Impact of Watershed Management Technology and Development Programme in Tikamgarh District of Madhya Pradesh (India)

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Abstract: The present study attempts to examine the "Impact of watershed management technology and development programme in Tikamgarh District of Madhya Pradesh (India)". The specific objectives were to study the cropping pattern, cropping intensity, production, cost and returns and cost-benefit ratio on the farms of different sizes in watershed (WSA) and non-watershed (non-WSA) areas. A multi-stage random sampling technique was used. A sample of two villages each from WSA and non-WSA areas was selected from the block of the Tikamgarh district. The sample consisting of 50 farmers from each of the categories of WSA and non-WSA areas as selected randomly making a total of 100 farmers. The farmers were grouped under three size groups, viz., small (less than 2 ha), medium (2 ha to 4 ha) and large (4.1 ha and above) farms. The data were collected by survey method during the agricultural year 2000—2001. The study showed that the average cropping intensity was higher in WSA than in non-WSA area. The average cost of production per quintal worked out to be lower in WSA area than in non-WSA area. The input cost, gross returns and net returns per ha of various crops in small, medium and large farms were higher in WSA area as compared to non-WSA area. Net returns per ha from the crops were higher in WSA as compared to non-WSA areas. The gross and net returns per ha increased more than proportionately as compared to the increased in production cost. The returns on per rupee of investment of crops were also higher in WSA as compared to non-WSA areas. The cost-benefit ratios in small, medium and large farms were also higher in WSA as compared to their counter parts in non-WSA areas. Farmers in WSA area adopted improved technology, thanks to financial assistance provided to them through subsidy and they used higher level of farm inputs like fertilizers, improved seeds and plant protection measures which in turn resulted in increased gross returns, net returns, family labour income and farm business income on this farms. The profit was higher for the small, medium and large farms in WSA areas, indicating the better impact of watershed management technology on crop productivity. There had been the positive impact due to adoption of watershed management and development programme in raising the level of income, employment and productivity.

Keywords: cropping intensity, cost-benefit ratio, impact, watershed technology

1 Introduction

In India, watershed development project is taken up under various programmes launched by the Government of India. The Drought Prone Area Programme (DPAP) and Desert Development Programme (DDP), adopted watershed approach in 1987. the Integrated Watershed Development Project (IWDP) in 1989 under National Watershed Development Board, National Watershed Programme in Rainfed Areas (NWPRA) under Ministry of Agriculture and Integrated Wastelands Development Programme in 1996 under Ministry of Rural Development and Employment. At present, ongoing 4 central schemes IWDP, DPAP, DDP and NWDPRA have been merged into a new scheme called Bhoomi Vikas Yojana under a common guideline (Guideline for Watershed Development, 1995), which envisages bottom-up approach. The main aim is to manage the land and water resources for sustained production.

The Govt. of Madhya Pradesh had launched the Rajiv Gandhi Mission for Watershed Development Project on 20th August, 1994 and has been operating since 1st April, 1995 with the objectives of

augmentation and conservation of soil and water resources (inclusive of surface as well as ground water) in rainfed areas as a means of proving sustainable livelihood to the rural population by reducing the vulnerability to droughts and by increasing the productivity of sterile soil in the state. The mission having aims like maximize people's participation in the concept, planning and implementation of land and water conservation schemes in their watershed area, to make the entire crop of schemes both more effective as well as transparent in their working. To check ecological degradation and improve the environmental resource base. To promote the economic development of the village community, employment generation and development of the human and other economic resources of the village in order to promote saving and other income generation activities. The watershed programme was started in Tikamgarh Distt. in 1997. The Rajiv Gandhi Watershed Technology Mission was helpful in increasing yields, income and gainful employment of the farmers in this region.

Keeping in view the Impact of Watershed Management Technology and Development Programme in Tikamgarh District of Madhya Pradesh, the present study was conducted with the following objectives:

(1) To study the farm structure, cropping pattern and cropping intensity on the farms of different sizes in WSA and non-WSA areas.

(2) To work out the cost of production of different crops on he farms of different sizes in WSA and non-WSA areas.

(3) To work out the cost and returns and benefit-cost ratio of different crops on the farms of different sizes in WSA and non-WSA areas.

2 Methodology

A multi-stage random sampling technique was used to select the Tehsil, Block, Villages and the Cultivators. Micro-watershed in Baldevgarh block of Tikamgarh district of Madhya Pradesh was purposively selected to represent a case study. A sample of two villages each from Rajiv Gandhi Watershed Technology Mission and non-WSA areas was selected from Baldevgarh block of Tikamgarh district. The sample consisting of 50 farmers from each of the categories of WSA and non-WSA areas in Micro-Watershed was selected randomly making a total of 100 farmers. The farmers were grouped under three-farm size groups viz., small (up to 2 ha), medium (2.1 ha to 4 ha) and large (4.1 ha and above). The number of farmers in each size group was kept in proportion to their number of falling in each size group. The data were collected by survey method through direct personal interview with the respondents during the agricultural year 2000—2001 under Rajiv Gandhi Watershed Technology Mission.

3 Cropping systems and cropping intensity

Rajiv Gandhi Watershed Technology Mission could play a vital role in changing the cropping pattern of the area to one that approached optimum. The net sown area, average size of holding, gross cropped area and cropping intensity on he farms of different sizes in WSA and non-WSA areas are given in Table 1.

Table 1, reveals that the overall average size of holding in WSA and non-WSA area came to 3.05 ha and 2.84 ha, respectively. The average cropping intensity worked out to 176.33% in WSA as compared to 163.86% in non-WSA area. The average cropping intensity in WSA area was higher by 12.47% than in non-WSA area. The WSA helped in a shift in the cropping pattern, increase in the productivity of crops in favour of high yielding varieties of commercial crops and considerable improvement in cropping intensity with the advent of conjunctive use of water which in turn resulted in higher income levels.

4 Cost and returns on different crops in WSA and non-WSA areas

The cost structure in crop production included the cost of production inputs like seed, manure and fertilizers, plant protection measures, land rent and overhead cost comprising interest on the working and fixed capital, repairs and depreciation, etc. The cost and returns of various crop enterprises on farms of different sizes in WSA and non-WSA areas are given in Table 2.

Table 1 The net sown area, average size of holding, gross cropped area and in cropping intensity on the farms of different sizes in WDP and non-WDP area

Particulars	Farm size group	Net sown area (ha)	Average size of holding (ha)	Gross cropped area (ha)	Cropping intensity in per-centage
Watershed area	Small	19.00	1.26	34.00	178.90
	Medium	42.40	2.82	75.00	176.88
	Large	76.20	5.08	132.00	173.22
	Total/ average	137.60	3.05	241.00	176.33
Non-watershed area	Small	18.00	1.20	30.00	166.66
	Medium	39.10	2.60	64.00	163.68
	Large	70.70	4.71	114.00	161.24
	Total/ average	127.80	2.84	208.00	163.86

WSA = Watershed area; Non-WSA = Non-Watershed area

Table 2, reveals that input cost, gross returns and net returns per hectare of various crops were higher in WSA as compared to non-WSA areas. The overall average net returns per hectare of paddy, urd, wheat and gram were worked out at *Rs*.3,550.00, *Rs*.4,769.00, *Rs*.5,087.00 and *Rs*.5,077.00 in WSA areas as compared to *Rs*.2,352.00, *Rs*.1,937.00, *Rs*.3,306.00 and *Rs*.2,980.00, respectively in non-WSA areas. The net returns per hectare of these crops were higher in WSA areas as compared to non-WSA areas. The input cost, gross returns and net returns per hectare of various crops on small, medium and large farms were also higher in WSA areas as compared to non-WSA areas.

The average cost-benefit ratio of paddy, urd, wheat and gram were calculated as 1:1.57,1:2.00, 1:1.77 and 1:1.96 in WSA areas as compared to 1:1.47, 1:1.46, 1:1.64 and 1:1.70, respectively in non-WSA areas. The returns on per rupee of investment of these crops were higher in WSA areas as compared to non-WSA areas. Cost-benefit ratio at their respective levels had given the right indications that the impact of WSA was significantly higher on small, medium and large farms by growing paddy, urd, wheat and gram crops. The better use in the availability of water through Micro-Watershed resulted in higher use of inputs like human labour, bullock labour, improved seeds, plant protection measures, and chemical fertilizers, resulting in increased productivity on beneficiary farms. The gross income, net income and return per rupee of investment were significantly higher after the implementation of Rajiv Gandhi Watershed Technology Mission.

The overall average cost of production per quintal of paddy, urd, wheat and gram were worked out at *Rs*.334.00, *Rs*.656.00, *Rs*.348.00 and *Rs*.584.00 in WSA areas as compared to *Rs*.347.00, *Rs*.898.00, *Rs*.377.00 and *Rs*.679.00, respectively in non-WSA areas. The cost of production per quintal of these crops was also lowest in WSA areas as compared to non-WSA areas.

The results of the study suggested that appropriate steps needed to be taken by the farmers for rational use of cultivated land, wasteland, forests and other common property resources. Soil and water conservation practices adopted by the farmers under Rajiv Gandhi Watershed Technology Mission approach should be undertaken. The productivity of crops must be increased by using modern inputs like high yielding varieties of seeds, chemical fertilizers, irrigation and plant protection measures, etc. The co-ordination of farmers and government functionaries, land development activity were some of the measures for improving the WSA. Better co-ordination between development agencies and voluntary organizations is also essential for effective implementation of the Rajiv Gandhi Watershed Technology Mission.

Table 2 Per hectare input cost, gross returns, net returns, cost-benefit ratio and cost of production per quintal of various crop enterprises on the farms of different sizes in WSA and non-WSA areas

Farm size group	Crop	Input cost (*Rs.*)		Gross return (*Rs.*)		Net returns (*Rs.*)		Cost-benefit ratio		Cost of production per quintal (*Rs.*)	
		WSA	Non-WSA	WSA	Non-WSA	WSA	Non-WSA	WSA	Non-WSA	WSA	Non-WSA
Small	Paddy	5,434	4,224	6,480	4,840	1,047	616	1: 1.19	1: 1.14	418	472
Medium	Paddy	3,545	4,906	9,700	5,945	3,155	1,039	1: 1.48	1: 1.21	364	377
Large	Paddy	6,969	5,918	15,080	12,350	8,111	6,432	1: 2.16	1: 2.08	249	258
Overall	Paddy	6,188	4,903	9,738	7,255	3,550	2,352	1: 1.57	1: 1.47	334	347
Small	Urd	4,327	3,638	8,220	4,780	3,893	1,142	1: 1.89	1: 1.31	698	976
Medium	Urd	4,593	3,993	4,690	6,380	5,097	2,387	1: 2.10	1: 1.59	629	832
Large	Urd	5,254	4,772	10,570	7,060	5,316	2,280	1: 2.01	1: 1.48	656	900
Overall	Urd	4,725	4,134	9,494	6,073	4,769	1,937	1: 2.00	1: 1.46	656	898
Small	Wheat	5,997	3,978	9,290	5,550	3,293	1,572	1: 1.54	1: 1.39	400	442
Medium	Wheat	6,564	5,393	11,160	8,050	4,596	2,657	1: 1.70	1: 1.49	365	415
Large	Wheat	7,054	6,081	14,425	11,770	7,371	5,689	1: 2.04	1: 1.95	300	317
Overall	Wheat	6,538	5,130	11,625	8,457	5,087	3,306	1: 1.77	1: 1.64	348	377
Small	Gram	4,558	3,489	6,900	4,580	2,342	1,891	1: 1.51	1: 1.31	760	872
Medium	Gram	5,240	4,332	11,460	6,900	6,220	2,568	1: 2.18	1: 1.59	543	722
Large	Gram	5,980	5,018	12,650	10,360	6,670	5,279	1: 2.11	1: 2.06	524	558
Overall	Gram	5,259	4,279	10,337	7,280	5,077	2,980	1: 1.96	1: 1.70	584	679

WSA = Watershed area; Non-WSA = Non-watershed area

Table 3 Per hectare values of net income, family labour income and farm business income of various crop enterprises on the farms of different sizes in WSA and non-WSA and non-WSA areas

Farm size group	Crop	Net Income		Family labour income		Farm business income	
		WSA	Non-WSA	WSA	Non-WSA	WSA	Non-WSA
Small	Paddy	1,047	200	1,790	807	3,940	2,522
Medium	Paddy	3,155	389	4,085	1,032	6,355	2,965
Large	Paddy	8,111	3,507	8,924	4,191	11,564	6,511
Overall	Paddy	2,521	281	3,323	903	5,572	2,802
Small	Urd	3,893	242	4,496	742	6,646	2,457
Medium	Urd	5,097	1,187	5,701	1,700	7,971	3,630
Large	Urd	5,316	953	5,943	1,711	8,583	4,030
Overall	Urd	4,205	666	4,798	1,169	7,047	3,067
Small	Wheat	3,293	642	4,088	1,523	6,238	3,138
Medium	Wheat	4,596	1,907	5,430	2,597	7,700	5,030
Large	Wheat	7,371	4,422	8,192	5,119	10,832	7,439
Overall	Wheat	4,611	2,525	6,568	4,084	7,673	5,099
Small	Gram	2,342	191	2,966	672	5,116	2,393
Medium	Gram	6,220	1,098	6,883	1,641	9,153	3,574
Large	Gram	6,670	3,137	7,363	3,718	10,003	6,038
Overall	Gram	4,237	1,184	4,880	3,700	7,129	3,609

WSA = Watershed area; Non-WSA = Non-watershed area

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