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Minor irrigation – impact of watershed programme on the living conditions of the farmers of Kurnool (Dt.)

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ABSTRACT

India is being an agrarian country depends a great deal on the natural resources for production of food and economic development of the rural areas. The best way through which a society can progress is by increasing the productivity of the economic activities, raising the productivity of irrigated and rain fed agriculture combined with soil and water conservation techniques is essential for faster development during the recent years, Water has become a matter of important subject for the National Level Planning and Plan Formulation, which led to the establishment of National Water Resources Council as a National Apex Body.

KEW WORDS : Watershed approach, Rainfed area, Watermanagment, Participatory approach

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INTRODUCTION

In the post green- revolution period, the thrust of Indian Agriculture is an enhancement of agricultural productivity through sustainable practices. To achieve this end, one of the major initiatives undertaken by the Government of India was the implementation of a National Level Programme for the development of rain fed areas through the watershed approach. The watershed approach aimed at augmentation and stabilization of production and productivity, minimizing the ecological degradation, optimization of water resources reduction in regional disparity, opening up on greater opportunities for employment of rural poor in the rain fed areas. Watershed, a natural entity in itself, combines forest management and land use management. It is a hydrologic and physiographic unit which offers a very good base for planning and implementing soil conservation, water harvesting, a forestation and environmental protection programmes. Watershed is defined as "a natural hydrological entity that covers a specific area expansion of land surface with in boundaries the entire rainfall-run off ultimately passes through a specifically defined stream. From the scientific perspective, a watershed is defined as the drainage areas of a stream. Water development and management should be based on a participatory approach, involving users, planners and policy makers at all the levels (Giridhar, 2007).

The study was under taken in Kurnool district, which is hot and drought prone area with a very low estimated annual rainfall of 670 mm, out of total rainfall received only 10 per cent to 15 per cent is utilized for agriculture and rest is going to waste through stream into sea and evaporation. The date shows that there is scanty rainfall which insufficient for the cultivation of principal crops. The major portion of the land has became barren due to shortage of water and irrigational facilities. In view of the above it is essential to study the impact of watershed programme on the living conditions of the farmers in Kurnool district. There has been a less concentration by the researchers to study the various aspects of watershed programme which bring the changes in income and employment generation of farmers in the watershed areas to asses the socio-economic transformation.

It is interesting to note about the total geographical area, net area sown, barren and uncultivable land. Land put to agriculture and total cropped area was mentioned during 2006-07, 2007-08, 2008-09 in Kurnool district, along with the source of irrigation under Registered Aycuts, actual area irrigated in the district is also worth note. Apart from

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the source of irrigation under area brought into cultivation by means of different water sources during 2004-05 up to 2008-09 is also very much useful to examine the drought conditions prevailed in the district which will give an idea about the living conditions of the farmers in the district to be considered in this research work.

The objectives of the study are as to understand the impact of watershed programme in a drought prone district like Kurnool, to examine the socio-economic conditions of the scheduled caste, scheduled tribe, backward caste and other caste farming community in the watershed areas of Kurnool district, to assess the impact of watershed programme on scheduled caste, scheduled tribe, backward caste and other castes engaged in agricultural activities in the selected Mandals of Kurnool district, to analyses the income and employment generation of farmers belonging to scheduled caste, scheduled tribe, backward caste and other caste farming community through watershed programme and to identify the problems and to suggest suitable measures for the overall development of the farming community.

METHODS

The present study is based on the data from both primary and secondary sources. The primary data were collected from the selected farmers and the farmers who were provided assistance under watershed programme during the years 2002-2010. A well structured questionnaire was prepared and administered to the farmers of watershed programme. The personal visits were made to the selected Mandals to make on the spot study of various socio-economic conditions of the farmers.

The secondary data were collected from Annual Reports, Action Plans, Reports of various studies and Government publications. The basic literature relating to rural poverty, status of farmers and various aspects of rural development programme and strategies were collected from various books and journals. Data were also collected from various offices like the Ministry of Rural Development (MORD), Delhi, Commissionerate Rural Development (CRD), Hyderabad, District Rural Development Agency Anantapur, Chittoor, Kadapa and Kurnool Drought Prone Area Programme in Rayalaseema Region, District Water Management Agency (DWMA) in Rayalaseema Region, Mandal level Project Implementation Officers, Village Level Watershed Secretaries, Legislatives, State Government and Research Institutions.

The study is based on "Before" and "After" approach. To assess the impact of watershed programme on the living conditions of farmers, the farmers enjoying the benefit from watershed were selected. To arrive at the conclusion, the information regarding the income and employment generated before the implementation of the watershed programme was collected through primary data and compared to get the correct picture.

Tools of analysis:

Since the study was based on both primary and secondary source data, relevant statistical techniques and tools were employed so as to arrive at meaningful conclusion and results.

Paired 't' test:

To compare the variation in the generation of income and employment before the watershed programme and after the watershed programmme, Paired 't' test was applied with the following formula :

$$t = \frac{\bar{d}}{s/\sqrt{n-1}} \times \rightarrow t = (n-1) \quad \text{where } d=x-y$$

$$\bar{d} = \frac{\Sigma di}{n} \qquad s = \sqrt{\frac{\Sigma di^{\,2}}{n} - (\bar{d})^2}$$

ANOVA two way classification:

To test the significance of difference in the two kinds of treatments simultaneously, the 'Analysis Of Varience

Anova – two way classification					
Source of variation	Degree of freedom	Sum of squares	Mean sum of squares	F calculated value	F Table value
Between the rows	r – 1	SSR	$\frac{RSS}{DF} = \sigma_1$	$F_1 = \sigma_3 / \sigma_1$	F (r-1), (r-1) (c-1)
Between the columns	c – 1	SSC	$\frac{SSC}{DF} = \sigma_2$	$\sigma_3 > \sigma_1$	
Residuals	(r – 1) (c – 1)	⊗	$\frac{\otimes}{DF} = \sigma_3$	$F_2 = \sigma_3 / \sigma_2$	F (c-1), (r-1) (c-1)
				$\sigma_3 > \sigma_2$	
Total	r c – 1	TSS			

(ANOVA)' Two-way classification was applied with the following Null hypotheses:

– Ho : There is no significant difference between the rows.

– Ho : There is no significant difference between the columns.

To test the above two hypotheses, the ANOVA table was applied.

Anova - two way classification:

$$\text{Correction of factor (C.F.)} = \frac{\text{Grarnd total}}{\text{No. of beneficiaries}} = \frac{T^2}{N}$$

where, N= r x c (r = rows, c=columns)

$$SSR = \frac{\Sigma (\Sigma x r)^2}{nc} \rightarrow \frac{T^2}{N}$$

$$SSC = \frac{\Sigma (\Sigma x c)^2}{nc} \rightarrow \frac{T^2}{N}$$

$$TSS = \Sigma (\Sigma x rc)^2 \rightarrow \frac{T^2}{N}$$

$$\otimes = TSS - SSR - SSC$$

F_1 Cal, < F tab. we cannot reject the null hypothesis. (due to rows)

F_2 Cal, < F tab. we cannot reject the null hypothesis. (due to columns)

It is inferred that there was no significant difference between the rows and between the columns.

OBSERVATIONS AND ANALYSIS

Table 1 shows that the land in use for the purpose of agriculture, barren and uncultivable area as against to the total geographical area was 17, 65, 800 acres and net area shown more or less was 8,86,256 acres during the three

Table 1 : Land use for agriculture, barren and uncultivable areas

Sr. No.	Category	2006-07	2007-08	2008-09
1.	Total geographical area	17,65,800	17,65,800	17,65,800
2.	Net area sown	8,86,256	8,61,504	8,89,122
3.	Barren and uncultivable land	1,27,390	1,27,314	1,27,315
4.	Total cropped area	9,59,549	10,34,808	8,56,537
5.	Land put to agriculture		1,31,877	
6.	Percentage to graphical area		7.21%	
7.	Percentage to graphical area		19.29%	
8.	Percentage to geographical area		7.85%	

Source: Chief Planning Office, Collectrate of Kurnool

Table 2 : Source of irrigation and irrigation utilization in catchment areas

Sr. No.	Sources of irrigation	Registered Ayucats in hectares	Actually area irrigated	
			Gross	Net
1.	Major project (Above 24,710 acres)	197394	100807	81084
2.	Medium project (4972 to 24710 acres)	10333	4836	4836
3.	Minor project (below 4942 acres)	207694	112170	91997

Source:- a) A Chief Planning Office, Collectorate of Kurnool.
b) S.E. Irrigation Kurnool and Chief Planning Office

Table 3 : Area irrigated under different sources

Sr. No.	Sources of irrigation	2004-05	2005-06	2006-07	2007-08	2008-09
1.	Canals	66146	87834	80028	102203	112170
2.	Tanks	134667	17415	11281	18144	11920
3.	Tube wells and filter point	73734	79742	85377	87238	81593
4.	Other wells	39310	34607	26419	34227	35248
5.	Lift irrigation	10035	7547	9217	10366	11486
6.	Other sources	699	1602	274	1625	932
7.	Net area irrigated	169783	192720	175705	207188	202883
8.	Gross area irrigated	203391	231242	212596	253803	253349

Source: Chief Planning Officer, Collectorate of Kurnool

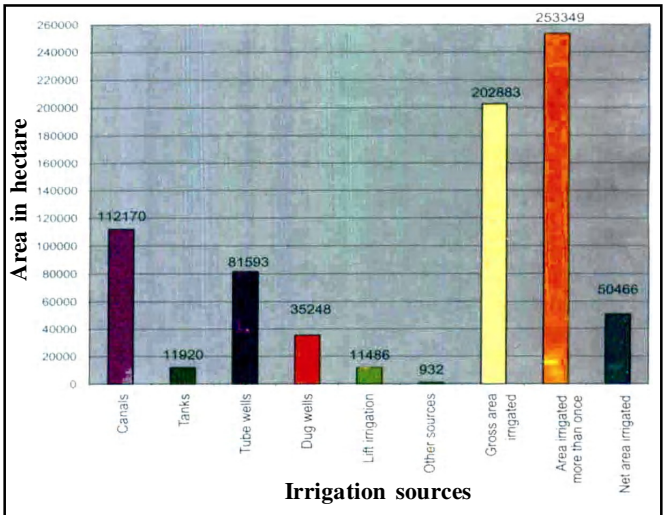

Fig. 1 : Area irrigated under different sources, 2008-09

consequent years. The left over barren and uncultivable land was 1,27,313 acres. It was a rainfied area which received low quantum of rainfall. The percentage of uncultivable land was about 19.29 per cent.

Table 2 shows the sources of irrigation such as major, medium and minor irrigation utilized water through the Ayucats catchments during the years in the district the registered Ayucats under minor irrigation was 2,07,694 acres and the area which actual brought irrigation was 1,12,170 acres and it was approximately 47 per cent as against the gross area due to shortage of water. The area under medium irrigation was worthwhile in cultivating land with an optimum utilization of water resources for irrigation.

Table 3 shows that the area irrigated under different sources. Major portion of area was cultivated under tanks followed by canals. The use of tubewells and filter points occupied third place in the district as a result of implementation of watershed programme in the district facilitated in providing irrigation in the district which has been increased (Fig. 1).

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