

# THE IMPACT OF MECHANIZED TILLAGE ON SOIL COMPACTION IN EASTERN BOLIVIA

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## SUMMARY

Quantitative information about the spatial distribution of soil degradation in developing countries is often not possible due to a lack of input parameters. We applied a method using available soil information to assess the increase of topsoil compaction due to mechanized tillage practices in the eastern Bolivian lowlands. Spatial information was obtained through classification of satellite images (Landsat) and digital terrain analysis. Terrain attributes were used as predictor variables for continuous regionalization of soil texture. Spatial prediction functions were defined by means of multiple regression analysis. Relative bulk density changes following cultivation of previously untilled soils were derived using data from local soil observations. The rates of changes were related to the respective initial level. It has been shown that continuous mechanized cropping has caused significant bulk density increases in the predominantly poor-structured soils in the area under investigation. Mean rates were between 24 and 44 percent for sandy clay loams and clay-loams, 14 to 34 percent for sandy loams and 15 to 30 percent for silty loams and silty clay loams after long term cultivation. The areas most affected by soil compaction are located in the older agricultural development zone (central zone). However, due to inappropriate tillage practices it is assumed that within the next years soil compaction will rapidly increase in the newly developed expansion zone.