



IMPACT OF CANAL IRRIGATION FROM TILPARA BARRAGE ON SOCIO-ECONOMIC CHARACTERISTICS OF FARMERS IN AJAY- MAYURAKSHI INTER RIVERINE TRACT OF BIRBHUM DISTRICT

Dr. Koyel Mukherjee

Sangra Bhaban, Shunripukur, Suri, Birbhum, West Bengal

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Abstract:

Tilpara barrage at suri is constructed over Mayurakshi river that has its source on Trikut in Jharkhand. The present study reveals the "Impact of canal irrigation from Tilpara Barrage on socio-economic characteristics of farmers in Ajay- Mayurakshi inter riverine tract of Birbhum District". This barrage helps in different directions to human civilization e.g. irrigation, distribution of land holding, occupational structure of villagers etc. Canal irrigation has been promoted as an important means of meeting perceived needs for water and as long-term, strategic investments, which have many additional benefits. Here to analyze the impact of Tilpara barrage on socio-economic characteristics of farmers in Ajay- Mayurakshi inter riverine tract of Birbhum district, data have been collected from field survey of the above said study area.

Key Words: Canal Irrigated Area, Land Ownership, Educational Status, Occupational Structure & Family Members

Introduction:

Any multipurpose project has more than one goal. There may be a primary objective but other consequences may be taken into account. In this case the primary purpose may be a dam for irrigation. Tilpara barrage at suri is constructed over Mayurakshi river that has its source on Trikut in Jharkhand. This paper shows how Tilpara barrage affects the socio-economic characteristics of farmers in this study area. Tilpara barrage belongs to the Mayurakshi reservoir which was the first project in west Bengal after independence. This project was conceived as back as in the year 1928 after a famine condition following failure of crops in 1927 due to rainfall failure. In this context Tilpara barrage was framed in 1949 and it was completed in 1951. Amalendu Roy was the irrigation minister on that period. Mihirlal Chatterjee took a lot of fruitful steps regarding this barrage and gave idea of two canals (Dwarka Brahmani main canal and Mayurakshi Dwarka main canal) from this barrage to circulate water properly to the agricultural field of the Birbhum district. Actually this barrage was constructed mainly to control flood and side by side it started to distribute water to the drought prone areas. In the past low water demanding crops were cultivated here but now high water demanding crops are cultivated after receiving canal water facility. As a result income of farmers has increased and their standard of living has also increased. So, it is relevant to study the socio-economic characteristics of the study area in respect of canal irrigated area. The socio-economic characteristics can be understood by means of distribution of land ownership, farmers belonging to different caste groups, educational status of the farmers, their occupational structure and distribution of sex wise family members. As the major purpose is to find the impact of irrigated area from Tilpara barrage, therefore the distribution of socio-economic characteristics can be observed against the distribution of percentage of canal irrigated areas.

Literature Survey:

Anil B. Mandavia (Chief engineer, Sardar Sarovar Narmada Nigam Limited, Gandhinagar, Gujarat, India) observed the impact of Sardar Sarovar project. He shows the socio-economic conditions of the farmers and the scientific use of water to satisfy crop requirements will determine the degree of success of canal irrigation.

Amit Garg assessed the water demands for agriculture in India. The barrages will permanently inundate the river bed for this stretch effectively ending the livelihoods of the people.

Bandara (2006) represented the impact of Sharda canal on the agriculture including crop production, cropping pattern etc. He emphasized on training of farmers on cropping techniques through the farmers field schools exposed them to crop husbandry and significant increase in the yield of rice.

Ranachini (1973) observed the socio – economic and environmental impacts of Bhakra – Nangal project and indicated direct and indirect consequences of the dam.

Objectives of the Study:

The major objective is to find the impact of irrigated area from canal system of Tilpara barrage. Therefore the distribution of socio-economic characteristics can be observed against the distribution of percentage of canal irrigated areas.

Data Base:

The data have been collected from two sources i.e. secondary and Primary. The secondary data on the physical aspects of the study area have been collected from west Bengal district gazetteers, Birbhum written by Durgadas Mazumdar (Dec.1975). The data on irrigation, drainage, drought problem, rainfall, temperature, soil

etc. have been collected from the records of the respective offices e.g. Mayurakshi canal circle, principal agricultural of Suri, from district census handbook, Birbhum 1981. Office of the detailed soil survey unit (Mayurakshi command area), Birbhum. The data on population characteristics as well as institutional aspects, infrastructural and facilities, social aspect have also been collected from district census handbook, Birbhum 1981. Primary data obtained from field survey are related to the distribution of the ownership of holding, farmers belonging to different caste groups, educational status of the farmers, their occupational structure and distribution of sex wise family members etc. have been collected from field investigation.

Methodology:

The step of methodology is concerned with the collection of data and information about the Tilpara canal system from Mayurakshi canal circle (Birbhum), has been collected. Agricultural farms (in acre) have been selected from five villages in Ajay-Mayurakshi inter riverine tract of Birbhum district and land owners of 250 farms have been interviewed and data regarding the ownership of holding, farmers belonging to different caste groups, educational status of the farmers, their occupational structure and distribution of sex wise family members etc. socio-economic condition have been collected. Later these data have processed. Percentage of Canal irrigated area wise socio-economic aspects has been arranged. For data processing coefficient of correlation statistical technique has been computed and microsoft excel software have been used for simple tabulation and calculation. Percentage of canal irrigated area wise socio-economic characteristics has been shown by bar graph. Arc GIS 10 software has been used for making location map.

Location of the Study Area:

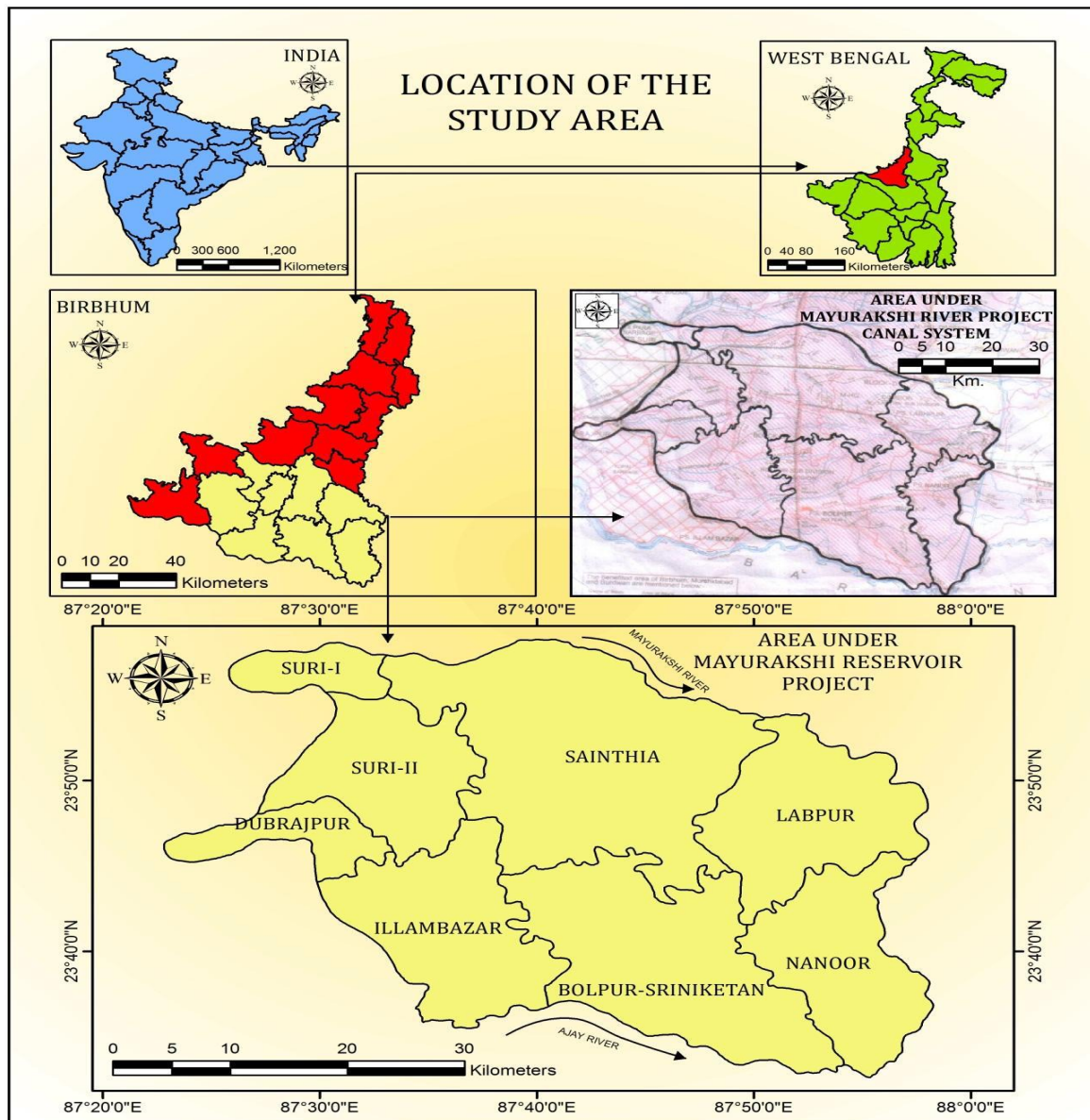


Figure 1: Source: Compiled by the author

Birbhum lies between 23° 32'30'' and 24 ° 35'00'' north latitude and 88° 01'44'' and 87 ° 05'25'' east longitude. The location of Tilpara barrage in suri 23 ° 56'42.98''N and 87 ° 31'31.80''E. From here it is divided into 2 branches. The north branch i.e. 'Mayurakshidwarka main canal' extends to the northern part of Birbhum near Raghunathganah and the 'Bakreshwar main canal' extends to south of Birbhum near Kirnahar. The study area is located between 23°40'00''N to 23°50'00''N latitudes to and 87°20'00''E to 88°00'00''E longitudes. In this region five villages namely Sattoremouza in Bolpur block, Komamouza in Suri II block, Hatoramouza in Sainthia block, Ramkrishnapurmouza in Nanoor block and Gopedighimouza in Labpur block represent the entire study area.

The principal objective of present study is to examine the nature and magnitude of impact of canal irrigation on the agricultural landscape within Ajay-Mayurakshiinter riverine tract of Birbhum district. Before going into detail about that it is necessary to observe the socio-economic characteristics of the farmers of the village.

Distribution of Land Ownership:

The distribution of landholding pattern has been shown against the distribution of percentage of canal irrigated area for different sample villages. In sattore village the percentage of canal irrigated area has been divided into three groups-the lowest group ranges between 55% and 61.66% where 32% of the sample farms exist. On the other hand there are 46% of the sample farms have the percentage of canal irrigated area ranges between 61.66% and 68.32%, whereas the large proportion of canal irrigated area ranges between 68.32% and 75% where 22% of the total sample households exist. Therefore it is observed that almost half of the sample households have the percentage of canal irrigated area possessing the medium range and smaller proportion of households have larger proportion of canal irrigated area. It is interesting to note that the average size of the farm is only 4.8 acre in those cases where the percentage of canal irrigated area is the largest where as there are 6.8 acre is the average farm size where moderate proportion of canal irrigated area is observed. Set against this the average farm size is 5.6 acre in case of those farms who posses the lower ranges of canal irrigated area. Therefore it is observed that in Sattore village there is larger farm size in case of the medium range of the canal irrigated areas.

In koma village a little bit different picture can be portrayed. The distribution of percentage of canal irrigated area and distribution of percentage of farms are directly proportional to each other whereas it is inversely proportional to the average size of landholding. As for example the lowest averagesize of the landholding is found in case of highest range of canal irrigated area and highest size of farm can be observed in case of moderate range of canal irrigated area.

- ✓ In Hatora village a distinct relationship between percentage of canal irrigated area and average size of land ownership can be observed. That is the firms with larger proportion of canal irrigated area also possess larger amount of average size of landholding that is 7.78 acre. On the other hand, the farms with lowest category of percentage of net irrigated area possess the lowest average size of land ownership that is 3.6 acre. In this way the relationship between them is directly proportional to each other.
- ✓ In Ramkrishnapur village there is positive and direct and direct proportional relationship exist between the ranges of total canal irrigated area and size of landholding. It is found that in the highest range of canal irrigated area larger size of landownership is observed which is just the opposite in case of smaller range of canal irrigated area where the avg size of landownership is also lowest.
- ✓ In Gopedighi village different kind of relationship has been established between size of canal irrigated area, percentage of farm, average size of landholding e.g. there are some farms with larger size of canal irrigated area there relatively smaller proportion of farms can be observed. On the other hand in small size of canal irrigated area have large proportion of farms is is observed. Set against this the average size of landholding is relatively larger in case of larger size canal irrigated area and the same is small in smaller size of canal irrigated area.
- ✓ The above discussion can be observed from the following table (Table 1).

Table 1: Distribution of land ownership according to canal irrigated area

SATTORE		KOMA		HATORA	
Canal irrigated area (%)	Amount of Land ownership (acre)	Canal irrigated area (%)	Amount of Land ownership (acre)	Canal irrigated area (%)	Amount of Land ownership (acre)
55.00-61.66	5.60	60.0-73.33	7.20	60.0-66.66	3.60
61.66-68.32	6.80	73.3-86.66	8.00	66.6-73.33	5.60
68.32-75.00	4.80	86.6-100.00	5.60	73.3-100.00	7.78

RAMKRISHNAPUR		GOPEDIGHI	
Canal irrigated area(acre)	Amount of Land ownership (acre)	Canal irrigated area(acre)	Amount of Land ownership (acre)

0.80-4.60	2.80	0.80-4.73	2.80
4.60-8.40	5.96	4.73-8.66	6.23
8.40-12.00	10.80	8.66-12.66	10.80

Source: Table compiled from data obtained from field survey

Distribution of Castes:

It is at present necessary to study the caste background of the farmers. The purpose is to find out the distribution of farmers with different caste background according to variation of farms with different size classes of canal irrigated area. The study regarding the caste background is important because generally the farmers with high and medium Hindu caste have larger amount of capital and by investing them they can produce considerable amount of crops. On the other hand the poor farmers who belong to schedule caste and schedule tribe communities do not have good access to the services of infrastructure facilities. They do not have adequate amount of capital resource for the investment in agricultural practices. So, the farmers with different caste background have different kinds of property to earn profit from agriculture. The study indicates that in the sample villages the numerical strength of farmers belonging to middle caste and schedule caste communities is beyond any doubt. However in koma village in the middle category of percentage of canal area along with the predominant of middle caste Hindu farmers the numerical significance is also observed in case of High caste Hindu farmers. This kind of numerical domination of farmers is observed in the farms with large, medium and small percentages of canal irrigated area. The detail account can be observed from the following table (Table 2).

Table 2: Distribution of farmers with caste background according to canal irrigated area

SATTORE				KOMA				HATORA			
Canal irrigated area (%)	No. of farmers with Caste background			Canal irrigated area (%)	No. of farmers with Caste background			Canal irrigated area (%)	No. of farmers with Caste background		
55.00-61.66	H.C	M.C	S.C	60.00-73.33	HC	M.C	S.C	60.00-66.66	HC	M.C	S.C
	1	10	5		1	8	1		1	7	4
61.66-68.32	4	15	4	73.33-86.66	4	9	3	66.66-73.33	4	7	5
68.32-75	3	3	5	86.66-100	1	12	11	73.33-100	4	9	9

RAMKRISHNAPUR				GOPEDIGHI			
Canal irrigated area(acre)	No. of farmers with Caste background			Canal irrigated area(acre)	No. of farmers with Caste background		
0.8-4.6	H.C.	M.C	S.C	0.8-4.73	H.C.	M.C.	S.C
	1	4	6		3	5	12
4.6-8.4	3	4	12	4.73-8.66	-	11	3
8.4-12	-	6	14	8.66-12.66	-	13	3

Source: Table compiled from data obtained from field survey

N.B- H.C – High Caste Hindu Farmers, M.C – Middle Caste Hindu Farmers, S.C – Schedule Caste Hindu Farmers.

Educational Status of Head of the Agricultural Farms:

Education seems to be a vital parameter which increases the depth of knowledge of the farmers which contribute significantly to augment agricultural productivity. Education increases the awareness of the farmers regarding scientific and better agricultural operation. It inspires motivate and mobilize the farmers in favour of scientific utilization of resources in order to achieve higher degree of agricultural development. Therefore it is utmost necessary to study the educational status of the head of the farms because it will influence the farmers to ad better science and technology for the development of agriculture. The study indicates that in the five sample villages in two villages the heads of the farms on an average have obtained higher secondary certificates whereas in one each village on an average the heads of the farms have passed either class IX or class VI or obtained school final degrees. In the middle category of percentage of canal irrigated area the average educational qualification of the head of the farms is lower than the farms with lower category of canal irrigated areas. e.g. out of five sample villages in three the average educational status of the heads of the farms is class X indicating that they have passed school final level but none of them have obtained higher secondary degree. However, the average educational status of one village is for the heads of the farm are class IX and class VIII respectively. The farms with larger proportion of canal irrigated area, there in two villages the average educational qualification of the heads of the farms is class X and upper primary level respectively where as in one village the average educational status is class IX. Therefore it has been surmised that the average educational status of heads of the farms is highest i.e. higher secondary level which is found in case of farms with small proportion of canal irrigated area. Otherwise, in middle and higher category of canal irrigated areas

large number of villages have the heads of the farms whose educational status becomes class X level and below that. This means the farmers with relatively higher educational qualification are serving particularly those farms which have small canal irrigated area. Following table (Table 4) will illustrate the factor.

Table 3: Distribution of educational status of farmers according to canal irrigated area

SATTORE		KOMA		HATORA	
Canal irrigated area (%)	Educational status of farmers	Canal irrigated area (%)	Educational status of farmers	Canal irrigated area (%)	Educational status of farmers
55.00-61.66	Class IX	60.00-73.33	Class VI	60.00-66.66	Class XI
61.66-68.32	Class VIII	73.33-86.66	Class X	66.66-73.33	Class IX
68.32-75.00	Class X	86.66-100.00	Class VIII	73.33-100.00	Class X

RAMKRISHNAPUR		GOPEDIGHI	
Canal irrigated area(acre)	Educational status of farmers	Canal irrigated area(acre)	Educational status of farmers
0.80-4.60	Class XI	0.80-4.73	Class X
4.60-8.40	Class X	4.73-8.66	Class X
8.40-12.00	Class X	8.66-12.66	Class IX

Source: Table compiled from data obtained from field survey

Occupational Structure:

Occupational structure has been considered as an important parameter to indicate the nature of agricultural practices in the village, e.g. there are some farmers whose main occupation is agriculture. Under such a situation these farmers will invest considerable amount of capital to achieve higher productivity of crops. Besides, they will devote considerable amount of time to supervise the agricultural practices to a significant extent. On the other hand there are some inhabitants who although cultivate crop but have main occupation as teacher of school, services in different organizations and have commercial stalls. The inhabitants who have other occupation about from agriculture cannot devote much time on agriculture rather invest money and concentration largely on service, business and teaching performances. Therefore these inhabitants cannot concentrate largely or supervise scientifically for agriculture which may give rise to lower productivity of crops. The present study indicates that in most cases the farmers have main occupation as agriculture however in some villages other categories are disar e.g. in Sattore, koma, Ramkrishnapur, Gopedighi and Hatora village the main occupation is only teaching along with agriculture. In case of subsidiary occupation, there are some inhabitants who apart from practising cultivation they involve themselves in various types of business, service and teaching activities.

Family Members:

Male Members:

Numerical strength of male population indicates the nature and magnitude of muscle power. This muscle power can be used more effectively and scientifically in agricultural development. Among the five sample villages in all the four villages except Koma there is direct proportional relationship or positive correlation between the farm size of canal irrigated area and the average number of male members in the family. It means the farms with larger proportion of canal irrigated area have also considerable number of male population that means the same farms are facilitated by muscle power, which conclude significantly to explain the higher level of agricultural development. Set against this, in Komavillage the relationship between farms with different size classes of irrigated area and average number of male population is negative. i.e. the larger the canal irrigated area of farm the lower of male members in the family. However the positive relationship in rest of the four villages can be observed. Following table (Table5) further illustrate it

Table 5: Distribution of male family members in respect of canal irrigated area

SATTORE		KOMA		HATORA	
Canal irrigated area (%)	Male members	Canal irrigated area (%)	Male members	Canal irrigated area (%)	Male members
55.00-61.66	4.00	60.00-73.33	4.10	60.00-66.66	4.00
61.66-68.32	4.00	73.33-86.66	4.00	66.66-73.33	4.37
68.32-75.00	3.00	86.66-100.00	4.00	73.33-100.00	4.40

RAMKRISHNAPUR		GOPEDIGHI	
Canal irrigated area(acre)	Male members	Canal irrigated area (acre)	Male members
0.80-4.60	3.80	0.80-4.73	3.18
4.60-8.40	3.56	4.73-8.66	3.45

8.40-12.00	4.34	8.66-12.66	4.10
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Source: Table compiled from data obtained from field survey

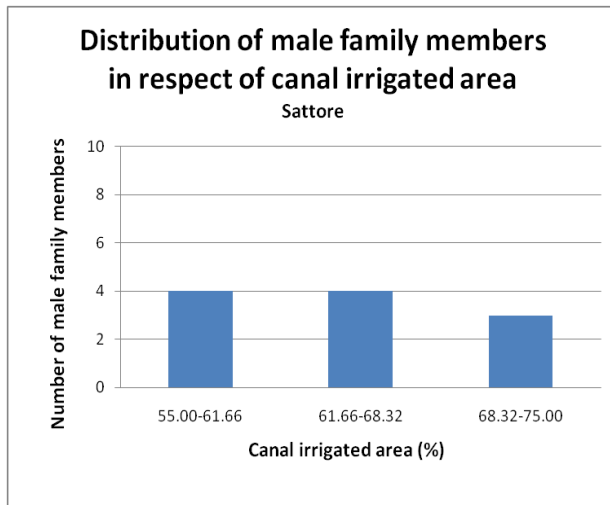


Diagram-1

Source- Diagram compiled from data obtained from field survey.

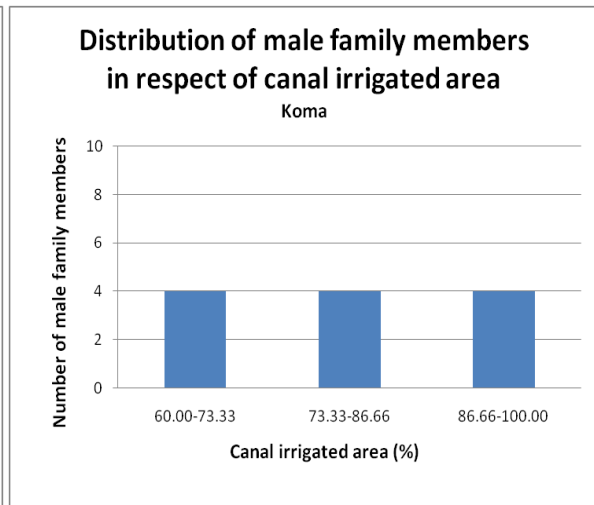


Diagram-2

Source- Diagram compiled from data obtained from field survey.

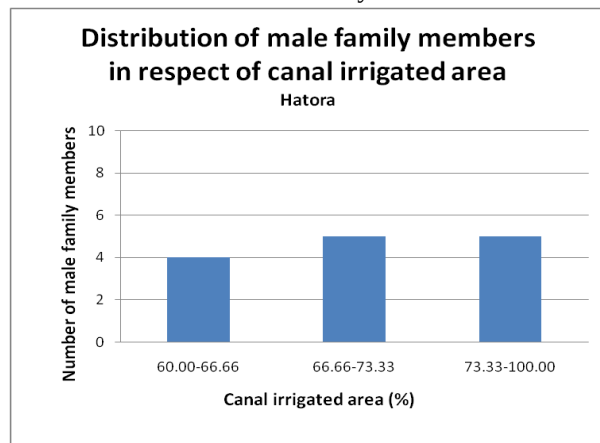


Diagram-3

Source- Diagram compiled from data obtained from field survey.

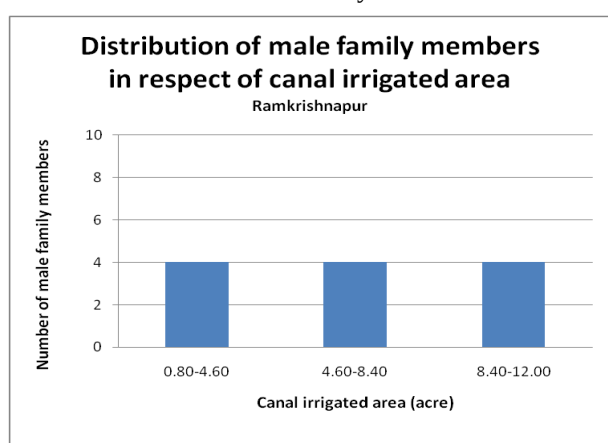


Diagram-4

Source- Diagram compiled from data obtained from field survey.

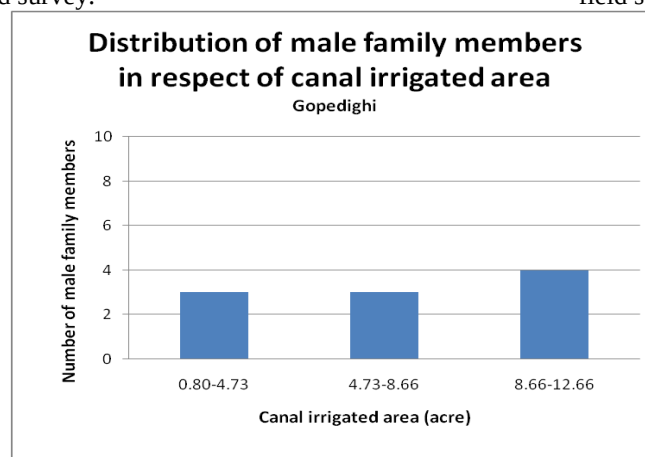


Diagram-5

Source- Diagram compiled from data obtained from field survey

Female Family Members:

Numerical strength of female members in the family indicates dependant population. Generally female population in the family are involved in the hds activities. The dependant population don't involve themselves in

the agricultural activities. Therefore the numerical strength of female population is not directly involved with agriculture but is involved with the household activities. The present study indicates that except in Sattore village in all other four sample villages the farms with larger size of canal irrigated area have large number of female population in the families whereas in Sattore village there the farms with larger size of canal irrigated area have small number of female population in the families. This can be observed from the following table (Table 6).

Table 6: Distribution of female family members in respect of canal irrigated area

SATTORE		KOMA		HATORA	
Canal irrigated area (%)	Female members	Canal irrigated area (%)	Female members	Canal irrigated area (%)	Female members
55.00-61.66	9.00	60.00-73.33	3.00	60.00-66.66	3.00
61.66-68.32	5.00	73.33-86.66	4.00	66.66-73.33	3.00
68.32-75.00	5.00	86.66-100.00	4.00	73.33-100.00	4.00

RAMKRISHNAPUR		GOPEDIGHI	
Canal irrigated area(acre)	Female members	Canal irrigated area (acre)	Female members
0.80-4.60	4.00	0.80-4.73	3.00
4.60-8.40	5.00	4.73-8.66	3.00
8.40-12.00	5.00	8.66-12.66	4.00

Source: Table compiled from data obtained from field survey

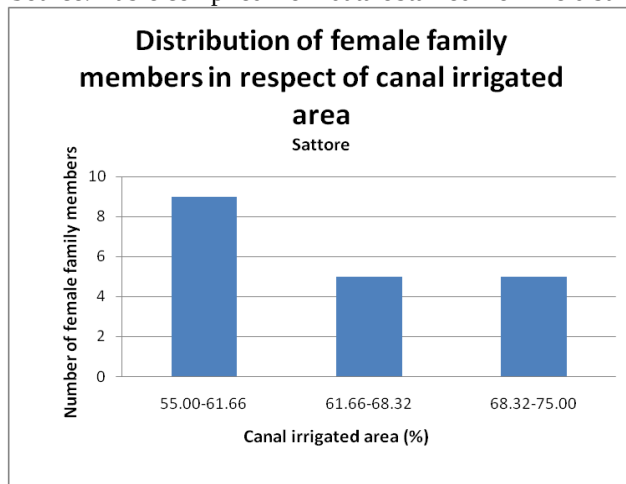


Diagram-6

Source- Diagram compiled from data obtained from field survey.

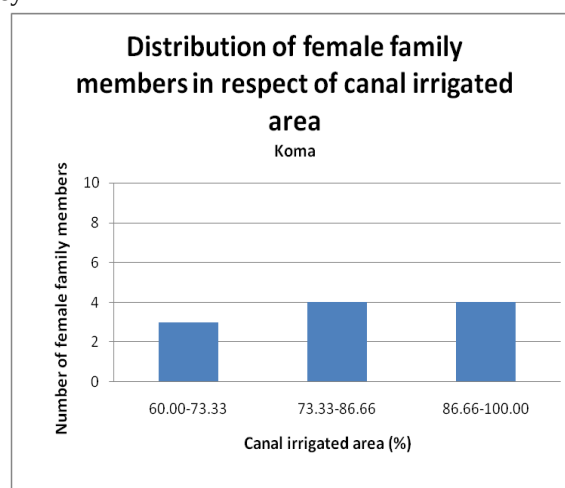


Diagram-7

Source- Diagram compiled from data obtained from field survey.

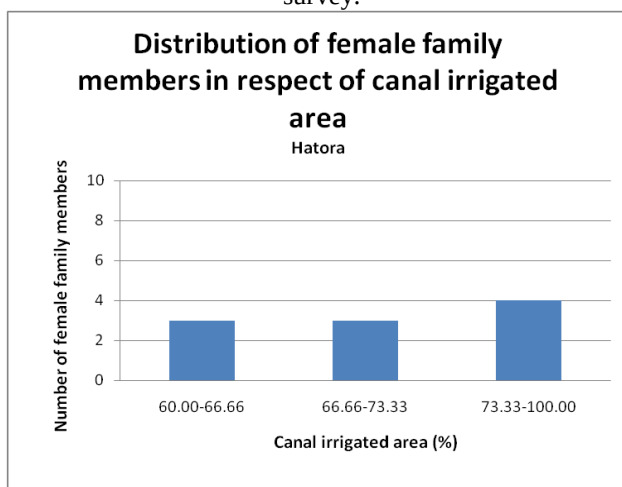


Diagram-8

Source- Diagram compiled from data obtained from field survey.

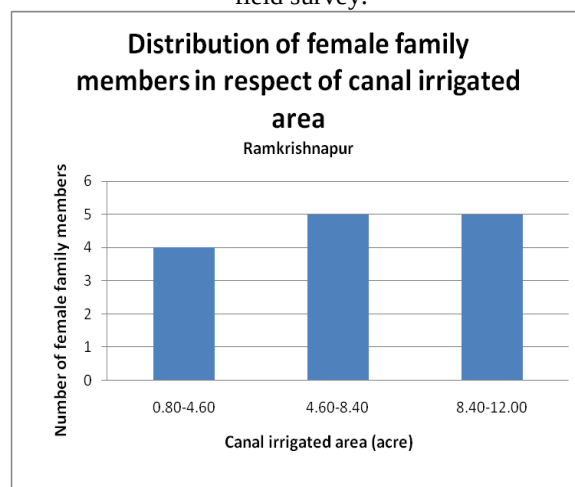


Diagram-9

Source- Diagram compiled from data obtained from field survey.

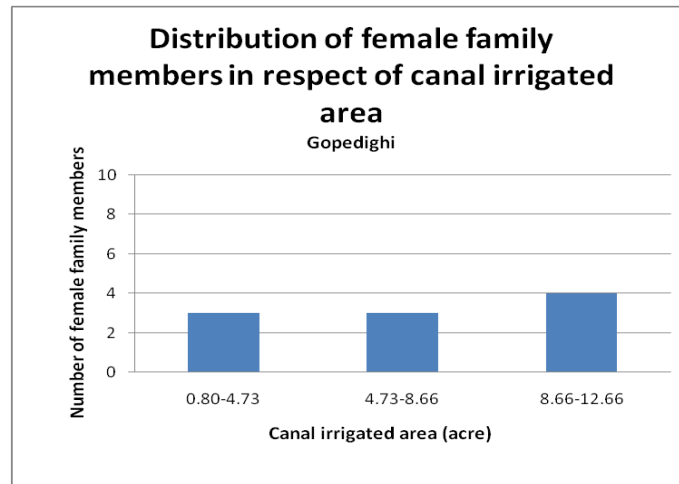


Diagram-10

Source- Diagram compiled from data obtained from field survey.

Total Family Members:

Family member is an important indicator which may indicate the number of working hand and size of the family to explain the nature of labour force and supervisor for agricultural development. In the present study it is found that the size class of farms with canal irrigated area and the number of family members in the households are by and large directly proportional to each other in all the sample villages of the study area that means the farms where considerable amount of canal irrigated area is found there large number of family members also reside in those households.

Statistical Analysis:

Variable X' (Canal irrigated area)	Variable 'Y' (Socio-economic characteristics of farmers)	'r' values (correlation)	Computed 't' value	Tabulated 't' value		Significant/ Insignificant	Hypothesis accepted
				5%	1%		
Sattore	Educational status	-0.49	-3.89	2.01	2.68	Significant	Alternative accepted
	Male family members	0.05	0.37	2.01	2.68	Insignificant	Null accepted
	Female family members	-0.27	-1.94	2.01	2.68	Insignificant	Null accepted
	Total family members	-0.14	-0.98	2.01	2.68	Insignificant	Null accepted
	Main occupation	0.22	1.56	2.01	2.68	Insignificant	Null accepted
	Subsidiary occupation	0.09	0.63	2.01	2.68	Insignificant	Null accepted
	Caste	-0.03	-0.22	2.01	2.68	Insignificant	Null accepted
Koma	Educational status	-0.09	-0.65	2.01	2.68	Insignificant	Null accepted
	Male family members	0.06	0.42	2.01	2.68	Insignificant	Null accepted
	Female family members	0.02	0.12	2.01	2.68	Insignificant	Null accepted
	Total family members	0.04	0.32	2.01	2.68	Insignificant	Null accepted
	Main occupation	-0.06	-0.47	2.01	2.68	Insignificant	Null accepted
	Subsidiary occupation	-0.16	-1.14	2.01	2.68	Insignificant	Null accepted
	Caste	0.14	0.98	2.01	2.68	Insignificant	Null accepted
Hatora	Educational status	-0.03	-0.23	2.01	2.68	Insignificant	Null accepted
	Male family members	0.14	0.98	2.01	2.68	Insignificant	Null accepted
	Female family members	0.001	8.59	2.01	2.68	Significant	Alternative accepted
	Total family members	0.09	0.65	2.01	2.68	Insignificant	Null accepted
	Main occupation	0.01	0.08	2.01	2.68	Insignificant	Null accepted
	Subsidiary occupation	0.57	4.81	2.01	2.68	Significant	Alternative accepted
	Caste	0.12	0.84	2.01	2.68	Insignificant	Null accepted
Ramkrishnapur	Educational status	-0.12	-0.84	2.01	2.68	Insignificant	Null accepted

	Male family members	0.27	2.00	2.01	2.68	Insignificant	Null accepted
	Female family members	0.23	1.63	2.01	2.68	Insignificant	Null accepted
	Total family members	0.36	2.67	2.01	2.68	Insignificant	Null accepted
	Main occupation	-0.11	-0.77	2.01	2.68	Insignificant	Null accepted
	Subsidiary occupation	-0.04	0.90	2.01	2.68	Insignificant	Null accepted
	Caste	0.13	0.91	2.01	2.68	Insignificant	Null accepted
Gopedighi	Educational status	0.06	0.41	2.01	2.68	Insignificant	Null accepted
	Male family members	0.22	1.56	2.01	2.68	Insignificant	Null accepted
	Female family members	-0.13	-0.91	2.01	2.68	Insignificant	Null accepted
	Total family members	0.30	2.18	2.01	2.68	Insignificant	Null accepted
	Main occupation	0.15	1.05	2.01	2.68	Insignificant	Null accepted
	Subsidiary occupation	0.37	2.76	2.01	2.68	Significant	Alternative accepted
	Caste	0.14	0.97	2.01	2.68	Insignificant	Null accepted

Conclusion:

From the above discussion, it is concluded that there is positive relationship between the farms with different size classes of canal irrigated area and size classes landownership. This relationship holds good in three sample villages namely Hatora, Ramkrishnapur and Gopedighi. However in rest two villages namely Sattore and Koma the relationship is inverse. In these sample village from study most of the farmers belong to either middle caste Hindu or schedule caste community except in one village that is Koma where farmers with high caste Hindu background becomes predominant. As far as educational status of heads of the households is concerned the heads of the farms of with small canal irrigated area have passed higher secondary level whereas in other category of canal irrigated area in most cases the heads have obtained either school final certificate or have passed either class IX or upper primary classes. The main occupation of the farmer is the agriculture however there are some inhabitants who are larger amount of money not from agriculture but from teaching, service and business. Apart from this the inhabitants also have service, business and teaching professions as their subsidiary occupation along with agriculture as main. In most of the villages the farms with larger amount of canal irrigated area also have higher numerical strength or male members in the family. In most of the sample villages the size of farms with canal irrigated area and the number of female population in the families are directly proportional to each other except in sattore village where the relationship is inversely proportion to each other. It is surmised that the farms with different size classes of canal irrigated area is directly proportional to the total family members of the households, indicating higher the size class of canal irrigated area larger is the number of total family members.

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