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An economics of paddy during pre-and post-National Food Security Mission in Bhandara District of Maharashtra

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ABSTRACT

National Food Security Mission (NFSM) was implemented with an objective to increase the productivity of major cereals and pulses including paddy by providing inputs like seeds, fertilizers, implements, irrigation facility, etc. It resulted in shift in cropping pattern and realization of higher net return. This study was conducted in Bhandara District of Maharashtra to assess the impact of NFSM on net return of paddy crop. A total of 50 samples including 35 small and 15 medium farmers were selected from the highest paddy producing block viz. Bhandara block out of seven blocks of the Bhandara District. The period of study for pre NFSM and post NFSM was 2006-07 and 2010-11, respectively. The total investment was highest on small farms followed by medium farms in both pre NFSM and post NFSM period. It was Rs.66834 and Rs.61835 per hectare on small and medium farms which was found to be higher as compared to pre NFSM investment of Rs.28255 and Rs.27097 per hectare in small and medium farms respectively. The price of paddy in post NFSM was found to be relatively higher than that of pre NFSM price in the study area. Net income and output-input ratio was higher in post NFSM. Thus, average incremental net income was Rs.9065 per hectare realizing that paddy cultivation after NFSM was economically viable and profitable over pre NFSM in the study area. Benefit cost ratio of paddy production in post NFSM was found to be higher than that of the pre NFSM. The increased B:C ratio clearly indicated the positive impact of NFSM on paddy production. Irrigation facility served as a catalyst in paddy production.

Key words: Benefit cost ratio, investment, cost, NFSM.

Paddy is the staple food for about 50 per cent of the population in Asia, where 90 per cent of the world's rice is grown and consumed. Asia's food security depends largely on the irrigated rice fields, which account for more than 75 per cent of the total rice production (Virk *et al.,* 2004). India requires to increase rice production by 3 million tonnes every year to ensure food security (Dass *et. al.,* 2015). Rice is the second important crop after Jowar in Maharashtra state. This is grown over an area of 14.99 lakh hectares with an annual production of 32.37 lakh tones. The average productivity of the state is 2.01 t ha^{-1}. Maharashtra ranks 13th in paddy production in the country. The total area under rice crop remained stable around 15 lakh ha and production around 24 lakh tones with 1.7 to 1.9 t ha^{-1} productivity during last 15 years in the state (Thaware *et al.*, 2010). The sustained growth of any processing industry depends on the viability which is largely determined by the cost of production and management efficiency in processing. Cost of production is an important variable that influences the profits, which are also an indicator of management efficiency (Shwetha *et al.*, 2011). Therefore, the present study is an attempt to find cost and return, cost concept, profitability and productivity of paddy by implementation of the

National Food Security Mission (NFSM). Cost and returns received from cultivation of rice by non beneficiaries and beneficiaries of NFSM was taken into consideration for assessing the change in production by National Food Security Mission. The investigations also envisaged the constraints of production and productivity related to rice crop.

Materials and Methods

The study was conducted in Bhandara District of Maharashtra. Bhandara district under East vidarbha region of Maharashtra was selected purposively for National Food Security Mission on rice production. Paddy is the main crop in Bhandara district and occupied the maximum area under *kharif* season (*i.e.* 70.12%). The Bhandara district comprises of seven blocks out of which, Bhandara block was selected purposively (having highest production) for rice crop. In Bhandara block there are 142 villages (2010-11), a list of paddy producing villages was prepared and two villages were selected purposively. In both villages paddy growers were categorized under small and medium farmers and the list of paddy growers was prepared. In the selected villages it was observed that most of the farmers were having very small land holdings. The farmers were categorized into two size groups as small farmers (up to 2 ha) and medium farmers (above 2.01 ha) only for the purpose of this study. Therefore, 35 farmers from small farmers category and 15 farmers from medium farmers category were selected for the study. For the collection of required primary data survey method was adopted to conduct the enquiry by personal visits and interview schedule used to collect the relevant information from the respondents for the study *i.e.* cost of production of paddy (Pre NFSM and Post NFSM). The relevant information pertains to the agriculture year 2010-11 for the primary data and the period of study for Pre NFSM and Post NFSM was 2006-07 and 2010-11, respectively.

The cost concepts approach to farm costing is widely used in India (Raju V.T and Rao D.V.S., 1990). These cost concepts include Cost A_1, Cost A_2, Cost B_1, Cost B_2, Cost C_1, Cost C_2 and Cost C_3. Various costs have been worked out by applying following concepts :

Cost A_1 = All actual expenses in cash and kind incurred in production

Cost A_2 = Cost A_1 + Rent paid for leased in land

Cost B_1 = Cost A_1 + Interest on value of owned capital assets

Cost B_2 = Cost B_1 + Rental value of owned land and rent paid for leased in land

Cost C_1 = Cost B_1 + Imputed value of family labour

Cost C_2 = Cost B_2 + Imputed value of family labour

Cost C_3 = Cost C_2 + 10% of Cost C_2

Results and Discussion

The analysis revealed that paddy has been highly labour intensive crop during pre NFSM period, the labour cost accounted for 53.09 per cent of the total cost which varied from 53.13 per cent in small farm to 53.04 per cent in large farm (Table 1). Among material cost, fertilizer contributed to about one-third of the total cost which was lowest (Rs. 978/ha) in medium farm and highest being in large farm (Rs. 1026/ha). Seed, manure and plant protection together contribute 8.36 to 8.43 per cent of the total cost for different size groups. In the first decade of 21st century there was decline in the production of paddy. To increase the production the HYV of paddy are introduced and for that there was a need of more fertilizer, more irrigation. On introduction of the mission there was an increase in the cost of irrigation than in earlier period (Birthal *et. al.* 2010). Therefore, the irrigation cost was zero during pre NFSM period because of lack of irrigation facilities before the national food security mission. There was completely rain fed cultivation of paddy. Interest on working capital was to the extent of 6.51 per cent of total cost on various sizes of farms. Average rental value of land fixed items was shared nearly about 11.66 per cent of the total cost revealed increasing trend with farm size in absolute terms.

Post NFSM period, there was reduction in the proportion of the labour cost which accounted to 50.15 per cent of the total cost which varied from 50.48 per cent in small farm to 49.79 per cent

Table 1. Cost of cultivation of paddy crop

S. No.	Particulars	(Rs/ha)					
		Pre NFSM			Post NFSM*		
		Small	Medium	Overall	Small	Medium	Overall
A	Labour cost						
	Human labour						
	Family	5012	4019	4515.5	9600	8690	9145
	Hired	3200	3800	3500	6059	6155	6107
	Machinery cost						
	Owned	Nil	668	334	2667	1997	2332
	Hired	1900	1000	1450	10300	9133	9716.5
	Bullock cost	4902	4887	4894.5	5114	4814	4964
	Total labour cost	15014	14374	14694	33740	30789	32264.5
B	Material cost						
	Seed	740	704	722	1421	1343	1382
	Plant protection	822	782	802	2063	1980	2021.5
	Organic manure	821	781	801	1289	1255	1272
	Irrigation	Nil	Nil	Nil	250	216	233
	Fertilizers	1026	978	1002	4170	3891	4030.5
	Total material cost	3409	3245	3327	9193	8685	8939
C	Total operating cost	18423	17619	18021	42933	39474	41203.5
	Interest on working capital @ 10%	1842.3	1761.9	1802.1	4293.3	3947.4	4120.3
D	Fixed cost						
	Rental value ($1/6^{th}$ of gross income)	3403	3050	3226.5	10677	9804	10240.5
	Revenue/Tax	25	25	25	25	25	25
	Depreciation	1500	1700	1600	1600	1800	1700
	Interest on fixed cost @10%	492.8	477.5	485.15	1230.2	1162.9	1196.55
E	Total fixed cost	5420.8	5252.5	5336.65	13532.2	12791.9	13162.1
F	Total cost (cost C_2)	25686.1	24633.4	25159.7	60758.5	56213.3	58485.9
	Managerial cost @10% of total cost	2568.61	2463.34	2515.97	6075.85	5621.33	5848.59
G	Cost C_3	28254.7	27096.7	27675.7	66834.3	61834.6	64334.4

Note : *in post NFSM shows *Kharif* paddy + Summer paddy.

in large farm. Among average material cost, 2.15 per cent of seed, 3.14 per cent of protection measures, 1.97 per cent of manures, 0.36 per cent of irrigation and highest among material cost *i.e.* 6.26 per cent of fertilizers were responsible in increasing total cost. Interest on working capital was to the extent of 6.40 per cent of total cost on various sizes of farms. Average rental value of land contributes about 15.92 per cent of the total cost which revealed increasing trend with farm size in absolute terms. Indicating the intensive cultivation of paddy crop by sample farmers.

The table 2 clearly shows that on an average total cost of (cost C_3) Rs. 27675.73 per hectare was required to produce paddy crop of which 59.97 per cent comprised for the variable cost commonly known as cost A_1. After adding interest on fixed capital to cost A_1, the cost went up to 61.73 per cent as cost B1 and when imputed value of land was further added it was increased up to 73.38 per cent. Thus, the remaining 26.62 per cent comprised of imputed value of family labour, and 10 per cent cost of the cost C_2 when added in this cost, it form total cost or cost C_3.

Table 2. Cost of cultivation of paddy crop cultivated during pre NFSM and post NFSM.

S. No.	Particulars	(Rs / ha)							
		Pre NFSM				Post NFSM			
		Small	Medium	Overall	By CACP	Small	Medium	Overall	By CACP
1	Cost A_1	16778	16418	16598	19462	36584	34559	35571	33169
2	Cost B_1	17271	16896	17083	20928	37814	35722	36768	36614
3	Cost B_2	20674	19946	20310	24604	48491	45526	47008	43010
4	Cost C_1	22283	21583	21933	24064	50081	46409	48245	42503
5	Cost C_2	25686	24633	25159	27740	60758	56213	58485	48899
6	Cost C_3	28254	27096	27675	27740	66834	61834	64334	48899

Table further inferred that cost A_1 to cost C_3 decreases with the increase in size of holding. The per cent of various costs to cost C_3 did not show any significant difference among different farms in cultivation of paddy on sample farm.

After the National Food Security Mission was implemented in the district all costs observed to have increased mostly because of irrigation cost which was earlier not so significant. One as the paddy was grown mostly in irrigated conditions. Here on an average total cost of (cost C_3) Rs. 64334.49 per hectare was required to produce paddy crop of which 55.29 per cent comprised variable cost commonly known as cost A_1. After adding interest on fixed capital to cost A_1, the cost went up to 57.15 per cent as cost B1 and when imputed value of land was further added it was increased up to 73.06 per cent. Thus, the remaining 26.94 per cent comprised of imputed value of family labour, and 10 per cent cost of the cost C_2 when added in this cost, it forms total cost or cost C_3. Table 2 further shows that cost A_1 to cost C_3 decreases with the increase in size of holding. The comparison of computed cost with the cost declared by CACP reveals that before the implementation of security mission, the cost was more than the actual cost but after the implementation of NFSM it seems to be lesser than the actual cost required.

The B:C ratio of paddy in small farms increased from 1.11:1 in pre NFSM to 1.15:1 in post NFSM and in medium farms it increased from 1.07:1 in pre NFSM to 1.12:1 in post NFSM (Table 3). The increased B:C ratio clearly indicated the positive impact of NFSM on paddy production.

The Triennium Average (TE) of minimum support price (MSP) of rice from 2003-04 to 2005-06 was Rs. 563.33 which increased at a rate of Rs. 10 only for the given three years. But the TE of MSP for the post NFSM period i.e. from 2006-07 to 2008-09 was 691.66 that increased at the rate of Rs. 135 per year. This is due to the implementation of NFSM which encouraged farmers to take up recommended package of practice that increased the cost of cultivation. As a result Government had to increase the MSP.

Table 3. Benefit - cost ratio of paddy crop cultivated under pre NFSM and post NFSM period.

S. No.	Particulars	(Rs / ha)					
		Pre NFSM			Post NFSM		
		Small	Medium	Overall	Small	Medium	Overall
1	Gross income	31515	29106	30310	76947	69849	73398
2	Total cost	28254.7	27096.7	27675.7	66834.3	61834.6	64334.4
3	Net income	3260.3	2009.3	2634.3	10112.7	8014.4	9063.6
4	B:C ratio	1.11:1	1.07:1	1.09:1	1.15:1	1.12:1	1.14:1

Summary and Conclusion

The investment in paddy production was more on small farms than that on medium farms in both pre NFSM and post NFSM periods in the study area. During pre NFSM period it was Rs. 28255 and Rs. 27097 per hectare for small and medium farmers respectively. But during post NFSM period it increased to Rs. 66834 and Rs. 61835 per hectare in case of small and medium farmers respectively. The price of paddy (MSP) set up by government was increased as cost of cultivation increased during post NFSM period. The small and medium farmers received incremental average net income during post NFSM period an average increment of Rs. 9065 per hectare during post NFSM period over the pre NFSM period. Benefit cost ratio (B:C) of small and medium farmers during pre NFSM period was 1.11:1 and 1.07:1 respectively. During post NFSM period, B:C ratio increased to 1.15:1 and 1.12:1 for small and medium farmers, respectively.

It shows that NFSM programme was significant impact on improving economic viability and profitability of paddy production in the study area. The higher yield of paddy through NFSM was due to quality seeds, proper irrigation, proportionate fertilizer use, adequate plant protection measures, etc. that were recommended through the programme. Promotion and adoption of these technologies through NFSM in more paddy growing areas of the region will boost up income generation and better standard of living of farmers. This can help to avoid crop failures and add a service to humanity by reducing number of suicidal events by farmers which is a major concern of the region.

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