Executive Summary
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Land Degradation in Chambal Region: Processes, Causes and Implications for Agriculture

Executive Summary

- Despite having the concentration of the largest badlands in India, ravines in the Chambal valley have not been studied adequately.
- This study attempted (a) to measure the extent of land degradation and to estimate the changes in its areal extent over a period of time; (b) to characterise ravines in terms of their severity and soil loss; (c) to examine the ravine formation processes and to identify the possible causative factors behind ravine formation and its spreading; and (d) to examine the implications of land degradation for agricultural productivity.
- The key findings of the study are: (a) there has been a substantial reduction of ravine land since 1974; (b) the reclaimed levelled land has been used primarily for crop cultivation; (c) the rapid transformation of landscape leads to a serious impact in the river systems, and there has also been a decline in natural vegetation cover in the region which in turn has accelerated soil erosion; and (d) despite such massive land levelling, the gains in terms of increased agricultural productivity has not been sustainable.
- Around 738.87 km² area were found to have been reclaimed from 1974 to 2014, and a substantial part of the reclaimed land is used for agriculture.
- Not only that the total area under ravines and gully area declined significantly, but the composition of ravines have also been altered significantly during the period under consideration. The deep ravines more or less have remained intact, whereas medium and shallow ravines have decreased in some study sites.
- The study developed a scheme to characterise ravines and operationalised the scheme at specific field sites.
- Proximity to agricultural fields and availability of road networks, apart from the financial capacity of the farmers, are important factors in the choice of sites for landlevelling.
- The ravine geomorphology has also been changing very fast in this region. Such
 changes cannot be characterised as part of the natural processes. The anthropogenic

- processes, such as the gully mound removing, gully line widening etc., are the major human-driven activities governing the natural process of ravine development.
- The study found that soil erosion was mostly related to the rainfall erosivity factor, soil texture, and land cover (crop practice factor) of the area. The elevation is a less important cause in the study area as elevation is not more than 450 m. The rate of soil erosion is more in the northern part, mainly along the Chambal and Kunwari river basin area, than in the southern and southwestern part, probably because of the presence of dense forest in the latter. The area where the rate of soil erosion is higher is entirely covered by the dense gully and ravines and also affected by the intense random ravine land levelling activities.
- Although large areas under ravines have been levelled and converted to agricultural land, plot-level comparisons show that non-reclaimed land is more productive than reclaimed land.
- To examine the changes in land productivity over a period of time, agricultural plots were classified according to the year in which the major land reclamation was undertaken. The evidence shows that land levelled in the recent period is more productive (measured through yield per acre of Mustard). Land productivity gradually declines in the reclaimed or levelled land.
- For comparison of land productivity across different types of ravines, the ravines were categorised into three broad categories: shallow, moderate and deep. Results indicated that shallow ravines are more productive than the moderate and deep ravines. But the difference between the moderate and deep ravines is not significant and deep ravines are marginally more productive than moderate ravines.
- Qualitative information gathered through FGDs and in-depth interviews suggest that the dependence of people on ravine land is aggravated by lack of alternative livelihoods resources. Lack of access to scientific methods of cultivation suitable for the local ecology has led to further soil erosion even in the reclaimed land.

Principal Investigator:

Dr Padmini Pani
Associate Professor
Centre for the Study of Regional
Development (CSRD)
Jawaharlal Nehru University, New Delhi