Annals of Arid Zone 54(1&2): 35-38, 2015

Impact of National Watershed Development Program on Production System in Western Rajasthan

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Abstract: The present study was conducted in arid areas of Jaisalmer district of Rajasthan, where National Watershed Development Program (NWDP) for rainfed areas was launched. Total 150 beneficiaries were randomly selected from 30 watersheds. The respondents were personally interviewed with the help of pretested interview schedule. Study revealed that the drastic change was noted in agricultural production. Regarding change in area of crop it was found that before implementation of the project clusterbean (37.37%) was the principal crops followed by pearl millet (35.75%), sesame (8.73%) and mustard (6.38%), whereas after implementation of the project, clusterbean (32.29%) was main crop followed by pearl millet (28.72%), mung bean (11.34%), and mustard(6.03%). Total cropped area was increased by 30.09%. Regarding the yield, maximum yield was increased in case of wheat (94.56%) followed by sorghum (81.62%) and groundnut (43.84%).

Key words: Watershed, cropping pattern, kharif and rabi crops.

National Watershed Development Program (NWDP) for rainfed areas was launched by the department of watershed development and soil conservation in the year 1990-91. The objective of the project was restoration of ecological balance in rainfed areas and sustainable biomass production. Project has an important role in the present context because water management along with judicious use of water for raising crop is going to be instrument in sustainable agriculture production in our country and more, especially in Rajasthan. The problem of soil erosion is very severe in the state as most of the part of the state is rainfed and dry. NWDP was completed in 1996-97. Keeping this in view a study was conducted to assess critically the impact of NWDP on the implementing functionaries and policy makers. The study was under taken with specific objectives to assess impact of NWDP in terms of cropping pattern and yield levels.

Materials and Methods

Impact assessment study of micro watershed project was carried out in Jaisalmer district of western Rajasthan. Twenty watersheds executed by forest department and 10 watersheds executed by Zila Parisad were selected randomly from 128 and 61 executed micro-watersheds, respectively. Thus, 30 watersheds were covered under the study (Table 1 and 2). From each micro-watershed one village and from each village 5 beneficiaries were selected randomly. Thus total 150 samples beneficiaries' households were covered representing the various caste/community and land holding sizes.

Data were collected from head of the households through a specially designed interview schedule, focused group discussion, in depth interview, etc. during 2012-13. Beside primary data collection, block level and district level officials involved in the project were also contacted for detailed information in connection with the implementation of the program. The selected watersheds are described here.

Results and Discussion

Changes in area under major crops

Data presented in Table 3 reveals the cultivated area under different crops in kharif and rabi season during watershed project. Before initiation of the project, in kharif clusterbean, pearl millet, mung bean, sesame and sorghum occupied major acreage, while after implementation of the project clusterbean, pearl millet, mung bean, sesame, moth bean and sorghum contributed major total cropped areas.

Moth bean and castor were not grown in the study area at the time of project implementation. They were introduced as a new crops in the area and were cultivated in 50.80 and 3.20 ha areas respectively. Similarly, mung bean,

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Table 1. Watershed selected under forest department, world food program and desert national park (DNP)

Range/ Division	Total number of selected watershed	Name of selected watershed
Sam	2	Lunnar, Dabri
Chhaya	4	Chhayan I, Loharki, Didoo I, Tota
Dabla	2	Amarpura, Dhanwa II
Pokharan	4	Sankdia, Padroda, Hajiron ki Dhani, Balad
Jaisalmer	3	Ramgarh, Bandha, Kalyanghat
Lathi	3	Chandan I, Karmo Ki Dhani, Chandan II
Desert national park (DNP)	1	Ramdeora
World food program	1	Nachna
Total	20	

Table 2. Watershed selected under Zila Parisad

Panchayat Samiti	Total selected watershed	Name of watershed select
Jaisalmer	3	Bramsar, Kathori, Lanelmokala
Sam	3	Rahu Ka Par (Dhanana), Kanoi II, Loono ki Basti
Sankara	4	Narsinghpura, Baghthal, Sankara I, Sankara II
Total	10	

clusterbean and castor crop area increased over pre implementation of project, whereas sesame crop area was decreased over the previous period. Overall 31.18% area increase in kharif crops over the previous period. The possible reasons for these changes could be on account of utilization of fallow land for cultivation after taking up of different soil and water conservation activities.

In case of rabi, mustard, wheat, cumin and gram occupied major cropped acreage. After implementation of the project it drastically increased by 22.97, 16.67, 24.39 and 21.02% respectively, as compared to previous situations. Similar results have been reported by Singh *et al*., 1995 and Mohod *et al*., 1997.

Changes in cropping pattern

The cropping pattern in the watershed area prior to implementation and after completion of NWDP has been depicted in Table 4. The maximum area was noted under pulses crops. As far as cropping pattern in the watershed areas in pulses (62.52%) followed by spices

Table 3. Changes in area of important crops after implementation of NWDP

Crop	Before (1991-92)		After (2012-13)		Per cent increase/ decrease
	Area (ha)	Percentage	Area (ha)	Percentage	
Kharif					
Pearl millet	320.32	35.75	334.72	28.72	19.40
Mung bean	5.50	0.61	132.34	11.34	2300.00
Moth bean	0.00	0.00	50.80	4.36	5080.00
Clusterbean	334.86	37.37	376.48	32.29	12.43
Sesame	78.24	8.73	67.52	5.79	-13.70
Sorghum	35.52	3.96	50.18	4.30	41.27
Groundnut	8.25	0.92	11.52	0.99	39.63
Castor	0.00	0.00	3.20	0.27	320.00
Total	782.69	87.34	1026.76	88.07	31.18
Rabi					
Mustard	57.12	6.38	70.24	6.03	22.97
Wheat	24.00	2.68	28.8	2.47	16.67
Cumin	13.12	1.46	16.32	1.40	24.39
Gram	15.60	1.74	18.88	1.62	21.02
Taramira	3.60	0.40	4.80	0.41	33.33
Total	113.44	12.66	139.04	11.93	22.56
Gross cropped area (A+B)	896.13	100.00	1165.80	100.00	30.09

Table 4. Changes in cropping pattern after implementation of NWDP

Crop	Before (1991-92)		After (2012-13)		Per cent increase
	Area (ha)	Percentage	Area (ha)	Percentage	
Cereals and millets	379.84	42.39	413.70	35.49	8.91
Pulses	355.96	39.72	578.50	17.33	62.52
Oilseeds	147.21	16.43	157.28	13.49	6.84
Spices	13.12	1.46	16.32	1.40	24.37
Total cropped area	896.13	100.00	1165.80	100.00	30.09

(24.37%), cereals (8.91%) and oil seeds (6.84%) respectively. An overall 30.09% total cropped area was increased.

Changes in yield level of major crops

Table 5 shows that before project implementation, yield of pearl millet, mung bean, clusterbean and sesame was 731, 647, 650 and 244 kg ha^{-1}, respectively, which increases upto 805, 894, 729 and 306 kg ha^{-1}, respectively after project implementation. The average yield of sorghum and groundnut was 914 and 1250 kg ha^{-1} prior to project initiation. After project implementation the yield of same crops was increased upto 1660 and 1798 kg ha^{-1}, respectively. The yield increased by 10.12 to 81.17% of various kharif crops after project implementation. Among rabi crops, the yield of mustard, wheat, cumin and gram was 866, 1306, 760 and 820 kg ha^{-1}, respectively before project initiation. After project implementation, the yield of same crops was 1121, 2541, 1037 and 1093 kg ha^{-1}, respectively. The average yield increased by 29.44, 94.56, 36.45 and 33.29% in mustard, wheat, cumin and gram, respectively. Above findings indicate that overall production of different crops of beneficiaries' increased in watershed area in rabi as well kharif season. However, the noticeable changes were observed in two crops namely sorghum and wheat. New crops introduce in kharif season is account of better utilization of the resources of the areas after the execution of the work. The yield of various crop were increased from 9.61 to 94.56% as shown in Table 5.

The factors which were responsible for this change are crops being given priority in the project, a small portion of land which left fallow since long was taken under cultivation by the beneficiary farmers as these lands were treated through watershed technology like growing of vegetative barriers on the contour line, construction of V ditches, alley cropping bunding, pasture development, and *in situ* moisture conservation through proper tillage operation, etc. In addition to this distribution of improved varieties of seeds and fertilizers and other inputs were also responsible for this remarkable changes in the yield levels.

Increase in rabi season yield of wheat and cumin was due to assured irrigation facilities and use of high yielding varieties seed, whereas mustard, gram and taramira showed a marginal increased in yield due to more area grown in conserved moisture and less use of fertilizer in dry land areas.

Overall improvement in yield of major kharif crops particularly sorghum, groundnut and mung bean is appreciable. In case of rabi crops, mustard, wheat, cumin and gram yield increased satisfactory. Hence, crop productivity is the prime indicator of technologies changes and impact of soil and water conservation

Table 5. Changes in yield level of different crops after of NWDP

Crops	Yield (kg ha^{-1})		Per cent increase
	Before	After	
Kharif			
Pearl millet	731	805	10.12
Mung bean	647	894	38.17
Moth bean	0.00	599	599.00
Clusterbean	650	729	12.15
Sesame	244	306	25.41
Sorghum	914	1660	81.62
Groundnut	1250	1798	43.84
Castor	0.00	218	218.00
Rabi			
Mustard	866	1121	29.44
Wheat	1306	2541	94.56
Cumin	760	1037	36.45
Gram	820	1093	33.29
Taramira	437	477	9.61

work. The project activities have improved water potential and soil condition resulted moisture available at the stress period during requirement of crops. These findings are in accordance with the findings of Gowda and Jayaramaith (1996) and Kushwah and Bajpai (1998) and Rathore *et al.* (2011).

Conclusions

Study revealed that after implementation of soil and water conservation practices in watershed areas, there has been enhancement in agricultural production. Regarding change in area of crop it was found that before implementation of the project main crop was clusterbean which shares 37.37% of the total cropped area followed by pearl millet (35.75%), sesame (8.73%), mustard (6.38%) and sorghum (3.96%) were major crops. Further total cropped area was increased after implementation of the project. As far as cropping pattern in watershed area, it was found that maximum area shifted in pulses (62.52%) followed by spices (24.37%), cereals (21.73%) and oilseeds (6.84%). It was found that maximum yield was increased in case of wheat (94.56%) followed by sorghum (81.62%), groundnut (43.84%) and mung bean (38.17%), while moth bean and castor were introduced as new crops in watershed area.

References

Mohod, R.S., Kulkarne, S.Y. and Shinde, P.S. 1997. Impact of national watershed development programme on agricultural production. *Maharashtra Journal of Extension Education* 16: 74-77.

Singh, P.K., Singh, Jaipal, Manhot, S.C. and Modi Sanjay 1995. Watershed approach in improving the socio-economic status of tribal area: A case study. *Journal of Rural Development* 14(2): 107-116.

Kushwah, R.S. and Bajpai, A.K. 1998. Effect of watershed development programme on small and marginal farmers. *Maharashtra Journal of Extension Education* 32: 104-107.

Rathor, R.S., Kalla, P.N. and Jani, P.P. 2011. Sustainable aricultural production in watershed area of southern Rajasthan. *Rajasthan Journal of Extension Education* 19: 55-58.