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Impact of watershed devolopment programme on rural community

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ABSTRACT

A study was conducted in the District of Bankura to asses the development of small and marginal farmers in relation to Radharamanpur watershed. This study reveals that in corporation of new technologies and cropping pattern enhance the yield of major crops in the watershed area .The increment in yield with respect to paddy, ground nut, mustard and variable are 36.30, 40, 33.3 per cent, respectively. The results further showed that fuel wood and fodder yield have been incised to the tune of 66.66 and 75 per cent, respectively with respect to small farmers. The socio economic status of the area has been increased by 75 and 64 per cent for small and marginal farmers respectively.

Key Words : Watershed development, rural community.

Out of total geographical area of 329 m.ha of India, 16.5 m.ha area with problem soil, 180 m.ha as arable while harnessing 109 m.ha and 200 m.ha is drought and erosion prone. This situation paves the way of ORP in 1983 followed by NWDPRA with the twin objective of restoring natural resources and preventing mankind from hading towards catastrophe. Watershed is an aerial expansion of the land from which surface run-off resulting from precipitation flowers past a single point, in to a large stream of river as a hydrological entity. In the present context sustainable land management augmented with sustainable agriculture development is usually require along with the active peoples participation in order to sustainable livelihood/ food security for the rural people in general and walker section in particular. The present study is endeavor to observe, record and access the watershed programme in the light of geo-hydrological and agro-meteorological parameters and to compare the benefit-cost ratio of this concept.

Materials and Methods

The watershed is located at Radharamanpur, Bankura – II block of the district Bankura under red and Lateritic zone of West Bengal. It is situated at 22° 38' to 23° 38' N Latitude, 86° 36' to 87° 38' E Longitude and at elevation of 90.0 to 120.0 meter above MSL. The climate of this region is sub-tropical, humid having an annual rainfall of 1400 mm out of which above 85% received during monsoon. The maximum temperature goes up to 45°C during summer months and minimum temperature comes down up to 5°C during winter.

The soil content 0.35 to 0.38% organic carbon, 60 to 65 kg available P_2O_5/ha and 100 to 105 kg exchangeable K_2O / ha with pH 5.5 to 6.0.

The watershed comprising villages namely Radharamanpur, Barakalai, Jharia, Bankati and Chaitali From the villages I0 farmers each from small and marginal category (absence of big farmers) were selected randomly, from the list of farmers having land under the water shed area. A total of 100 farmers (50 each for both small and marginal categories) were selected as the respondents for the study. The data were collected using a pre-tested structured interview schedule.

The bench mark data were obtained from the secondary data sources. The ex-post facto research design was employed in the study. The data were analyzed with the help of the following analytical tools.

$$\delta(SD) = \sqrt{(\sum fdi^2)} / N \qquad di = x_i - \overline{x}$$

Coefficient of variance (CV) = x 100

Where, $\overline{X}$ = mean date

N = no. of years of observation

X = date of OEM or EEM

Thornthwaite formula, for calculating potential evapotranspiration is

Where, e = potential ET mm/month
T = mean monthly temperature °C
I = seasonal index

$$I = \sum_{i}^{n} i$$

i = monthly heat index

RESULTS AND DISCUSSION

This dry tract received precipitation annually 1335.60mm and the minimum and the maximum temperature hovering around 20.6°C and 33.4°C respectively (Table 1). Onset effective monsoon (OEM) starts from June 14 with earliest probable dates of OEM is June 5, likewise mean date of end of effective monsoon (EEM) is September 21 with latest probable date of EEM is September 29. The annual potential evapotranspiration of the watershed is 2005mm. the average per day evapotranspiration is 58.69mm.

Table 1. Agro-meteorological and geo-hydrological analysis

1.	Mean date of OEM	June 14
2.	SD of OEM	June 9
3.	Earliest probable date of OEM	June 5
4.	Latest probable date of OEM	June 23
5.	Mean date of EEM	September 21
6.	SD of EEM	September 8
7.	Earliest probable date of EEM	September 13
8.	Latest probable date of EEM	September 29

Analysis of maximum and minimum temperature

Mean maximum temperature °C	S.D.	C.V.
33.4	4.1	12
Mean minimum temperature °C	S.D.	C.V.
20.4	5.1	25

Analysis of rainfall

Total rainfall	S.D	CV	Max.	Mean.	Range
1335.60	267.0	20	1965.50	741.60	1223.90
Annual PET	2005mm				
Av. Evaporation /day 58.69mm					

The technical aspect of watershed development programme and its achievement is presented in Table 2. The programme are taken of the covering an area of 378ha.

Table 2. Technical programme and its achievements

Particulars	Area (Ha)
Forest plantation	30.30
Agroforestry	3.0
Agri-horticulture	17.0
Bench-terracing	12.0
Contour bunding	40.00
Check dam construction and pond excavation	17.00
Crop cultivation	
Rainfed agriculture	116.25
Irrigated crop(s) kharif	77.75
Irrigated crop(s)	
From ponds	32.50
From check dam	32.00
Total	377.80

Benefit cost ratio

From agricultural component 2. 91 : 1

From forestry and horticultural component 2.33:1

The benefit cost ration is quite higher in agriculture component 2.91 as compare to forestry and horticultural component 2.33. This is due to adoption of improved agro-techniques and replacement of mono-cropped area by double and triple cropping (Mohanty, 1995).

The productivity levels of major crops were presented in Table 3.

Table 3. Productivity of major crops

Crops	Crop yield data (q/ha)		Mean difference	Percentage increase
	Before implementation of watershed	After implementation of watershed		
Paddy (local)	18	23	5	27.27
Paddy (HYV)	22	30	8	36.36
Sesamum	8	10	2	25.00
Ground nut	10	14	4	40.00
Mustard/toria	10	14	4	40.00
Wheat	16	20	4	25.00
Vegetables	120	200	50	33.33

Table 4. Fuel wood, fodder utilization pattern before and after watershed

Farmers category		Mean use (kg/day)		Mean difference	Percentage increase
		Before	After		
Small	Fuel wood	15	25	10	66.66
Marginal		10	16	6	60
Small	Fodder	8	14	6	75
Marginal		5	8	3	60

The data presented in Table 1 reveal that there was significant increase in the yield of all the crops mean differences of yield of different crops are paddy (local) 5q/ha, paddy (HYV) 8q/ha, sesamum 2q/ha, groundnut 4q/ha, mustard/ toria 4q/ha, wheat 4q/ ha , vegetable 50q/ha respectively. The enhancement of productivity ranges from 25 % to 40%.

The availability of fuel wood and fodder was also increased to a great extent (data presented in Table 4). It is assumed that a family of six requires 10,000kg fuel wood /year. The small farmers are quiet closer to that but marginal farmers are far away from the projected requirement. The use of fuel wood is increased almost 65% in case of small farmers and 60% in marginal farmers. The fodder availability has also increased to a considerable extent. It is often estimated that fodder and green grass require meal for a cow is 7500kg/year. In this case the availability increased to 75% in case of small farmers and 60% for marginal farmers.

Table 5. Socio-economic status of small and marginal farmers before and after implementation of watershed.

Farmers category	Mean score		Mean difference	Percentage Increase
	Before	After		
Small	15.59	27.25	11.66	74.79
marginal	12.63	20.75	8.12	64.29

Table 5 presents the average development of socio-economic status of both small and marginal farmers. The increase in the mean socio economic status score was 11.66 in case small farmers and 8.12 in case of marginal farmers over the bench mark socio-economic status score of 15.59 and 12.63 respectively. The increase in socio-economic status of farmers might have been the effect of strong extension education effort and cultivation of followed dry after inception of the programme.

Table 6. Adoption level of Watershed

Watershed practices management	Farmers' category	Mean adoption score		Mean differences
		Before	After	
Soil and water	Small (10)	2.24	9.72	7.48
conservation practices	Marginal (10)	0.56	4.59	4.03
Improved crop production	Small (10)	5.92	14.32	8.40
	Marginal (10)	3.26	10.54	7.28
Non-arable land	Small (10)	1.27	3.37	2.10
development practices	Marginal (10)	0.15	1.19	1.04
Alternate level use system	Small (10)	-	1.26	1.26
	Marginal (10)	-	0.58	0.58

The watershed development programme has contributed significant increase (Table -6) in the level of adoption of watershed management practices by small and marginal farmers (Golya, Naik & Joyaramaiah, 1997). The increase in the mean adoption score of soil and water conservation practices were 7.48 and 4.59 where as increase in the mean adoption score of improved crop production practices were 14.32 and 10.54 for small and marginal farmers (Kushwah, & Bajpai. 1998) respectively after implementation of the programme. Further the small and marginal farmers had take-up non-arable land development practices in the areas.

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