

Watershed Management and Its Impact on Environment and Economy (A Case Study of Bharatpur District)

Abstract

The economic development of a region is determined by the availability of water in that region. Less than 1% of total available water is used by man in drinking, irrigation, sanitation, industries, transportation, and recreation purposes. The study area is the eastern most district of Rajasthan state. The objective of the study is to compare impact of pre and post watershed development on environment and economy of the study area. The concept of watershed management is adopted for overall development of the region. The post watershed interventions data show the improvement in environment and economic status of the study area.

Keywords: Urbanization, Industrialization, Scarcity, Productivity, NWDPR, Banganga, Watershed, Span, Depletion, Dark Zone, Drainage Divide, Negligible, Diversification, Intensification, Horticulture, Castration, Chaff Cutter, Contribute, Mustard, Flourishing

Introduction

The economic development of a region is determined by the availability of water in that region. Nearly 71% of earth surface is covered by the water. Only 29% of earth surface is a land part. Over 97% of the water on earth's surface is contained in oceans and this water is saline in nature. Less than 3% is held in ice caps, glaciers, ground water and all the fresh water bodies and rivers. 1.76% of total water is deposited in ice caps and glaciers. Remaining less than 1% water is used by man in drinking, irrigation, sanitation, industries, transportation and recreation purposes. The rapid growth of population, urbanization and industrialization require a huge amount of water. There is an imbalance in demand and supply of water. Eighty countries comprising 40% of total population are facing scarcity of water. The concept of watershed development in India is very old and this concept led to development of tanks and reservoirs for increasing the production of food grains to meet the demand of evergrowing population since ages. Govt. of India launched watershed development programmes in 1983-84 in a big way to conserve and utilize natural resources for enhanced productivity and higher socio-economic status. In 1986-87, the National Watershed Development Programme for Rainfed Agriculture (NWDPR) was launched for optimizing the production of important rained crops. The watershed development programme is the most ambitious initiatives to redress the issue of poverty alleviation through conservation and development of land and water resources.

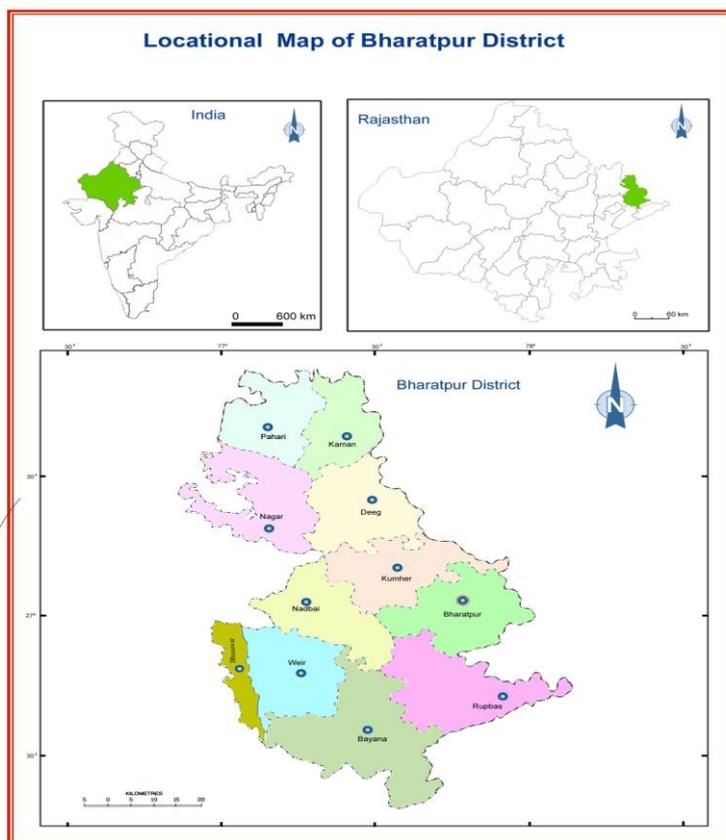
Study Area

Bharatpur district "Eastern gate of Rajasthan" is situated between 26°22' North latitude to 27°50' north latitude and 76°53' to 78°17' East longitude. It is situated 100 meters above the mean sea level. The district covers a total area of 5066 sq.kms. The northern border of the district touches Mewat district of Haryana state, eastern border touches Mathura district, and southern border touches district Agra of Uttar Pradesh state and district Dhaulpur of Rajasthan. It touches district Dausa in south-west and Alwar in the north-west. Indian census 2011 reads that the total population of Bharatpur district in Rajasthan is 25.48 lakhs people. The decadal growth rate for the period of 2001-2011 is 21.28%. Density of Bharatpur district is 503 persons per sq. km which is second highest in the state after Jaipur district. Average literacy rate of Bharatpur district is 70.11% which is above state as well as national average. The sex ratio of Bharatpur district is 880 females per 1000 males according to 2011 census.



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Objectives of the Study

The present study focuses on the implementation of watershed development projects and its ecological and economic changes in Bharatpur district. Following are the objectives of the study :-

1. To study the impact of watershed on land use pattern and crop pattern.
2. To compare impact of interventions of pre watershed and post watershed development on ecology and economic condition of the region.
3. To examine the changes in economic and environmental status of the area.
4. To suggest the effective ways of restoring the ecological balance by conserving natural resources.

Research Hypothesis

A proposition or set of propositions set forth as an explanation for the occurrence of some specified group of phenomena either asserted merely as a provisional guess to guide investigation or accepted as a highly predictable in the light of established facts.

The following are the hypothesis :

1. Micro watershed has changed the ecological status of the study area.
2. Economic aspects of the study area have changed due to implications of the micro watersheds.

Methodology

The study is based on secondary data. The related data have been obtained from statistical abstracts of various years of Bharatpur district. The

secondary data sources for the study include survey of India top sheets, population census, various economic surveys, annual reports of directorate of the watershed development and soil conservation departments. Further documents submitted by various NGO's working in the field of watershed development will be also utilized for the study area. Wherever possible the pre and post watershed secondary data sources will be compared and contested for understanding and analyzing the changes observed after watershed implementation in the area. Further field observations will also be used to substantiate the other data. The time span for the study area is from 1991-92 to 2011-12 to observe the pre and post watershed interventions impact on the ecological and economic status.

Watershed Management

The economic importance of rain water is vital because water is lifeline of all living being in this particular dry region. Importance of water management is increased due to rapid depletion of underground water. The present study for agriculture land development is focused on underground water as well as surface water management. The whole Bharatpur district is in dark zone-an area where underground water table has reduced below recoupable level. Watershed management implies the rational use of land and water resources for optimum production with minimum hazards to natural resources. The concept of watershed management is essentially adopted for soil and water conservation practices in the watershed.

“Generally a watershed can be defined as an area from which run off resulting from precipitation flows past a single point into stream, river, lake or an ocean”. The term watershed, catchment area or drainage basin is used synonymously. The watershed boundary is called drainage divide. Rains received on opposite sides of drainage divide do not contribute run off and reach to the adjoining area.

Over 71% of total geographical area require watershed development treatment in Rajasthan. The government of Rajasthan has started watershed development and management programme in 1994 with the aims of reducing drought, improving

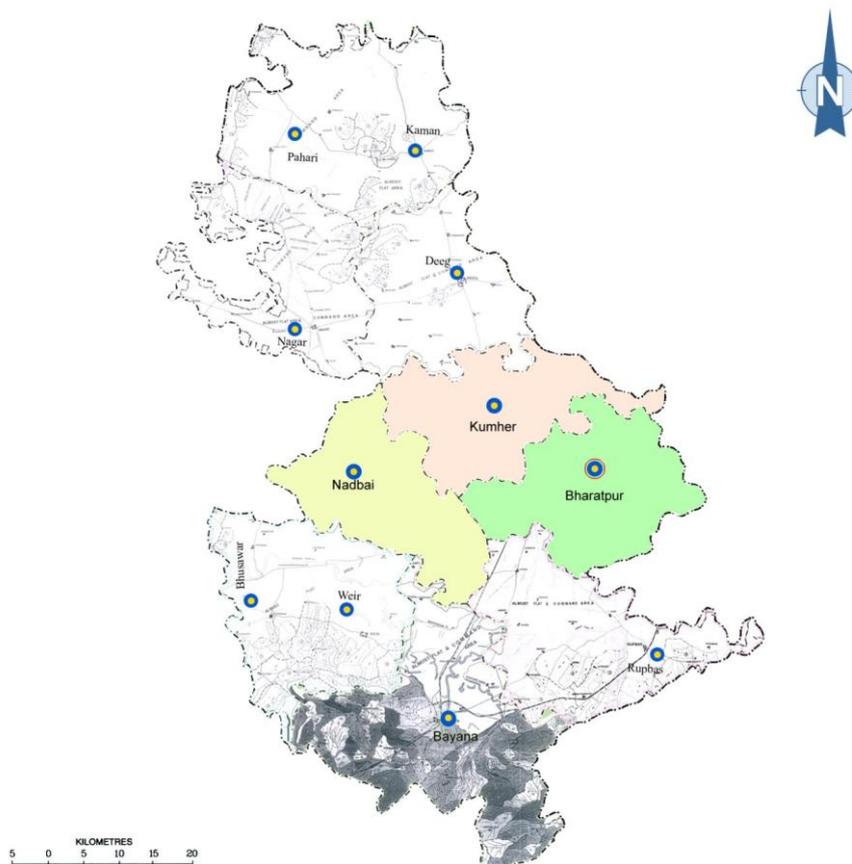
livelihood and providing employment opportunities in rural areas. It was started on participatory mode in Bharatpur district. In Bharatpur district more than 1.25 lakhs hectares area have been treated under various watershed development schemes like DPAP, IWDP, EAP, PRIs and others. Department of science and technology, GOR has prepared a watershed atlas on panchayat samiti wise. The following are the number of macro and micro watersheds, area under watershed, total geographical area, percentage of total area in selected panchayat samities in the district.

Watersheds in selected panchayatsamities in Bharatpur district

Sr.No.	Name of panchayatsamiti	No. of macro watershed	No. of micro watershed	Area under watershed (ha)	Total geographical area (Sq. Km.)	% of total area
1	Bayana	04	104	53858	803	66.99
2	Weir	08	53	24752	576	40.31
3	Rupbas	04	27	18442	539	33.58
4	Kaman	09	26	14305	510	40.42
5	Nagar	05	14	5799	654	12.31
6	Deeg	06	15	3917	490	7.8

Source: Deptt. of Science & Technology, GOR, Jaipur.

Distribution of Watersheds in Selected Panchayat Samities
Bharatpur District



The southern tehsils (Bayana, Weir and Rupbas) have hilly and undulating topography. Watershed programmes are implemented to enhance ecological and economic status of the region. Bayana

tehsil possesses 66.99%, Weir tehsil 40.31% and Rupbas tehsil 33.58% of their total area under watershed programmes. The northern tehsils Kaman and Pahari have scattered and small hills belong to

Delhi super group. This region possesses 40.42% area under watershed programmes. Nagar and Deeg panchayat samities possesses only 12.31% and 7.8% area under watershed programmes. The central part of the district (Sewar, Kumher and Nadbai panchayat samities) is almost flat and possesses negligible area under watershed programmes.

The concept of watershed management is essentially adopted for soil and water conservation practices in the watershed area. The conservation practices like contour vegetative bund, gully control structures, D.C.B/stone wall fencing, bank stabilization construction of earthen check dams, construction of waste weir, construction of farm ponds, excavation of pits etc, adopted in the watershed areas. These practices protect soil and rainwater loss in the region. These practices protect land erosion, improve soil moisture retention capacity and improve underground water level. Water harvesting structures reduce runoff in the peak discharge and increase water recharge and irrigation potential in the region. Crop diversification and intensification are practised to reduce the risk of crop failure. Farmers are adopting plantation in pasture land, dry land horticulture and agro-forestry in the region. To enhance livestock rearing and dairy development activities castration of scab animals, artificial insemination and natural service for breed improvement are adopted by the farmers. Fodder production activity involves demonstrating high yielding fodder crops variety, fodder minikits and distribution of chaff cutter machines on subsidy basis. Hence a multidisciplinary approach is to be followed in

an integrates manner with an active people participation.

Impacts

We shall study the ecological and economic impacts of watershed interventions. Ecological impact- Forest cover has increased in the district after implementation of watershed development programme in 1994. The forest cover had increased from 26126 hectares (5.12%) in 1990-91 to 33645 hectares (6.63%) in 2011-12. This is the net increase of 7519 hectares under forest cover in the district. Most of the watershed interventions are operating in hilly regions and southern part of the district. Significant increase under forest cover during this period was observed in Bayana tehsil from 14820 hectares in 1990-91 to 19302 hectares in 2011-12 and negligible area to 3240 hectares in Kaman tehsil. There is a high correlation between the number of watersheds in the area and area under forest cover. It is obvious that watershed interventions contribute a lot. Forest cover is dense and possesses varieties of plants. They provide food and shelter to wild animals also. It is observed during field survey and discussions that number of wild animals have increased after watershed interventions. Some carnivores like panthers and leopards with their cubs were noticed in the region by local residents. Economic impact :Bharatpur district consists 80.57% rural population and 19.42% urban population. Basically it is a rural population district. Mostly rural population is engaged in agriculture directly or indirectly. Farmers are benefited immensely with a bumper production of crops particularly in rabi season.

Production of important crops (1991-92 to 2011-12)Metric Tonnes

Sr.No.	Year	C R O P S								
		Bajara	Jowar	Wheat	Barley	Rice	Gram	Mustard	Cotton	Guar
1	1991-92	10261	19904	231617	9795	3329	47742	207804	25	1431
2	2011-12	195331	45236	601237	8070	6967	6419	338349	4536	2026

Source : Bharatpur district statistical abstracts

The above table represents the comparison of pre and post watershed production of important crops in the district. The above table shows that production has increased after watershed interventions except production of barley and gram. Bharatpur district is famous for the production of wheat and mustard in the state. Area under barley and gram crops have shifted to wheat and mustard during this period. Production has also increased due to improved agriculture practices in terms of high quality seeds, modern agriculture tools and changes in cropping as well as irrigation pattern. The prices of lands have also increased in all watershed sites. The villagers benefited from direct and indirect wage employment opportunities in the watershed areas. Dairy development and livestock rearing activities are flourishing after the watershed interventions. The production of milk, meat and wool has increased. There was a improvement in fodder availability to some extent. These activities have brought additional income to the local residents. Pasture development was partially successful in the watershed sites due to encroachment by local people. This venture has increased income, employment and social status in

rural areas. Small, marginal and landless farmers have derived immense benefits from it.

Conclusions

Bharatpur is a rainfed district with 80.57% of rural population depending directly or indirectly on agriculture. The government of Rajasthan has started watershed development and management programme with the aims of multiple benefits in term of increasing foodgrains production, improving livelihood, protecting environment and providing employment opportunities in rural areas. This venture was started on participatory mode. The study was designed to evaluate watershed management and its impacts on environment and economy at the grass root level.

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