

Innovation to enhance agriculture, nutrition, and health linkages

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Despite the economic growth registered in Latin America in recent decades, poverty rates are still high, especially in rural areas. Much of the Andean highlands is populated by indigenous peoples who depend on potatoes as their main staple food and who struggle with economic marginality, difficult terrain, extreme weather events and, in many cases, limited access to markets. In this region, levels of malnutrition are still alarming with more than 20% of children under three years of age suffering from chronic undernourishment, mainly due to deficiencies of microelements such as iron and zinc. Anemia in children under five years of age reaches levels of 39%, although there is high disparity between countries.

To diminish hunger and malnutrition, efforts must be made to reduce inequalities by focusing on gender, improving human capital, and promoting better nutrition and health outcomes. Approaches that link agricultural development with nutrition are being promoted to improve the nutritional status of rural populations. Interventions include: introduction of biofortified foods, supporting home vegetable gardens, milk production, and promoting consumption of animal's origin food (Haddad, 2000¹; Masset et al. 2011²).

The IssAndes project

The Innovation for Food Security in the Andes (IssAndes) project, implemented in the period 2011-2015, has aimed to reduce the vulnerability to food insecurity of rural populations in Bolivia, Colombia, Ecuador and Peru. It has promoted innovation for food and nutrition security by improving linkages between agriculture, nutrition, and health interventions. It has contributed to food and nutrition security of rural highland populations by introducing innovations in native potato-based production systems, and the promotion of dietary diversity. The emphasis was placed on native varieties of potato because they are part of the diet of these populations, and have a higher content of micronutrients and are richer in antioxidants than commercial varieties.

The IssAndes project has been coordinated by the International Potato Center (CIP) and financed by the European Union through the International Fund for Agricultural Development (IFAD). The project has been implemented through partnerships involving more than 19 public and private entities from the agriculture, health and education sectors.



Fig.1: Public and private partners of the IssAndes project.

1. Haddad, L. (2000). A conceptual framework for assessing agriculture-nutrition linkages. Food and Nutrition Bulletin 21: 367-373.
2. Masset, E., Haddad, L., Cornelius, A., and Isaza-Castro, J. (2011). A systematic review of agricultural interventions that aim to improve nutritional status of children. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

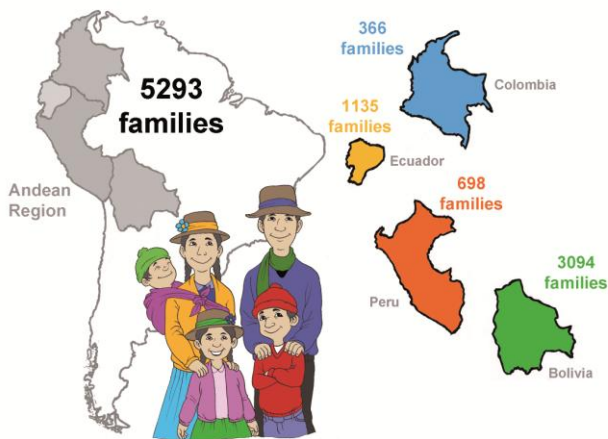


Fig.2 Total amount of beneficiaries of the IssAndes project.

Through its multi-sectorial partnerships, the project implemented activities along the innovation value chain linking research with development. The interventions directly reached and benefitted more than 5000 families in the four countries. The project developed partnership's mechanisms to add value to existing food security interventions through specific research contributions.

Although each country developed its own interventions, depending on local and national needs and situations, these were all under the umbrella of a common approach and conceptual framework that promoted knowledge exchange, learning and synergy among partners, to enhance the scope and impacts of the intervention.

IssAndes model

The project's intervention strategy was based on the food security framework presented in figure 3, based on the four pillars of food security defined by FAO:

1. **Food availability:** Raising yields through improved crop management techniques, including high-yielding and more nutritious commodities, *ad hoc* potato seed multiplication systems for small farmers, and support to other productive activities which are part of the potato based systems.
2. **Market access:** Income improvements through enhanced productivity and product quality to access high value markets.
3. **Use of genetic diversity:** A focus on native potatoes which are rich in micronutrients (particularly iron and zinc) and antioxidants, and play a significant role in local diets. Through nutritional education programs with mothers, emphasis has been given to promoting dietary diversity based on local products.
4. **Stability:** Improving responsiveness to climate risks, pests and disease threats, as well as access to more stable market opportunities.

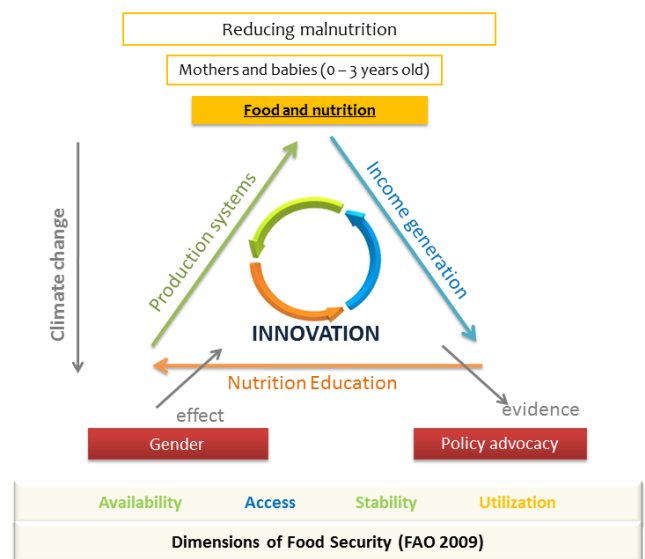


Fig.3 Food Security framework developed in IssAndes.

Those efforts have been combined with institutional support and advocacy, promoting learning environments with different public and private actors, reinforcing specific regulations and coordinating actions based on evidence that emerged from project interventions. Given the important role of women in household food security, especially for small children, IssAndes has introduced gender focused tools to enhance food security.

Outputs and results by components

IssAndes was linked to ongoing public and private initiatives on food security in each country. Its research and development actions were structured around four main components to add value to these initiatives. A brief explanation of each component and a summary of outputs and results generated by the project are presented below.

Component 1: Use of potato biodiversity, nutrition and health



This component leveraged genetic diversity of potato by identifying and selecting more nutritious local varieties of potato with high content of iron, zinc and micronutrients that would improve families and children's health.

Outputs and results

Through collaboration with CIP, more than 200 local potato varieties from the CIP's gene bank were characterized for their content of zinc and iron.

Once clones were identified the best varieties were selected with farmers. As a result of this process, a new

variety of potato was released in Peru: KAWSAY which means 'food that gives life' with higher levels of iron and zinc (18.50 and 16.50 mg/kg respectively). Some 19 other varieties with good agronomic and nutritional characteristics are being tested.

The selected varieties were disseminated among small farmers through family and/or community plots. Following a production system perspective and an action-research approach, these plots served as sites to integrate potato cultivation with the production of other crops and small animal breeding, such as guinea pigs. They also served to provide training to farmers on integrated crop management, quality seed production and use of quality seeds.



Fig.4 Release of the variety KAWSAY by the Ministry of Agriculture in Peru.

Component 2: Enhanced potato based production systems

This component aimed at strengthening the local potato production and seed supply system, and supporting other productive activities that are part of the potato-based systems such as wheat, vegetables, beans, and animals breeding through the implementation of better adapted agricultural practices.



Fig.5 Capacity strengthening on production systems aspects.

Outputs and results

A production baseline study was carried out to assess the production systems and the living conditions of over 1200 farm families in the four countries.

The project focused on improving potato seed supply system, combining sophisticated seed production techniques, such as aeroponic under controlled conditions, with simple production techniques in farmers' fields, such as positive selection. The aeroponic technique was scaled up with the Ministry of Agriculture and the Agriculture Research Institute in Ecuador (INIAP).

The project implemented integrated crop management techniques, reducing the use of agrochemicals that were complemented with support tools for farmers to help them control diseases, such as late blight, reducing production costs.

In response to high potato losses in storage due to the potato tuber moth, the control method 'Attract & Kill' developed at CIP using pheromone traps, was evaluated in potato stores. These evaluations were positive, confirming proof of concept, leading to broader dissemination of this technology.

These efforts, combined with other interventions to diversify the production system, resulted in technologies that improved the family production portfolio with better opportunities to diversify their diet, the consumption of different products and to access to new markets.

Farmers, technicians of the partner institutions, staff from the public and private actors strengthened their capacities in production system aspects, contributing to enhance nutrition and health of the local populations.

Guidelines with recommendations and lessons learned to better focus on gender issues in food security and nutrition interventions from the project experience were developed and published (Polar et al., 2015).

nutritional education program. Coordinated actions with health community agents and medical centers were implemented, improving access to nutrition and health information.

Women were informed about the nutritional benefits of local potato varieties and the importance of diet diversification. There is already evidence that children and their mothers are consuming greater amounts of the recommended potatoes.

A study to explore the relationships between agricultural production characteristics and nutrition of young children of rural families in Peru whose livelihood is based on potato production was implemented with IIN to develop a model that assesses the correlation among production, nutrition and socioeconomic variables. Relationships could be attributed to higher contents of iron and zinc in small animal products and native potatoes, and to increased income from sales of agricultural products that allows diet diversification.

Component 3: Nutritional education

An increase in food production does not necessarily result in better household nutrition. For this reason, the nutritional education component focused on strengthening the integration of actions for improving agricultural production with those aimed at improving food practices for a better nutritional status, especially of children under three years of age. To support this approach, a nutritional education program was implemented in three countries (Bolivia, Ecuador and Peru), reaching a total of over 4700 rural families. It also strengthened the capacities of staff from local partner institutions and from health networks. The education program fostered the consumption of potato varieties with high level of iron and zinc among rural families. It was developed with the Research Nutritional Institute in Peru (IIN) and implemented with national partners in the three countries.

Outputs and results

A nutritional baseline study and assessment of nutritional habits was carried out in three countries (Bolivia, Ecuador and Peru) to promote dietary behavior change towards a more balanced, diversified and healthy diet through the



Fig.6 Mother and baby beneficiaries of the IssAndes Project.

Component 4: Advocacy

The IssAndes project was implemented in partnership with a variety of actors from different sectors (agriculture, nutrition, education, and health). The project generated evidence on the importance of implementing a multi-stakeholder project with a cross-sectorial perspective in order to reinforce food security and nutritional policies at the local and national level. In the same way, it was crucial to disseminate messages related to the economic, social, and nutritional importance of the potato, particularly the nutritional benefits of native potato varieties, to public and private actors.

Outputs and results

A network of partners from the agriculture and nutrition sectors was developed and linked with CIP for sharing

knowledge and experiences related to food and nutrition security and for supporting policies to engage public investments at local and national levels. Based on evidence developed by the project, local and national regulations have integrated some of the agriculture-nutrition approaches promoted by IssAndes, such as the 'Local Investment Fund for Food Security' and a 'National strategy for food security and nutrition 2013-2021' in Peru.

The project's results were presented and shared at different levels, local, national and international, in order to promote the importance of linking agriculture, nutrition and health in food security interventions through innovation in potato-production based systems and the promotion of dietary diversity. These concepts were supported and promoted through different communication mechanisms (web page, blogs, video and participation in events, conferences and fairs).



Fig.7 Dissemination platforms of the IssAndes Project.

Lesson learned

By integrating nutritional objectives and indicators in agricultural innovation interventions, IssAndes managed to strengthen food security initiatives already existing in the areas where it intervened. Main achievements comprised:

1. The research undertaken by IssAndes generated information about the nutritional content of native potatoes, identifying and selecting more nutritious native varieties with high content of iron, zinc and micronutrients, to contribute to improve families' and children's health.
2. The integrated approach developed by IssAndes, combining innovations to improve the potato-based production systems with actions focusing on
3. On the item of production, the implementation of innovative agricultural practices and technologies accessible to small-scale farmers, adapted to environmental and gender imperatives, were key components in the improvement of crop production and providing access to new markets. Some of these technologies are now ready for upscaling.
4. The regional dimension of IssAndes contributed to the creation of networks of partners with different backgrounds, such as agriculture, nutrition, education and health, focusing on issues related to food and nutrition security. It facilitated knowledge exchange and learning among research and development organizations.

5. Capacity building related to technological and nutritional innovations, as well as methodologies, provided the institutional basis to support new programs and projects that could use the IssAndes model for articulating linkages between agriculture, nutrition and health.
6. Evidence-based policies and advocacy were key for enlisting government support at local and national levels as an essential component for contributing to the sustainability of project results and promoting larger scale or complementary interventions.
7. Considering the significant roles played by women in the Andean production and food systems, the focus on gender issues in food security and nutrition interventions was analyzed and published for further use in other agricultural innovation processes for food and nutrition security.

The value generated through IssAndes, as mentioned by one of its partners, can be summarized with the following statement:

‘IssAndes became a practical and, at the same time, conceptually strong approach to articulate agriculture, health and nutrition. It is based on the integration of technical, commercial and institutional innovations aiming at promoting collective actions and learning among multiple actors.’

IssAndes offers a comprehensive approach on innovation for food and nutrition security for future interventions. It has set the basis for new work in the areas where it has intervened. New projects will need to take advantage of some of the proofs of concepts and methods developed by IssAndes, supporting development actions at a larger scale, extending the scope of its results and achieving impacts in the Andes and beyond.

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Further Information:

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