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## **Review Of Research**



#### IMPACT OF TILPARA BARRAGE ON AGRICULTURAL LAND USE IN AJAY-MAYURAKSHI INTER RIVERINE TRACT OF BIRBHUM DISTRICT

#### Dr. Koyel Mukherjee

Ph.D.(Awarded), M.A (Geography), B.ED, NET & RET Qualified.

#### ABSTRACT :

ilpara barrage at suri is constructed over Mayurakshi river that has its source on Trikut in Jharkhand. The present study reveals the "Impact of Tilpara Barrage on agricultural land use in Ajay-Mayurakshi inter riverine tract of Birbhum District". Agricultural land use means how and to what extent the lands are used under the purpose of agricultural activities. Here to analyze the impact of Tilpara barrage on agricultural land use in Ajay-Mayurakshi inter riverine tract of Birbhum district, data have been collected from field survey and secondary survey of the above said study area.



KEYWORDS: canal irrigated area, gross cropped area, net cropped area, cropping intensity.

#### **INTRODUCTION**

Geographers studying the agricultural complex of India have been discussing the distributional patterns of agricultural phenomena (Bhatia, S.S. 1965 : Economic Geography, ? Pattern of crop concentration and diversification in India, vol 41, pp 39-56.). Agricultural land use pattern is closely related to irrigation. In this case the primary purpose may be a dam for irrigation. Tilpara barrage at Suri is constructed over Mayurakshiriver that has its source on Trikut in Jharkhand. Here Agricultural land utilization includes several parameters which are used here are as follows:-

- Percentage of net sownarea
- + Percentage of area under canalirrigation
- + Percentage of submersible irrigation
- + Percentage of tankirrigation
- + Intensification of crops
- Distribution of elevated area +

This paper shows how Tilpara barrage affects the land use pattern in this study area. The canal irrigation is provided by Tilpara barrage which affects the land use pattern in different ways.

#### LITERATURE SURVEY:

Abdul Bayes (January, 2007) observed the socio-economic impact of Jamuna multipurpose bridge project (JMBP). The studies reveal the changing pattern of land use causes increase of the product market, occupation and income and provide a picture of the changes in the distribution of income over the periods.

P. S. Bansode and S. S. Nimbalkarassessed land use pattern and cropping pattern of marginal farmers of Marathwada region of Maharashtra. According to him land use pattern indicates how efficiently the land use resources available to the farmers were utilized. The land utilization pattern also indicates the area available for the cultivation, gross copped area and cropping intensity.

#### **OBJECTIVES OF THE STUDY:**

#### The objectives of the study is to identify the impact of Tilpara barrage on

(1) agricultural land use including gross cropped area, net cropped area and cropping intensity of this region.(2) agricultural development of this region.

#### Data base:

The data have been collected from two sources i.e. secondary and Primary .The secondary data on irrigation, has been collected from there cords of there spective officese.g.Mayurakshi canal circle, principal agricultural of Suri, fromdistrictcensushandbook,Birbhum1981. Primary data obtained from field survey are related to the distribution of the net sown area, canal, submersible and tank irrigated area 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 their land use pattern including gross cropped area, net cropped area, cropping intensity etc. have been collected. Later these data have processed. Percentage of Canal irrigated area wise distribution of net sown area, size of farms, submersible and tank irrigated area, elevated land have been arranged. For data processing statistical technique has been computed and microsoft excel software have been used for simple tabulation and calculation. Percentage of canal irrigated area wise distribution of net sown area has been used for making choropleth maps.

#### LOCATION OF THE STUDY AREA:

The study area is located between 23<sup>2</sup>40'00''N to 23<sup>2</sup>50'00''N latitudes and 87?20'00''E to 88?00'00''E longitudes of Birbhum district. 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.





Source- India map, West Bengal map and Birbhum map compiled by raster from google.com and vectorised by GIS software. Birbhum map of =area under Mayurakshi reservoir project' was provided by Mayurakshi Canal Circle, Suri. Location of the study area between Ajay-Mayurakshi inter riverine tract of Birbhum district map was compiled by Author with the help of political map of Birbhum district.

#### Now the above said points will be discussed-Distribution of percentage of net sownarea:

In the present study a relationship has been identified between percentage distribution of canal irrigated area and average size of net sown area in different sample villages. In Sattore and Koma villages the relationship is inverse. Set against this, in Hatora, Ramkrishnapur andGopedighi villages such relationship is positive and directly proportional. It can be indicated in details in the following table (Table- 1) and diagrams (Diagrams- 1 to 5).-

Sattore		Koma		Hatora		Ramkrishnapur		Gopedighi	
Canal irrigated area(%)	Net sown area(acre)	Canal irrigated area(%)	Net sown area(acre)	Canal irrigated area(%)	Net sown area(acre)	Canal irrigated area(acre)	Net sown area(acre)	Canal irrigated area(acre)	Net so wn area(acre)
55.00- 61.66	5.60	60.00- 73.33	7.20	<66.66	3.60	0.80-4.60	2.80	0.80-4.73	2.80
61.66- 68.32	6.80	73.33- 86.66	8.00	66.66- 73.33	5.60	4.60-8.40	5.96	4.73-8.66	6.23
68.32- 75.00	4.80	86.66- 100.00	5.60	>73.33	7.78	8.40-12.00	10.80	8.66-12.66	10.80

#### Table : 1 Distribution of net sown area according to canal irrigated area



#### Source: Table compiled from data obtained from field survey





Diagram-5 Source- Diagrams compiled by the authour

#### PERCENTAGE OF AREA UNDER CANALIRRIGATION:

The distribution of canal irrigated area is the same that of net irrigated area (Report on the activities of the irrigation and waterways Department (Mayurakshi Canal Circle). In Sattore village there is 32% of the total farm where relatively smaller proportion of canal irrigated area is found whereas in 22% of the total farms where considerable proportion of canal irrigated area predominant. Side by side there are 20% of the farms in Koma village where the percentage of canal irrigated area ranges between 86.66% and 100% which seems to be the highest ranges, whereas 48% of total households have the percentage of canal irrigated area which ranges between 60% and 73.33%. Therefore in Koma village the considerable proportion of farms have moderate proportion of canal irrigated area vhereas relatively smaller proportion of farms have larger proportion of canal irrigated area whereas relatively smaller proportion of farms have larger proportion of canal irrigated area and 4.73 acre, whereas there are 38% of the total farms have highest range of canal irrigated area ranges between 8.66 acre and 12.66 acre. So, the impact is remarkable. In case of other three villages the relationship is also positive and directlyproportional which can be shown from the following table (Table-2)

Sattore		Koma		Hatora		Ramkrishnapur		Gopedighi	
Canal irrigated area(%)	Distribution of size of farms(acre)	Canal irrigated are a(%)	Distribution of size of farms(acre)	Canal irrigated area(%)	Distribution of size of farms(acre)	Canal irrigated area(acre)	Distribution of size of farms(acre)	Canal irrigated are a(acre)	Distribution of size of farms(acre)
55.00- 61.66	5.60	60.00- 73.33	7.20	<66.66	3.60	0.80- 4.60	2.80	0.80- 4.73	2.80
61.66- 68.32	6.80	73.33- 86.66	8.00	66.66- 73.33	5.60	4.60- 8.40	5.96	4.73- 8.66	6.23
68.32- 75.00	4.80	86.66- 100.00	5.60	>73.33	7.78	8.40- 12.00	10.80	8.66- 12.66	10.80

#### Table: 2 Distribution of size of farms according to canal irrigated area

Source: Table compiled from data obtained from field survey

#### Percentage of submersible irrigated area:

In this new system an irrigation engine is installed below the Earth surface and from there this engine sucks out water and throw it to the agricultural land. The present study indicates inverse relationship between percentages of canal irrigated areas and the average size of submersible irrigated area in Sattore, Koma, Hatora villages. That means in these three villages canal irrigated area is extensively found and submersible area is relatively smaller in proportion. It is directly proportional in Ramkrishnapur and Gopedighi villages.

#### Percentage of tank irrigated area:

Tank irrigation is another artificial means applied for improving the cultivation in India. Tank is a reservoir of any specific size. It is relevant to study the relationship between the percentage of canal irrigated area and the average size of tank irrigated area. This relationship is inverse Sattore, Hatora villages and direct in Gopedighi village. whereas in Koma and Ramkrishnapur the farmers are solely dependent on canal irrigation.

#### Intensification of crops:

Cropping intensity is a very important indicator for discussing the present study. It is the ratio of gross sown area / net sown area multiplied by 100. The cropping intensity may exceed 100 percent where more than one crop cycle is permitted each year on the same area. Canal irrigation has impact on cropping intensity (Ghosh, D,1981, pp, 503-531). In this study it is clear that in Koma, Hatora, Ramkrishnapur and Gopedighivillages considerable amount of positive impact of Tilpara barrage on cropping intensities. On the other hand, in Sattore village the reverse picture is found. This picture can be observed from the following table (Table 3).

Sattore		Koma		Hatora		Ramkrishnapur		Gopedighi	
Canal irrigated are a(%)	Cropping intensity(%)	Canal irrigated area(%)	Cropping intensity(%)	Canal irrigated area(%)	Cropping intensity(%)	Canal irrigated area(acre)	Crop ping intensity(%)	Canal irrigated area(acre)	Cropping intensity(%)
55.00-61.66	125.00	60.00- 73.33	156.00	<66.66	154.00	0.80-4.60	103.00	0.80-4.73	103.00
61.66-68.32	117.00	73.33- 86.66	168.00	66.66- 73.33	148.00	4.60-8.40	104.00	4.73-8.66	109.00
68.32-75.00	116.00	86.66- 100.00	174.00	>73.33	318.00	8.40-12.00	105.40	8.66-12.66	11 1.00

Table: 3 Distribution of cropping intensity according to canal irrigated area

Source: Table compiled from data obtained from field survey

#### DISTRIBUTION OF ELEVATEDAREA:

Distribution of lands is an important element to discuss the relationship between percentage of canal irrigated area and the average size of elevated land. Actually it is very easy to understand that canal is constructed mainly on elevated land flow of water is also smooth here. In this present study it is prominent that among five villages four villages namely Sattore, Koma, Hatora and Ramkrishnapur shows the inverse relationship between percentages of canal irrigated areas and average size of elevated lands and vice- versa. It indicates distinct impact of Tilpara barrage to reduce the amount of elevated land where paddy cultivation becomes popular. In contrast, in Gopedighi village the size of elevated land is negligible Data of gross cropped area, net cropped area and cropping intensity have been given in tables 4 and 5. Here gross cropped area, net cropped area and cropping intensity of seven blocks namely, Suri I, Suri II, Bolpur-Sriniketan, Dubrajpur, Illambazar, Sainthia, Labpur, Nanoor can be represented through the following maps.

## Table : 4 Gross cropped area, net cropped area and cropping intensity in Birbhum district during the year 2010-11

Sl. No.	Blocks	Gross Cropped Area (Hectare)	Net Cropped Area (Hectare)	Cropping Intensity (%)
1.	Suri-I	7547.00	3235.00	233.29
2.	Suri-II	15182.00	10580.00	143.50
3.	Sainthia	47395.00	12129.00	391.00
4.	Bolpur- Sriniketan	20302.00	6280.00	323.28
5.	Illambazar	20661.00	11496.00	180.00
б.	Labpur	25088.00	10635.00	236.00
7.	Nanoor	30819.00	11057.00	279.00

Source : Table prepared from data obtained from report provided by office of Deputy Director of Agriculture (Administration), Birbhum

## Table : 5 Gross cropped area, net cropped area and cropping intensity in Birbhum district during the year 2011-12

Sl. No.	Blocks	Gross Cropped Area	Net Cropped Area	Cropping Intensity (%)
1.	Suri-I	13173.00	9940.00	132.53
2.	Suri-II	14076.00	9690.00	145.26
3.	Sainthia	36166.00	21415.00	168.88
4.	Bolpur- Sriniketan	33395.00	21660.00	154.18
5.	Illambazar	25818.00	18180.00	142.01
6.	Labpur	35334.00	20730.00	170.45
7.	Nanoor	40075.00	22050.00	181.75

## Source : Table prepared from data obtained from report provided by office of Deputy Director of Agriculture (Administration), Birbhum



Figure-2

Figure-3

Source : Map prepared from data provided by office of Deputy Director of Agriculture (Administration), Birbhum

figure-2 and figure- 3 represent the distribution of gross cropped area in hectare showing comparison between 2010-11 and 2011-12.

Figure-2 shows that the middle part of this study area including Sainthia block has large spatial extent of gross cropped area in hectare, whereas the eastern part has moderate spatial extent of gross cropped area and the maximum western and southern parts including have small spatial extent of gross cropped area (Table-4). Figure-3 shows the large spatial extent of gross cropped area has been recorded in the middle and south-eastern parts of this region whereas the moderate spatial extent of gross cropped area has been recorded in parts of eastern and south-western side of this study area. The small spatial extent of gross cropped area has been found in north-western portion covering Suril, Suri II blocks (Table-5).



Figure-4

Figure-5



Figure-4 shows that Sainthia, Suri II, Illambazar, Labpur and Nanoor blocks have large spatial extent of net cropped area in hectare whereas the maximum southern part represents the moderate spatial extent and rest parts covering Suri I has small range of distribution of net cropped area in hectare (Table-4). Figure-5 shows the large spatial extent of net cropped area in hectare in middle and south-eastern parts of this region, r whereas the moderate spatial extent of net cropped area in hectare has been recorded in north-western part of this study area. The small spatial extent of net cropped area in hectare has been found in western part covering Suri II blocks (Table-5).



Figure-6

Figure-7

Source : Map prepared from data provided by office of Deputy Director of Agriculture (Administration), Birbhum

Figure -6 shows that the middle part of this study area including Sainthia and Bolpur- Sriniketan blocks have large percentage of cropping intensity, whereas the north-western and eastern pockets have small percentage of cropping intensity (Table-4).

Figure- 7 shows the large percentage of cropping intensity in eastern and middle part of the region, The small percentage of cropping intensity has been found in western portion, (Table-5).

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## Table-6 : Regression analysis between percentage of canal irrigated area and cropping intensity of different crops in five villages.

NAME OF	Y'	X' VAIABLE	b	а	R2 (RSQ)	Y= a+bX
VILLAGES	VARIABLE	(INDEPENDENT)	(SLOPE)	(INTERCEPT)		
	(DEPENDE					
	NT)					
Sattor	Cropping	Percentage of canal	-0.61	159.00	19.00%	Y=159.00+(-
	Intensity	irrigated area				0.61)X
			0.00	105.00	<b>a</b>	** 100.00
Koma		Percentage of canal	0.30	137.00	2.60%	Y=137.00+0.3
		irrigated area				0X
			0.40	10100	<b>B</b> 4 004	<b>TT</b> 10100 /
Hatora		Percentage of canal	-0.63	184.00	7.10%	Y=184.00+(-
		irrigated area				0.63)X
	•	Absolute value of sevel	0.29	102.00	10.00%	V-102.00+0.2
Ramkrishn		irrigated a rea	0.58	102.00	19.00%	1=102.00+0.5
apur		ingateu area				01
Gonedighi	1	Absolute value of canal	0.46	98.63	44.00%	Y=98.63+0.46
Copedigin		irrigated area				X
		5				
				1		

Source- : Table compiled from data obtained from field survey

#### PERCENTAGE OF CANAL IRRIGATED AREA AND CROPPING INTENSITY:-

The regression co-efficient (b) has been computed between the cropping intensity (Y71) and percentage of canal irrigated area (x). Here the second variable is considered as independent variable because irrigation increases the cropping intensity.

Here the beta (b) coefficients are (-)0.61 and (-)0.63 for Sattore and Hatora villages respectively, whereas they are 0.30, 0.38 and 0.6 for Koma, Ramkrishnapur and Gopedighi villages. Now, the equations are Y=159+(-0.61)x and Y=184+(-0.63)x for Sattore and Hatora, where as they are Y=137+(0.30)x, Y=102+0.38x and Y=98.63+0.46x for Koma, Ramkrishnapur and Gopedighi villages respectively. It shows that per unit increase in percentage of canal irrigated area will decrease 0.61 and 0.63 Units of cropping intensity in Sattore and Hatora villages but it will increase 0.30, 0.38 and 0.46 units for Koma, Ramkrishnapur and Gopedighi villages.

Now, the intercepts (a) are 159,137,184,102 and 98.63 for Sattore, Koma, Hatora, Ramkrishnapur and Gopedighi villages respectively. It means the cropping intensity in an average are 159, 137, 184, 102 and 98.63 and the regression coefficient Shows variations above these constant figures. The coefficient of determination (r2) are 0.19, 0.026, 0.071, 0.19 and 0.44 for Sattore, Koma, Hatora, Ramkrishnapur and Gopedighi villages respectively which means 19%, 2.6%, 7%, 19% and 44% of the total variation in Y are being explained by X (Table - 160 to 164) and diagrams (Diagrams-6 to 10).









#### Diagram-8

Diagram-9



#### Diagram-10

Source- Diagrams compiled from data obtained from field survey.

#### CONCLUSION:

From the above discussion it can be surmised that the relationship between percentage distributions of canal irrigated areas and average size of net sown areas, submersible irrigated area, tank irrigated areas, elevated land, cropping intensities etc. are positive or negative in case of five villages of the study area. The present researcher feels that this canal irrigation system reflects its impact on the socio-economic aspects of the canal command area. This irrigation system has been practiced for a long time. It has deeply increased the efficiencies of land use and farming ability. Now it demands a proper scientific planning for irrigation system which must be introduced by the government agencies. Care is to be taken to maximize the benefits accruing from the irrigation capacity by making a more judicious use of water. If it is provided, it will accelerate the economic growth of the farmers of this canal command area.

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