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## **Potato Diversity Buffering Against Climate Variability & Food Insecurity:**

**Evaluation of In-Situ Conservation of Native Varieties  
by Farming Communities in the Peruvian Andes.**

Master thesis

by

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# 1. ABSTRACT

The livelihoods, economic viability and nutrition of indigenous and rural smallholder producers in the Andes is incredibly reliant upon the biodiversity of native potatoes. The existing genetic variation within potato (*Solanum tuberosum*) has resulted from generations of selection by native farmers. This dynamic process of management and the crop's natural adaptation to geographical variation, manifests in a multitude of characteristics and traits important for the crop's resilience to stressors, increasingly felt and associated with climatic variations due to global warming.

The in-situ conservation of this diversity is imperative to the maintenance of resilient agroecosystems which can reliably support the subsistence diets and livelihoods of Andean producers in the face of climate change. The enhancement of capacity for farming communities to maintain potato diversity is imperative to its genetic conservation. The continuation of a diverse potato production base and the maintenance of culture and traditional knowledge are co-dependent. Additionally, potato breeding programs to create climate-ready potato crops, may be an important element in the adaptation of Andean farming systems to escalating frost and drought pressures and aridic rainfall patterns. The implementation of such participatory breeding programs requires information about the available native potato diversity, farmers' management and the threats or obstacles to its maintenance and use.

The analysis of diversity management and seed saving priorities was carried out in 4 communities in the Peruvian Andes from 2 geographically and culturally distinct regions. In each community, the number of potato varieties being conserved by farmers was quantified. From the original 509 and 505 varieties present at the commencement of the in-situ project, 419, 315, 220 and 87(-200\*) remained. The challenges in maintaining these specific varieties are primarily associated with climatic and disease pressures, management strategies, variety preferencing and community sociocultural and livelihood characteristics.