Generating innovations for the competitive development of potato in Peru

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Abstract

In Peru, potato is the main crop in the Andean region and for small producers, for whom it is an important source of income and food, and also a way to preserve ancestral customs.

The INCOPA Project (Innovation and Competitiveness of the Potato) of the International Potato Center (CIP), funded by the Swiss Agency for Development and Cooperation (SDC) in alliance with a series of public and private partners, is demonstrating that research and development can go hand in hand to obtain effective impact at the small producers level. The project effectively applies the Participatory Market Chain Approach (PMCA) that promotes working with the potato chain actors and R&D organizations for linking research to market chain innovation. The objective is to improve the competitiveness of selected market chains and enable the effective participation of small-scale farmers.

The results obtained refer to

3. commercial innovations or new products (selected fresh native potatoes, colored potato chips, yellow mashed potato and selected white *chuño* or *tunta*)
4. institutional innovations or new rules and norms (public-private alliances, National Potato Day, Potato Wholesale Commerce Law and the Tunta Technical Norm, among others)
5. technological innovations (post-harvest management, production of healthy seed and sustainable potato production technologies, among others).

The evidence indicates that native potatoes' value and their appreciation as cultural heritage is essential for small producers. Their commercialization enables producers to obtain prices 20% above the prices offered by traditional channels, as well as better performance by hectare (from 10 to 14 tm/ha) and quality improvement.

Keywords: production chains, innovation systems, small farming, products development, market articulation.

The potato in Peru

Potato represents one of the main nutritional staples in the world. In Peru, it is one of the most important products in the agrarian system in economical and social terms. An average of 3 million tones per year is produced and 270 thousand hectares are planted annually. Almost 600 thousand families depend on its cultivation (MINAG, 2007).

Particularly, in the case of the Andean region, it is the main crop for small producers, for whom potato is a very important source of income, food and also a way to preserve ancestral customs. But, it is also significant to the urban population, because this millennial tuber provides nutrients and diversity to the daily diet. The potato is a good example of how, by combining agro-ecological factors with efficient handling, a product with high nutritional value can be obtained. There is no other crop that produces so much energy and protein per hectare than potato. Furthermore, it offers great culinary versatility. In 2007, the World Summit of Gastronomy Madrid-Fusión recognized the Peruvian potato as 'one of the eight emblematic products of international cuisine'.

In Peru, the potato production sector is not homogeneous. It displays different specific features according to the varieties grown. Analyzing this sector, there are three main segments: white potatoes, yellow potatoes and native potatoes. In the first case, during the last thirty years there have been periods of pronounced fluctuation in prices (although with a general decreasing tendency) and the possibilities of industrialization have not been clearly investigated. In the second case, the varieties of yellow potato have good positioning in the local market and the processed product (peeled, precooked and frozen) has been exported to international markets such as the United States, Spain and Japan, although in small quantities and oriented to the 'ethnic' market (Peruvians living abroad). Finally, in the case of native potatoes, recent endeavors have successfully introduced them in local supermarkets as a gourmet product**,** and processed products have been developed such as flakes and mashed potato, with good export potential (Ordinola, 2009).

Even though the nutritional value of potato is excellent, consumption per capita among Peruvians has been irregular. During the 50s it was 128 kg. But by the beginning of the 90s,it had fallen to 32 kg eventually rising to 70 kg by 2005. Along with this during the last few years the sector has experienced decreasing competitiveness. This is reflected in the relatively low prices (and the lack of management in quality conditions in the production zones). The identified causes for this situation are negative environmental factors, inadequate technological resources and the economic and social precariousness of the farmers. A key limitation is scant commercial development. The fresh product image has not been modernized and no aggregated value has been generated in the last few years. In this context, one of the crucial aspects to determine is how to generate innovations supporting the development of competitiveness in the sector, as well as promoting articulated involvement of all the various actors along the potato production chain.

Strategy for generating innovations in the potato sector

During recent years, it has been demonstrated that research and development can work hand in hand to create impact at the small producers' level, which translate to a reduction in poverty, improvement in food safety and sustainable exploitation of natural resources (Devaux *et al.*, 2008).

In this context, CIP's INCOPA Project , executed with SDC funds , and in alliance with a series of public and private partners, is geared to improving the competitiveness of the potato chain.Emphasis is on small producers, taking advantage of new market opportunities and promoting the consumption of Peruvian potato, within a framework of public-private institutions, favoring the modernization of the sector. Through their work, it has been demonstrated that research and development can work together to achieve effective impacts at the small producers level. The project operates a Participatory Market Chain Approach (PMCA), seeking to involve all the actors within the potato productive process so as to generate innovations that will improve the competitiveness in the chain production (Ordinola *et al.*, 2007).

The work at INCOPA is organized along four intervention lines

1. to promote negotiation platforms between the chain actors, which are strong and operate sustainably
2. to promote public awareness activities and policies jointly implemented by all the partners to reinforce the potato sector
3. to build up the abilities of the local partners to improve the competitiveness of small producers (local service markets)
4. to promote a broader participation of the private business sector in the Peruvian potato productivity chain.

INCOPA is implemented in the Peruvian Andes, with a small coordinating team in Lima, and works through local partners in the following regions: Ancash, Junín, Huánuco, Cajamarca, Cusco, Pasco, Ica, Huancavelica, Apurímac, Ayacucho and Puno.

The following graphic summarizes the strategy and shows how research and development can complement each other to obtain concrete results (innovations).

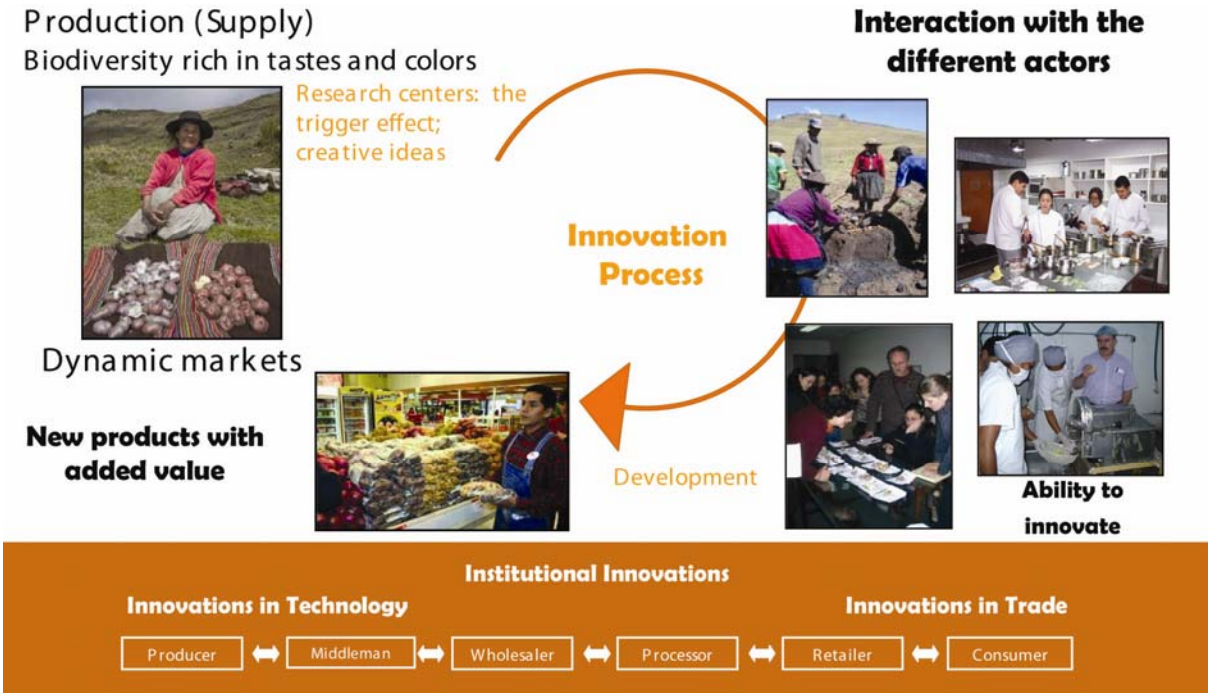

Figure 1. S timulating innovations along the market chains

The model operates on three main levels. The first is the chain approach (widespread in recent years), which focuses on contact amongst all the different actors in the market chain, such as producers, businesses and service providers, in order for them to express their needs, mainly regarding innovations and technical assistance. The second area is research for development, which channels all this information so that research institutions –CIP, research centers, universities- can respond to what the markets require to improve competitiveness. Finally, the incidence of policies would allow bringing the results and approaches to bigger scales, and generating trends that may enable policy makers –ministries, regional and local governments- to adjust their actions and promote others that have already been approved at the different levels. These three major fields of action generate synergies among them. For example, while the actors of the chain promote incidence, the policy makers may generate norms that enable better business performance for these actors. The chain participants need innovations and the research institutions adjust their response (offers of technological) to this demand.

The 'visible' results of the model are: commercial innovations, technical innovations and institutional innovations. Each one of these will be explained later.

The Participatory Market Chain Approach (PMCA)

As mentioned before, the project's main intervention tool is the so called Participatory Market Chain Approach (PMCA), which is a method developed in Peru by INCOPA along with Iniciativa Papa Andina. It is a method which is openly geared to involving all actors in the chain taking part in the production, marketing and consumption processes. The idea is to generate innovations that will improve competitiveness and support the creation of new businesses benefiting all the participants (Thiele and Bernet, 2005).

The PMCA strives to combine supple elements of leadership and decision making that favor innovation in the production chains, based upon a participative process. This can result in new rules of partnership and/or quality standards (institutional innovation), more efficient processes (process or technological innovation), or new products (innovation of products or commercial innovation). The procedure looks primarily to demand, emphasizing the needs and requirements of the consumers. Once innovations have been identified at this level, the changes are rolled out 'backwards', that is to the other members of the chain (retailer, processor, wholesaler and producer) and so a qualitative and quantitative product that meets the market's need is manufactured. In the case of Peru, the PMCA has been applied in two instances (2002-2003 and 2003-2004).

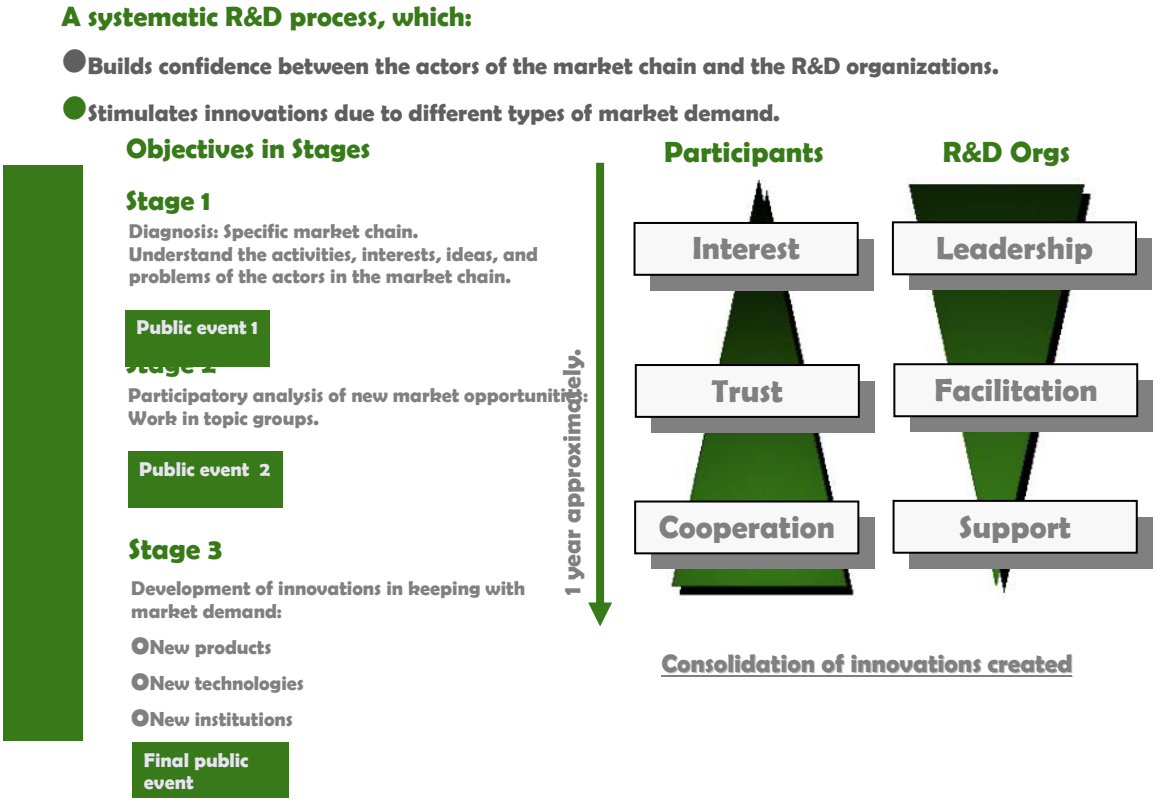

Figure 2. The PMCA process

Innovations generated and their potential benefits

As a result of the implementation of the PMCA, the following innovations have been developed and applied.

Commercial innovations. These are the changes made to final products that allow bigger and better access for small producers to dynamic markets with increased added value. Examples in this area are: Mi Papa, Seleccionada & Clasificada (wholesalers' trade), packed tunta (white *chuño*) (for local market and export) Puré Andino (for export) T'ikapapa (supermarkets) and Jalca Chips (for export). It should also be noted that new brands of snacks made out of native potatoes have been developed and launched recently in 2008 These are: Lay's Andinas, Inca's Gold, Natu Krunch, Nips and Mr. Chips among others. These all represent initiatives with whom the project jointly works.

Institutional innovations. These are changes in the rules of the game played by all the agents of the chain and other public actors. They may be new institutions (CAPAC Perú, Alianza Institucional de la Tunta, Iniciativa Papas Andinas), or new regulations (National Potato Day, the Technical Norm for Tunta and Ley de Comercio Mayorista de Papa among others). At the same time, a key issue is the inclusion on the public and sectorial agenda of the need for sustainable development of the potato segment in Peru.

Technological innovations. These are the technological changes required to increase the efficiency or quality of production and the transformational processes aimed at meeting market demands. Some achievements attained in this area are the trials performed to define norms and quality standards for Mi Papa, the trials of sprouts inhibitors, widespread diffusion of strategies for integrated harvest management, storage techniques and seed production techniques.

The specific combination of these results makes for a significant impact. Regarding income increase, **commercial innovations** have an influence on the return small producers receive. Since the products target market niches they move into a higher price range and improve the profit margins producers obtain. T**echnological innovations** also have repercussions on prices, because with better quality and higher quantities of products the level of performance rises and costs are reduced. I**nstitutional innovations** diminish transaction costs, mainly in commercialization, allowing access to identified market niches and improving the product's image amongst consumers. Establishing the National Day of the Potato is a good example of this. With the resulting increases in demand, this, in turn, influences the size of the market (

Insofar as the combination of these results influence prices, quantities and size of markets for small farmers' products, they also influence their incomes level and effect a reduction in their state of poverty.

Results among the different actors in the potato chain

At sector level

As mentioned before, the potato sector in Peru is not homogeneous. One of the key issues has been to insist upon policy maker's perceiving the potato sector as defined by certain characteristics. The following graphic summarizes the way to look at it. The important matter now is that it should be clear there is potential for development and commercial positioning for native potatoes, a segment that was neglected by different actors in the potato chain.

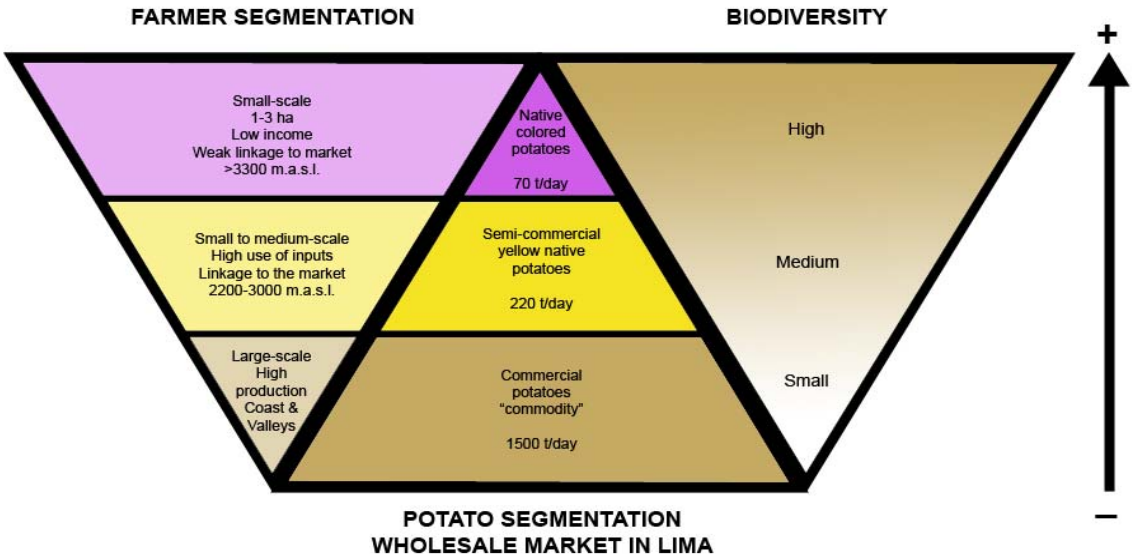

Figure 3. Segmentation of the potato market in Lima

On a global scale, there are significant changes and the following results may be seen as consequences of the project.

White potato varieties. Two of the main limitations in the case of fresh products are inefficient post-harvest handling, which cause losses, and the persistently inefficient wholesalers' markets that continue using 120 kg containers of unselected unclassified product. Some important steps have been taken to change this situation by modernizing the potato wholesale market in Lima and introducing new products such as Mi Papa. It should be noted that Lima's wholesalers' market commercializes 600 thousand t of potatoes per year. Higher efficiency with this volume of production generates a whole chain of goods and services. At retailers' level, supermarkets are applying the concept of selected product, classified, clean, washed and packed so as to facilitate its access to consumers.

Yellow potatoes. This product has gained position in an 'exclusive' segment of the market due to its taste and color differentiation. But it is equally consumed throughout all social classes, hence consolidating a high penetration level in the important fresh product consumers' market. **.** In the export segment, the 'ethnic' market, mainly Peruvian citizens living abroad, is significant, first within the United States, and more recently in Japan and Spain. In 2006, the export total of this product increased by 83%. An interesting fact is that during the first semester of 2007 potato exports grew by 42% compared to the same period in 2006, which, in turn, had increased 16% over the same semester of the previous year. We may well be on the brink of an export boom of this tuber (De Althaus, 2007).

At the same time, there are other options being developed to process mashed yellow potato both with and without peeling for the export market. A new yellow potato processing plant has recently been opened in Cajamarca. In 2008, the Gloria Group launched Mr. Chips Papa Amarilla, a line of yellow potato chips, while Frito-Lay has launched as recently as mid 2009 Lay's Peruanísimas, a product also based on yellow potato. The challenge for yellow potato varieties is to cross from the ethnic segment to the general public of the targeted export markets.

Native varieties. These potatoes have become important and more visible since the joint ventures described in previous paragraphs. There is a great biodiversity of potatoes in the Peruvian Andes that has been inefficiently exploited in sustainable terms and the majority of these varieties are unknown.

In the case of fresh produce consumption, there are some varieties that have been successfully introduced in supermarkets with the concept of 'fresh, selected, classified native potato, clean and packed with brand', This has gained endorsement thanks to the potatoes' extraordinary nutritional value and diversity of forms, size and color, as well as the texture and flavor of their pulp (Ordinola *et al.*, 2008). Furthermore, there are some processed products from native potatoes on the market. They include a deluxe presentation of native potatoes chips that is sold in the duty free shops at Lima's international airport, and other brands that have been introduced in the supermarkets of Lima and in regional markets for the tourist segment. In May 2008, Frito-Lay, a snack food transnational corporation based in Peru, launched Lay's Andinas, potato chips made from native varieties, which implies a substantial improvement in market development for these products. At the same time, the Gloria Group, an important local company, has launched a new product, Mr. Chips Native Potatoes, which is also produced from native varieties. Another private sector company has developed a facial cream with extracts of the purple potato variety. The next step is to explore the possibilities the export market has to offer for products processed from native potatoes.

It is imperative to take advantage of the gastronomic potential that the various Peruvian potatoes offer, especially the yellow and native varieties. There are many ways to cook them, and their versatility in the creation of dishes is astonishing, as several haute cuisine schools in Lima and other Peruvian cities may well testify. Many recipes have been created in different ways with a diversity of potato varieties as their main ingredient (Ordinola *et al.*, 2007).

At the producers level

Many studies have been conducted to measure how the benefits of implemented actions have impacted on the producers. Some of the most important results within the region of Huánuco (Bucheli *et al.*, 2007) are described below:

1. The study substantiates that fieldwork has been performed with improved native potatoes and small producers.
2. In Cayna (one of the project's intervention zones) there has been an important increase in the average annual income due to the sale of potatoes (from US$ 721 to US$ 2,058), and there are qualitative signs that support this positive variation. Productivity is also increasing (from 10,830 kg/ha to 14,810 kg/ha), while there is a positive difference in prices of 20% in relation to other market alternatives.
3. This income increase comes from technical assistance and training provided that has impacted on production improvement (quality and productivity). There also is the contribution of INCOPA/ADERS to the opening of new market opportunities: the commercialization of native potatoes not seen before, the use of mechanisms such as Mi Papa and T'ikapapa and new commercialization channels such as supermarkets and the wholesalers' market of Lima.
4. This situation means that there is a new window open for commercialization that did not exist before, and it remains open to the present day. The market incentives for these new opportunities are enabling perceptible changes that will strengthen and continue in the future.
5. The intervention of INCOPA/ADERS has made important contributions towards the situation of women, especially in the division of work, their self esteem and self appreciation. This involvement has made it possible for women to access new commercial spaces, and the work they perform in the field, particularly the classification, has been appreciated
6. The strategy of bringing together actors, promoted by the EPCP, has been successful in Cayna, where greater confidence towards NGOs, businesses and producers' associations is observed; a situation which is not perceptible in other intervened communities.
7. The observed results are related to the innovations indicated in the EPCE approach: technological (improved knowledge), commercial (new commercial channels, new products), and institutional (the strengthening of ECOMUSA).

Conclusions

In general, it may be said that the potato sector in Peru – particularly that of yellow and native potatoes – is in the process of changing. As observed, there are products already developed by private companies, or new products these companies are researching, because the markets are asking for them. To support the success of the project, which means improving the income of potato producers, it is essential that all the actors in the production chain share the common vision of selling quality products, fresh as well as processed, to cater to what the market demands.

If the potato sector is developed competitively**,** this will have an effect on promoting the competitiveness of the Andean region as well, and the generation of innovations described here plays a key role in that process.

References

Bucheli, B., Ordinola, M., Antezana, I., Obregón, C., & Maldonado, L. (2008). *Informe de la evaluación de impacto de la intervención de INCOPA/ADERS (2002-2007)*. Lima, Perú: Centro Internacional de la Papa (CIP).

De Althaus, J. (2007). *La Revolución Capitalista en el Perú*. Fondo de Cultura Económica (FCE).

Devaux, A., Horton, D., Velasco, C., Thiele, G., López, G., Bernet, T., Reinoso, I., & Ordinola, M. (2008). Collective action for market chain innovation in the Andes. *Food Policy*, Vol. 34, No.1, pp 31-38.

Ministerio de Agricultura (MINAG) (2007): *Dinámica Agropecuaria 1997 – 2007*. Lima, Perú: MINAG-DGPA.

Ordinola, M. (2009) Perspectivas del Sector Papa: ¿Puede despegar en los siguientes años? In Quevedo, M y Maza, S. (Eds.). *Boletín de Papa N° 3*. Lima, Perú: MINAG, pp.18-21.

Ordinola, M., Bernet, T., & Manrique, K. (2008). *T'ikapapa: Linking Urban Consumers and Small-Scale Andean Producers with Potato Biodiversity.* Lima, Perú: Centro Internacional de la Papa (CIP).

Ordinola, M., Bernet, T., Manrique, K., & Fonseca, C. (2007). *Promoviendo Innovaciones con los Actores de la Cadena y Revalorizar la Biodiversidad de la Papa: El Desarrollo y Aplicación del Enfoque Participativo de Cadenas Productivas (EPCP) en el Perú*. Lima, Perú: Centro Internacional de la Papa (CIP).

Thiele, G., & Bernet, T. (Eds). (2005). Conceptos, Pautas y Herramientas: Enfoque Participativo en Cadenas Productivas y Plataformas de Concertación. Lima, Perú: Proyecto Papa Andina, (CIP).