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Impact Assessment of Andhra Pradesh Water Management Project on Socio-economic Conditions of Farmers in Godavari Western Delta Pilot Area

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Abstract

The benefits of installing subsurface drainage for salinity control in the Godavari Western Delta region of India are assessed in terms the impact of subsurface drainage on sustainability of agricultural production. The study in the Kalipatnam pilot area revealed substantial farm-level benefits from installing subsurface drainage, as a result of a significant increase in crop yields, the benefit-cost ratio during *kharif* season in the pilot area was increased incrementally from -0.23 during *kharif*, 2004 to 0.50 during *kharif*, 2009. Similarly, during *rabi* season, benefit-cost ratio in the pilot area was increased incrementally from 0.18 during *rabi*, 2004-05 to 0.50 during *rabi*, 2008-09. The land value has been increased from Rs.2.5 lakh/ha in 2004 to Rs. 15.0 lakh ha in 2009. A difference of 3.75 lakh/ha was noticed between pilot area and control area and this difference can be attributed to appreciation of land value due to installation of subsurface drainage system. Among the extension methods used for teaching, trainings followed by demonstrations, kalajathas and campaigns were proved effective in capacity building of farmers.

Key words: Godavari Western Delta, A.P. Water Management Project, Subsurface drainage system, Socio- economic impact.

Introduction

With the prime objectives of land and water productivity management, the Andhra Pradesh Water Management (APWAM) Project has started functioning in A.P. State since November 2003, with Bapatla as the main center and Undi, Garikapadu, Jagtial and Tirupati as net work centers. The APWAM Project is functioning under the aegis of Acharya N. G. Ranga Agricultural University (ANGRAU) with the financial assistance from FAO and technical Assistance from ILRI, Wageningen, Netherlands. Undi network centre is operating in Godavari Western Delta. Subsurface system was installed in 18 ha area in farmers' fields at Kalipatnam pilot area in Godavari Western Delta canal command in India in the year 2005 to combat the problems of water logging, salinity and sodicity. The project has completed the first phase of five years by October 2008 and has been extended for a two-year period, till October 2010. With this background, the present study on 'Impact assessment of Andhra Pradesh Water Management Project on socio-economic conditions of farmers in pilot area and on capacity building of stakeholders in Godavari Western Delta' was conducted.

Materials and Methods

1. Selection of Pilot Areas APWAM Project, Undi center has selected pilot areas, Kalipatnam in West Godavari District for improving the land productivity of problematic soils under saline and water logged conditions.

2. Selection of Sample Farmers All farmers in the pilot area (28) and control area (32) were taken into consideration for collecting the data.

3. Data Collection

Secondary data The secondary data on total cultivated area and number of farmers in the selected pilot area were collected from official records of the pilot areas. The data pertaining to the year 2004 were collected from the Bench Mark Survey Report of pilot areas of the Project.

Primary data The information on socio economic conditions and capacity building on water and land productivity enhancement were collected through pre-tested questionnaires and personnel interviews from sample farmers. The data that were not available in the Bench Mark Survey Report were collected from sample farmers on memory recall basis to the maximum possible extent.

4. Data Analysis The data for the year 2004 was taken as 'Before the Project' situation and the average of four years from 2005 to 2009 was taken as 'After the Project' situation. The data were collected for the year 2009 from the sample farmers of non-pilot areas so as to analyze the impact of the project by comparing 'With Project' and 'Without Project' situations. Simple tabular analysis

was used to prepare text tables. Garrett scoring technique (Garrett and Woodworth, 1969) was used to analyze the importance of various extension methods in capacity building of farmers.

Results and Discussion

The data collected from sample farmers were analyzed as per the objectives and the results are presented hereunder.

1. Social Conditions

Age composition The number of farmers in the age group of more than forty years was more in pilot area and control areas, inferring that more number of young farmers are involved in agriculture and is an indication to show good response to the drainage technology showcased by APWAM Project (Table 1).

When the impact of APWAM Project has been analyzed by taking the number of farmers in different age groups before and after the situations, it was found that there was not any change in > 60 year age group, while the number of farmers in 41-60 group was increased and that in < 40 year age group decreased due to passing of time in 2009.

Educational Status When the educational status was analyzed before and after the situations, it was found that there was decrease in the per cent of illiterates during 2009 over 2004, which is a good indication of better standard of living. However, not much change was observed between pilot and control areas (Table 2).

Community-wise Distribution of Land Holdings

The analysis of community wise distribution of land holdings (Table 3) reveals that the area under cultivation increased with the OC category of farmers in the pilot area. There was increase in per capita land availability in the OC category but over all per capita land availability remained same in the pilot area during the study period.

2. Economic Parameters

Land Holding Particulars It could be revealed from Table 4 that most of the pilot area farmers are cultivating on their own lands and entire area is under irrigated cultivation. The land value has been increased from Rs. 2.5 lakh/ha in 2004 to Rs. 15.0 lakh/ha in 2009. A difference of 3.5 lakh/ha was noticed between pilot area and control area and this difference can be attributed to appreciation of land value due to installation of subsurface drainage system.

Profitability of Agribusiness

The benefit-cost ratio in the pilot area increased incrementally from -0.23 during *kharif*, 2004 to 0.50 during *kharif*, 2009. Similarly, benefit-cost ratio in the pilot area increased incrementally from 0.18 during *rabi*, 2004-05 to 0.50 during *rabi*, 2008-9 (Table 5).

3. Capacity Building of Stakeholders

Impact of Different Extension Methods on Capacity Building of Farmers of Pilot Areas

The impact of various extension methods on the perception of farmers' knowledge on different technological aspects was studied by ranking the extension methods (Table 6). The Garrett's scoring analysis revealed that among the different extensions methods, farmers gave highest preference to trainings followed by demonstrations, kalajathas and campaigns.

Conclusions

1. Social Implications

- Literacy rate increased in the study area from 48% during 2004 to 53% in 2009 due to awareness in adult education programme imparted by APWAM project, Undi centre.
- The area under cultivation increased with the OC category of farmers in the pilot area. The per capita land availability also increased in the OC category but over all per capita land availability remained same in the pilot area during the study period.

2. Economic Implications

- The land value has been increased from Rs.2.5 lakh/ha in 2004 to Rs. 15.0 lakh ha in 2009. A difference of 3.5 lakh/ha was noticed between pilot area and control area and this difference can be attributed to appreciation of land value due to installation of subsurface drainage system.
- The benefit-cost ratio in the pilot area increased incrementally from -0.23 during *kharif*, 2004 to 0.50 during *kharif*, 2009. Similarly, benefit-cost ratio in the pilot area increased incrementally from 0.18 during *rabi*, 2004-05 to 0.50 during *rabi*, 2008-9.
- The net income which was negative before the APWAM Project increased gradually, bringing surplus income to the farmers in Kalipatnam area.

3. Capacity Building of Stakeholders

- Farmers have gained knowledge on improved water management practices that resulted in managing salinity in efficient way and hence significant increase in the yield was noticed.
- Farmer's knowledge on IPM and INM technologies has resulted in increased yields.
- Among the extension methods used for teaching, trainings followed by demonstrations, kalajathas and campaigns were proved effective in capacity building of farmers

References:

Garrett, H.E. and Woodworth, R.S. 1969. Statistics in Psychology and Education, Vakils, Feffer and Simons Pvt. Ltd. Bombay. p. 329.

Table 1. Age composition of sample farmers in Kalipatnam pilot area

Age group	Kalipatnam		
	Pilot Area (2009)	Control (2009)	Before APWAM Project (2004)
<40	18 (64.3)	20 (62.5)	39 (65.0)
41-60	7 (25.0)	8 (25.0)	14 (23.3)
>60	3 (10.7)	4 (12.5)	7 (11.7)
Total	28 (100.0)	32 (100.0)	60 (100.00)

Figures in parentheses indicate per cent to respective total

Table 2. Educational status of sample farmers in pilot areas

Level of Education	Kalipatnam		
	Pilot Area (2009)	Control (2009)	Before APWAM Project (2004)
Illiterate	13 (46.5)	15 (46.9)	69 (52.0)
Primary	10 (35.7)	11 (34.4)	41 (31.0)
Matriculation	4 (14.3)	5 (15.6)	18 (14.0)
Degree	1 (3.5)	1 (3.1)	4 (3.0)
Total	28 (100.0)	32 (100.0)	132 (100.0)

Figures in parentheses indicate per cent to respective total

Table 3. Community-wise distribution of land holdings among sample farmers in Kalipatnam pilot area

Community	Pilot						Control(2009)		
	Number		Area (ha)		Per Capita Land (ha)		Number	Area (ha)	Per Capita Land (ha)
	2004	2009	2004	2009	2004	2009			
OC	12	12	7.06	7.46	0.59	0.62	26	14.52	0.56
	(42.9)	(42.9)	(39.2)	(41.4)			(81.2)	(80.7)	
BC	16	16	10.94	10.54	0.68	0.66	2	2.00	1.00
	(57.1)	(57.1)	(60.8)	(58.6)			(6.3)	(11.1)	
SC & ST	0	0	0	0	-	-	4	1.48	0.37
	(0.0)	(0.0)	(0.0)	(0.0)			(12.5)	(8.2)	
Total	28	28	18.00	18.00	0.64	0.64	32	18.0	0.56
	(100.0)	(100.0)	(100.0)	(100.0)			(100.0)	(100.0)	

Figures in parentheses indicate per cent to respective total

Table 4. Land holding particulars of sample farmers in Kalipatnam pilot area (2009)

Item	Pilot			Control		
	I	ID	T	I	ID	T
Owned (ha)	14.4 (25)	--	14.4 (25)	13.6 (27)	--	13.6 (27)
Leased in (ha)	3.6 (3)	--	3.6 (3)	4.4 (5)	--	4.4 (5)
Leased out (ha)	--	--	--	--	--	--
Present value of land (Lakh. Rs/ ha)	15.0	--	--	11.25	--	--
Rental value of land (Rs/ha/year)	42000	--	--	42000	--	--
Land revenue or tax (Rs/ha)	625	--	--	625	--	--

I: Irrigated, ID: Irrigated Dry, T: Total (Figures in parenthesis indicate number of farmers)

Table 5. Cost of cultivation and income measures of rice in Kalipatnam pilot area

Particulars	2004-05		2005-06		2006-07		2007-08		2008-09	
	kharif	*rabi*	*kharif*	*rabi*	*kharif*	*rabi*	*kharif*	*rabi*	*kharif*	*rabi*
Yield (t/ha)	3.5	6.9	3.77	7.78	5.8	7.70	5.1	7.9	6.5	7.5
Price (Rs/t)	6130	5730	6130	5770	7460	7460	7632	7832	9333	9333
Total cost of cultivation (Rs/ha)	28065	34160	23163	44896	45226	52810	32925	47231	42290	48627
Gross income (Rs/ha)	21455	39537	13119	26186	44828	58970	40923	54108	36611	73314
Net income (Rs/ ha)	-6610	5377	-4370	12353	1398	6160	7998	16133	21321	24687
B:C ratio	-0.23	0.18	-0.15	0.37	-0.01	0.12	0.24	0.34	0.5	0.50
Cost of production (Rs/t)	8019	4951	7303	4185	7798	6858	6455	6757	6506	6484

Table 6. Impact of extension methods on capacity building of farmers of pilot areas

S. No.	Particulars/ Activity	Demonstrations			Trainings			Campaigns			Kalajathas		
		Rank	% Position	Score	Rank	% Posi-tion	Score	Rank	% Posi-tion	Score	Rank	% Posi-tion	Score
1	Crop management aspects	3	62.5	44	1	12.5	74	4	87.5	28	2	37.5	57
2.	Fertilizer application	1	12.5	74	2	37.5	57	4	87.5	28	3	62.5	44
3.	Identification of pests & diseases	2	37.5	57	1	12.5	74	4	87.5	28	3	62.5	44
4.	Use of PP Chemicals	1	12.5	74	2	37.5	57	4	87.5	28	3	62.5	44
5.	Preparation of botanical extracts	1	12.5	74	2	37.5	57	3	62.5	44	4	87.5	28
6.	Use of bio-control agents and bio-pesticides	2	37.5	57	1	12.5	74	4	87.5	28	3	62.5	44
7.	Conservation of natural enemies	3	87.5	28	1	12.5	74	4	87.5	28	2	37.5	57
8.	Water management	2	37.5	57	1	12.5	74	4	87.5	28	3	62.5	44
9.	Mechanised farming	1	12.5	74	2	37.5	57	3	62.5	44	4	87.5	28
Average of scores				60.0			66.4			31.2			43.3
Overall Ranking				II			I			IV			III