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EFFECT OF WATERSHED DEVELOPMENT PROGRAMME ON CROPPING PATTERN, CROP PRODUCTIVITY AND SOCIO-ECONOMIC STATUS OF KARWADI- NANDAPUR WATERSHED

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Short Profile

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ABSTRACT:

The existing cropping pattern and crop productivity of watershed was studied according to land use and discussions were made with farmers regarding improvement and adoptability of the new crop packages and technology. To study the socio-economic status of watershed, the data pertaining to socio-econimic condition of the farmers has been collected. A technical questionnaire has been developed to collect the information on various aspects by personal interview method and analysed by simple tubular method. The results revealed that, the crop productivity of kharif crop has been increased by 28.57, 42.45, 33.33, 25 and 18.57 percent for the crps Soybean, Cotton, Pigeon pea, Turmeric and Sorghum respectively. Socio-economic study of Karwadi-Nanadapur watershed showed that during the post-development phase income of watershed community was increased as well as dairy, poultry and emu-farming generated the employment for the stake holders.

KEYWORDS

Watershed Development Programme , Socio-economic status , Cropping Pattern, Crop Productivity.

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INTRODUCTION :

Watershed development involves the human resource development (community development), soil and land management (conservation and use), water management (conservation and use), afforestation, pasture (fodder development), agricultural development, livestock management and rural energy management, also watershed development involves the continuous interaction and exchange between various sectors, e.g. the livestock that can be maintained is dependent on the availability of fodder, which in turn is related to soil and water management. The availability of firewood and other fuel is related to the extent of forest cover, the livestock in the area and the productivity of the land. The development of all the above sectors is crucially dependent on the development of human population inhabiting that watershed. When the environment gets degraded, the quality of the life of the human community.within that region also deteriorates. Watershed development thus aims at the rejuvenation of the environment in an integrated and comprehensive manner. Watershed development, therefore, involves not only regeneration of the environment, but also the management of the needs of the human community in such a way that their demands match the resources viz. land, water and vegetation available within that particular watershed.

The watershed development programme to be successful must involve the participation of the concerned people and must be related to the environment in which they live, and on which they depend for their needs. This involves to be focused on the regeneration and equitable use of the resources in the particular environment on which the village depends for its needs. The research on impact of soil and water conservation measures particularly on runoff, soil loss and ground water recharge, land use pattern has significant importance in watershed studies. It is necessary to generate wide database on effect of conservation measures on increasing groundwater table, soil loss and socio-economic benefits. Hence a study has been planned to evaluate the effect of watershed development programme on cropping pattern, crop productivity and socio-economic status of Karwadi- Nandapur watershed.

LAND USE PATTERN :

Land use pattern of Karwadi- Nandapur watershed during pre and post development is presented in Table 1.

Table 1: Land use pattern of Karwadi- Nandapur watershed during pre and post development

Sr. No.	Season	Land Use	Pre-development 2009-2010 (ha)	Post development 2010-2011 (ha)	Percent increase in Area
1	Kharif	Cultivated land under Kharif crop	399.92	430	7.52
		Forest and pasture land	270	270	0
		Fallow land	80.08	50	- 37.56
2	Rabi	Cultivated land under Kharif crop	263.37	402.52	52.83
		Forest and pasture land	270	270	0
		Fallow land	216.63	77.48	- 64.23
3	Summer	Cultivated land under Kharif crop	1.68	25.21	1400
		Forest and pasture land	270	270	0
		Fallow land	478.32	454.79	-04.91
4	Cropping Intensity (%)		154.64	199.47	28.98

From Table 1, it is revealed that, after watershed development programme, area under cultivation in kharif, rabi and summer season was increased by 7.52, 52.83 and 1400 percent respectively. The cultivated land is increased after watershed development programme in year 2010-2011, because of increased water availability in Karwadi-Nandapur watershed and fallow land was decreased in kharif, rabi and summer season by 37.56, 64.23 and 4.91 percent respectively. Also it was seen that cropping intensity of watershed area increased by 28.98 percent (Govind Gowda et.al. 2011).

CROPPING PATTERN

Cropping pattern and crop productivity of kharif season of Karwadi-Nandapur watershed in pre-development and post development is presented in Table 2.

In watershed area, the main kharif crops grown were Soybean, sorghum, pigeon pea, cotton, green gram, black gram and turmeric.

Table 2: Area under various crops and their productivity in kharif season

Season Kharif	Pre-development 2009-2010		Post-development 2010-2011		Percent increase	
	Area	Productivity (q/ha)	Area	Productivity (q/ha)	Area	Productivity
Soybean	282	17.5	237.8	22.5	- 15.67	28.57
Green gram	1.60	6	2.75	5.62	71.87	-6.33
Black gram	3.00	6	1.65	5.06	-45	-15.66
Cotton	54.65	17.5	62.72	25	14.76	42.85
Pigeon pea	34.76	15	97.6	20	180.78	33.33
Sorghum	18.23	15	19.60	17	7.51	13.33
Turmeric	4	20	5	25	25	25

From the Table 2, it is revealed that during kharif season (2010-2011) area under crop soybean, green gram, black gram, cotton, pigeon pea, sorghum and turmeric was 237.8, 2.75, 1.65, 62.72, 97.6, 19.60 and 5 ha respectively whereas in 2009-2010 it was 282, 1.60, 3, 54.65, 34.76, 18.23 and 4 ha respectively. Osman et.al. (2013) have evaluated the Kadwanchi watershed in Maharashtra and observed that area under rainfed, grazing land , permanent pastures, current and other fallows, and culturable wastelands registered decline in post project scenario and got converted into supplemental irrigated area to the extent of 115% in post watershed project compared to pre project period.

The area under the crop greem gram, cotton, pigeon pea, sorghum and turmeric is found to be increased byb 71.87,14.76,180.78, 7.51 and 25 percent respectively. The area under soybean was decreased by 15.67 percent because of the increased area under pigeon pea due to accelerated pulse production programme launched by state government. The productivity of soybean, cotton, pigeon pea, sorghum and turmeric is found to be increased by 28.57, 42.85, 33.33, 13.33 and 25 percent respectively during the year 2010-11. Whereas, productivity of green gram and black gram was decreased because of high rainfall occurred during the year 2010-11 in Karwadi-Nandapur watershed.

Table 3: Area under various crops and their productivity in Rabi Season

Season (Rabi)	Pre-development 2009-2010		Post-development 2010-2011		Percent increase	
	Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)
Wheat	32.9	30	70	37.5	112.7	25
Chickpea	125.5	18	140	25	11.5	38.89
Safflower	9.88	7.5	14.32	8	44.9	6.67
Sorghum	-	-	10	10	100	-

From the Table 3, it is revealed that during Rabi season (2010-11) area under wheat, chickpea, safflower, sorghum is found to be increased by 112.7, 11.5, 44.9 and 100 percent respectively whereas, in 2009-10 it was 32.9, 125.5, 9.88 and 0 ha respectively. Tad Fa watershed, 17 farm ponds each of 1260 m3 of volume were constructed that provided much needed supplemental irrigation to crops/fruit trees/vegetables particularly in the post rainy season. In large areas the field bunds were constructed along with the vetiver grass for controlling soil erosion. About 68% area was planted on contour on mild slopes. The cultivation increased the maize yield by 30-40 percent compared to conventional up and down cultivation. It also significantly reduced the soil loss. (Wangkahart, 2005).

The area under wheat, chickpea, safflower, sorghum is found to be increased by 112.7, 11.5, 44.9 and 100 percent respectively in the pre-development phase. The productivity of wheat, chickpea and safflower, is also increased by 25, 38.89 and 6.67 percent respectively in Karwadi-Nandapur watershed during the post-development phase. According to Wangkahart (2005) the vegetative barriers were constructed in Wang Chai watershed to protect the roads and field bunds from erosion. Drains were constructed for safe disposal of excess run-off water. New crops and varieties were introduced in the watershed. The construction of farm ponds had significantly increased the cropping area and agricultural productivity in the post-rainy season.

Table 4: Area under various crops and their productivity in Summer Season

Season (Rabi)	Pre-development 2009-2010		Post-development 2010-2011		Percent increase	
	Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)
Groundnut	0	0	12.19	15	100	100
Fodder crop	0	0	10.14	-	100	-

From the table 4, it reveals that, before the pre-development phase of the watershed development programme there was no area under summer crop due to unavailability of water for irrigation but in the year 2011, area under summer ground nut and fodder crops was 12.19 and 10.14 ha respectively. The productivity of ground nut crop was found to be 15q/ha during the summer season 2011. Ground nur and fodder crops were cultivated during summer season 2011 in Karwadi-Nandapur watershed because of the availability of water in open wells and bore wells located in the watershed, which was helpful to give irrigation throughout the summer season(Crispino Lobo,1999). Fodder availability for livestock has increased the milk production which is the effect of soil and water conservation works implemented in Karwadi-Nandapur watershed.

Table 5: Area under horticulture crops and vegetable during pre-development and post-development of the watershed

Crop	Pre-development 2009-2010		Post-development 2010-2011		Percent increase	
	Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)	Area (ha)	Productivity (q/ha)
Banana	0	-	1.2	100	100	100
Sweet Orange	1.68	-	1.68	-	100	-

From the Table 5, it is sen that, horticulture crops like Banana and Sweet orange were also found to be cultivated in watershed area. It was possible due to availability of the irrigation water. Banana productivity was found to be 100q/ha.

From the above discussion it is concluded that implementation of soil and water conservation measures in Karwadi-Nandapur watershed resulted in increasing the crop productivity of various crops grown during kharif, rabi and summer season.(Diwate,2002), Rajmane(2004).

Impact of watershed development on socio-economic status:

Socio-economic study was carried out to access the impact of watershed development programme on watershed community. Information on socio-economic status of Karwadi-Nandapur watershed was collected during the pre and post development phases. The collected information is tabulated for the analysis.

Table 6: Land holding wise classification of farmers in Karwadi-Nandapur watershed

Sr.No.	Category	Land Holding (ha)	No. of farmers	% to Total Farmers
1	Landless	0	25	10.08
2	Marginal	< 2	143	57.67
3	Small	2 to 4	58	23.38
4	Medium	4 to 10	15	06.05
5	Large	>10	7	02.82
Total			**248**	**100**

From the table 6, it is observed that, in Karwadi-Nandapur watershed, the highest 57.67 percent farmers are marginal farmers while the lowest i.e. 2.82 percent farmers are the large farmers. 10.08, 23.38, 6.05 percent of the farmers are landless, small and medium farmers respectively.

LIVE STOCK POPULATION:

The population of livestock and animal husbandry in pre and post development of watershed is given in Table 7.

From the Table 7, it is found that the total population of livestock which was 1452 during pre

development phase has been increased to 31526 during the post development phase. Increase in availability of the fodder could be one of the main reasons for increasing the livestock population during the post-development phase. As it is clear from the Table 7 that number of milch animals like cows and buffaloes have doubled during the post-development phase. In

Table 7: Live stock population in pre and post development phases of Karwadi-Nandapur watershed

Sr. No.	Particulars	Population of Livestock		Percent increase in livestock
		Pre development 2009-2010	Post development 2010-2011	
1	Goat	65	120	84.61
2	Cows	153	203	32.67
3	Poultry birds	1000	30528	2952.8
4	Bullock	199	300	50.75
5	Buffaloes	35	95	171.42
6	Emu	-	280	100
Total		**1452**	**31526**	**2071**

Karwadi-Nandapur watershed the daily milk production was recorded in the range of 550 to 1070 lpd during the post-development phase which was 80 to 100 lpd during the pre- development phase. With the initiative of the local leadership, milk collection centre was established on 8th March 2010 by National Dairy Development Board at Nandapur. In the post development phase dairy, poultry and emu farming generated the employment to the watershed community. The number of emu birds were increased to 280 after the watershed development programme and given the additional benefit to the village community.

Table 8: Monthly milk collected and income generated in Karwadi-Nandapur watershed.

Month	Quantity of Milk	Income (Rs.)
March-2010	15054.12	294017.25
April-2010	29138.82	566742.00
May-2010	32083.92	624829.11
June- 2010	29825.87	586663.00
July-2010	25590.84	532127.43
August-2010	18913.70	407849.30
September-2010	14546.25	327804.20
October-2010	15701.60	397062.05
November-2010	18684.44	455054.40
December-2010	20626.74	482158.27
January-2011	20515.32	471852.36
February-2011	21320.12	490362.76
March-2011	23960.82	551098.86
April-2011	18825.12	432977.76
May-2011	18341.82	421861.86
Total	323129.50	7042460.61

From Table 8, it is revealed that the monthly milk collected in Karwadi-Nandapur watershed is ranged between 15054.12 litres to 32083.00 litres. The total milk collected from March 2010 to May 2011 in the watershed was 323129.50 litres and it has given an additional income of Rs. 7042460.61/- to the watershed community. This is due to the availability of grass and fodder crops during the whole year as a result of soil and water conservation measures and the increased soil moisture content in the post monsoon season.

Machinery inventory

In Karwadi-Nandapur watershed, in the pre-development phase, farmers were using traditional bullock drawn implements like seed drill, harrow, hoes and hand operated tools. Data of the availability of machinery in Karwadi-Nandapur watershed during the pre and post development phases is presented in Table No.9.

Table 9: Machinery inventory In Karwadi-Nandapur watershed

Sr. No.	Name of the Equipment	Pre-development 2009-2010	Post-development 2010-2011
1	Tractor	4	12
2	Jeep	3	3
3	Thresher	1	2
4	Bullock drawn implements	95	148
5	Power Sprayer	-	12
6	Dal mill	-	1
7	Other Tractor Drawn implements	24	49

From the table 9, it revealed that, during year 2010-2011 the number of tractor increased to 12 from 4, the number of jeeps were remained constant, number of threshers threshers were increased to 3 from 1, bullock drawn implements to 148 from 95, There was no power sprayer and dal mill in the pre-development phase but it was increased to 12 and 1 respectively in the post development phase of the watershed. The other tractor drawn implements were nearly doubled in the post development phase.

Irrigation Potential

The pre-development snd post development data on irrigation potential is presented in Table 10.

Table 10: Impact of Soil and water conservation measures on irrigation potential

Sr. No.	Particulars	Pre-development 2009-2010	Post-development 2010-2011
1	Total no. of open wells	22	22
2	No. of open wells in operation	16	22
3	Total no. of tube wells	75	84
4	No. of tube wells in operation	60	84
5	Electric operating centrifugal pumps	16	22
6	Electric operating submersible pumps	60	84
7	Oil engines	2	3
8	Sprinkler irrigation sets	8	50
9	Drip irrigation sets	-	3
10	Irrigated Area (ha)	59	152

From Table 10, it was revealed that during the pre-development phase out of 22 open wells, only 16 were in operation and that too yielded water till the end of December. However, during the post-development phase, all the open wells were in operation and most of them yielded water till the end of April and remaining have yielded throughout the whole year. Similarly, only 60 out of 75 tube wells were in operation during pre-development phase whereas in the post development phase the number of tube wells were increased to 84 and all the tube wells were in operation. The table also revealed that the area under irrigation was increased from 59 ha to 152 ha. The use of advanced techniques of irrigation like drip and sprinkler irrigation was increased in Karwadi-Nandapur watershed. The number of sprinkler sets was increased by 42 in the post development phase as compared to pre-development phase. During the pre-development phase, drip irrigation was not in use but, during post- development phase three farmers have been using drip irrigation for crops like cotton, sweet orange and banana. The increased availability of water (and hence supplementary irrigation) and better employment opportunities in watershed development related activities have contributed to diversification of income opportunities and reduced vulnerability to drought and other shocks.(Wani, 2003)

CONCLUSIONS:

1.The crop productivity of Kharif season has increased by 28.57, 4245, 33.33, 13.33, 18.75 percent for the crops soybean, cotton, pigeon pea, turmeric and sorghum respectively.
2.In Rabi season, productivity of wheat, chick pea and safflower was increased by 25, 38.89 and 6.67 percent respectively. After the watershed development programme, in Karwadi-Nandapur watershed summer crops were grown such as ground nut and fodder crops and productivity of summer crop was found to be 15Q/ha.
3.It was found that the number of open wells as well as tube wells under operation is increased from 16 to 22 and 60 to 84 respectively. Irrigated area was also increased from 59 ha to 152 ha in Karwadi-Nandapur watershed.
4.The use of advanced techniques of irrigation was also increased appreciably. The number of drip irrigation sets was increased from 0 to 3 and the sprinkler sets were increased from 8 to 50 in the post-

development phase.

5.Livestock population of Karwadi-Nandapur watershed, in the post-development phase was found to be increased such as goat from 65 to 120, cows from 153 to 203, poultry birds from 1000 to 30528, bullocks from 199 to 300 and buffaloes from 35 to 95. Also 280 emu birds were introduced in the watershed.

6.From emu farming and dairy development an additional income of Rs. 7.00 lakh and 70.42 lakh was added to the village community.

REFERENCES:

1.Crispino Lobo (1999). Poverty reduction through natural resources generation. The Indo-German Watershed development programme. Watershed Organization Trust (WOTR) Ahmadnagar, Maharashtra, India.

2.Diwate S.A. and S.S. Bhosale (2002). Impact of watershed development activities on beneficiariy farm. Indian J. of Soil Cons., 30(1) : 87-94.

3.Govinda Gowda, V. and A. Satish (2011). Socio-economic and natural resources impact of Sujala watershed project in Karnataka. International J. Science and nature. 2(1): 31-37.

4.Osman et.al. 2013. Impact evaluation of Kadwanchi watershed in Maharashtra: Lessons for Post-project sustainability. Indian Journal of Dryland Agriculture Research and development.28(2): 9-15.

5.Rajmane, S.P. (2004). Impact study on Shamwadi watershed development programme. Unpublished M.Tech. thesis submitted to M.K.V., Parbhani.

6.Sudhishri S., Patnaik U.S. and Dass A. 2007. Hydrological study and water resource assessment in Kokriguda watershed of Orissa for sustainable water management. Indian J. Soil Cons.35 (2): 103-107

7.Wani, S.P., Singh H.P., Sreedevi, T.K., Pathak, P., Iyer S.R. 2003. Farmer-participatory integrated watershed management: Adarsha watershed, Kothapally, India: An innovative and upscalable approach. In Research towards Integrated natural resources Management: Examples of Research Problems, Approaches and partnerships in action in the CGAIR(Harwood, RR and Kassam A.H., Eds.). Interim Science council. Consultative Group on International Agricultural Research, Rome, Italy.: 123-147 pp.

8.Wani S.P., Piara Singh, K.V.Padmaja, R.S. Dwivedi and T.K. Sreedevi. 2006. Assessing impact of integrated natural resource management technologies in watersheds. In Impact assessment of watershed development- Issues, methods and experiences, eds. K. Palanisami and D. Suresh Kumar, 38-58. Karol Bagh, New Delhi, India: Associated Publishing Company.

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