

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

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ABSTRACT

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 total (TOC) and active soil organic C (AOC), and total (TN), inorganic (TIN) and active soil N (AIN). Field trials established with combinations of soil inorganic fertilizers (SIF) and local and alternative soil organic fertilizers (i.e., cow and sheep manure, household compost and a biofertilizer) revealed that the cow and sheep manure combined with SIF significantly affected soil properties, such as pH, soil test P, TN, TIN and TOC, soil water content and bulk density and significantly increased the production of potato (*Solanum tuberosum* L.) and a subsequent quinoa (*Chenopodium quinoa* Willd.) crop. Results of testing a portable field method to assess N status of potato plant tissue suggest that use of the Cardy nitrate-N meter 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.