

Watershed development in alfisols through soil conservation

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ABSTRACT

Improvement of rainfed farming is key to development of agriculture and removal of poverty. To increase the production and productivity from dry land areas, the Government of India launched NWDPR in different parts of the country including Karnataka. This was also implemented in Haveri district, demonstrating different soil conservation practices in different villages. Demonstrations were mainly conducted in major crops of the area like sorghum, groundnut, pulses, chillies and cotton. The study was conducted in Kadkol watershed of Karnataka. New crop varieties were introduced along with watershed treatment in different crops. Different soil conservation measures like contour bands, vegetative barriers, rubble check and contour cultivation had given more yields compared to conventional practices with local varieties. The farmers were also convinced to a great extent.

INTRODUCTION

Agriculture production in India is vitally linked with dry land farming. With respect to other crops it accounts for nearly 75% of oil seeds, 90% of the pulses and 70% of the cotton (Kanwar, 1990). Thus, the improvement of rainfed farming is key to development of agriculture and for removal of poverty. These dry lands are more impoverished due to continuous tilling, erosion, ill distribution of rainfall and poor crop management. More over the timely operations have become difficult due to poor look after of animal power with many of the small and marginal farmers, operating these lands with meagre resources and low risk bearing capacity.

To mitigate the hardships of the dry land farmers by increasing production and productivity from dry areas, the Government of India launched the NWDPR in different states including Karnataka, on a massive scale, where research component is also included. The University of Agricultural Sciences, Dharwad having the jurisdiction of northern twelve districts has started the ORPs in each district.

The Agricultural Research Station, Hanumanamatti was identified for NWDPR activities in the northern transitional zone having a geographical area of 11.30 lakh ha. Out of 14 taluks under NWDPR, seven taluks come

under the jurisdiction of ARS, Hanumanamatti. Demonstrations were conducted at Hoovinasigli village of Kadkol watershed of Savanur taluk. The total area of the watershed was 4270.25 ha with the annual rainfall of 676.30 mm. The watershed is divided in to 3 sub-watersheds namely, Hoovinasigli, Basavanakoppa and Kodkol. The existing productivity level of major food crops is very low which is due to low fertility status of lands, inadequate rainfall and traditional agricultural practices. The major portion of the agricultural land is covered by the millets. The soils are predominantly red sandy loams with soil depth varying from 45 to 80 cms.

The major food grains grown in the areas are sorghum, groundnut, pulses, chilli and cotton. It is very much essential to adopt suitable cropping system, high yielding varieties of different crops and also better utilization of soil and moisture to the maximum extent, to increase the productivity. Sufficient technical information suiting different regions to raise the crop productivity under dry-lands is available. However, these technologies are not fully used by the farmers.

Hence, this study was conducted with the objective of demonstrating the simple soil and water conservation technologies along with improved varieties in boosting the yields of major crops of the region.

Key words :

Watershed, Dry land farming, Soil conservation structures

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METHODOLOGY

The study was conducted at Kadkol watershed of Karnatak state. The ORP at Kadkol was initiated in *Kharif* 1994. Some of the innovative ideas tried on farmers field on watershed basis were contour bunds, vegetative barriers, rubble checks and contour cultivation.

The contour bunds strictly on contour key line were laid out in an area of 15 ha. in red soils, followed by rubble checks in an area of 2 ha. In these soil conservation structures, new crop varieties like hybrid sorghum (SPV-462, DSH-3, DSV-3 and SPH-843) followed by small millets like little millet (TNAU-63), foxtail millet (SIA-2642), groundnut(JL-24 and TMV-2), and redgram (IPCL-8863) were introduced. Beside, demonstrations were conducted in different intercropping systems with improved varieties like sorghum + redgram in 2:1 row ratio with improved varieties and groundnut + redgram in 3:1 row ratio with improved varieties. The farmers participation was ensured in all the activities of water shed.

RESULTS AND DISCUSSION

The data presented in Table 1 explain the results regarding soil and water conservation measures in alfisols. The data revealed that the increase in yield of groundnut, hybrid sorghum and chilli due to vegetative barrier was 20.20, 16.00 and 27.80 per cent, respectively. The yield of all crops was increased in contour bunded area compared to unbunded area. The yield increase in groundnut was 22.89% *Rabi* sorghum was 13.63 per cent and hybrid sorghum was 25.95 per cent. Similarly, increasing greengram and maize by 15.51 per cent and chilli by 9.86 per cent over unbunded area (Table 2).

It was observed that in all the crops the yield was quite high in rubble checks compared to control (Table 3). In case of groundnut the yield was 34.28 per cent more followed by hybrid sorghum 23.91 per cent and 14.85 per cent in case of chilli over control.

In contour cultivation practices the yield of crop obtained was 15.60 per cent more in groundnut followed

Table 1 : Yield of groundnut and hybrid sorghum as influenced by vegetative barrier

Crop	Treatments	Yield (kg/ha)	% increase
Groundnut	Vegetative barrier	998	20.20
	Control	830	
Hybrid sorghum	Vegetative barrier	1750	16.00
	Control	1500	
Chilli	Vegetative barrier	450	27.80
	Control	325	

Table 2 : Crop yield as influenced by contour bunds and improved varieties

Crop/ variety	Treatment yield (kg/ha)		% Increase
	Contour bunds	Control	
Groundnut / TMV-2	1020	830	22.89
<i>Rabi</i> sorghum / 9-13R	500	446	13.63
Hybrid sorghum /SPV-462	1175	870	25.95
Maize /DMH-1	1450	1225	15.51
Chilli / Byadgi kaddi	375	338	09.86
Greengram (PB)	600	313	15.51

Table 3 : Performance of different crops as influenced by rubble check

Crop/Variety	Treatment yield (kg/ha)		% Increase
	Rubble checks	Control	
Groundnut/ TMV-2	875	575	34.28
Sorghum /SPV-462	1150	875	23.91
Chilli dry / Byadgi kaddi	415	355	14.85

by hybrid sorghum 10.57 and in redgram 13.13 per cent. Cowpea has given 12.40 and greengram 8.60 per cent more yield than control. The yield of little millet and foxtail millet was 21.33 and 19.72 per cent more than the control. (Table 4). Similar findings have also been reported by Grewal *et al.* (1989).

The yield of hybrid sorghum with improved varieties was increased (Table 5). Similarly, the new variety of foxtail millet (SIA-2642) gave better yields over local varieties. In intercropping system, sorghum + redgram in

Table 4 : Influence of contour cultivation on crop yield

Crop/Variety	Treatment (yield kg/ha)		% Increase
	Contour cultivation	Control	
Groundnut /JL-24	960	830	15.60
Hybrid sorghum/ CSH-5	1850	1673	10.57
Redgram /IPCL-8863	1128	997	13.13
Cowpea / C-152	770	685	12.40
Greengram / PB	530	488	8.60
Little millet/ TNAU-63	375	298	21.33
Foxtail millet/ SIA-2642	355	285	19.72

2:1 with improved varieties has performed better (Table 6).

Table 7 reveals the comparative yields improved against local varieties of different crops. In all the crops the yield of improved varieties was more than the local varieties. The percentage increase ranged from 12.50 to 39.33 per cent

Table 5 : Performance of inter cropping system with improved varieties

Farmers practice		Package of practice			
Sorghum + Redgram (4:1)		Sorghum (SPV-462) + Redgram (IPCL-8863) (2:1)			
Crop		Sorghum	Redgram	Sorghum	Redgram
Yield	Maxi.	875	635	1150	820
(kg/ha)	Mini.	870	585	1175	475
Average yield		873	610	1163 (24.94)	648 (5.86)

Table 6: Performance of inter cropping system with improved varieties

Farmers practice		Package of practice			
Groundnut+ Redgram (5:1)		Groundnut(TMV-2) + Redgram (IPCL-8863) (3:1)			
Crop		Groundnut	Redgram	Groundnut	Redgram
Yield	Maxi.	575	575	875	655
(kg/ha)	Mini.	615	480	765	625
Average yield		595	528	820 (27.41)	640 (17.5)

Table 7: Crop yield under improved varieties v/s local varieties

Name of the farmer	Crop/Variety	Yield (kg/ha)		% Increase over control
		Package	Control	
S. Sigadi	Sorghum/DSH-3	1375	850	38.18
V. Puttaiah	Sorghum/ DSV-3	1000	875	12.50
M. Belekar	Sorghum/ SPH-843	1600	910	39.33
B. Gojagatti	Little millet/TNAU-63	375	295	21.33
B. Y. Barekar	Proso millet/GPUP-8	315	250	26.00
S. B. Bellary	Foxtail millet/SIA-2642	355	285	19.72
M. Halli	Redgram/IPCL-8863	820	650	20.73

Conclusion:

The main focus of watershed development is to conserve the natural resources. In the present context of deterioration of natural resources, watershed management assumes greater significance. Looking to the progress achieved, the Government of India launched the NWDPPRA in different states including Karnataka.

The ORP was implemented in Kadkol watershed in University of Agricultural Sciences, Dharwad. The different soil conservation measures were tried in farmers field in a participative approach where contour bunds, vegetative barrier, rubble check and contour cultivation along with improved varieties of major crops of the region gave higher yield compared to conventional practices with local varieties. The farmers were also convinced to a great extent about the importance of different soil conservation structures.

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