)

The Government's price policy for oilseeds seeks to ensure remunerative prices to the growers for their produce with a view to encourage higher investment and production, and to safeguard the interest of the consumers by making available supplies at reasonable prices. The price policy also seeks to evolve a balanced and integrated price structure in the perspective of the overall needs of the economy. Towards this end, the Government fixes the Minimum Support Price (MSP) for major agricultural commodities, taking into account the recommendations of the Commission for Agricultural Costs and Prices (CACP), the views of State Governments and Central Ministries as well as other important factors which are considered relevant for fixing the MSP.

MSP is in the nature of a minimum guaranteed price for the farmers offered by the Government for their produce in case the market prices fall below that level. If the market offers higher price than MSP, the farmers are free to sell their produce at that price.

The Rationale Behind Determination of MSP Includes:

(i) the need to provide incentive to the producer/ farmer for adopting improved technology and developing a production pattern broadly in the light of national requirements;

(ii) the need to ensure rational utilization of land, water and other production resources;

(iii) the likely effect of the price policy on the rest of the economy, particularly on cost of living, level of wages, industrial cost structure, etc. and

(iv) the terms of trade between agricultural and non-agricultural sector.

Minimum Support Price of Oilseeds

(Rs. per Quintal)

	Minimum Support Price (MSP)	
Oilseeds	2012-13	2013-14
R/ Mustard	3000	3000
Groundnut	3700	4000
Soyabean(Yellow)	2240	2560
Soya bean (Black)	2200	2500
Sesamum	4200	4500
Sunflower	3700	3700
Niger seed	3500	3500
Safflower	2800	2800
Copra (Ball)	5350	5500
Copra (milling)	5100	5250
Copra(Dehusked)	1400	1425

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(iii) Potato

Introduction:

In India, potato is cultivated in almost all states and under very diverse agro climate conditions. The states of Uttar Pradesh, Uttaranchal, West Bengal, Punjab, Bihar and Gujarat accounted for 83.21 per cent share in total production.

Area

The Area under potato in 2012-13 was estimated at 19.92 lakh hectares as against 19.06 lakh hectares in 2011-12 thereby representing an increase of 4.5% over the previous year. The increase in area under potato cultivation in major states was reported in Bihar, Gujarat, Haryana, Jharkhand, Madhya Pradesh, Uttaranchal, Punjab, Uttar Pradesh and West Bengal registered highest increase in area under potato cultivation.

Production

The All India production of Potato increased from 414.83 lakh tones in 2011-12 to 453.44 lakh tones in 2012-13. It showed an increase of 9.3% over the previous year. The following table gives the State-wise estimates of Area and Production of Potato for the year 2011-12 and 2012-13:

Area (000 Hect.), Production (000 MT)

States	2011-12		2012-13	
	Area	**Production**	**Area**	**Production**
Andhra Pradesh	4.92	98.38	9.48	189.60
Arunachal Pradesh	4.60	40.00		
Assam	89.38	783.40	99.77	975.27
Bihar	315.17	6101.69	322.46	6640.55
Chhattisgarh	41.20	579.18	43.35	648.62
Gujarat	80.70	2395.54	81.27	2499.73
Haryana	27.82	618.85	29.47	676.02
Jharkhand	45.75	652.79	47.21	659.61
Karnataka	45.40	483.00	44.40	698.30
Madhya Pradesh	87.89	1816.68	108.87	2299.00
Maharastra	18.00	360.00	14.00	321.00
Meghalaya	17.84	164.75	18.14	172.96
Orissa	14.19	201.05	14.14	201.06
Punjab	84.11	2103.97	85.25	2132.31
Rajasthan	11.86	178.02	9.17	107.20
Uttar Pradesh	567.66	14125.08	603.76	14430.28
Uttaranchal	25.03	433.82	25.04	434.44
West Bengal	376.75	9693.33	386.61	11591.30
Others	48.71	653.26	49.83	666.35
All India	**1906.98**	**41482.79**	**1992.22**	**45343.60**

Source: NHRDF

Price Behaviour

During the agricultural year 2011-12 and 2012-13 the Wholesale Price Index (WPI) of Potato showed a fluctuating trend. The annual average of Wholesale Price Index of potato during 2012-13 was higher by 36.62 percent over the previous year. The table below shows the Wholesale Price Index of Potato and the percentage variation for the year 2011-12 and 2012-13.

Monthly & Annual Average of Wholesale Price Index of Potato

(Base Year 2004-05 =100)

Month	2011-12	2012-13	% Variation over the Previous Year
July	143.1	247.9	73.24
August	154.8	264.3	70.74
September	159.2	242.7	52.45
October	154.9	231.0	49.13
November	140.3	235.5	67.85
December	110.8	175.1	58.03
January	98.9	171.2	73.10
February	105.9	159.0	50.14
March	126.6	146.6	15.80
April	173.8	172.7	-0.63
May	203 .5	206.1	1.28
June	232.8	213.3	-8.38
Annual Average	150.38	205.45	36.62

Source: Office of Economic Adviser, Ministry of Commerce & Industry.

Price Policy of Potato

Potato being one of the Horticultural crops, is not covered for declaring its MSP. However, under its agricultural price policy, Government of India implements the Market Intervention Scheme (MIS) for the crops (including potato) which are not covered under the MSP. The MIS is implemented on the request of State/UT Government. The objective is to protect the growers of these commodities from incurring losses due to distress sale in the event of bumper crop. Procurement under MIS is made by National Agricultural Cooperative Marketing Federation (NAFED) as Central Agency and the designated State agencies. Losses incurred if any, by the procuring agencies are shared between Central Government and concerned State Government on 50:50 basis (75:25 in case of North Eastern States).

(iv) Onion

Introduction

Onion (*Allium cepa L*) is extremely important vegetable crop not only for internal consumption but also as highest foreign exchange earner among the fruits and vegetables. It occupies an area of 1051.55 thousand ha, with production of 16813.00 thousand tons.

In India, three crops of onion are grown: Rabi (March-June), Kharif (October- December) and late Kharif (January-March). The period from July to September/October is reported to be the lean period for the production of onion and markets are more or less dependent on the stored onion of the rabi crop.

Area

The Area under onion in 2012-13 was estimated at 1051.55 thousand hectares as against 1087.26 thousand hectares in 2011-12 thereby representing a decline of 3.28% over the previous year. The increase in area under cultivation was reported in Andhra Pradesh, Chhattisgarh, Haryana, Jharkhand, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttaranchal and West Bengal. However, the area under cultivation decreased in Bihar, Karnataka, Gujarat, Orissa and Maharashtra.

Production

The All India production of Onion decreased from 17511.10 thousand tones in 2011-12 to 16813.00 thousand tones in 2012-13. It showed an decrease of 3.99% over the previous year. The following table gives the State-wise estimates of Area, Production and percentage variation of Onion for the period 2011-12 and 2012-13:

Area (000 Hect.), Production (000 MT)

State	2011-12		2012-13	
	Area	**Production**	**Area**	**Production**
Andhra Pradesh	48.52	824.77	86.67	1560.06
Bihar	53.81	1236.74	53.02	1107.84
Chhattisgarh	13.94	222.21	17.95	269.28
Gujarat	61.30	1562.20	28.85	704.38
Haryana	27.45	589.83	27.80	604.47
Jammu & Kashmir	2.85	65.27	2.85	65.27
Jharkhand	15.70	318.19	17.21	322.15
Karnataka	177.20	2451.20	159.60	2395.90
Madhya Pradesh	88.07	1957.00	111.73	2691.00
Maharastra	382.00	5638.00	260.00	4660.00
Orissa	35.16	418.99	34.92	419.09
Punjab	8.24	182.69	8.26	183.65
Rajasthan	73.46	664.22	139.05	476.21
Tamil Nadu	37.12	556.45	37.70	429.72
Uttar Pradesh	23.69	383.47	26.63	474.01
Uttaranchal	3.81	39.27	3.82	39.40
West Bengal	21.68	304.56	22.00	309.10
Others	13.26	96.04	13.49	101.47
Total	1087.26	17511.10	1051.55	16813.00

Source: NHRDF, Ministry of Agriculture

Price Behaviour

During the agricultural year 2011-12 and 2012-13, the Wholesale Price Index (WPI) of Onion showed a fluctuating trend, The annual average of Wholesale Price Index of onion at 269.03 in 2012-13 is higher than the annual average of Wholesale Price Index of 182.84 in previous year, *i.e.* 2011-12.

The table below shows the Wholesale Price Index of Onion for the year 2011- 12 and 2012-13.

Monthly and Annual Average of Wholesale Price Index of Onion

(Base Year 2004-05 =100)

Month	2011-12	2012-13	% Variation over the Previous Year
July	200.9	180.7	-10.05
August	244.8	194.1	. -20.71
September	257.6	194.0	-24.69
October	231.3	210.2	-9.12
November	222.9	259.8	16.55
December	180.1	311.2	72.79
January	151.0	340.0	125.17
February	133.8	377.8	182.36
March	136.0	286.6	110.74
April	139.6	266.4	90.83
May	138.2	268.5	94.28
June	157.9	339.1	114.76
Annual Average	182.84	269.03	4714

Source: Office of Economic Adviser, Ministry of Commerce & Industry.

Price Policy of Onion

Onion being one of the Horticultural crops, is not covered for declaring its MSP. However, under its agricultural price policy, Government of India implements the Market Intervention Scheme (MIS) for the crops (including onion) which are not covered under the MSP. The MIS is implemented on the request of State/UT Government. The objective is to protect the growers of these commodities from incurring losses due to distress sale in the event of bumper crop. Procurement under MIS is made by National Agricultural Cooperative Marketing Federation (NAFED) as Central Agency and the designated State agencies. Losses incurred if any, by the procuring agencies are shared between Central Government and concerned State Government on 50:50 basis (75:25 in case of North Eastern States).

(V) Condiments and Spices

Introduction

Spices are high value and low volume commodities of commerce in the world market. All over the world, the fast growing food industry depends largely on spices as taste and flavour makers. Health conscious consumers in developed countries prefer natural colours and flavours of plant origin to cheap synthetic ones. Thus, spices are the basic building blocks of flavor in food applications.

India has been a traditional producer, consumer and exporter of spices. There are about 109 spices listed by International Organization for Standardization and India grows about 60 of these spices. Almost all the States in the country produce one or other spices.

Spices constitute an important group of horticultural crops and are defined as vegetable products or mixture thereof, free from extraneous matter.' used for flavouring, seasoning and imparting aroma in foods. The term applies equally to the product in the whole form or in the ground form. India is known as the home of spices and produces a wide variety of spices like black pepper, cardamom (small and large) ginger, garlic, turmeric, chilli and a large variety of tree and seed spices.

Major Producing States

Almost all the states grow one or more spices. The major spice producing states are Andhra Pradesh, Kerala,Gujarat, Rajasthan, Maharashtra, West Bengal, Karnataka, Tamil Nadu, Orissa and Madhya Pradesh. N.E. region and Andaman & Nicobar Islands have also been identified as potential areas for spice cultivation. While black pepper and small cardamom are mainly confined to south India, ginger and turmeric are grown in S.E, N.E. region and in many other states. Large cardamom is mainly confined to Sikkim. Cumin, coriander and fenugreek are mainly confined to northern states.

During the crop year 2012-13 the country produced about 5805 thousand tons from 3100 thousand hectares of area under spices (Table 1).

TABLE 1: ALL INDIA AREA AND PRODUCTION OF SPICES

Commodity	2011-12		2012-13	
	Area (000 Hectares)	Production (000 Tonnes)	Area (000 Hectares)	Production (000 Tonnes)
Spices	3212.47	5951.46	3100.94	5805.73

Sources: Agricultural At a Glance, DES.

Price Behavior

During the agricultural year 2011-12 and 2012-13 the Wholesale Price Index (WPI) of Spices as a group showed a fluctuating trend. The annual average of Wholesale Price Index of Spices during 2012-13 was lower by 4.17 percent over the previous year. The wholesale price index of Spices which stood at 204.0 in July, 2012 increased to 232.0 in May, 2013. However, the wholesale price index (WPI) declined in June, 2013 and stood at 229.7. The table below shows the Wholesale Price Index of Spices and the percentage variation for the year 2011-12 and 2012- 13.

TABLE 2: Monthly and Annual Average of Wholesale Price Index of Spices

(Base Year 2004-05 =100)

Month	2011-12	2012-13	% Variation over the Previous Year
July	236.4	204.0	-13.71
August	235.7	210.4	-10.73
September	241.6	210.2	-13.00
October	255.5	208.8	-18.28
November	252.2	207.9	-17.57
December	237.6	209.9	-11.66
January	226.1	217.8	-3.67
February	214.4	220.1	2.66
March	214.3	222.3	3.73
April	207.4	230.0	10.90
May	198.9	232.0	16.64
June	196.3	229.7	17.01
Annual Average	**226.4**	**216.9**	**-4.17**

Source: Office of Economic Adviser, Ministry of Commerce & Industry.

(vi) Cotton

1. Introduction

Cotton, the 'white gold' or the "King of Fibres" enjoys a predominant position amongst all cash crops in India. In India, cotton occupies an area of nearly 11.97 million hectares, with a production of 342.20 lakh bales (2012-13). It plays a vital role in the Indian economy providing substantial employment and making significant contributions to the export earnings.

2. Indian Scenario

The area under cotton was 119.77 lakh hectares during 2012-13, as compared to 121.781akh hectare in 2011-12. The production of cotton decreased from 352.00 lakh bales in 2011-12 to 342.20 lakh bales in 2012-13 thereby registering an increase of 2.78 percent compared to the previous year.

4. Major Producing States

Cotton in India is grown in varied soils, climates, and agricultural practices under irrigated and rainfed situations. Approximately 65% of India's cotton is produced under rainfed conditions and 35% on irrigated lands. It is cultivated in three distinct agro-ecological zones (north, central and south) of the country. The northern zone is almost totally irrigated, while the percentage of irrigated area is much lower in the central (37%) and southern zones (22%). Major Cotton producing states in India are Andhra Pradesh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan and Tamil Nadu.

5. Area, Production and Yield

(a) Cotton Acreage in India

Among the cotton-growing states in India, Maharashtra, Gujarat and Andhra Pradesh together account for around 76% of area under cotton. Maharashtra has the highest area under cotton cultivation followed by Gujarat and Andhra Pradesh. During 2012-13, the area under cotton cultivation has decreased compared with that of 2011-12 in almost all states except in Andhra Pradesh and Maharashtra.

(b) Cotton Production:

As of 2012-13, the central states of Gujarat, Maharashtra and Madhya Pradesh had the highest contribution of 55% in the domestic cotton production while the southern states such as Andhra Pradesh, Karnataka and Tamil Nadu contributed 27% and the northern states such as Punjab, Haryana and Rajasthan contributed to around 18% of cotton production. Cotton grown in different states have varying staple length, strength and grade depending on the climate, farm and pest management practices. Although Maharashtra had the highest area under cotton cultivation in 2012-13 (at around 41.46 lakh ha), Gujarat had the highest contribution in cotton production (at an estimated 88.50 lakh bales) followed by Maharashtra (at 76.55 lakh bales). Increased area under cultivation and greater use of hybrid and genetically-modified seeds has aided the robust growth in Cotton production in the country.

(c) Cotton Yield

In the year 2011-12, the average yield in the country was 491 Kg. per hectare and it falls to 486 Kg. per hectare in the year 2012-13. Due to adoption of Bt varieties and accelerated transfer of technology and coordinated development efforts made by Government and other agencies, the country has received positive results in the increase of cotton productivity. In North zone, Haryana & Punjab maintained a good yield of 692 to 708 kg. per ha, but in Rajasthan the yield advantaged was not observed over the years having low productivity of 529 kg. per ha. The over all yield level was 650 kg. per ha in North zone which is 1.72% higher than 2011-12 crop season. One major reason for low yield of cotton in India is cultivation of the crop in rainfed conditions. While in all other countries, cotton is an irrigated crop, in India only 35 per cent to 40 per cent of the crop is under irrigation, which limits the scope of adopting balanced nutrition.

TABLE 1: STATE-WISE AREA, PRODUCTION AND YIELD OF COTTON

States	Area (000 hectares)		Production (000 bales)		Yield (kg/hectare)	
	2011-12	2012-13	2011-12	2012-13	2011-12	2012-13
North Zone						
Haryana	641.0	614.0	2650.0	2500.0	703	692
Punjab	560.0	480.0	2300.0	2000.0	698	708
Rajasthan	470.0	450.0	1335.0	1400.0	483	529
Total North Zone	1671.0	1544.0	6285.0	5900.0	639	650
Central Zone						
Gujarat	2962.0	2497.0	12000.0	8850.0	689	603
Madhya Pradesh	706.0	608.0	2000.0	2200.0	482	615
Maharashtra	4125.0	4146.0	7200.0	7655.0	297	314
Total Central Zone	7793.0	7251.0	21200.0	18705.0	462	439
South Zone						
Andhra Pradesh	1879.0	2400.0	4900.0	7350.0	443	521
Karnataka	554.0	485.0	1200.0	1255.0	368	440
Tamil Nadu	133.0	128.0	450.0	500.0	575	664
Total South Zone	2566.0	3013.0	6550.0	9105.0	434	514
Others	148.0	169.0	1165.0	510.0	1338	513
All India	12178.0	11977.0	35200.0	34220.0	491	486

Source: DES, Ministry of Agriculture

TABLE 2: State-wise Change in Area and Production during 2012-13 over 2011- 12

Increase: -V Decrease: X

S.No.	State	Area	Production
1.	Haryana	X	X
2.	Punjab	X	X
3.	Rajasthan	X	√
4.	Gujarat	X	X
5.	Madhya Pradesh	X	√
6.	Maharashtra	√	√
7.	Andhra Pradesh	√	√
8.	Karnataka	X	√
9.	T amil Nadu	X	√
10.	**All India**	X	X

TABLE 3: Percentage Change in Area, Production and Yield of Cotton during 2012- 13

STATES	Percentage change over 2011-12		
	Area	Production	Yield
North Zone			
Haryana	-4.21	-5.66	-1.56
Punjab	-14.29	-13.04	1.43
Rajasthan	-4.26	4.87	9.52
Total North Zone	-7.60	-6.13	1.60
Central Zone			
Gujarat	-15.70	-26.25	-12.48
Madhya Pradesh	-13.88	10.00	··27.59
Maharashtra	0.51	6.32	5.72
Total Central Zone	-6.95	-11.77	-5.17
South Zone			
Andhra Pradesh	27.73	50.00	17.61
Karnataka	-12.45	4.58	19.57
Tamil Nadu	-3.76	11.11	15.48
Total South Zone	17.42	39.01	18.38
Others	14.19	-56.22	-61.66
All India	-1.65	-2.78	-1.02

6. Price Scenario

(a) Wholesale Price Index (WPI)

The annual average of wholesale price index of cotton at

210.2 in 2012-13 is higher than the annual average of wholesale price index of 209.3 of previous year i.e. 2011-12. During the cotton year i.e. in 2012-13, the index has shown a mixed trend as compared to annual average index of previous year (2011-12). Month-wise details of WPI for raw cotton are given in Table

TABLE 4: Month wise Wholesale Price Index of Raw Cotton

(Base Year: 2004-05=100)

Months	2011-12	2012-13	% variation over the previous year
July	207.1	216.8	4.7
August	221.3	222.2	0.4
September	235.4	211.7	-10.1
October	222.1	200.9	-9.5
November	216.2	202.7	-6.2
December	210.0	200.7	-4.4
January	202.8	199.2	-1.8
February	199.2	202.0	1.4
March	196.1	214.4	9.3
April	198.6	212.9	7.2
May	204.5	213.3	4.3
June	198.8	225.3	13.3
Average	209.3	210.2	0.4

Source: Office of Economic Adviser, M/o Commerce

(b) Month-end Wholesale Prices of Cotton

The crop year 2012-13 (July-June) started with high prices; Rs. 4400 per quintal for NH-44 in July 2012-13 compared to Rs.2950 per quintal during the corresponding period in 2011-12 and Rs. 4033 compared to Rs. 2902 for Brahma. It may be observed that cotton prices higher almost throughout during 2012- 13(July- June) compared to the previous year. A comparison between the annual average prices shows that the wholesale prices of Raw Cotton are substantially higher compared to the corresponding prices a year ago and are in the range of Rs. 2800 to Rs. 5200 per quintal in 2012-13. Thus, during 2012-13 the wholesale prices of Raw Cotton are substantially higher compared to the corresponding prices a year ago.

The annual average of month end wholesale prices of some of the varieties of cotton at important markets during the years 2011-12 and 2012-13 (July- June) is given below in the table:

TABLE 5: Month end Wholesale Prices of Raw Cotton in Major Centres

(Rs. Per Quintal)

State/ Month	Andhra Pradesh Nandyal NH44		Gujarat Harij BT		Haryana Sirsa American		Karnataka Davangere Brahma		Tamil Nadu Virudhunagar LRA	
	2011·12	2012·13	2011·12	2012·13	2011·12	2012·13	2011·12	2012·13	2011·12	2012·13
July	2950	4400	Na	Na	Na	4650	2902	4033	Na	3500
August	Na	4600	Na	Na	Na	4500	3468	4383	Na	Na
September	Na	3700	Na	Na	Na	4150	3455	3645	Na	Na
October	Na	3600	4630	Na	4400	4250	3945	3624	Na	Na
November	3750	3750	4425	Na	4150	4200	3688	3989	Na	Na
December	3600	3750	4425	Na	4125	4200	3765	3995	2816	Na
January	3800	3850	4500	4355	4800	4160	3828	4057	3416	3666
February	3600	3900	4000	4300	4325	4600	3695	4006	3556	3766
March	3400	4300	4225	4895	4250	4840	3690	4296	3676	4366
April	3350	4000	4255	4910	4200	4600	3600	4350	3856	4200
May	3450	4300	3970	3605	4200	4800	3572	3929	3400	3700
June	3450	4350	3540	Na	3800	5200	3474	2800	3500	3800
AVERAGE	**3483**	**4042**	**4219**	**4413**	**4250**	**4513**	**3590**	**3926**	**3460**	**3857**

Source: Ministry of Agriculture

8. Minimum Support Price (MSP)

The Government's price policy for cotton seeks to ensure remunerative prices to the cotton growers for their produce with a view to encourage higher investment and production, and to safeguard the interest of the consumers by making available supplies at reasonable prices. The price policy also seeks to evolve a balanced and integrated price structure in the perspective of the overall needs of the economy. Towards this end, the Government fixes the Minimum Support Price (MSP) for major agricultural commodities, taking into account the recommendations of the Commission for Agricultural Costs and Prices (CACP), the views of State Governments and Central Ministries as well as other· important factors which are considered relevant for fixing the MSP for cotton.

MSP is in the nature of a minimum guaranteed price for the farmers offered by the Government for their produce in case the market prices fall below that level. If the market offers higher price than MSP, the farmers are free to sell their produce at that price.

The criteria and the factors considered by the CACP for fixation of the MSP include;-

(i) Cost of Production;

(ii) Changes in input prices;

(iii) Input / Output price parity;

(iv) Trends in market prices;

(v) Demand and supply situation;

(vi) Inter-crop price parity;

(vii) Effect on industrial cost structure;

(viii) Effect on general price level;

(ix) Effect on cost of living;

(x) International market price situation; and

(xi) Parity between prices paid and prices received by farmers (terms of trade).

The Rationale Behind Determination of MSP Includes:

(i) the need to provide incentive to the producer/ farmer for adopting improved technology and developing a production pattern broadly in the light of national requirements;

(ii) the need to ensure rational utilization of land, water and other production resources;

(iii) the likely effect of the price policy on the rest of the economy, particularly on cost of living, level of wages, industrial cost structure, etc. and

(iv) the terms of trade between agricultural and non-agricultural sector.

The cost of cultivation/production takes into account all paid out costs and also imputed values of overall inputs. The weighted average cost takes into account actual expenses incurred in cash and kind, rent for leased-in land, imputed value of family labour, rent for owned land and interest on fixed capital. The price policy seeks to ensure that the MSP covers cost of production i.e. all actual expenses in cash and kind incurred in production plus rent paid for leased- in land plus imputed value of family labour incurred in the various States. The cost also covers depreciation of farm machinery and buildings.

The MSP for Medium Staple Cotton and Long Staple Cotton for the year 2012-13 has been fixed at Rs. 3600 per quintal and Rs. 3900 per quintal respectively.

TABLE 6 : Minimum Support Prices (MSP) of Raw Cotton

(Rs. per quintal)

Variety	2011-12	2012-13
Medium Staple	2800	3600
(increase % over previous year)	(12%)	(28.57%)
Long Staple	3300	3900
(increase % over previous year)	(10%)	(18.18%)

Note : In brackets percentage changes over the years.

*Staple length (mm) of 24.5-25.5 and Micronaire value of 4.3-5.1

** Staple length (mm) of 29.5-30.5 and Micronaire value of 3.5-4.3

9. Purchases / Procurement of Cotton:

The Government organizes purchase operations through public and cooperative agencies. The designated central nodal agencies intervene in the market for undertaking procurement operations with the objective that the market prices do not fall below the MSPs fixed by the Government. Cotton Corporation of India Ltd. (CCI) and NAFED are the designated nodal agencies of the Government of India to undertake procurement of Cotton under Price Support Scheme (PSS).

Under the Price Support Scheme, procurement is made directly from the farmers through cooperative network when the prices of prescribed quality stocks (FAQ) rule at or below MSP level in the mandies. The market intervention by CCI and NAFED in the procurement of cotton has helped in restoring the confidence of farmers for sustaining their interest in cotton cultivation. Statement

TABLE 7 : Raw Cotton (Kapas) Purchased under PSS by CCI & NAFED

(Quantity in Bales)

Procurement agency	2011-12	2012-13
CCI	7696	2286685
NAFED	NIL	296974
TOTAL	7696	2583659

Source : Cotton Corporation of India Ltd. and NAFED.

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(VII) Jute

Jute is one of the important Commercial Crops in India. It sustains the country's jute manufacturing industry and provides gainful employment to a large segment of the population engaged in cultivation, trade, processing, manufacturing, marketing etc. of jute fiber. It also serves the jute handloom sector of the country.

1. AREA, PRODUCTION AND YIELD

Assam, Bihar, West Bengal, and Orissa are the major jute growing States in the country and account for about 98.7 percent of area and 99.5 percent of the production in the country during 2012-13. During 2012-13, the All-India area and production of jute has been estimated at 776.67 thousand hectares and 10340.33 thousand bales of 180 kgs. each which was lower by 3.99 percent in area and by 3.68 percent in production over All-India estimates of area and production of 809.0 thousand hectares and 10735.6 thousand bales of 180 kg. each in 2011-12.

The All-India yield of Raw Jute in 2012-13 at 2396 kgs. per hectare was marginally higher as compared to 2389 kgs. per hectare computed in 2011- 12.

The State-wise area, production and yield of Raw Jute during 2011-12 and 2012-2013 are given below: —

State-wise Area, Production and Yield of Raw Jute

Area'000'ha

Production : '000' Bales of 180 Kgs. each

Yield: Kgs per ha.

STATE	AREA		PRODUCTION		YIELD	
	2011-12	2012-13	2011-12	2012-13	2011-12	2012-13
Assam	65.6	65.09	607.9	558.0	1669	1543
Bihar	129.1	123.05	1490.7	1490.24	2079	2180
Orissa	3.9	1.78	32.1	17.29	1477	1748
West Bengal	599.0	576.71	8558.6	8228.16	2572	2568
Others	11.4	10.04	46.3	46.64	731	836
All-India	809.0	776.67	10735.6	10340.33	2389	2396

Source: Directorate of Economics & Statistics, Ministry of Agriculture

2. Price Trend

The rate of inflation point to point based on the Wholesale Price Index of Jute from July to June, 2011-12 and 2012-13 is given in the following table. A perusal of the data reveals that Wholesale Price Index of Jute has varied between 10.6 % to 24.0 % during the period of July 2011 to July 2012 and from June, 2012 to June , 2013. The annual average of wholesale price index of Raw-Jute at 253.5 in 2012-13 is higher than the annual average of wholesale price index of 216.1 of previous year i.e. 2011-12 showing an increase of 17.3% over the year.

Index Number of Wholesae Prices of Raw Jute

(Monthly Average)

(Base: 2004-05=100)

Month/Year	2011-12	2012-13	% variation over the previous year
JULY	222.7	246.3	10.6
AUGUST	221.8	251.6	13.4
SEPTEMBER	223.9	255.3	14.0
OCTOBER	209.6	241.9	15.4
NOVEMBER	199.7	234.8	17.6
DECEMBER	194.5	239.0	22.9
JANUARY	205.9	246.6	19.8
FEBRUARY	223.2	254.2	13.9
MARCH	227.0	273.2	20.4
APRIL	222.2	272.2	22.5
MAY	216.1	268.0	24.0
JUNE	227.1	258.3	13.7
ANNUAL AVERAGE	216.1	253.5	17.3

Source: Economic Advisers' office, Ministry of Commerce and Industry.

3. Wholesale Price

During 2011-12 and 2012-13 season, the month-end wholesale price range of raw jute in the main markets like Matabhanga, Raiganj and Toofanganj of West Bengal are as under:

Month-end wholesale Prices of Raw Jute in West Bengal

(Rs. per quintal)

Centre	Variety	Year	Range
Matabhanga	**TD-5**	**2011-12**	**2050-2500**
		2012-13	**2400-2850**
Raiganj	**TD-5**	**2011-12**	**1800-2300**
		2012-13	**2400-2750**
Toofanganj	**TD-5**	**2011-12**	**2050-2500**
		2012-13	**2450-3000**

4. Price Policy

To protect the interests of jute growers, the Government fixes Minimum Support Prices (MSP) of Raw Jute every year. The Minimum Support Price of Raw Jute is fixed on the basis of the recommendations of the Commission for Agricultural Cost Prices (CACP), views of the State Government, concerned Central Ministries and other relevant factors which are important for fixation of the Minimum Support Price. The following table gives the

Minimum Support Prices (MSP) announced by the Government during 2011-12 and 2012-13 season:

Minimum Support Price of Raw Jute

(Rs. Per Quintal)

Crop/ Year	Basic Variety	Announced by the Govt.
2011-12	TD-5 grade in Ex-Assam	1675
2012-13	TD-5 grade in Ex-Assam	2200

The MSP of other grades of jute and mesta for various varieties in different jute/mesta growing States are fixed by the jute Commissioner of India on the basis of normal market price differentials.

5. Price Support Operations

In order to provide remunerative prices to the jute growers in the event of a fall in prices due to higher production or for any other reasons, the Government organizes price support operations and authorizes its nodal agency, viz. Jute Corporation of India to procure at the Minimum Support Price. The following table gives the procurement of raw jute under price support operation by the Jute Corporation of India (JCI) during 2011-12 and 2012-13 season.

Procurement of Raw Jute (under PSS)

(In lakh bales of 180 kgs each).

YEAR	Quantity
2011-12	1.282
2012-13	3.196

Source: Jute Corporation of India, Kolkata.

PART II—Statistical Tables

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	Woman	Non Adult	Man	Woman	Non Adult	Man	Woman	Non Adult	Carpenter	Blacksmith	Cobbler
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Andhra Pradesh															
Krishna	Ghantasala	Sep., 2013	8	250	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Guntur	Tadikonda	Sep., 2013	8	NA	NA	NA	NA	NA	NA	200	NA	NA	NA	NA	NA
Rangareddy	Arutla	Sep., 2013	8	225	175	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Karnataka															
Bangalore	Harisandra	May to June, 2012	8	200	150	NA	200	150	NA	250	180	NA	300	300	NA
Tumkur	Gedlahali	May to June, 2012	8	160	160	NA	180	160	NA	180	160	NA	180	180	NA
Maharashtra															
Nagpur	Mauda	Feb., 2012	8	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ahmednagar	Akole	Feb, 2012	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jharkhand															
Ranchi	Gaintalsood	April, 2012	8	100	100	NA	90	90	NA	58	58	NA	170	150	NA

1.1 Daily Agricultural Wages in Some States (Operation-wise)

(in Rupees)

State/Distt.	Centre	Month and Year	Type of Labour	Normal Daily Working Hours	Ploughing	Sowing	Weeding	Harvesting	Other Agri. Labour	Herdsman	Skilled Labour		
											Carpenter	Blacksmith	Cobbler
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Assam													
Barpeta	Loharapara	March, 12	M	8	180	180	180	180	180	180	180	180	180
			W	8	NA	NA	160.00	160.00	160.00	NA	NA	NA	NA
Bihar													
Muzaffarpur	Bhalui Rasul	April to,	M	8	130	120	80	130	150	120	200	180	250
		June, 2012	W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shekhpura	Kutaut	May and	M	8	NA	NA	185	NA	185	NA	245	NA	NA
		June, 2012	W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chhattisgarh													
Dhamtari	Sihaba	Aug., 2013	M	8	400	200	120	NA	80	80	250	100	80
			W	8	NA	150	120	NA	70	80	150	80	NA
Gujarat													
Rajkot	Rajkot	Jan., 2012	M	8	209	225	150	170	147	150	360	360	240
			W	8	NA	169	150	179	145	142	NA	NA	NA
Dahod	Dahod	Jan., 2012	M	8	100	100	100	100	100	NA	200	144	150
			W	8	NA	100	100	100	100	NA	NA	NA	NA
Haryana									100				
Panipat	Ugarakheri	March., 2013	M	8	180	180	180	200	180	NA	400	400	NA
			W	8	NA	150	150	180	150	NA	NA	NA	NA

1.1 Daily Agricultural Wages in Some States (Operation-wise)—*Contd.*

(in Rupees)

State/Distt.	Centre	Month and Year	Type of Labour	Normal Daily Working Hours	Ploughing	Sowing	Weeding	Harvesting	Other Agri. Labour	Herdsman	Skilled Labour		
											Carpenter	Blacksmith	Cobbler
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Himachal Pradesh													
Mandi	Mandi	Sep, 13	M				—NA—						
Kerala			W										
Kozhikode	Koduvally	April, 13	M	4 to 8	920	550	NA	550	710	NA	650.00	NA	NA
			W	4 to 8	NA	NA	450.00	450.00	500.00	NA	NA	NA	NA
Palakkad	Elappally	April, 13	M	4 to 8	NA	NA	NA	400	400	NA	500	NA	NA
			W	4 to 8	NA	NA	NA	300	200	NA	NA	NA	NA
Madhya Pradesh													
Hoshangabad	Sangarkhera	Aug., 2013	M	8	150	130	150	150	125	100	300	300	NA
			W	8	NA	130	150	150	125	100	NA	NA	NA
Satna	Kotar	Aug., 2013	M	8									
			W	8					—NA—				
Shyopur Kala	Vijaypur	Aug., 2013	M	8					—NA—				
			W	8									
Odisha													
Bhadrak	Chandbali	July., 2013	M	8	NA	NA	NA	160	175	100	350	NA	NA
			W	8	NA	NA	NA	120	140	100	NA	NA	NA
Ganjam	Aska	July., 2013	M	8	200	150	150	NA	225	100	300	300	200
			W	8	NA	100	100	NA	110	100	NA	NA	NA
Punjab													
Ludhiana	Pakhowal	June, 2008	M	8	NA	NA	90	95	NA	99.44	NA	NA	NA
			W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rajasthan													
Barmer	Vishala	July. 2013	M	8					—NA—				
			W	8									
Jalore	Panwa	June., 2013	M	8	NA	NA	NA	NA	NA	200	350	300	NA
			W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tamil Nadu													
Thanjavur #	Pulvarnatham	May., 2013	M	6	NA	300	NA	300	278.54	NA	NA	NA	NA
			W	5	NA	NA	108.33	104.17	108.33	NA	NA	NA	NA
Tirunelveli #	Malayakulam	May., 2013	M	8	NA	NA	250	200	388..31	NA	NA	NA	NA
			W	8	NA	NA	140	125	241.5	NA	NA	NA	NA
Tripura													
State avarege	Apr, 11to		M	8	238	201	203	209	207	199	253	235	240
	March, 12		W	8	NA	154	152	154	154	149	NA	NA	NA
*Uttar Pradesh**													
Meerut	Ganeshpur	Jan., 2013	M	8	205	207	206	204	206	NA	320	NA	NA
			W	8	NA	180	180	180	180	NA	NA	NA	NA
Aurraiya	Aurraiya	Jan., 2013	M	8	150	193	192	150	193	NA	300	NA	NA
			W	8	NA	160	167	120	167	NA	NA	NA	NA
Chandauli	Chandauli	Jan., 2013	M	8	150	150	125	125	125	NA	271	NA	NA
			W	8	NA	150.00	125	125	125	NA	NA	NA	NA

M-Man W-Woman

N. A. —Not Available N. R. —Not Reported

*- Uttar Pradesh reports its district-wise average rural wage data rather than from selected centre/village.

Tamil Nadu reports its district-wise average rural wage data rather than from selected centre /village

2. FARM HARVEST PRICES OF PRINCIPAL CROPS IN INDIA

(Rs per Quintal)

Crop	Variety	Year	Season	Andhra Pradesh	Andman& Nicobar	Assam	Bihar	Chandi-garh	Chhattis-garh	Dadra & Nagar	Delhi	Goa	Gujarat	Haryana	Himachal Pradesh	Jammu & Kashmir	Jharkhand	Karnataka
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
Arecanut	-	2010-11	-	-	-	-	-	-	-	-	-	9800	-	-	-	-	-	-
	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10755
	-	2011-12	-	-	10214	-	-	-	-	-	-	14223	-	-	-	-	-	-
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14499
Bajra	-	2010-11	-	1137	-	-	-	-	1442	-	1200	-	1018	691	-	1000	-	-
	-	2010-11	Kharif	912	-	-	806	-	-	-	-	-	-	-	-	-	-	802
	-	2010-11	Rabi	2249	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	1078	-	-	-	-	1599	-	1250	-	987	1229	-	1052	-	-
	-	2011-12	Kharif	1004	-	-	834	-	-	-	-	-	-	-	-	-	1030	1010
	-	2011-12	Rabi	1408	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barley	-	2010-11	-	-	-	-	-	-	1176	-	1200	-	-	1077	1359	1453	-	-
	-	2010-11	Rabi	-	-	-	792	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	-	-	-	-	-	2710	-	1300	-	-	981	1489	1468	-	-
	-	2011-12	Rabi	-	-	-	838	-	-	-	-	-	-	-	-	-	1182	-
Cashewnut	-	2010-11	-	-	-	-	-	-	-	-	-	7863	-	-	-	-	-	-
	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6616
	-	2011-12	-	-	-	-	-	-	-	-	-	7706	-	-	-	-	-	
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6492
	Raw	2011-12	-	-	3500	-	-	-	-	-	-	-	-	-	-	-	-	-
CasterSeed	-	2010-11	-	3188	-	7399	-	-	-	-	-	-	3819	-	-	-	-	-
	-	2010-11	Kharif	3192	-	-	-	-	-	-	-	-	-	-	-	-	-	2570
	-	2010-11	Rabi	2692	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	3146	-	-	-	-	-	-	-	-	3833	-	-	-	-	
	-	2011-12	Kharif	3286	-	-	-	-	-	-	-	-	-	-	-	-	-	3394
	-	2011-12	Rabi	1833	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chilly	-	2010-11	-	-	-	-	-	-	-	-	-	-	-	-	8772	8888	-	-
	-	2010-11	Rabi	-	-	-	4568	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	-	-	-	-	-	-	-	-	-	-	-	-	8869	-	-
,	-	2011-12	Rabi	-	-	-	5050	-	-	-	-	-	-	-	-	-	-	-
	Drv	2010-11	-	7721	-	10402	-	-	-	8739	-	-	7441	-	-	-	-	
	Dry	2010-11	Kharif	7699	-	-	-	-	-	-	-	-	-	-	-	-	-	5744
	Dry	2010-11	Rabi	7794	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dry	2011-12	-	5006	-	10594	-	-	-	7576	-	-	9575	-	9241	-	-	
	Dry	2011-12	Kharif	4940	-	-	-	-	-	-	-	-	-	-	-	-	-	6438
	Dry	2011-12	Rabi	5247	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Green	2011-12	-	-	4083	-	-	-	-	-	-	-	-	-	-	-	-	-
Cotton		2010-11	-	4176	-	4182	-	-	-	-	-	-	-	-	-	-	-	-

2. Farm Harvest Prices of Principal Crops in India (Contd.)

Crop	Variety	Year	Season	Andhra Pradesh	Andman& Nicobar	Assam	Bihar	Chandi-garh	Chhattis-garh	Dadra & Nagar Haveli	Delhi	Goa	Gujarat	Haryana	Himachal Pradesh	Jammu &Kashmir	Jharkhand	Karnataka
		2010-11	Kharif	4176	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cotton	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4573
	-	2011-12	-	3682	-	4507	-	-	3100	-	-	-	-	-	-	-	-	-
	-	2011-12	Kharif	3682	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3835
	American	2010-11	-	-	-	-	-	-	-	-	-	-	-	4513	-	-	-	-
	American	2011-12	-	-	-	-	-	-	-	-	-	-	-	5516	-	-	-	-
	Desi	2010-11	-	-	-	-	-	-	-	-	-	-	2717	5514	-	-	-	-
	Desi	2011-12	-	-	-	-	-	-	-	-	-	-	2445	5788	-	-	-	-
	Hybrid	2010-11	-	-	-	-	-	-	-	-	-	-	4397	-	-	-	-	-
	Hybrid	2011-12	-	-	-	-	-	-	-	-	-	-	4030	-	-	-	-	-
Ginger	-	2010-11	-	-	-	-	-	-	-	-	-	-	-	-	3185	-	-	-
	-	2010-11	Rabi	-	-	-	2647	-	-	-	-	-	-	-	-	-	-	
	-	2011-12	-	-	5286	-	-	-	-	-	-	-	-	-	3597	-	-	-
	-	2011-12	Rabi	-	-	-	2886	-	-	-	-	-	-	-	-	-	2415	Fresh
2010-11	-	-	-	-	-	-		-	5234	-	-	-	-	-	-	-		
	Fresh	2011-12	-	-	-	-	-	-	3944	-	-	-	-	-	-	-	-	-
Gram	-	2010-11	-	2435	-	3644	-	-	3638	-	3000	-	2340	2305	3683	3823	-	-
	-	2010-11	Rabi	2435	-	-	2401	-	-	-	-	-	-	-	-	-	-	2335
	-	2011-12	-	3582	-	4062	-	-	3500	-	3800	-	2605	2487	4558	3500	-	-
	-	2011-12	Rabi	3582	-	-	2524	-	-	-	-	-	-	-	-	-	3451	3421
Ground Nut	-	2010-11	-	2971	2500	-	-	-	3009	-	-	-	2899	4123	5275	4000	-	-
	-	2010-11	Kharif	2597	-	-	-	-	-	-	-	-	-	-	-	-	-	2860
	-	2010-11	Rabi	3553	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3285
	-	2011-12	-	3685	3000	-	-	-	3461	-	-	-	3727	4884	4989	4000	-	-
	-	2011-12	Kharif	3167	-	-	5500	-	-	-	-	-	-	-		-	2517	3007
	-	2011-12	Rabi	4113	-	-	-	-	-	-	-	-	-	-		-	-	-
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-		-	-	3695
Jowar	-	2010-11	-	1546	-	-	-	-	-	-	1700	-	1659	1157		3000	-	-
	-	2010-11	Kharif	965	-	-	675	-	1422	-	-	-	-	-		-	-	-
	-	2010-11	Rabi	1889	-	-	-	-	2000	-	-	-	-	-		-	-	-
	-	2011-12	-	1548	-	-	-	-	-	-	1800	-	1585	1105		-	-	-
	-	2011-12	Kharif	1791	-	-	733	-	980	-	-	-	-	-		-	-	-
	-	2011-12	Rabi	1439	-	-	-	-	-	-	-	-	-	-		-	-	-
	Local	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-		-	-	1401
	Local	2010-11	Rabi	-	-	-	-	-	-	-	-	-	-	-		-	-	1650
	Local	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-		-	-	2197
	Local	2011-12	Rabi	-	-	-	-	-	-	-	-	-	-	-		-	-	2451
Jute	-	2010-11	-	-	-	1319	-	-	-	-	-	-	-	-		-	-	-
	-	2010-11	Kharif	-	-	-	3120	-	-	-	-	-	-	-		-	-	-

2. Farm Harvest Prices of Principal Crops in India (Contd.)

Crop	Variety	Year	Season	Andhra Pradesh	Andman& Nicobar	Assam	Bihar	Chandi-garh	Chhattis-garh	Dadra & Nagar Haveli	Delhi	Goa	Gujarat	Haryana	Himachal Pradesh	Jammu & Kashmir	Jharkhand	Karnataka
	-	2011-12	-	-	-	1456	-	-	-	-	-	-	-	-		-	-	-
	-	2011-12	Kharif	-	-	-	3200	-	-	-	-	-	-	-	-	-	-	-
Linseed	-	2010-11	-	-	-	2358	-	-	2443	-	-	-	-	-	4861	4351	-	-
	-	2010-11	Rabi	-	-	-	2172	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	-	-	2430	-	-	3304	-	-	-	-	-	5806	5117	-	-
	-	2011-12	Rabi	-	-	-	2451	-	-	-	-	-	-	-	-	-	2440	-
Maize	-	2010-11	-	1035	-	889	-	900	1075	-	1400	-	1067	1307	1149	1156	-	-
	-	2010-11	Kharif	902	-	-	740	-	-	-	-	-	-	-	-	-	836	-
	-	2010-11	Rabi	1130	-	-	950	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	1058	2120	981	-	1030	1155	-	1550	-	1046	1256	1228	1205	-	-
	-	2011-12	Kharif	986	-	-	848	-	-	-	-	-	-	-	-	-	904	-
	-	2011-12	Rabi	1108	-	-	978	-	-	-	-	-	-	-	-	-	-	-
	HB	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	889
	HB	2010-11	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	986
	HB	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1085
	HB	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1001
	HB	2011-12	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1029
	HB	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1159
	Mesta	2010-11	-	2457	-	1149	-	-	-	-	-	-	-	-	-	-	-	-
	-	2010-11	Kharif	2457	-	-	1255	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	1414	-	1235	-	-	3000	-	-	-	-	-	-	-	-	-
	-	2011-12	Kharif	1414	-	-	1320	-	-	-	-	-	-	-	-	-	-	-
	Nigerseed	2010-11	-	-	-	3096	-	-	2871	2760	-	-	-	-	-	-	-	-
	-	2011-12	-	-	-	3397	-	-	3747	3094	-	-	-	-	-	-	-	-
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	2750	-
	Paddy	2010-11	-	990	1000	-	-	916	-	-	-	942	1074	2076	1694	-	-	-
	-	2010-11	Autum	-	-	825	-	-	-	-	-	-	-	-	-	-	-	-
	-	2010-11 .	Kharif	1023	-	-	-	-	-	-	-	-	-	-	-	-	840	-
	-	2010-11	Rabi	954	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2010-11	Summer	-	-	831	-	-	-	-	-	-	-	-	-	-	901	-
	-	2010-11	Winter	-	-	898	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	1064	880-	-	-	II 15	-	-	-	1478	1121	1452	1772	-	-	-
	-	2011-12	Autum	-	-	845	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	Kharif	1068	-	-	-	-	-	-	-	-	-	-	-	-	851	-
	-	2011-12	Rabi	1057	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	Summer	-	-	843	-	-	-	-	-	-	-	-	-	-	-	-
Paddy	-	2011-12	Winter	-	-	899	-	-	-	-	-	-	-	-	-	-	-	-
	Aghani	2010-11	Kharif	-	-	-	859	-	-	-	-	-	-	-	-	-	-	-
	Aghani	2011-12	Kharif	-	-	-	897	-	-	-	-	-	-	-	-	-	915	-
	Bhadea	2010-11	Kharif	-	-	-	833	-	-	-	-	-	-	-	-	-	-	-

2. Farm Harvest Prices of Principal Crops in India (Contd.)

Crop	Variety	Year	Season	Andhra Pradesh	Andman& Nicobar	Assam	Bihar	Chandi-garh	Chhattis-garh	Dadra & Nagar Haveli	Delhi	Goa	Gujarat	Haryana	Himachal Pradesh	Jammu & Kashmir	Jharkhand	Karnataka
	Bhadea	2011-12	Kharif	-	-	-	864	-	-	-	-	-	-	-	-	-	-	-
	Coarse	2010-11	-	-	-	-	-	-	1213	-	-	-	-	-	-	-	-	-
	Coarse	2011-12	-	-	-	-	-	-	997	-	-	-	-	-	-	-	-	-
	Fine	2010-11	-	-	-	-	-	-	1191	971	-	-	-	-	-	-	-	-
	Fine	2011-12	-	-	-	-	-	-	1217	1194	-	-	-	-	-	-	-	-
	Local	2010-1 I	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1020
	Local	2010-11	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1096
	Local	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	998
	Local	2011-12	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	972
	Medium	2010-11	-	-	-	-	-	-	1027	806	-	-	-	-	-	-	-	-
	Medium	2011-12	-	-	-	-	-	-	1046	822	-	-	-	-	-	-	-	-
Pepper	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21441
	-	2011-12	-	-	26000	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28813
Potato	-	2010-11	-	-	-	1191	-	1175	-	-	-	-	1560	679	-	1207	-	-
	-	2010-11	Kharif	-	-	-	604	-	-	-	-	-	-	-	1168	-	-	887
	-	2010-11	Rabi	-	-	-	612	-	-	-	-	-	-	-	998	-	-	1023
	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1096
	-	2011-12	-	-	-	1206	-	960	-	-	-	-	658	-	-	1312	-	-
	-	2011-12	Kharif	-	-	-	615	-	-	-	-	-	-	-	1138	-	-	673
	-	2011-12	Rabi	-	-	-	629	-	-	-	-	-	-	-	1192	-	880	920
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	920
	Aghani	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	886	-
	Hills	2010-11	Winter	-	-	-	-	-	967	-	-	-	-	-	-	-	-	-
	Hills	2011-12	Winter	-	-	-	-	-	1085	-	-	-	-	-	-	-	-	-
Ragi	-	2010-11	-	1018	-	-	-	-	1231	912	-	1420	1321	-	-	-	-	-
	-	2010-11	Kharif	976	-	-	725	-	-	-	-	-	-	-	-	-	966	-
	-	2010-11	Rabi	1249	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	1005	-	-	-	-	-	1023	-	1485	1210	-	-	-	-	-
	-	2011-12	Kharif	914	-	-	795	-	-	-	-	-	-	-	-	-	842	957
	-	2011-12	Rabi	1304	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	HB	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1031
	HYV	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	919
	HYV	2010-11	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	872
Ragi	HYV	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	1031	-
	HYV	2011-12	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	954
	HYV	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1079
Rape/Mustard	-	2010-11	-	-	-	2476	-	-	-	3453	-	2750	-	2302	-	4416	3823	-
	-	2010-11	Rabi	-	-	-	2641	-	-	-	-	-	-	-	2544	-	-	-
	-	2011-12	-	-	3500	2486	-	-	2774	-	-	3275	-	2363	2617	5452	3829	-

2. Farm Harvest Prices of Principal Crops in India (Contd.)

Crop	Variety	Year	Season	Andhra Pradesh	Andman& Nicobar	Assam	Bihar	Chandi-garh	Chhattis-garh	Dadra & Nagar Haveli	Delhi	Goa	Gujarat	Haryana	Himachal Pradesh	Jammu & Kashmir	Jharkhand	Karnataka
	-	2011-12	Rabi	-	-	-	3036	-	-	-	-	-	-	-	-	-	3571	-
Rice	-	2010-11	-	-	-	-	-	-	-	-	-	-	-	-	-	2641	-	-
	-	2011-11	-	-	-	-	-	-	-	-	-	-	-	-	-	2689	-	-
	Coarse	2010-11	-	-	-	-	-	-	1618	-	-	-	-	-	-	-	-	-
	Coarse	2011-12	-	-	-	-	-	-	1730	-	1950	-	-	-	-	-	-	-
	Local	2011-12	-	-	-	-	-	-	-	-	1950	-	-	-	-	-	-	-
Sannhemp	-	2010-11	-	-	-	-	-	-	2675	-	-	-	-	1566	-	-	-	-
	-	2011-12	-	-	-	-	-	-	-	-	-	-	-	1643	-	-	-	-
Sesamum	-	2010-11	-	3487	3500	5854	-	-	-	-	-	-	4927	5395	6960	6311	-	-
	-	2010-11	Kharif	3109	-	-	3589	-	5711	-	-	-	-	-	-	-	-	4119
	-	2010-11	Rabi	3909	-	-	-	-	5348	-	-	-	-	-	-	-	-	-
	-	2011-12	-	4237	3667	5974	-	-	-	-	-	-	5040	4543	7174	6142	-	-
	-	2011-12	Kharif	3638	-	-	3663	-	5371	-	-	-	-	-	-	-	5710	4333
	-	2011-12	Rabi	4617	-	-	4320	-	5521	-	-	-	-	-	-	-	-	-
	Bhadea	2010-11	Kharif	-	-	-	3964	-	-	-	-	-	-	-	-	-	-	-
	Bhadea	2011-12	Kharif	-	-	-	4293	-	-	-	-	-	-	-	-	-	-	-
Soyabean	-	2010-11	-	-	-	-	-	-	2880	-	-	-	-	-	-	-	5742	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1889
	-	2011-12	-	-	-	-	-	-	2702	-	-	-	-	-	-	-	4012	-
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2249
Sugar Raw	-	2010-11	-	2510	-	3627	-	-	3291	-	-	-	-		-	2063	-	-
	-	2010-11	Kharif	2510	-	-	2889	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	2455	-	3679		-	3361	-	-	-	-	-	-	-	-	-
	-	2011-12	Kharif	2455	-	-	3031	-	-	-	-	-	-	-	-	-	-	-
Sugarcane	-	2010-11	-	-	-	-	-	-	-	-	-	135	226	-	-	-	-	-
	-	2011-12	-	-	-	901	-	-	-	-	-	186	190	-	-	-	-	-
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200
Sunflower	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2600
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2756
	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2618
	-	2011-12	Kharif	-	-	-		-	-	-	-	-	-	-	-	-	-	2887
	-	2011-12	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2904
Sunflower	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3134
Tobacco	-	2010-11	-	10584	-	7538	-	-	8893	-	-	-	2794	-	-	6000	-	-
	-	2010-11	Rabi	10584	-	-	12076	-	-	-	-	-	-	-	-	-	-	-
	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8624
	-	2011-12	-	10283	-	7774	-	-	10059	-	-	-	3253	-	-	6000	-	-
	-	2011-12	Rabi	10283	-	-	12237	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10095
Tur Arhar	-	2010-11	-	3322	-	6077	-	-	-	3140	4500	-	3539	-	-	-	-	-
	-	2010-11	Kharif	3322	-	-	-	-	-	-	-	-	-	-	-	-	-	3567
	-	2010-11	Rabi	3306	-	-	3216	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	3334	4000	6193	-	-	-	3686	4600	-	3031	-	-	-	-	-
	-	2011-12	Kharif	3332	-	-	-	-	-	-	-	-	-	-	-	-	-	3031

2. Farm Harvest Prices of Principal Crops in India (Contd.)

Crop	Variety	Year	Season	Andhra Pradesh	Andman& Nicobar	Assam	Bihar	Chandi-garh	Chhattis-garh	Dadra & Nagar Haveli	Delhi	Goa	Gujarat	Haryana	Himachal Pradesh	Jammu & Kashmir	Jharkhand	Karnataka
	-	2011-12	Rabi	3594	-	-	3260	-	-	-	-	-	-	-	-	-	3675	-
	Delay	2010-11	-	-	-	-	-	-	4349	-	-	-	-	-	-	-	-	-
	Delay	2010-11	Rabi	-	-	-	-	-	4349	-	-	-	-	-	-	-	-	-
	Delay	2011-12	-	-	-	-	-	-	4261	-	-	-	-	-	-	-	-	-
	Early	2010-11	-	-	-	-	-	-	4171	-	-	-	-	-	-	-	-	-
	Early	2011-12	-	-	-	-	-	-	4022	-	-	-	-	-	-	-	-	-
Turmeric	-	2010-11	-	10587	-	-	-	-	15070	-	-	-	-	-	10355	-	-	-
	-	2010-11	Kharif	10587	-	-	-	-	15070	-	-	-	-	-	-	-	-	-
	-	2010-11	Rabi	-	-	-	8380	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	3550	5375	-	-	-	9914	-	-	-	-	-	10275	-	-	-
	-	2011-12	Kharif	3550	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	Rabi	-	-	-	8522	-	-	-	-	-	-	-	-	-	2324	-
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4372
	Dry	2010-11	-	-	-	9790	-	-	-	-	-	-	-	-	-	-	-	-
	Dry	2011-12	-	-	-	10414	-	-	-	-	-	-	-	-	-	-	-	-
Wheat	-	2010-11	-	-	-	1172	-	1200	1367	-	1300	-	1325	1180	1338	1213	-	-
	-	2010-11	Rabi	-	-	-	1047	-	-	-	-	-	-	-	-	-	-	1597
	-	2011-12	-	-	-	1192	-	1098	1416	-	1310	-	1301	1153	1310	1287	-	-
,	-	2011-12	Rabi	-	-	-	1070	-	-	-	-	-	-	-	-	-	1255	1559

2. Farm Harvest Prices of Principal Crops in India (Contd.)

Crop	Variety	Year	Season	Kerala	Madhya Pradesh	Maha-rashtra	Manipur	Mizoram	Nagaland	Orissa	Pondicerry	Punjab	Rajasthan	Tamil-Nadu	Tripura	Uttar Pradesh	Uttranchal	West Bengal
Arecanut	-	2010-11	-	-	-	-	-	-	-	-	-	-	-	21229	-	-	-	-
	-	2011-12	-	-	-	-	-	-	-	-	-	-	-	14769	-	-	-	-
Bajra	-	2010-11	-	-	895	958	-	-	-	-	-	1073	-	1186	-	-	-	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	880	-	-	739	-	-
	-	2011-12	-	-	807	\085	-	-	-	-	-	1100	-	1291	-	-	-	-
	-	2011-12	Kharif		-	-	-		-	-	-	-	855	-	-	808	-	-
Banana	-	2010-11	-	1979	-	-	1483	950	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	2334	-	-	1696	1047	-	-	-	-	-	-	-	-	-	-
Barley	-	2010-11	-	-	991	-	-	-	-	-	-	999	-	-	-	-	-	1303
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	1056	-	-	984	1087	-
	-	2011-12	-	-	1126	-	-	-	-	-	-	1070	-	-	-	-	-	1452
	-	2011-12	Rabi	-	-	-	-	-	-	-	-	-	1227	-	-	1086	1349	-
Cashewnut	-	2010-11	-	-	-	-	-	-	-	-	-	-	-	5183	-	-	-	-
	-	2011-12	-	-	-	-	-	-	-	-	-	-	-	5477	-	-	-	-
CasterSeed	-	2010-11	-	-	3375	2574	-	-	-	-	-	-	-	3154	-	-	-	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	1808	-	-
	-	2011-12	-	-	3133	3724	-	-	-	-	-	-	-	3148	-	-	-	-
Chilly	-	2010-11	-	-	-	-	2000	8375	-	-	-	-	-	6198	-	-	-	-
	-	2011-12	-	-	-	-	21288	9050	-	-	-	-	-	6900	-	-	-	-
	Dry	2010-11	-	-	6717	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dry	2010-11	Kharif	-	-	-	-	-	-	-	-	-	7134	-	-	-	-	-
	Dry	2011-12	-	-	6532	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dry	2011-12	Kharif	-	-	-	-	-	-	-	-	-	7706	-	-	-	-	-
Coconut	With husk	2010-11	-	-	-	-	-	-	-	-	-	-	-	645	-	-	-	-
	With husk	2011-12	-	-	-	-	-	-	-	-	-	-	-	622	-	-	-	-
Cotton	-	2010-11	-	-	4216	-	-	7012	-	-	-	-	-	3081	-	-	-	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	4125	-	-	3686	-	-
	-	2011-12	-	-	3876	-	-	-	-	-	-	-	-	3142	-	-	-	-
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	453	-	-	4146	-	-
	American	2010-11	-	-	-	-	-	-	-	-	-	5082	-	-	-	-	-	-
	American	2011-12	-	-	-	-	-	-	-	-	-	4273	-	-	-	-	-	-
	Desi	2010-11	-	-	-	-	-	-	-	-	-	3792	-	-	-	-	-	-
	Desi	2011-12	-	-	-	-	-	-	-	-	-	4296	-	-	-	-	-	-
	Lint	2010-11	Kharif	-	-	-	-	-	-	-	-	-	8224	-	-	-	-	-
	Lint	2011-12	Kharif	-	-	-	-	-	-	-	-	-	11866	-	-	-	-	-
Ginger	-	2010-11	-	-	-	-	1175	900	2000	-	-	3033	-	-	-	-	-	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	2804	-	-	-	-	-
	-	2011-12	-	-	-	-	1270	1050	-	-	-	-	-	-	-	-	-	-
Ginger	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	3718	-	-	-	-	-
	Dry	2010-11	-	12046	-	-	-	-	-	-	-	-	-	11904	-	-	-	-
	Dry	2011-12	-	6204	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fresh	2010-11	-	-	4279	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fresh	2011-12	-	-	3254	-	-	-	-	-	-	-	-	-	-	-	-	-

2. Farm Harvest Prices of Principal Crops in India (Contd.)

Crop	Variety	Year	Season	Kerala	Madhya Pradesh	Maha-rashtra	Manipur	Mizoram	Nagaland	Orissa	Pondicerry	Punjab	Rajasthan	Tamil-Nadu	Tripura	Uttar Pradesh	Uttranchal	West Bengal
Gram	-	2010-11	-	-	2281	2023	-	-	-	-	-	3378	-	3265	5357	-	-	2864
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	2143	-	-	2259	-	-
	-	2011-12	-	-	3414	2517	-	-	-	-	-	2542	-	3966	4000	-	-	3359
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	3082	3851	-
	-	2011-12	Rabi	-	-	-	-	-	-	-	-	-	3445	-	-	3332	-	-
Ground Nut	-	2010-11	-	-	2734	2427	-	-	-	2274	3055	2872	-	3227	-	-	3413	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	2586-	-	-	2721	3413	-
	-	2011-12	-	-	3093	2472	-	-	-	2370	3551	3376	-	3722	3750	-	3851	-
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	3274	-	-	3271	3851	-
Jowar	-	2010-11	-	-	-	1099	-	-	-	-	1074	-	-	1410	-	-	-	-
	-	2010-11	Kharif	-	1020	-	-	-	-	-	-	-	1159	-	-	836	-	-
	-	2010-1 I	Rabi	-	1126	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	-	-	1779	-	-	-	-	932	-	-	1534	-	-	-	-
	-	2011-12	Kharif	-	1122	-	-	-	-	-	-	-	1074	-	-	984	-	-
	-		Rabi	-	1208	-	-	-	-	-	-	-	-	-	-	-	-	2828
Jute	-	2011-12	-	-	-	-	-	-	-	-	-	-	-	-	2100	-	-	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	2837	-	-
	-	2011-12	-	-	-	-	-	-	-	2704	-	-	-	-	2100	-	-	2307
Linseed	-	2010-11	-	-	2783	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	2601	-	-	2703	-	-
	-	2011-12	-	-	3380	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	Rabi	-	-	-	-	-	-	-	-	-	3078	-	-	3572	-	-
Maize	-	2010-11	-	-	918	879	700	992	650	804	-	1027	-	1093	-	-	1053	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	949	-	-	859	1053	-
	-	. 2011-12	-	-	940	1024	752	1150	800	969	-	995	-	1198	-	-	-	-
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	1028	-	-	910	1081	-
Mesta	-	2010-1 1	-	-	-	-	-	-	-	-	-	-	-	-	1200	-	-	-
	-	2011-12	-	-	-	-	-	-	-	-	-	-	-	-	1720	-	-	-
Nigerseed	-	2010-1 I	-	-	2385	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	-	5062	-	-	-	-	-	-	-	-	-	-	-	-	-
Paddy	-	2010-11	-	1200	-	1153	-	1082	-	932	-	1092	-	991	-	-	1043	-
	-	2010-1 I	Autum	-	-	-	975	-	-	-	-	-	-	-	817	-	-	997
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	1513	-	-	888	1043	-
	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	740	-	-	1070
Paddy	-	2010-11	Winter	-	-	-	1125	-	-	-	-	-	-	-	948	-	-	1075
	-	2011-12	-	1235	-	1564	-	1375	-	984	831	1126	-	1009	-	-	-	-
	-	2011-12	Autum	-	-	-	933	-	-	-	-	-	-	-	813	-	-	693
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	1384	-	-	1108	1139	-
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	874	-	-	1005
	-	2011-12	Winter	-	-	-	992	-	-	-	-	-	-	-	1351	-	-	1002
	Coarse	2010-11	-	-	884	-	-	-	800	-	-	-	-	-	-	-	-	-
	Coarse	2011-12	-	-	1049	-	-	-	500	-	-	-	-	-	-	-	-	-
	Fine	2010-11	-	-	1195	-	-	-	900	-	1135	-	-	-	-	-	-	-

2. Farm Harvest Prices of Principal Crops in India (Contd.)

Crop	Variety	Year	Season	Kerala	Madhya Pradesh	Maha-rashtra	Manipur	Mizoram	Nagaland	Orissa	Pondicerry	Punjab	Rajasthan	Tamil-Nadu	Tripura	Uttar Pradesh	Uttranchal	West Bengal
	Fine	2011-12	-	-	1541	-	-	-	520	-	1214	-	-	-	-	-	-	-
	Medium	2010-11	-	-	1165	-	-	-	-	-	-	-	-	-	-	-	-	-
	Medium	2011-12	-	-	1262	-	-	-	-	-	-	-	-	-	-	-	-	-
Pepper	-	2010-11	-	21348	-	-	-	-	-	-	-	-	-	15218	-	-	-	-
	-	2011-12	-	32527	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potato	-	2010-11	-	-	-	-	902	1250	-	614	-	605	-	1483	964	-	-	480
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	709	-	-	-	459	-
	-	2011-12	-	-	-	-	954	1400	-	654	-	-	-	1450	1106	-	-	519
	-	2011-12	Rabi	-	-	-	-	-	-	-	-	-	920	-	-	-	534	-
	Hills	2010-11	Summer	-	803	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hills	2010-11	Winter	-	807	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hills	2011-12	Summer	-	1920	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hills	2011-12	Winter	-	948	-	-	-	-	-	-	-	-	-	-	-	-	-
Ragi	-	2010-11	-	-	2000	-	-	-	-	932	1043	-	-	1146	-	-	1699	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	1699	-
	-	2011-12	-	-	2200	-	-	-	-	1005	1078	-	-	1246	-	-	-	-
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	2109	-
Rape/Mustard	-	2010-11	-	-	2292	-	2100	1531	-	3047	-	2693	-	-	4812	-	-	2517
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	2356	-	-	2267	2273	-
	-	2011-12	-	-	3204	-	2180	2000	-	3197	-	2777		-	4500	-	-	2799
	-	2011-12	Rabi	-	-	-	-	-	-	-	-	-	3324	-	-	-	2317	-
Rice	-	2010-11	Autum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1698
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	2133	-	-	-	-	-
	-	2010-11	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1942
	-	2010-11	Winter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1825
	-	2011-12	Autum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1628
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	2388	-	-	-	-	-
	-	2011-12	Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1959
	-	2011-12	Winter	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1746
	Coarse	2010-11	-	-	1606	-	-	-	-	-	-	-	-	-	-	-	-	-
Rice	Coarse	2011-12	-	-	1659	-	-	-	-	-	-	-	-	-	-	-	-	-
Sannhemp	-	2010-11	-	-	1242	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	1853	-	-	-	-	-
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	2110	-	-
Sesamum	-	2010-11	-	-	-	-	-	3125	-	3048	3216	3997	-	3880	4780	-	5580	-
	-	2010-11	Kharif	-	4633	-	-	-	-	-	-	-	5091	-	-	4549	5580	-
	-	2010-11	Rabi	-	5648	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	-	-	-	-	3300	-	3206	3060	7188	-	4142	4344	-	5191	-
	-	2011-12	Kharif	-	5308	-	-	-	-	-	-	-	5184	-	-	4865	5191	-
	-	2011-12	Rabi	-	6499	-	-	-	-	-	-	-	-	-	-	-	-	-
Soyabean	-	2010-11	-	-	2163	1957	-	3550	-	-	-	-	-	-	-	-	1901	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	-	1901	-
	-	2011-12	-	-	2240	2162	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	2167	1765	-
Sugar Raw	-	2010-11	-	-	2751	-	-	-	-	-	-	-	-	2760	644	-	2942	3199
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	2789	-	-
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	2731	-	-	-	-	-
	-	2011-12	-	-	2499	-	-	-	-	-	-	-	-	3009	-	-	-	3247
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	2848	2782	-
	-	2011-12	Rabi	-	-	-	-	-	-	-	-	-	2794	-	-	-	-	-
Sugarcane	-	2010-11	-	-	-	-	418	575	-	117	-	322	-	-	-	-	208	-
	-	2010-11	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	204	208	-
	-	2011-12	-	200	-	-	456	-	-	131	-	165	-	-	-	-	-	-

2. Farm Harvest Prices of Principal Crops in India (Contd.)

Crop	Variety	Year	Season	Kerala	Madhya Pradesh	Maha-rashtra	Manipur	Mizoram	Nagaland	Orissa	Pondicerry	Punjab	Rajasthan	Tamil-Nadu	Tripura	Uttar Pradesh	Uttranchal	West Bengal
	-	2011-12	Kharif	-	-	-	-	-	-	-	-	-	-	-	-	221	220	-
Sunflower	-	2010-11	-	-	-	2180	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	-	-	-	2794	-	-	-	-	-	-	-	-	-	-	-	-
Tapioca	-	2010-11	-	976	-	-	-	816	-	-	-	-	-	650	-	-	-	-
	-	2011-12	-	901	-	-	-	-	-	-	-	-	-	820	-	-	-	-
Tobacco	-	2010-11	-	-	5712	-	-	14572	-	-	-	-	-	3562	-	-	-	-
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	2191	-	-	-	-	-
	-	2011-12	-	-	4438	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	2011-12	Rabi	-	-	-	-	-	-	-	-	-	4189	-	-	-	-	-
	Calcattia	2010-11	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	3332	-	-
	Calcattia	2011-12	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	3353	-	-
Toria	-	2011-12	-	-	-	-	-	-	-	-	-	3500	-	-	-	-	-	-
Tur Arhar	-	2010-11	-	-	-	3748	-	2331	-	-	-	-	-	4462	-	-	-	-
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	3445	-	-	3345	-	-
	-	2011-12	-	-	-	3070	-	2741	-	-	-	-	-	3218	-	-	-	-
	-	2011-12	Rabi	-	-	-	-	-	-	-	-	-	3911	-	-	3452	-	-
Tur Arhar	Delay	2010-12	-	-	3383	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delay	2010-12	-	-	3208	-	-	-	-	-	-	-	-	-	-	-	-	-
	Early	2010-11	-	-	3514	-	-	-	-	-	-	-	-	-	-	-	-	-
	Early	2010-12	-	-	3312	-	-	-	-	-	-	-	-	-	-	-	-	-
Turmeric	-	2010-11	-	-	-	-	11000	-	-	-	-	-	12073	-	-	-	-	-
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	2987	-	-
	-	2010-11	-	-	8838	-	1165	-	-	-	-	-	8188	-	-	-	-	
	-	2010-11	Rabi	-	-	-	-	-	-	-	-	-	-	-	-	851	-	-
Wheat	-	2010-11	-	-	1166	1384	-	-	1335	-	1103	1155	-	-	-	-	-	1231
	-	2010-11	Rabi	-	-	-	-	-	-	-	1130	-	-	-	-	1063	1097	-
	-	2011-12	-	1279	1280	1280	-	-	1376	-	-	-	-	-	-	-	-	1052
	-	2011-12	-	-	-	-	-	-	-	-	-	1226	-	-	-	1105	1256	-

3. WHOLESALE PRICES OF CERTAIN AGRICULTURAL COMMODITIES AND ANIMAL HUSBANDRY PRODUCTS AT SELECTED CENTERS IN INDIA.

Commodities	Variety	Unit	State	Centre	2011-12	2012-13	Crop Year
Wheat	PBW 343	Quintal	Punjab	Amritsar	1185	1403	May-April
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1078	1390	May-April
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1162	1483	May-April
Jowar	-	Quintal	Maharashtra	Mumbai	2474	2167	May-April
Gram	No III	Quintal	Madhya Pradesh	Sehore	-	2800	Mav-April
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1098	1237	May-April
Gram Split	-	Quintal	Bihar	Patna	4278	5250	May-April
Gram Split	-	Quintal	Maharashtra	Mumbai	4107	5896	May-April
Arhar Split	-	Quintal	Bihar	Patna	5948	5856	May-April
Arhar Split	-	Quintal	Maharashtra	Mumbai	5608	6131	May-April
Arhar Split	-	Quintal	NCT of Delhi	Delhi	5704	6429	May-April
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	5333	6154	May-April
Gur	-	Quintal	Maharashtra	Mumbai	3162	3432	Nov-Oct
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	3004	3517	Nov-Oct
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2655	2773	Nov-Oct
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	2740	3781	Apr-Mar
Mustard Seed	Black	Quintal	West Bengal	Raniganj	3111	4325	Apr-Mar
Mustard Seed	-	Quintal	West Bengal	Kolkata	3271	4198	Apr-Mar
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	3103	3967	Apr-Mar
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	3051	3437	Apr-Mar
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	1293	1479	Apr-Mar
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	1550	1550	Apr-Mar
Castor Seed	-	Quintal	Andhra Pradesh	Hyderabad	3448	3175	Apr-Mar
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	6108	6247	Nov-Oct
Copra	FAQ	Quintal	Kerala	Alleppey	4329	5425	Nov-Oct
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	3850	3904	Nov-Oct
Groundnut	-	Quintal	Maharashtra	Mumbai	6413	7771	Nov-Oct
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1034	1305	Apr-Mar
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1213	1392	Apr-Mar
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1675	1656	Nov-Oct
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1667	1649	Nov-Oct
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1100	1387	Apr-Mar
Castor Oil	-	15 Kg.	Andhra Pradesh	Hyderabad	1183	1113	Nov-Oct
Sesamum Oil	-	15 Kg.	NCT of Delbi	Delhi	1429	1594	Nov-Oct
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1853	2720	Nov-Oct
Coconut Oil	-	15 Kg.	Kerala	Cochin	946	1168	Jan-Dec
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	1110	1883	Apr-Mar
Groundnut Cake	-	Quintal	Andhra Pradesh	Hyderabad	2840	3137	Nov-Oct
Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	3740	4058	Sept-Aug
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	3465	3916	Sept-Aug
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	2338	2627	July-June
Cotton Raw	W5	Quintal	West Bengal	Kolkata	2328	2622	July-June
Oranges	-	100 No.	NCT of Delhi	Delhi	560	580	Jan-Dec

3. WHOLESALE PRICES OF CERTAIN AGRICULTURAL COMMODITIES AND ANIMAL HUSBANDRY PRODUCTS AT SELECTED CENTERS IN INDIA.(Cond.)

Commodities	Variety	Unit	State	Centre	2011-12	2012-13	Crop Year
Oranges	Big	100 No.	Tamil Nadu	Chennai	544	564	Jan-Dec
Oranges	Nagpuri	100 No.	West Bengal	Kolkata	430	-	Jan-Dec
Banana	-	100 No.	NCT of Delhi	Delhi	189	199	Jan-Dec
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	319	396	Jan-Dec
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	47250	51708	Jan-Dec
Almonds	-	Quintal	Maharashtra	Mumbai	43092	49733	Jan-Dec
Walnuts	-	Quintal	Maharashtra	Mumbai	53288	62229	Jan-Dec
Kishmish	-	Quintal	Maharashtra	Mumbai	11803	12933	Jan-Dec
Peas Green	-	Quintal	Maharashtra	Mumbai	3011	3950	Jan-Dec
Tomatoes	Ripe	Quintal	Uttar Pradesh	Kanpur	1151	1651	Jan-Dec
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	2508	2345	Jan-Dec
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1267	1564	Jan-Dec
Potatoes	Red	Quintal	Bihar	Patna	928	942	Jan-Dec
Potatoes	Desi	Quintal	West Bengal	Kolkata	1005	919	Jan-Dec
Potatoes	Sort I	Quintal	Tamil Nadu	Mettuppalayam	2097	2446	Jan-Dec
Onions	Pole	Quintal	Maharashtra	Nashik	490	1925	Jan-Dec
Turmeric	Nadan	Quintal	Kerala	Cochin	7496	9908	Jan-Dec
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	6583	9185	Jan-Dec
Chillies	-	Quintal	Bihar	Patna	7752	7801	Jan-Dec
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	36233	38583	Jan-Dec
Ginger	Dry-	Quintal	Kerala	Cochin	10163	16042	Jan-Dec
Cardamom	Major	Quintal	NCT of Delhi	Delhi	73208	102500	Jan-Dec
Cardamom	Small	Quintal	West Bengal	Kolkata	92917	97333	Jan-Dec
Milk	Cow	100 Liters	NCT of Delhi	Delhi	3475	3686	Jan-Dec
Milk	Buffalo	100 Liters	West Bengal	Kolkata	3217	3383	Jan-Dec
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	27506	28348	Jan-Dec
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	25933	27642	Jan-Dec
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	28317	29268	Jan-Dec
Fish	Rohu	Quintal	NCT of Delhi	Delhi	7625	9225	Jan-Dec
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	24525	29142	Jan-Dec
Eggs	Madras	1000 No.	West Bengal	Kolkata	3483	3838	Jan-Dec
Tea	-	Quintal	Bihar	Patna	19652	19925	Jan-Dec
Tea	AttiKunna	Quintal	Tamil Nadu	Coimbatore	12000	9000	Jan-Dec
Coffee	. Plant-A	Quintal	Tamil Nadu	Coimbatore	27333	26000	Jan-Dec
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	13467	14000	Jan-Dec
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	2397	2771	Jan-Dec
Tobacco	Raisa	Quintal .	Uttar Pradesh	Farukhabad	2290	2678	Jan-Dec
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	3950	3617	Jan-Dec
Rubber	-	Quintal	Kerala	Kottayam	17479	15692	Jan-Dec
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	27825	28500	Jan-Dec

4. Monthly Wholesale Prices of Some Important Agricultural Commodities in International Markets during Year 2013

Commodity	Variety	Country	Centre	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	3 4	5	6	7	8	9	10	11	12	13	14	15	16	17
CARDAMOM	Guatmala Bold Green	U.K. -	Dollar/M.T.	16500.00	16500.00	16500.00	17000.00	14250.00	1425006	1425000	14250.00	14250.00	14250.00	9000.00	9000.00
			Rs./Qtl	88572 00	89875.50	89743.50	92174.00	80341.50	85770.75	84018.00	96030.75	87965.25	8756625	56169.00	6214.00
CASHEW KERNELS	Spot U.K. 320s	U.K. -	Dollar/lbs	36.0	36.0	3.66	36.4	35.9	3.56	3.55	3.50	3.47	3.49	3.48	3.48
			Rs./Qtl	42591 86	43218.68	43874.45	43498.32	44112.841	47226.52	46131.48	51984.65	47210.36	4726709	47867.97	47906.32
	Spot U.K. 320s	U.K. "	Dollar/M.T.	791509	7898.35'	8056.22	8024.08	7861 2	7844.3d	7869.32	7719.15	7633.83	7705.14	7673.70	7671 79
			Rs./Qtl	42488.20	43022.31	43817.78	43506.56	44321.61	47214.84	46397.51	52019.35	47123.63	4734809	47891.56	7918...00
CASTOR OIL	Any Origin ex tank Rotterdam	Netherlands -	Dollar/M.T.	1690.00	1650.00	1650.00	1600.00	1500.00	1510.00	1480.00	1420.00	1440.00	1470.00	1535.od	180000
			Rs./Qtl	9071.92	8987.55	8974.35	8675.20	8457.00	9088.69	8726.08	9569.38	8889.12	9033.15	9579.94	1124280
CELERY SEED	ASTA cif	India -	Dollar/M.T.	1500.00	1500.00	1500.00	150000	1500.00	1500.00	1500.00	1500.00	150000	150000	150006	150000
			Rs./Qtl	805200	8170.50	8158.50	8133.00	8457.00	9028.50	8844.00	10108.50	9259.50	921750	9361.50	936900
CHILLIES	Birds eye 2005 crop	Africa	Dollar/M.T.	500000	4250.00	4250.00	4100.00 ~	4100.00	4100.00	4100.00	4100.00'	410000	410000	4100.00	410000
			Rs./Qtl	26840.00	23149.75	23115.75	22230.20	23115.80	24677.90	24173.60	27629.90	25309.30	25194.50	25588. 10	2560860
CINNAMON BARK		Madagascar -	Dollar/M.T.	1100.00	1100.00	1100.00	1100.00	1100.00	1100.00	1100.00	1100.00	110000	110000	110000	110000
			Rs./Qtl	5991.70	5982.70	5982.70	5964.20	6201.80	6620.90	6485.60	7412.90	6790.30	6759.50	6865.10	687060
CLOVES	Singapore	Madagascar '-	Dollar/M.T.	9500.00	9500.00	9500.00	12000.00	12000.00	11850.00	13500.00	13500.00	1280000	12000.00	12750.00	13250.00
			Rs./Qtl	50996.00	51746.50	51670.50	65064.00	67656.00	71325.15	79596.00	90976.50	79014.40	73740.00	79572.75	82759.50
COCONUT OIL	Crude	Netherlands -	Dollar/M.T.	815.00	850.00	805.00	800.00	850.00	890.00	850.00	930.00	990.00	100000	1300.00	125000
	Phillipine/Indonesia		Rs./Qtl	4374.92	4629.95	4378.40	433760	4792.30	5356.91	5011.60	626727	6111.27	6145.00	8113.30	7807.50
COPRA	Phillipines cif	Phillipine	Dollar/M.T.	538.00	530.00	505.00	47600	527.00	559.00	546.00	578.00	616.00	622.50	819.00	790.50
	Rotterdam		Rs./Qtl	2887.98	288691	2746.70	2580.87	2971.23	3364.62	3219.22	3895.14	3802.57	3825.26	5111.38	493746
CORRIANDER		India	Dollar/M.T.	1150.00	1150.00	1150.00	115000	1150.00	1150.00	1150.00	1150.00	1150.00	1150.00	1500.00	1500.00
			Rs./Qtl	6173.20	6264.05	6254.85	623530	6483.70	6921.85	6780.40	7749.85	7098.95	7066.75	9361.50	9369.00
CUMMIN SEED		India	Dollar/M.T.	2889.00	2889.00	2889.00	2889.00	2889.00	2889.00	2889.00	2889.00	2889.00	2889.00	2250.00'	2250.00
			Rs./Qtl	15508.15	15736.38	15713.27	15664.16	16288.18	17388.89	17033.54	19468.97	17833.80	17752.91	14042.25	14053.50
Fennel seed		India	Dollar/M.T.	2600.00	2600.00	2600.00	260000	260000	2600.00	2600.00	2600.00	260000	260000	2600.00	2600.00
			Rs./Qtl	13956.80	14162.20	14141.40	14097.20	1465880	15649.40	15329.60	17521 40	1604980	15977 00	16226.60	16239.
GINGER	Split	Nigeria	Do11ar/M.T.	2400.00	2400.00	2400.00	240000	181000	2005.00	2300.00	2300.00	230000	200000	2000.00	200000
			Rs./Qtl	12883.20	13072.80	13053.60	13012.80	1020478	12068.10	13560.80	1549970	14197.90	1229000	12482.00	1249200
GROUNDNUT	US 2005, 40/50	European	Dollar/M.T.	1275.00	1350.00	-	-	140(,00	131000	135000	145000	1350.00	133000	1350.00	133000
Ports			Rs./Qtl	6844.20	7353.45	-	-	7611.30	8306.22	8254.40	8828.09	8333.55	8910.25	8425.35	8307.18
GROUNDNUT OIL	Crude Any Origin	U.K.	Dollar/M.T.	2200.00	-					170000	170000	170000	1600 00	1500.00'	150000
kernels	cif Rotterdam		Rs./Qtl	11809.60	-	-	-	-	-	10022.20	11456.30	10494.10	9832	9361.50	9369.00
LENTILS	Turkish Red Spiit	U.K.	Pound/M.T.	522.72	65520	660.98	64780	656.64	655.38	65012	64489	62354	61725	611.96	61107
	Crop I + I water		4428.48	544668	5438.54	542209	563791	601901	589594	6739 10	617305	614472	6241.38	6245 75	
MAIZE		U.SA Chicago	C/56 lbs	720.75	70050	735.25	639.50	66500	664.50	50825	504.25	45475	442 75	417.25	42500
			Rs./Qtl	1520.51	149954	1571.62	136268	147346	1571 85	1177 68	1335.47	110322	106923	1023.39	1043.24
OATS		CANADA Winnipeg	Dollar/M.T.	359.83	384.62	406.44	40194	36625	40576	36284	389.94	31938	35548	407.52	37669
			Rs./Qtl	1931.57	209503	2210.63	217932	2064 92	2442.27	2139 30	2627 81	1971 53	218442	2543.33	2352.81
PALM KERNAL OIL	Crude	Netherlands -	Dollar/M.T.	795.00	85500	815.00	84000'	84000	84000	83000	90500	89500	92500	1100.00	114000
	Malaysia/Indonesia		Rs./Qtl	4267.56	4657 19	4432.79	455448	473592	505596	4893.68	609880	552484	5684 13	6865.10	712044
PALM OIL	Crude	Netherlands -	Dollar/M.T.	855.00	86000	850.00	830.00	86000	85500	82500	85000	82000	900 (10	910.00	87500
	Malaysian/Sumatra.		Rs./Qtl	4589.64	468442	4623.15	450026	484868	514625	4864.70	5728 15	5061 86	5530 so	5679.31	5465 25

4. Monthly Wholesale Prices of Some Important Agricultural Commodities in International Markets during Year 2013

Commodity	Variety		Country	Centre	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PEPPER (Black)	Sarawak Black lable	Malaysia		Do11ar/M.T.	-	7300.00	-	-	-	-	-	-	-	-	8400.00	890000
				Rs./Qtl	-	39763 10	-	-	-	-	-	-	-	-	52424.40	5558940
Repeseed	Canola	Canada	Winnipeg	Can	605.80	644.20	638.60	637.60	640.50	613.10	505.20	527.40	484.90	493.40	493.40	445.70
				Dollar/M.T.	3244.06	3448.40	3415.21	3388.84	3505.46	3521.65	2895.81	3372.20	2903.10	2910.57	2906.73	2608.68
	UK delivered	U.K.	-	Pound/M.T.	379.00	389.00	393.00	394.00	375.00	330.00	318.00	320.00	290.00	303.00	305.00	300.68
	rapeseed, delivered			Rs./Qtl	3210.89	3233.76	3233.60	3297.78	3219.75	3030.72	2883.94	3344.00	2871.00	3016.37	3110.70	3066.30
RAPESEED OIL	Refined Bleached and	U.K.	-	Pound/M.T.	871.00	908.00	867.00	819.00	855.00	826.00	731.00	752.00	693.00	688.00	718.00	704.00
	deodorised		-	Rs./Qtl	7379.11	7548.20	7133.68	6855.03	7341.03	7585.98	6629.44	7858.40	6860.70	6849.04	7322.88	7195.58
SOYABEAN MEAL	UK Produced 49%	U.K.	-	Pound/M.T.	351.00	379.00	376.00		409.00	395.00	422.00	426.00	393.00	432.00	405.00	490.00
	oil & protein			Rs./Qtl	2973.67	3150.63	3093.73	-	3511.67	3627.68	3827.12	4451.70	3890.70	4300.56	4130.60	5008.29
SOYABEAN OIL		U.S.A.	-	C/lbs Rs/Qtl	52.03	52.07	50.82	49.18	48.63	46.63	44.26	44.31	41.82	41.50	40.00	39.06
					6155.71	6251.10	6092.08	5877.05	6042.84	6185.88	5751.49	6581.26	5689.73	5620.59	5502.07	5377.07
	Refined bleached	U.K.	-	Pound/M.T.	826.00	849.00	839.00	768.00	774.00	716.00	720.00	758.00	704.00	716.00	717.00	698.00
	and deodorised			Rs./Qtl	6997.87	7075.74	6903.29	6428.16	6645.56	5675.74	6529.68	7921.10	6969.60	7127.78	7312.68	7134.26
SOYABEANS	US NO. 2 yellow	Netherland	Chicago	Dollar/M.T.	596.70	594.10	580.10	569.20	510.10	513.00	511.50	561.7.	573.70	549.20	560.50	563.10
				Rs./Qtl	3203.09	3236.06	3155.16	3086.20	2875.94	3087.75	3015.80	3785.30	3541.45	3374.83	3498.08	3517.12
		U.S.A.	-	C/60 lbs	1437.00	1482.75	1453.75	1345.25	1501.75	1534.25	1392.50	1433.00	1321.75	1310.00	1320.00	1324.00
				Rs./Qtl	2830.97	29640.49	2901.85	2676.88	3107.34	3389.12	3013.14	3544.11	2994.41	2954.33	3023.39	3034.98
SUNFLOWER	Refined bleached	U.K.	-	Pound/M.T..	983.00	1018.00	963.00	934.00	845.00	787.00	843.00	829.00	731.00	731.00	766.00	753.00
SEED OIL	deodorised			Rs./Qtl	8327.98	8462.63	7923.56	7817.58	7255.17	7227.81	7645.17	8663.05	7236.90	7277.11	7812.43	7696.41
TALLOW	High grade	U.K.	London	Pound/M.T.	550.00	460.00	440.00	440.00	440.00	440.00	445.00	445.00	445.00	445.00	465.00	465.00
	delivered			Rs./Qtl	4659.60	3823.98	3620.32	3682.80	3777.84	4040.96	4035.71	4650.25	4405.50	4429.98	4742.54	4752.77
TURMERIC	Madras finger	India	-	Dollar/M.T.	850.00	850.00	850.00	850.00	850.00	850.00	850.00	850.00	850.00	850.00	850.00	850.00
	spot/cif			Rs./Qtl	4562.80	462995	4623.15	4608.70	4792.30	5116.15	5011.60	5728.15	5247.15	5223.25	5304.85	5309.10
WALNUTS	Indian light haives	U.K.	-	Pound/M.T.	7500.00	7500.00	7950.00	7750.00	7980.00	7980.00	7800.00	7800.00	7800.00	8330.00	8295.00	8130.00
				Rs./Qtl	63540.00	62347.50	65412.60	64867.50	68516.28	73288.20	70738.00	81510.00	77220.00	82925.15	84600.71	83096.73
Wheat		U.S.A.	Chicago	C/60 lbs	774.75	738.50	736.75	691.75	702.75	667.00	653.25	646.50	670.50	701.75	651.25	612.75
				Rs./Qtl	1526.30	1476.30	1470.64	1376.50	1454.09	1473.38	1413.52	1598.93	1519.01	1582.60	1491.65	1404.60

Source ;Public Ledger

Exchange Rate

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Now	Dec
US Dollar	53.68	54.47	54.39	54.22	56.38	60.19	58.96	67.73	61.73	61.45	62.41	62.46
CAN Dollar	53.55	53.53	53.53	53.15	54.73	57.44	57.32	63.94	59.87	58.99	58.96	58.53
UK Pound	84.72	83.13	82.28	83.70	85.86	91.84	90.69	104.50	99.55	101.99	101.99	102.21

5. SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING JANUARY, 2014

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

(K)—Kharif. (R)—Rabi.

MGIPRRND—2353 Agri./2013—600.