

Pursuing the Millennium Development Goals in the Andean Altiplano

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Pursuing the Millennium Development Goals in the Andean Altiplano

Building on CIP Project Experience with Poverty Alleviation and Sustainable Development

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The International Potato Center (CIP) has had an evolving research-for-development agenda that includes potatoes, sweet potatoes, Andean roots and tubers, and sustainable use of natural resources in mountains. In 2003, CIP completed a participatory Vision Exercise that led to prioritization of 7 development challenges that reflect 8 of the UN Millennium Development Goals (MDGs). In summary, these challenges include: reducing poverty and hunger; improving human health; developing sustainable rural and urban systems; and improving the availability of new technologies. A strategy was developed to help accomplish the selected MDGs. The first step towards implementa-

tion of this vision was a realignment of CIP's research program. Then, using different tools such as GIS and available national, regional, and world statistics, poverty targeting was carried out in order to prioritize the countries and regions where CIP will focus its resources and its research and development efforts. Targets were identified by overlaying poverty, hunger, and vulnerability with the areas where CIP's commodities are produced. Within this framework, the Center is implementing a new project in the Central Andes Altiplano, which is supported by the Government of Canada as well as other donors. The project is called ALTAGRO (Andean Agriculture in the Altiplano).



CIP's experience with improving livelihood conditions

The High Plateau of the southern Peruvian–northern Bolivian Andes, known as the Altiplano, is one of the poorest areas of the world. More than 6 million people of Quechua and Aymara origin inhabit this area, and over 75% of the population, whose livelihoods depend on agriculture, live in poverty. Despite great biological diversity, agriculture is particularly challenging, owing to the high altitude (above 3600 m) and erratic climate (high incidence of frost, droughts, floods). Through the centuries peasants have practiced

complex and successful farming systems (Figure 1) that have relied upon the management of water, soils, and biodiversity to produce crops (potatoes, *oca*, *mashua*, *olluco*) and livestock (alpaca, sheep, and cattle) vital for their livelihoods. However, the market economy and population increases have established a new economic framework, and traditional strategies are no longer sustainable. Low productivity and environmental degradation are now the main characteristics of Altiplano peasant agriculture; migration and social tensions prevail.

During the last two decades, the International Potato Center (CIP) and its part-



FIGURE 1 The centuries-old land use system developed by the indigenous communities on the Altiplano combines crop and livestock production. (Photo by Oscar Hidalgo, CIP)



ners have been working to understand these complex systems and have developed technologies and knowledge to improve agricultural productivity, reduce poverty, ensure food security, and protect the environment. Additionally, work has been conducted to improve marketing and transformation (Figure 2). Thus,

Successful activities of CIP and Centro de Investigación de Recursos Naturales y Medio Ambiente (CIRNMA)

"CIP and CIRNMA helped me to improve my forage systems, build stables, and buy new, better breeds of cattle," says Presento Rodríguez Andrade, in Illpa. "They also helped me to develop this cheese-making plant," he continues, indicating the two small rooms where he centers his production process. Although cattle owners in Puno have always produced cheese, their product was very rudimentary and sold for little on the market, or was barely enough for home consumption.

Adela Pineda López lives down the road from Presento Rodríguez, in the neighboring community of Yanamoco. She saw the success her neighbor was having with his cheese-making business and decided to get her own family involved. Her home was far enough away that she could use a different group of suppliers, opening up the opportunity to reach a wider segment of the local population. Adela's husband, Juan Carlos, had been scraping money together for the family as a taxi driver in Puno before she convinced him to embark upon this venture.

"CIP and CIRNMA gave us the loans and showed us how to do business, how to organize ourselves," says Pineda. "Now we're producing from 30 to 40 molds a day. My wife took 70 to the market today, on her bicycle. Every Friday one of our buyers comes to take a big shipment to Cusco." Tourism in Cusco provides many opportunities for the producers in Puno, and CIRNMA keeps a keen eye on this potential. "I'm not afraid of the future any longer," concludes Pineda as if he were speaking for the whole community. "I have it programmed now." All in all, things are looking better for the villagers of Yanamoco.

FIGURE 2 New techniques for producing and marketing cheese being discussed. (Photo by Carlos León Velarde)

technology development was complemented with community organization to add value to primary products through post-harvest processing of potato, quinoa, milk, and alpaca wool, among other things. For example, over 1000 peasant women have been organized to weave alpaca sweaters for export markets and their annual income has increased by 25–40%. Likewise, food security has been addressed through the use of low-cost greenhouses to produce vegetables and meet family income and nutritional needs. Methods to integrate biophysical and socioeconomic information at various scales (ecoregion, watershed, community, and farms) and computer simulation tools have also been developed. These allow to understand interactions in resource use, and help in decision-making. Notwithstanding this progress, achieved at particular locations, it is urgent to continue efforts to improve Altiplano rural livelihoods at a larger scale, in order to achieve social and economic development.

The ALTAGRO project

Previous research and development (R & D) experiences have been highly successful because of their participatory nature, the strong linkages between production, processing, and marketing, and the use of computer simulation models for analyzing scenarios. ALTAGRO will build on this. Furthermore, it will use other innovative processes to expand experiences—including a better definition of recommendation domains—and foster more innovative approaches such as farmers mentoring other farmers, and using telecenters in collaboration with the private sector in order to provide access to knowledge for peasant communities. ALTAGRO will also promote intersectorial linkages (agriculture, education, and health) from the onset.

ALTAGRO aims to contribute to the attainment of the following MDGs:

- Reduce poverty and hunger,
- Empower women,
- Reduce child mortality,
- Improve maternal health, and
- Sustainably manage the environment.

ALTAGRO will benefit indigenous people in the Altiplano of Peru and Bolivia, and consumers elsewhere. The target area includes approximately 700 farming communities, and the potential beneficiaries of the project will number approximately 42,000 families. The project will follow a holistic and participatory approach that will build on the long and successful experiences of CIP and its regional partners to establish a strong mechanism for the systemic integration into farming systems of agricultural technology produced by the commodity-oriented research carried out by several of CIP's divisions. The entire framework will be informed by biological, social, gender, economic, market, and policy analyses, so as to yield sound research-based options for rural development and integration of a peasant economy into a market-oriented economy.

Specific objectives of the project are to:

- Improve the productivity, diversity, and income generation of farming systems, and explore innovative local non-farming sources of employment and income;
- Organize and train peasant women to enable them to effectively participate in post-harvest activities that add value to primary products, such as potato, bitter potatoes, quinoa, milk, meat, and alpaca fiber;
- Improve child nutrition and health through enhanced food availability, dietary diversity, and nutritional education;
- Increase knowledge among peasant women relating to human and environmental health factors, to convert them into effective agents of change in the household and the community;
- Promote utilization of agricultural technologies that reduce and reverse degradation of natural resources.

The pro-poor research and development (R & D) cycle

The project will follow the pro-poor R & D cycle recently adopted by CIP (Figure 3). In summary, the pro-poor cycle involves the following activities:

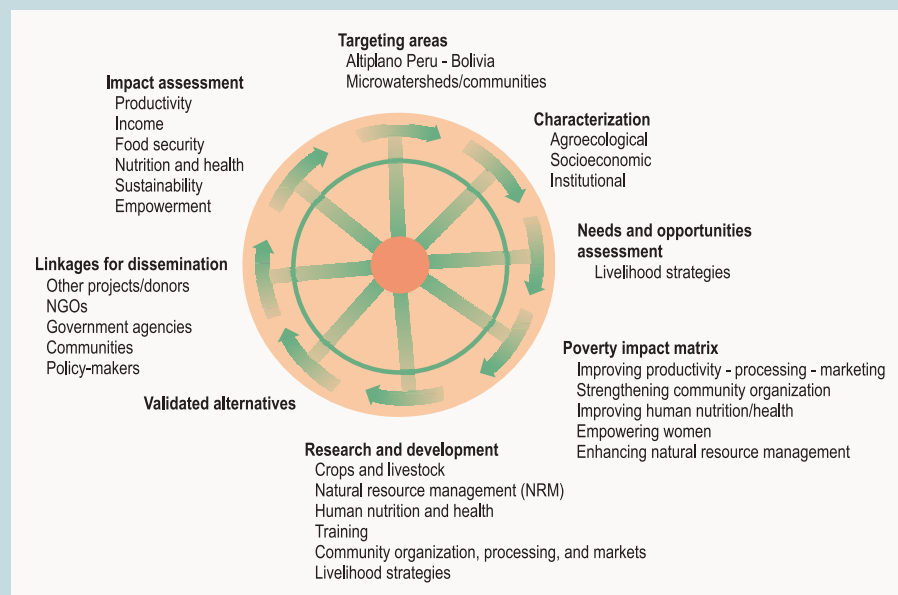


FIGURE 3 CIP's pro-poor research and development cycle, adapted by ALTAGRO.

1. *Targeting:* This activity will lead to:
 - Definition of target agro-ecosystems and extrapolation domains (sites of similar soils, climate, and farming systems), based on the prevalence of poverty, the importance and potential of potato, Andean roots and tubers, livestock, quinoa, and grasslands, and the potential for impact within the projected time frame;
 - Definition of target farming systems;
 - Site selection for direct R & D interventions. Active participation of project beneficiaries will be critical. Representative peasant communities will be selected.
2. *Characterization:* Analytical tools and methods will be used to characterize farming communities in the Altiplano. This will provide a baseline for project monitoring and evaluation and quantification of impacts. Specifically, analytical studies will address the following:
 - Characterization of agro-ecosystems;
 - Vulnerability and climatic risk analysis;
 - Trade-off analysis of production and environment;
 - System analysis and determination of baseline data for agricultural productivity, family income, human nutrition and health, conditions and trends relating to natural resources, biodiversity, community organization, and gender issues.

3. *Needs and opportunities assessment:* The effect of policies on technology adoption, environmental impact, and access to markets will be studied. Focus on gender issues will also foster and recognize the participation of women in decision-making at the household and community levels, and increase impact probability. Current and novel non-farming sources of income will be identified, with particular attention to complementarities with farming.
 - Community organization;
 - Small agricultural business management;
 - Use of information technologies.

Community empowerment will also be achieved by organization of the main food chains. Telecenters will be created at selected peasant communities to provide Internet access to technology and market information.
4. *Poverty impact matrix:* Overall, the project will have the following outputs and derived impacts:
 - Improved farming systems for increased productivity, income, and food security, and sustainable natural resource management;
 - Non-farming income options based on value-added local products;
 - Efficient food/commodity chains generating more equitable distribution of benefits among stakeholders;
 - Organized groups of women with managerial and technical skills for processing primary products and access to profitable market niches;
 - Increased food availability and diversity at the community level, and better use of available food by families;
 - Improved community sanitary and environmental health conditions;
 - Validated soil, water, and biodiversity conservation practices;
 - Policy options to foster technology adoption, sustainable natural resource stewardship, equitable investments by the private sector, access to markets and credit, and small-scale agro-industry development.
5. *Research and development:* Based on the aforementioned analyses, CIP's research divisions and partners will provide available technology and conduct required additional commodity research to improve present farming systems. Training will increase peasants' knowledge in the following areas:
 - Production technologies;
 - Processing technologies;
 - Human nutrition;
 - Environmental health;
6. *Validated alternatives:* Production and processing technology, non-farming sources of income, and organizational and policy options will be evaluated ex ante, and subsequently tested and validated in the field with the full participation of selected peasant communities. Proven options will be promoted in the extrapolation domains in order to enhance adoption, replicate successes, and catalyze a development process beyond the target peasant communities.
7. *Linkages for dissemination:* Dissemination of project results among extension agents and other actors will increase adoption of technology by the target farming population as well as awareness of development needs and opportunities for investment in infrastructure, education, and markets. The *Pachama-Raymi* approach to promote the use of technologies will be used. This approach is based on the identification of model farmers as trainers of others, and the promotion of mutual learning. Trained farmers and communities then compete for the achievement of the best results to resolve identified constraints. The approach has been successfully applied in other projects in the Andes. Microcredit schemes to support adoption of technology will also be implemented.
8. *Impact assessment:* Monitoring and evaluation of economic, social, and environmental impacts will be conducted, based on baseline information. These impacts will occur at 2 levels. The first level relates to the communities where intervention will take place, as a sample

of the total population of communities in the target area. This will occur towards the end of the project. The second level relates to the whole population of communities in the Altiplano, and will occur as results are disseminated through various mechanisms such as field days, radio programs, telecenters, farmer competitions, and the work of development agencies.

Next steps in implementation of the R & D cycle

ALTAGRO and the Natural Resources Management Division of CIP have initiated agro-ecological characterization and definition of recommendation domains in the Altiplano of Peru and Bolivia. This will be complemented by institutional mapping, certification, selection of community samples, and participatory analysis of problems and opportunities. Simultaneously, multiplication of improved potato seeds to overcome major production constraints is being carried out (Figure 4). Development activities previously supported by Spain in Puno are being expanded. They include provision of microcredit to farmers for the production of organic quinoa, milk, cheese, trout, and alpaca sweaters. Women's organizations continue to be strengthened.

The solid alliances between CIP and its partners offer a unique opportunity to obtain high social and economic returns on investments in applied research and development in the Altiplano. These part-

FIGURE 4 Women farmers are key players in ensuring food security. (Photo from CIP archives)



nerships are strengthened by the utilization of user-friendly decision-support tools and methods, and participatory approaches. CIP and its partners are confident that the approaches and methods proposed in ALTAGRO will help to achieve the MDGs, as they have already been tested in previous projects implemented in 8 peasant communities in the Peruvian Altiplano. ALTAGRO will build on the results of these projects and partnerships to construct a model for the achievement of the MDGs in poor mountainous areas.

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FURTHER READING

CIP [International Potato Center]. 2004. *The CIP Vision: Preserving the Core, Stimulating Progress*. Lima, Peru: International Potato Center. Also available at www.cipotato.org/projects/Documents/CIPVISION04.pdf; accessed on 22 November 2005.

Quiroz R, León Velarde C, Bowen W. 2000. FSR from a modelling perspective: Experiences in Latin America. In: Collinson M, editor. *A History of Farming Systems Research*. Wallingford, UK: CABI Publishing, pp 342–354.

Quiroz RA, León Velarde CU, Valdivia R, Zorogastúa FP, Baigorria GA, Barreda C, Reinoso J, Holle M, Li Pun H. 2003. Making a difference to Andean livelihoods through an integrated research approach. In: Harwood RR, Kassam HK, editors. *Research Towards Integrated Natural Resources Management*. Rome, Italy: CGIAR [Consultative Group on International Agricultural Research], pp 111–122.

Van Immerzeel WHM, Cabero J. 2003. *Pachamama Raymi—La Fiesta de la capacitación. Teoría y práctica de un sistema de capacitación campesino-a-campesino*. Cusco, Peru: DEXCEL. Also available at www.dexcel.org/libro; accessed on 22 November 2005.