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## Relational analysis of beneficiary farmers of tail region with agriculture and socio-economic development parameters

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### Abstract

The study entitled “Impact of Wan irrigation project on agriculture and socio-economic development of beneficiary farmers” was frame and conducted in Akola and Buldhana district of Maharashtra State at Wan irrigation project. Wan irrigation project is one of the major irrigation projects in Vidarbha sanctioned by Government of Maharashtra in the year 1979 and completed in the year 2001-02. It was started functioning from 2005. It is therefore, in order to know the benefits from this irrigation to the beneficiary farmers. In the study, the total of 300 respondents were the beneficiaries of head, middle and tail reach of wan irrigation project. The primary data were collected through personal interview, for fulfilling the specific objectives.

Regarding, socio-economic development parameters, there was change in occupation, land holding, family education, annual income, socio-political participation, expenditure pattern and economic empowerment of the beneficiary farmers in the study area. It was also observed that, 132.89 percent impact as a whole of agriculture and socio-economic development was noticed on the beneficiary farmers through wan irrigation project.

In case of coefficient of correlation, between selected independent variables of beneficiaries of study area with agriculture and socio-economic development parameters, it was found that, most of the independent variables were found to be significant at 0.01 and 0.05 level of probability. In case of path analysis, sources of irrigation along with frequency of irrigation in a year, land under irrigation, land holding and irrigation potential exerted the maximum direct effect and also served as vehicle for the production of indirect effect through other variables on increasing impact of wan irrigation project on beneficiary farmers.

**Keywords:** Socio-economic development, agriculture, tail region, irrigation, beneficiaries, frequency, empowerment

### Introduction

Irrigation has shaped the economics of many semi- arid and arid areas, permanently coloring the social fabric of numerous regions around the world. It has stabilized rural communities, increasing income and providing many new opportunities for economic advancement. Irrigation permits human habitation, quite dense populations, where it otherwise could not exist. Nevertheless, it is estimated that 60.00 percent of the global population may suffer from water scarcity by 2025 (Qadir, *et al.*, 2007) <sup>[15]</sup>.

An estimated 260 million hectares (ha) worldwide are irrigated compared to fewer than 100 million ha in 1950. These lands constitute approximately 17.00 percent of the world's total cultivated farmland but produce 40.00 percent of its food and fiber. Irrigated agricultural activities also provide considerable food source and foraging areas for migratory and local birds as well as other wildlife. In short, irrigation underpins current society and lifestyle. Yet irrigation is not without its problems and critics. Water's uneven geographical distribution has made its acquisition a matter of great contention. The picture is further complicated by the fact that the productivity of the currently irrigated land base around the world is actually declining because of soil salivation, waterlogging and soil erosion.

If the water resource hungry competition swells in the form of increasing population, urbanization, environmental consciousness, recreation and tourism then agriculture's access to a critical resource is no longer guaranteed. This scarcity is especially evident in the prime agricultural areas of the arid and semi-arid areas, but it is also being felt in the humid regions of the world.

The United Nations (U.N. Educational, Scientific, and Cultural Organization, 2006) [16] recently estimated that increased cropping intensity to meet world demands will require an increase of 40.00 percent in the area of harvest crops by 2030, and that the amount of water allocated to irrigation must increase correspondingly by 14.00 percent. However, it unlikely that the needed water will be available. This is creating a major paradox and a looming crisis. At the same time that both irrigated agriculture's land base and water supplies are being depleted and reallocated, it is being asked to produce even more.

The present study is proposed to conduct in two districts i.e. Akola and Buldhana of Maharashtra State. The findings of this study were based on the responses of beneficiaries of this project. Wan irrigation project is also useful for generating the electricity and provide drinking water in Akola and Buldhana district. The water holding capacity of this dam is 84.434 M<sup>3</sup> and 59.898 M<sup>3</sup> water is reserved for irrigation purpose. The ultimate irrigation potential of this dam is 19177 ha of land in Akola and Buldhana district of Maharashtra. The present study will be helpful to know the utility of this project in terms of agriculture and socio-economic development of the farmers in this region. Thus, in view of the need and importance of the study, the present investigation was carried out.

### Methodology

The present investigation was carried out in Akola and Buldhana districts of Western Vidarbha region of Maharashtra. Western Vidarbha region situated between 22° 55' N to 77°45' E. Western Vidarbha consists of five districts and total population is 11,266,653 according to 2011 census. The major crops grown in this area are cotton, soybean, turn, maize and Udid in Kharif season wheat, gram and vegetables in *Rabi* season and groundnut in summer season. Wan irrigation covers total 54 villages. Out of which 41 villages were from Akola and 13 villages from Buldhana district.

In the present study, the command area of wan irrigation project was divided into three segments as head reach, middle reach and tail reach. From each segment five villages were selected on the basis of beneficiary farmers. Out of total 15 selected villages, 10 villages were from Akola and 5 villages from Buldhana district. From each selected village 20 beneficiary farmers were selected as respondents. Total of 100 beneficiaries from each segment.

Thus, for the proposed study, total 300 beneficiaries constituted the sample respondents. Out of total 300 respondents 200 farmers from Akola and 100 farmers from Buldhana district. The respondents were selected by random sampling method from Akola and Buldhana districts of western Vidarbha region of Maharashtra.

### Results

The findings of the present study as well as relevant discussion have been presented under following heads.

#### 1. Change in occupation in tail region

In tail region, from Table 35, it may be noted that, before the Wan irrigation project most of the respondents having agriculture and labour as their occupation (63.00%), followed by agriculture (28.00%), agriculture plus allied occupation (06.00%) and agriculture plus business (03.00%).

**Table 1:** Distribution of respondents according to their change in occupation in tail region

S. No.	Occupation	Respondents ( n = 100)				
		Before Wan project		After Wan project		Percent change (%)
		Freq.	Percent	Freq.	Percent	
1.	Agriculture + Labour	63	63.00	25	25.00	-60.31
2.	Agriculture	28	28.00	25	25.00	-10.71
3.	Agriculture + Allied occupation	06	06.00	20	20.00	233.33
4.	Agriculture + Business	03	03.00	30	30.00	900
5.	Agriculture + Service	00	00.00	00	00.00	00.00
	Total	100	100.00	100	100.00	
	Mean	1.05		1.97		
	S. D.	1.01		0.89		
	'z' Value	3.888*				

\* Significant at 0.05 level of probability

However, after wan irrigation project, it was found that, 30.00 percent of the respondents were having agriculture plus business for income followed by agriculture (25.00%), agriculture plus labour (25.00%) and agriculture plus allied occupation (20.00%). There was significant difference in occupation among the beneficiaries before and after wan irrigation project as indicated by the 'z' value. The 'z' value was found significant at 0.05 percent level of probability. From above findings it can be concluded that there was definite change in occupation in tail region.

#### 2. Change in land holding in tail region

Table 2 revealed that, distribution of respondents according to their change in land holding in tail region prior to wan irrigation project, it was found that 54.00 percent of respondents possessed marginal land holding, it was followed by small land holding (24.00%), and semi medium land holding (20.00%). Only 02.00 percent possessed medium type of land holding. Whereas after Wan irrigation project, 44.00 percent of respondents possessed small type of land holding, it was followed by marginal (40.00%) semi medium (14.00%) and medium (02.00%) type of land holding.

**Table 2:** Distribution of respondents according to their change in land holding in tail region

SL. No	Land Holding (Ha)	Respondents ( n = 100 )				
		Before Wan project		After wan project		Percent change %
		Freq.	Percent	Freq.	Percent	
1.	Marginal	54	54.00	40	40.00	-25.92
2.	Small	24	24.00	44	44.00	83.83
3.	Semi medium	20	20.00	14	14.00	-30.00
4.	Medium	02	02.00	02	02.00	00.00
5.	Large	00	00.00	00	00.00	00.00
	Total	100	100.00	100	100.00	
	Mean	1.32		1.85		
	S. D.	1.04		1.01		
	'z' Value	1.777 NS				

NS - Non significant

#### 3. Change in family education in tail region

In case of family education in tail region, from Table 3, it was seen that, there was increase above 12 std. education by 100.00 percent, followed by 25.00 percent change was noticed in up to 4 std. education, followed by 20.00 percent change in 5 to 7 std. education of the respondent's family. There was found reduction in illiteracy (100.00%) and also

reduction in 11 to 12 std. education (33.33%) after wan irrigation project.

There was significant difference in family education among the beneficiaries before and after wan irrigation project as indicated by the 'z' value. The 'z' value was found significant at 0.01 level of probability.

**Table 3:** Distribution of respondents according to their change in family education in tail region

SL. No.	Level of education	Tail region (N=100)			
		Before wan project		After Wan project	Percent change
		Freq.	Freq.	%	
1.	Illiterate	20	00	-100	
2.	Up to 4 std.	100	125	25.00	
3.	5 to 7 STD	25	30	20.00	
4.	8 to 10 std.	30	30	00.00	
5.	11 to 12 std.	15	10	-33.33	
6.	Above 12	10	20	100.00	
	Mean	74.08	79.01		
	S. D.	8.3	5.7		
	'z' Value	4.123**			

\*\* Significant at 0.01 level of probability

**Change in annual income in tail region**

Table 4 revealed the change in annual income of beneficiary farmers before and after wan irrigation project. From the Table 4, it is concluded that, 500.00 percent change was observed in the annual income category of above Rs. 2,00,000/-, 74.28 percent change was observed in the annual income category of Rs. 51,001 to 1,50,000/-. There was found reduction (-100.00%) in the annual income category up to 50,000 /-., followed by (60.00%) in the annual income category of Rs.1,00,00 to 1,50,000/-, followed by (16.66%) in the annual income category of Rs. 1,51,000 to 2,00,000/-.

**Table 4:** Distribution of respondents according to their change in annual income in tail region

SL. No	Annual Income (Rs.)	Respondents (N = 100)				Percent change (%)
		Before Wan project		After wan project		
		Freq.	Percent	Freq.	Percent	
1.	Up to 50,000	15	15.00	00	00.00	-100.00
2.	50,001 to 1,00,000	35	35.00	61	61.00	74.28
3.	1,00,001 to 1,50,000	30	30.00	12	12.00	-60.00
4.	1,51,000 to 2,00,000	18	20.00	15	15.00	-16.66
5.	Above 2,00,000	02	00.00	12	12.00	500.00
	Total	100	100.00	100	100.00	
	Mean	1.01		1.36		
	S. D.	44.5		91.1		
	'z' value	1.961				
		NS				

NS - Non significant

**4. Change in socio political participation in tail region**

The data pertaining to change in socio-political participation of respondent in tail region revealed that, majority (100.00%) of the respondent were found change in participation in social political participation and in financial contribution or raised funds for community work, followed by 03.22 percent change in respondent involved in community work.

Whereas, there was reduction by 37.00 percent change in respondent having official position in one or more formal organization.

**Table 4:** Distribution of respondents according to their change in socio political participation in tail region

SL. No	Socio political participation	Respondents (N = 100 )				Percent change
		Before Wan project		After Wan project		
		Freq.	Percent	Freq.	Percent	
1.	Participated in social political institutions	15	23.33	30	30.00	100.00
2.	Participated without any position in sociopolitical organization	24	24.00	15	15.00	-37.50
3.	Official position in one or more formal organization	15	15.00	13	13.00	-13.33
4.	Official position in socio and political organization	00	00.00	00	00.00	00.00
5.	Financial contribution or raised funds for community work	05	05.00	10	10.00	100.00
6.	Active office bearer	00	00.00	00	00.00	00.00
7.	Involved in community work	31	31.00	32	32.00	03.22
	Total	100	100	100	100	
	Mean	55.66		77.61		
	S. D.	11.02		13.06		
	'z' value	5.698NS				

**5. Change in expenditure pattern in tail region**

Table 5 revealed that, the expenditure pattern of the beneficiary farmers in tail region before and after wan irrigation project. It was found that there was increase in expenditure pattern in case of clothing 150.00 percent, medical/health 100.00 percent, education 85.71 percent, religious 66.67 percent, housing 55.55 percent, food 22.72 percent and on electricity 20.00 percent.

In overall, there was 61.53 percent change was observed in case of expenditure pattern of beneficiary respondents before and after wan irrigation project in tail region.

**Table 5:** Distribution of respondents according to their change in expenditure pattern in tail region (Mean monthly expenditure)

SL. No	Indicators	Respondents (N = 100 )		
		Before Wan project	After Wan project	Percent change (%)
1.	Food	2200	2700	22.72
2.	Education	700	1300	85.71
3.	Housing	900	1400	55.55
4.	Clothing	1000	2500	150.00
5.	Medical/Health	500	1000	100.00
6.	Electricity	1000	1200	20.00
7.	Religious	1500	2500	66.67
	Grand Total	7800	12600	61.53

**6. Change in economic empowerment in tail region**

Table 6 revealed distribution of respondents of tail region according to their economic empowerment after Wan irrigation project, it is found that there was increase in freedom to start business by 300.00 percent, freedom for spending on entertainment of guest (266.66%), operating seasonal accounts in bank (200.00%), freedom for offering present to relatives (150.00%), participation in decision about marketing produce (125.00%), opportunity for economic development and participating in decision about purchasing

building /house (100.00%), personal saving in the form of fixed deposited (80.00%), participating in decision about

adopting modern technology in home (60.00%) and authority to employ labour 16.66 percent.

**Table 7:** Distribution of respondents of tail region according to their change in economic empowerment

SL. No	Economic empowerment aspects	Tail region (N = 100 )				
		Before Wan project		After Wan project		Percent change
		Frequency	Percent	Percent	Percent	%
1.	Opportunity for economic development	04	04.00	08	08.00	100.00
2.	Freedom to start business	02	02.00	08	08.00	300.00
3.	Personal saving in the form of fixed deposit	10	10.00	18	18.00	80.00
4.	Operating seasonal account in bank	60	60.00	18	18.00	200.00
5.	Participating in decision about adopting modern technology in home	05	05.00	08	08.00	60.00
6.	Participation in decision about purchasing building/ house	04	04.00	08	08.00	100.00
7.	Participation in decision about marketing of produce	04	04.00	09	09.00	125.00
8.	Authority of employ labour	06	08.00	07	07.00	16.66
9.	Freedom for spending on entertainment of guest	03	03.00	11	11.00	266.66
10.	Freedom for offering present to relatives	02	02.00	05	05.00	150.00
	Total	100	100.00	100	100.00	
	Mean	71.06	82.03			
	S. D.	5.21	11.0			
	'z' value	3.201**				

\*\* Significant at 0.01 level of probability

The 'z' value was found significant at 0.01 level of probability. It means that there was positive impact in respect of economic empowerment of beneficiary farmers of tail region after wan irrigation project.

### Conclusions

In case of occupation the variables such as occupation, was found positively significant at 0.01 level of probability.

Whereas, the variables namely land holding, annual income were found positively significant at 0.05 level of probability. In case of land holding, out of total independent variables, the variables namely annual income, occupation, Whereas, the variables such as a, land holding, were found significant at 0.05 level of probability.

In case of family education, out of total independent variables, the variables viz. land holding, annual income, Variable distance of dam was found negatively significant at 0.0 1 level of probability. Rest of the variables didn't show any relationship with family education.

In case of annual income out of total independent variables, the variables namely land holding, occupation, farming experience, sources of irrigation, method of irrigation, land under irrigation, economic motivation, frequency of irrigation in a year and irrigation potential were found positively significant at 0.01 level of probability.

The variable distance of dam showed negatively significant relationship at 0.01 of level of probability. Rest of the variables didn't show any relationship with land holding.

In case of socio political participation, out of total independent variables, the variables namely annual income, sources of irrigation, type of land and economic motivation and frequency of irrigation in a year were found positively significant at 0.01level of probability. Whereas, the variables namely age, land holding, occupation, farming experience, method of irrigation, and land under irrigation, scientific orientation and innovativeness were found significant at 0.05 level of probability.

In case of expenditure pattern, out of total variables, the variables viz. annual income, occupation, sources of irrigation, land under irrigation, economic motivation, frequency of irrigation in a year and irrigation potential were

found positively significant at 0.01 level of probability. Whereas, the variables such as age, land holding, farming experience sources of information, method of irrigation and type of land were found significant at 0.05 level of probability.

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