

Public Abstract

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Title:IMPACTS OF SOIL MANAGEMENT PRACTICES ON SOIL FERTILITY IN POTATO-BASED CROPPING SYSTEMS IN THE BOLIVIAN ANDEAN HIGHLANDS

Due to changes in climate and socioeconomic developments, current soil management practices in the Bolivian Andean Highlands may be increasing soil degradation thereby threatening food security. A study was established in four representative communities during the 2006-09 growing seasons to identify an integrated soil management strategy that may help to improve soil fertility and productivity by increasing soil organic matter. Soil samples collected from fields of different lengths of cropping (LC) and fallow (LF) showed that LC decreased and LF increased organic carbon (OC) and total soil N (TN). Field trials established with combinations of soil inorganic fertilizers (SIF) and local and alternative soil organic fertilizers (SOF) (i.e., cow and sheep manure, household compost and Biofert, a solid biofertilizer) revealed that the cow and sheep manure combined with SIF significantly improved soil chemical and physical properties and significantly increased the production of potato (*Solanum tuberosum* L.) and a subsequent quinoa (*Chenopodium quinoa* Willd.) crop. Testing of a portable field method to assess N status of potato plant tissue showed that the nitrate-N readings in leaf petioles determined by the Cardy meter were significantly related with leaf petiole total N determined by laboratory procedures and with the total tuber yield. These results suggest that this portable and relatively low cost tool may have some promise for tissue testing for potato in the Andean highlands of Bolivia, where access to soil and plant tissue testing services is limited.