

## Summary Description

Soils play a fundamental role in supporting agricultural productivity and an assortment of key ecosystem services. As demands on agriculture continue to increase, new strategies of smallholder farmers must ensure sustainable intensification of cropping and grazing practices, while promoting resilience to climate change and maintaining soil quality and function. In the first phase of our McKnightfunded project we screened a number of promising forage/fallows options and assessed ecosystem services across several representative Andean farming landscapes. We now propose to extend these findings and amplify the impact of our work using multienvironment experimentation in new regions, targeted landscape analysis, and integration of our findings into local education efforts and regional/global information networks for agroecological intensification (AEI). We will build off multienvironment participatory trials developed in the first phase of this project (Objective 1) to continue exploring fallow management strategies that restore soil function and address shortfalls in forage, via adaptation of our experimental approach with new partners and communities in Peru and elsewhere in the Andes. By working with multiple farmers across distinct Andean landscapes, we will test options for AEI within diverse contexts and gain understanding on how biophysical and cultural drivers determine the potential for success of each option. We will also work to further refine the landscape inventory of soil health and ecosystem services from our first phase (Objective 2) by examining the impacts of heterogeneity, resource gradients, and edge effects within agricultural fields. This effort will improve the relevance of our current findings by allowing us to better predict the impact of land use on ecosystem service production at multiple scales. We will also promote scaling out of Objectives 1 and 2 and support local agroecological innovation in future generations via working with local schools to develop new strategies and curriculum for promoting the responsible management of soils and agroecosystems. Additionally, we will support local universities (Objective 3) via seminars and training in soil quality assessment, as well as involve scientists and undergraduate students in on-farm research activities. We will continue to maintain and expand our [SuelosAndinos.org](http://SuelosAndinos.org) website to share information about our project and foster collaboration and information transfer across the Andean region. Along with building capacity of farmers and local public institutions in the communities where we work, this project will build technical skills on soil and ecosystem service evaluation and participatory research for the partners involved in this work, via trainings and on-the-ground learning. Furthermore, we propose that a highly promising technician who has grown professionally during the first phase of this project should pursue formal training in a Master's program in Agroecosystem Management at Colorado State University. Our proposed research aligns well with CCRP strategies by pursuing feasible options for sustainability in smallholder systems and via research that works alongside and empowers farmers and local organizational partners. Furthermore, we seek to expand locally tested options and innovation approaches to new Andean contexts and to foster environmental citizenship and revalorization of farming livelihoods throughout the region.