

Sustainability of Water Resource: Problems and Future Need

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Introduction:

In India the primary source of livelihood for more than 70 percent of population is agriculture. Agriculture is the backbone of the Indian economy Agriculture being the heart of rural economy, water is all resources of life and without which life is unthinkable. Thus it is aptly known as life. The land is one of the major resources for economic development. Water, land and agriculture development is complementary and supplementary to each other. Agriculture has made India self-sufficient in food grains with the help of green revolution.

In the success of green revolution irrigation has played a vital role. The importance of irrigation in the Indian context is notable in broader sense, in which it firstly plays a protective role against the uncertainty of monsoon; secondly, with the given technology, mere provision of assured water supply can boost the productivity of the existing agricultural inputs and thirdly, irrigation creates favorable conditions for the introduction of new technology in diverse agricultural activities. The high yielding varieties need adequate water supply on time and use of certain chemical fertilizers and pesticides. However use of these fertilizers and pesticides without adequate water supply affect crop and output adversely. Thus, irrigation is essential to increase agricultural production.

After independence the government has undertaken intensive irrigation projects. As a result, about 40 percent of total sown area in Maharashtra as well as in India is irrigated. This implied that much more efforts are necessary to bring maximum agriculture under irrigation. This leads to the sustainable economic development. In this paper an attempt is made to analyse the relationship between economic development and some issues emerging out of irrigation and sustainability of land and water.

Significance of the Study:

Borgaon village is benefited with the facility of perennial irrigation. The farmers are using the traditional method of irrigation. After observing this method of irrigation, question arises that, is there any effect of excessive use of water and chemical fertilizers on land? However, the researchers and scholars have undertaken a number of studies on various issues relating to agriculture. But very few attempts have made to explore the role of irrigation in sustainable development. In the light of this, the 'SUSTAINABILITY OF WATER RESOURCE: PROBLEMS AND FUTURE NEEDS' is undertaken.

Objectives of the Study:

1. To understand the impact of irrigation on agriculture.
2. To study the changing cropping pattern and the productivity of irrigated land in Borgaon village.
3. To understand the land related problems in an irrigated rural set up and suggest appropriate measures for the sustainable water resource development.

Data Base & Methodology:

A case study method is used for the present study. The study is based on the primary as well as secondary data. The primary data has collected through the interview of fifteen respondents selected at random from the Borgaon village. Interview of the respondents was taken with the help of a structured questionnaire. The secondary data is collected from the village record, books, journals and research papers.

Sr. No.	Land use category	1990		2010		Volume of change(%) + increase - decrease
		Area in hect.	Percentage	Area in hect.	Percentage	
1	2	3	4	5	6	7
1.	other uncultivated area (excluding fellow land)	187	9.05	64	3.16	- 5.89
2.	Net sown area	1820	88	1940	93.89	+ 5.89
3.	Area not available for cultivation.	61	2.95	61	2.95	-----
Total		2068	100	2068	100	- 5.89 + 5.89

Table 1 General Landuse Pattern

Profile of the Village

Borgaon village is situated on the bank of Krishna river in Walwa taluka of Sangli district. It is 4 km. away from Takari railway station on the west side and 10 km. from Islampur tahsil on the east. The village has a total area of 2068 hectares and the village population is 11094 (2001 census). The general land use pattern is given in table 1. (Source- Village records)

The weather prevailing in the study area is cool in the winter and hot in the summer. The soil of the study area is black which is suitable for the cultivation. Agriculture is the main occupation of the villagers. Sugarcane, soyabin, groundnut and wheat are the major crops taken in the study area. The rice, jawar and gram are other crops which are taken on marginal scale. Before the availability of irrigation facility there was severe problem of drinking

water. In those days rice, jawar, groundnut, soyabin and chilli had been cultivated on large scale in kharip season only and sugarcane was taken very rarely because of unavailability of irrigation.

Data Analysis:

The data collected from respondents is analyzed with the help of some statistical tools like averages and percentage. Accordingly inferences are drawn. Source of Irrigation: There are two major sources of irrigation in Borgaon village, which are shown in the table2.

Sr. No.	Source Of Irrigation	1990		2000		2010	
		Area in Hect.	Percentage	Area in Hect.	Percentage	Area in Hect.	Percentage
1	2	3	4	5	6	7	8
1	Well	558.74	30.7	474.54	24.91	495	25.78
2	Lift	1261.26	69.3	1430.47	75.09	1425	74.22
	Total	1820	100	1905	100	1920	100

Table 2 Distribution of Irrigated Land, Source- Village records

Before nineteen, as a means of irrigation, the contribution of well (30.7percent) was Less than lift irrigation (69.3percent). In the late seventieth, irrigation through Koyana project on the Krishna river is started in 1969-70. This project is providing perennial irrigation facility to Krishna basin since last four decades. The water is released frequently from this project in the river bed from which is lifted by electric pumps for agricultural purposes. However after completion of the Koyana irrigation project, the area under lift irrigation has increased to 75 percent of the area under crop. Now a day the irrigation facility is available for all cultivated area in the village.

The irrigation facility has increased the employment opportunity in the study area. It has also been possible for the cultivators to rare milch animals. It has opened ways to the ancillary industries like lift irrigation, sugar and dairy co-operatives in the region. Thus, the availability of irrigation facility encouraged the beneficiary farmers to undertake diverse activities supporting to the agriculture. Cropping Pattern: The cropping pattern of the village is given in the table- 3. During mid sixties, there was no irrigation facility except some well irrigation. In those days, rainfall was the major irrigation source in the study area. As a result, area under well irrigation was found high and the area under cash corps was very low.

Due to unavailability of irrigation facility the village farmers had been cultivated the traditional crops like rice, jawar, bajara, groundnut, chilli which grow on rain fed water. The perennial irrigation facility has been available from late seventieth in the village. This has changed substantially the cropping pattern in the study area. The area under traditional crops (rice, jawar, groundnut, soyabin etc.) has been decreased steeply by increasing that under sugarcane. This is reflected clearly in column no. 6 & 8 of table-3.

Sr.No.	Crops	1990		2000		2010	
		Area in hect.	Percentage	Area in hect.	Percentage	Area in hect.	Percentage
1	2	3	4	5	6	7	8
Kharip							
1.	Sugarcane	1154	63.41	1369	71.86	1568	80.82
2.	Soyabin	276	15.16	245	12.87	206	10.62
3	Groundnut	185	10.17	154	8.08	93	4.80
4.	Rice	91	5.00	64	3.36	32	1.65
5.	Others	114	6.26	73	3.83	41	2.11
Total		1820	100.00	1905	100.00	1940	100.00
Rabbi							
1.	Wheat	168	71.49	297	76.74	365	76.04
2.	Gram	67	28.51	90	23.26	115	23.96
Total		235	100	387	100	480	100

Table 3 Cropping pattern, Source- Village record

The data shows that during 1990 the area under sugarcane crop (63.41 percent) was more than that remaining crop, due to the availability of irrigation facility. Whereas, the rice comprise very lowest area (5 percent) under crop. During the later decade (2000-2010), the area under sugarcane crop has increased highest among all crops at 80.82 percent by decreasing the area under traditional crops like Soyabin (10.62 percent) groundnut (4.80), other crops (2.11 percent) and rice (1.65 percent).

In rabbi season the area under wheat (71.49 percent) was more than that of gram (28.51 percent). During later decade, area under both crops has increased sharply. In 2010, the area under wheat comprises 76.04 percent where as gram comprises 23.96 percent area. Here it concluded that the cropping pattern in the irrigated area has changed reducing the area under traditional crops.

Productivity Of Crops: Among the various factors responsible for the productivity of land, irrigation is one of the significant factors, which has direct relationship with crop yields. Here, productivity refers to the production of crop per hector of land. Generally sugarcane, rice and wheat are the major crops cultivated in the Borgaon village. Thus, the productivity of these crops has been taken into consideration. The data on productivity of these crops is given in the Table 4.

Sr. No.	Crops	1990		2000		2010	
		Productivity	Change in Productivity	Productivity	Change in Productivity	Productivity	Change in Productivity
1	2	3	4	5	6	7	8
1.	Sugarcane	100	-----	125	25.00	110	-12.00
2.	Soyabin	2.6	-----	3.3	26.92	3	-9.09
3.	Wheat	2.8	-----	3.2	14.29	3	-6.25

Table 4 Productivity Of Different Crops Per Hector (In Kg. 000)

Note: 1990 is taken as base year, Percentage of increase/decrease is computed on productivity of earlier period.

The data shows that productivity of crops during the first decade (1990-2000) is increased very sharply. The increase in the productivity of soyabin was

highest among all at 26.92 percent of earlier productivity (1990) followed by that of sugarcane and wheat.

The data pertaining to the later decade (2000-2010) revealed that the productivity of all the crops has been decreased. There is highest decrease in the productivity of sugarcane (12.00 percent) whereas decrease in productivity of wheat was lowest (6.25 percent). It can be concluded that the rate of decrease in the productivity of cash crops is higher than that of traditional crops.

Problems :

The Problem of Saline Land: Irrigation has played a significant role in agricultural development. Majority of the farmers are using the traditional methods of free irrigation. However, there is no natural *nalas* system, which is useful for the outlet of the excessive water in the field. Along with this uncontrolled use of chemical fertilizers contribute to the problems of saline land. The salt-affected area is given in the Table 5.

Sr. No.	Area (ha)	Severe (ha)	Very high (ha)	High (ha)	Total Saline (ha)
1	Borgaon	4.64	133.7	288.11	426.45
2	Walva	963.58	3847.96	13889.81	18701.35

Table 5 Salt Affected Area In Borgaon And Walva, Source- Tech. Report, GR 01/05, Dept. Of Geography,

Decrease in Productivity: The productivity of different crops in Borgaon villege is decreased in the last decade. The inquire of decrease of productivity revealed that the excessive use of water and chemical fertilizers is the major cause. Because of excessive use of water the salinity has been increasing in the land of study area. In turn, it reduces the productivity of land.

Conclusions:

The provision of perennial irrigation to the agriculture leads to increase area under cash crops like sugarcane. Accordingly the cropping pattern in the irrigated area has changed reducing the area under traditional crops. Productivity of the land, during first decade (1990-2000) has been increased sharply. It is reflected in column No.6 of Table-4. It has continued for first one and half decade. However, productivity of the land has been decreased slowly during the last five-six years from 2000 onwards, which is reflected clearly in column No.8 of Table-4. The excessive use of water and fertilizers has paved the way for increase in salinity of land. As a result, productivity is reducing slowly.

Suggestion :

On the basis of data analysis and the above inferences it is to suggest that-

1. Controlled use of water and chemical fertilizers is essential.

2. Modern techniques of irrigation like drip irrigation, sprinkler should be used in order to control the excessive use of water.
3. The crops like sugar beet, wheat and DHP cotton and prabhavati and indrayani varieties of rice should be grown on alternate basis to sugarcane. Use of organic fertilizers and zero base agriculture is recommended strongly.
4. In order to maintain the fertility of the land, mixed cropping or alternative cropping pattern should be followed.
5. Soil testing should be undertaken annually so that it is possible to provide required nutrients to particular crops.
6. In order to increase the fertility of land, use manure, compost and green compost of jute should be followed.

References :

Nationalist Congress Party’s Water Special “Rashtrawadi- Panee Visheshyanka” (Monthly) –Feb. 2001.

Pawar C T., (1989), Impact of Irrigation – A Regional Perspective, Himalaya Publishing House, Bombay.

Pawar Jaysingrao., (2005), Science, Technology and Development, Phadake Prakashan, Kolhapur

Singh M B and Chandel R S., (1994), Sustainability of Irrigation Based Agriculture in India; A case study of Uttar Pradesh, article from Annals, Volume 14,(2)

Statistical data from village record of Borgaon and Irrigation Dept., Islampur.