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Impact of bore well irrigation on socio-economic conditions of farmers in Yadgir District of Karnataka State

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Abstract:

In agricultural development, groundwater occupies an important place. Water, by nature, differs in its availability and therefore, causes a change in the cropping pattern, cropping intensity, income of the farmer and agriculture productivity. Since, water is an important input, it is necessary to study the impact of bore well irrigation on farm productivity and income of the farmers. The present study reveals the socio-economic conditions of the farmers and it examines the impact of bore well irrigation on farm productivity and income of the farmers.

Key words: bore well irrigation, socio-economic conditions, impact

1. Introduction:

Agriculture is backbone of rural population in India. Around 80% of the area is under rain fed agriculture, which plays a major role in global food supply (Aguilar, 2011; Latha et al., 2012). Around 57% of the agricultural area is predominantly rain fed in Karnataka. Due to uneven distribution and magnitude of rainfall, farmers started pumping the ground water for irrigation. Construction of bore wells and pump sets actually triggered more rapid decline of water levels and these structures, by virtue of their depth, are capable of yielding more water than the dug wells (Rukmani and Manjula).

Therefore, major investment incurred by the farmer in competitive digging of bore wells compared to adjacent farmers. Present study the impact of bore well irrigation on socio-economic condition of farmers in the study area

2. Objectives of the study:

The following objectives have been set for this research study:

1) To examine the impact of bore well irrigation on socio-economic condition of farmers in the study area.
2) To assess the impact of bore well irrigation on living style of farmers in the study area.

3. Methodology:

The Present Study has been carried out by an empirical investigation conducted by canvassing a structured schedule, which was supplemented by an unstructured questionnaire. However secondary data wherever available was made use of with given resource time and manpower.

3.1. Selection of the Samples:

Yadgir district as such lies central part of Karnataka state. The district has more irrigated area under canal, tank and well irrigation. There are talukas in the districts viz, Yadgir, Shorapur, Shahapur, Wadagera, Hunasagi and Gurumitkal. The researcher has selected a sample of 20 villages randomly from six taluks. A total of 400 respondents were selected 20 from each village at random. 9 farmers were bore well land owners and 9 farmers un irrigated land owners. In order to know the impact of bore well irrigation on farm productivity and income of the farmers, information regarding farm productivity and income of the farmers with bore wells and without bore wells was gathered from the selected farmers. Thus, the sample size was 400 farmers 20 from each village.

3.2.Data Source:

The study is based on various sets of data, both primary and secondary source. The major secondary data is obtained from the reports of District department of irrigation. The primary data is collected through Pre-tested interview schedule from the sample farmers. Analysis of the bore well irrigation, through the cost of cultivation, production, employment, income and other issues related to bore well irrigation.

3.3.Analysis frame work:

The primary data collected thorough interview schedules has been organized in a tabular form; various simple methods such as average, percentage and cost-benefit ratio have been applied to draw the inference.

The present study reviles that the socio-economic conditions of the farmers and it examines the impact of bore well irrigation on farm productivity and income of the farmers, cropping pattern and cropping intensity.

1. **Gender – Wise Distribution of the Respondents :**

Table - 1

Gender – Wise Distribution of the Respondents

Gender	Irrigated		Non - Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
Male	165	82.5	150	75
Female	35	17.5	50	25
Total	200	100	200	100

Source: Field Survey

It is observed that more than 82.5 percent of the male and 17.5 percent of female have been carrying on agricultural activities in the bore well irrigated area. On the other hand, in the un-irrigated area 75 percent of the male and 25 percent of the female have been carrying on agricultural activities in the dry land area.

It is clear from the data, given about that the percentage of female cultivator is more in unirrigated area than in irrigated area.

2. **Household Toilets status in the study area:**

Table - 2

Household Toilets status in the study area

Household Toilets	Irrigated		Non - Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
Yes	185	93%	115	58%
No	15	8%	85	43%
Total	200	100%	200	100%

Source: Field Survey

The Toilet status of the study area is shown in the above table and diagram. The data reveals that 93% percent of the household (185) in the irrigated belt have toilet facility, where as this 58% in non-irrigated area. On the other hand, while 8% percent households in irrigated area are avoid of toilet facility, in unirrigated area 43% percent of households do not have toilet facility.

The income level in irrigated area is considerably is higher than unirrigated area. Therefore, households in irrigated area are capable of creating personal toilet facility. People in unirrigated area are not accustomed to using toilet at home. They prefer to defecate in the open field. They have not realized the importance of constructing toilet at home.

3. Size of the Family of the sample:

Table - 3
Size of the Family

Numbers	Irrigated area		Un-irrigated area	
	No. of Households	Percentage	No. of Households	Percentage
2 to 4	35	17.5	49	25.6
4 to 6	115	57.5	122	63.3
6 to 8	32	16	22	8.9
8 to 10	12	6	7	2.2
Above 10	6	3	0	0
Total	200	100	200	100

Table -3, gives information about size of family in the study area. The family structure has been broadly classified in to five categories on the basis of numbers of person in the family both in irrigated and non-irrigated area. The size of family in irrigated area reveals that 17.5 percent families have 2 to 4 persons whereas 57.5 percent families have 4 to 6 persons. This constitute the largest chunk of family size. 6to 8-person family is about 16 percent and 8 to 10 person found in 12 percent families. More than 10 persons are found in only 6 percent families.

Similar feature can be observed in non-irrigated regions also. Here, 25.6 percent family 2 to 4 persons whereas 63.3 percent families have 4 to 6 persons. 8 to 10 persons' 8.9 percent families have 6 to 8 persons and 8 to 10 persons are found in 2.2 percent families. There is no single family consisting of more than 10 percent in non-irrigated region.

The evolution of nuclear family concept has made its impact in the study area too. Joint families are gradually fading even in rural area. The educated young population is moving to urban areas in search of highly remunerative and suitable job opportunities. Such migration has led to reduction in supply of farm labor component. This has led to considerable fall in farm output productivity and income, making rural life highly miserable.

4. Literacy rate of Respondents in the study area:

Table -4
Literacy rate of Respondents in the study area

Households	Irrigated		Non-Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
Literates	108	54	112	56
Illiterates	92	46	88	44
Total	200	100	200	100

Source: Field Survey

Literacy has positive impact in cultivating on modernity in agriculture. Among the respondents in unirrigated area literates constitute 56 percent while remaining 44 respondents are

illiterates. More or less similar situation is found in irrigated area also. While 54 percent of respondents are literates the balance 46 percent respondents are illiteracy.

It can be observed here that vast illiteracy in the study area has come in the way of application modern technology incultivation.

5. Education status of farmer's family member

Table - 5
Education status of farmer's family member

Qualification	Irrigated		Non-Irrigated	
	No. of Households	Percent	No. of Household	Percent
Illiterate	42	21	65	32.5
Primary	72	36	89	44.5
Secondary	48	24	32	16
Graduate and above	38	19	14	7
Total	200	100	200	100

Source: Field Survey

Literacy status of household members in the study area is depicted in Table 5. Let us first analyze situation in bore well irrigated area. Literacy more than three fourth of household members fare literate and only 21 percent household members are illiterates. 36 percent, 24 percent and 19 percent household member have got primary education, higher education and graduation respectively. In unirrigated area the ratio of literates of illiterates is 32.5. Among the literates 44.5 percent of household members have primary education whereas 16 percent has got higher secondary education, only 7 percent household members have studied up to graduation level.

Based on this analysis it may be opined that large majority household members have an access only to primary education. There are many reasons for this there are no higher secondary school and colleges in close proximity in the study area. In addition, poverty of the farming community did not permit children of farmers to go to nearby cities for higher secondary and college education.

6. Nature of house owned by farmers in the study area:

Table -6
Nature of house owned by farmers in the study area

Nature of house	Irrigated		Un-Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
Hut	0	0	12	6
Thatched Hut	10	5	22	11
Improved House	100	50	140	70
House with Concrete roof	90	45	26	13
Total	**200**	100	**200**	100

Source: Field Survey

The Nature of house status of the study area is shown in the above table, the data reveals that 5 percent of the household in the irrigated belt has Thatched hut and 50 and 5 percent of respondents have been got improved house and house with concrete roof respectively. On the other hand, in unirrigated area while 6 percent households have got hut and 11, 70 and 13 percent of respondents have been got thatched hut, improved house and house with concrete roof respectively in the study area

The income level in irrigated area is considerably is higher than unirrigated area. Therefore, households in irrigated area are capable of creating good houses than the unirrigated area.

From the above table it is observed chi-square test revealed a significant difference between Nature of house in Irrigated land and Un irrigated land (X^2=321.86; p=.000.)

7. Size of Land holding of respondents in the study area

Table -7

Size of Land holding of respondents in the study area

Land Holding (In Acre)	Irrigated		Non-Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
1 to 3	56	28	60	30
4 to 6	96	48	80	40
7 to 10	33	16.5	60	30
10 above	15	7.5	0	0
Total	**200**	**100**	**200**	**100**

Source: Field Survey

Farmers have been classified in to four categories on the basis of size of cultivable land held by them. Table-7 reveals the following facts. In irrigated area 28 percent respondents have 1-3 hector lands whereas 4-6 hectors of land are held by 48 percent respondents, 16.5 percent respondents hold landholding ranging from 7 to 10 hectors while 7.5 percent of respondents possess more than 10 hectors of land.

In non-irrigated area the classification of respondents on the size of land holding is given here under. 30, 40 and 30 percent respondents respectively possess Land holding ranging from 1-3 hectors, 4-6 hectors and 7-10 hectors. It is surprising to note that no respondent possess more than ten hectors of land in non-irrigated area.

From the above analysis it can be stated that large majority of farmers belong to small and medium farmers' category both in bore well irrigated area and non-irrigated area. In fact, the increase in the percentage of small and medium farmers has taken place on account of prevalence of the loss of inheritance. With the passage of time the families have been divided subdivided. This has resulted in division, subdivision and fragmentation of landholdings. Only a small percent of respondents has been able to retain large size holdings.

8. Own land cultivation and cultivation of land on lease basis:

Table -8
Own land cultivation and cultivation of land on lease basis

Land Holding	Irrigated		Non-Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
Own Land	186	93	190	95
Leased Land	14	7	10	5
Total	**200**	**100**	**200**	**100**

Source: Field Survey

Data in table -8 reveals that the percentage cultivation of own land is predominantly high in both irrigated and unirrigated regions in the study area. In bore well irrigated area 93 percent respondents' area engaged in cultivation of own land whereas in unirrigated area percentage of respondents cultivating own land 95 percent. Thus respondents to extent of 7 percent in irrigated area and 5 percent in unirrigated area. Cultivate land on lease basis.

The percentage of leased land cultivation is higher in bore well irrigated area as farming is more profitable in irrigated area than in unirrigated region.

9. Income of the farmer in the Irrigation area and non-Irrigation area:

Table - 9
Income of the farmer in the Irrigation area and non-Irrigation area

Income (Rs.)	Irrigated		Non-Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
Below-50000	12	6.0	70	35.0
50000-75000	47	23.5	60	30.0
75000-1 lakh	82	41.0	43	21.5
1lakkh-2 lakh	45	22.5	18	9.0
2 lakh-3 lakh	10	5.0	9	4.5
Above 3 lakh	4	2.0	0	0.0
Total	**200**	**100**	**200**	**100**

Source: Field Survey

Based on annual income, farmers in the study area have been classified in to six groups as shown in the table 10. It may be noted from that income of only 6 respondents in irrigated region is less than fifty thousand whereas in unirrigated area as much as 35 percent respondents have income less than rupees fifty thousand per annum. Poverty is more intense in unirrigated region the income of 23.5 percent of respondents in irrigated area and 30.0 percent of respondents in un irrigated is between fifty thousand and seventy-five thousand per annum. In irrigated and un irrigated are as

23.5 and 30.0 percent respondents are in the annual income group of rupees seventy-five thousand and one lakh . 22.5. percent respondents in irrigated area and 9 percent respondent in unirrigated area have annual income up to rupees two lakh. While 5 percent respondents in irrigated area have income up to rupees three lakh only 4.5 percent respondents in unirrigated area have income of up to rupees three lakh per annum. No respondents earn has income above rupees three lakhs per annum in unirrigated area whereas a meager 2 percent respondents in irrigated area have income of rupees three lakh per annum.

From the above table it is observed chi-square test revealed a significant difference between Income of the farmer in Irrigated land and Un irrigated land (X^2=184.70; p=.000.)

10. Livestock Owned by the Respondents:

Table -10

Livestock Owned by the Respondents

Livestock	Irrigated		Non-Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
Milch Animal	88	44	70	35
Drought Animal	46	23	33	16.5
Young Cattle	34	17	45	22.5
Goats/Sheep	20	10	30	15
Chock/ Hen	10	5	22	11
Pigs	2	1	0	0
Total	200	100	200	100

Source: Field Survey

An attempt has been made by the researcher to find out the extent to which the samples in the study area have maintained the livestock. The description of the same has been given in table 10. Let us first take into consideration livestock position in bores well irrigated area.44 percent of the respondents are in possession milch animals whereas 35 percent respondents rear drought animals. The stock of young cattle is held by 23 percent respondents and the stock of sheep is held by 16.5 percent respondents. The stock of pig and hen is held by 1 and 5 percent respondents respectively. It may be noticed that in bore well irrigated region piggery is not a popular activity among farmers. It may be noticed that respondents in the study area have given greater importance to the rearing of Milch and sheep as these two type of animal provide farmers with additional revenue.

Now let us consider the environment in unrigged region while 35 percent respondents maintain milch animal sheep rearing done by 16.5 percent respondents. Drought animal held by 15 percent respondents and 11 percent respondents are in to poultry farming. It is surprising to know no respondents has ventured to rare pigs. Even in un irrigated area maintaining Milch and sheep and

sheep is very popular and it is a reliable dependent additional source of revenue farmers.

Comparatively maintaining Milch animal and rearing sheep is more in irrigated area than in unirrigated region. In both region piggery is almost insignificant.

11. Annual income from livestock:

Table – 11
Annual income from livestock

Income	Irrigated		Non-Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
2000-4000	103	51.5	55	27.5
4000-6000	28	14.0	28	14.0
6000-8000	24	12.0	20	10.0
Above 8000	20	10.0	43	21.5
No Income from Livestock	25	12.5	54	27.0
Total	**200**	100.0	**200**	100.0

Source: Field Survey

Farmers by and large derive income from non-farm activities to support their livelihood. One such popular on farm activity is maintenance of livestock which provides supplementary source of revenue to farmers. Table.-11 is devoted to income derive form livestock by respondents both in bore well irrigated area and un irrigated area in the study area.

For purpose of effective analysis in come secure from livestock has been classified in to five group. In irrigated area 51.5 percent respondents earn income from rupees 2000-4000 per annum from livestock. whereas 14.0 percent respondents derive annual income from rupees 4000-6000 11.1 percent respondents received rupees 6000-8000 and 10 percent people earn annual income ranging from rupees annual in excess of rupees 8000.

In unirrigated it is evident from the table that 27.5 percent respondents get annual income from rupees 2000-4000 from livestock, whereas to 14 percent respondents' faunal income is rupees 4000-6000. Only 10 percent respondents farm income ranging from rupees 6000-8000 per annum and there is no income at all to 27 percent respondents fin unirrigated area.

In bore well irrigated area there is sufficient water to nurture, protect and maintain livestock in irrigated area. This creates scope for supplementary source of income. But in unirrigated area due to scarcity of water farmers find it very difficult to maintain livestock. Therefore, farmers in bore well irrigated area are better than their counter parts in unirrigated area with regard to income from livestock.

From the above table it is observed chi-square test revealed a significant difference between Annual income from livestock of the farmer in Irrigated land and Un irrigated land (X^2=338.667;p=.000.)

12. Secondary Sources of House Hold Income:

Table -12
Secondary Sources of House Hold Income

Sources	Irrigated		Non-irrigated	
	No. of respondents	Percent	No. of respondents	Percent
Dairy	118	59	40	20.00
Poultry	4	2	0	0.00
Emp. /Service	24	12	12	6.00
Labor	30	15	118	59.00
Business	24	12	30	15.00
Total	200	100	200	100.00

Source: Field Survey

The researcher wanted know the secondary source income that the farmers in the study area have developed over a period time. It is true that there is scope for earning substantial income from secondary sources, nonagricultural in nature, such as Dairy, Poultry Emp/ service, Labor and Business. Table No. 12 narrates the income earned by respondents from different secondary sources. Dairy activity seems to be an important dependable economic activity of the respondents fin the study area. As much as 59 percent respondents secure income from dairy activities. Poultry has not become a popular activity in the study area as of now. Only 2 percent respondents received meager income from poultry. 12 percent respondents receive income from employment/service and 15 percent respondents receive income from labor and remaining 12 percent receive income from business.

The situation in non-irrigation area is a bit different. No family depends on family for secondary source of income. Only a small percentage 20 respondents receive income from dairying. The largest source of secondary income in non-irrigated region is labor is 59 percent. 6 percent respondents and 15 percent respondents receive income from employment /business sources respectively.

It may be noted that dairy activity is a popular subsidiary economic activity in the study area in irrigated region whereas in non-irrigated area respondents have not shown much inclination towards dairying. The reason could be that in a non-irrigated area sufficient fodder may not be available to rare cattle and buffalos. Irrigated region is better than non-irrigated region in terms of employment and business services.

From the above table it is observed chi-square test revealed a significant difference between Income of the farmer in Irrigated land and Un irrigated land (X^2=336.50; p=.000).

13. Annual Household Expenditure:

Table – 13

Annual Household Expenditure

Income	Irrigated		Non-Irrigated	
	No. of Respondents	Percent	No. of Respondents	Percent
50000 -75000	64	32	113	56.5
1 lakh – 1.5 lakh	88	44	72	36
1.5 lakh – 2 lakh	35	17.5	15	7.5
2 lakh above	13	6.5	0	0
Total	**200**	**100**	**200**	**100**

Source: Field survey

The above table shows the annual expenditure of the respondents in the study area. 32 percent of the respondent's expenditure is in the range of Rs. 50000 – 75000 per annum, 44 percent of the respondents' expenditure in between Rs.1 lakh –1.5 lakh per annum. 17.5 percent of the respondent's expenditure in between Rs.1.5 – 2 lakh per annum. 6.5 percent of the respondents' expenditure in between Rs. 2 lakhs above per annum.

The result shows that the bore well irrigated area farmers have made more expenditure compared to un-irrigated area farmers.

14. Agriculture implements owned and hired by the Respondents in Bore Well Irrigated area:

Table – 14

Agriculture implements owned and hired by the Respondents in Bore well irrigated area

Implements	Owned	Percent	Hired	Percent
Traditional				
Plough	180	100	00	00
Bullock cart	84	46.7	96	53.3
Spade	160	88.9	20	11.1
Crowbar	74	41.1	106	58.9
Modern				
Tractor	44	24.4	136	75.6
Harvester	18	10	162	90

Source: Field Survey

Farmers require farming implements to carry on farm activity. Therefore, the researcher wanted to know the extent to which farmers in irrigated region in the study possess their own farm implements and how many use hired implements. Farm implement can broadly be classified in to two categories mainly traditional and modern. Plough bullock cart spade and crowbar are treated as traditional implements whereas tractors and harvester have been grouped under modern implement. While large number of respondents own traditional implement they use modern implement on

higher basis. This phenomenon is clear from table 14. All the 180 samples in irrigated region make use own ploughs whereas 84 respondents have own bullock cart. Crowbar is owned by 44 members and spade held by 160 members. Only 18 and 44 respondents have own harvester and tractors respectively.

Thus it is clear from table that large number of farmers in the irrigated region dependent on hired modern implements and tools. The respondents in irrigated region stated that their income does not permit them to have sown tractors and land harvesters. Moreover, these modern implements are easily available them on hire basis.

15. Conclusion:

This chapter provides a detailed analysis of data and information obtained from respondents in the study area. The data has been presented and interoperated with help of tables. The socio economic profile of farming community is related to the development of ground water irrigation and its utilization has been clearly analyzed. This is an eye opener for policy formulation concerning groundwater irrigation management.

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