Combating desertification strategies in arid land of India

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ABSTRACT

The present study deals with the current status and process of desertification due to over exploitation and mis-management of natural resources of the Rajasthan. The author try to make some observations on specific indicators of natural resources degradation that have strong impact on the process of desertification. The author have also looked into the climatological phenomenon such as drought. From the above study it is very much clear that to meet out the ever increasing demand of the man and society, the natural resources are being exploited at the rate where no regeneration is possible. Lastly, a brief account of the protective measures that have been taken by government is discussed.

GEOGRAPHICAL BACKGROUND OF RAJASTHAN

Rajasthan extends between 23^0 3' north to 30^0 12' north latitudes and 69^0 30'E to 78^0 17' east longitudes. In terms of area it is the second largest state in India and covers about 3,42,000 square kilometers. Rajasthan stretches two of India's major physiographic divisions, namely the Great plains (Indian Desert) and the Central Highlands. The Aravalli range of hills intersects the state diagonally from southwest to northeast, extending right up to Delhi. While the area east of the Aravalli falls in the northern part of the Central Highlands. The Aravalli forms the Watershed line between catchment streams flowing into Arabian Sea and Bay of Bengal respectively. It has a steep but discontinuous front to the Thar plains in the west and a relatively gentle slope to the alluvial basins in the north and the east. The central part of Aravalli consist of an important basin of interior drainage is gifted with Sambhar lake. This area is full of sand hills and typical landscape with several low depressions.
The climate of Rajasthan, west of the Aravalli as of other desert and semi-desert regions, which rapidly gets heated during the day and cool down quickly after dusk, variations of as much as 22^0 c is noted in the maximum and minimum temperature. In the east and south of Aravallis there is considerable variation in the temperature and amount of rainfall. Climatically the Rajasthan is driest State in the country. The annual rainfall varies from less than 100 mm to 1000 mm. As one moves from southwest to northeast, the rainfall goes on decreasing.

CAUSES OF DESERTIFICATION IN RAJASTHAN

Deforestation:

On account of the phenomenal increase in population of the State from 3.42 million in 1901 to 54.34 million in 2001, heavy demands are being placed on the tree-lands. The demand in rural areas is met by felling of trees standing on the private agricultural farms,

government forests and wasteland, community pasturelands etc. Another important demand on forest and pasturelands is uncontrolled grazing. The cattle population of the state is about 50 million as per 2007 census. The cattle are rarely stall-fed they are allowed to graze in village wastelands or the government forests which results into further degradation of vegetation cover.
Forests that are highly degraded and mostly in the form of scrubs, constitute a bare 6 percent (FSI 2003) which is highly insufficient in view of the ecological requirements and the country's accepted national forest policy, 1952 of keeping 33 percent area under forest cover.

Scarcity of Water
The average rainfall received in the state is 16% less than average normal rainfall. As a result about 75 % of cultivated area in the state remains un-irrigated. Damage to crops causes wide spread distress to land. Water scarcity and drought are combined a phenomenon in the State, which also occurs due to high range of evaporation that are major problems arising out of heat. Due to this phenomenon a large chunk of area remain dry for a long period, hence it reduces soil fertility and land becomes barren.

Culturable Wastelands
These lands are mostly in the form of water-logged lands, ravines, ravine beds, undulating lands near hills or on sand-dunes, degraded forest lands or rocky, hummock plains. In Rajasthan, most of the areas of the western and north-western districts are wastelands on account of a thick mantle of permanent **sand-dunes** which are often 20 to 40 metres high and 2 to 6 km. long. They have foliage cover of xerophytic vegetation including dwarf trees of *khejari* (Proscopies cineraria). Tillage of such sand-dunes is neither permitted nor desirable as it will make the sand loose and subject the area to further wind erosion causing spread of desertic conditions to other areas.

Drought
Owing the geographical situation, Rajasthan, faces scarcity condition over large area on a recurring basis, Rainfall is often inadequate and erratic. There is also uneven distribution during the crucial growth period of crops.. As a result, about 76 percent of cultivated area in the State remains un-irrigated. In case of failure of rains of Kharif season destroys the existing as well as coming Rabi crops.

Over Irrigation
Due to over irrigation and for a long period of accumulation of natural water after rains, sub-soil water table rises and the natural salts also move-up with the water and gets deposited on the soil surface, which results in the saline soils. Consequently, the land losses its productivity and becomes barren. The physical deterioration of the soil due to water logging has affected about 29 thousand hectare in Rajasthan. This is mostly due to over irrigation and leakage from canal in the Western Rajasthan. Another study conducted by the State Ground Water Board, In the year 1981 about 19.75 S. Km area was under water logged that was increased up to 609.37 S. Km by the year 1998 in the Indira Gandhi Canal Command area.

GOVERNMENT STRATEGIES TO COMBAT DESERTIFICATION

Drought Prone Area Program

A large portion of agricultural/cropped area will have to depend on monsoon/ rains. It is this dryland/ rain-fed areas which will determine whether the beetle for agricultural

production and self sufficiency will be won or lost. Government of India has recognized this fact and has introduced Drought Prone Area Program (DPAP) since 1970. It covered about 511 blocks of 70 districts in 13 states in the country. In Rajasthan state this program was launched in 1974-75- as a centrally sponsored scheme to be finance by the center and the state on a 50: 50 basis. The specific objectives of the program is to ensure optimum utilization of land and water in drought prone area and to minimize the ill effects of drought and scarcity conditions on the economy of these areas.

Desert Development Program
This was stared in 1977-78 as a program totally financed by the center. It covers both the not and cold arid regions of the country. An objective of the program is integrated development of the desert area. The specific objective of this program in Rajasthan is to arrest the process of desertification and to use the limited resources of drought for drought -proofing and improving the economy of the desert areas. The program covers 85 blocks of 16 districts of Rajasthan.

Soil and Water Conservation Program
Soil and Water Conservation Program as a strategy are formulated on the basis of integrated watershed management plan combining conservation strategy with social economic development objectives.

Dryland Farming
After the announcement of new 20 point program and inclusion of Dry Farming Development as point No. I-B, this subject has been receiving growing attention. National Workshops/conferences have been decided schemes have been launched under State, Central and Centrally Sponsored Sections for development of Dryland Farming. Attempt have also been made to secure and utilized financial assistance from International Financial Agencies like World Bank and IFAD(International Found for Agricultural Development)

Afforestation
Afforestation is a one of the importance methods of maintaining the ecological balance and soil conservation. This also reduces the intensity of the drought. Under various schemes like Drought Prone Area Development Program (DPAP), National Rural Employment Program (NREP) etc. Provisions have been made for afforestation.

Various proposals for Inter-Linking of Rivers
Several proposals have been put forward from time to time for conservation of flood flows in water rich basins and transferring them through interlinking canals and mediate storage's to water deficit areas. After examine of merit and demerits of the various schemes initiated by various individuals and agencies, the Ministry of Irrigation (Now Water Resources) and the Central Water Commission have evolved an out line of the National Perspectives of Water Resources Development in India.

POLICY SUGGESTIONS

Selection of Appropriate Land Use
Wrong policy choices have aggravated the problems land degradation in the Rajasthan. Nowhere in any desert of the world is wasted water over extensive cultivation by flood irrigation method. The geo-physical character of land in the desert areas of Rajasthan is of margin origin. Also there is a large deposits of Gypsum at many places in the Indira

Gandhi Canal Command areas below a sand sheet ranging from one to three meters of depth from surface. In such condition if a intensive irrigation is done for continuous 10 to 15 years the area is bound to be waterlogged. Therefore,iIt is now suggested that the land, which is not suitable for intensive irrigation, should be used for pasture land development and hence the animal husbandry should be promoted in the desert rather than agriculture which is not sustainable.

Urban Land Use

The urban population is increasing very fast so as the urban areas. Presently all most all urban areas are expanding at the cost of peripheral agricultural land, quite often very fertile and productive. This process has resulted in the conversion of agricultural lands into non-agricultural uses. Apart from the diversion of lands for non-agricultural uses, the extensive damage to ecology and environment due to industrial waste, pollution, and misuse of land can also be seen in the urban areas and its periphery. One other important impact is noticed on the natural hydrological system of the city. As the urban areas spread the natural hydrological features like rivers, nallah, water bodies comes in the heart of the city. The people subject them to encroachment. These results in either completely or partly block of the system. This process on one hand breaks the hydrological system and on other hand creates a permanent recurrent flood damage zone in the city area. No data are being collected on urban land use. Hence there in a need to collect the extensive data of urban land use covering environmental aspects.

Need to Expand the Forest Land / Cover

According to the National Forest Policy of the country 33 percent of the total geographical area should be under forest cover where as the state has only 4.78 percent tree cover. The area covered under the administrative control of Forest department is 6 percent of the state. Still there is a need to bring about 2 percent of the state land under forest area. The potential areas for expansion of forest cover are culturable wastelands covering 4.73 m ha and part of fallow land and land other than current fallow, covering 4.14 m ha.

Forest Area v/s mining

Another major cause of land degradation is mining activities which not only spoils the land but also reduces green tree cover. Most of the forests are on the hilly areas. Unfortunately the mineral bearing land also falls under the forest boundary, therefore, there is a constant conflicts between the forest and mining departments. Though there is a provision of compensentry afforestion even double the acquired area, but, due to lack of effective monitoring system forests have not been increasing at required rate. It can be monitored by putting the remote sensing data in the mining governance.

Legislation

There are a number of legislation protecting and conserving natural resources like Water, Air, Forest and Bio-diversity etc. But there is no direct legislation which protects the quality of soil or helps in conservation of soil, however there are oil conservation programs that are mostly confined with Agriculture Departments, and the aim is to educate the farmers with various conservation practices. But so far these programs have not been successful due to inadequate approach of implementation.