

# Agricultural Land Use Pattern of Bharatpur District, Rajasthan, India

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## Abstract

The present study deals with agriculture land use pattern of Bharatpur district for better land use planning with the growing population and limited resources, it is imperative to take into account proper planning of land and its resources to meet the needs of future generations. Land is the basic resource and a gift of nature from which man gets varieties of products to meet his need. Food is the basic necessity of man, which he gets from the land. The continues rise of population is inevitable and to meet the food requirement efforts have to be made to make optimum use of the land and get as much as out of it. The development of irrigation projects are the major steps in direction of bringing more culturable waste land under cultivation and also increasing the production and intensity of cultivation. However, the major irrigation projects need to be designed after considering all environmental and ecological aspects, so that the ecological balance could be maintained.

**Keywords:** Agriculture land use; Land use Pattern; Agricultural planning; Agriculture resources

## Introduction

According to land use principles and the forest policy of India, some balance has to be maintained between in various land uses. Mono land uses may lead to economic and ecological conflicts of long range due to short range sustainability. Therefore, diverse land use planning according to the carrying capacity of land is a precondition for any systematic development programme. With this philosophical guideline in mind, what follows in the chapter is description of existing land use pattern, with special emphasis on agriculture. Certain criteria underlying land use and condition of soil and drainage, i.e., land capability factors, are also discussed for an integrated understanding and diagnosis of ecological problem. In the end, environmental management plan with reference to agriculture is given as curative and reinforcing measure.

## Geographical setting

The district Bharatpur is situated on the extreme eastern part of the state of Rajasthan. District Bharatpur owes its name to the former capital town of the then princely state of Bharatpur of Rajputana. It is surrounded by the district of Gurgaon of the

Haryana state in the north, Agra and Mathura of Uttar Pradesh in the east, Dholpur, Alwar, and Swai Madhopur districts of Rajasthan in the south and west, respectively. It spreads over an area of 5,066 Sq. km. Which is 1.48 percent of the total area of Rajasthan. As per census 2011, total population of the district was 25,48,462, whereas it was 20,98,323 during 2001 census, thus registering 27.05 percent growth in population between 2001 and 2011, with urban and rural population is 495,099 and 20,53,363 respectively.

## Existing land use pattern

Land has been the important and fundamental resource and the medium of production from ancient times. Therefore, every region whether that is plain, plateau, field, uneven /rough terrain, it points towards the historic background of cumulative social level and regional unstable geographical facts. On the other hand, it also develops the side of nature as resources provider. Geomorphology and local environment play a major role in life and living standard of man. The analysis of land use pattern has been done as per revenue records for the year 2011 given in table below at tehsil levels. Bharatpur district with least desartic

conditions has been an inhabited area from ancient days and is therefore fairly inhabited and most of the land has been brought under cultivation, irrespective of its fertility or suitability. Today only the hilly and barren rocky land or land under water logging is left area. Agriculture is done intensively to the extent that the beds of tank are cultivated during rabi season, as soon as they get empty after water is drained of the irrigation. The land use data reveal that land in the district is intensively cultivated and about 85 percent land is cultivated. In Nadbai and Kumher areas the intensity of cultivated land is even more than 90 percent fallow and waste land are only 20.8 percent about 27.2 percent cultivated land is double cropped. However, the irrigated land is only 28 percent. A sizeable land of about 10 percent is not available for cultivation most of which is under water bodies, hills and Kewla deo national park.

### Agriculture land use

The prosperity of an agricultural area largely depends on the efficient utilization of potential agricultural land. These lands are the means of providing food which every human being requires every effort is made by man to get as much as he can get from his

land, which often creates problems of over exploitation in the form of reduction in soil fertility. Increase in salinity as well as water logging. Through command area is being intensively used for cultivation, but the use does not seem to be proper and balanced. For ecological balance the land use pattern has to be relational with areas under various uses like forest pastures etc. The recent concept of social forestry to develop forest land in all the villages is totally missing in the region, and even though there are hilly and rocky land in the area, such uses are almost negligible. Because of the excessive exploitation of land practically area under waste land and groves is negligible to about 1.2 percent. Even there is lack of grazing land which is only about 1.7 percent of the total area of the district. However, the hills could not be cultivated by man and therefore about 11 percent land is not available for cultivation comprising of barren hilly of rocky land & land under water bodies, rail, road, and settlements.

### Land use in command area

The land use pattern in command area is almost similar to the overall land use pattern of the district as is evident from the table 01.

*Table 1: Land use in Command Area in Bharatpur District.*

|                       |                   |                                | Land use in Ha. |                     |                                   |  |                                    |
|-----------------------|-------------------|--------------------------------|-----------------|---------------------|-----------------------------------|--|------------------------------------|
| #                     | Name of Tehsils   | Total Area of Village (in Ha.) | Forest          | Irrigated by Source | Unirrigated Including Follow Land | Culturable Waste including Gochar & Graves | Area not Available for cultivation |
| Under Lift Irrigation |                   |                                |                 |                     |                                   |  |                                    |
| 1.                    | Pahari            | 21773.36                       | -               | 7623.84             | 11393.65                          | 450.32                                     | 2305.55                            |
| 2.                    | Deeg              | 20788.32                       | -               | 3452.46             | 14273.01                          | 451.23                                     | 2611.62                            |
| 3.                    | Kumher            | 14306.08                       | -               | 2751.83             | 10761.33                          | 55.40                                      | 737.52                             |
| 4.                    | Bharatpur         | 5175.10                        | -               | 2156.33             | 2709.82                           | 25.98                                      | 282.97                             |
| 5.                    | Rupbas            | 1503.14                        | -               | 954.75              | 426.00                            | 11.00                                      | 111.39                             |
| 6.                    | Kaman             | 20078.49                       | 72.84           | 4721.76             | 10315.62                          | 1347.19                                    | 3621.08                            |
| 7.                    | Nagar             | 27939.78                       | -               | 8129.47             | 16489.38                          | 360.54                                     | 2960.39                            |
| 8.                    | Nadbai            | 22850.60                       | -               | 14584.86            | 6802.60                           | 365.36                                     | 1097.78                            |
|                       | <b>Total</b>      | <b>134414.87</b>               | <b>72.84</b>    | <b>44375.30</b>     | <b>73171.41</b>                   | <b>3067.02</b>                             | <b>13728.30</b>                    |
| Under Flow Irrigation |                   |                                |                 |                     |                                   |  |                                    |
| 1.                    | Pahari            | 11267.32                       | 4.05            | 4233.16             | 4732.50                           | 476.48                                     | 1821.13                            |
| 2.                    | Deeg              | 28255.49                       | 989.34          | 8075.69             | 16680.66                          | 525.37                                     | 1984.43                            |
| 3.                    | Kumher            | 29710.26                       | -               | 8244.71             | 19232.72                          | 345.20                                     | 1887.63                            |
| 4.                    | Bharatpur         | 34587.33                       | 2790.00         | 13767.43            | 14540.01                          | 183.12                                     | 3306.77                            |
| 5.                    | Rupbas            | -                              | -               | -                   | -                                 | -  | -                                  |
| 6.                    | Kaman             | 13035.37                       | -               | 6721.80             | 5010.84                           | 190.81                                     | 1111.92                            |
| 7.                    | Nagar             | -                              | -               | -                   | -                                 | -  | -                                  |
| 8.                    | Nadbai            | -                              | -               | -                   | -                                 | -  | -                                  |
|                       | <b>Total</b>      | <b>116855.77</b>               | <b>3783.39</b>  | <b>41042.79</b>     | <b>60196.73</b>                   | <b>1720.98</b>                             | <b>10111.88</b>                    |
|                       | <b>G. Total</b>   | <b>251270.64</b>               | <b>3856.93</b>  | <b>85418.09</b>     | <b>133368.14</b>                  | <b>4788.00</b>                             | <b>23840.18</b>                    |
|                       | <b>Percentage</b> | <b>100</b>                     | <b>1.6</b>      | <b>33.9</b>         | <b>53.0</b>                       | <b>1.9</b>                                 | <b>9.4</b>                         |

The forest cover in only about 1.6 percent while about 87 percent land is cultivable out of which about 34 percent is irrigated. Only about 1.9 percent area consists of waste land while 9.4 percent land is not available for cultivation. As such 77.4 percent of the total area of the district is under cultivation. It is again interesting to note that in the tehsils under command area the percentage of cultivated land is quite high varying between 79 to 92 percent. The land use pattern in the command area is still high as about 86 percent of the total area comprises of cultivable land. The area under forest in the district is about 5 percent, and mostly the area is in Bayana tehsil which is outside the command area. In the command area the land under forest is only 3856 hectares or about 1.6 percent. The irrigated area is only about 27.8 percent of the total area of the district. However, in Deeg and Nagar tehsils less than percent area is irrigated (Table 1).

### Problems and prospects of land use development

For rational land use planning appraisal of soil and land resources is essential. Although substantial portion of land is under agriculture, a large chunk of land in Bharatpur is affected by soil erosion and other problems. There are as much as 40.58 sq. km. of eroded land in the district while about 122.54 sq. km has turned into rocky land due to degradation of forest areas and other erosion problems. Such eroded lands are quite significant in the tehsils of Bayana, Bharatpur and Kaman. Besides, about 26.89 sq. kms. Of land is salt affected and suffer from salinity problems, mainly in Kaman and Rupbas Tehsils. In addition, there is sizeable extent of Culturable waste land in Bayana, Kaman and Weir Tehsils All these degraded lands are caused mainly by forest degradation, water logging, and improper use of land, over-grazing and the existence of barren and rocky areas. Small extent of land (about 8.59) sq. km), particularly in Bharatpur tehsil, is also affected by water logging. In view of these problems mentioned above, some curative measure--engineering, biological, administrative and social engineering are necessary. They are being discussed here under the rubric of environmental management plan.

### Impact on agricultural land use

The irrigation project is bound to have great impact upon the agricultural prospects of the command area. The scheme shall be providing irrigation facilities to 1,80,000 hectares of CCA in seven tehsils of Bharatpur. It may be seen that 86,500 hectares unirrigated crop land shall be benefited by irrigation facility. The total area under principal Kharif crops shall increase from 42,000 hectares to 1,02 000 hectares; while area under principal rabi crops shall increase to 1.16 lac. Hectare. Thus, total cropped area under major crops shall increase from 1.99 lacs to 2.16 Lacs hectares. In all about 86,500 hectares additional crop land shall be added due to canal irrigation. The total net value of product in the

unirrigated area of 1.136 lacs hectares is Rs. 542.30 lacs which will increase to 736.76 lacs after the introduction of canal irrigation. The average per hectare production shall also increase considerably.

### Surplus food grain

On the basis of recommendations of expert of Nutrition Research Laboratories, Hyderabad as well as other studies; standard per capita choleric requirement of 2400 calories a day has been assumed for which a total of 220 kg. Per year food grain is required for a person. Assuming an average production of between 15 to 20 quintals per hectare, the total production of food grain in the command area is expected to about 41.5 Lac quintals. On the basis of standard requirement of 220 kg. Per capita the total food grain requirement for the population of 200 as expected to about 14.5 Lac for the command area works out to about 31.00 Lac quintal. Thus, a surplus of about 10.00 Lac quintal of food grain shall be available in the area. The above surplus food grain shall obviously generate a lot of economic activities; mostly the marketing, transportation and agro industries in the command area. The other benefits of the Yamuna water irrigation project in Bharatpur District shall be in the form of increase in other agro associated economic activities such as animal husbandry, household industries, dairy, poultry etc.

### Reclamation of waste land

About 4788 hectares land in the command area is waste land out of which 3067 hectares is under lift irrigation and 1721 hectares is under flow irrigation; Most of the waste land is in up lands, sandy areas and with rock out crops. It is not advisable to bring these waste land under cultivation, but it should be used for other purpose. They should be suitably developed with tree plantation either by forest department or even by planting trees by the individual land owners. The waste land having saline effect may be got treated properly and may be developed as green areas by tree plantation rather than looking barren and dry as of today.

### Measures for Mitigating Adverse Impacts

Measures for mitigating adverse environmental impacts related to Yamuna water irrigation project need to be adopted. A brief discussion about them is presented here.

**Submergence/acquisition of agriculture land:** Submergence/acquisition of agriculture land is unavoidable but may be kept as low as possible, consistent with the project objectives and techno-economic analysis. Generally, it should be about 10 percent and under no circumstances above 25 percent of the extent of benefited area. This will avoid conflict during land acquisition, resettlement and rehabilitation process. In the present case land acquisition made be needed only for canal alignment,

which will be negligible, while by providing proper drainage even water-logged areas can be reclaimed.

**Rehabilitation:** Farmers need to be persuaded to “Consent Award” wherein they are given rightful compensation and/or given alternative land and improved scale of facilities at new rehabilitation sites. In the Yamuna Water Irrigation Project, Bharatpur no rehabilitation is required, because no village is to be submerged or resettled.

**Health Aspects:** A number of aquatic bodies are prone to give rise to water borne diseases like Malaria, Filariasis, Schistosomiasis, etc. Water stagnation may be avoided and people discouraged to use infested water. The environment management plan for malaria control is given in chapter xii separately.

**Vegetative menace:** Vegetative menace like water hyacinth, bull rush or Typha grass would be eradicated at the initial stages. Biological control through certain type of fish and weevil feed on water hyacinth would be explored. However, in the case of this project, not much vegetative menace is to be created rather more plants to be added.

**Siltation:** Siltation in canals would be checked by proper gradient for vigosity control. Suitable soil and water conservation measures including tree plantation in catchment area helps in controlling erosion. The tree plantation alone the canal is proposed to be undertaken for environmental upgradation and check the erosion of canal.

**Construction and environment:** Some of the measures include giving proper shape to borrows, filling of quarries with waste material, locality of canals at appropriate alignment to allow minimum possible cut and fill, create fishponds, tree plantation over and around spoil heap and along canal side, etc. Thus, the proper canal alignment has to be taken avoiding adverse impacts.

**Sanitation and sewage disposal:** To avoid pollution of canal water, provide proper sewage disposal (septic tank, biogas plant, etc.) as well as waste disposal plants; because they pollute the water.

**Energy requirement:** Instead of mere regulatory provisions, provide alternative sources like biogas plant, charcoal, kerosene, energy plantation, etc. It will enable control and diversion of cow dung and vegetative waste from fuel to use as manure.

**Movement Facility:** Construct bridges, siphons, culvert, etc., for facilitating local movement of peoples, wild life, domestic animals, vehicles, etc. to cross canals and drains.

**Seepage from canal and rise of groundwater table:** Seepage from canals, drains, etc., lead to problems of water stagnation, creation of marshy land, salinity, sodicity, rise in groundwater table etc. For this necessary advance planning and adoption of appropriate measures need to be taken up. Some of the important measures include lining of canals and water courses, proper operation and maintenance, installation of suitable vertical,

horizontal and/or biological drainage system and adoption of efficient methods/systems of irrigation.

**Change in Micro-climate:** Irrigation network does change the micro-climate which is generally advantageous but in some cases it may also be disadvantageous. The humidity may rise and reduce the effect of aridity and bring moderate conditions.

**Agro-Industries:** With the development of Yamuna water irrigation project, different kinds of related agro-industries also simultaneously come up which may create pollution problems and the same need to be controlled by imposing suitable regulations and locating them at selected growth centres having proper infrastructure.

**Human induced environmental problems:** Human induced environmental problems could be:

- Irrigation on marginal lands.
- Instead of recommended cropping pattern, high water requiring/profit giving crops are raised.
- Inappropriate, generally low, water rates.
- Overall low irrigation efficiency.
- Lack of equity, i.e., farmers of command area get higher income due to almost negligible cost of irrigation as compared to farmers of well irrigated area and those of dry land farming areas.
- Rise of water table including perched water table.
- Water logging, building up of nitrate and pesticide residue.
- Heavy weed infestation.

## Conclusion

The present work on ‘Geomorphology and Land use Pattern and Its Impact on Agricultural Development. A Case Study of Bharatpur District’ is a study of the applied geomorphology and land use pattern with the special reference of Bharatpur District. It deals with the geomorphology of this region and land use pattern system because land use is the surface utilization of all developed and vacant land on a specific point at a given time and space. It deals with the development of agricultural activities of the region. Crop combination regions and their impact assessment on local and surrounding environment have been analysed in this study. In this sequence several factors have been taken under consideration in order to conduct a crop-combination analysis of present agricultural activities and thereafter a plan is being suggested for the sustainable development of this region. This study not only helps in understanding the problems or benefits of cropping but also provides significant and useful information about crop management and the right way of doing cropping pattern. It also helps farmers for making new strategies for the development of cropping area and for decreasing degradation of land through proper methods of farming.

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