

# "Impact of irrigation development on crop intensity in Ganganagar district"

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## ABSTRACT

Irrigation is the backbone of agriculture. Timely and adequate water supply is necessary for healthy agriculture. Irrigation plays an important role in agricultural development of the country. Agricultural production and productivity of cultivable land can be increased through irrigation. Irrigation provides water the crops are in need of water. The main aim of the present paper is to study the irrigation development and its impact on cropping intensity in Ganganagar District of Rajasthan the 2015-16. The present study is based on the secondary source of data. The Tahsil has been taken as a unit for analysis the impact of irrigation growth on cropping intensity in the study area. The study has observed that during the study periods in 1960-61 only 15.31 percentage areas was under irrigation, which has increased up to 58.81 in 2015-16. It means during the span of fifty five years 45.50 percent area under irrigation is increased. Latest data available about tahsilwise area under irrigation and cropping Intensity shows that a region having good irrigation facilities helps to increased cropping intensity. Applying the modern methods of irrigation like drip and sprinkler will be useful to use water effectively for agriculture in study area.

## INTRODUCTION:

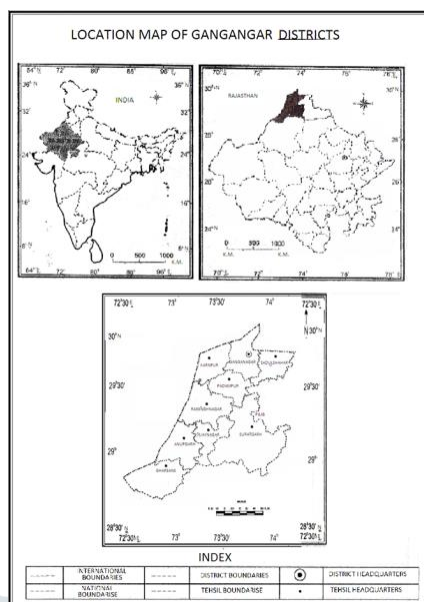
Agriculture is a primary economic and productive activity on earth surface which provides fundamental sustain to all living beings. Agriculture has remained the prime sector of Indian economy in view of its major share in employment and livelihood creation. Though, it has played a significant role in poverty alleviation, meeting the food requirements of the existing population and providing raw materials to various industries but its share in gross domestic production of the nation has continuously declined over the period. Agriculture demand land, labour, capital and energy inputs as basic requirement. Chemical fertilizers and agricultural machineries are the vital inputs of agriculture. Indian agriculture has achieved remarkable progress in the level of agricultural mechanization. Irrigation is the backbone of agriculture. Timely and adequate water supply is necessary for healthy agriculture. Irrigation plays an important role in agricultural development of the country. Its influence on agricultural productivity and leads to develop the economy in area where rainfall is plentiful and well-distributed over the year. But in the study area there is rain uncertainty and irregularity. Therefore artificial irrigation is requiring for the agricultural production and to expand the area under cultivation. Irrigation provides assured supply of water. Irrigation plays important role in increase the cropping intensity and crop production. It also makes favourable condition to introduction of new technology and crop diversification of crops. Cropping Intensity is defined as an extent to which the net area sown has been cropped or resown in the one agricultural year. Irrigation is prime factors which controlled the cropping intensity. The flexibility in selecting appropriate crop pattern is also enhanced when irrigation facilities make water available in a controllable manner farm to the farmers throughout the year. Therefore study of irrigation development is important to increase the cropping intensity of agricultural region.

## STUDY AREA:

Ganganagar district is located in northern part of Rajasthan between 28°4' to 36°6' North latitude and 72°30' to 74°16' East longitudes and covers about an of 11154.66 sq. K.M. Which is about 3.26 percent of total state area. The district is bound in north by the state Punjab and in the south It is bordered by Bikaner district. Its eastern boundary is demarketed by Hanumangarh district. The northern and western boundaries of district are marked by the eastern boundary of Pakistan. At present for the purpose of administration, the district is divided into five sub-divisions and nine tehsils. These five sub-divisions are Sri Ganganagar (Ganganagar and Sadulshahar tehsils), Karanpur (Karanpur and Padampur tehsil), Raisinghnagar (Raisinghnagar and Vijaynagar tehsil), Suratgarh (Suratgarh tehsil) and Anupgarh (Anupghrh and Gharsana tehsil). Here (major canel I.G.N.P., Bhakhara and Gangacanel) is irrigation in area. fig-01.

Figure- 01 Location map of study area

Fig. No.1



**OBJECTIVES:**

The main objectives of the present paper are as follows.

1. To analysis the irrigation development in the study area.
2. To analysis the impact of irrigation on cropping intensity in the study area.
3. To highlight the problems of irrigation development and suggest proper remedies for minimized the intensity of problems of irrigation in the study region.

**DATA BASE AND METHODOLOGY:**

The study is based on secondary data taken from Statistical Abstract of Ganganagar, Economic and Statistical Department . An attempt has been made to tabulate process, analyze and interpret the data by applying suitable statistical and cartographic techniques. Tehsil-wise proportion of area under different land use categories has been calculated and shown on map with the help of pie diagrams for 1960 to 2015-16.

To calculate the cropping intensity following formula is used.

$$C.I. = \frac{TCA}{NSA} \times 100$$

Where, - C.I. = Cropping Intensity, TCA= Total Cropped Area, NSA= Net Sown Area

**RESULTS & DISCUSSION:**

**Irrigation Development:**

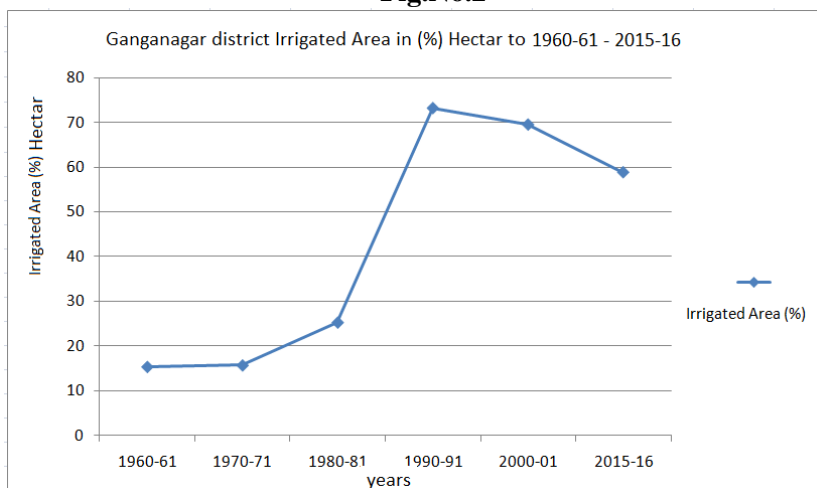
In area where rainfall is plentiful and well-distributed over the year, there is no problems of water. But in the study region, rainfall in is uncertain and Irregular. so Alternate irrigation is requiring for the agricultural production. Irrigation started after the arrival of Gang Canal and Idira Gandhai canal in Ganganagar. First only Gang Canal was constructed before . After the arrival of non-irrigated area projects in irrigation started and awareness of cash crops was not high, the area of irrigation and cash crops was very low during the year 1960-61. In the study area, three major projects (Gang Canal, Inira Gandhi Canal, and Bhakhara Canal) are irrigation projects. A study of data in Table No.1 indicates that area under irrigation is increased by 45.50 percentage during the 55 years. During the year 1960-61 to 1990-91, there was high much increased (57.80) in irrigated area but after then it was decreased by (14.33) percentages within 25 years period.

**TABLE NO.1: GANGANAGAR DISTRICT: AREA UNDER IRRIGATION -1960-61 TO 2015-16**

Sr. No.	Year	Irrigated Area (%)
1	1960-61	15.31
2	1970-71	15.65
3	1980-81	25.23
4	1990-91	73.14
5	2000-01	69.47
6	2015-16	58.81

Source: Statistical Abstract of Ganganagar, Economic and Statistical Department.

Fig.No.2



Compiled by the researcher, 2015-16.

**Cropping Intensity:**

Cropping Intensity is defined as an extent to which the net area sown has been cropped or resown in the one agricultural year. It is percentage ratio of total cropped area to the net sown area. It is used to define the land use efficiency and extent to which the sown area is resown. It reveals the efforts of man in extracting maximum output from a particular part of agricultural land by sowing more than once. It is used to define the land use efficiency and extent to which the sown area is resown. In general level of cropping intensity is higher in area with higher percentage of net sown area irrigated. At some region it may be differ due to other factors which also impact of cropping intensity e.g. Climate, Capital, technological infrastructure etc. After using the formula, cropping intensity is calculated for year 2015-16 to each tahasil of the study area, which is indicated in Table No.2 and Fig.No.3.

**TABLE NO.-2. GANGANAGAR DISTRICT: IRRIGATED AREA (%) & CROPPING INTENSITY-2015-16**

Sr. No.	Name of Tahsils	NIA	TGCA	IA (%)	Net Sown Area (%)	Double Cropping Area (%)	Cropping Intensity
1	Ganganagar	82220	146512	94.43	83.35	65.11	178.19
2	Karnpur	68820	109239	92.15	84.04	49.35	158.73
3	Padampur	75464	127610	82.75	89.52	61.86	169.10
4	Raisinghnagar	112583	180104	69.00	85.50	51.27	159.97
5	Anupgarh	80299	128922	69.75	69.66	42.30	160.55
6	Gharsana	76798	118445	44.14	55.39	33.64	154.23
7	Vijaynagar	56274	92279	72.90	67.21	43.00	163.98
8	Surtgarh	165078	225761	35.93	58.44	21.48	136.76
9	Sadulsahar	67903	114483	83.14	88.15	66.51	168.59
<b>Total Area</b>		<b>785439</b>	<b>1243355</b>	<b>76.09</b>	<b>89.60</b>	<b>52.40</b>	<b>158.30</b>

Source: Statistical Abstract of Ganganagar, Economic and Statistical Department .

Where = NIA-Net Irrigated Area, TGCA-Total Gross Crops Area, IA-Irrigated Area.

**SPATIAL PATTERN AND LEVEL OF CROPPING INTENSITY:**

On the basics of cropping intensity, the tahasil of the study region are grouped into three categories, which are shown in Table No.3. Table No.2 and 3 indicates that generally cropping intensity is high in those tahsils where percentage of irrigation is high. The cropping intensity of the study are was 158.30 in 2015-16. Fig. 3 portrays the positive correlation (r= +0.96) between irrigation area and cropping intensity in the study area.

TABLE NO.3: GANGANAGAR DISTRICT: CROPPING INTENSITY-2015-16

Sr.	Cropping Intensity (%)	Tahsils
1	High (161 < )	Ganganagar, Padampur, Anupgarh, Vijaynagar, Sadulsahar
2	Moderate (131-160 )	Karanpur, Raisinghnagar, Gharsana
3	Low (130 > )	Surtgarh

Source: Compiled by Researcher, 2015-16.

#### Area of High Cropping Intensity:

Areas, which have cropping intensity more than 161 percent, are included in these categories. Higher cropping intensity means that higher portion of the net sown area is being cropped more than once during one agricultural year. It is observed from Table No.2 and Fig No.4 that during the year 2015-16 the cropping intensity was found high in Ganganagar, Padampur, Anupgarh, Vijaynagar, and Sadulsahar tahsils. In these areas irrigation facilities and agricultural infrastructure are well developed, which helps to increase the cropping intensity of these areas.

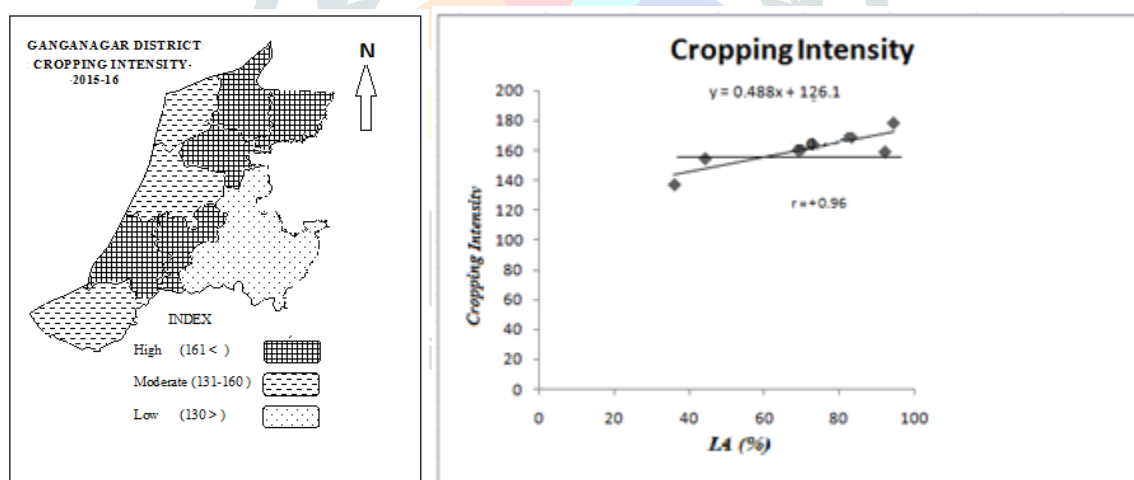
#### Area of Moderate Cropping Intensity:

The area, which has the cropping intensity range from 131 to 160 percentage are included in this category. Karanpur, Raisinghnagar, and Gharsana tahsils are included in this category. In this region moderate cropping intensity is found due to irrigation and due availability of irrigation and other agricultural infrastructure. Mostly tahsils is developing in producing various cash crops and use of greenhouse also increasing during last years in the various tahsils.

#### Area of Low Cropping Intensity:

Areas, which have cropping intensity less than 130 percent are included in this category. The low cropping intensity was found only one tehsil Surtgarh. Whereas irrigation facilities are too much developed and local physical environment also too much favourable for agricultural development but the tehsil area is non-irrigated.

Fig.No.3



#### CONCLUSION:

1. After the arrival of non-irrigated area projects in irrigation started and awareness of cash crops was not high, the area of irrigation and cash crops was very low during the year 1960-61.
2. It is concluded that the irrigation development is not uniform. There is a regional disparity in cropping intensity at tahsil level in the study region.
3. Cropping intensity was found high in Ganganagar, Padampur, Anupgarh, Vijaynagar and Sadulsahar tahsils. In these areas irrigation facilities and agricultural infrastructure are well developed, which helps to increase the cropping intensity of these areas.
4. The low cropping intensity was found in Karanpur, Raisinghnagar, and Gharsana. Whereas irrigation facilities are developed and local physical environment is also too much favourable for agricultural development, It is concluded that the irregular flow of water and irregularity of the rain is uncertain.
5. Irrigation is one important factor, which controlled the cropping intensity but other factors like availability of capital, climatic condition and use of modern technology also play important role in this regard.

**SUGGESTIONS:**

On the basis of above analysis, some measures can be apply to increase the cropping intensity through irrigation development in the study area.

1. Irrigation in association with mechanical and biochemical input has influenced the landuse in the region.
2. On farm water management should include efficient land levelling and shaping efficient design and layout of irrigation methods, scientific scheduling of irrigation water under bouth adequate and deficit water supplies and crop planning for optimal use limited water resources of the arid region.
3. The study lays emphasis on national policy and pianing of land use for promotion of agri-business to create employment in rural area, discourage migration from rural to urban area and create an optimum growth rate of agriculture.
4. It involves balanced water allowance, optimum and conjunctive use of surfce and ground water resources. lining and disiltation of water courses must be done.

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