

IMPACT OF NATIONAL FOOD SECURITY MISSION-WHEAT IN MADHYA PRADESH - A TIME SERIES ANALYSIS

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ABSTRACT

The present study highlighted the impact of National Food Security Mission-Wheat (NFSM-W) on growth of area, production and productivity of wheat along with input use, financial progress under NFSM-W in Madhya Pradesh. The relationship between percentage change in NFSM-W expenditure and percentage change in irrigated area, fertilizer consumption and area & production of wheat in the state was also analyzed. The study is based on the time series secondary data for the period of 1997-98 to 2011-12 and classified into 9th, 10th and 11th Five Year Plans (FYPs). The 11th FYP has been compared with 9th and 10th FYPs to observe change in area, production and productivity by using Average Annual Growth Rate (AAGR). The growth of area, production and productivity was found to be negative in 9th FYP which turned into positive in 11th FYP. The growth in irrigation intensity, cropping intensity and fertilizer consumption were also accelerated during 11th FYP as compared to 9th and 10th FYP. The correlation between percentage change in NFSM-W expenditure with percentage change in Net Irrigated Area (NIA), percentage change in fertilizer consumption and percentage change in area of wheat were found to be 0.84, 0.81, 0.81 respectively, showing significant positive and high correlation, while correlation with production of wheat was found to be non-significant but positive (0.44) and moderate. As far as financial progress of NFSM-W is concerned, the percentage achievement over amount released was also found to be increased from 23.32% (2007-08) to 119.97% (2011-12) during the 11th FYP.

KEYWORDS: Impact, National Food Security Mission, Wheat, Madhya Pradesh

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INTRODUCTION

Agriculture sector is immensely important for the Indian economy as the sector is contributing 14 per cent of the nation's Gross Domestic Product, 11 per cent of its exports and about half of the population still depends on agriculture as its primary source of income while it provides raw material for a large number of industries (GoI, 2012-13). The experience of last three decades indicate that the growth rate of food grain production decreased from 2.93 per cent during the period 1986-97 to 0.93 per cent during 1996-2008. The declining growth of food grains production was partly contributed by the decline in area but largely by the decline in yield rate. The yield growth rate of food grains decreased from 3.21 per cent to 1.04 per cent during the same time period. There was also decline in growth in the production of other agricultural commodities. This is clearly reflected in the decelerated agriculture growth from 3.5 per cent during the period 1981-82 to 1996-97 to around 2 per cent during 1997-98 to 2004-05. Nevertheless, there have been signs of

improvement during the recent years (Dev and Sharma, 2010; Kumar 2013 and GoI 2012-13). In order to combat the challenge of deficit food availability in the country, the Government of India launched National Food Security Mission (NFSM) in 2007-08 at the beginning of 11th Five Year Plan (FYP). The NFSM Programme targeted to escalate production of rice, wheat and pulses by 10, 8, and 2 million tonnes, respectively by the end of 11th FYP. The Mission is being continued during 12th FYP with new targets of additional production of food grains of 25 million tons of food grains comprising of 10 million tons rice, 8 million tons of wheat, 4 million tons of pulses and 3 million tons of coarse cereals by the end of 12th FYP. In this plan the NFSM components increased from 3 to 5 i.e. (i) NFSM- Rice; (ii) NFSM-Wheat; (iii) NFSM-Pulses, (iv) NFSM-Coarse cereals and (v) NFSM-Commercial Crops.

To increase the production and productivity of wheat, Government of India launched National Food Security Mission – Wheat (NFSM – W) in 12 different states of the country i.e. Bihar, Gujarat, Haryana, Jammu & Kashmir, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Uttar Pradesh, West Bengal, Himachal Pradesh and Uttarakhand. The main objective of this mission was popularization and habitualization of Wheat production and protection technology among farmers for higher production and productivity. In this training as well as required kit of inputs were also provided to farmers for this purpose particularly related to wheat. The kit has several eco-friendly inputs necessary for production and protection of Wheat crop.

The mission has been completed almost six years (2007-08 to 2011-12). Since sufficient time has been passed, it is in this context it was felt to conduct impact study in the districts covered under NFSM-W to evaluate the performance of NFSM-W in M.P. Trends in area, production and productivity of wheat along with its financial progress was analyzed in the present study.

METHODOLOGY

The study is confined to Madhya Pradesh as the state has remarkable position in India's wheat production basket and contributing nearly 11.78 per cent (10.77 Million t) of the country's production. The time series data used in this study were collected from secondary sources viz. "Agriculture Statistics of Madhya Pradesh published by Directorate of Agriculture, www.landrecordcommissioner.in, www.mpkrishi.org and [www.http://nfsm.gov.in/wheat.aspx](http://nfsm.gov.in/wheat.aspx)." To find out the clear cut picture of impact, time series data encompassing the period from 1997-98 to 2011-12 on selected parameters i.e. area, production and productivity of wheat, net irrigated area, gross irrigated area, net sown area, fertilizer consumption, and financial progress of NFSM in the state. The impact evaluation study was conducted with reference to the period since inception of NFSM covering the 11th Five Year Plan i.e. from 2007-08 to 2011-12 over previous FYPs i.e. 9th and 10th FYPs. A time series analysis has been carried out to find out the growth of area, production and productivity of wheat in different districts of the state covered under NFSM-W along with input use, financial progress under NFSM-W, correlation between percentage change in NFSM-W expenditure and percentage change in net irrigated area, fertilizer consumption, area & production of wheat with the help of Statistical Package for Social Science (SPSS). The 11th FYP has also been compared with 9th and 10th FYPs to observe change in area, production and productivity by using Average Growth Rate (AGR) and Average Annual Growth Rate (AAGR) and calculated with the help of following formula.

$$\text{Annual Growth Rate (AGR)} = \frac{(\text{Current Year} - \text{Base Year})}{\text{Base Year}} \times 100$$

$$\text{Average Annual Growth Rate (AAGR)} = \frac{\sum \text{AGR of Different Year}}{\text{No. of Years}}$$

RESULTS AND DISCUSSIONS

The impact of NFSM-W has been observed in light of trend and growth of area, production and productivity of wheat crop in the state, growth in NFSM-W districts, trend in area and input use for food grain crops, financial progress in 11th and 12th FYP and correlation between percentage change in NFSM-W expenditure and percentage change in net irrigated area, fertilizer consumption and area & production of wheat have been analyzed and presented below.

- Area, Production and Productivity of Wheat in Madhya Pradesh**

The changes in area, production and productivity of wheat along with the AAGR were worked out for 9th, 10th and 11th FYP to judge the impact of NFSM on area, production and productivity of wheat in the state during 11th FYP over 9th and 10th FYP since the scheme has been implemented in the year 2007-08. The analyzed data have been presented in table 1.

Table 1: Trend in Area, Production and Productivity of Wheat in Madhya Pradesh

Years	Area (Lakh Ha)	Production (Lakh T)	Productivity (Q/Ha)
1997-98	45.02	71.54	16.55
1998-99	45.75	82.57	18.83
1999-00	46.69	86.87	19.38
2000-01	33.11	48.69	15.35
2001-02	37.04	60.01	16.91
9th Plan AAGR	-0.45	-1.60	-1.55
2002-03	33.81	49.23	15.20
2003-04	40.91	73.65	18.79
2004-05	42.00	73.27	18.21
2005-06	37.85	62.00	17.10
2006-07	42.75	78.48	19.16
10th Plan AAGR	3.60	8.46	3.27
2007-08	41.01	67.37	17.14
2008-09	40.10	72.80	18.95
2009-10	44.71	88.73	20.71
2010-11	46.45	92.27	20.73
2011-12	52.61	145.44	27.70
11th Plan AAGR	4.47	15.48	8.60

It is observed from the data that growth in area, production and productivity of wheat was found to be decreased by -0.45, -1.60 and -1.55 per cent per year respectively during 9th FYP. During this plan area and production was found to be decreased from 45.02 (1997-98) to 37.04 lakh ha (2001-02), 71.54 (1997-98) to 60.01 lakh t (2001-02) respectively, while productivity was increased from 16.55 (1997-98) to 16.91 q/ha (2001-02), but growth of productivity showed decreasing trend due to drastically decrease in year 2000-01 (15.35 q/ha) as compared to year 1999-2000 (19.38 q/ha).

The growth of area, production and productivity of wheat in Madhya Pradesh was found to be increased from 33.81 to 42.75 lakh ha, 49.23 to 78.48 lakh t and 15.20 to 19.16 q/ha respectively with AAGR of 3.60% (Area), 8.46% (Production) and 3.27% (Productivity) per annum respectively during 10th FYP. The production was found to be increased due to increase in area and productivity of wheat in the state during this particular plan period.

The growth of area, production and productivity of wheat was also found to be increased from 41.01 (2007-08) to 52.61 lakh ha (2011-12), 67.37 (2007-08) to 145.44 lakh t (2011-12) and 17.14 (2007-08) to 27.70 q/ha (2011-12) with

growth of 4.47, 15.48 and 8.60 per cent per year respectively during the 11th FYP period. This drastic change in the production and productivity along with area was found due to the efficient implementation of NFSM-W during this particular plan period, which increased the growth of production and productivity by many folds as compared to 9th and 10th FYP period.

• Growth in Area and Input Use

The growth of Net Irrigated Area (NIA), Gross Irrigated Area (GIA), Net Sown Area (NSA), Percentage Net Irrigated to Net Sown Area, Irrigation Intensity, Cropping Intensity and Fertilizer Consumption (kg/ha of NSA) was worked out for 9th (1997-98 to 2001-02), 10th (2002-03-2006-07) and 11th (2007-08 to 2011-12) FYP to have complete idea about the changes which are being taking place due to implementation of NFSM-W in the state and the results are presented in table 2.

The increase in growth of NIA (6.71%/year), GIA (6.54%/year), net irrigated to NSA (6.72%/year), Cropping Intensity (1.33%/year) and Fertilizer Consumption (11.11%/year) was found maximum in 10th FYP as compared to 9th and 11th FYP, While growth of NSA (0.54%/year) and irrigation intensity percentage (0.29%/year) was found maximum in 11th FYP as compared to 9th and 10th FYP.

In spite of higher growth in NIA (6.71%/year), GIA (6.54%/year), NSA (1.49%), percentage net irrigated area to NSA (6.72%/year), cropping intensity (1.33%/year) and fertilizer consumption (11.11%) during 10th FYP the growth in the above described parameters was also found to be increased by 4.44, 4.75, 3.89, 1.65 and 8.99 per cent respectively in 11th FYP in the state.

Table 2: Growth in Area and Input Use in different FYPs in M.P

Year	Net Irrigated Area (lakh ha)	Gross Irrigated Area (lakh ha)	Net Sown Area (lakh ha)	Net Irrigated to NSA (%)	Irrigation Intensity (%)	Cropping Intensity (%)	Fertilizer Consumption (Kg/ha of NSA)
1	2	3	4	5	6	7	8
1997-98	5224	6527.1	19940	26.20	124.94	130.74	48.94
1998-99	5514	6813.7	19954	27.63	123.57	130.93	49.43
1999-00	5661	5827.8	15070	37.56	102.95	135.49	62.61
2000-01	4135	4284.9	14767	28.00	103.63	121.72	48.43
2001-02	4735	4898.6	14962	31.65	103.46	127.97	51.63
9th Plan AAGR	-0.88	-4.54	-4.99	5.73	-3.52	0.23	3.32
2002-03	4494	4630.9	14621	30.74	103.05	124.35	48.20
2003-04	5631	5776.1	15049	37.42	102.58	132.18	65.35
2004-05	6042	6192.8	15078	40.07	102.50	134.67	70.72
2005-06	5682	5878.3	15074	37.69	103.45	130.76	62.41
2006-07	6365	6543.2	14838	42.90	102.80	136.24	81.22
10th Plan AAGR	6.71	6.54	-0.15	6.72	-0.13	1.33	11.11
2007-08	6418	6567.3	14687	43.70	102.32	139.01	88.64
2008-09	6506	6714.3	14941	43.55	103.20	138.26	95.27
2009-10	6892	7162.2	14972	46.03	103.93	143.01	110.95
2010-11	7140	7421.2	15119	47.22	103.94	145.82	123.54
2011-12	7887	8227.5	15237	51.76	104.32	147.77	124.17
11th Plan AAGR	4.44	4.75	0.54	3.89	0.29	1.65	8.99

- **Financial Progress under NFSM-W in the 11th & 12th FYP**

The financial progress under NFSM-W in Madhya Pradesh is presented in table 3. it is observed from data that amount released as well as expenditure incurred during 11th FYP have been found to be increased from Rs 261.1 (2007-08) to 317.4 lakh (2011-12) and Rs 60.9 (2007-08) to 380.8 lakh (2011-12) with the growth of 5.28 and 93.75 per cent respectively. The percent achievement of amount released was also found to be increased by 23.32 (2007-08) to 119.97 per cent (2011-12) in 11th FYP which was found maximum in the year 2009-10 (148.96%) under NFSM-W in Madhya Pradesh.

Table 3: Financial Progress under NFSM-W in Madhya Pradesh

Year	Amount Released	Achievement (Expenditure)	Percentage of Achievement
	(Rs. in lakhs)	(Rs. in lakhs)	
2007-08	261.1	60.9	23.32
2008-09	261.8	255.8	97.71
2009-10	250	372.4	148.96
2010-11	280	288.9	103.18
2011-12	317.4	380.8	119.97
11th Plan Avg. AGR	5.28	93.75	
2012-13	2851.95	1345.7	47.19
2013-14	3223.3	957	29.69

Table 4: Category wise Interventions Outlay and Expenditure for Wheat in the 11th FYP in Madhya Pradesh (2007-08 to 2011-12)

Interventions	Fin Target	Fin Achievement	Percentage Achievement
Demonstrations	1536.36 (5.65)	1247.47 (7.82)	81.20
Distribution on subsidy	5735.66 (21.11)	2856.94 (17.92)	49.81
Farm Machines	4632.04 (17.05)	2382.60 (14.94)	51.44
Farmers Training	634.48 (2.34)	492.99 (3.09)	77.70
IPM	0.00	0.00	0
Local Initiatives	3414.75 (12.57)	2034.17 (12.76)	59.57
Micro nutrients	3564.01 (13.12)	1780.75 (11.17)	49.96
Production Subsidy	0.00	0.00	0
Project Management Teams	1198.74 (4.41)	543.83 (3.41)	45.37
Publicity	378.00 (1.39)	0.00	0.00
Seed minikits	0.00	0.00	0
Soil Amendments (Lime/Gypsum)	896.92 (3.30)	297.06 (1.86)	33.12
Water Management	5180.60 (19.70)	4308.72 (27.02)	83.17
Training of Extension workers	0.00	0.00	0
Total	27171.55 (100.00)	15944.52 (100.00)	58.68

The financial target of the integrated pest management (IPM), production subsidy, seed minikit and training of extension workers in NFSM-W in Madhya Pradesh were not set consecutively for the last five years i.e. from 2007-08 to

2011-12. However, the financial target of Rs 378.00 lakh was set during 11th FYP under the publicity intervention but nothing can be achieved and the whole amount under this intervention lapsed without utilization. The percent achievement of financial targets for wheat in the 11th FYP in Madhya Pradesh amongst the different interventions was found to be maximum in water management (83.17%) followed by demonstration (81.20%), farmers training (77.70%), local initiatives (59.57%), farm machines (51.44%), micro nutrients (49.96%), distribution on subsidy (49.81%), project management team (45.37%) and soil amendments (33.12%). In total, only 58.68 per cent achievement has been observed out of total financial targets (Rs. 27171.55 lakh) under NFSM-W in Madhya Pradesh during 11th FYP (Table 4).

- **Correlation between Per Cent Change in NFSM-W Expenditure and Irrigation / Fertilizer**

The correlation between percentage change in NFSM-W expenditure and percentage change in net irrigated area, and percentage change in NFSM-W expenditure and percentage change in fertilizer consumption in Madhya Pradesh has also been analyzed and found that there were significant positive and high correlation between the percentage change in NFSM-W expenditure and percentage change in net irrigated area (0.84), and percentage change in NFSM-W expenditure and percentage change in fertilizer consumption (0.81) in Madhya Pradesh (Table 5).

Table 5: Correlation between Per Cent Change in NFSM-W Expenditure and % Change in net Irrigation / Fertilizer Consumption

Year	% Change Total NFSM-W Expenditure	% Change of Net Irrigated Area	% Change of Fertilizer consumption
Change over 2007-08			
Change over 2008-09	0.27	0.84	9.14
Change over 2009-10	-4.51	1.37	7.48
Change over 2010-11	12.00	5.92	16.46
Change over 2011-12	13.36	3.60	11.34
Correlation Coefficient	-	0.838*	0.809*

*Significant at 10 percent

Table 6: Correlation between % change in NFSM-W Expenditure and % Change in Area & Production of Wheat

Year	% Change Total NFSM-W Expenditure	% Change of Area Lakh Ha	% Change Production '000 Tonnes
Change over 2007-08			
Change over 2008-09	0.27	-4.05	-14.16
Change over 2009-10	-4.51	-2.23	8.06
Change over 2010-11	12.00	11.50	21.88
Change over 2011-12	13.36	3.89	4.00
Correlation Coefficient	-	0.815*	0.438 ^{ns}

*significant at 10 per cent, NS=non-significant

The correlation between percentage change in total NFSM expenditure and percentage change in area, and percentage change in total NFSM expenditure and percentage change in production for wheat in Madhya Pradesh has also been analyzed and found that there were significant positive and high correlation between the percentage change in total NFSM expenditure and percentage change in area (0.82), while the correlation between percentage change in total NFSM expenditure and percentage change in production (0.44) for wheat was found non-significant positive but moderate in Madhya Pradesh (Table 6).

• SUMMARY AND CONCLUSIONS

NFSM-W was introduced in 11th FYP (2007 to 2012) in the country. The impact of NFSM-W was found quite satisfactory in Madhya Pradesh as the growth of area, production and productivity of wheat increased manifold in 11th FYP as compared to 9th and 10th FYP. The irrigation intensity, cropping intensity and fertilizer consumption were also showed more growth in 11th FYP as compared to 9th and 10th FYP. It clearly shows the positive impact of different interventions taken under NFSM-W. The financial progress as regards to percentage achievement over amount released under NFSM-W was also increased from 23.32% (2007-08) to 119.97% (2011-12) during the 11th FYP. However, the financial targets of IPM, production subsidy, seed minikit and training of extension workers were not set by the implementing agency and under publicity sector nothing can be achieved. Hence, it can be suggested that the intensive publicity campaign is needed to be undertaken as majority of the beneficiary farmers was relying on the State Agriculture Department for information. Use of standard marketing strategy with wide use of electronic and print media will bring increased awareness among all the categories of farmers and improve the coverage along with delivery of the service. The capacity building for farmers, field level workers, technical officers and developing orientation skills of all the stake holder in the context of changing world in agriculture need to be intensified. More and more training programmes for all the stakeholders are needed to be organized. There is a need to involve PRIs and other voluntary organizations in the selection of beneficiaries to make the NFSM-W more wide and transparent, which will help in improving the delivery system. There are many success stories in the implementation of the programme of the mission. Some of such stories may be documented and used for propagation/publicity of the programme.

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