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Identifying Priority Policy Issues to Reduce Soil Degradation: Evidence from a Statistical Analysis for Asia

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Abstract

Soil degradation is a severe problem in Asia. The strong role of socioeconomic factors for (un)sustainable use of natural resources is acknowledged. Yet, competing hypotheses exist about single causes. Policy measures against soil degradation have been adopted, but it proves difficult to achieve major improvements. In short, there is need for informed advice for policy making. Policy making requires both a generalised picture on relationships among key factors, and differentiated, site-specific recommendations. Availability of data is a major obstacle to monitoring and analysis. This work therefore aims at developing a statistical framework satisfying the information needs and suited to available data for Asia.

An analytical concept called “agricultural development patterns” is designed, differentiating degradation issues and causal relations by sets of agricultural conditions. A regional, spatial analysis combines the possibilities for generalisation inherent to large scale analyses with the detailed description of high resolution analyses.

Exploratory methods (factor and cluster analysis) are used to determine agricultural development patterns and logistic regressions by cluster to indicate causes of degradation. Compiling, inspection and integration of geo-referenced data on soil degradation, natural and socioeconomic conditions, and land use were important analysis steps. Six agricultural development patterns are identified — “intensive, cropland”, “intensive, livestock”, “expanding cropland, humid”, “mountain areas”, “marginal high mountains” and “rainforest” — showing different degradation problems.

Results show strong support for the pessimist view of degrading effects of population pressure and poverty: the two are important causes of soil degradation throughout clusters. The effect of agricultural growth is less uniform: expansion acts as cause of water erosion, whereas intensification plays a less critical role. Specialisation in small ruminants and lack of market access are found to be degrading factors in some clusters. Policy implications are: Need for political measures is strongest in “intensive, livestock”, “expanding cropland, humid”, and “mountain areas” patterns. Efforts to combat water erosion should focus on poverty reduction and measures to relieve pressure on land. In marginal regions such measures are of special importance. The results do not suggest an easy solution. However, if taken seriously, successful development efforts could lead to both improved welfare and protection of soils.

Keywords: Asia, GIS, policy issues, soil degradation

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