AGRICULTURAL SITUATION IN INDIA

OCTOBER, 2012

PUBLICATION DIVISION
DIRECTORATE OF ECONOMICS AND STATISTICS
DEPARTMENT OF AGRICULTURE AND CO-OPERATION
MINISTRY OF AGRICULTURE
GOVERNMENT OF INDIA

Publication Division

DIRECTORATE OF ECONOMICS AND STATISTICS
DEPARTMENT OF AGRICULTURE AND CO-OPERATION
MINISTRY OF AGRICULTURE
GOVERNMENT OF INDIA
C-1, HUTMENTS, DALHOUSIE ROAD,
NEW DELHI-110001
PHONE : 23012669

Subscription

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

Available from :

The Controller of Publication,
Ministry of Urban Development,
Deptt. of Publications,
Publications Complex (Behind Old Secretariat),
Civil Lines, Delhi-110 054.
Phone : 23817823, 23817640, 23819689

Agricultural Situation in India

VOL. LXIX **OCTOBER 2012** **No. 7**

CONTENTS

PART I

Officials of the Publication Division, Directorate of Economics and Statistics, Department of Agriculture and Co-operation, New Delhi associated in preparation of this publication :

B. B. S.V. Prasad—*Sub. Editor*

D. K. Gaur—*Technical Asstt.*

Uma Rani —*Technical Asstt.* (*Printing*)

The Journal is brought out by the Directorate of Economics and Statistics, Ministry of Agriculture. It aims at presenting a factual and integrated picture of the food and agricultural situation in India on month to month basis. The views expressed, if any, are not necessarily those of the Government of India.

NOTE TO CONTRIBUTORS

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

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

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.

ISSN 0002—167
Regn. No. : 840

P. Agri. 21-10-2012
600

LIST OF PUBLICATIONS

Journal

Agricultural Situation in India (Monthly)

Periodicals

Agricultural Prices in India

District-wise Area and Production of Principal Crops in India

Agricultural Wages in India

Cost of Cultivation of Principal Crops

Year Book of Agro-Economic Research Studies

Land Use Statistics at a Glance

Farm Harvest Prices in Principal Crops in India

Agricultural Statistics at a Glance

Copies are available from : The Controller of Publications, Civil Lines, Delhi-110054. (Phone 23817640)

PRINTED BY THE MANAGER, GOVERNMENT OF INDIA PRESS, RING ROAD, MAYAPURI, NEW DELHI-110064
AND PUBLISHED BY THE CONTROLLER OF PUBLICATIONS, DELHI-110054—2013.

A. General Survey

1. Trends in Foodgrain Prices

During the month of September, 2012, the All India Index Number of Wholesale Price (2004-05=100) of Foodgrains increased by 2.17 per cent from 207.4 in August, 2012 to 211.9 in September. 2012.

Similarly, the Wholesale Price Index Number of Cereals showed an increase of 2.49 per cent from 196.4 to 201.3 and Pulses showed an increase of 0.73 per cent from 259.5 to 261.4.

The Wholesale Price Index Number of Wheat and Rice increased by 3.88 percent and 2.15 percent respectively during the same period.

2. Weather, Rainfall and Reservoir situation during October, 2012

- Cumulative Monsoon Rainfall for the country as a whole during the period 1st June to 30th August, 2012 is 12% less than LP A. Rainfall in the four broad geographical divisions of the country during the above period was (-) 14% in North West India, (-) 10% in Central India, (-) 12% in South Peninsula and (-) 15 % in East & North East India.
- Out of a total of 36 meteorological subdivisions, 22 subdivisions constituting 68% of the tota area of the country received excess/normal rainfall and the remaining 14 subdivision constituting 32% of the total area of the country received deficient/ scanty rainfall.
- Central Water Commission monitors 84 major reservoirs in the country which have a total live capacity of 154.42 BCM at Full Reservoir Level (FRL). Current live storage in these reservoirs as on 30th August. 2012 was 94.04 BCM as against 114.08 BCM on 30.08.2011(last year) and 93.91 BCM of normal storage (average storage of the last 10 years). Current year's storage in 82% of the last year's and 100% of the normal storage. Major States reporting lower than normal storage are Himachal Pradesh, Punjab, Jharkhand, West Bengal, Tripura, Andhra Pradesh, Karnataka, Kerala, Maharashtra and Tamil Nadu.
- 954.31 lakh ha. area had been sown under various Kharif crops upto 31.08.2012 as compared to average sown area of 960.92 lakh ha. upto the corresponding period of previous years. Area coverage is higher by 15.3 lakh ha. in Rice, 12.4 lakh ha. in Soyabean, 5.6 lakh ha. in Cotton, 6.2 lakh ha. in Sugarcane and 1.8 lakh ha. in Urad. Major decline (compared to average area) has been reported under Bajra (-18.9 lakh ha.), Jowar (-5.5 lakh ha.), Pulses (-3.6 lakh ha.), Groundnut (-9.7 lakh ha.), Sunflower (-2.6 lakh ha.) and Sesamum (-1.21akh ha.).
- A statement indicating comparative position of area coverage under major Kharif crops during 2012-13 (upto 31.08.2012) and the corresponding perilld of last year is enclosed.

ALL INDIA CROP SITUATION - KHARIF (2012-13) AS ON 31-08-2012

(In lakh hectares)

Crop Name	Average Area for whole Kharif Season	Average Area as on date	Area sown reported			Absolute Change over (+/–1)	
				% of Average for			
			This Year 2012	Whole season	Last Year 2011	Average as on date	Last Year
Rice	391.10	331.85	341.10	319.2	364.61	15.3	–17.5
Jowar	32.88	29.02	23.54	71.6	25.85	–5.5	–2.3
Bajra	92.70	77.47	58.59	63.2	78.60	–18.9	–20.0
Maize	70.64	71.91	71.91	101.8	72.69	0.0	–0.8
Total Coarse Cereals	218.58	196.77	167.87	76.8	193.37	–28.9	–25.5
Total Cereals	609.68	528.62	514.97	84.5	557.98	–13.7	–43.0

ALL INDIA CROP SITUATION - KHARIF (2012-13) AS ON 31-08-2012—*Contd.*

(In lakh hectares)

Crop Name	Average Area for whole Kharif Season	Average Area as on date	Area sown reported			Absolute Change.over (+/–1)	
			% of Average for				
			This Year 2012	Whole season	Last Year 2011	Average as on date	Last Year
Tur	37.00	37.67	36.13	97.7	37.40	–1.5	–1.3
Urad	23.11	21.25	23.02	99.6	21.49	1.8	1.5
Moong	26.29	23.40	19.35	9.2	22.11	–4.1	–2.8
Others	23.36	18.99	19.20	82:2	23.18	0.2	–4.0
Total Pulses	109.75	101.31	97.70	89.0	104.18	–3.6	–6.5
Total Foodgrains	719.43	629.93	612.67	85.2	662.16	–17.3	–49.5
Groundnut	49.94	46.63	36.97	74.0	42.12	–9.7	–5.1
Soyabean	92.11	94.56	106.94	116.1	103.12	12.4	3.8
Sunflower	6.33	4.26	1.68	26.5	2.39	–2.6	–0.7
Sesamum	18.67	14.16	12.92	69.2	14.63	–1.2	–1.7
Niger	4.03	1.83	1.59	39.3	1.46	–0.2	0.1
Castor	7.79	6.93	7.06	90.5	11.13	0.1	–4.1
Total Oilseed	178.89	168.36	167.15	93.4	174.86	–1.2	–7.7
Cotton	98.66	106.91	112.83	114.4	118.37	5.9	–5.5
Sugarcane	47.36	46.72	52..88	111.7	50.63	6.2	2.3
Jute	7.96	9.00	8.78	110.3	9.19	9.2	–0.4
All– Crops	**1052.30**	**960.92**	**954.31**	**90.7**	**1015.21**	**–6.6**	**–60.9**

Source: Crops and TMOP Divisions, DAC.

Agriculture

3. All India production of foodgrains: As per the 1st advance estimates (Kharif only) released by Ministry of Agriculture on 24-09-2012, production of foodgrarins during 2012-13 is estimated at 117.18 million tonnes compared to 123.95 million.tonnes (1st advance estimates) in 2011-12.

Procurement: Procurement of rice as on 3rd September, 2012 (Kharif Marketing Season 2011-12) at 34.84 million tonnes represents an increase of 4.85 per cent compared to the corresponding date last year. Wheat procurement during Rabi Marketing Season 2012-13 is 38.15 million tonnes as compared to 28.15 million tonnes during the corresponding period last year.

TABLE 1— PROCUREMENT IN MILLION TONNES

	2009-10	2010-11	2011-12	2012-13
Rice (Oct.-Sept.)	32.03	34.20	34.93*	n.a.
Wheat (Apr.-Mar.)	25.38	22.51	28.34	38.15**
Total	**57.41**	**56.71**	**63.27**	**38.15**

* Position as on 1-10-2012. ** Positions as on 02-08-2012

Off-take: Off-take of rice during the month of August, 2012 was 27.37 lakh tonnes. This comprises 20.16 1akh tonnes under TPDS and 7.21 lakh tonnes under other schemes during August 2012. In respect of wheat, the total off take was 21.46 lakh tonnes comprising of 15.86 lakh tonnes under TPDS and 5.60 lakh tonnes under other schemes.

Stocks: Stocks of food-grains (rice and wheat) held by FCl as on September 1, 2012 were 71.75 million tonnes, which is higher by 27.37 per cent over the level of 56.33 million tonnes as on September 1, 2011.

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

	Off-take			Stocks	
	2010-11	2011-12	2012-13(P)	Sep. 1, 2011	Sept. 1, 2012
Rice	29.93	32.12	12.83	22.71	25.59
Wheat	23.07	24.26	11.20	33.62	46.16
Total	**53.00**	**56.38**	**24.03**	**56.33**	**71.75**

P=Provisional figures up to August, 2012.

4. Growth of Economy

As per the latest estimates of the Central Statistics Office (CSO), the growth in real Gross Domestic Product (GDP) is placed at 5.5 per cent in the first quarter of 2012-13 with agriculture, industry and services registering growth rates of 2.9 per eent, 3.6 per cent and 6.9 per cent respectively. As per the Revised Estimates (RE), the, growth in GDP at factor cost at constant (2004-05) prices was estimated at 6.5 per cent in 2011-12 as compared to 8.4 per cent in 2010-11 (Quick Estimate). At disaggregated level, this (RE 2011-12) comprises growth of 2.8 per cent in agriculture and allied activities, 3.4 per cent in industry and 8.9 per cent in services as compared to a growth of 7.0 per cent, 7.2 per cent and 9.3 per cent respectively during 2010-11.

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

(at 2004-05 Prices)

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

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

TABLE 4—QUARTERLY ESTIMATE OF GDP

(Year-on-year in per cent)

	2010-11				2011-12			2012-13	
Industry	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
1. Agriculture, forestry & fishing	3.1	4.9	11.0	7.5	3.7	3.1	2.8	1.7	2.9
Industry	**8.3**	**5.7**	**7.6**	**7.0**	**5.6**	**3.7**	**2.5**	**1.9**	**3.6**
2. Mining & quarrying	6.9	7.3	6.1	0.6	–0.2	–5.4	–2.8	4.3	0.1
3. Manufacturing	9.1	6.1	7.8	7.3	7.3	2.9	0.6	-0.3	0.2
4. Electricity, gas & water supply	2.9	0.3	3.8	5.1	8.0	9.8	9.0	4.9	6.3
5. Construction	8.4	6.0	8.7	8.9	3.5	6.3	6.6	4.8	10.9
Services	**10.0**	**9.1**	**7.7**	**10.6**	**10.2**	**8.8**	**8.9**	**7.9**	**6.9**
6. Trade, hotels, transport & communication	12.6	10.6	9.7	11.6	13.8	9.5	10.0	7.0	4.0
7. Financing, insurance, real estate & bus. Services	10.0	10.4	11.2	10.0	9.4	9.9	9.1	10.0	10.8
8. Community, social & personal services	4.4	4.5	-0.8	9.5	3.2	6.1	6.4	7.1	7.9
9. GDP at factor cost (total I to 8)	**8.5**	**7.6**	**8.2**	**9.2**	**8.0**	**6.7**	**6.1**	**5.3**	**5.5**

Source: CSO

B. Articles

Production and Export Performance of Onions—An Exploratory Study

SENDHIL R*

Introduction

Onion *(Allium cepa*), the liliaceous plant is an important ingredient of Indian culinary and also is used as a vegetable and spice. Its significance in the consumption basket of the poor is more than exhorted by the famous Indian saying, "you will never starve when you can afford a roti and an onion". Besides culinary, it has immense medicinal and therapeutic value. The versatile crop is being cultivated in all parts of the country predominantly for domestic consumption and international trade. India is surplus in onion production and stands second next to China both in quantity and value terms. India stands second among the onion exporting countries in terms of quantity and value. During 2010 India exported 1.36 million tonnes worth US$ 465.31 million (FAO Stat). Though Maharashtra ranks first both in area and production, but Gujarat holds the prime position in terms of onion productivity during 2009-10.

Onion is a commercial crop in India, but the crises of 1998 and 2010 played spoilt sports on the economy and the welfare of the producers. During crises the prices of onion spiked across-the country because of the supply shock exacerbated by the erratic and excess rainfall, and the state's inability to initiate timely action to control the spiraling prices resulted in the explosive situation of onion prices (Nayyar, 2011). As a mitigating measure, Indian government tackled this uncertain situation through controlled price delivery, EXIM policies and a host of other interventions. More emphasis was given on curbing onion exports during both the crisis times in order to the meet the domestic demand. The spiraling prices of onion undermined the sustainability of current economic growth process as well as the efficiency of public management in controlling rising prices. Price volatility creates uncertainty and risks that can threaten agricultural performance and negatively impact the income and welfare of producers and the rural poor (World Bank, 1997). During the crisis, price rose about 425 per cent to 600 per cent across different markets. Onion crises almost threatened the economic and political stability as it has serious implications for the political economy of India.

Generally, there exists an explanatory relationship between exports, national income and investment. Fluctuations in domestic production, export quantity and value generate fluctuation in economic activity rendering planned development complicated, uncertain and reducing the allocation efficiency of the resource investment (Chand *et al.*, 2001). In this context the present study was carried out with the specific objective of analysing the production and export performance of onions over a period of time in view of the onion crises.

Data and Methodology

Data Source

The study is primarily based on the secondary data published from various authentic sources. Data on area, production, productivity and export of onions were collected from the Food and Agricultural Organisation (F AO) trade statistics, portals of indiastat and Ministry of Commerce (India). For analysis purpose, the collected data were divided into two period's viz., Period I (Pre-Onion Crisis) and Period II (Post-Onion Crisis) based on 1998 as the year of demarcation.

Methodology

1. Compound Annual Growth Rate (CAGR)

The following functional form is used to estimate the growth in area, production and productivity: $Y_t = Y_o (1 + r)^t$

Transforming this to logarithmic form, $\ln Y_t = \ln Y_o + t \ln (1 + r)$. Here, Y_t is the variable for which growth is calculated, r is the compound growth rate and In is the natural logarithm.

Now, let $\ln Y_o = \beta_1$ and $\ln (1+r) = \beta_2$

Therefore, the above equation becomes, $\ln Y_t = \beta_1 + \beta^2 t$

Now, β_1 and β_2 are estimated by Ordinary Least Square (OLS) method and the CAGR is given by, $r = (\text{antilog } \beta_2 - 1) \times 100$

2. Instability (Cuddy-Della Valle Index)

Instability in area, production and productivity is estimated to examine the extent of risk in those variables using Cuddy-Della Valle Index (Cuddy and Della Valle, 1978) which is given as, Cuddy-Della Valle Instability Index (%) $= CV \times \sqrt{(1-\bar{R}^2)}$

Here, CV is the coefficient of variation in per cent, and $\bar{R}^2$ is the adjusted coefficient of determination from a time trend regression.

*Scientist, Social Science Directorate of Wheat Research, Agrasain Marg, Karnal, Haryana-132001

3. Geographic Concentration in the Export of Onion (Hirschman Index)

Increased geographic concentration increases the instability and thereby the risks in export earnings. The Hirschman index is computed to measure the geographic concentration in the export of onion.

$$\text{Hirschman Index (HI)} = 100 \sqrt{\sum_{i=1}^{n} (X_{it} 1 X_t^2}$$

where,

X_{it} is the value of export of onions from India to the i^{th} market in t^{th} year

X_t is the total value of export of onions from India in t^{th} year

n is the number of countries importing onions from India

4. Markov Chain Analysis

Markov chain analysis involves developing a transitional probability matrix (TPM) 'P', whose elements, P_{ij} indicate the probability of exports switching from country 'i' to country 'j' over time. The diagonal element P_{ij} where i=j, measures the probability of a country retaining its market share or the loyalty of an importing country to a particular country's exports (Ajjan *et al*., 1998).

The TPM is estimated using linear programming framework by a method referred to as minimization of mean absolute deviation.

Minimise $OP^* + I e$

subject to

$X P^* + V = Y$

$GP^* = I$

$P^* \geq 0$

where,

P^* is a vector of the probabilities P_{ij}

0 is the vector of zeros

I is an appropriately dimensional vectors of areas

e is the vector of absolute errors

Y is the proportion of exports to each country.

X is a block diagonal matrix of lagged values of Y

Y is the vector of errors and

G is a grouping matrix to add the row elements of P arranged in P* to unity.

Results and Discussion

Growth and Instability in Area, Production and Productivity

Knowledge about the current scenario is contingent upon the pattern of growth in onion economy. This gives a clue on the trend in area, production and productivity and the plausible reasons behind the growth pattern (Figure 1).

FIGURE 1—Growth In Area, Production And Productivity of Onions

The figure clearly shows an increasing trend over the years. in all the variables under consideration. The growth was phenomenal since 2002-03 in terms of area, production and productivity particularly due to the introduction of a new scheme by the Government of India *"Vishesh Krishi Upaj Yojana"* (Special Agricultural Produce Scheme) in 2004 to boost the export of fruits, vegetables, flowers, minor forest produce and their value added products (Annexure 1). Some of the features of this scheme largely attracted the onion growers to increase the area under this crop substantially and increase in production can be attributed to the increase in area under onion.

Compound growth rate was computed and Cuddy-Della Valle index was worked out to find the growth and instability in area, production and productivity of onion. Results of the above analysis furnished in Table 1 indicates a significant positive growth in all the variables. Growth in production was more pronounced (4.68 %) attributed mainly to significant growth in area (3.90 %) and productivity (0.75 %). The high growth in production was also accompanied by high instability (32.23 %) compared to other variables. Period II exhibits a positive and- significant growth in area (6.41 %), production (10.28 %) and productivity (3.61 %) compared to Period 1. Post crisis, growth in area, production and productivity was spectacular more due to the special package on horticultural crops by the Government of India in 2004. High growth in onion production was attributed to significant growth in area and productivity for all the periods. Similar kind of pattern was noticed in the instability index too. Instability was high in production compared to area and productivity implying the high risk.

TABLE 1—GROWTH AND INSTABILITY IN ONION

Period	CAGR(%)			Cuddy-Della Valle Index (%)		
	Area	Production	Productivity	Area	Production	Productivity
Period I	3.18*	3.15*	0.01*	5.47	7.52	4.78
Period II	6.41 *	10.28*	3.61 *	11.72	19.70	8.77
Overall Period	3.90*	4.68*	0.75*	16.24	32.26	9.94

NOTE: * indicates the significance at one per cent level of probability

The growth-instability matrix for area, production and productivity of onion in different states and periods depicted in Table 2 to Table 4 revealed that most of the states are in comfortable zone (positive growth coupled with low instability) in Period 1 for area and productivity. Excluding Orissa rest of the states have positive growth in area and production for the whole period. It is worth to note that the top onion producing states viz., Maharashtra and Karnataka have positive growth coupled with high instability for the whole period. Most of the states recorded positive growth with low instability in productivity. In Period I, Punjab witnessed a negative growth coupled with high instability in area, while Maharashtra and Karnataka exhibited a positive growth coupled with low instability. But the major producing states witnessed high instability in area and production in Period II.

TABLE 2—GROWTH-INSTABILITY MATRIX FOR ONION

(1975-76 to 1997-98)

Growth	Instability (Cuddy-Della Valle Index)	
(CAGR)	Low (<30)	High (>30)
	Area	
Negative	—	Punjab (0.58)
Positive	Andhra Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh (98.33)	Haryana and Tripura (1.09)

TABLE 2—GROWTH-INSTABILITY MATRIX FOR ONION—*Contd.*

(1975-76 to 1997-98)

Growth	Instability (Cuddy-Della Valle Index)	
(CAGR)	Low (<30)	High (>30)
	Area	
	Production	
Negative	—	—
Positive	Andhra Pradesh, Assam, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and Tripura (84.17)	Haryana, Himachal Pradesh, Punjab, Rajasthan and Uttar Pradesh (15.73)
	Productivity	
Negative	Karnataka, Maharashtra, Tamil Nadu [20.12], Tripura [1.50]	
Positive	Andhra Pradesh, Assam [1.90], Bihar, Gujarat [32.96], Haryana, Madhya Pradesh, Orissa, Punjab, Rajasthan and Uttar Pradesh	Himachal Pradesh [1.14 to 7.3]

NOTE: Figures in normal parenthesis indicate the per cent share of the states in that quadrant to all states. Figures in square parenthesis indicate the range of productivity of the states in that quadrant.

TABLE 3—GROWTH-INSTABILITY MATRIX FOR ONION

(1998-99 to 2009-10)

Growth	Instability (Cuddy-Della Valle Index)	
(CAGR)	Low (<30)	High (>30)
	Area	
Negative	Assam, Tamil Nadu and Uttar Pradesh (10.32)	—
Positive	Andhra Pradesh, Haryana, Karnataka, Madhya Pradesh, Maharashtra and Rajasthan (48.54)	Bihar, Gujarat, Himachal Pradesh, Orissa and Punjab (41.15)
	Production	
Negative	Uttar Pradesh (4.07)	—
Positive	Andhra Pradesh, Assam, Haryana, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu (55.73)	Bihar, Gujarat, Himachal Pradesh, Karnataka, Orissa and Punjab (40.20)
	Productivity	
Negative	—	—
Positive	Andhra Pradesh, Assam [2.32], Bihar, Gujarat [31.68], Haryana, Himachal Pradesh, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh	Karnataka [3.56 to 18.36]

NOTE: Figures in normal parenthesis indicate the per cent share of the states in that quadrant to all states. Figures in square parenthesis indicate the range of productivity of the states in that quadrant.

TABLE 4—GROWTH-INSTABILITY MATRIX FOR ONION

(1975-76 to 2009-10)

Growth (CAGR)	Instability (Cuddy-Della Valle Index)	
	Low (<30)	High (>30)
	Area	
Negative	—	Orissa (9.49)
Positive	Andhra Pradesh, Assam, Rajasthan, Karnataka, Uttar Pradesh, Madhya Pradesh, Himachal Pradesh and Tamil Nadu (51.58)	Bihar, Gujarat, Haryana, Punjab, Maharashtra and Tripura (38.93)
	Production	
Negative	—	Orissa (5.91)
Positive	Andhra Pradesh, Assam, Tamil Nadu and Tripura (12.70)	Rajasthan, Karnataka, Uttar Pradesh, Madhya Pradesh, Himachal Pradesh, Bihar, Gujarat, Haryana, Punjab and Maharashtra (81.39)
	Productivity	
Negative	Maharashtra, Tamil Nadu [20.12] and Tripura [1.50]	—
Positive	Rajasthan, Uttar Pradesh, Madhya Pradesh, Bihar, Gujarat [32.96], Haryana, Punjab, Andhra Pradesh, Assam [1.90] and Orissa	Karnataka [18.36] and Himachal Pradesh [1.14]

NOTE: Figures in normal parenthesis indicate the per cent share of the states in that quadrant to all states. Figures in square parenthesis indicate the range of productivity of the states in that quadrant.

Growth and Instability in Onion Exports

The growth in export quantity and value right from 1998 (since the earlier onion crisis) has been stupendous (Figure 2). This is particularly due to the reduction in the Minimum Export Prices (MEP) that boosted the growth of exports. Also, announcement of the Special Agricultural Production Programme by the Indian government aggravated the growth in onion exports. The export growth and instability in different periods are presented in Table 5 and discussed. A high significant growth was noticed for the overall period in export quantity (8.85%) than export value (5.64 %) and unit value (3.03 %). Similar pattern was noticed in the instability index too. Period II witnessed tremendous growth in export quantity and value of onion accompanied by remarkably reduced instability indicating less volatility.

—Export Quantity (million tonnes) —Export Value (million $)

FIGURE 2—Growth in Export of Onion

TABLE 5—GROWTH AND INSTABILITY IN ONION EXPORT

Period	CAGR (%)			Cuddy-Della Valle Index (%)		
	Export Value	Export Quantity	Unit Value	Export Value	Export Quantity	Unit Value
Period I	4.37*	8.83*	4.28*	37.16	32.26	24.96
Period II	20.97*	25.91 *	4.09*	15.08	15.04	16.55
Overall Period	5.64*	8.85*	3.03*	71.57	96.52	27.18

Note: * indicates the significance at one per cent level of probability.

Hirschman's index (HI) was computed to know the geographic concentration of onion importing countries from India. The index increased in tandem with the number of importing countries indicating the inherent risk in possible export earnings as revealed in Table 6. The concentration has started increasing since 1991-92. The table also indicates the index hovering between 38.10 (2002-03) to 54.00 (2009-10) with a growth rate of 1.2 per cent over the years. It is also worth to note that the HI was low during 1998-99 (39.69) indicating that the domestic crisis affected more the export potentials in quantum and range as revealed by the decreased instability index, which later started rising following the implementation of the programme. Domestic scarcity always puts a curb on export which drastically reduces the geographic concentration and thereby yielding low instability index. It is also clear from the table that the geographic concentration increased after the onion crisis, particularly after the announcement of the "*Vishesh Krishi Upaj Yojana*" by the Indian government boosting the growth in onion exports. Increasing geographic concentration (positive trend coefficient of 0.55) with respect to onion exports to different destinations is shown in Figure 3.

TABLE 6—HIRSCHMAN'S INDEX (HI) FOR GEOGRAPHIC CONCENTRATION IN ONION EXPORTS

Year	HI	Year	HI	Year	HI
1992-93	41.20	1998-99	39.69	2004-05	53.71
1993-94	40.58	1999-00	43.92	2005-06	48.63
1994-95	41.38	2000-01	43.22	2006-07	41.20
1995-96	43.30	2001-02	44.67	2007-08	47.83
1996-97	39.85	2002-03	38.10	2008-09	45.27
1997-98	39.12	2003-04	44.08	2009-10	54.00
CAGR (%)	*-0.76*	*CAGR (%)*	*0.37*	*CAGR (%)*	*-0.11*
CV (%)	*3.54*	*CV (%)*	*6.41*	*CV (%)*	*10.18*
				CAGR (%)	*1.22*
			Overall	*CV (%)*	*10.52*

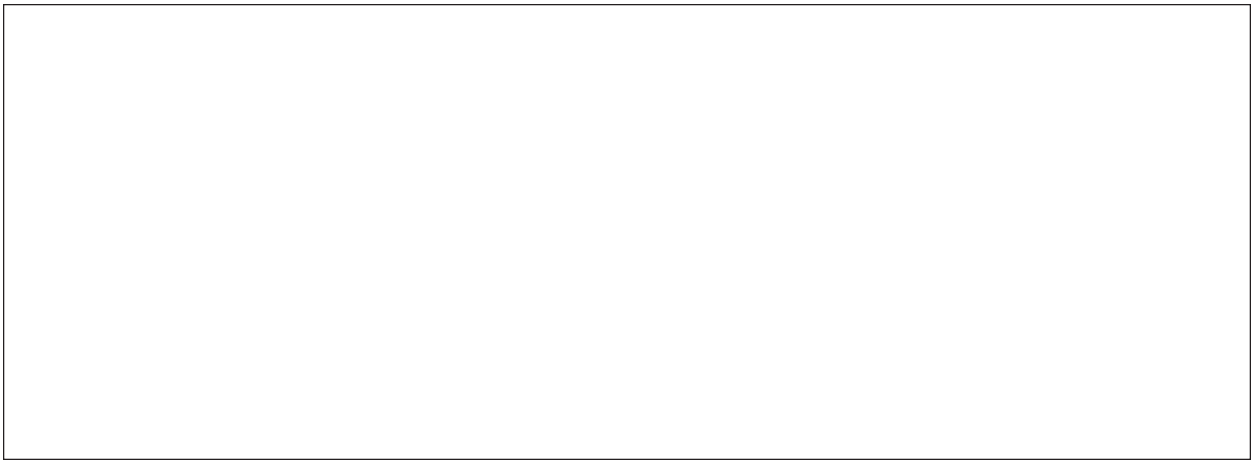

Figure 3—Fitted Linear Trend for Geographic Concentration in Onion Exports

TABLE 7—TRANSITIONAL PROBABILITY MATRIX OF ONION EXPORTS FROM INDIA

Countries	Bangladesh	Malaysia	Srilanka	Pakistan	Nepal	Singapore	Mauritius	Others
Bangladesh	0.54	0.23	0.04	0.12	0.04	0.02	0.01	0
Malaysia	0	0	0	0	0	0	0	1.00
Srilanka	0.56	0	0.38	0.04	0	0	0	0.01
Pakistan	0.97	0	0	0.00	0.03	0	0	0
Nepal	0	1.00	0	0	0.00	0	0	0
Singapore	0	1.00	0	0	0	0.00	0	0
Mauritius	0	0.00	0	0	0	0.47	0.53	0
Others	0.45	0.27	0.14	0	0.01	0.01	0.01	0.11

The TPM obtained through Markov chain analysis (Table 7) provides a broad indication of changes in the direction of onion exports from India during 2004-05 to 2009-10. Bangladesh, Malaysia, Srilanka, Pakistan, Nepal, Singapore and Mauritius were identified as the major importing countries. It is observed from the TPM, 0.54 probability of India's export share is retained by Bangladesh during the current period; of the remaining 0.46 probability, 0.23 was directed to Malaysia, 0.12 to Pakistan and the rest directed to Srilanka, Nepal, Singapore and Mauritius. Bangladesh gained 0.97 probability of Pakistan's import share and 0.56 from Srilanka's share in importing onions. Malaysia does not retain any import share from India during the study period while, it lost cent per cent of its market share to other countries.

India retained 53 per cent of its previous year's onion export share to Mauritius market and remaining 47 per cent was diverted to Singapore. It gained only one per cent of share from Mauritius and other countries market. India's onion export to Srilanka market was retained to the tune of 38 per cent during the current period and remaining 56 per cent was diverted to Srilanka and four per cent to Pakistan. India could not retain its previous export share to Malaysia, Pakistan, Nepal and Singapore during the study period. The present analysis revealed that Bangladesh was the most loyal importer of Indian fresh onions (Manjunath, 2007).

Conclusions

The onion crises of 1998 and 2010 created an explosive politico-economic (being very sensitive commodity for daily consumption) situation calling for the state interventions to mitigate the disaster as a short term stabilization measure. Consumers suffered as prices skyrocketed following poor market arrivals, while producers lost the standing crop due to untimely rains and had to sell at throwaway prices whatever could be harvested due to poor quality all within week's interval. Analysts were divided in their assessment of the situation and its cause and critiques blaming the state allowing middlemen to exploit the situation. Thus, there is a dire need to go in detail into the onion economy of the country. The panic short term reaction by the state affects the loyal export market too as India stands being branded as an unreliable partner in International trade. The present study is an attempt to analyse the growth and of the commodity over years for comprehending better the nuances in onion economy in context of crisis situation. The results of the analysis indicated that significant growth achieved in onion economy both in domestic and export market particularly post onion of 1998 and the subsequent developments in policy arena. Growth in area, production and productivity was more pronounced after 2003 due to the implementation ofVishesh Krishi Upaj Yojana (2004). Growth in export quantity and value also showed an increasing trend over the years and more pronounced after 1998 due to reduction in the minimum export price. But the high growth was not without high degree of instability indicating unpredictability in production and the associated risk. The study suggests that for achieving the desired growth and breakthrough in farm production and exports, besides sustaining the vast domestic demand, slew of policy measures are required—market intelligence, crop insurance, cold chains, warehousing, grading, sorting, processing, ete to ensure stability and even out the possible volatility that producers and consumers loathe alike.

REFERENCES

Ajjan, N., Vasheeharan, S. S., Ranganathan, C. and Raveendranathan, N., (1998),. "An Economic Analysis of Export Performance of Senna and Periwinkle in India", Indian Journal of Agricultural Economics, 48: 88-99.

Atkin, M. and Blandford, D., (1982), "Structural Changes in Import Shares of Apples in theUnited Kingdom", European Journal of Agricultural Economics, 9: 313-326.

Chand, K., Mathur, V.C., and Shalander Kumar., (2001), "An Economic Inquiry into Growth and Instability of India's Agricultural Exports", Indian Journal of Agricultural Research, 35(1): 25-30.

Durham, S. E. and Lee, D. R., (1987), "An Evaluation of Alternative Approach to Market Share Analysis with Application to Kuwaiti Poultry Market, Indian Journal of Agricultural Economics, 38: 85-97.

FAO (Food and Agricultural Organization), Trade Statistics.

Manjunath Reddy, H. N., (2007), "Export Competitiveness and Performance of Selected Fresh Fruits and Vegetables from India: An Economic Analysis", M.Sc. (Agri) thesis, University of Agricultural Sciences, Bangalore.

Negi, Y. S., Parashar, R.S. and Tiwari, S. C., (1994), "Analyzing the India's Horticultural Export Strategies", Indian Journal of Agricultural Marketing, 8: 25-29.

Sidhu, R.S., Sanjay, K., Kamal, V., and Parminder, S., (2010), "Supply Chain Analysis of Onion and Cauliflower in Punjab", Agricultural Economics Research Review, 23.

Wilson, W. W., Woo, W. W. and Carter, C. A., (1990), "Importer Loyalty in the International Wheat Market", Journal of Agricultural Economics, 41: 94-102.

Annexure 1: Vishesh Krishi Upaj Yojana special features

- Export of the products qualifies for duty free credit entitlement (5 per cent of free on board value of exports) for importing inputs and other goods.
- Duty free import of capital goods under Export Promotion Capital Goods (EPCG) scheme, permitting the installation of capital goods imported under EPCG for agriculture anywhere in the Agri- Export Zone (AEZ).
- Utilizing funds from the 'Assistance to States for Infrastructure Development of Exports (ASIDE)' scheme for development of AEZs.
- Liberalization of import of seeds, bulbs, tubers and planting material, and liberalization of the export of plant portions, derivatives and extracts to promote export of medicinal plants and herbal products.

Crop Shifts in Coastal Region of Andhra Pradesh : A Markov Chain Approach

S. B. Ramya Lakshmi* and I. Bhavani Devi

Abstract

The present study is made to know the direction of cropping pattern changes in the selected districts of coastal Andhra region using Markov chain analysis. The results revealed that in Vizianagaram district, groundnut and greengram which retained relative proportions of their area in period I were highly unstable in period II. In the case of mesta, the retention probability of its own area has increased to a little extent to 0.3288 in period II from 0.3154 in period I. Paddy, one of the major crops in the district did not retain much of its area in the second period as observed in the period I. Horsegram and sesamum remained as the most unstable crops in both the periods. Other crops ability to retain their own area was very less in period I but was moderate in period II. In Prakasam district in period I, bengalgram and cotton were the only unstable crops, but in period II, Jowar, cotton, red gram and tobacco remained as unstable crops. Cotton in both the periods was unstable.

Introduction

Agriculture is the most important sector of the Indian economy, since it contributes the largest share of National Income (NI) and provides a source of livelihood to 70 per cent of the people. Indian agriculture had gone through a fundamental change after the green revolution years. According to an estimate 40 per cent of the gross cropped area was listed under high yielding varieties (Sharma & Amit, 2010). This shift was also examined from coarse cereals to other fine grains. For instance, between the decade of the 1950s and 2000 the area under rice, maize, wheat, tur, sugarcane and oilseeds grew dramatically, whereas the area under jowar, bajra, ragi, barley, small millets, gram and fiber other than cotton and jute fell (Sriram, 2007). This shift in area under different crops takes place due to changing demand position and prices of agricultural commodities.

Andhra Pradesh has been one of the front-runners in reaping the benefits of green revolution. However, considerable changes have occurred in the structure of agriculture in Andhra Pradesh. Low value crops such as coarse cereal grains (sorghum and pearl millet) lost a significant share of area to kharif pulses, sugarcane and oil seeds crops like groundnut, sesame etc. (Johl and Sidhu,1988). Therefore the present study is made in order to study the crop shifts at district-level during post-liberalization and post-WTO period in coastal region of Andhra Pradesh.

Methodology

For the purpose of the present study two districts in the coastal Andhra region viz., Vizianagaram from north coastal and Prakasam from south coastal districts were purposively selected. Time series secondary data on area under different crops grown in these districts from the period 1992-93 to 2008-09 were collected from various secondary sources. The study period is divided into two periods viz., period I (1992-93 to 1998-99) and period II (1999-2000 to 2008-09). Period I is post-liberalisation period, while Period II, post-WTO period. A transition probability matrix was constructed for each period for two districts using Markov chain analysis described below.

Markov Chain Analysis

Markov chain analysis is an application of dynamic programming to the solution of a stochastic decision process that can be described by a finite number of states. The Markov process was used to study the shifts in the cropping pattern and thereby gain an understanding about the dynamics of the changes.

The Markov Probability Model

Any sequence of trails (experiments) that can be subjected to probabilistic analysis is called a stochastic process. For a stochastic process it is assumed that the movements (transitions) of objects from one state (possible outcome) to another are governed by a probabilistic mechanism or system. A finite Markov process is a stochastic process whereby the outcome of a given trial t (t = 1, 2,...T) depends only on the outcome of the preceding trial (t-l) and this dependence is the same at all stages in the sequence of trials (Lee *et al*., 1965). Consistent with this definition, let

S_i : represent the r state or possible outcomes; i = 1, 2,..., r.

W_{it} : represent the probability that state S_i occurs on trial t or the proportion observed in trial t in alternative outcome state i of a multinomial population based on a sample of size n, i.e. $P_r(S_{it})$.

P_{ij} : represent the transitional probability which denotes the probability that if for any time t the process is in state S_i, it moves on next trial to state S_j, i.e:$Pr(S_j, t + I/S_{jt}) = P_{ij}$.

*Ph.D. Scholar, Dept. of Agril Economics, S. Y. Agricultural College, Tirupati-517502

$P=(P_{ij})$: represent the transitional probability matrix which denotes the transitional probability for every pair of states (i, j = 1, 2,.....r) and has the following properties.

$$0 \leq P_{ij} < 1, \ldots \ldots \ldots \quad \ldots (1)$$

and

$$\sum P_j = 1, \text{ for } i = 1, 2, \ldots\ldots\ldots, r \ldots\ldots\ldots\ldots\ldots (2)$$

Given this set of notations and definitions for a first order Markov chain, the probability of a particular sequence S_i on trial t and S_j on trial t + 1 may be represented by

$$P_r(S_{it}, S_j, t+1) = P_r(S_{it})\, P_r(S_j, t+l/S_{it}) = W_{it}\, P_{ij} \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

and the probability of being in state j at trial t + 1 may be represented by

$$P_r(S_j, t+1) = \sum W_{it}\, P_j \text{ or } W_{j,t} + 1 = \sum W_{it}\, P_{ij} \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

The data for the study are the proportions of area under the crops. The proportionate changes from year to year are as a result of the factors like weather, technology, price and institutional changes. It is reasonable to assume that the combined influence of these individually systematic forces approximates a stochastic process and the propensity of farmers to move from one crop state to another differs according to the crop state involved. If these assumptions are acceptable, then the process of cropping pattern change may be described in the form of a matrix P of first order transition probabilities. The element of P_{ij} of the matrix indicates the probability a farmer in crop state 'i' in one period will move to crop state 'j' during the following period. The diagonal element 'Pij' measures the probability that the proportion share of'ith' category of crop will be retained.

Estimation of Transition Probability Matrix

Equation (4) can be used as a basis for specifying the statistical model for estimating the transition probabilities. If errors are incorporated in equation (4) to account for the difference between the actual and estimated occurrence of $W_{j(t+l)}$, the sample observations may be assumed to be generated by the following linear statistical model:

$$W_{jt} = \sum_i W_{it}\, W_{i,t-l}\, P_{ij} + U_{jt} \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

or in matrix form it can be written as :

$$Y_j = X_j P_j + U_j \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

where, Y_j is a (Tx1) vectors of observations reflecting the proportion in cropping pattern j in time t, X_j is a (Txr) matrix of realised values of the proportion in cropping pattern i in time t-1, P_j is a (rx1) vector of unknown transition parameters to be estimated and U_j is a vector of random disturbances.

The Minimum Absolute Deviations Estimator: A method to derive parameter estimates when equality or inequality restrictions are present is to make use of Minimum Absolute Deviations (MAD) estimator. If we employ this method in obtaining estimates of the transition probabilities, our problem may be specified as follows:

To find a vector $\bar{P}$ which minimizes

$$\left\{ Y - X_p \right\{ E \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

subject to

$$Y = X_p + u; \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

$$R_p = e; \ldots\ldots\ldots\ldots\ldots\ldots (8)$$

$$P \geq O \ldots\ldots\ldots\ldots\ldots\ldots (9)$$

where E is a unit vector of order (rTxl). In order to solve the above LP problem, non-negative variables are introduced for u such that

$$u = \theta - P \ldots\ldots\ldots\ldots\ldots\ldots (10)$$

$$\text{where } \theta = [\theta_{jt}] = [\theta_{11}\ \theta_{12} \quad \theta_{IT}\ \theta_{21} \ldots .\theta_{rT}] \geq 0 \ldots\ldots\ldots\ldots\ldots\ldots (11)$$

and

$$P = [P_{jt}] = [P_{11}\ P_{12}\ \ PI_T\ P_{21} \quad P_{rT}] \geq 0 \ldots\ldots\ldots\ldots\ldots\ldots (12)$$

By redefining u in this way, the LP problem may be transformed to the following form:

To minimize:

$$(\theta - P)' E \ldots\ldots\ldots\ldots\ldots\ldots (13)$$

subject to

$$Y = X_p + u \sim X_p + [I, -I]\ \overset{\theta}{[P\}} \ldots\ldots\ldots\ldots\ldots\ldots (14)$$

$$R_p = e \text{ and} \quad (15)$$

$$p, \theta, P \geq O \quad (16)$$

Results and Discussion

The results of Markov chain analysis to find out changes in the direction of different crops in both the districts were presented in the form of transition probability matrix show the area of the corresponding group lost to the other group. On the other hand, columns indicate area gained by the respective group.

I. Vizianagaram district

The results of transition probability matrix for crops in Vizianagaram district in period I and Period II are presented in Table I and Table II respectively. The crops considered were paddy, greengram, horsegram, groundnut, mesta, sesamum and other crops. The other crops in the district include jowar, bajra, ragi, maize, small millets, redgram, bengalgram, blackgram, sugarcane, chillies and tobacco.

TABLE I TRANSITION PROBABILITY MATRIX FOR SHIFTS IN CROPPING PATTERN IN VIZIANAGARAM DISTRICT IN POST-LIBERALISATION PERIOD (1992-93 TO 1998-99)

Crop	Paddy	Green gram	Horse gram	Groundnut	Mesta	Sesamum	Other crops
Paddy	0.3032	0.0141	0.1984	0.1336	0.2277	0.1230	0.0000
Green gram	0.0000	0.3914	0.0000	0. 0000	0.0000	0.0000	0.6086
Horsegram	0.0000	0.0000	0.0000	0.0000.	0.0000	0.0000	1.0000
Groundnut	0.0000	0. 0000	0.0000	0.5791	0.0000	0.0296	0.3913
Mesta	0.5763	0.1084	0.0000	0.0000	0.3154	0.6000	0.0000
Sesamum	0.0000	0.0000	0.0000	0.0000	O. 0000	0.0000	1.0000
Other crops	0.5567	0.0337	0.1194	0.1035	0.0913	0.0324	0.0629

TABLE II. TRANSITION PROBABILITY MATRIX FOR SHIFTS IN CROPPING PATTERN IN VIZIANAGARAM DISTRICT IN POST-WTO PERIOD (1999-2000 TO 2008-09)

Crop	Paddy	Green gram	Horse gram	Groundnut	Mesta	Sesamum	Other crops
Paddy	0.2550	0. 0000	0.0000	0. 0000	0.0000	0.1374	0.6074
Green gram	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Horse gram	0.0000	0.0000	0.0000	0.8133	0.1867	0.0000	0.0000
Groundnut	0.2428	0.0182	0.2218	0.0000	0.3514	0.0736	0.0922
Mesta	0.1480	0.1296	0.2292	0.1643	0.3288	0.0000	0.0000
Sesamum	0.0000	0.0000	0.0000	0.0000	0.2724	0.0000	0.7276
Other crops	0.3504	0.0819	0.0000	0.1252	0.0243	0.0000	0.4182

From the Tables I and II it can be observed that, groundnut which retained a relatively higher proportion (0.5791) of its area in period I was highly unstable (0.00) in period II. In the first period groundnut lost its share of 0.0296 and 0.3916 probabilities only to sesamum and other crops respectively, but in the second period, it has lost its share to all the remaining crops viz., paddy, greengram, horsegram, mesta, sesamum and other crops. In period I it has gained its area only from paddy (0.1336) and other crops (0.1035) to a very low extent and in period II it had a major share from horsegram (0.8133) and a small share from mesta (0.1643) and other crops (0.1252).

Greengram was the next crop to groundnut in period I which exhibited retention levels (0.3914) of its own area, gained its share from paddy, mesta, other crops and had a transfer probability to a large extent (0.6086) to other crops. But in period II it had a zero degree of retention and lost its entire share to paddy, gained a very small share from groundnut, mesta and other crops. In the case of mesta, the retention probability of its own area has increased to a little extent to 0.3288 in period II from 0.3154 in period I. It has lost its major share to paddy (0.5763) and a small share to greengram (0.1084) in the first period compared to second period which lost its share to paddy, greengram, horsegram and groundnut.

Paddy one of the major crops in the district did not retain much of its area in the second period as observed in the period I in which major area had shifted from mesta (0.5763) and other crops (0.5567) to paddy. Whereas in period II it was different as it gained from groundnut (0.2428) to a small extent and entire share from greengram (1.00). In the first period, share of paddy was gained by all the remaining crops under this study except other crops and in period II small area was shifted to sesamum and a large extent to other crops. Other crops ability to retain their own area was very less (0.0629) in period I but was moderate (0.4182) in period II, because in the first period, major area under other crops was shifted to paddy and to a small extent to greengram, horsegram., groundnut, mesta and sesamum, whereas in the second period, the share of

paddy, greengram, groundnut and mesta from other crops declined and also horsegram and sesamum had zero transfer probability from other crops.

Horsegram remained as the most unstable crop in both the periods. Its entire share was profited by other crops in period I, whereas in period II, there was a zero transfer probability to other crops, but groundnut has gained a large share (0.8133) and mesta gained to a small extent (0.1867) from horsegram. In period I, horsegram was profited from paddy and other crops and in period II it was profited only from groundnut and mesta. Sesamum in both the periods did not retain any of its area i.e. it had zero retention probability. In period I, total share of it was lost to other crops but in period II sesamum lost greatest extent of its share (0.7276) to other crops and mesta gained a less probability (0.2724) from it. With regard to its gain, a very negligible area from paddy (0.1230) and other crops (0.0324) had shifted to sesamum in period I but gained from paddy and groundnut in period II.

II. Prakasam District

Table III and IV reveals that in period I, bengalgram and cotton were the only unstable crops, but in period II, bengalgram retained its area to an extent of 0.6096 but jowar, cotton, redgram and tobacco remained as unstable crops.

Paddy has improved its retention probability to 0.5980 in period II from 0.1880 in period I. In both the periods paddy did not gain any share from jowar and tobacco, but lost its share to tobacco and other crops in both periods. The other crops in the district include bajra, ragi, maize, small millets, blackgram, greengram, groundnut, sunflower, sesamum and chillies. The area transfer from cotton to paddy was reduced from 0.6425 period I to 0.6006 in period II and maintained almost similar shares. Paddy gained from almost the same crops in both the periods. But the share of bengalgram was reduced from 1.00 in period I to 0.0276 in period II. In period II cotton was replaced by bengalgram in terms of share from paddy.

TABLE III. TRANSITION PROBABILITY MATRIX FOR SHIFTS IN CROPPING PATTERN IN PRAKASAM DISTRICT IN POST-LIBERALISATION PERIOD (1992-93 TO 1998-99

Crop	Paddy	J owar	Cotton	Redgram	Bengal gram	Tobacco	Other crops
Paddy	0.1880	0.0000	0.2153	0.0000	0.0000	0.1351	0.4609
Jowar	0.0000	0.5654	0.0000	0.0000	0.0000	0.0000	0.4346
Cotton	0.6425	0.0000	0.0000	0.0000	0.0858	0.0000	0.2717
Redgram	0.4100	0.0000	0.0000	0.4746	0.1154	0.0000	0.0000
Bengalgram	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tobacco	0.0000	0.0000	0.3744	0.0000	0.0000	0.6256	0.0000
Other crops	0.1929	0.0153	0.0169	0.0798	0.0000	0.0000	0.6951

TABLE IV. TRANSITION PROBABILITY MATRIX FOR SHIFTS IN CROPPING PATTERN IN PRAKASAM DISTRICT IN POST- WTO PERIOD (1999-2000 TO 2008-09)

Crop	Paddy	J owar	Cotton	Redgram	Bengal gram	Tobacco	Other\ crops
Paddy	0.5930	0. 0000	0.0000	0. 0000	0.1853	0.0765	0.1402
Jowar	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000
Cotton	0.6006	0.1791	0.0000	0.2203	0.0000	0.0000	0.0000
Redgram	0.2867	0.0000	0.2016	0.0000	0.1274	0.3843	0.0000
Tobacco	0.0276	0.0000	0.0000	0.0000	0.6096	0.1499	0.2129
Bengalgram	0.0000	0.0000	0.0000	0.8377	0.0000	0.0000	0.1623
Other crops	0.0397	0.0000	0.0419	0.0611	0.0000	0.0414	0.8160

Jowar which was the most stable crop (0.5654) in the first period became highly unstable and lost its entire share to cotton in period II, while in period I only moderate area of 0.4346 probability was shifted to other crops. It has gained a negligible share from other crops (0.0153) in period I and from cotton (0.1791) in period II. Cotton in both the periods was unstable. In period I it was benefited from paddy, tobacco and other crops which was different in period II i.e. cotton has gained from other crops, redgram and entire share from jowar. To redgram in period I negligible area was shifted from other crops (0.0798), while in period II it received a high transfer of area from tobacco (0.8377), cotton (0.2203), other crops (0.0611). Bengalgram has retained much of its area (0.6096) in period II which was highly unstable in period I as it lost its entire share (1.00) only to paddy.

Tobacco a highly stable crop in period I lost its share only to cotton (0.3744) due to factors attributable to the marketing costs such as transportation, weighing, ,grading, labour etc., and middlemen's margin. Since the price spread in tobacco crop was higher, the cotton crop was preferred by the farmers (Rajagopal,1988). and gained only from paddy to a small extent (0.1351), but in period II a major share was lost to redgram and a minor share to other crops and has gained its share from paddy, red gram and bengalgram. Area under other crops retained to a high degree of probability (0.8160) in period II when compared to period I (0.6951) and it has received its share from paddy, jowar, cotton in period I and from paddy, bengalgram and tobacco in period II. In the case of its transfer probabilities, negligible area was lost to paddy, cotton, red gram in both the periods. But its share to jowar in period I was replaced by tobacco in period II.

Conclusion

The findings of present Markov Chain analysis concludes that in Vizianagaram district, horsegram and sesame remained as the most unstable crops in both the periods i.e post-liberalisation period (period-I) and post-WTO period (period-II), whereas high retention probabilities were exhibited by groundnut followed by greengram in period-I and by other crops area followed by mesta in period-II. In Prakasam district, in both the periods only cotton remained unstable with zero retention probability and area unfler other crops had shown high retention probabilities followed by jowar in period-I and bengal gram in period-II.

REFERENCES

Johl, S.S. and Sidhu, R.S. (1988), "Developing Crop Zones in India: A Production Optimization Approach", *Agricultural Situation in India*, Vo1.43, No.5 p.369-389.

Lee, T.C, Judge G..G.. and Takayama,T. (1965), "On estimating the transition probabilities of a Markov process". *Journal of Farm Economics,* Vo1.47, No.3 p.742-762.

Rajagopal, G.(1988), "Dynamics of Price Spread and Cropping Pattern of Commercial Crops". *Indian Journal of Agricultural Economics,* Vo1.43 No.3, p. 524-525.

Sharma, R.K. and Amit Guleria, (2010) "Rural Credit System and Factors Affecting Credit in Kangra district of Himachal Pradesh. *Agricultural Situation in India,* Vol.LXVII, No.8, p. 435-446.

Sriram, M.S.(2007), Productivity of Rural Credit. A Review of Issues and Some Recent Literature. Research and Publication. Indian Institute of Management. Ahmedabad, India.

Attention Subscribers

All correspondence regarding subscription of monthly journal "Agricultural Situation in India" should be made on the following address :

The Controller of Publications,
Ministry of Urban Affairs
Department of Publications,
Publication Complex (Behind Old Secretariat)
Civil Lines, Delhi-110054
Phone : 23817640, 23819689, 23817823

Planning Achievements and Problems of National Horticulture Mission in Uttar Pradesh

B. K. Bajpai*

Introduction

Horticultural crops can be promoted by identifying the most suitable environmental conditions in different ecological areas for the commercial production of various fruits, vegetables and ornamental plants. Encouragement of such crops also helps in improving the methods of processing and preservation of fruits and vegetables, so as to curb wastage. The Government of India has started National Horticulture Mission Scheme in place of Macro Management Mode during 2005-06. This scheme has been implemented as State Horticulture Mission in the state. SHM was launched initially in 26 districts of Uttar Pradesh. The programme was extended to 14 more districts during 2007-08 in the state. Later on this programme was approved to be launched in 5 more districts of Bundelkhand region during the year 2008-09. Thus, State Horticulture Mission is running in 45 out of 71 districts of the state.

Present paper traces the detailed physical and financial target achievements of NHM during Eleventh Five Year Plan of Uttar Pradesh. The analysis is based on the Midterm Appraisal of NHM by the author during 11th Plan period in UP. The paper also highlights the major problems of programme and suggestions for successful implementation of NHM in the state. The observations about the programme and views of stakeholders are based on FGD and interviews in course field survey.

Financial Progress

Approved outlay for the scheme was Rs. 5340.27 lakh for 2005-06 and Rs. 12398.16 lakh for 2006-07. The agreed outlay for NHM in the state for the Eleventh Five Year Plan Period is Rs. 116526.9 lakh. Out of total agreed outlay Rs. 99047.90 (85 per cent) is the central share and Rs. 17479.00 lakh (15 per cent) is state share.

Table 1 shows the year-wise figures of approved outlay and actual expenditure for NHM. To begin with financial utilization was very low. The figures improved somewhat in the last two years. Still utilization lagged much behind outlays, showing low preparedness of the state to implement the programme. Only 52 per cent of the outlay could be utilized in 2007-08. The figures improved somewhat to 63.5 per cent during 2008-09.

TABLE 1—Approved Outlay and Expenditure for NHM

(Rs. Lakh)

Year	Approved Outlay	Actual Expenditure	% Achievement
2005-06	5340.27	2055.28	38.49
2006-07	12398.16	2313 .50	18.66
2007-08	18640.43	9693.69	52.00
2008-09	16966.43	10777.82	63.52

Source: Directorate of National Horticulture Mission, Govt. of Uttar Pradesh.

Scheme-wise picture of financial outlay and achievement of NHM from tb.e year 2005-06 till 2008-09 in the state is presented in Table 2. Largest proportion of the expenditure has been on plantation development and management. Utilisation of funds on this head was very low in first two years of the scheme. But financial achievement has improved to 71.3 per cent in 2007-08. It was slightly lower at 64.84 per cent in 2008-09. Utilisation of funds on other components has been very low. It was 17.1 per cent and 20.0 per cent in the two years respectively. About one fourth of outlay on mission management was utilized in 2007-08 and about half in 2008-09. Utilisation ratio was, however, satisfactory on innovative components.

*Senior fellow, Gin Institute of Development Studies, Sector 'O', Aliganj Lucknow-226024.

TABLE 2—FINANCIAL OUTLAY AND ACHIEVEMENT UNDER NHM IN UP

(in lakh Rupees)

Year	Item	Plantation Infrastructure & Development	Post Harvest Management	Mission Management	State Interventions (Innovative component)	TOTAL
2005-06	Outlay	3592.45	1493.53	254.29	—	5340.27
	Expenditure	1841.13 (23.41)	80.1 (5.36)	134.05 (52.71)	—	2055.28 (38.49)
2006-07	Outlay	8187.80	3832.35	378.01	—	12398.16
	Expenditure	2293.15 (28.01)	0.15 (0.004)	20.20 (5.34)	—	2313.50 (18.66)
2007-08	Outlay	10361.32	6107.30	1311.35	860.37	18640.34
	Expenditure	7390.60 (71.33)	1081.55 (17.71)	341.99 (26.08)	879.55 (102.22)	9693.69 (52.00)
2008-09	Outlay	11958.24	4084.66	807.90	115.63	16966.43
	Expenditure	7753.08 (64.84)	816.97 (20.00)	436.70 (54.05)	1771.07 (1531.62)	10777.82 (63.52)

Source: Directorate of National Horticulture Mission, Govt. of Uttar Pradesh.

The latest figures show an expenditure of Rs. 1623 lakh during the first two quarters of 2009-10 against the released amount of Rs. 9791 lakh (Table 3). During 2008-09 actual expenditure was Rs. 107.77 against the available funds of Rs. 119.8 crore. In the current year also financial achievement is likely to be substantially lower than the available funds. Poor financial performance of the programme is indicative of unsatisfactory planning and implementation of the NHM in the state.

TABLE 3—FINANCIAL PROGRESS UNDER NHM IN UP DURING 2009-10

(Amount in Rs. Crore)

Year	Approved Outlay by GOI	Unspent Balance on 1st April	Released			Expenditure		
			Central share	State Share	Total	Central share	State Share	Total
2008-09	169.66	41.32	63.72	14.76	119.80	91.90	15.87	107.77
2009-10*	135.02	12.95	60.00	24.96	97.91	14.65	1.58	16.23

*Upto 30.09.2009.

Source: XIth Five Year Plan document of UP.

Physical Achievements of NHM

Component-wise target and achievement of NHM during 2005-06 and 2008-09 in the state are presented in Table 4. An area of 83,039 hectare has been brought under various horticulture crops during the period 2005-06 to 2008-09. IPM/IM infrastructure facilities were created such as bio-control labs, leaf/tissue analysis labs, plant health clinic, 34 community water structures created and 27061 bee colonies with hives were distributed under the component of post Harvest Management.

TABLE 4—PHYSICAL TARGET AND ACHIEVEMENT UNDER NHM IN UP

Year	Target/ Achievement	Plantation Infrastructure & Development (No./Ha./Sqm.)	Post Harvest Management (No)	Mission Management	State Interventions (Innovative component)
2005-06	Target	1094690.30	1594	—	—
	Achievement	616445.39 (56.31)	1002 (6.40)	—	—
2006-07	Target	723814.90	1200	—	—
	Achievement	110825.10 (15.31)	1 (0.08)	—	—
2007-08	Target	533654.55	1337	—	130625
	Achievement	423196.54 (79.30)	888 (66.42)	—	10252 (7.85)
2008-09	Target	484943.95	1839	—	5400
	Achievement	240668.68 (49.63)	619 (33.66)	—	—

Source: Directorate of National Horticulture Mission, Govt. of Uttar Pradesh.

A perusal of component-wise physical achievement over the years showed highest level of achievement at 79.30 percent in Plantation Infrastructure and Development during the year 2007-08. The highest achievement of Post Harvest Management (66.42 percent) was attained during the year 2007-08. In short, there are significant shortfalls in the physical achievement under the programme under all components.

District-wise Financial Progress

The district-wise financial outlay and expenditure for NHM in Uttar Pradesh for the year 2008-09 are presented in Table 5. The highest total expenditure under NHM was found in the district of Unnao, but this expenditure constituted only about 88 percent of the approved outlay. The highest utilization of about 99 percent was recorded in Basti district of the State. This achievement level was recorded against 63.50 per cent average achievement at the state level. Out of 40 districts where the NHM was launched during this year, in 21 districts the achievement level was recorded above the state average. The lowest NHM achievement was seen in the districts of Sultanpur and Ghazipur. The achievement was recorded to be only 19.5 per cent and 16.2 per cent respectively in these districts respectively.

Apart from this, the expenditure of NHM funds at the headquarter level was more than 100 per cent because of expenditure from last year spill over funds. More than 25 per cent of the total State's NHM expenditure was made through Headquarter funding. This expenditure is incurred for different NHM components in different districts through the approval of the Central Government's Annual Plan.

TABLE 5—DISTRICTWISE FINANCIAL ACHIEVEMENT UNDER NHM IN UP (2008-09)

District	Total		Plantation Infrastructure & Development		Post Harvest Management		Mission Management		State Interventions (Innovative component)	
	Expenditure	%of Outlay	Expenditure	%of Outlay	Expenditure	%of Outlay	Expenditure	%of Outlay	Expenditure	%of Outlay
Basti	296.7	98.9	124.4	85.1	0.00	0.0	4.9	70.0	43.0	0.0
Siddharth Nagar	575.6	96.4	282.2	95.9	0.15	19.2	7.2	100.0	3.8	0.0
Saharanpur	784.0	91.8	376.7	97.4	2.58	4.3	17.4	87.8	10.6	0.0
Kannauj	259.0	89.7	126.0	89.9	0.00	0.0	7.0	99.3	0.0	0.0
Unnao	950.3	87.8	465.4	93.4	0.00	0.0	10.6	42.0	9.0	0.0

TABLE 5—DISTRICTWISE FINANCIAL ACHIEVEMENT UNDER NHM IN UP (2008-09)—*Contd.*

District	Total	Plantation Infrastructure &		Post Harvest Management			Mission Management		State Interventions (Innovative component)	
	Expenditure	%of Outlay	Expenditure	%of Outlay	Expenditure	%of Outlay	Expenditure	%of Outlay	Expenditure	%of Outlay
Gorakhpur	465.1	86.0	227.3	94.3	0.00	0.0	6.5	90.8	4.0	0.0
Muzafar Nagar	512.5	82.9	238.6	85.8	0.75	1.4	7.7	81.2	26.7	0.0
Mathura	483.7	81.7	235.8	98.7	1.00	1.0	11.1	92.8	0.0	0.0
Sant Kabir Nagar	180.8	81.6	84.6	78.7	0.00	0.0	4.8	90.3	6.8	0.0
Mahrajganj	415.3	79.4	200.5	88.2	0.00	0.0	7.1	52.7	7.2	0.0
Farrukhabad	212.5	76.6	101.2	75.2	0.00	0.0	5.7	83.8	4.5	0.0
Jaunpur	288.4	74.7	137.1	85.7	0.00	0.0	10.3	67.9	3.9	0.0
Lucknow	606.0	74.2	281.0	74.5	0.00	0.0	9.2	93.9	34.9	0.0
Raebareli	676.6	72.4	333.6	89.3	0.00	0.0	9.4	28.5	0.0	0.0
Bareilly	425.0	71.8	207.6	86.7	0.50	0.5	5.6	33.5	3.7	0.0
Faizabad	369.1	71.5	179.8	80.0	0.00	0.0	6.3	63.0	3.2	0.0
Kanpur Nagar	361.8	70.1	164.4	96.1	0.00	0.0	7.0	46.3	25.9	0.0
Barabanki	513.2	69.9	251.9	80.8	0.75	0.8	8.6	42.9	0.0	0.0
Kaushambi	898.1	69.2	443.1	73.2	1.10	1.5	10.8	94.1	0.0	0.0
Etawah	268.1	64.4	127.2	84.1	0.00	0.0	9.0	72.3	4.7	0.0
Buland Shahar	525.4	63.0	261.0	67.9	0.00	0.0	3.4	32.3	0.0	0.0
Varanasi	192.5	58.2	75.9	61.6	0.00	0.0	7.7	85.8	33.0	146.8
Pratapgarh	303.4	55.6	147.1	63.2	0.00	0.0	9.1	83.5	0.0	0.0
Mainpuri	163.9	54.5	76.4	63.2	0.00	0.0	3.5	41.1	7.7	0.0
Sitapur	154.3	53.7	76.2	67.9	0.10	0.2	1.9	20.8	0.0	0.0
Kushi Nagar	299.4	52.9	145.3	62.6	0.00	0.0	8.9	46.3	0.0	0.0
Moradabad	304.7	52.8	148.3	67.3	0.00	0.0	4.1	27.1	3.9	0.0
Allahabad	485.9	50.7	228.0	52.2	0.00	0.0	11.5	52.5	18.4	0.0
Ghaziabad	569.4	50.3	265.6	52.0	0.00	0.0	12.4	45.5	25.8	0.0
Meerut	665.6	50.3	306.9	53.2	0.00	0.0.	11.9	22.3	39.8	0.0
Agra	502.3	47.3	231.7	58.9	1.25	0.5	9.7	47.0	27.9	0.0
Jhashi	482.6	46.3	240.0	50.7	0.50	0.7	2.2	8.0	0.0	0.0
Ballia	206.2	45.5	98.3	45.4	0.00	0.0	9.6	94.4	0.0	0.0
Hathras	114.7	44.1	56.3	80.3	0.00	0.0	2.2	24.4	0.0	0.0
Mirzapur	313.7	41.6	144.0	42.8	0.00	0.0	12.5	62.9	13.2	29.3
Banda	177.0	33.8	85.0	34.0	3.75	36.6	3.2	24.2	0.0	0.0
Sonbhadra	287.1	32.3	131.8	32.2	0.00	0.0	19.9	99.6	3.6	7.9
S.Ravidas Nagar	160.4	26.9	68.4	23.5	0.00	0.0	13.8	94.5	9.9	0.0
Sultanpur	170.0	19.5	80.2	26.5	0.00	0.0	9.6	80.3	0.0	0.0
Ghazipur	172.8	16.2	57.4	12.9	0.00	0.0	0.9	2.9	57.0	1822.4
Head Quarter	2737.8	111.9	240.9	47.1	804.54	64.8	112.5	61.8	1338.9	0.0
State Total	10777.8	63.50	7753.1	64.84	816.97	20	436.7	54.1	1771.1	1531.7

Source: Directorate of National Horticulture Mission, Govt. of Uttar Pradesh.

The highest expenditure of NHM funds under Plantation Infrastructure and Development Component was made in the district of Unnao followed by Kaushambi, Saharanpur and Raebareli districts during 2008-09. But the highest achievement level (98.7 per cent) was recorded in Mathura followed by Saharanpur, Siddharthnagar, Gorakhpur and Unnao. Low level of achievement is found in the districts of Sultanpur, Sant Ravidas Nagar and Ghazipur. A low average financial achievement of Post Harvest Management component of 20 per cent is observed at the state level. The Expenditure of approved outlay was made only in 11 districts out of total 40 districts where NHM was in existence during 2008-09. The highest expenditure of 36.6 per cent of total approved outlay under this component was found in Sonbhadra district followed by Siddharthnagar having 19.20 per cent achievement. The financial achievement under the component of Post Harvest Management ranged from less than one per cent to about 4 per cent in remaining nine districts.

The average performance of Mission Management Component of NHM was 54 per cent at the State level during 2008-09. The financial achievement was 100 per cent in the district of Siddharthnagar and more than 99 per cent in Sonbhadra and Kannauj districts. The achievement was more than 90 per cent in the districts of Gorakhpur, Mathura, Sant Kabir Nagar, Lucknow, Kaushambi, Ballia, Sonbhadra and Sant Ravidas Nagar. The lowest performance in this respect was recorded in Sitapur, Meerut and Ghazipur districts. There has not been approved Outlay under Innovation Component through State Interventions in most of the districts in the State during 2008-09. Yet, there were expenses under this component through previous years' spill over funds. The approved outlay was found only in the districts of Varanasi, Ghazipur and Sonbhadra under this component during this year.

District-wise Physical Achievements

District-wise physical target and achievement of Plantation and Infrastructure and Development component of NHM in the state for the 2008-09 is presented in Table 6. As compared to 49.63 per cent of average performance of this component in the state, the achievement has been above the state average in 32 out of 40 districts. The highest performance with full target achievement was found in the districts of Jhansi and Etawah. The achievement level was nearly 100 per cent in the districts of Farrukhabad, Lucknow and Unnao. Out of 8 districts, where achievement level was below state average, districts of Barabanki, Sultanpur and Sitapur had the lowest ranking. There was no achievement of fixed target in Banda District.

The Physical target and achievement of Post Harvest Management component of NHM could not be achieved at all in 21 districts out of total 40 NHM districts during the year 2008-09 (Table 7). Out of the remaining 19 districts, the achievement level was negligible in Kaushambi and Hathras. It was very low in the districts of Pratapgarh, Jhansi, Agra and Meerut. Considering the State average target achievement of 33.66 per cent, 10 districts stood above the state average in terms of their performance under this component. The best performance was recorded in the districts of Etawah, Mathura and Siddharthnagar. A good achievement level .ranging from about 95 per cent to 93 per cent was recorded in Muzaffarnagar, Raebareli Allahabad.

TABLE 6—DISTRICT-WISE PHYSICAL TARGET AND ACHIEVEMENT PLANTATION INFRASTRUCTURE AND DEVELOPMENT UNDER NHM IN UP (2008-09)

(No./Ha./Sqm.)

SI. No.	District	Target	Achievement	% Ach.
1.	Jhashi	24613.00	24817.00	100.83
2.	Etawah	22245	22244	100.00
3.	Farukhabad	4366	4359	99.84
4.	Lucknow	5820	5769	99.12
5.	Unnao	5737	5680	99.01
6.	Siddharth Nagar	9227.85	9103.8	98.66
7.	Sant Ravidas Nagar	2650.00	2600.00	98.11
8.	Jaunpur	2782	2667	95.87
9.	Gorakhpur	2760	2644	95.80
10.	Kanpur Nagar	2214.00	2090.00	94.40
11.	Kushi Nagar	2877	2715.8	94.40
12.	Sant Kabir Nagar	12398.4	11576	93.37
13.	Allahabad	7791.5	7225	92.73
14.	Varanasi	2353	2177.35	92.54

TABLE 6—DISTRICT-WISE PHYSICAL TARGET AND ACHIEVEMENT PLANTATION INFRASTRUCTURE AND DEVELOPMENT UNDER NHM IN UP (2008-09)—*Contd.*

(No./Ha./Sqm.)

SI. No.	District	Target	Achievement	% Ach.
15.	Buland Shahar	27698.00	25182.05	90.92
16.	Mahrajganj	3014	2721	90.28
17.	Basti	2300	2074	90.17
18.	Muzafar Nagar	19170.00	17258.00	90.03
19.	Saharanpur	6048	5438	89.91
20	Raebareli	3308	2885	87.21
21.	Mathura	3052	2632	86.24
22.	Ballia	6214	5086.17	81.85
23.	Pratapgarh	3175	2545	80.16
24.	Kaushambi	14387	11195	77.81
25.	Sonbhadra	1746.00	1310.00	75.03
26.	Agra	2758	1933	70.09
27.	Bareilly	17304.00	11582.00	66.93
28.	Mainpuri	1997.7	1314	65.78
29.	Meerut	8356.5	5492.25	65.72
30.	Ghaziabad	28861	18844.95	65.30
31.	Kannauj	3023	1885	62.36
32.	Hathras	1540.50	883.00	57.32
33.	Moradabad	4313.00	2106.50	48.84
34.	Mirzapur	7175.50	2734.30	38.11
35.	Ghazipur	2471	575	23.27
36.	Faizabad	12664.00	2405.00	18.99
37.	Barabanki	28981.00	3704.00	12.78
38.	Sultanpur	63559	1991.51	3.13
39.	Sitapur	101321.00	820.00	0.81
40.	Banda	2072.00	0.00	0.00
	Head Quarter	**600.00**	**404.00**	**67.33**
	State total	**484944.0**	**240668.68**	**49.63**

Source: Directorate of National Horticulture Mission, Govt. of Uttar Pradesh.

TABLE 7—DISTRICT-WISE PHYSICAL TARGET AND ACHIEVEMENT OF POST HARVEST MANAGEMENT UNDER NHM IN UP (2008-09)

Sl. No.	District	Target	Achievement	% Ach.
1.	Etawah	4	4	100
2.	Mathura	204	200	98.04
3.	Siddharth Nagar	31	30	96.77
4.	Muzafar Nagar	158	150	94.94
5.	Raebareli	14	13	92.86
6.	Allahabad	28	26	92.86
7.	Saharanpur	7	6	85.71
8.	Kushi Nagar	32	22	68.75
9.	Sitapur	35	20	57.14
10.	Bareilly	130	50	38.46

TABLE 7—DISTRICT-WISE PHYSICAL TARGET AND ACHIEVEMENT OF POST HARVEST MANAGEMENT UNDER NHM IN UP (2008-09)—*Contd.*

Sl. No.	District	Target	Achievement	% Ach.
11.	Varanasi	6	2	33.33
12.	Barabanki	26	5	19.23
13.	Pratapgarh	36	6	16.67
14.	Jhashi	123	20	16.26
15.	Agra	13	2	15.38
16.	Meerut	132	20	15.15
17.	Kaushambi	118	11	9.32
18.	Hathras	27	2	7.41
19.	Ghazipur	253	0	0
20.	Faizabad	111	0	0
21.	Mirzapur	54	0	0
22.	Ghaziabad	52	0	0
23.	Sultanpur	18	0	0
24.	Buland Shahar	17	0	0
25.	Unnao	16	0	0
26.	Moradabad	16	0	0
27.	Ballia	14	0	0
28.	Banda	14	0	0
29.	Maharaj ganj	11	0	0
30.	Kanpur Nagar	7	0	0
31.	Lucknow	6	0	0
32.	Sant kabir Nagar	6	0	0
33.	Farukhabad	4	0	0
34.	Kannauj	4	0	0
35.	Gorakhpur	3	0	0
36.	Jaunpur	3	0	0
37.	Sonbhadra	3	0	0
38.	Mainpuri	2	0	0
39.	Sant Ravidas Nagar	2	0	0
40.	Basti	1	0	0
	Head Quarter	**98**	**30**	**30.61**
	State total	**1839**	**619**	**33.66**

Source: Directorate of National Horticulture Mission, Govt. of Uttar Pradesh.

Significant Achievements

The main achievements of NHM in U.P. are highlighted below:

- More than 404 departmental officers/ employees of Horticulture Department have been trained as resource persons through national and state level institutes for imparting training to the beneficiaries of NHM programme.
- More than 11657 hectare of additional area was brought under horticulture fruits crops like Mango, Guava, Banana and lemon etc. under plantation during the year 2008-09. This was 1011 hectare higher than the last year's plantation under NHM in the state.
- An area of 5460 hectare was brought under commercial flower cultivation Promotion Programme of NHM during the year 2008-09. This was found to be 27 percent higher than the last year's achievement in this respect.

- An area of 18010 hectare was brought for cultivation under spices cultivation programme of NHM during the year 2008-09. This was 68 percent higher than the last year's achievement of the same programme.
- New fruits Plantation was made in 11131 hectare area of old redundant fruit orchards under NHM programme.
- Various programmes to promote organic farming were launched in 9607 hectares through NHM during 2008-09. Apart from this, 2066 vermi compost units were also established for sustained organic farming of fruits and vegetables.
- More than 2602 beneficiaries were imparted different type of training under NHM to adopt latest production technologies of crop cultivation.
- Various promotional programmes of bee keeping were launched to supplement the existing horticulture development activities in the state.
- Out total 42 cold storages established under NHM in the state, 27 were started during 2008-09. This has increased the storage capacity of 9 lakh MT of potatoes during the year.
- Organic farming certification programme was launched in l5150 hectares. For this, 9298 farmers were registered from 25 selected districts through NAFED, Govt. of India.
- Nine wholesale markets were started in the districts covered under intensive horticulture production area of NHM of the state.

Implementation of NHM: A View from the Field

A rapid rural appraisal of the NHM was undertaken in the Mango Belt of Kakori and Malihabad blocks of Lucknow. Following picture of the programme emerges from the appraisal:

- The small farmers are not getting the full benefit of Plantation Programme in their land through NHM in these blocks. The farmers having land holding below 0.25 hectare are not eligible to get grant for Plantation under NHM. They should also be included in this programme, as large numbers of farmers are still left to be covered under this programme.
- The soil testing units established under NHM is located at the district level. It takes a long time to get soil testing results. It is suggested by the beneficiary farmers that the soil testing unit should be located either at the block or tehshil level for easy accessibility.
- Required insecticides and pesticides for plant protection are not provided regularly and timely. Under these circumstances the farmers approach the local fruit traders/ brokers to procure required material. Most of the times traders provide the required preventive or curative medicines for their plants only after getting assurance from farmers that they will sell their crops to them only. This prevents farmers from getting a profitable price for their fruit crop. The provision under NHM for barred wire to protect farmers' crops from wild animals has been made. But the coverage of this facility is very limited and most of the farmers are not able to get this facility to protect their crops. The coverage of this provision should be wide spread among all categories of fruit growers.
- The distribution of seeds for vegetable and horticulture crops under NHM has not been timely. This causes loss of farmers as the crop yield is reduced due to delayed sowing. Most of the farmers are not using seeds available through NHM due to delayed delivery. They are forced to purchase low quality seeds from the market at high price.

Major Problems

Although U.P. is a major producer of horticultural crops in the country the National Horticulture Mission in U.P. is not running satisfactorily in the State as the above discussion shows. There are significant lapses in achievement of financial and physical targets. A major problem has been frequent transfers of officers in charge of the programme at Director's level. The state has been slow to gear up its machinery for implementation of the programme.

Some of the major problems in the implementation of the programme identified through discussions with officials and beneficiaries are listed below:

(i) The norms for most of the components are old. The poor off take of PHM projects has been due to lower cost norms and assistance.

(ii) The staff at field level for implementation of large scale horticultural development under NHM is inadequate.

(iii) There is lack of qualitative planting material, certified and improved variety seeds.

(iv) The supply of pesticides and insecticides is inadequate.

(v) Productivity of various horticultural crops is relatively low in U.P.

(vi) Due to lack of sufficient marketing and post harvest management facilities, farmers do not get

remunerative prices of various horticultural crops and there are heavy post harvest losses.

(vii) There is lack of latest horticultural technical knowledge at various levels.

(viii) There is insufficiency of infrastructure facilities at all the levels.

(ix) Reliable data base for horticulture crops is not available.

(x) There is lack of technical staff at block and village level for extension management.

Suggestions

Following steps need to be taken for improving the performance of the NHM:

(i) The state should ensure holistic development of horticulture by adopting cluster approach and convergence of schemes of other departments.

(ii) In view of the rise in cost of planting material etc. upward revision of the cost norms and assistance for post harvest management components is required. With the enhanced cost norms and assistance, more projects from the private sector will be received under the PHM components.

(iii) Unit Cost of selected crops/programmes as potato seed production, banana tissue culture, cut-flowers, bulbous flowers, spices(turmeric, garlic), aromatic plants (mentha), green-house, mulching, shed-net, plastic tunnel, distribution of bee-colonies may be enhanced.

(iv) Presently 45 districts are covered under NHM. Remaining 26 districts may also be taken up under the programme.

(v) Project based activities with small financial requirements viz. onion storage, small pack house, seed multiplication etc. should be exempted from credit linked back ended subsidy pattern.

(vi) The mechanism of release of funds should be relaxed. Additional funds should be released on expenditure of 60 percent by the state.

(vii) Approval of project based activities under NHM may be decentralized.

(viii) An awareness campaign should be launched by the NHM to educate the farmers regarding proper use of appropriate medicine for their crops. Arrangement of timely supply of insecticides and pesticides should be ensured.

(ix) As majority of farmers in the state are marginal farmers, the coverage should be extended to the farmers having land holding below 0.25 hectare, who are not eligible to get grant for Plantation under NHM.

(x) Adequate trained staff should be made available at all levels. Higher level officials should not be changed too frequently.

(xi) There is need to undertake evaluation and monitoring of the programme by independent outside agencies.

Conclusion

The coverage of NHM has been in more than 63 percent districts of the state. Still utilization lagged much behind outlays, showing low preparedness of the state to implement the programme. Only 52 percent to 63 percent outlay could be utilized over the years in the state. Utilization ratio was, however, satisfactory on innovative components. Overall planning and implementation of the NHM has been unsatisfactory in the state. There has been significant shortfalls in the physical achievement under the programme under all components. A low average financial achievement of Post Harvest Management component of 20 percent is observed at the state level.

Despite shortfalls of the scheme, additional area was brought under horticttlture fruits crops, commercial flower cultivation and under spices cultivation through different NHM programmes during the year 2008-09. Various programmes to promote organic farming were launched. Along with this, vermi compost units were also established for sustained organic farming of fruits and vegetables. Departmental officers/ employees of Horticulture Department have been trained as resource persons through national and state level institutes for imparting training to the beneficiaries of NHM programme. Wholesale markets were started in the districts covered under intensive horticulture production area of NHM of the state.

Apart from the achievements in different areas of NHM projects in the state, numbers of problems were faced by the beneficiaries of the programme in different parts of the state. The problems were found in the percolation of facilities to the small farmers, timeliness in getting soil testing results and irregular supply of plant protecting medicines. The provision of barred wire to protect farmers' crops from wild animals has been available to the limited farmers and distribution of seeds for vegetable and horticulture crops under NHM has not been timely.

With the above analysis the inference may be drawn that although U.P. is a major producer of horticultural crops in the country the National Horticulture Mission in U.P. is not running satisfactorily. There are significant lapses in achievement of financial and physical targets. In view of this, the state should ensure holistic development of horticulture by adopting cluster approach and

convergence of schemes of other departments. Awareness campaign along with monitoring and evaluation of NHM programme is also required to make this programme more effective in the state.

REFERENCES

1. Bajpai, B. K., National Horticulture Mission (NHM) "Mid Term Appraisal of the 11th Plan of Uttar Pradesh". (2009-10), Giri Institute of Development Studies, Lucknow.
2. Annual Report, (2009-10) Directorate of National Horticulture Mission, Govt. of Uttar Pradesh.
3. XIth Five Year Plan document of UP.
4. Chadha, Dr. K. L. Chairman, Working Group on Development of Hort. for XI Plan, Approaches for Development of Horticulture during XI Plan and thereafter, National Horticulture Conference, 13-14 November, 2006, New Delhi.

Institutions in Indian Agriculture : Imperatives for Innovations

I. Sekar*

Abstract

India made significant achievements in food grain production and farmers' contributions to food security are immensely great. However, farmers are the vulnerable section in the society as the institutions in agriculture are often not so dynamic with changing times. Innovations in these institutions starting from agriculture research and technology delivery extending up to marketing, credit and natural resources are becoming important. Agricultural production achievements are inadequately translated to growth in consumer welfare and producer surplus mainly bdue to greater price spread. Infrastructure and institutions are often the causal factor for some of the hardships. Increase in food prices and erosion of consumers' budget, inaccessibility to quality food are impacting the consumers. On the other side, less producers' share in consumer rupee, deceleration in productivity growth of crops, widening yield gap and persisting spatial disparities in production are still continuously confronting agriculture production. Though different innovative models in institutions are experimented in' Indian agriculture, some successful ones are with limited spatial domain. As the share of GDP on investment for agriculture research and development is low, increasing its share can pave a way for innovations in institutions of Indian agriculture. Innovations in institutional development in agricultural marketing are visible and may be extended to agriculture extension and credit. Information technology would play a greater role in such innovative institutions for efficient deivery, which can place Indian agriculture in a higher trajectory of growth. Innovations in natural resources and environment are equally important as they are continuously under pressure.

Introduction

The Green Revolution breakthrough in India that jumpstarted its agricultural growth in the mid 1960s followed by favorable price movements, policy environment and improved production conditions has placed India on self sufficiency path. In the last five decades, we have made tremendous achievements in agriculture sector, which was witnessed through a series of successful agricultural revolution starting with the green revolution (wheat and rice), white revolution (milk) and yellow revolution (oilseeds) in the 1960's, 1970' and 1980's respectively. In recent years, there have been successive years of bumper Crop production since 2007-08 and the country's food grain production touched an all time high of 242 million tons in 2010-11. This achievement has been largely attributed to the technology development and favourable policy and above all, the support of several million small farmers in the country, who form the backbone of Indian agriculture and economy.

Amidst some structural changes that are often skewed towards industrial and service sectors, agriculture still remains a key sector, providing both employment and livelihood opportunities to majority of rural population in the country. It continues to remain so for several years and therefore the importance of agriculture cannot be undermined. It remains critical as it accounts for about 58 per cent of employment in the country, and therefore the growth of Indian agriculture would be considered as a necessary condition for 'inclusive growth'. Despite its importance and marvellous past achievements, there are still some grey areas which need to be given adequate attention. The share of agriculture in GDP has declined rapidly in the recent past. In 2009-10, it accounted for 14.6 per cent of the GDP compared to 15.7 per cent in 2008-09 and 19.0 per cent in 2004-05 (Economic Survey, 2010-11). When the overall GDP has grown by an average of 8.62 per cent during 2004-05 to 2010-11, agricultural sector GDP, has increased by only 3.46 per cent during the same period. During the first three years of the XI Five Year Plan, the agriculture sector (including allied activities) recorded an average growth of 2.03 per cent against the Plan target of 4 per cent per annum although it improved in the subsequent two years.

Such decline in agriculture growth is often correlated with investment made in agriculture sector. There has been a decline in public investments in agriculture over a period of time. The share of agriculture GDP for agriculture research and development is too low (0.6 per cent) compared to developed countries (2-3 per cent). It was reported that total factor productivity is in deceleration phase in several states across the country particularly in Indo-Gangetic plains implying technology fatigue. Technology fatigue is witnessed with intensive use of technology inputs with higher inefficiency levels leading to decline in total factor productivity. Per capita supply dipped to 436 grams a day in 2008, compared with 442.8 grams in 2007 and 445.3 grams the year before. It implies that the achievement in food grain production has not yet quite translated to consumer

*Division of Agricultural Economics, Indian Agricultural Research Institute, New Delhi-12.

benefits, which could be mainly due to population increase. Even after such bumper harvests particularly staple food crops, there is no sign of decline in escalated price levels. The impact is increasingly more on consumers the middle income class. Disparities in agricultural crop production, wide yield gap, increasing pressure on natural resources are some of the problems confronting Indian agriculture, which are discussed in detail in ensuing sections. These grey areas and looming projected demand of food grains in future prompt the policy planners and research scientists to revisit the existing policies and technologies and make possible revisions and improvements. Innovation is the key, which can be infused in evolving new institutions or reforming old ones that are more particularly relating to agriculture input supply, marketing, and extension.

Spatial disparities in food grain production

The increase in food grain production achieved so far is largely from yield gains rather than horizontal expansion of cultivated area. However, yield gap still persists. Innovations in technology development are imperative if it is desired to meet the challenges of production to feed the future population. Despite high yielding variety development in various crops, average yield of most crops at the national level still remain low due to large scale regional variations in productivity across the country. For instance, rice productivity in Northern and Southern regions is fairly higher which enhances the overall average rice productivity in the country. While the northern region comprising Punjab, Haryana and Jammu & Kashmir, registered around 4 ton per hectare while the Southern region covering Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu witnessed an average productivity of 3.6 ton per hectare. However, eastern and western regions have registered very low productivity in the country. Eastern region comprises of Bihar, Madhya Pradesh, Orissa, Uttar Pradesh and West Bengal. This eastern region is hailed as the rice bowl of the country, wherein area and production of rice are at the highest level as compared to rest of the rice growing regions of the country. However, the productivity is much lower than the national average productivity and the productivity level of other agrarian states in high productive northern region. If the yield level of rice in these regions is enhanced, there would be an increase in production as well as per capita availability. There are potentials to increase the rice productivity in the eastern region of the country by removing production constraints. Concerted efforts are needed to popularize technologies that are well adapted to the extreme weather conditions in this region.

Not only does vast untapped potential in the yield exist in rice crop but also for many other crops. Priority needs to be given to the states where current yield levels are below the national average yield for location specific technological innovations. For example in the case of rice, eastern states are the priority states, which require more attention. As far as wheat crop is concerned, states like Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan are the target domain. Cotton crop requires greater yield improvement efforts in Maharashtra, Gujarat and Andhra Pradesh. βt cotton in these states improved the level of productivity and the plight of the farmers to a certain extent. Such techniques as genetic engineering and bio-technology can enhance the productivity of many other crops. As developing innovative technologies to boost the crop productivity is important, investments both public and private on research are therefore assuming increasingly greater importance. In addition to field crop production, innovations are imperative in horticulture and livestock sector as well. There exists scope for increasing genetic yield potential of a large number of vegetables, fruits, and livestock as well as fisheries.

Pressure on natural resources

While agricultural sector is a benefit to the country's economy, the use of natural resources, particularly land and water, requires regulation and interventions in order to sustain such resources. It is important to support poor peasants in rural areas to improve their livelihoods as well as to safeguard the natural resources on which all depend on for survival. While supporting local farmers in their efforts to manage natural resources, it is critical to carry out agricultural activities in such a way that its adverse impacts on natural resources should be minimized. Water is becoming a limiting resource and needs to be managed efficiently. Due to inter sectoral competition, it is more often the case that agricultural water supply is diverted to other sectors. where its marginal value is higher. As urbanization spreads its wings to rural areas, this diversion of water takes place in rural areas also. Excessive withdrawal of ground water in many places with the rising demand exacerbates the current situation. Decreasing recharge rate and increasing extraction rate can cause the water table into a funnel shape or cone of depression.- Farmers now started using deep, large-capacity wells, which can have far reaching impact on environment. It not only lowers the water table but also intrudes saltwater and can result in sink holes and land subsidence. Attempts to make water use sustainable must be centered on improving water use efficiency and reducing ground-water extraction. Water harvesting and ground water recharge structures would help in recharging ground water. Likewise, runoff water from impermeable roofs and paved roads can be captured and artificially recharged into underlying aquifers. This is being practiced in some places; however the scale of implementation and its intensity and efficiency need to be enhanced. Community level institutions and local governance can address some of the pressing problems in natural resources.

There is a need for revision of pricing and subsidy policies of energy and water. The financial and technical assistance that the farmers receive can further facilitate the rapid proliferation of drilled, mechanized wells. Although water-table declines are visible in many places, excessive use of ground-water in Indian agriculture still continues, which is reported in many studies. Depletion of ground water table can impact largely in long run although there is benefit of production increase in short run. On one hand, water is required for compelling demand to increase crop production and on the other, there is a stiff competitive demand from domestic and industrial sectors. Prudent water allocation and use is important for its sustainability in future. Ground-water declines will slow only when increasing inflows are made or extraction of ground water is decreased or combination of both. The amount of water saved depends primarily on the length of the crop growing season and therefore crop shifts to less water-intensive nature can be encouraged. Water price increases can encourage conservation of water. Watershed management is another area, which offers multiple benefits including recharge of ground water. Innovations in water harvesting and new institutions in irrigation management may be given importance.

At watershed scale, disturbances in agriculture fields and the consequent impermeable areas disturb the integrity of stream ecology and can affect aquatic organisms. As more and more agriculture fields are abandoned and the subsequent urbanization in rural areas, its impact is visible in streams, which is invariably accompanied by loss and alteration of aquatic habitats. At watershed scale. such disturbance in the stream habitats has impacts on aquatic species. When the proportion of impervious layer increases in rural watersheds, it strongly influences the pattern and magnitude of precipitation, infiltration and surface runoff. The extent of imperviousness has an obvious direct effect on stream hydrology and water quality and an indirect but strong effect on stream habitat. The runoff from such layer contains a variety of pollutants that degrade water quality. All of these physical and chemical alterations restructure biotic communities and cause declines in the diversity and productivity of fishes.

Increasing level of socio economic variables of change drives the conversion of green forest land to open impervious areas. Expansion of arable land means reduction in forest area and deforestation brings in several ill effects. Harvesting of wood and other forest products beyond a certain threshold can also result in reduction of forest extent. When pristine forest resources are depleted, natural rural landscape is getting disturbed. Rural dwellers associate quality of rural life mainly with aesthetic nature of landscape as well as a sense of community life. Forest sector cannot be neglected, while rural developmental efforts are made, where agriculture is the predominant occupation. Forest-based entrepreneurship development can be encouraged to meet the twin objectives of development and conservation of forest resource. Agro forestry may also be promoted. Transition is required from a purely productive-based practice into improving environmental public goods, strengthen community stability, create amenity forests, and enhance the quality of life in the broader sense. Even though human disturbances are associated with depletion of forest, it is witnessed in few developed nations that sustained and steep declines of forest cover have been followed by a period of stabilization and then a gradual increase in forest area. This happens with the economic development and the forest shrinkage has given way to forest expansion. However, the new forests often differ from the forests they replace in their species composition.

Habitats integrity and neighborhood connectivity are critical for survival of several species and richness. Anthropogenic disturbances can cause habitat destruction, alteration and fragmentation, which can lead to decline in population and sometimes species extinctions of rare species. Habitat alterations are changes made to the environment that adversely affect ecosystem function, although not perhaps completely or permanently. Clear cutting of trees alters habitats and has impacts on species richness and abundance. Habitat fragmentation is a secondary affect of habitat destruction. The primary effect being the elimination of individuals or populations from the portion of the landscape that has been destroyed, and the secondary effect, habitat fragmentation, occurs when remaining populations are isolated because the links between habitat patches have been destroyed. The isolated populations are more likely to go extinct in the long run than populations that are slightly connected. Over time, habitat fragmentation can lead to the loss of genetic diversity which can affect a population's ability to respond to environmental changes and confounding the effects of climate change.

Imperatives for Innovations in Institutions

Institutions play an important role in addressing some of the problems confronting in agriculture and natural resources. Innovations in institutions are imperative to solve many of these problems. To start with agriculture research, it has undergone institutional changes and reforms in the past few decades. Those reforms were aimed at organizational aspects, and therefore innovations in institutional reforms are important in making Indian agriculture more vibrant. In the beginning of Green revolution era, public sector contribution in agriculture research and development was predominant and private sector participation was very little. Over a period of time, funding of private sources for agricultural R&D has increased and now constituted around 11 per cent of the total R&D funding (Pal and Jha, 2007). Of late besides private corporate, NGOs as well as research foundations

also ventured into agricultural research and development domain. Many of them have a broader outlook and have been working with the poor besides contributing towards innovation and research, thereby helping the poor in accessing new information knowledge and technology. Earlier, private sector R&D had its functioning aloof and had limited collaborations with public sector research. There were no major public-private collaborative programs earlier, but now the collaborative mode of research has improved.

The Indian Council of Agricultural Research (ICAR) implemented National Agricultural Technology Project (NATP) in 1998 receiving financial assistance from the World Bank as part of the organizational and management reforms, in which the ICAR delegated powers to lower administrative units, mainly at the level of Institute Directors and Principal Investigators of research projects. Establishment of PME (Priority setting, Monitoring and Evaluation) cells at various ICAR institutes was another significant reform brought about for improving research programme performance. Now, a significant stride forward in the arena of research management and collaborative mode of research is the National Agricultural Innovation Project (NAIP), which supports the development of research consortia with the participation of private and civil society actors. In addition to innovations in institutional reforms of agricultural research and development, innovations in institutions of technology disseminations are also equally important.

Agricultural extension played a crucial role in the country particularly when the Training and Visit (T & V) system of extension was in operational, which has shown visible results in agricultural technology dissemination across the country. However, the external assistance got squeezed in the early 1990s, which left the states to fund their extension machinery. That was the dwindling phase of T & V and ended in weakening of public sector extension. Since then, at ICAR level, there were a number of Krishi Vigyan Kendras (KVKs) have come up but the effective reach of these KVKs are minimal. In addition, the main focus of KVKs is restricted to imparting training to farmers on modem agricultural technologies. Effective dissemination of need based technologies through extension mechanisms is missing which could be attained through innovative institutional models. How to take a good number of technologies that are shelved in research institutions to the farmers in a simple way but more effectively? This could be answered only by developing innovative models of institutional mechanisms of technology dissemination.

There are quite a number of private extension service providers who started showing interest in extension work and have intensified their roots in the last two decades. These include NGOs, producers associations, input agencies, and agri-business companies, who are providing better services to farmers. However, the scale is limited. In such a big agrarian based society, many poor subsistent farmers in remote areas of the country are neither served by the public nor by the private sector. Agriculture itself has undergone lots of transformation. Modem agriculture is very different from what was traditionally practiced. In light of its transition, farmers in the modem era require a host of support at different levels, including organizational, marketing, technological, financial and entrepreneurial levels. If institutional reforms bring in such a support which provides service to the farmers through single window system would be a welcome sign. Therefore innovations in agricultural institutions for providing holistic support under one roof for the welfare of farmers are important.

Agricultural Technology Management Agency (ATMA) came into existence in agricultural extension after T & V system, which is considered as a major reform in extension. However, it is more of a coordinating agency for technology dissemination than to address challenges confronting farmers. Extension still continues to be centrally-planned and implemented without much devolution of powers and operational freedom at the local level. These are all organizational changes that are taking place in agricultural extension and there is little reform in institution per se so far in public sector agricultural extension and hence innovation offers huge scope for improvement. But, relative unwillingness to reform the institutions is a feature that marks Indian agricultural research and extension (Raina, 2003). As innovation requires interaction among a large number of actors, innovations in extension require active participation of the real stakeholders, the farmers. Though involvement of locals in the innovation process is taken up by some private players, its extent seems to be limited. A greater deal of innovativeness is required in extension efforts and models for efficient dissemination of agricultural technologies for effective reach and wide scale uptake. Recent upsurge in communication and informatics can be wisely used while developing extension models for easy accessibility as well as to give an opportunity of linking farmers, extension workers and scientists.

In addition to agricultural research and extension, innovative institutional reforms are imperative in inputs use and distribution as well as post harvest management and marketing. More specifically, in inputs domains, water and credit are two critical sectors which need innovation to bring about reforms. As many minor irrigation structures are defunct, it is important to revive them with active participation of water users. Therefore more emphasis must be on community level participation and collective action in irrigation management. Apart from irrigation sector, marketing and value supply chain is also going to be important and hence innovative measures are need of the hour in this field. As income growth and health awareness

can have greater demand for horticulture, livestock, poultry, and fisheries products in future, greater emphasis needs to be put on these sectors for efficient supply and marketing. Importance is also felt in institutions for handling harvested products and its value addition as well as cost-effectiveness. Post-harvest losses generally range from 5 to 10 percent for non-perishables and about 30 per cent for perishables. This loss could be minimized through innovations in marketing institutions. It not only prevents huge losses, but also improves the quality with the help of proper storage, packaging, handling and transport. Agricultural, co-operatives and Gram Panchayats can play a critical role in this effort. The Model APMC Act provides some provisions for private institutions to set up these infrastructure facilities. However, its extent of operationalization is limited. Besides, insurance is another area, wherein innovations are required for effective delivery of insurance products and for overall rosy performance of agriculture in coming years.

Several models of modern institutions have been experimented for the benefit of farmers in recent years both by the public and corporate bodies. Farmer's Club programme is an informal forum at the grass root level initiated by NABARD, which connects rural banking institutions with farmers for mutual benefits and creates user-friendly environment through direct intervention of the NABARD. Tata Kisan Sansar is yet another model designed by Tata Chemical Limited. is to reach the farmers through farmers-corporate alliance. It provides adequate market access with a mission to help them creating value addition by fulfilling credit need, providing information and advice on better agronomic practices, apart from supply of quality agri-inputs at a single source point. Hariyali Kisan Bazaar is a model with a unique farmer-corporate interface, which operates on a 3-tier system, farm advisory, rural retailing and farm produce linkage. This model provides all the needs of the farmers under one roof, encourages diversification of opportunities, and facilitates technology transfer, besides focusing on marketing of agricultural produce and processing. Farm Management Committee (FMC) in Assam is an instrument of rural development and mechanism of knowledge emplouerment to the farming community. Though innovations in institutions through such models are working and positive impacts are visible, up scaling is minimal so far.

Since the major thrust is on increasing production, while practicing intensive farming using excessive application of chemical inputs, it adversely impacts the environment and natural resources. It is further worse in rain fed areas, where resource poor farmers remained continuously in disadvantageous position; it aggravates the problems of inequity, regional imbalances and high concentration of malnourished people in these rainfed, low productive areas. Innovations in institutions can enhance community level action for sustainable management of common property resources in rural areas with the involvement of private voluntary organizations, farmers groups, self-help group etc. Novelty. in institutional arrangements can provide impetus to these rainfed farmers to raise their income and livelihood levels. While rainfed farming is risky in extreme weather conditions, innovative institutional preparedness in risk management is required for better adaptation in the context of changing climate. Grass root level organizations may be equipped with facilities and personnel to provide knowledge inputs on weather related information to farmers and information on inputs use, price and marketing which can be of great help to them in adapting to the climate aberrations.

Modern agriculture involves integration and use of different technologies from different -domains, and hence demands are more for newer knowledge almost on continuum basis. Innovations in institutions are required to provide such knowledge and updated information to the farmers otherwise the gap between the potential and the actual remains far from convergence. India has a rich tradition of peoples' institutions for managing common natural resources and stable production practices. The tragedy of commons continues in all common pool resources of water, forest and fisheries resources. Common resources can be managed effectively by community group and traditionally such institutions worked effectively. The neglect of these age old pristine institutions resulted in increased vulnerability of rural livelihood to various shocks in production, increased probability of their exclusion from agriculture, and loss of means of economic gain. It is time to revive those conventional institutions, and win back the confidence of the people. It is also right time to infuse novelty in institutional arrangements managing these resources to ward off over exploitation of these common pool resources.

Conclusions

Innovations in institutional development for empowering farmers particularly small farmers can revolutionize Indian agriculture. Farmers are often the vulnerable section in the society but their contributions to food security are great. India made significant achievements in food grain production and in the process we have managed well to meet the domestic demand and buffer stock requirements so far. However, it is not proportionately and adequately translated to Increase in consumer welfare and producer surplus increase in food prices and the consequent impact on consumers' budget, less producers' share in consumer rupee are some of the hardships. Productivity growth of many crops particularly staple foods is declining in recent years when compared to eighties. Yield gap and spatial disparities in production are still persisting at national level. Per capita availability of food grains is less due to population growth.

On one hand we have a long array of problems confronting agricultural production and on the other we are trying to find ways to reduce or eliminate the gravity of those problems. One of them is experimenting with different models in institutions for the betterment of agricultural development in the country. In a minuscule proportion, there are some success stories in agricultural marketing front. The contract farming model developed by some corporate bodies has been successful in some pockets, which is however not replicated on a wider scale. In a similar fashion, co-operative marketing model in dairy sector has been successful. It is not prudent to be complacent with institutional development in agricultural marketing alone but also it is high time innovations are extended to other gamut of institutions in agricultural research and extension as well as credit. While bringing in innovations in institutions, efforts may be made to use the modern era opportunities like information technology to strengthen the informatics in agriculture. Such innovations can put Indian agriculture on a high growth path in agriculture to meet the demands of future food grain requirements. However, high growth in agriculture should not be at the expense of natural resources and therefore institutional innovation in management of natural resources and environment is also equally important.

REFERENCES

Pal, S., and Jha, D., 2007. Public-private partnerships in Agricultural R&D: Challenges and Prospects, In Visawa Ballabh (ed.) Institutional Alternatives and Governance of Agriculture, Academic Foundation, New Delhi.

Raina, R. (2003). Institutions and Organisations; Enabling reforms in Indian agricultural research and policy, International Journal of Technology Management and Sustainable Development, 2 (2), 97-116.

Possibilities and Constraints for Increasing the Pulses Production in Bihar and Impact of National Food Security Mission on Pulses

Background of Pulses Production in Bihar

Bihar is one of the important pulse growing states in India contributing about 6.5 per cent to the country's pulse production. The area under pulse crops was reported to be 448.7 thousand hectares in 2007-08, accounting for 5.78 per cent of the GCA of the state. Total area under pulse crops is about 448.7 thousand hectares with a total production of 365.09MT. Production of kharif pulses has increased by 7.54 per cent despite a significant fall in its acreage by 4.36 per cent. This is reflective of significant leap in productivity of kharif pulses (Economic Survey, Government of Bihar, 2007-08). Production of pulses in the state has shown a more spectacular declining trend over the post bifurcation years with the exception of 2002-03, when their acreage and production both increased by 0.51 per cent and 2.52 per cent respectively. The year 2004-05 had seen a fall of 15.34 per cent in total pulse production (Bihar was bifurcated in the states of Bihar and Jharkhand in November, 2000) .

Background of Pulses Production in Sample Districts

It is found that growth rate of lentil, gram and arhar in NFSM district (Patna) was (-) negative with (-3.01), (-8.38) and (-6.52) respectively. With regards to growth rate of production of lentil, gram and arhar these were found negative i.e., (0.58), (-7.33) and (-1.0.91) whereas, annual growth rates of yield of lentil and gram were positive (2.50) and (1.08) respectively, except arhar that witness negative growth rate (-4.65).

Meanwhile, annual growth rates of area for moong and lentil in Non-NFSM district (Kishanganj) were found negative with (-3.96) and (-2.15) except gram which showed positive growth (0.25). With regard to growth rates of production for moong and lentil these were negative (-3.75) and (-1.84) respectively except gram that showed positive growth rate (0.39). Growth rates of yield for important pulse crops like moong, lentil and gram were positive with (0.09), (0.29) and (0.16) respectively.

Objectives

The main objectives of the study are:

(i) To analyze returns from cultivation of pulses vis-a-vis competing crops.

(ii) To analyze the other major problems and prospects for pulse cultivation.

(iii) To assess the impact, if any, of NFSM on pulses.

Methodology

The universe of the study is fell under two separate administrative districts viz., NFSM district (Patna) and Non-NFSM district (Kishanganj). At the first stage of sampling, one potential block from each district was selected, viz., Dhanaruwa and Kochchadhaman from Patna and Kishanganj districts respectively. Similarly, one village from each block was selected, namely: Pabhera from Patna and Pariharpur from Kishanganj district. At the last leg of sampling, from each village, on the basis of reconnaissance survey, lists of pulse growing farmers were prepared with their operational holdings. The list prepared was further classified into four size groups, viz., Marginal (< 1ha) Small (up to 2ha), Medium (up to 5 ha) and large (>5 ha). Subsequently, a sample of 50 pulse growers from each of the selected villages was randomly selected by adjusting available size groups. In this way, 50 farmers from each of the two districts were selected for the study. Thus, the sample size was of 100 pulse growers.

Profitability of pulse crops in NFSM districts (Patna)

(i) Overall gross return per hectare for lentil (masur) in NFSM district was found Rs. 42,099, Rs. 51,473 and Rs. 60,530 during 2006-07, 2007-08 and 2008-09 respectively, whereas net returns per hectare during above noted year were found Rs. 17,502, Rs. 21,780 and Rs. 26,939. Therefore, gross returns per quintal were Rs. 2864; Rs. 3506 and Rs. 4068 whereas; net returns per quintal were Rs. 1227, Rs. 1504 and Rs. 1716 during the years 2006-07, 2007-08, and 2008-09 respectively. Consequently, it was concluded that these returns varied among the farmers, i.e., lower the return among the marginal and small farmers and higher the returns among the medium and larger farmers.

(ii) Gram

Overall gross returns per hectare were found Rs. 21998, Rs. 30262 and Rs. 36396, whereas net returns per hectare were Rs. 7383, Rs. 13007 and Rs. 15256 during the years 2006-07, 2007-08 and 2008-09 respectively.

*A.E.R.C. T. M. Bhagalpur University, Bhagalpur-812007 Bihar and Jharkhand.

Overall gross returns per quintal were found Rs. 2007, Rs. 2504 and Rs. 2811, whereas net returns per quintal were Rs. 882, Rs. 1075-arid Rs. 1178 during 2006-07, 2007-08 and 2008-09 respectively. However, these returns varied among the farmers, i.e., lower the net returns among the marginal and small farmers and higher the returns among the medium and large farmers.

(iii) Lentil and Gram

Gross returns per hectare were calculated as Rs. 3248, Rs. 40867 and Rs. 48463, whereas net returns per hectare were Rs. 12442, Rs. 17393 and Rs. 21097 during reference years. Further, net returns per quintal were found Rs. 1054, . Rs. 1289 and 1447 during 2006-07, 2007-08 and 2008-09 respectively. However, it may be concluded that returns were lower among marginal and small farmers and higher among medium and large farmers.

Profitability of Major Pulse Crops in Non-NFSM District (Kishanganj)

(i) Moong

Overall gross returns per hectare were found Rs. 29954, Rs. 36405 and Rs. 39078, whereas net returns per hectare were Rs. 11741, Rs. 14388 and Rs. 15325 during the years 2006-07, 2007-08 and 2008-09 respectively. Gross returns per quintal were found Rs. 4984, Rs. 5608 and Rs. 6011 during same period.

(ii) Lentil

Overall gross returns per hectare of lentil were found Rs. 38990 Rs. 46187 and Rs. 53583, whereas net returns per hectare were found Rs. 17251, Rs. 19644 and Rs. 21990 during referred years. However, gross returns per quintal were found Rs. 2985, Rs. 3500 and Rs. 3939 and net returns per quintal were Rs. 1320, Rs. 1489 and Rs. 1641 during above noted years.

(i) Lentil + Moong

Overall gross returns per hectares were found Rs. 34472, Rs. 41296 and Rs. 46330, whereas net returns per hectare were noted as Rs. 14496, Rs. 17016 and Rs. 18657 during the same years. Further, gross returns per quintal and net returns per quintal were estimated at Rs. 3984, Rs. 4554, Rs. 4975 and Rs. 1636, Rs. 1851, Rs. 1999 respectively. It was ultimately found that trend of increasing returns was similar for all size of surveyed farmers.

Profitability of Rice in NFSM and N on-NFSM Districts

Overall gross returns per hectare in NFSM district were Rs. 49582, Rs. 54377 and Rs. 57107 and that is in Non-NFSM district were Rs. 46559, Rs. 54436 and Rs. 49832 respectively. Net returns per hectare in NFSM district were Rs. 21828, Rs. 22768 and Rs. 22853, and that in Non-NFSM district were estimated as Rs. 19652, Rs. 22927 and Rs. 25277 respectively. Further, the gross returns per quintal in NFSM and Non-NFSM districts were found same as Rs. 1689, Rs. 1748, Rs. 1869 and Rs. 1754, Rs. , 2002, Rs. 2195 in respective years. Net returns per quintal in both NFSM and Non-NFSM districts were estimated to be Rs. 775, Rs. 822, 861 and Rs. 740, Rs. 846, Rs. 926 respectively. Almost increasing trend could be seen in all the cases.

Profitability of Wheat in NFSM and Non-NFSM Districts

Overall gross returns per hectare in both the districts were Rs. 39950, Rs. 45418, Rs. 55309 and Rs. 47898, Rs. 49945, Rs. 49199 respectively. Net returns per hectare were Rs. 17903, Rs. 18610, Rs. 22748 in NFSM district (Patna) and Rs. 20824, Rs. 21758, Rs. 25764 in Non-NFSM district (Kishanganj) during 2006-07, 2007-08 and 2008-09 respectively. Further, gross returns per quintal and net returns per quintal in both the sample districts increased in the years 2006-07, 2007-08 and 2008-09.

Profitability of Rice and Wheat in NFSM and Non-NFSM Districts

Overall gross returns per hectare in NFSM and Non-NFSM districts were found to be Rs. 44766, Rs. 49897, Rs. 56208 and Rs. 47228, Rs. 52190, Rs. 59515 in the years 2006-07, 2007-08 and 2008-09 respectively. Net returns per hectare in both the noted districts were calculated as Rs. 19865, Rs. 20689, Rs. 22800 and Rs. 20238, Rs. 22342, Rs. 25520 respectively.

Profitability of Maize in NFSM and Non-NFSM Districts

Overall gross returns per hectare in NFSM and Non-NFSM districts were estimated at Rs. 32606, Rs. 41866, Rs. 54603, and Rs. 32746, Rs. 41653, Rs. 53304 respectively, while overall net returns per hectare in the above noted districts were calculated as Rs. 11832, Rs. 14615, Rs. 18354, Rs. 17946, Rs. 22015 and Rs. 27230 respectively. Ultimately, it may be observed in regard to gross returns per quintal that these were Rs. 470, Rs. 535 and Rs. 570 in NFSM and in Non-NFSM districts, these were Rs. 612, Rs. 712 and Rs. 757 whereas net returns per quintal were Rs. 300, Rs. 368, Rs. 456 and Rs. 355,Rs. 434 Rs. 537 in NFSM and Non-NFSM districts during 2006-07, 2007-08 and 2008-09 respectively.

Technology Adoption of the Respondent of the Sample Districts

- Larger proportion of respondents (3 out of 4 i.e., 75%) considered/pointed out about knowledge of area under improved varieties of pulses (Khesadi) by large farmers followed by medium (4 out of 12 i.e, 33.33) for arhar and small farmers 4 out of 15 for gram accounting for 26.67 per cent,

while in case of Non-NFSM district (Kishanganj), it was found that larger proportion of respondents (4 out of 6 i.e, 66.67 %) pointed out about knowledge of area under improved varieties of pulses (arhar) by large farmers followed by medium (5 out of 12 i.e., 41.67%) for gram, small (4 out of 14) with 18.57 per cent for lentil and marginal farmers (4 out of 18) respondents accounting for 22.22 per cent for moong.

Area under Improved Varieties of Pulses

- Areas under improved varieties of lentil and gram were 5.5 hectares and 4.0 hectares accounting for 20.00 per cent and 18.18 per cent respectively in NFSM district, whereas in case of Non-NFSM district, areas under improved varieties of moong, lentil and gram were found 4.0 hectare, 3.5 hectare and 2.5 hectare accounting for 24.24 per cent, 26.92 per cent and 31.93 per cent respectively.

Knowledge of Improved Varieties in NFSM and Non-NFSM Districts

- In NFSM district, larger farmers have cent per cent knowledge about improved varieties of pulses followed by medium (66.67%), small (46.67%) and marginal (31.58%), while in case of Non-NFSM district, 19 farmers out of 50 farmers were aware about improved varieties of pulses, accounting for 38.00 per cent. 50.00 per cent of the larger farmers had knowledge of improved varieties of pulses followed by medium (5 out of 12) accounting for 41.67 per cent and small farmers (5 out of 14) accounting for 35.11 per cent. Therefore, it may be concluded that farmers of NFSM district (Patna) were more aware about improved varieties of pulses in comparison to Non-NFSM district (Kishanganj).

Source of Knowledge of Improved Varieties

- Extension agents were the most important source, for knowledge of improved varieties 6f pulses in NFSM district. In case of Non-NFSM district (Kishanganj), 30 farmers out of 50 were aware about improved varieties of pulses. However, Extension Agents were considered most effective source at the average 36.67 per cent followed by Neighbours (30%), Newspapers (26.67%) and others (6.68%).

Recommended Practices for Improved Varieties of Pulses

- Seed and sowing practices were adopted by 44.00 per cent, 28.00 per cent of the respondents and 28.00 per cent did not follow any practice in NFSM district. In Non-NFSM district, these accounted for 52.63 per cent, 42.11 per cent and 5.26 per cent for seed practice, sowing practice and not followed any practices respectively. However, it was found that seed practices were most important in both the districts (NFSM and Non-NFSM).

Households Reporting Problems with Improved Varieties of Pulses

- Analysis of the responses of sample farmers in NFSM district reveals that larger proportion of respondents (12 out of 25 i.e., 48%) considered 'availability but not on time' as the most important problem with improved varieties of pulses. In Non-NFSM district (Kishanganj), it reveals that larger proportion of respondents (19 out of 90 ie., 21.11 %) considered non-availability of improved varieties of pulses as the most important problem followed by next important problem as non-availability of improved varieties of pulses (17 out of 90 i.e., 18.89%) as second rank and third rank (12 out of 90 i.e., 13.33%). However, it may be concluded that availability but not on time emerged as the most important problem, which was ranked first (8 out of 18 i.e., 44.44 %) followed by problems of not available at all (6 out of 15 i.e., 40%).

Suggested Solutions for Improved Varieties of Pulses (NFSM & Non-NFSM)

- Analysis of the responses of sample farmers in NFSM district revealed that larger proportion of respondents (11 out of 25 i.e., 44 %) considered cheaper availability of seed as the most important suggestion for improved varieties of pulses which was ranked as first followed by timely availability of seeds (9 out of 25 i.e., 36%), while in case of Non-NFSM district, analysis of the responses of sample farmers reveals that larger proportion of respondents (47.11%) considered timely availability of seeds as the most important suggestion for improved varieties of pulses followed by cheaper availability of seeds (42.11 %) and subsidy (35.78%).

Marketing Channels for Pulse Crops in NFSM & Non-NFSM Districts

- It may be concluded that in both the NFSM and Non-NFSM districts, hatt and village trader for marketing of pulses were common.

- Total quantity of pulses (lentil) sold in NFSM district Patna was 35851 kg and price received Rs. 1249420. Quantity sold, out of the total quantity through hatt market and village traders were found to be 5166 kg and 30685 kg. In regard to prices

received, these were Rs. 103931 and Rs. 1145489 respectively.

- It may be concluded that village trader was the most suitable marketing channel for selling pulses in both the NFSM and Non-NFSM districts. Analysis of the sample district showed that most of the small and marginal farmers grew pulses for home consumption, but they sold their produces according to their situation of livelihood, while larger farmers grew pulses for both home consumption and commercial purposes.

- Total quantity of gram sold and price received in NFSM district (Patna) were 21474 kg and Rs. 520315 respectively. Out of this, quantity sold and price received through village market were 2995 kg and Rs. 27569, whereas remaining quantity sold and price received through common agent were 18479 kg and Rs. 447746.

- Total quantity of moong sold and price received in Non-NFSM district (Kishanganj) by sample farmers were 5918 kg and Rs. 325490 respectively. Out of the total, quantities sold and prices received through hatt market and village market were 1043 kg with Rs. 57365 and 4875 kg with Rs. 268125 respectively.

Opinion Survey for Major Pest Problems (NFSM & Non-NFSM) Districts

There were various types of insect pests and diseases i.e., pod borer, pod fly, wilt, root rot, nematodes for pulses, which were found in NFSM district. These pests i.e., pod borer, wilt and nematodes cause damage to gram pulse and estimated yield losses per acre were recorded at 19 kg, 14 kg and 10 kg with respective insect-pests, whereas yield losses per acre for Arhar and Lentil were found 29 kg and 26 kg with respective insect-pests. In Non-NFSM district, pod borer and nematodes cause damage to gram crops and estimated yield losses per acre were recorded 24 kg and 21 kg with respective insect-pests. Also, it was observed that estimated losses per acre from pod fly and wilt for moong were 20 kg and 13 kg and root rot for lentil was recorded 37 kg. with respective insect-pests. However, it may be concluded that pod fly in NFSM district was found serious pest, while in Non-NFSM district, root rot was found serious pest for damaging pulse crops.

Major Problems for Cultivating Pulses (NFSM and Non-NFSM Districts)

Analysis based on the responses of sample farmers of NFSM district revealed that larger proportion of respondents (20 out of 50 i.e., 40%) considered lack of improved varieties of pulses as the most important problem for cultivating pulses and ranked it as first. Large doses of other inputs required emerged as the next most important problem by sample farmers (16 out of 50 i.e., 32%). Further, comparatively larger percentage of sample farmers (18 out of 50 i.e., 36%) perceived lack of irrigation facilities as the third most important problem for cultivating pulses, while data related to sample farmers of Non-NFSM district showed that larger proportion of respondents 37.40 per cent considered large doses of other inputs required as the most important problem for cultivating pulses followed by lower yield (34.29%), lack of improved varieties (30.43%) and lack of irrigation facilities (29.03%).

Important Suggestions from the Farmers for Cultivating Pulses

Larger proportion of respondents (36%) of the NFSM district considered availability of high yielding varieties as the most important suggestion for cultivating pulses. This suggestion occupied a predominant position throughout the rank also. Further, comparatively improved irrigation facilities (32%) was ranked fourth, whereas availability of pest resistant varieties (28%) was ranked third in regard to important suggestions for cultivating pulses followed by assured procurement with MSP and high market price. Analysis based on the responses of sample farmers of Non-NFSM district revealed that larger proportion of respondents (32.65%) considered assured procurement with MSP as the most important suggestion and it was ranked as the first and second by the farmers of sample district followed by improving irrigation facilities (27.03 %), availability of pest resistant varieties (25%) and availability of high yielding varieties of pulses (24.39%).

The effect of NFSM on Area and Production of Pulses

Total areas under lentil crop before and after NFSM were 25.25 hectares and 32.00 hectares respectively. It has increased to 26.73 per cent after NFSM. Total area under gram crop before and after NFSM had been recorded as 21 hectares and 24 hectares respectively. Its area had increased to 14.29 per cent in gram. It means there was higher percentage change/ increase in the area of lentil than gram.

Size group wise analysis reveals that area of the marginal and small farmers for lentil crops increased to 33.33 per cent after NFSM followed by large farmers (27.27%), medium farmers (20%), whereas area of the marginal farmers for gram crop remained the same after NFSM. Small farmers showed 20.00 per cent increase in area after NFSM followed by larger farmers (15.79%) and medium farmer (13.04%).

- Total production of lentil crop before NFSM was 36037 kg and after NFSM; it increased by 33.20 per cent, whereas total production of gram crop before NFSM was 24200 kg and after NFSM, it increased to 28.93 per cent.

- Size group wise analysis reports that marginal and small farmers showed higher percentage (40.10%)

increase in production of lentil followed by large farmers (33.76%) and medium farmers (26.07%) after NFSM, while medium farmers showed higher percentage (36.60%) increase in production of gram followed by small farmers (35.26%), large farmers (30.59%) and marginal farmers (13.04%). However, it may be concluded that there were comparatively large percentage increase (farm size group wise) in the area and production of lentil crop than increase in the area and production of gram crop after NFSM.

Problems for Improvement of the NFSM Pulses' Programme

Various problems for improvement of the NFSM pulses' programme has been presented in table 7.10. The analysis of the responses of the sample farmers of NFSM district showed that larger proportion of overall percentage of respondents considered lack of high yielding varieties of seed (60%) as the most important problem for improvement of the NFSM pulses' programme.

Lack of original pesticides to control insect-pest and diseases was considered as the next most important problems for improvement of the NFSM pulses programme accounting for 52.00 per cent. Again, pulse seeds are not available at all the time and eyery where was viewed as third most important problems for improvement of the NFSM pulses programme accounting for 48.00 per cent followed by pulses have much lower yield compared to cereal crops (44%) and low price support for gram compare to lentil whereas production of both the pulses are the same (40%).

Important Suggestions for Cultivating Pulses in NFSM District

Analysis of the responses of sample farmers of NFSM district regarding important suggestions for cultivating pulses have been presented in table 7.11 which revealed that larger proportion of overall percentage of respondents considered markets and marketing infrastructure should be made available for pulses cultivation (62%) as the most important suggestions for pulses cultivation. High yielding varieties should be made available to the farmers was considered as the next most important suggestions for cultivation of pulses accounting for 60.00 per cent.

Again, procurement should be ensured with minimum support prices was viewed as third most important suggestions for pulses cultivation accounting for 50.00 per cent followed by pest resistant varieties should be made available to the farmers (46%) and irrigation facilities should be provided properly (26%). .

Policy Implications

On the basis of field data, there are some suggestions to increase area and production of pulse crops, which are as given below:

1. Insect-pest and disease free pulses' seed should be made available for better yield. (*Attn: Dept. of Agri., Govt. of Bihar*).
2. Original medicines/ pesticides should be provided to control insect-pest and diseases. (A*ttn: Dept. of Agri., Govt. of Bihar*).
3. With a view to increase area under gram, its price may be increased to compete with lentil. (*Attn: Ministry of Agri, Govt. of India*).
4. Pulses seed should be made available to all in time. (*Attn: Dept. of Agri., Govt. of Bihar*).
5. Farmers should be encouraged to undertake cultivation of high yielding variety of pulses in rice, wheat and other cereals growing areas also. (*Attn: Dept. of Agri., Govt. of Bihar, Ministry of Agri, Govt. of India)*
6. Measures should be taken to reduce storage losses through infrastructural development. (*Attn: Dept. of Agri., Govt. of Bihar, Ministry of Agri, Govt. of India*)
7. Emphasis on strengthening market information systems should be given. (*Attn: Dept of Agri., Govt. of Bihar, Ministry of Agri, Govt. of India*)
8. Linking MSP to market prices can bridge the gap between demand and supply of pulses. (*Attn: Ministry of Agri, Govt. of India*)

D. Commodity Reviews

(i) Foodgrains

During the month of September, 2012 the Wholesale Prices of foodgrains displayed a rising trend. Wholesale Price Index (Base 2004-05=100) of foodgrains, pulses and Cereals rose by 2.17 per cent, 0.73 per cent, 2.49 per cent respectively over the previous month.

ALL INDIA INDEX NUMBER OF WHOLESALE PRICES

(Base : 2004-2005=100)

Commodity	Weight (%)	WPI for the Month of September 2012	WPI for the Month of August 2012	WPI A year ago	Percentage change during	
					A month	A year
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rice	1.793	194.8	190.7	173.3	2.15	12.41
Wheat	1.116	198.0	190.6	166.9	3.88	18.63
Jowar	0.096	234.8	236.5	256.9	–0.72	-8.60
Bajra	0.115	232.3	233.4	194.2	-0.4 7	19.62
Maize	0.217	235.1	229.4	201.1	2.48	16.91
Barley	0.017	200.6	204.4	177.4	–1.86	13.08
Ragi	0.019	269.9	252.3	206.1	6.98	30.96
Cereals	3.373	201.3	196.4	176.3	2.49	14.18
Pulses	0.717	261.4	259.5	202.2	0.73	29.28
Foodgrains	4.09	211.9	207.4	180.8	2.17	17.20

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

Behaviour of Wholesale Prices

The following Table indicates the State wise trend of Wholesale Prices of Cereals during the month of September, 2012.

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

Procurement of Rice

94 thousand tonnes of Rice (including paddy converted into rice) was procured during September, 2012, as against 497 thousand tonnes of Rice (including paddy converted into rice) procured during September 2011.The total procurement of Rice in the current marketing season i.e 2011-2012, upto 28.09.2012 stood at 34924 thousand tonnes, as against 33690 thousand tonnes of rice procured, during the corresponding period of last year. The details are given in the following table.

PROCUREMENT OF RICE

(in thousand tonnes)

State	Marketing Season 2011-12 (up to 28-09-12)		Corresponding Period of last Year (2010-11)		Marketing Year (October-September) 2010-11		2009-10	
	Procure-ment	Percentage to Total	Procure-ment	Percentage to Total	Procure-ment	Percentage to Total	Procure-ment	Percentage to Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Andhra Pradesh	7547	21.61	9537	28.31	9610	28.10	7555	23.58
Chhattisgarh	4115	11.78	3726	11.06	3746	10.95	3357	10.48
Haryana	2007	5.75	1687	5.01	1687	4.93	1819	5.68
Maharashtra	178	0.51	208	0.62	308	0.90	229	0.71
Punjab	7731	22.14	8635	25.63	8635	25.25	9275	28.95
Tamil Nadu	1596	4.57	1509	4.48	1543	4.51	1241	3.87
Uttar Pradesh	3350	9.59	2446	7.26	2554	7.47	2901	9.06
Uttarakhand	378	1.08	399	1.18	422	1.23	375	1.17
Others	8022	22.97	5543	16.45	5693	16.65	5282	16.49
Total	**34924**	**100.00**	**33690**	**100.00**	**34198**	**100.00**	**32034**	**100.00**

Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat in the current marketing season i.e. 2012-2013 upto August, 2012 is 38148 thousand tonnes against a total of 28148 thousand tonnes of wheat procured during last year. The details are given in the following table :

PROCUREMENT OF WHEAT

(in thousand tonnes)

State	Marketing Season 2012-13 (up to 2-08-2012)		Corresponding Period of last Year (2011-12)		Marketing Year (April-March) 2011-12		2010-11	
	Procure-ment	Percentage to Total	Procure-ment	Percentage to Total	Procure-ment	Percentage to Total	Procure-ment	Percentage to Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Haryana	8665	22.71	6882	24.45	6928	24.45	6347	28.19
Madhya Pradesh	8493	22.26	4905	17.43	4965	17.52	3539	15.72
Punjab	12834	33.64	10957	38.93	10958	38.67	10209	45.35
Rajasthan	1964	5.15	1303	4.63	1303	4.60	476	2.11
Uttar Pradesh	5063	13.27	3461	12.30	3461	12.21	1645	7.31
Others	1129	2.96	640	2.27	720	2.54	298	1.32
Total	**38148**	**100.00**	**28148**	**100.00**	**28335**	**100.00**	**22514**	**100.00**

Source: Department of Food & Public Distribution.

(ii) Commercial Crops

OILSEEDS AND EDIBLE OILS :

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 205.4 in September, 2012 showing a fall of 0.8 per cent over the previous month. However, it increased by 28.1 per cent over the previous year.

The Wholesale Price Index (WPI) of all individual oilseeds showed a mixed trend. The WPI of Groundnut seed (1.2 per cent), Rape & Mustard (2.1 per cent), Cottonseed (3.8 per cent), Gingelly seed (3.1 per cent) and Sunflower. (0.6 per cent) increased over the previous month. However, the WPI of Copra (0.4 per cent), Niger Seed (0.8 per cent) and Soyabean (6.4 per cent) decreased over the previous month. The WPI of Safflower seed remained unchanged over the previous month.

The Wholesale Price Index (WPI) of Edible Oils as a group stood 151.0 in September, 2012 showing a rise of 0.8 per cent and 10.8 per cent over the previous month and over the previous year, respectively. The WPI of Cottonseed Oil (5.4 per cent), Mustard Oil (0.2 per cent), Soyabean Oil (3.5 per cent), Sunflower Oil (0.4 per cent) and Gingelly Oil (0.8 per cent) increased compared to the previous month. However, the WPI of Groundnut Oil (1.4 per cent) and Copra oil (0.9 per cent) decreased over the previous month.

FRUITS AND VEGETABLE:

The Wholesale Price Index (WPI) of Fruits & Vegetable as a group stood at 194.9 in September, 2012 showing a fall of 3.4 per cent over the previous month. However, it increased by 0.1 per cent over the previous year.

POTATO:

The Wholesale Price Index (WPI) of Potato stood at 242.3 in September, 2012 showing a fall of 7.3 per cent over the previous month. However, it increased by 52.2 per cent over the previous year.

ONION:

The Wholesale Price Index (WPI) of Onion stood 193.5 in September, 2012 showing a fall of 0.4 per cent and 24.9 per cent over the previous month and over the previous year.

CONDIMENTS AND SPICES:

The Wholesale Price Index (WPI) of Condiments & Spices (Group) stood at 210.3 in September, 2012 showing an increase of 0.1 per cent over the previous month. However, it decreased by 13.0 per cent over the previous year.

The Wholesale Price Index of Black Pepper, Chillies (Dry) and Turmeric decreased by 0.6 per cent, 1.5 per cent and 0.2 per cent, respectively over the previous month.

RAW COTTON:

The Wholesale Price Index (WPI) of Raw Cotton stood at 211.7 in September, 2012 showing a fall of 4.7 per cent and 10.1 per cent over the previous month and over the previous year.

RAW JUTE:

The Wholesale Price Index (WPI) of Raw Jute stood at 255.3 in September, 2012 showing an increase of 1.5 per cent and 14.0 per cent over the previous month and over the previous year respectively.

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

(Base Year : 2004-05=100)

Commodity	Latest	Month	Year	Percentage Variation over	
	Sept., 2012	August, 2012	Sept., 2011	Month	Year
Oil Seeds	205.4	207.0	160.3	–0.8	28.1
Groundnut Seed	242.2	239.4	205.0	1.2	18.1
Rape & Mustard Seed	208.0	203.8	152.2	2.1	36.7
Cotton Seed	171.4	165.1	148.2	3.8	15.7
Copra (Coconut)	89.9	90.3	114.8	–0.4	–21.7
Gingelly Seed (Sesamum)	318.8	309.3	183.4	3.1	73.8
Niger Seed	210.9	212.6	177.1	–0.8	19.1
Safflower (Kardi Seed)	150.4	150.4	155.4	0.0	–3.2
Sunflower	178.7	177.7	166.9	0.6	7.1
Soyabean	241.4	257.9	136.8	–6.4	76.5
Edible Oils	151.0	149.8	136.3	0.8	10.8
Groundnut Oil	191.6	194.3	167.0	–1.4	14.7
Cotton Seed Oil	188.6	178.9	151.9	5.4	24.2
Mustard & Rapeseed Oil	157.5	157.2	137.1	0.2	14.9
Soyabean Oil	167.9	162.3	148.5	3.5	13.1
Copra Oil	113.2	114.2	124.1	–0.9	–8.8
Sunflower Oil	139.2	138.6	131.9	0.4	5.5
Gingelly Oil	166.3	165.0	143.4	0.8	16.0
Fruits and Vegetables	194.9	201.7	194.8	–3.4	0.1
Potato	242.3	261.4	159.2	–7.3	52.2
Onion	193.5	194.2	257.6	–0.4	–24.9
Condiments and Spices	210.3	210.1	241.6	0.1	–13.0
Black Pepper	531.5	534.9	406.2	–0.6	30.8
Chillies (Dry)	230.1	233.7	283.6	–1.5	–18.9
Turmeric	173.2	173.5	201.9	–0.2	–14.2
Raw Cotton	211.7	222.2	235.4	–4.7	–10.1
Raw Jute	255.3	251.6	223.9	1.5	14.0

PART II—Statistical Tables

A. Wages

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

(in Rupees)

State/Distt.	Village	Month and Year	Normal Daily Working Hours	Field Labour			Other Agri. Labour			Herdsman			Skilled Labour		
				Man	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	Dec., 2011	8	250.00	100.00	NA	250.00	130.00	NA	NA	NA	NA	NA	NA	NA
Guntur	Tadikonda	Dec., 2011	8	200.00	175.00	110.00	200.00	160.00	110.00	160.00	NA	NA	NA	NA	NA
Rangareddy	Arutla	Dec., 2011	8	200.00	120.00	NA	150.00	120.00	NA	150.00	120.00	NA	220.00	200.00	NA
Karnataka															
Bangalore	Harisandra	July to Sep., 2011	8	200.00	150.00	NA	200.00	150.00	NA	250.00	180.00	NA	300.00	300.00	NA
Tumkur	Gedlahali	July to Sep., 2011	8	150.00	150.00	NA	140.00	145.00	NA	150.00	NA	NA	150.00	150.00	NA
Maharashtra															
Nagpur	Mauda	Dec., 2009	8	100.00	80.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ahmednagar	Akole	June, 2009	8	80.00	70.00	NA	NA	NA	NA	NA	NA	NA	83.5	85.00	85.00
Jharkhand															
Ranchi	Gaintalsood	April, 2012	8	100.00	100.00	NA	90.00	90.00	NA	58.00	58.00	NA	170.00	150.00	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	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00
			W	8	NA	NA	160.00	160.00	160.00	NA	NA	NA	NA
Bihar													
Muzaffarpur	Bhalui Rasul	Feb. &,	M	8	104.00	104.00	104.00	104.00	104.00	NA	150.00	150.00	150.00
		March, 2010	W	8	NA	104.00	104.00	104.00	104.00	NA	NA	NA	NA
Shekhpura	Kutaut	May &	M	8	150.00	NA	NA	NA	150.00	NA	220.00	NA	NA
		June, 2010	W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chhattisgarh													
Dhamtari	Sihaba	June, 2012	M	8	150.00	120.00	NA	80.00	80.00	80.00	150.00	80.00	60.00
			W	8	NA	110.00	NA	60.00	60.00	80.00	100.00	80.00	NA
Gujarat													
Rajkot	Rajkot	March., 2012	M	8	247.00	270.00	164.00	197.00	168.00	140.00	408.00	358.00	240.00
			W	8	NA	182.00	142.00	167.00	167.00	100.00	NA	NA	NA
Dahod	Dahod	March, 2012	M	8	71.00	71.00	71.00	71.00	71.00	NA	143.00	150.00	150.00
			W	8	NA	71.00	71.00	71.00	71.00	NA	NA	NA	NA
Haryana													
Panipat	Ugarakheri	May &	M	8	180.00	180.00	180.00	200.00	180.00	NA	NA	NA	NA
		June, 2012	W	8	NA	150.00	150.00	180.00	150.00	NA	NA	NA	NA

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

May, 2012 (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	Nov., to Dec. 2010	M	8	300.00	110.00	110.00	110.00	110.00	110.00	200.00	200.00	NA
			W	8	NA	110.00	110.00	110.00	110.00	110.00	NA	NA	NA
Kerala													
Kozhikode	Koduvally	Feb., and March, 2012	M	4 to 8	720.00	450.00	NA	450.00	572.05	NA	500.00	NA	NA
			W	4 to 8	NA	NA	350.00	350.00	350.00	NA	NA	NA	NA
Palakkad	Elappally	Feb., and March, 2012	M	4 to 8	400.00	300.00	NA	275.00	368.75	NA	400.00	NA	NA
			W	4 to 8	NA	NA	150.00	200.00	160.00	NA	NA	NA	NA
Madhya Pradesh													
Hoshangabad	Sangarkhera	Aug., 2012	M	8	150.00	130.00	150.00	150.00	125.00	100.00	350.00	350.00	NA
			W	8	NA	130.00	150.00	150.00	125.00	100.00	NA	NA	NA
Satna	Kotar	Aug., 2012	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
			W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shyopur Kala	Vijaypur	Aug., 2012	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
			W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Orissa													
Bhadrak	Chandbali	Mary, 2012	M	8	220.00	150.00	NA	NA	166.66	150.00	250.00	140.00	140.00
			W	8	NA	NA	NA	NA	106.66	100.00	NA	NA	NA
Ganjam	Aska	Mary, 2012	M	8	250.00	150.00	150.00	150.00	168.33	150.00	300.00	150.00	150.00
			W	8	NA	100.00	100.00	100.00	100.00	100.00	NA	NA	NA
Punjab													
Ludhiana	Pakhowal	June, 2008	M	8	NA	NA	90.00	95.00	NA	99.44	NA	NA	NA
			W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rajasthan													
Barmer	Vishala	Aug., 2011	M	8					—NA—				
			W	8					—NA—				
Jalore	Panwa	Aug., 2011	M	8	NA	NA	NA	NA	NA	50.00	100.00	50.00	NA
			W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tamil Nadu													
Thanjavur	Pulvarnatham	Aug., 2012	M	6					—NR—				
			M	5									
Tirunelveli	Malayakulam (Kurvikulam)	Aug., 2012	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
			W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tripura													
Agartala	Govt. Agri. Farm		M						—NR—				
			W										
*Uttar Pradesh**													
Meerut	Ganeshpur	July, 2012	M	8	208.00	205.00	205.00	207.00	204.00	NA	306.00	NA	NA
			W	8	NA	175.00	175.00	177.00	176.00	NA	NA	NA	NA
Aurraiya#	Aurraiya	July, 2012	M	8	120.00	120.00	120.00	132.9	120.00	NA	257.1	NA	NA
			W	8	NA	NA	120.00	132.9	120.00	NA	NA	NA	NA
Chandauli	Chandauli	July, 2012	M	8	NA	NA	NA	125.00	125.00	NA	236.00	NA	NA
			W	8	NA	NA	NA	125.00	125.00	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.

New district is opted to replace Chandbali.

B. PRICES

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

(Month-end Prices in Rupees)

Commodity	Variety	Unit	State	Centre	Sep.-12	Aug.-12	Sep.-11
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wheat	PBW	Quintal	Punjab	Amritsar	1450	1350	1145
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1450	1350	1040
Wheat	—	Quintal	Madhya Pradesh	Sagar	NA	1700	1500
Jowar	—	Quintal	Maharashtra	Mumbai	2100	1950	2750
Gram	—	Quintal	Punjab	Abohar	NA	NA	NA
Maize	Yellow	Quintal	Uttar Pradesh	Bahraich	1120	1065	1020
Gram Split	—	Quintal	Maharashtra	Mumbai	5800	5400	3850
Gram Split	—	Quintal	Bihar	Patna	5460	5400	4250
Arhar Split	—	Quintal	NCT of Delhi	Delhi	7000	7500	6000
Arhar Split	—	Quintal	Maharashtra	Mumbai	6250	5750	6070
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	6100	6400	5100
Arhar Split	—	Quintal	Bihar	Patna	5850	6000	5700
Gur	Balti	Quintal	Uttar Pradesh	Hapur	3050	3275	2800
Gur	Sort II	Quintal	Tamil Nadu	Chennai	3200	3200	2950
Gur	—	Quintal	Maharashtra	Mumbai	3350	3300	2750
Mustard Seed	Rai UP	Quintal	West Bengal	Kolkata	4425	4700	3200
Mustard Seed	Raira	Quintal	West Bengal	Kolkata	NA	NA	NA
Mustard Seed	Black	Quintal	Uttar Pradesh	Kanpur	4190	4080	2910
Linseed	—	Quintal	Maharashtra	Nagpur	4000	4150	3050
Linseed	Bada	Quintal	Uttar Pradesh	Kanpur	4270	4100	3120
Cotton Seed	Superior	Quintal	Maharashtra	Jalgaon	NA	NA	NA
Castor Seed	—	Quintal	Andhra Pradesh	Badepalli	NA	NA	NA
Sesamum	Black	Quintal	Tamil Nadu	Chennai	4500	4500	4500
Cotton Seed	—	Quintal	Maharashtra	Mumbai	NA	NA	NA
Copra	FAQ	Quintal	Kerala	Alleppey	4050	4050	5900
Groundnut	—	Quintal	Maharashtra	Mumbai	7900	7000	6525
Groundnut	TMV 7	Quintal	Tamil Nadu	Chennai	4280	4280	4280
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1395	1470	1150
Mustard Oil	—	15 Kg.	Uttar Pradesh	Kanpur	1328	1352	1050
Groundnut Oil	—	15 Kg.	Maharashtra	Mumbai	1688	1883	1455
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1650	1800	1440
Linseed Oil	—	15 Kg.	Uttar Pradesh	Kanpur	1476	1494	1073
Castor Oil	—	15 Kg.	Uttar Pradesh	Kanpur	NA	NA	NA
Sesamum Oil	Agmark	15 Kg.	Tamil Nadu	Chennai	2310	2250	1875
Sesamum Oil	—	15 Kg.	Maharashtra	Mumbai	NA	NA	NA
Coconut Oil	—	15 Kg.	Kerala	Cochin	885	900	1298
Mustard Cake	—	Quintal	Uttar Pradesh	Kanpur	2150	2050	1110
Groundnut Cake	—	Quintal	Uttar Pradesh	Kanpur	NA	NA	NA
Cotton/Kapas	F414	Quintal	Punjab	Abohar	NA	NA	NA
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Thiruppur	NA	NA	NA
Wool	Fine	Quintal	Madhya Pradesh	Dabra	NA	NA	NA
Jute Raw	TD5	Quintal	West Bengal	Kolkata	2500	2725	NA

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

(Month-end Prices in Rupees)

Commodity	Variety	Unit	State	Centre	Sep.-12	Aug.-12	Sep.-11
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Jute Raw	W5	Quintal	West Bengal	Kolkata	2500	2700	NA
Oranges	—	100 No.	Maharashtra	Mumbai	NA	NA	NA
Oranges	Nagpuri	100 No.	West Bengal	Kolkata	NA	NA	NA
Oranges	Big	100 No.	Tamil Nadu	Chennai	540	540	640
Banana	Basarai	100 No.	Maharashtra	Jalgaon	210	350	NA
Banana	Singapore	100 No.	West Bengal	Kolkata	350	350	NA
Cashewnuts	—	Quintal	Maharashtra	Mumbai	52500	52500	60000
Almonds	—	Quintal	Maharashtra	Mumbai	45000	45800	38500
Walnuts	—	Quintal	Maharashtra	Mumbai	52500	52500	65000
Kishmish	—	Quintal	Maharashtra	Mumbai	11000	11000	14000
Peas Green	—	Quintal	Tamil Nadu	Chennai	NA	NA	8000
Tomatoes	—	Quintal	Tamil Nadu	Chennai	1200	1500	1500
Ladyfinger	—	Quintal	Tamil Nadu	Chennai	2000	1700	1200
Cauliflower	—	100 No.	Tamil Nadu	Chennai	1100	1300	800
Potatoes	Red	Quintal	Bihar	Patna	1230	1200	800
Potatoes	Desi	Quintal	West Bengal	Kolkata	1060	1160	620
Potatoes	Sort I	Quintal	Tamil Nadu	Mettuppalayam	NA	2366	NA
Onions	Bombay	Quintal	West Bengal	Kolkata	NA	NA	NA
Turmeric	Erode	Quintal	West Bengal	Kolkata	8200	8000	NA
Turmeric	Nadan	Quintal	Kerala	Cochin	7850	7700	10000
Chillies	—	Quintal	Bihar	Patna	6800	7350	9300
Black Pepper	Palai	Quintal	Kerala	Alleppey	NT	NT	30000
Ginger	Dry	Quintal	Kerala	Cochin	11100	10900	12600
Cardamom	Big	Quintal	West Bengal	Kolkata	82000	80000	110000
Cardamom	Small	Quintal	West Bengal	Kolkata	100000	110000	80000
Milk	Cow	100	NCT of Delhi	Delhi	3600	3600	3400
Milk	Buffalo	100	West Bengal	Kolkata	3200	3200	3000
Ghee Deshi	Agmark	Quintal	West Bengal	Kolkata	33000	33000	NA
Ghee Deshi	—	Quintal	Uttar Pradesh	Khurja	NA	NA	NA
Ghee Deshi	—	Quintal	Maharashtra	Mumbai	NA	NA	26500
Fish	Rohu	Quintal	West Bengal	Kolkata	13000	13000	NA
Fish	Sea Prawns	Quintal	Tamil Nadu	Chennai	18000	15000	17000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4000	3800	2900
Tea	Medium	Quintal	Assam	Guwahati	18000	19000	14000
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	NA	NA	13000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	26000	26000	30000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	14000	14000	12400
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	2250	NA	2325
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	2125	NA	2315
Tobacco	Bidi /Tobacco	Quintal	West Bengal	Kolkata	4000	4000	3250
Rubber	—	Quintal	Kerala	Kottayam	18200	15800	19900
Arecanut	Rashi	Quintal	Tamil Nadu	Chennai	30000	30000	26000

NA :—Not Available

NT :—Not Transaction

3. Month-end Wholesale Prices of Some Important Agricultural Commodities in International Markets During Year, 2012—*Contd.*

Commodity	Variety	Country	Centre		Jan.	Feb.	Mar.	Apr.	May	June	Jul.	Aug.
Barley		Canada	Winni-	Dollar/M.T.	213.00	214.00	216.00	220.00	220.00	220.00	220.00	—
			peg	Rs./Qtl.	1072.88	1048.81	1100.30	1175.68	1183.38	1203.40	1211.54	—
Cardamom	Guatmala Bold Green	U.K.	—	Dollar/M.T.	15000.00	11000.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00
				Rs./Qtl.		85536.00						
Cashew Kernels	Spot U.K. 320s	U.K.	—	Dollar/1bs	4.12	4.03	4.00	4.06	4.03	3.80	3.65	3.60
				Rs./Qtl.	71672.23	69067.37	71815.14	76346.38	77034.63	73199.25	69979.98	69338.72
Castor Oil	Any Origin ex tank Rotterdam	Nether-	—	Dollar/M.T.	1880.00	1875.00	1700.00	1600.00	1500.00	1500.00	1680.00	1775.00
		lands		Rs./Qtl.	9687.64	9185.63	8649.60	8392.00	8305.50	8346.00	9282.00	9884.98
Celery Seed	ASTA cif	India	—	Dollar/M.T.	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00	1500.00
				Rs./Qtl.	7729.50	7348.50	7632.00	7867.50	8305.50	8346.00	8287.50	8353.50
Chillies	Birds eye 2005 crop	Africa	—	Dollar/M.T.	5500.00	6500.00	5900.00	5900.00	5650.00	5650.00	5650.00	5650.00
				Rs./Qtl.	28341.50	31843.50	30019.20	30945.50	31284.05	31436.60	31216.25	31464.85
Cinnamon Bark		Mada-	—	Dollar/M.T.	1100.00	1100.00	1100.00	1100.00	1100.00	1100.00	1100.00	1100.00
		gascar		Rs./Qtl.	5668.30	5388.90	5596.80	5769.50	6090.70	6120.40	6077.50	6125.90
Cloves	Singapore	Mada-	—	Dollar/M.T.	10875.00	12000.00	12000.00	12000.00	12000.00	10300.00	10500.00	9500.00
		gascar		Rs./Qtl.	56038.88	58788.00	61056.00	62940.00	66444.00	57309.20	58012.50	52905.50
Coconut Oil	Crude Phillipine/ Indonesia	Nether-	—	Dollar/M.T.	1430.00	1430.00	1315.00	1325.00	1030.00	1095.00	1000.00	965.00
		lands		Rs./Qtl.	7368.79	7005.57	6690.72	6949.63	5703.11	6092.58	5525.00	5374.09
Copra	Phillipines cif Rotterdam	Philli	—	Dollar/M.T.	901.50	905.00	835.00	825.50	648.00	692.00	616.00	616.50
		pine		Rs./Qtl.	4645.43	4433.60	4248.48	4329.75	3587.98	3850.29	3403.40	3433.29
Corriander		India	—	Dollar/M.T.	1150.00	1150.00	1150.00	1150.00	1150.00	1150.00	1150.00	1150.00
				Rs./Qtl.	5925.95	5633.85	5851.20	6031.75	6367.55	6398.60	6353.75	6404.35
Cummin Seed		India	—	Dollar.M.T.	3800.00	3800.00	3800.00	3800.00	3800.00	2800.00	2800.00	2800.00
				Rs./Qtl.	19581.40	18616.20	19334.40	19931.00	21040.60	15579.20	15470.00	15593.20
Fennel seed		India	—	Dollar/M.T.	2600.00	2600.00	2600.00	2600.00	2600.00	2600.00	2600.00	2600.00
				Rs./Qtl.	13397.80	12737.40	13228.80	13637.0	14396.20	14466.40	14365.00	14479.40
Ginger	Split	Nigeria	—	Dollar/M.T.	3800.00	3400.00	2550.00	2550.00	2550.00	2550.00	2550.00	2550.00
				Rs./Qtl.	19581.40	16656.60	12974.40	13374.75	14119.35	14188.20	14088.75	14200.95
Groundnut kernels	US 2005, 40/50 cif Rotterdam	European	—	Dollar/M.T	-	-	-	2400.00	1725.00	1650.00	1595.00	1550.00
		Ports		Rs./Qtl.	-	-	-	12588.00	9551.33	9180.60	8812.38	8631.95
Groundnut Oil	Crude Any Ori gin cif Rotterdam	U.K.	—	Dollar/M.T	-	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00	2200.00
				Rs./Qtl.	-	17107.20	17921.20	18770.40	19080.60	19228.00	1917.80	19225.80
Lentils	Turkish Red Split Crop 1+1 water	U.K.	—	Pound/M.T	587.57	567.02	562.08	553.32	574.59	572.94	571.55	525.70
				Rs./Qtl.	4637.69	4409.15	4578.70	4720.93	4983.42	5007.50	4971.91	4594.09
Maize		U.S.A	Chic-	C/56 lbs.	658.00	630.00	630.50	607.00	601.25	645.50	790.00	780.00
			ago	Rs./Qtl	1332.53	1212.94	1260.74	1251.20	1308.34	1411.48	1715.35	1707.12
Oats		Canada	Winni-	Dollar/M.T.	209.31	211.40	211.23	207.59	217.72	215.14	212.19	366.66
			peg	Rs./Qtl.	1054.29	1036.07	1076.01	1109.36	1171.12	1176.82	1168.53	2065.76
Palm Kernal Oil	Crude Malaysia/ Indonesia	Nether-	—	Dollar/M.T.	1355.00	1410.00	1370.00	1375.00	1180.00	1070.00	1000.00	975.00
		lands	—	Rs./Qtl.	6982.32	6907.59	6970.56	7211.88	6533.66	5953.48	5525.00	5429.78
Palm Oil	Crude Malaysian/ Sumatra	Nether-	—	Dollar/M.T.	1063.00	1125.00	1163.00	1178.00	1015.00	1013.00	990.00	973.00
		lands	—	Rs./Qtl.	5477.64	5511.38	5917.34	6178.61	5620.06	5636.33	5469.75	5418.64

3. MONTH-END WHOLESALE PRICES OF SOME IMPORTANT AGRICULTURAL COMMODITIES IN INTERNATIONAL MARKETS DURING YEAR, 2012—*Contd.*

Commodity	Variety	Country	Centre		Jan.	Feb.	Mar.	Apr.	May	June	Jul.	Aug.
Rapeseed	Canola	Canada	Winni-peg	Can Dollar/M.T	524.80 2643.42	559.50 2742.11	606.90 3091.55	620.50 3315.95	610.80 3285.49	632.10 3457.59	605.00 3331.74	603.50 3400.12
	U.K. delivered rapeseed, delivered	U.K.	—	Pound/M.T. Rs./Qtl.	365.00 2880.95	372.00 2892.67	394.00 3209.52	397.00 3387.20	364.00 3156.97	378.00 3303.72	390.00 3392.61	375.00 3277.13
Rapeseed Meal	UK produced HP 37% DO, Resell Erith	U.K.	—	Pound/M.T. Rs/Qtl.	171.00 1349.70	176.00 1368.58	166.00 1352.24	178.00 1518.70	197.00 1708.58	199.00 1739.26	221.00 1922.48	— —
Rapeseed Oil	Refined bleached and deodorised	U.K.	—	Pound/M.T. Rs/Qtl.	911.00 7190.52	914.00 7107.26	909.00 7404.71	913.00 7789.72	851.00 7380.72	870.00 7603.80	870.00 7568.13	868.00 7585.45
Soyabean Meal	U.K. produced 49% oil & protein	U.K.	—	Pound/M.T. Rs./Qtl.	264.00 2083.75	269.00 2091.74	302.00 2460.09	292.00 2491.34	354.00 3070.24	365.00 3190.10	459.00 3992.84	482.00 4212.20
Soyabean Oil		U.S.A.	—	C/lbs Rs./Qtl.	52.15 5922.79	54.00 5830.59	55.02 6169.92	55.72 6441.22	50.40 6150.59	50.87 6238.22	51.73 6299.21	52.83 6484.39
	Refined bleached and deodorised	U.K.	—	Pound/M.T. Rs/Qtl.	843.00 6653.80	874.00 6796.22	875.00 7127.75	871.00 7431.37	823.00 7137.88	834.00 72.89.16	864.00 7515.94	855.00 7471.85
Soyabeans		U.S.A.	—	C/60 lbs Rs./Qtl	1208.50 2285.46	1267.75 2279.33	1370.75 2559.60	1465.00 2820.00	1382.50 2809.35	1471.50 3004.79	1645.50 3336.54	1623.00 3317.12
	US No. 2 yellow	Nether-lands	Chi-cago	Dollar/M.T. Rs./Qtl	503.90 2596.60	527.50 2584.22	558.20 2840.12	591.70 3103.47	556.40 3080.79	606.30 3373.45	676.10 3735.45	672.80 3746.82
Sunflower Seed	US hulled ex-store	U.K.	—	Pound/M.T. Rs./Qtl	979.28 7729.46	945.03 7348.55	936.80 7631.17	922.20 7868.21	957.64 8305.61	— —	— —	— —
Sunflower Seed Oil	Refined bleached and deodorised	U.K.	—	Pound/M.T. Rs./Qtl	964.00 7608.85	985.00 7659.36	981.00 7991.23	1004.00 8566.13	1038.00 9002.57	1026.00 8967.24	981.00 8533.72	978.00 8546.74
Tallow	High grade delivered	U.K.	Lon-don	Pound/M.T. Rs./Qtl	550.00 4341.15	550.00 4276.80	550.00 4480.30	550.00 4692.60	570.00 4943.61	570.00 4981.80	570.00 4958.43	570.00 4981.23
Turmeric	Madras finger spot/cif	India	—	Dollar/M.T. Rs./Qtl	4100.00 21127.30	4100.00 20085.90	4100.00 20860.80	4100.00 21504.50	4100.00 22701.70	850.00 4729.40	850.00 4696.25	850.00 4733.65
Walnuts	Indian light halves	U.K.	—	Pound/M.T. Rs./Qtl	6750.0 53277.75	6300.00 48988.80	6350.00 51727.10	6350.00 54178.20	6350.00 55073.55	6775.00 59213.50	5900.00 51324.10	5900.00 51560.10
Wheat		U.S.A.	Chic-ago	C/60 lbs Rs../Qtl	646.50 1222.63	633.00 1138.09	639.50 1194.14	624.50 1202.11	683.00 1387.91	727.50 1485.55	880.25 1784.86	840.00 1716.81

Source : Public Ledger.

Exchange Rate

	Jan.	Feb.	Mar.	Apr.	May	June	Jul	Aug.
US Dollar	51.53	48.99	50.88	52.45	55.37	55.64	55.25	55.69
CAN Dollar	50.37	49.01	50.94	53.44	53.79	54.70	55.07	56.34
UK	78.93	77.76	81.46	85.32	86.73	87.40	86.99	87.39

C. CROP PRODUCTION

4. SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING THE MONTH OF NOVEMBER, 2012

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Paddy, Jowar, (in some areas), Bengal gram, horsegram, condiment and spices and potato.	Kharif paddy, ragi, other kharif cereals, ginger and groundnut.
Assam	Rabi paddy, gram, mustard, winter vegetables and potato.	Kharif paddy, jute, tea and winter potato.
Bihar	Wheat, barley, gram, rapeseed & mustard, sweet Potato	Kharif paddy and potato.
Gujarat	Paddy, Wheat, Gram, Pulses and Potato.	Paddy, Kharif, Jowar, groundnut, bajra and Cotton.
Himachal Pradesh	Wheat, barley and gram.	Winter paddy, rabi kharif, sugarcane, ginger (dry), chillies (dry), tobacco, cotton, turmeric and sannhemp.
Jammu & Kashmir	Wheat (in Kashmir) barley, linseed and rapeseed and mustard.	Maize (in Jammu).
Karnataka	Bengal gram; potato and Rabi paddy.	Kharif paddy, jowar, bajra, ragi, groundnut and sweet potato.
Kerala	Paddy, Pulses and sweet potato.	Kharif paddy, sugarcane, ginger and tapioca.
Madhya Pradesh	Wheat, barley, gram, rabi pulses, potato, rapeseed & mustard and castorseed.	Kharif paddy, jowar, bajra, ragi, kharif, pulses, potato, chillies, tobacco. cotton, sweet potato and turmeric.
Maharashtra	Wheat, gram, barley, jowar and pulses.	Kharif Paddy, jowar, groundnut, bajra, cotton and sugarcane.
Manipur	—	Winter paddy, tur, groundnut, sesamum, sweet potato and turmeric.
Orissa	Wheat, sugarcane, tobacco, mustard, gram and linseed.	Kharif paddy, groundnut, sugarcane, cotton and sannhemp.
Punjab	Wheat, barley, gram and linseed.	Jowar, bajra, maize, cotton and sugarcane.
Rajasthan	Wheat, barley, gram, potato, tobacco, rapeseed and mustard and linseed.	Paddy, jowar, bajra, sugarcane and cotton.
Tamil Nadu	Rabi paddy, jowar, cotton, tobacco, horsegram, chillies and rapeseed and mustard.	Kharif Paddy, kharif jowar, cumbu ragi, maize, groundnut (un irrigated,), cotton, varagu, samai, tapioca and ginger.
Tripura	Pulses, potato and rapeseed and mustard.	Winter rice.
Uttar Pradesh	Wheat, barley, gram, linseed and cotton.	Kharif paddy, jowar, bajra, sugarcane, groundnut, cotton, tobacco and sannhemp.
West Bengal	Wheat paddy, wheat, barley, linseed, rapeseed and mustard and potato.	Winter paddy, sugarcane, sesamum and cotton.
Delhi	Wheat, barley, gram, pulses, tobacco, linseed and rapeseed and mustard.	Jowar, kharif pulses, sugarcane and sweet potato.

MGIPRRND—250 Agri./2012—600

(K) — Kharif (R) — Rabi