

Implications of Watersheds in Bringing Change in the Cropping System and its Productivity

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ABSTRACT

A study was conducted in Jammu district to observe the changes in cropping pattern in watershed areas. To get first hand information, 400 respondents were interviewed from two watershed areas. It was observed that the availability of irrigation water in wells was increased in both the sites. But, recharge of wells was faster in case of watershed-2 as compared to watershed-1. The highest positive changes were observed in the area of barley (11.67%) cultivation and negative change was observed in black gram (-6.67%) cultivation. The crop productivity of wheat and gram increased up to 43.33 and 23.08 percent, respectively after construction of watershed-1. In case of watershed-2, a decline in area of bajra and wheat was observed but the area under barley was increased up to 50.00 percent. The crop productivity of all crops was increased in the range of 15.56 to 77.78 percent. The area and productivity of vegetable crops drastically increased after construction of watersheds but highest changes were observed in watershed-2, as farmers using participatory management, were shifting from food grain to vegetable crops as they wanted regular cash flow to meet their family needs.

Key words : *Cropping pattern; Participation; Productivity; Vegetable, Watershed;*

About two-thirds of the country's cultivated land currently depends exclusively on rainfall, which is often erratic and poorly distributed. Water, soil and vegetation are the most vital natural resources for the survival of people. Watershed forms an integral component of these basic, natural resources. Watershed conditions influence the productivity of food, fuel, fodder, fiber and fruits. Growing demand for these items has extensively depleted the protective vegetative cover and exposed surface soils, which has resulted in partial to complete loss of nutrients and thereby reducing productivity and endangering vital life, support system. Experiences of many have also indicated that it is not very difficult to organise people around a profitable activity for some time but sustaining of such interest for a long period has been difficult. Mobilization of people's participation would need much more intensive interaction while the communities would be needed to be involved in the process of planning, execution and management of the watershed to the extent possible. It is well known fact that after construction of watershed the water for irrigation was increased, which brings the changes in cropping pattern and increases the crop productivity in the respective watershed areas. Hence, an attempt was made to see the cropping pattern

and crop productivity before and after watershed construction in Jammu district.

METHODOLOGY

The study was conducted in Jammu district. The district had 2 watersheds namely Akhnoor (no involvement of people in planning and management stage) and Bari-Badhori (people participated in each stage of management). Fourteen out of 72 villages under the command area of Akhnoor watershed were selected randomly to represent the whole watershed area. Where as, all 6 villages of Bari-Badhori watershed were selected for the investigation. From each watershed area, 200 respondents were selected randomly. In total 400 respondents from 20 villages were interviewed to get the first hand information. Here, Akhnoor (no involvement of people in planning and management stage) and Bari-Badhori (people participated in each stage of management) were quoted as watershed-1 and watershed-2, respectively in the entire study.

RESULTS AND DISCUSSION

Change in cropping pattern and crop productivity : The main aim of any watershed is to recharge the ground water and increased availability of water for irrigation.

The availability of irrigation water in wells was increased at both the sites. Prior to watershed project the water level was at 180 to 190 feet from the surface and after grounding of watershed programme, it came upto 140 to 150 feet. Thus, the availability of water in wells was increased equally at both the sites. Where as, recharge of well was faster in case of watershed-2 as comparision to watershed-1.

After established of watershed, the water availability for irrigation was increased, which brought the changes in cropping pattern and increased the productivity. To

obtain the effect, the data was collected on food grain and vegetable crops.

a) Food grain crops : The data presented in Table 1 indicated that total area under food grain crops increased after implementation of watershed-1. The positive changes were observed in the area of barley (11.67%), gram (5.00%) wheat (1.88%) and maize (1.18%), cultivation. Where as negative change was observed in case of black gram (-6.67%) and bajra (-0.62%) in case of watershed-1. Further, the crop productivity of wheat and gram was increased up to 43.33 and 23.08 percent, respectively after implementation of watershed-1

Table 1. Area and productivity of food grain crops in watershed-1

S.No.	Crop	Before watershed		After watershed		Change (%)	
		Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)
Watershed-1							
1	Maize	338	16.00	342	18.50	1.18	15.63
2	Bajra	162	14.00	161	17.00	-0.62	21.43
3	Barley	120	17.00	134	19.00	11.67	11.76
4	Wheat	850	15.00	866	21.50	1.88	43.33
5	Urd	150	8.00	140	9.00	-6.67	12.50
6	Gram	120	13.00	126	16.00	5.00	23.08
Watershed-2							
1	Maize	35	15.50	38	21	8.57	35.48
2	Bajra	20	12	18	16	-10.00	33.33
3	Barley	20	16	30	25	50.00	56.25
4	Wheat	850	22.50	800	26	-5.88	15.56
5	Urd	50	9	60	16	20.00	77.78
6	Gram	50	13	50	19	0.00	46.15

In case of watershed -2 data regarding food grain crops are presented in Table 1 which reveals that there was decrease in the total area under food grain crops after established of watershed-2. The decline changes were observed in the area of bajra (10.00%) and wheat (5.88%) but increase was observed in case of barley (50.00%) and black gram (20.00%). Further, the crop productivity of all crops increased in the range of 15.56 to 77.78 percent. Desai et.al. (1997) reported that the impact of NWDP brought the significant positive change in cropping pattern, creating and constructing rainfall utilization. Similar findings were also reported by Mohod et.al. (1997).

b. Vegetable crops : The data presented in Table 2 indicated that total area under vegetables increased after establishment of watershed-1. The major change in area was in case of chilly (23.08%), onion (11.11%) and potato. Further, the productivity of vegetable crops was drastically increased such as onion (40.00%), radish (39.10%), chilly (23.53%) after establishment of watershed-1. Although the area under onion and radish

did not increase as in other crops but the yield of vegetables increased up to 40.00 percent. Thus, it could be safe to say that yield of vegetables increased after establishment of watersheds.

Data regarding area and productivity of vegetable crops as presented in Table-2 which indicates that total area under vegetables increased after establishment of watershed-2 i.e. 60.00, 42.86, 25.00 and 14.29 percent in chilly, radish, potato and onion, respectively. But the area under turnip declined up to 16.67 percent.

While the productivity of vegetable crops significantly increased such as onion (60.00%), radish (35.71%), chilly (28.57%) and potato (23.53%) after establishment of participatory watershed. although the area under turnip was declined but the yield of that vegetable was increased up to 23.53 percent. Thus it could be safe to say that yield of vegetables was increased after construction of watershed. Chennamaneni (1998) reported that a positive impact on land use intensity in terms of cropping pattern, crop yields, human labour utilization, creation of assets, etc. occur in watersheds.

Table 2. Area and productivity of vegetables crops

S.No.	Crop	Before watershed		After watershed		Change (%)	
		Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)
Watershed-1							
1	Potato	630	182	665	195	5.56	7.14
2	Chilly	130	68	160	84	23.08	23.53
3	Radish	160	133	165	185	3.13	39.10
4	Turnip	250	170	253	206	1.20	21.18
5	Onion	180	60	200	84	11.11	40.00
Watershed-2							
1	Potato	200	170	250	210	25.00	23.53
2	Chilly	5	70	8	90	60.00	28.57
3	Radish	7	140	10	190	42.86	35.71
4	Turnip	12	170	10	210	-16.67	23.53
5	Onion	28	60	32	96	14.29	60.00

c. *Fruit trees* : The data presented in Table 3 indicated that, total area under fruits increased after establishment of watershed-1. The positive changes were observed in the area of guava and mango plantation i.e. 11.11 and 6.90 percent, respectively. Where as area under citrus plantation declined up to 10.83 percent. But the productivity of citrus increased up to 13.51 per cent after es-

tablissement of watershed-1 on the other side, area under citrus increased upto 52.00 percent, whereas 27 percent area under mango and guava plantation increased after establishing of watershed-2. Similar trend was also noticed in the productivity of fruit plants. Productivity of citrus was 50q/ha before watershed but later it went upto 75q/ha.

Table 3. Area and productivity of fruit plants/trees

S.No.	Crop	Before watershed		After watershed		Change (%)	
		Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)
watershed-1							
1	Mango	580	36.50	620	39.00	6.90	6.85
2	Guava	360	40	400	43.50	11.11	8.75
3	Citrus	240	37	214	42	-10.83	13.51
watershed-2							
1	Mango	100	37	127	50	27.00	35.14
2	Guava	40	38	51	51	27.50	34.21
3	Citrus	50	50	76	75	52.00	50.00

Finally, results reveal that the over all area under food grain, vegetable and fruits increased after implementation of watersheds. While, slight decline (3.30%) was observed in food grain crops in case of watershed-2, on the other hand area under fruits (33.68%) and vegetables (23.02%) increased in the watershed managed on participatory approach.

CONCLUSION

It is concluded that change in cropping pattern and

productivity was more in case watershed-2, which was managed by people in a participatory mode. Moreover, farmers participated in watershed gained more knowledge in all the direction, as a result shift from food grain crops to fruits and vegetables was observed. During the course of investigation, it was observed that potato, onion and chilly were the main vegetable crops whereas mango and citrus plants were mostly planted by majority of farmers in the study area.

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