



Socio-economic analysis of Baroda branch canal of Som Kamla Amba irrigation project, Dungarpur, Rajasthan

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ABSTRACT

Irrigation system development results in improvements of farmers' economic condition, followed by livelihood sustainability, standard of living and social attitude. Present analysis focused on socio-economic status of farming families in the command area of Baroda Branch Canal of Som Kamla Amba Irrigation Project. The study considered survey sampling of 10 per cent beneficiaries in the Baroda branch canal command which consisted 150 farming families having 787 persons in numbers. The socio-economic indicators viz., the family structures, employment pattern, education status, livestock ownership, farm asset distribution, cost of cultivation, and cost of returns were analysed. Results indicated that education and living standards of farmers was low which may be one of the reasons for not adoption of newly farming technologies. Cost of cultivation per hectare for wheat, barley, gram, and mustard crops were found as Rs. 28,503.00, Rs. 26,727.00, Rs. 21,184.00 and Rs. 21,697.00, respectively and net benefits per hectare obtained from these crops were Rs. 13,297, Rs. 13,023, Rs. 14,416 and Rs. 18,303, respectively. The pattern of ownership of livestock showed that the average number of cows in the command area was about 1.97 per family. The productivity in the area is average due to low inputs use.

Introduction

Poor irrigation performance, mainly in many irrigation schemes globally, results in important social, economic and environmental problems, so that the modernization of these areas is required to ensure their profitability and sustainability. Performance analysis of irrigation schemes is essential to improve the systems performance (Rajput *et al.*, 2017a). Irrigation schemes are evaluated using technical, maintenance and comparative performance indicators (Rajput *et al.*, 2017b; 2017c; Molden *et al.*, 2007). Socio-

economic study helps in evaluating the impacts occurred to implementation of irrigation project. Borkar *et al.* (2000) reported that the highly significant association was seen between educations of the farmers with their knowledge level of biofertilizers. Age, land holding, annual income, socio economic status, extension contact and civility characteristics of the farmers were found. Jain (2000) carried out socio-economic survey of 50 farmers in command of Nimoda minor concluded that in the command 55 percent of the

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total farmers were under small land holding. Socio-economic study revealed that per capita per annum income from agricultural activities was Rs. 5496.00. Machiwal (2001) conducted the study of socio-economic status of 45 sampled farmers on the head, middle and tail reaches of Right Main Canal of Jakhm irrigation project and concluded that the agriculture is the main occupation of the farmers who were the mostly tribal, their literacy percentage and family assets were very low and therefore, the farmers were not aware of new technologies of farming. Chahar and Chaudhri (2003) conducted the socio-economic survey in Suratgarh area of Indira Gandhi Nahar Pariyojana. The survey revealed that the income of the farmers has increased after commencement of the canal, it is reached to a maximum and then started to decline due to water logging. They concluded that 10 percent farmers have land holding of less than 10 bigha, 35 percent between 10-20 bigha, 45 percent between 20-30 bigha and 10 percent above 30 bigha, implying that medium size holdings predominate in the surveyed area. Further, 42.5 percent farmers have their area partially affected by water logging while 57.5 percent land holdings were wholly water logged among the surveyed farmers. The study was conducted among the selected farmers, who were taking wheat crop in Sriganganagar district of Rajasthan. Arya (2005) studied LMC command of Som-Kagdar irrigation project. Almost all the farmers in the command area were hiring machines for field preparation and cultivation practices which show the low economic level of the farmers in the command, cost of cultivation of wheat, gram and barley were Rs. 14736.70, Rs. 9036.50 and Rs. 8723.80 per hectare respectively and net benefits obtained from these crops were Rs. 6432.90, Rs. 5214.70 and Rs. 8131.20 per hectare.

Small land holders in irrigation schemes appear relatively wealthy compared to marginalized peasants without access to irrigable land. Sufficient area of irrigable land seems crucial to provide sufficient income; an optimal land allocation of the scarce areas appears necessary (Hagel *et al.*, 2019). Singh *et al.*, (2012) study reveals that whereas 87 % farmers in the head reach and 65 % of farmer in the middle reach, it is only 10 % farmers in the tail

reach are satisfied with present situation of canal command. Percentage of farmer contributing towards the maintenance of the irrigation system are found to be 47.5 %, 25 % and 7.5 % in head, middle and tail reach, respectively. Varhade *et al.*, (2013) worked on “Realistic study of Rehabilitation and Resettlement of Project Affected Persons (PAP’s) of Gosikhud Project in Maharashtra State”. They found that area of RV (Rehabilitated Villages) is 4 times that of AV (Affected Villages); while population density at RV is found out to be 39 persons/ha as compared to 175 persons/ha in case of AV. This clearly shows that PAP’s are being provided more space for their new habitat. They also concluded that 48.42 % of PAP’s are landless or marginal farmers, it means that 51.16 % of households possess farms of more than 1 ha. Akkuzu *et al.*, (2007) indicated that diagnostic analysis of entire canal network is essential to identify the operational problems as well as for socio-economic status survey of the peoples living within the command. Community tubewell schemes improves the income and thereby livelihood of farmers (Singh *et al.*, 2020; Ananta Raj Dahal, 2013). Therefore, socio-economic evaluation is needed to implement any new technology or scheme in the command area to improve existing level of technology adoption for achieve higher production. This investigation conducted to evaluate the impact of irrigation project on socio-economic status of farmers in the command area of Baroda branch canal of Som Kamla Amba irrigation project.

Material and Methods

Description of study area

Som Kamla Ambba irrigation project is a major project in the Dungarpur district, Rajasthan, India. The gross command area (GCA) of the project is 25088 ha with culturable command area (CCA) of 17724 ha. The live storage capacity of reservoir is 160.3 M cum. Dead storage capacity is 12.5 M cum. The command area of Som Kamla Amba project lies on both banks of Som River. The total numbers of villages benefited are 57. The location map of study area and line diagram of Baroda branch canal of Som Kamla Amba irrigation project are shown in (figure 1) and (figure 2), respectively.

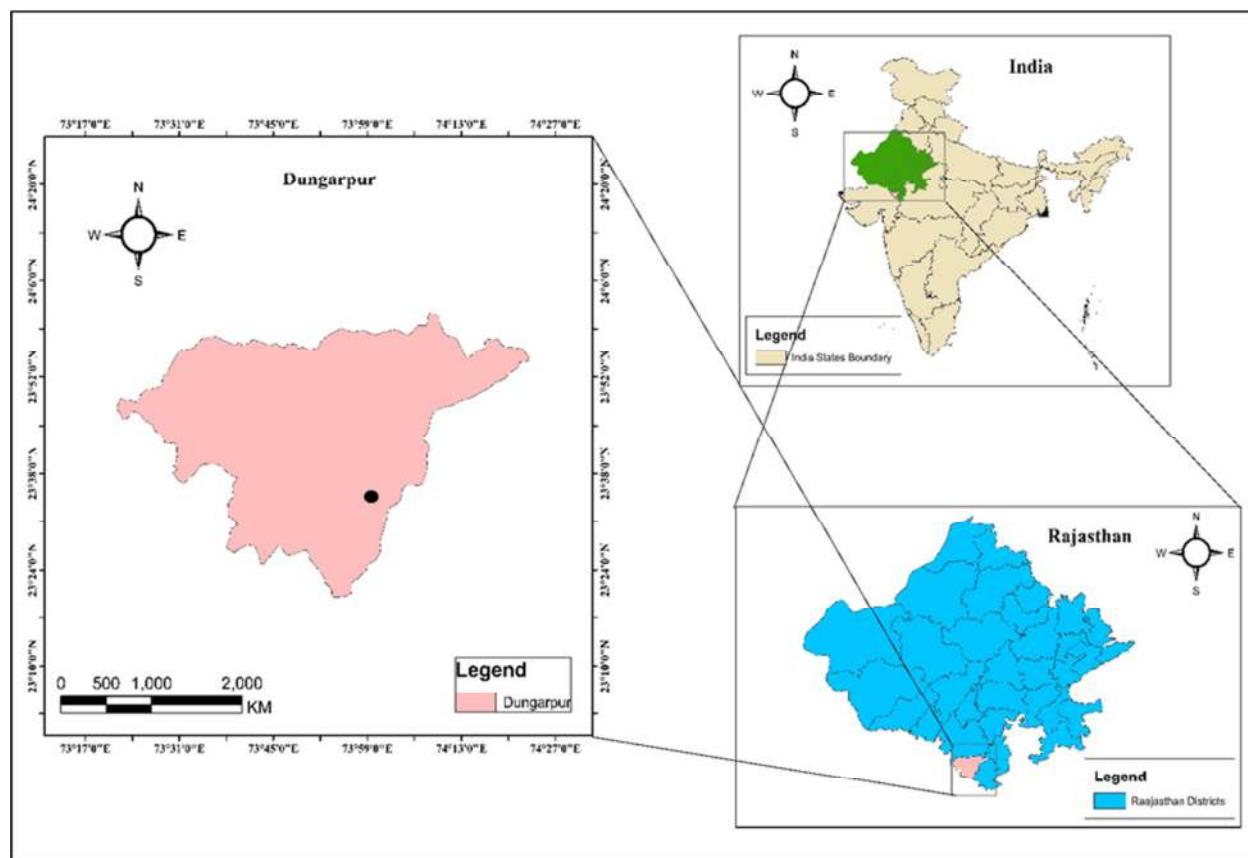


Figure 1: Location map of Som Kamla Amba irrigation project

Socio Economic Status of Farmer's

The technical and socio-economic constraints that prevent farmers from achieving the output potential of their farms differ among countries and even amongst region within a country. The role of socio-economic study is to delineate economic and social problems and to identify the losses associated with technical, institutional, social and economic constraints. It is also imperative that if we are going to implement some planned technology in a region then we should be familiar with the social and economic conditions of that region to get success in the implementation. The present study deals with determination of socio-economic status of the farmers in the command area of Baroda Branch Canal (BBC) of Som Kamla Amba irrigation project with reference to age, level of education, social participation, land holding, farm & non-farm assets. The different techniques used for measuring the socio-economic status and procedure for collection of samples and the data are given below.

a. Selection of Farmers

A complete list of all head, middle and tail end cultivators of the minors on the BBC was obtained. A sample of 10 percent of total farmers of command area of the BBC was chosen for the study. Equal representation has been given to head, middle and tail end of each minor while selecting the sample at randomly. Likewise, 150 farming families were selected in the study command area. As there is undulating and very less land holding in the command, it is difficult to classify them as small, medium and large farm size.

b. Collection of Data

To fulfil the objectives of the study, both primary and secondary data were collected. The required information was collected personally by contacting the main system officials the other lower division official, irrigation staff (Irrigation Patwari etc.) and farmers in the selected minors. All the data and information collected for the study can be divided into two groups viz., macro and micro level.

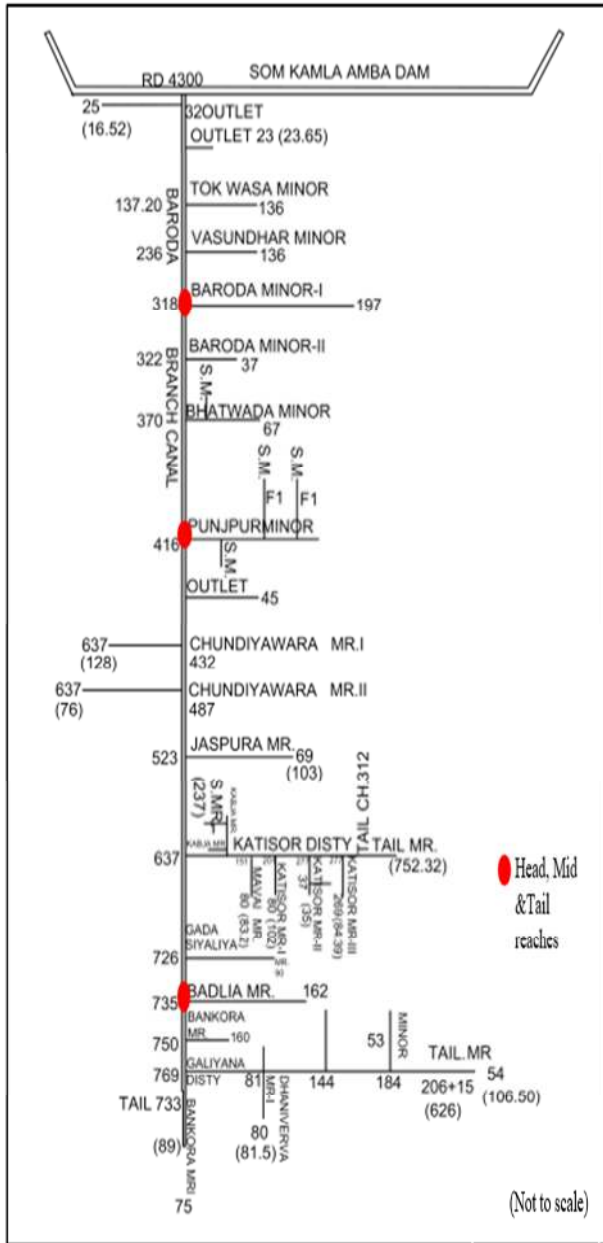


Figure 2: Line diagram of BBC of Som Kamla Amba irrigation project.

Results and Discussion

Development of agriculture in area brings about changes in the economy of farmers, followed by changes in economic and social attitude of the people. These changes are reflected in level of education, pattern of agricultural production and the occupational distribution etc. In the area with the commencement of irrigation, there have been slight changes in socio-economic status of the farmers of this particular command area though the process of

transformation has been comparatively slow. Due to illiteracy and lack of knowledge the farmers were slow to adopt the appropriate procedure regarding crop production and other agronomic practices recommended by the concerned departments. This section deals with the socio-economic status of the sample farmers in the command area. Family composition, occupational pattern, ownership of livestock, farm assets distribution, cost of cultivation and cost of returns are the major components of the analysis. In the command area, there were 150 families surveyed, which is approximate 10 percent of total cultivator. The survey covered 787 persons.

a. Family Composition of the Sample Farmers

The information of each family member was collected through survey questionnaire such as number of family members, migration, age, sex, education level and occupation of family members etc. Average family size in the command area is 5 members per family. (Figure 3) shows number of family members and percentage of facilities.

b. Details of different age group

(Figure 4) shows the age group wise population. Highest population falls in the age group of 11-20 followed by 21-30 age group with population percentage of 22.36 and 19.95 %, respectively. Lowest population was in the age group of 71-90.

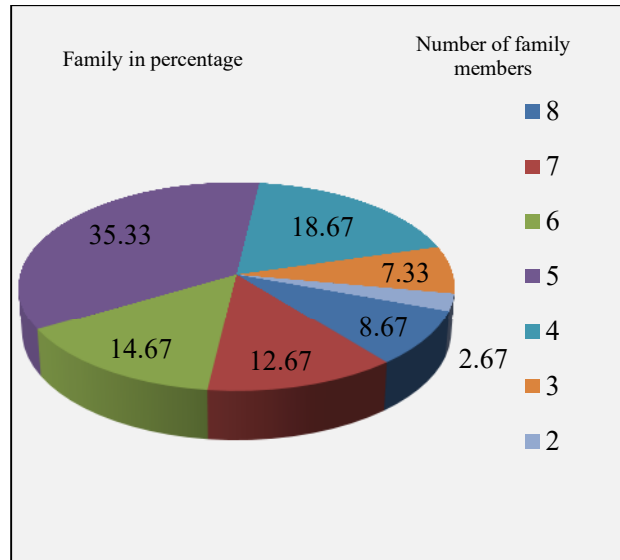


Figure 3: Number of family members and family percentage

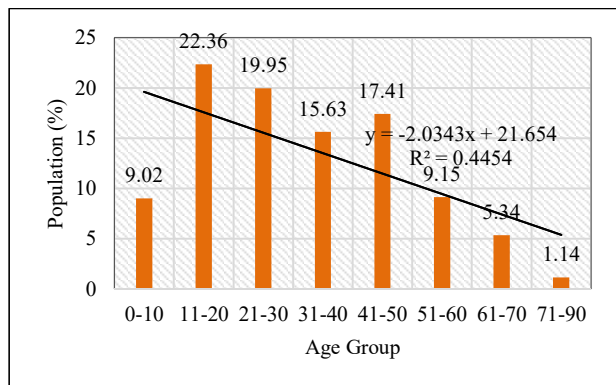


Figure 4: Different age group in the command area.

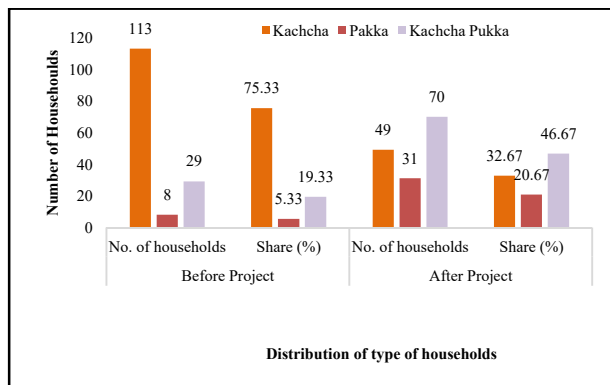


Figure 6: Residential building of sample family

c. Details of male and female surveyed in command area

Female population in the command area is more than male population. (Table 1) shows the population of male and female.

d. Education level of surveyed population in command area

Education level of surveyed area sample is given in (figure 5). It is clear from the table that 84.37 % population is literate.

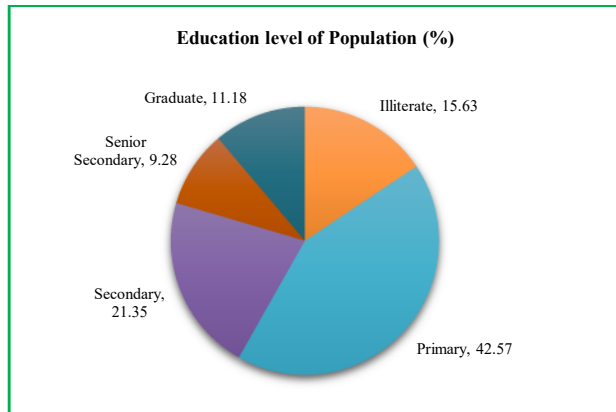


Figure 5: Education level of sample population in command area

e. Buildings

As per survey only 8 families lived in Pakka house, 29 families lived in Partial Pakka house and rest were lived in Kachcha house before irrigation project, whereas at present 31 families lives in Pakka house, 70 families lives in Partial Pakka house and 49 families lives in Kachcha house after irrigation project. The present status of residential building of surveyed family is shown in (figure 6).

f. Migration Details

There were seasonal and long duration migration was found 16.01 percent for employment. Most of people are going for labour work employment in nearby towns, tehsil headquarters, districts headquarters and states.

g. Land Value

Before irrigation project, average value of irrigated land was Rs. 31000 per bigha and unirrigated land was Rs. 23000 per bigha, because in that time span, the most of area was unirrigated and therefore, low crop production due unavailability of assured irrigation source. After irrigation project, there are drastically changes in land value due to increase in irrigation facility and production, because of almost all area is irrigated through canal networks and suitable for all type of crops. At present, the value of irrigated land is approximate Rs. 79000 per bigha and unirrigated land Rs. 60000 per bigha. There has been seen 60.79 % increase in the irrigated land value and 61.66 % increase in unirrigated land value.

h. Age and Social Participation of the Farmers

The analysis states that most of the farmers belonged to young age group i.e. (below 30 years) which was followed by middle age group (i.e., 31 to 49 years) and old (above 50 years) farmers. In the age group of young, middle and old farmers there were 51.33, 33.04 and 15.63 % farmers, respectively. Farmers involved in any social organization as Panchayat were considered under social participation. Only 7.12 percent farmers were found in active participation in social organization

in the study area. It means that most of the farmers have no interest in social activities.

i. Distribution of Farm Assets of Sample Farmers

The distribution of farm assets shown in figure 7. Almost all the farmers in the command area were hiring machines for field preparation and cultivation practices. The economic level of the farmers in the command is low. Some farmers in the command area were without lands and they work as a farm labour on the other farmer’s land. It is observed that major portion of farm assets is devoted to Khurpi, Spade, Gaiti, Indigenous plough, sprayer, Diesel engine and Kudali contributing 21.21, 20.51, 13.68, 8.39, 6.92, 5.05 and 4.51 %, respectively.

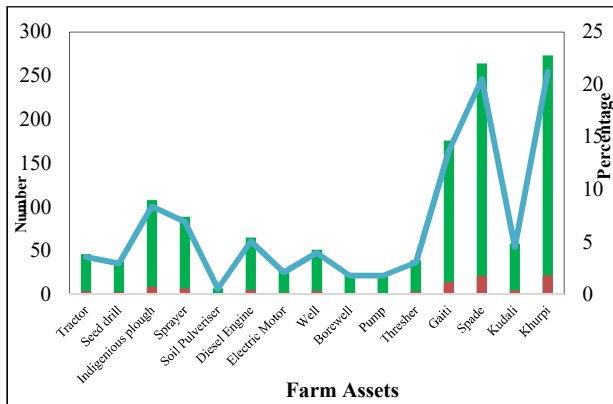


Figure 7: Distribution of farm assets of sample farmers

Table 1: Details of male and female surveyed in command area

SN	Sex	No.of persons	Population (%)
1	Male	379	48.16
2	Female	408	51.84

Table2: Ownership of livestock of the sample farmers

SN	Particulars	Number	No./Family	Percentage
1	Cow	295	1.97	56.30
2	Buffalo	229	1.53	43.70

j. Distribution of Non-Farm Assets of the Sample Farmers

On the analysis of obtained data from selected farmers in command area, number of non-farm assets per family and their percentage individually

shown in figure 8. It is observed from figure that major portion of non-farm assets is devoted to Chairs, Fan, Cycle, Almirah, and Radio contributing 22.84, 15.79, 8.44, 8.33, and 8.10 percent, respectively, of total non-farm assets. Most of the farmers do not have any non-farm assets in the command area. It means almost all the farmers come under very low economic condition.

k. Ownership of Live Stocks of the Sample Farmers

The pattern of ownership of livestock in the selected farmers is presented in Table 2. The average number of cows in the command area was found 1.97 per family. The average buffaloes were estimated 1.53 per family in the command area.

l. Occupational Pattern of the Sample Farmers

Figure 9 clearly depicts that most of the farmers practice farming as a major source of living in their own farm. Most of the adult women performed farming practices along with domestic work. Only 5.34 percent of total family members were on service in government and private organizations in nearby cities or villages.

m. Cropping Pattern of the Project Area

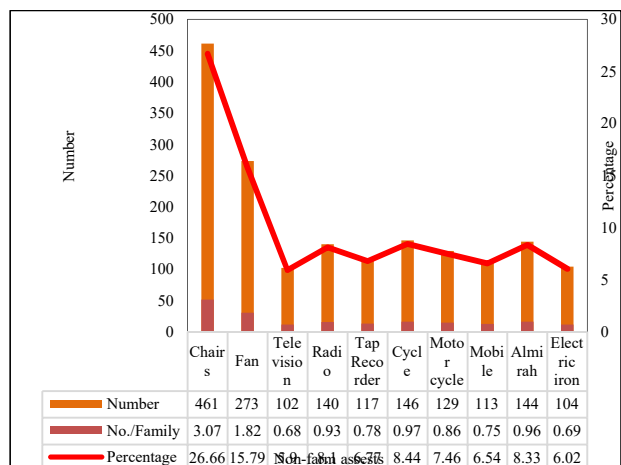
Cropping patterns in a location are ascertained by a diverse array of factors, including climate, land quality, domestic water need, moisture levels, relative profitability, farmer managerial skills, and a number of other factors. Proper monitoring of cropping pattern in the project area is inevitable. Field data regarding the existing cropping pattern were collected from Aspur Tehsil office. The most dominating crop is Maize in Kharif season, while in Rabi season, Wheat is the dominant crop. From figure 10, it becomes clear that the dominant crop wheat covers about 72 percent and remain crops (Gram, mustard, and barley etc. in Rabi season) are grown in only 27 percent of total cropped area.

n. Cost of Cultivation and Net Benefit of Rabi Crops in Command Area

There are varying charges for irrigation of different crops and crop wise irrigation charges for different crops. Table 3 shows the prevailing irrigation rate. Using these irrigation charges, the cost of cultivation of wheat, barley, gram, and mustard, were Rs. 28,503.00, Rs. 26,727.00, Rs. 21,184.00 and Rs. 21,697.00 per hectare, respectively and net benefits obtained from these crops were Rs. 13,297, Rs. 13,023, Rs. 14,416 and Rs. 18,303 per hectare. Crop cultivation of wheat crop is shown in table 4.

Table 3: Crop wise irrigation charges

SN	Crop	Rates in Rs/acre	Rates in Rs/ha
1	Wheat	60	150
2	Mustard	46	115
3	Gram	44	110
4	Coriander	52	130
5	Barley	33	80
6	Vegetables	44	110
7	Lucern	44	110
8	Garlic	52	130
9	Other crops	44	110

**Figure 8: Distribution of non-farm assets of the sampled farmers.****Table 4: Cost of cultivation of wheat crop**

SN	PARTICULARS	COST
A. VARIABLE COST		
1	Preparation of the Field : Ploughing and Bund Making, 6tr hr @Rs.500 per hr and 3 labour @ Rs.150 per day	3450.00
2	Manure and fertilizer	
	(a)F.Y.M. – 5 Cartload @ Rs.350 per cartload	1750.00
	(b) 1 pair of bullock @ Rs. 300 per day and 5 labour @ Rs. 150 per day.	1050.00
	(c) Urea – 100 kg @ Rs.7.0 per kg DAP- 70 kg @ Rs. 25 per kg	700.00 1750.00
3	Seed and sowing	
	(a) Seed – 130 kg @ Rs.1800 per q	2340.00
	(b) Sowing – 2 tr hr @ Rs. 500 per hr and 2 labour @ Rs.150 per day	1300.00
4	Irrigation –(1+4)	
	(a) Irrigation by canal @ Rs.150 per ha	150.00
	(b) Guiding irrigation water – 2 labour @ Rs. 150 per labour	1500.00
5	Interculture Operation – 1 10 labour per weeding and hoeing @ Rs. 150 per day	1500.00
6	Harvesting: 20 Labour @ Rs. 150 per day	3000.00
7	Transporting to threshing floor tr hr @ Rs. 500 per hr and 3 labour @ Rs. 150 per day	950.00
8	Threshing: Power thresher 20 HP @ Rs. 500 per hr for 4 hr and 10 labour @ Rs. 150 per day	3500.00
9	Carting product to market 3 tr hr @ Rs. 500 per hr and 2 labour @ Rs. 150 per day	1800.00
	TOTAL (1 TO 9)	24,740.00
10	Interest on working capital@12% per annum for 6 month	1484.00
	GRAND TOTAL (1 TO 10) OF A.	26,224.00
B. FIXED COST		
11	Depericiation on Farm Building@ 3% on Pacca	350.00

12	Rental value of land	300.00
13	Cost of management @ Rs. 250 per month for 6 months	1500.00
	TOTAL (11 TO 13)	2150.00
14	Interest on fixed capital @ 12 % per annum for 6 months	129.00
	GRAND TOTAL OF B	2279.00
15	Total cost of cultivation (A+B)	28,503.00
16	Yield-	
	Main Product- 22 q /ha@ Rs.1600 per q	35,200.00
	By product- 22 q/ha @ Rs. 300 per q	6,600.00
17	Gross Returns	41,800.00
18	Net Returns	13,297.00

Hydrological Status in Command Area

There was no difference in ground water and surface water quality in command area. No difference in availability and demand of drinking water was found. Many times, water source are not sufficient for agricultural activities in tail command area. This constraint can be resolved by proper irrigation scheduling and development of water allocation plan to achieve uniformity of water distribution throughout the command area of scheme (Rajput *et al.*, 2018). Similar work had been done by other researchers. Machiwal (2001) and Arya (2005) concluded agriculture is the main occupation of the farmers who were the mostly tribal, their literacy percentage and family assets were very low and therefore, the farmers were not aware of new technologies of farming.

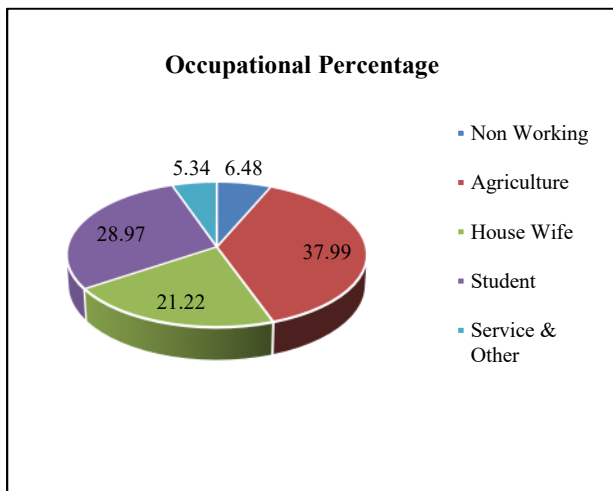


Figure 9: Details of occupational pattern of sample population in command area.

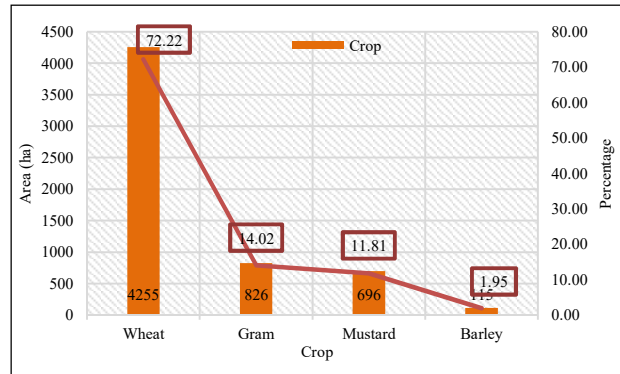


Figure 10: Existing cropping pattern of the Baroda Branch Canal command area for Rabi season in 2013-14

Conclusion

Farming found to be the primary income source in the study area. Majority of farming communities are tribal; their literacy rate and family assets were relatively low, and as an unaware outcome, the farm owners were of application of modern technologies in agriculture. The analysis of survey stated that the proportion of male and females was 48.16 and 51.84 per cent respectively, the average literacy percentage in the command area was 84.37 most of the farmers belonged to young age group i.e., below 30 years which was followed by middle (i.e., 31 to 49 years) and old (i.e., above 50 years) farmers. In the age group of young, middle and old farmers were 51.33, 33.04 and, 15.63 per cent, respectively. Net benefit per hectare obtained from these crops was Rs. 13,297.00, Rs. 13,023.00, Rs. 14,416, and Rs. 18,303, respectively. Results indicated that area under oil seed crops like mustard may be increased to get more net benefits.

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