

Periodic Research

Impact Assessment of Irrigation on Transformation of Income and Socio-Economic Status in the Indira Gandhi Nahar Project Area (Rajasthan)



Jai Singh Rathore

Associate Professor,
Deptt.of Geography,
JNV University,
Jodhpur



Jai Bharat Singh

Associate Professor,
Deptt.of Geography,
Govt. Dungar College,
Bikaner

Sultan Singh

Scientist,
Deptt.of Space,
Haryana State Remote
Sensing Centre,
Hisar

Abstract

Irrigation is an age-old practice and in fact as old as man's first attempt at crop growing. The beginning of agriculture revolutionized the way of living of primitive man who was till then depended only on hunting and food gathering (Dilip Kuamr Majumdar, 2004). Early agriculture involving mainly food production changed slowly to modern agriculture through continuous evolution of agricultural technologies. This transformation gave a strong structural and economic base to the human society for its existence and progress.

The large scale irrigation by canal and tube-wells has brought changes not only in the physical environment of the area but also in the social and economic status of the population. Economic impacts include employment opportunities, poverty alleviation, increase in household income and living standard etc. The present study is, however confined to impact of irrigation which has brought revolutionary changes in socio-economic status in the IGNP area.

Keywords: Irrigation, Transformation, Socio-Economic Status.

Introduction

Statement of the Problem

Irrigation is pivotal to agricultural, social and economic growth of nation. It has provided stability to food production. Agriculture has always occupied a place of pride in desert's economy (Chauhan, Y. S. and Prasad, V., 1978). The great significance of agriculture in the desert life and economy is well borne out by the fact, that it is the mainstay of the people. It forms the basic key to economic development. The Indira Gandhi Canal Project (IGNP) area is predominantly an agricultural and pastoral region. Most of population is engaged in agriculture and allied pursuits for their livelihood and it is still the chief occupation of sustenance for growing population. After the introduction of IGNP irrigation, the crop revenue has significantly increased. The traditional cropping pattern has shifted to the market oriented crops and the crop yield has increased enormously that has further accelerated the economic prosperity and infrastructural development of the area.

Study Area

The IGNP area spreads over four districts of the Indian Thar Desert in Rajasthan for the point of view of irrigation facilities namely Hanumangarh, Sriganganagar, Bikaner and Jaisalmer by covering an area of 92,649 sq km. The study area is located between 26°5' to 30°6' north latitudes and 69°30' to 75°3' east longitudes. It slopes from north-east to south-west having an altitude of 150-300 m. The rainfall is very low, highly erratic and unpredictable. The study area has extremes of temperature, high evaporation and strong winds (Sharma, H.S. and Sharma, M.L 2010). The ground water is very deep, found only in small isolated patches and its quality is poor and saline. The area has 23 blocks, 27 tehsils, 25 urban centres and 6007 inhabited villages and hamlets. The construction of the IGNP has been divided into two stages -

Stage-I

It consists a feeder canal of 204 km long, having a headwork discharge capacity of 460 m³/sec, which starts from Harike Barrage. The feeder canal lies 170 km in Punjab and 34 km in Haryana. In Rajasthan, it

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has 189 km long main canal and 3454 km long distribution system. The entire system of this stage is concrete lined and serves 5.53 lakh ha of culturable command area, out of which 0.46 lakh ha is served by pumping to 60 m high lift having four pumping stations. The Stage I was completed in 1983. The canal command area and intensity of irrigation are 5.28 lakh ha and 110-140 per cent respectively.

Stagell

It comprises construction of main canal (256 km long) and 5,606 km of a lined distribution system, and will serve 14.10 lakh ha of CCA (8.74 lakh ha area in flow and 5.37 lakh ha under 9 lift schemes), utilising 4,930 mm³/yr of water with 80 per cent intensity of irrigation in Sriganganagar, Bikaner, and Jaisalmer districts of Rajasthan. The main canal in the entire length was completed in the year 1986.

Aim of the Study

To assess the impact of irrigation on socio-economic status of the study area.

Hypothesis

1. Expansion of irrigation is a positive factor for revolutionizing the agriculture.
2. Increase in agricultural income and employment have changed the socio-economic condition of farmers as well as rural masses.

Methodology

The primary data have been collected through survey-cum-schedule method from 238 sample villages located in both canal and tube-well irrigated areas by random sampling. The survey has responses from Hanumangarh, Sriganganagar, Bikaner, Jodhpur and Jaisalmer districts. The respondents/ households (5 from each village) comprise farmers, agricultural labourers, village heads and people engaged in agricultural activities. A detailed schedule is prepared for the collection of data and information regarding type and availability of

house, kitchen, rooms, animal shelter, and basic and modern amenities at household level, type and size of family, expenditure etc. after inception of irrigation.

While secondary data have been collected from various departments -IGNP, Landuse and Agriculture, Colonization and Land Settlement; and Rajasthan Agriculture University, Bikaner. The statistical and cartographic presentation is done by tabulation, graphs and diagrammatic maps to support the opinions and relevant reactions of the respondents and to get a better idea of the impact of irrigation.

Expansion of Irrigation

In the year of 1977-78, irrigation was very limited in the study area. The area under irrigation is almost doubled during 1977-78 to 1997-98 after inception of the IGNP. The irrigated area in the Stage-I is 4.84 lakh ha with an irrigation intensity of 110-140 and 7.24 lakh ha with an intensity of 80-110 in the Stage-II in the year 2012-13. Sriganganagar district along with Hanumangarh has the maximum irrigated area and contributes 72.4 percent area of the net irrigated area. It is followed by Bikaner (17.2 per cent) and Jaisalmer districts (4.6 per cent).

The irrigated area to net sown area has also increased in the whole area. Sriganganagar ditrict has the highest percentage (76.24) of irrigated area to net sown area follwed by Hanumangarh (40.05), Jaisalmer (22.33) and Bikaner (17.94). It is also important to mention here that irrigated area to net sown area has increased the maximum 13 times in Jaisalmer district and 2.5 times in Bikaner district (table 1). Both of these districts are irrigated by the introduction of IGNP whereas Sriganganagar and Hanumangarh districts have been irrigated by the Gang Canal and Bhakra Canal; and also contribute the maximum area under IGNP irrigation.

Table 1
IGNP- Irrigated Area to Net Sown Area
(In Per cent)

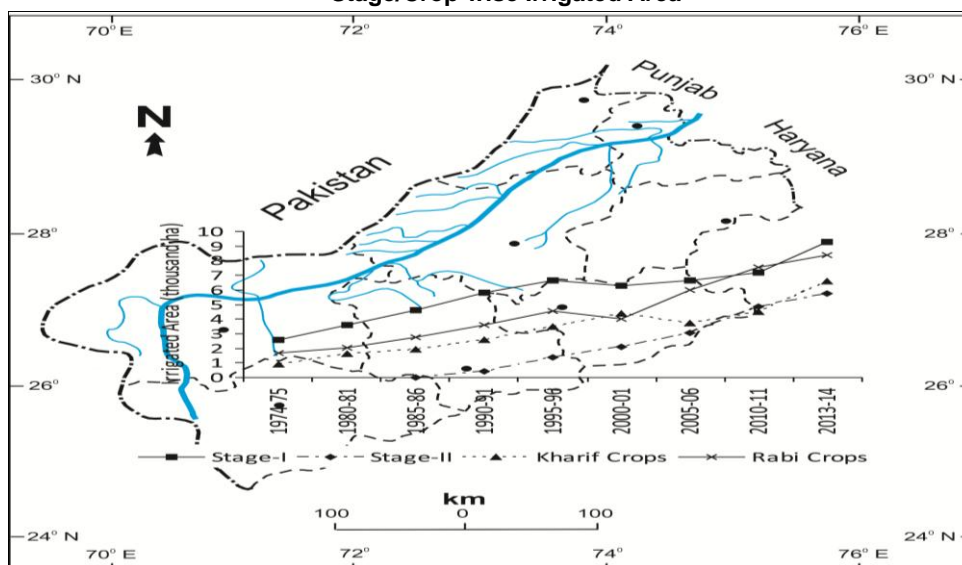
Year	District			
	Bikaner	Sriganganagar	Hanumangarh	Jaisalmer
1988-89	7.04	70.54	-	0.5
1996-97	10.23	73.31	38.69	8.47
2001-02	17.94	75.05	40.05	22.33
2014-15	23.86	76.24	46.50	27.53

Source: CAD, IGNP, GoR, Jaipur, 2014-15

The IGNP irrigated area has increased from 2.58 lakh ha to 15.02 lakh ha during 1974-75 to 2013-14 (table 2). It is interesting to note that there are wide variations in the net sown area and the gross irrigated areas from one district to another in the study area. Out of the gross irrigated area of 15.02 lakh ha, Sriganganagar (39.46 per cent), Hanumangarh (22.67 per cent) and Bikaner (21.46 per cent) districts shared about 83.59 per cent irrigated area of the IGNP

whereas minimum irrigated area is in Jaisalmer district. When the crop-wise irrigated area is considered, *rabi* crops have been dominant during the entire period. The area under *khari* crop was 0.92 lakh ha and *rabi* crop was 1.65 lakh ha in 1974-75 have reached upto 2.58 lakh ha and 3.58 lakh ha respectively in 1990-91, and 6.61 lakh ha and 8.41 lakh ha respectively in 2013-14.

**Fig. 1: IGNP Area
Stage/Crop-wise Irrigated Area**



**Table 2
IGNP Area - Net Irrigated Area**

Year	Stage-I	Stage-II	Total	Kharif Crop	Rabi Crop
1974-75	2.58	-	2.58	0.92	1.65
1980-81	3.60	-	3.60	1.59	2.01
1985-86	4.63	0.02	4.65	1.89	2.75
1990-91	5.78	0.40	6.18	2.58	3.58
1995-96	6.64	1.37	8.01	3.45	4.56
2000-01	6.28	2.08	8.36	4.36	3.99
2005-06	6.63	3.07	9.70	3.71	5.99
2010-11	7.16	4.87	12.03	4.47	7.55
2013-14	9.27	5.75	15.02	6.61	8.41

Source: Annual Report, IGND Department, GoR, Jaipur 2014-15

Impacts of Irrigation

In the Thar Desert, IGNP has become the life-giving current for the study area. Before meeting canal irrigation scarcity of water was common feature, animal rearing was main occupation and agricultural activities were completely dependent on rainfall. Pattern of rainy days and uncertainty of rainfall was the main cause of famines and they pulled the society into condition of starvation and poverty in study area. But since the beginning of irrigation, drastic changes in income generation, housing, household amenities, type and size of family etc. have been noticed here.

Income Generation

Earlier the area was economically very poor and survival was very difficult. There was dominance of cattle herders. After introduction of canal irrigation life of farmers has transformed with incredible rise in

their income structure. Though, it was very difficult to know about the income of rural people as none of them was ready to talk about it, yet tried best to extract the proper responses.

On the basis of the data given in table 3, it is analysed that there is majority of lower and medium class households (61.72 per cent) ranging upto Rs. 3.00 lakh of annual income. Among the total 1160 households, 24.31 per cent households come under lower income group having below Rs. 1.00 lakh annual income while 37.41 per cent families fall under medium income group ranging an annual income of Rs. 1.00-3.00 lakh. The families under upper medium and high income category are 18.79 and 12.75 per cent respectively. There is only 6.72 per cent households come under very high income class ranging above Rs. 10.00 lakh annual income.

**Fig. 2: IGNP Area
Annual Income of Sample Household**

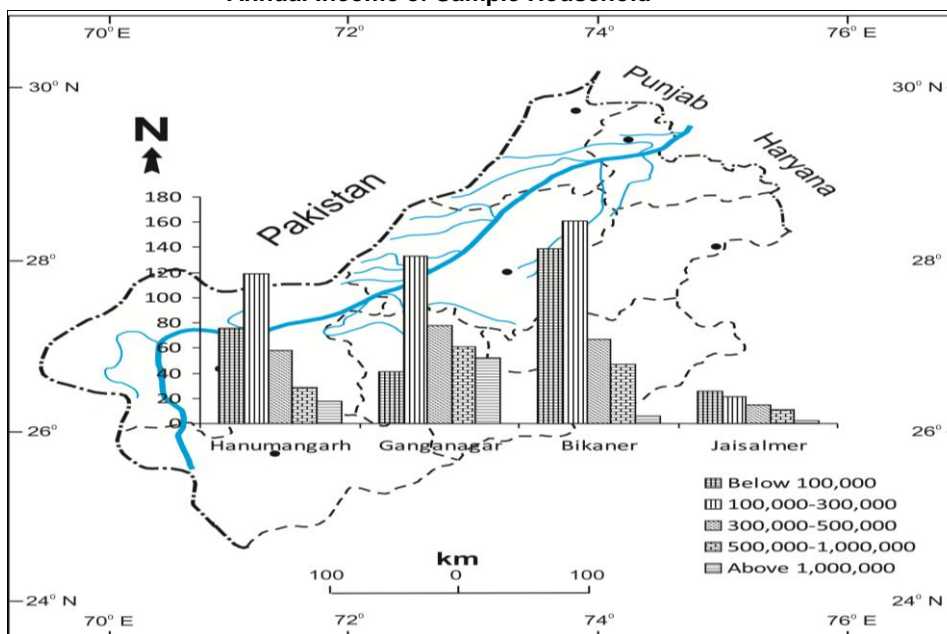


Table 3

IGNP- Annual Income of Sample Households

Income Structure (in Rs) (Low, Medium, Upper Medium High, Very High)	District-Number of Households			
	Hanumangarh	Sriganganagar	Bikaner	Jaisalmer
Below 100,000 (L)	76	41	139	26
100,000-300,000 (M)	119	133	161	21
300,000-500,000 (UM)	58	78	67	15
500,000-1,000,000 (H)	29	61	47	11
Above 1,000,000 (VH)	18	52	06	02

Source: Field Survey Conducted During 2014-15

Improvement in Living Standard

The life of rurals/farmers has become quite comfortable and in some way lavish as they have and enjoy all the basic and modern amenities and assets which we could think for urban residents only. It is seen that most of the households have pucca house, television, dish TV, gas stove (gas chulha), refrigerator, cooler/air conditioner, inverter, vehicles (motor cycle, jeep/bolero car/utility vehicle), sofa/chair set, double bed, electricity connection, mobiles, drawing room, kitchen, toilet, separate cow sheds etc. Though, the per capita availability of these items varies from Stage-I to Stage-II and from one district to another. It is also very important to mention here that the lifestyle of the farmers alters within 2-3 good crop seasons. The prosperity of a farmer depends upon availability of irrigation that assures crop yields. The farmers of Stage-I have better irrigation intensity (110-140) than of the Stage-II (80-110) and in the same way it is also reflected in their living standard.

It is analysed by the data and information collected from the IGNP area that 88 per cent households have pucca house, 86.12 per cent have television, 96.20 per cent have electricity and mobile connections, and separate cow sheds, 37 per cent use both gas and fuel-wood in cooking, 82 per cent have two-wheelers, 54 per cent have four-wheelers, 32 per cent have both two and three wheelers, 74.72 per cent have cooler, 7 per cent have air conditioner, 23 per cent have sofa set, 67 per cent have chair set and 34 per cent have separate drawing room (table 4). It is also observed that they have seasonal variations in cooking area like open space in summer and kuccha/ pucca kitchen in winter and rainy seasons. Most of women (98 per cent) do not use standing kitchen/platform, as they prefer cooking on floor in sitting position. Use of modern toilets is also becoming popular since the inception and motivation by the Central Government. About 43 per cent sample households have toilets and their number is increasing speedily.

Table 4
IGNP Area- Type of Houses and Amenities in Sample Households

House type	Before Canal Irrigation				After Canal Irrigation			
	Hmg	Ggn	Bkn	Jsl	Hmg	Ggn	Bkn	Jsl
Kucha House	204	244	420	75	00	00	31	24
Pucca House	96	121	00	00	300	365	389	51
Kitchen	53	81	216	12	223	328	328	51
Drawing Room	74	104	194	17	216	281	312	43
Toilet	61	96	23	05	300	365	389	51
Bedroom	96	121	54	44	300	365	389	51
Children Room	32	34	00	00	153	171	144	22
Animal Shelter	26	46	35	05	162	223	206	31
Gas Stove	47	86	00	00	214	233	142	14
Electricity	116	224	00	00	300	365	389	62
Transistor	83	163	46	13	37	51	63	13
Television B/C	16	41	00	00	269	342	331	57
Modern Amenities								
Refrigerator	13	33	00	00	229	294	178	17
Dish TV	00	00	00	00	269	342	331	57
Cooler	22	46	00	00	255	303	243	31
Sofa Set	32	65	41	09	61	115	144	15
Inverter	09	21	00	00	45	155	86	17
Generator	03	16	00	00	44	56	21	03
Camera	00	15	00	00	24	32	29	03
Air Conditioner	00	00	00	00	36	69	39	02
VehicleCar/Jeep/Motor cycle/Scooter	52	127	28	03	300	365	420	75
Medical Facilities	142	212	94	12	300	365	420	75
Educational Facilities	76	143	38	07	300	365	420	75
Mode of Transport-Bus/Train	93	121	106	28	291	354	377	34

Source: Field Survey Conducted During 2014-15

It is a very complicated task to know about the household income of farmers. The respondents were not ready to reply about family income. They used to say that there is not much income for running the family though they have a pucca house with all

modern household amenities, and agricultural machineries and equipments. In some of the households, store houses were found to be full of wheat, guwar, mustard, groundnut, gram, cattle feed etc.

Fig. 3 IGNP Areas

Type of House and Facilities in Sample Household

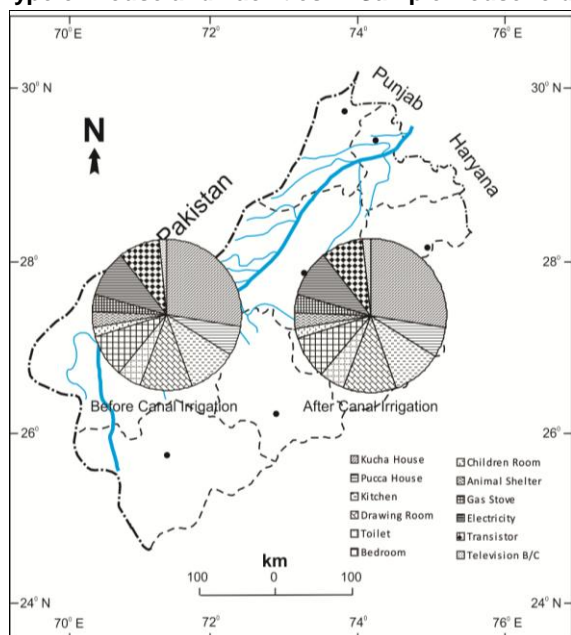
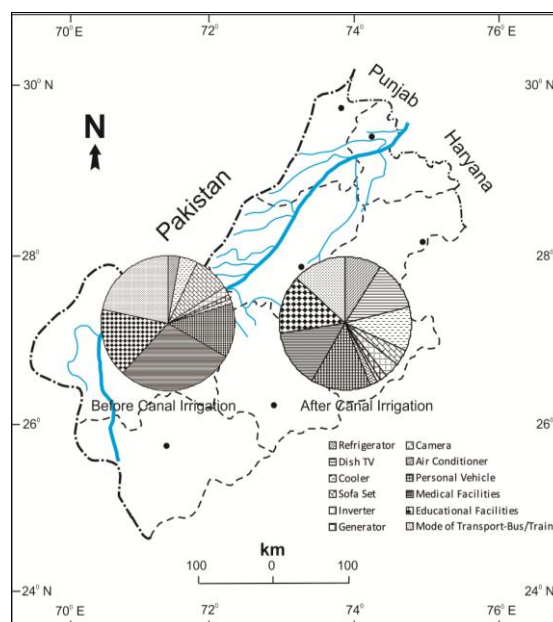


Fig. 4 IGNP Area

Modern Facilities in Sample Households



Upgradation in Socio-economic Status

The irrigation has revolutionized in the socio-status of Other Backward Classes, Scheduled Castes and Scheduled Tribes in the IGNP area. Their occupation has shifted from poor farmer, herder and labourer to landlords. Now, they have beautiful houses and prosperous lifestyle. They have good reputation in society and there is not much gap between the upper and lower caste. They participate in marriages/functions, fairs and festivals together. It is also very important to mention here that 67 per cent of landholdings are owned by Other Backward Class (Jat, Bishnoi, Sidh, Swami), 18 per cent by Schedules Caste and Scheduled Tribe and the rest by General

Category people. So there is just reverse situation in this area where 85 per cent of the cultivated land is owned by the so called weaker sections of the society. It is reported by the 77 per cent respondents that the status of family in society/community has grown up and level of education, medical and transportation has developed since last 15-20 years beyond their imagination. Traditional food- bajra chapati, dry vegetables, milk and dahi have been supplemented by wheat, rice, pulses, green vegetables, milk products, fruits, meat, processed food etc. Tea has become very common and use of wine is also accepted in the traditional society (table 5).

Table 5
IGNP Area- Changes in Socio-economic Status of Sample Households

Status	Before Canal Irrigation	After Canal Irrigation
Family Status (especially of SC/ST/OBC)	Poor	Better
Family Income	Low	Increased
Occupational Structure	Agriculture, Labourer	Agriculture, Services, Manufacturing
Food Habits	Based on local products	Modern
Medical Services	Poor	Developed
Educational Structure	Poor	Developed
Dressing Style	Normal	Modern fashionable
Domestication of Animals	Indigenous cow, goat, sheep, camel	Hybrid cow, buffalo, goat
Transportation & Communication	Bus, train, camel/ox cart	Bus, train, car, motor cycle, utility vehicle
Purchasing Power	Poor	Good
Expenditure on Social Customs/ Occasions	Marriage, child birth, Community dinner on death	Marriage, child birth

Source: Field Survey Conducted During 2014-15

The irrigation has brought some social changes also. It has distorted both the type and size of family. Earlier, there was dominance of joint and large families with 6-10 children but after inception of irrigation and economic prosperity respondents prefer nuclear and small families with 2-4 children and more over they take precautions for family planning.

Conclusion

The introduction of has brought socio-economy development in the study area. It has improved in living standard, housing pattern and types, availability of basic and modern household facilities, better opportunities of employment and income generation.

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