

Genomics, photogrammetry, and agroecological knowledge for the improvement of native potatoes

COSTA RICA, BOLIVIA, PERU



Webstory



Technological solution

To mitigate agrobiodiversity loss and productive risks derived from extreme climate variability, the technology generates native potato cultivars with high adaptive capacity. Assisted plant breeding reduces the genetic stabilization timeframe compared to traditional crossing, enabling the release of cold and drought-tolerant phenotypes. Its integration with aerial monitoring techniques and soil health indicators optimizes agroecological yields in Andean systems.



Technological description

The development integrates marker-assisted genomic selection with precision agriculture techniques for agrobiodiversity conservation. The research utilizes whole-genome sequencing (Next Generation Sequencing) to identify unique molecular regions conferring adaptation to abiotic stress. At the phenological level, unmanned aerial vehicles equipped with multispectral sensors are employed to monitor the validation plots. The agronomic evaluation is complemented by hydrological flow measurements with current meters, physicochemical soil analyses, and in situ measurements of carbon dioxide emissions using static chambers to characterize tillage treatments compared against ancestral practices.



Impacts and results

The project has achieved the agronomic validation and formal registration of the "Miren" and "Violeta" varieties, distributed to cooperative organizations. Technologically, it projects the structuring of a genomic database with exclusive molecular markers for Andean ecotypes and an agrobiodiverse catalog documenting frost resistance and organoleptic quality. Demonstration plots will be established to validate productive resilience and comparative carbon emissions between conventional tillage, zero tillage, and pre-Columbian terrace schemes, supporting the technological package with participatory management manuals.



+ 2

Tolerant varieties validated and distributed



638

Target direct beneficiary farmers



+ 2

Expected genomes to be sequenced



1

Native potato catalogs to be developed



+ 1

Expected dataset for physicochemical soil analysis



+ 2

Target producer training events per region



+ 4

Target experimental validation plots



4

Local technicians to be trained in aerial photogrammetry

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PARTICIPATING ORGANIZATIONS

