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DESCRIPTIVE ANALYSIS OF IRRIGATION IN JAMMU DISTRICT: A CASE STUDY OF VILLAGE SARORE

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ABSTRACT

India is a big country and stands next to China when we talk about population and so irrigation facilities are needed to grow more food to feed our teaming millions. The distribution in rainfall is so uneven and uncertain which either causes famines or draught. By means of irrigation, we can check both the problems. Moreover different problems of different crops can only be met through irrigation facilities. India, being a tropical country, the temperature is high and evaporation more rapid so artificial irrigation is necessary for ample supply of water and also to prevent water scarcity in the long dry winter season. The emphasis of the present paper is on the present status of irrigation facilities and its impact on agriculture in the village Sarore of district Jammu as well as associated problems and recommending some suitable suggestions.

***KEYWORDS**: Irrigation, Agriculture, Sarore, Jammu*

INTRODUCTION

Rainfall is the only source of water for all modes of irrigation. A well-regulated system of irrigation is needed in view of the unequal distribution of rainfall over the years. Irrigation offers an opportunity to alleviate mass hunger and famine (Falkemark 1996). In an agrarian country, irrigation has always been a decisive factor affecting millions of farmers. In India, agriculture remains the primary source of livelihood in rural areas, which account for 75 percent of the population. The irrigated agriculture contributes to 56 percent of agricultural output. Given that water needs are increasing and water availability also exhibits seasonal and random fluctuations, the problem of balancing the supply with demand becomes complex. Water for irrigation is not required uniformly throughout the year. Irrigation requirement varies with the meteorological factors, the available soil moisture condition, the type and stage of the crop, and so on. Accordingly, surface water is proposed to be supplied by an irrigation storage system or groundwater needs to be drawn from the irrigation well. The quantities vary over different periods to conform to the varying irrigation requirements of the crops.

OBJECTIVES

The main objectives of the present study are as follows:

- To assess the different sources of irrigation in the study area
- To analyze the impact of irrigation on agriculture in the study area.

- To study the problems associated with available irrigation facilities and to suggest suitable measures.

METHODOLOGY

A methodology is the method and techniques used in fulfilling the objective**.** We have collected the primary data for 50 households by observing, interviewing the people present over there, field survey and photography. Moreover, a questionnaire was being prepared that helped to gather the informations about the physical and cultural landscape of the place. After getting the responses from people the data was analyzed needed by us regarding the topic under study and was extracted accordingly. The use of topographic sheet for studying land use and land cover is included in this analysis. With the help of these data, various tables were constructed using Microsoft Excel software. Data were processed by various scientific and statistical means and represented by using different diagrams and cartographic techniques so that the picture of process of the irrigation could be visualized at a glance. These diagrams were then interpreted to reach the more appropriate conclusions.

LOCATION OF THE STUDY AREA

Sarore is located in the Shivalik range in Samba district. Sarore is located at 32.577439°N and 74.879952˚E. It has an average elevation of 285 meters. This town is situated on the range of Shivalik hills alongside National Highway 44.

Sketch Showing the Study Area

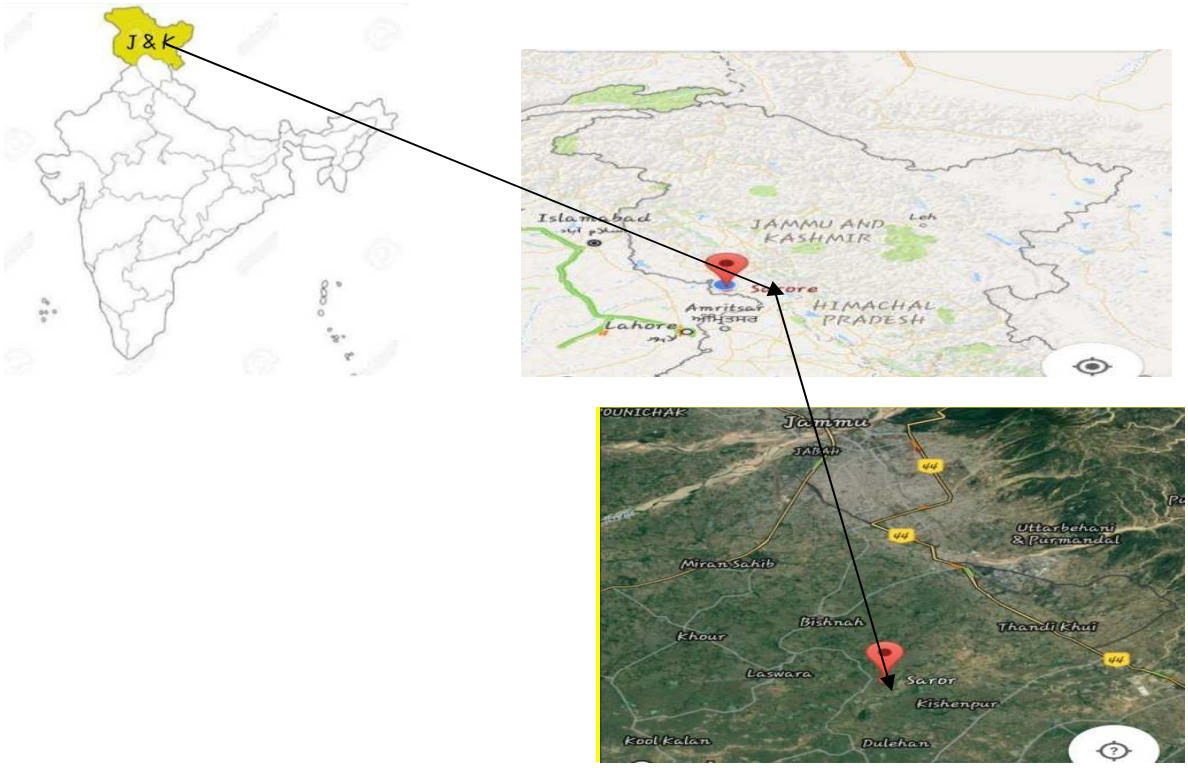

Figure 1

Source: - Google Image

DIFFERENT SOURCES OF IRRIGATION IN STUDY AREA

Depending upon the availability of surface or groundwater, topography, soil, and rivers two types of irrigation practices found in the study area i.e. Sarore as:-

Table 1: Sources of Irrigation

S. No.	Source of Irrigation	Area in Kanals	Percentage to the total Irrigated area
1.	Canal	390	90.5
2.	Tube well/pump	41	9.5

Source: - Field Survey, 2018

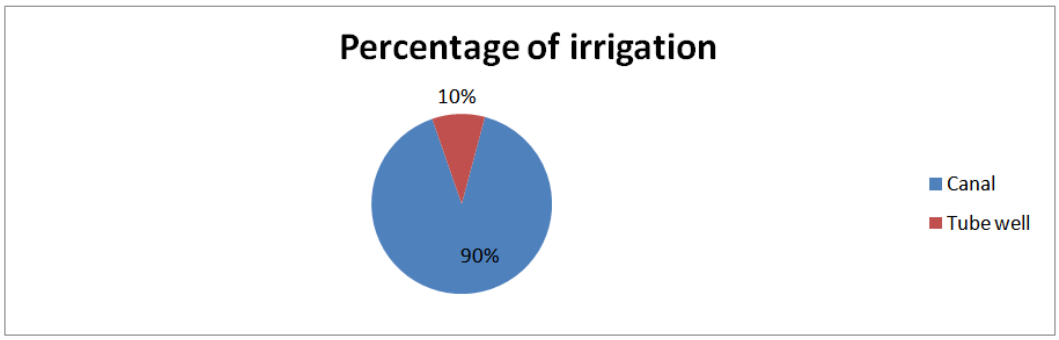

Figure 2: Percentage of irrigation by different sources

Interpretation

The given table depicts the sources of irrigation in the study area and the extent of the area that they cover. Canal irrigation covers about 390 hectares of an area which is about 90.5% of the total irrigated area whereas tube well irrigation which covers about 41 hectares of irrigated land holding i.e. 9.5%.

TOTAL IRRIGATED AREA AND NON-IRRIGATED AREA IN STUDY AREA

Irrigated area: - Area of crops which have actually been irrigated at least once during the 12 months prior to the survey date.

Non- irrigated area: - Area of crops which have not actually been irrigated at least once during the 12 months prior to the survey date.

Table 2: Irrigated and Non-Irrigated Area

Agricultural area	Area in Kanals	Percentage
Total Irrigated area	431	86.9
Non-Irrigated area or Rainfed Area	65	13.1
Total	496	100

Source: - Field Survey, 2018

Interpretation

The given table tells about the total irrigated and non- irrigated area in village Sarore. A total irrigated area in the village is about 431 Kanals which is about 86.9% of the total agricultural area whereas the non-irrigated area is about 65 Kanals i.e. 13.1%. Thus, most of the agricultural land of the study area is irrigated and only a little percent of the land is non-irrigated.

INTENSITY OF IRRIGATION

The percentage of a net irrigated area to the net sown area is the intensity of irrigation. Therefore, Intensity of irrigation is calculated by using the formula:-

Intensity of irrigation = Total area of irrigated crops in a year

Total culturable command area

Intensity of Irrigation of Sarore = (431/496) × 100 =86.9

496

Thus, the total intensity of irrigation of Sarore is 86.9.

Table 3: Intensity of Irrigation of Different Crops Grown in the Agricultural Year, 2018

Season	Crop	Total Net Sown Area	Net Irrigated Area	Area Not Irrigated or Rain Fed Area	Intensity of Irrigation of Different Crops
Kharif	Rice	434	422	12	97.2
	Maize	18	5	13	27.77
	Sugarcane	10	0.0	10	0
	Bajra	22	0.0	22	0
	Jowar	0.0	0.0	0.0	0
	Other	12	4	4.0	33.33
Rabi	Wheat	403	381	22	94.54
	Barley	27	20	7	74.04
	Mustard	33	13	20	39.39
	Other	33	17	16	51.51
Zaid	Main Zaid Crops	316	281	35	88.92
	Others	180	150	30	83.33

Source: - Field Survey, 2018

Interpretation

In the above table the data of the intensity of irrigation of different crops i.e. Kharif, Rabi, and Zaid is depicted. In the case of Kharif crops, Rice has maximum intensity i.e. 97.2%. Maize stands number second in the terms of irrigation intensity i.e. 27.77% and other minor crops have 33.33%. Sugarcane, Bajra, and Jowar have 0% irrigation intensity because they are grown under totally rainfed conditions. Among the Rabi crops, we find that Wheat has maximum intensity i.e. 94.54% followed by Barley and Mustard 39.39% and other minor crops of Rabi seasons have (51.51%). Moreover, major Zaid crops have also irrigation intensity.

PRODUCTIVITY OF MAJOR CROPS FROM IRRIGATED AND NON IRRIGATED AGRICULTURE LAND

Productivity

Crop productivity is the quantitative measure of crop yield in the given measured area of the field. The use of new crop varieties and the efficient application of agrochemicals immensely contributed to increased plant productivity.

Table 4: Productivity of Crops

Crops	Productivity form Irrigated Area (Quintal/Kanal) (X)	Productivity form Non-Irrigated Area (Quintal/Kanal) (Y)	Average Productivity $\frac{X+Y}{2}$
Rice	3.1	1.3	2.2
Wheat	2.0	1.1	1.55
Barley	1.5	0.8	1.15
Mustard	0.9	0.5	0.7
Maize	0.8	1.1	0.95
Bajra	N.A	0.5	0.25

Source: - Field Survey, 2018

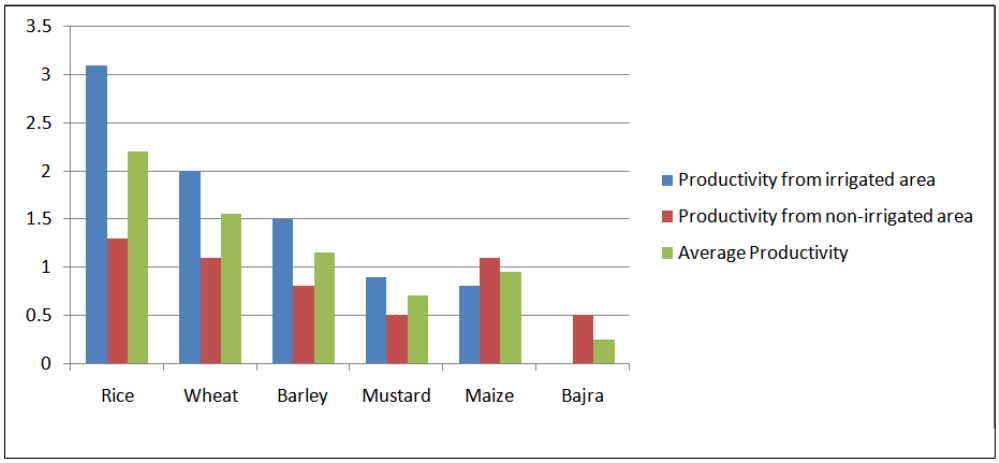

Figure 3: Productivity of Crops

Source: - Field Survey, 2018

Interpretation

The given table depicts the productivity of different crops from irrigated and non- irrigated area. The productivity from an irrigated area is more in case of rice, wheat, barley, mustard than from non- irrigated area whereas the productivity of maize and Bajra from irrigated land is less than that of non-irrigated land.

AMOUNT OF FERTILIZERS SUPPLIED TO MAJOR CROPS IN IRRIGATED AND RAINFED/NON-IRRIGATED LAND HOLDING

The two major fertilizers used in agricultural fields in the study area are Urea and DAP

Table 5: Amount of Fertilizer Supplied to Crops

Crops	Fertilizer Usage in Irrigated Area Kg/Kanal			Fertilizer Usage in Non- Irrigated Area Kg/Kanal			Average Fertilizer Used (Kg/Kanal)
	Urea	DAP	Total	Urea	DAP	Total	
Rice	10	4	14	6	2	8	11
Wheat	6	4	10	4	2	6	8
Barley	5	3	8	4	2	6	7
Mustard	4	3	7	4	3	7	7
Maize	5	N.A	5	5	N.A	5	5
Bajra	4	N.A	4	4	N.A	4	4

Source: - Field Survey, 2018

Interpretation

We know that the fertilizers used in the irrigated area yield more productivity than that used in the non-irrigated area. In the given table we see that different crops have a different usage of fertilizer both urea and DAP. Rice requires about 14 Kg/Kanal of fertilizer in the irrigated area followed by wheat with 10 Kg/Kanal, barley with 8 Kg/Kanal, mustard with 7 Kg/Kanal etc. whereas in case of non-irrigated area rice utilizes 8 Kg/Kanal of fertilizer followed by wheat with 6 Kg/Kanal, barley with 6 Kg/Kanal, mustard with 7 Kg/Kanal and so on.

Table 6: Relationship between Productivity and Amount of Fertilizer

Crops	Average Productivity (Quintal/Kanal)	Average Fertilizer used (Kg/Kanal)
Rice	2.2	11
Wheat	1.55	8
Barley	1.15	7
Mustard	0.7	7
Maize	0.95	5
Bajra	0.25	4

Source: - Field Survey, 2018

Interpretation

The given table depicts the relationship between average productivity and the average fertilizer used in the agricultural lands. The average productivity of rice is 2.2 Quintal/Kanal and average fertilizer used is 11 Kg/Kanal whereas in case of wheat the average productivity is 1.55 Quintal/Kanal and average fertilizer used is 8 Kg/Kanal. Moreover, the average productivity of barley is 1.15 Quintal/Kanal and average fertilizer used is 7 Kg/Kanal whereas in case of wheat the average productivity is 0.7 Quintal/Kanal and average fertilizer used is 7 Kg/Kanal and so on.

PROBLEMS ASSOCIATED WITH AVAILABLE IRRIGATIONAL FACILITIES

There are various problems associated with irrigational facilities which came into the picture through various means such as by investigating people, by personal observation, by on-site photographs etc and it constitutes the first-hand information. The major problems are:

- The foremost problem associated with the canal irrigation in the study area is untimely dredging or distillation of canals
- There is no proper concrete lining of embankments of the canal in the study area.
- There is an irregular water supply of canal and as far as tube well irrigation is concerned there is a shortage of power during the time of urgency.
- There is a complete absence of concrete-field-channels which carry water from canal to field. Due to this, there is heavy loss of water from seepage.
- There are some patches of marshy areas around the canal embankments which are acting as breeding grounds of mosquitoes and result in widespread malaria.
- Small and marginal farmers having land in the interior are not able to use canal water effectively because they are associated with the problems of field-leveling, field channel, shortage of input supply and other on-field activities.

- There is the small size of landholding and Irrigation becomes difficult in such small and fragmented fields. Under such circumstances, the farmer cannot concentrate on improvement.
- Warabandi system of irrigation is not running properly in the study area due to which there are scuffles among the farmers especially during the time of paddy cultivation.

CONCLUSIONS

Summarizing the above article that is a very generous attempt to study the irrigation status of village Sarore it became clear that there are two main irrigation sources i.e. canal and tube well out of which canal irrigation accounts for 90% of the total irrigation sources. Canal irrigation predominates due to even topography and soft strata which facilitates the digging of canals in the study area. The impact of the irrigation has been studied through the means of various tables that are discussed above. In the study area, rice is the staple diet and rice and wheat are the two major cereal crops. The intensity of irrigation for rice and wheat is above 95% and on the other hand, the intensity of irrigation for Bajra, Maize, and Jowar etc. is below 40%. The productivity of rice and wheat is up to the mark as compared to the national average due to the good consumption of chemical fertilizers. There is a positive relationship between irrigation productivity and chemical fertilizers. Two major chemical fertilizers which are used by the farmers of the study area are urea and DAP. The status of irrigation especially canal irrigation is fairly good but there are certain hindrances and problems associated with canal irrigation which must be highlighted in order to tackle them. The following suggestions and recommendations can be considered by the authorities to improve the status of present irrigation facilities in the study area.

SUGGESTIONS AND RECOMMENDATIONS

- Timely (at least bi-annually) dredging or distillation of existing canals in the study area
- Concrete lining of embankments of the canal and their timely repair to avoid heavy loss of water from seepage.
- Regular water supply in canal should be there especially during the time of paddy cultivation.
- Construction of concrete-field-channels which carry water from canal to field which is also a heavy loss of water from seepage
- Small and marginal farmers having land in the interior should be provided with on-field activities such field-leveling, field channel, field grading, input supply etc. They should be provided agro-credit services and schemes
- If possible there should be a reallocation of holdings which are fragmented as well as the creation of farms which comprise only one or a few parcels in place of the multitude of patches formerly in the possession of each peasant.
- Forming of Pani-Panchayat to resolve the issues regarding the use of canal water
- Effective implementation of Warabandi system of irrigation regarding the equitable share of canal water by the farmers depending on the size of holdings.

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