



Improving potato production for increased food security of indigenous communities in Colombia

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Introduction

A comprehensive project involving potato breeding, genomics, metabolomics, biochemistry, human nutrition, gender studies and agricultural education through participative research is in progress to contribute to the improvement of the food security of indigenous communities in Colombia. The indigenous populations of the province of Nariño in Colombia are the second highest undernourished people in Colombia. Potato is a staple food crop and the main source of family income. A multidisciplinary research team has been constituted to introduce new methodologies for plant breeding, evaluate nutritional status and develop functional foods, select for potato disease resistance, educate and empower women to achieve food security for the families in Nariño.

Objective

To improve food security of indigenous communities by developing potato cultivars with stable yield and nutritional qualities to improve families' income and diet, to empower women as food security axes, to adopt nutritional habits, to develop participatory research on Good Agricultural and Postharvest Practices, and to introduce new molecular technologies in potato breeding to anticipate global warming.

Methodology:

The scheme shows the project components



Food consumption and diet Characterize food intake of native potato production communities in Nariño. Contribute to the improvement of food quality and nutritional security of potato growers in five municipalities.



Figure 1. Potato (*Solanum phureja*) in Colombia. (A) Potato biodiversity in Colombia. (B) Potatoes from UNC's breeding program.



Figure 2. Participatory research in Nariño. (A) Meeting with the community, in Field School for Smallholders . (B) Smallholders work in research activities of potato breeding program in Nariño.

6. Family roles and gender Identify sustainable strategies to empower Nariño's indigenous women as axes for the achievement of Food Security and Nutrition (FSN) for their families and their communities.



Training women leaders in FSN

> Involvement of local and regional agencies

Educational Program – ECAs Develop an educational program (Escuela de Campo de Agricultores, ECAs) for the indigenous and poor smallholders in Nariño to introduce good agricultural and postharvest practices, including sustainable agricultural practices (Fig. 3).

functional food components (phenolics).

7. Establish public advocacy strategies for the incorporation of the results of the project Involvement of local and regional agencies. Participation in agreements on FSN.

4. Genomics and metabolomics Apply genomics and metabolomics technologies to develop markers for selection and breeding of improved potato varieties with improved nutritional quality, resistance to late blight and adaptability to climate change (Fig. 4).



Figure 4. Responses of potato genotypes to *Phytophthora infestans* infection (late blight). (A, B) Potato genotypes displaying stem resistance. (C, D) Potato genotypes displaying foliage resistance.



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