

Land Degradation in India with Special Reference to Punjab

P.K. SHARMA

Punjab Remote Sensing Centre, Ludhiana 141 004.

The food production in India increased from 51 million tonnes in 1950's to more than 190 million tonnes in 1990's. The significant growth of agriculture has been at the cost of decline in soil quality and risk of soil degradation (Abrol and Sehgal, 1992). Out of 329 M ha total geographical area of India, 142 M ha is arable, some of this area is undergoing deterioration in soil quality because of misuse or mismanagement of this resource. About 57 per cent of soils are under different kinds and degrees of degradation (Sehgal and Abrol, 1994). Soils are degraded much below their optimum potential due to erosion, salinity, alkalinity, water logging, shifting cultivation, sand dune formation, shallow depth, low availability of nutrients seasonal flooding, industrial and sewage effluents etc. (Sehgal et al., 1987). Further, it has been estimated that nearly 50 per cent of the canal irrigated area is suffering from salinization and/or alkalization due to inadequate drainage.

In Punjab, 39.2 per cent area was under different categories of degraded soils during 1987 (Sehgal et al., 1987). The extent of salt-affected soils in Punjab has been monitored using remote sensing technology and it was found that the area of these soils decreased from 0.232 M ha in 1988 to 0.152 M ha in 1996. It was also observed that the area of salt-affected soils decreased in most of the districts, however, the extent of these soils has increased in south-western districts due to water logging (PRSC, 1997).

Nearly, 7.4 per cent of the total area of the Punjab State, located in the Siwalik foot hills, piedmont plains and flood plains is degraded by water erosion. Another 5.6 per cent area of the State mainly in arid tract is occupied by sand dunes and soils with thick sand cover (Sidhu et al., 1995).

Nearly 18 per cent area of the State was flooded during 1988 whereas it was 19.4 per cent during 1993 floods (Sharma et al., 1996). Large area in cotton belt of Punjab covering south-western districts has been affected by water logging. The extent of water logging was mapped using August 1997 satellite data and it was estimated that 45333 ha area was waterlogged in three worst affected

districts of Punjab, namely Firozpur, Faridkot and Muktsar. The waterlogging seriously affected the cotton crop and the damage was estimated to the tune of Rs. 1000 crores.

The major causes of land degradation in Punjab are poor vegetative cover in hills, irrational use of surface and ground water for irrigation, ineffective drainage system and blockage of natural drainage channels by the construction of roads, railway tracks and canals, clearing and levelling of sand dunes etc. The increase in area under paddy and use of tubewell water of marginal quality for irrigation have further aggravated the problem of water logging and salinity.

The Govt. of India and State Govts. are making efforts to manage the wastelands or degraded lands under various programmes. Recognising the relevance of integrated approaches towards development planning, Department of Space (DOS) has already embarked up on the Integrated Mission for Sustainable Development (IMSD), under which remote sensing based integrated land and water resources plans for large number of problem districts in the country are being prepared and implemented in close coordination with other Govt. and non government departments. Under the integrated watershed development programme, a number of watersheds in the country having problem of severe erosion, deforestation etc. are being treated through funding from Ministry of Agriculture, GOI and World Bank. For preparing various thematic maps (erosion status, drainage, land use, soils), remote sensing technology is being made use of.

Under the wasteland development programme the extent of various categories of wastelands including, salt-affected, eroded, water logged are being mapped and monitored using remote sensing technology jointly by National Remote Sensing Agency, Hyderabad and State Remote Sensing Centres. The maps on 1:50,000 scale showing different categories of wastelands are available for Patiala, Gurdaspur and Jalandhar districts of Punjab.

References

- Abrol, I.P. and Sehgal, J. 1992. Degraded lands and their rehabilitation in India. In *Soil Resilience and Sustainable Land Use*, (Greenland, D.J. & I. Szabolcs, Eds) pp 129-144, Cab International, U.K.
- PRSC 1997. Mapping and monitoring of salt-affected soils in Punjab using remote sensing technology. Final report of the project "Mapping and monitoring of soil salinity associated with water logging using remote sensing technology". Punjab Remote Sensing Centre, Ludhiana.
- Sehgal, J.L., Sharma, P.K. and Pandey, S. 1987. The degraded soils of India - A case study of Punjab. *Wat. Conserv. India*, 31(2) : 151-154.
- Sehgal, J.L. and Abrol, I.P. 1994. *Soil degradation in India, Status and Impact*. Oxford & IBH Publishing Co., Pvt. Ltd., New Delhi, India, p 80.
- Sharma, P.K., Chopra, Rajiv., Verma, V.K., and Thomas, A. 1996. Flood management using remote sensing technology : The Punjab (India) experience. *Int. J. Remote Sensing* 17(17) : 3511-3521.
- Sidhu, C.S., Walia, C.S., Lal, Tarsem, Rana, K.P.C. and Sehgal, J. 1995. *Soils of Punjab : Their kinds, distribution, characterization and interpretations for optimising land use*. NBSS Publ. 45, Soils of India Series 2, pp-67.