Dealing with innovation in response to market opportunities and poor farmers´ needs: The case of the Bolivian Andean Platform promoting technical and commercial innovation in the native potato market chain in the Andean highlands in Bolivia

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Abstract

Agricultural development in developing countries is taking place in the context of rapid urbanization and increasing market integration. Such context poses multiple challenges as well as opportunities to economic agents (including poor farmers) but also to agricultural R&D organizations and other development agencies if agricultural innovation is to be responsive to poor farmers´ needs. Using the innovation system perspective as a conceptual framework, this paper presents and analyzes the experience of the multi stakeholder platform ANDIBOL in fostering pro poor technical innovation in response to market opportunities.

Keywords: Bolivia, innovation system, potato, chuño, market chain, stakeholder platform.

Introduction

Changes in urban consumption habits and the increasing importance of new actors in food markets (supermarkets, food industries and retailers) are exercising increasingly pressure over production practices and resources of small farmers and other small and medium scale market chain actors, which in turn have limited access to market information, services, technology and capital, and inferior bargaining power to compete in this evolving context.

The panorama described above, not only poses multiple challenges as well as opportunities to economic agents (including poor farmers) but also to agricultural R&D organizations and other development agencies. Although very frequently market opportunities have been signalled as a trigger for innovation mainly in the private sector and recently in the small rural household sector in developing countries; the question of how and to what extent development programs and projects can help poor farmers to face those challenges and benefit from the opportunities posed by market transformations still a challenging question in the current debate of agricultural development.

Bolivian farmers habiting Andean highlands are among the poorest in Latin America. Native potatoes varieties and the local knowledge for their cultivation and transformation are perhaps the unique resources possessed by farmers in these areas. Fresh native potatoes and traditional freeze – dried potato product known as "Chuño" are normally used for home consumption, intra household exchange and trade in local markets. This paper report on the experience of the Bolivian Andean multi stakeholder platform (ANDIBOL); a social network involving potato producers, R&D organizations, NGOs, and medium scale enterprises, in fostering pro poor commercial and technological innovation to develop and exploit market niches for this special transformed product (chuño) in most demanding urban markets.

The ANDIBOL experience has been analyzed from the perspective of the "Innovation system framework" focussing on the associated processes of collective decision making and knowledge sharing undertaken by actors within ANDIBOL in order to provide insights about the potentialities, challenges and implications for agricultural development programs and projects that entail bring together a broad range of actors (and the inherent variety of social, cultural and economic background, interests and expectations) for innovation in response to market opportunities and farmers´ needs at the same time.

Conceptual framework

This paper assumes the broad and flexible conceptualization of innovation offered by the Innovation System Perspective whose main elements are developed in the fallowing lines in order to create a conceptual framework to analyse the experience of ANDIBOL in fostering commercial and technical innovation.

We start introducing the concept of innovation as it is defined in terms of the innovation system perspective:

Central to the innovation system framework definition of innovation is the presence of diverse agents playing different roles and interacting between them in the process of generation, accumulation, diffusion and use of knowledge in response of market opportunities or other social needs, and the formal and informal institutions in which such a process is embedded (Spielman, 2005; Johnson et al, 2003; Berdegué, 2005; Hall, et al, 2001; World Bank, 2007).

The first element in the previous definition that deserve attention is that explicitly recognizes that innovation is an interactive process which often requires quite extensive relationships to sustain knowledge acquisition and permit interactive learning. Most of the literature on innovation system mentions as of primary importance the flow of knowledge between actors in the process of technical change and the factors that condition these flows (Hall et al, 2000, 2001, 2003; Spielman, 2005; Johnson et al, 2003; Clark, 2002; Berdegué, 2005). Further, Johnson et al (2003, p. 6) notes that the flow of knowledge required for innovation necessarily involves "complex patterns of interaction and relationship between actors, generally characterized by reciprocity and feedback mechanisms in several loops". Therefore, there is an important role for a broad spectrum of actors in the innovation process whose different agendas and demands nourish the process.

Second, such recognition introduces a wider perspective about knowledge and their sources. Knowledge generation is no longer seen as separate from its context of use as it has been seen in more traditional approaches (Johnson et al, 2003; van Kerkhoff and Lebel, 2006). This consideration permits move the attention from 'basic research' to the 'processes of innovation', where research becomes just one element of a wider process of transforming 'new knowledge' into goods and services (Barnett 2006, p. 2). This point of view – which can be expressed as "put new knowledge in to use" - means among other things that agricultural research organizations confront the challenge to gain new skills and capacities and to change their working schemes to closely cooperate and coordinate with actors from the demand side if technological change is to be responsive to end users´ needs. On the other hand signifies that the innovation process necessarily takes in to account multiple sources of knowledge; implicit and explicit, and that the existing stock of knowledge – possessed by each different actor – is a substantial source of innovation either incremental or radical innovation.

The third remarkable element in the definition of innovation offered by the innovation system perspective corresponds to the institutional context in which innovation takes place. If it is admitted that the pattern of interaction and interactive relationship between actors impinge on knowledge flows, there is an explicit recognition that the set of rules and norms governing such relation really matter for innovation.

Finally, under the innovations system perspective it is possible to assert that improvements on the nature and extent of the interactions between farmers, R&D organizations and a broad range of other actors are widely important if innovation is to be responsive to poor farmers´ needs (Hall et al, 2007; Hall 2001; 2006; 2007; Hartwich et al, 2005; Hartwich et al, 2007; Johnson et al, 2003; Spielman, 2005; Berdegué, 2005; The Wold Bank, 2007).

The Case: "The Bolivian Andean Platform (ANDIBOL)"

ANDIBOL is a market chain platform bringing farmers' associations together with traders, processors, researchers, extension agents, service providers and others to foster pro-poor innovation. Papa Andina Initiative, a partnership program hosted by the International Potato Center and the PROINPA Foundation, a private R & D organization working in Bolivia, have promoted the use of stakeholder platforms as an approach to foster interaction, social learning, social capital formation, and collective activities involving diverse actors in innovation processes (Devaux, et al, 2008).

The efforts to build the ANDIBOL started in 2003. At this time PROINPA Foundation used the Participatory Market Chain Approach[3] to foster innovation in the market chains for "tunta" and "chuño", traditional freeze dried potato products. These applications involved farmers, traders, food-processing firms, exporters, cooking schools and R&D organizations. In the first cycle, participants prepared a set of 'Bolivian Quality Standards for Chuño and Tunta'. In 2004, the PMCA was used again to identify new market opportunities for chuño and tunta, and ways to improve the products' image in different market from the traditional ones. This exercise involved some participants from the first application plus chefs and a food-processing firm manager. It resulted in a new product: clean, selected and bagged chuño, marketed under the brand 'Chuñosa'. In 2005, participants established the 'Bolivian Chuño and Tunta Platform', formalized as the 'Bolivian Andean Platform ANDIBOL'. (Devaux, et al, 2008. p. 35).

Among other activities, ANDIBOL has established links with market agents to develop better quality chuño-based products with a higher price and to explore the export potential of chuño. The platform has a strategic plan guiding their activities and has got additional financial resources to support new projects. The platform today is facilitated by PROINPA and represents 13 core members including four farmers' associations with around 200 members, processing firms, development projects, NGOs and other service providers (Devaux et. al, 2008).

The following sections present the experience carried out by members of ANDIBOL in searching and adapting two specific technologies to overcome chuño quality problems in response to market opportunities.

The process of technical innovation in response to market opportunities: Details and results

Market opportunities as source of technical innovation

Based on the initial results in commercializing Chuñosa (clean, selected and bagged chuño) in supermarkets of La Paz and Santa Cruz (two of the main cities in Bolivia), the manager of RicaFrut, a medium scales firm dedicated to the transformation and commercialization of natural Andean products, revealed to its R & D partners in the platform the necessity to improve chuño quality to respond urban costumers´ requirements specially in terms of size and shape uniformity, cleanness and absence of peel and of pest damages. Since the quality of chuño stems essentially from the process of transformation of fresh potatoes into frozen and dried potatoes using traditional techniques at farmers' field level, achieving such exigencies signified the searching of technical alternatives that permit farmers to improve their process of transformation.

It is interesting to see that Ricafrut didn´t articulate a demand for a specific technology; the demand was posed in terms of what can be named an "explicit demand" or the manifestation of a problem that need to be solved (Bentley, J. et al, 2004); in this case the necessity to solve quality problems. Once the demand was set up, it was translated in to what ANDIBOL denominates a "research mandate" or the commission passed to the R&D organizations to search for technical solutions to overcome concrete constraints hindering farmers and/or firms make profit of market opportunities.

Looking for technical alternatives

According to the research mandate, PROINPA and KURMI started the hunt for technical alternatives to solve quality problems at field level. They found the existence of a local retailer using a manual machine invented by him to remove chuño peel. They also found that some year ago CIFEMA (a R&D organization outside the platform dedicated to develop animal drawn tillage implements) had already developed a prototype of a manual machine to classify fresh potatoes. The performance of this machine, however, was never tested with the kind of potatoes that farmers use to obtain chuño.

[3] The Participatory Market Chain Approach (PMCA) is another approach developed and promoted by Papa Andina Initiative and its strategic partners in Bolivia, Ecuador and Peru. The PMCA was developed as an approach for identifying and exploiting new business opportunities that benefit the poor, by stimulating market driven innovation of different types. It engages market chain actors, researchers, and other service providers in identifying and analyzing potential business opportunities (Bernet et al, 2006).

Both machines were taken as starting point to carry out a process of participatory research to find out if they solve marketing limitations and if they were appropriate to farmers work conditions.

Adapting and improving the peel remover machine

PROINPA and KURMI researchers working with a local mechanic introduced the first changes in the manual machine used by the retailer. The new version was assembled changing the barrel of the first version for a cylinder made of metal sheet in order to make peel remover stronger. Chuño producers from 4 communities tested the improved machine during 2 months. They tested aspects such as the time required to peel 1@ (11 Kg.) of chuño, the human effort necessary to operate the machine manually, the appropriate velocity with which the cylinder need to be turned to achieve a good product, and the resistance of the materials with which the machine was made of. Equally important was the participation of the manager of Ricafrut, who visited the production area to see how the machine performed and verify if the chuño obtained fulfill market quality standards.

Two months after, in a meeting with the presence of farmers, researchers and local authorities the results achieved were presented and the following suggestions were offered:

- The material of the internal mechanism needed to be replaced with stronger material to avoid erosion
- Introduce chuño into the machine was very difficult; therefore there was a need to install a kind of funnel on the peeler top.
- To facilitate the separation of removed peel, powder and clean chuño, it was necessary to add a sieve on the bottom part of the machine.
- Finally, the peeler machine was extremely noisy

There was not possibility to work on those improvements with the local mechanic, so CIFEMA experts were contacted and the suggestions were passed to them. Aside from working on the aspects mentioned above, CIFEMA introduced modifications to improve durability, to facilitate the reparation and replacement of parts and also investigating on the type of cover material to diminish noise.

Six new improved machines are now used by farmers. Interviewed by the researchers, chuño producers highlight the following initial results:

- Now we have more time available for other activities; the time required to peel 1 @ has been reduced from 4 hours to 20 minutes
- Normally chuño was peeled by women; now with the machine, men and women we share this work.
- We obtain clean chuño and without peel and we are able to satisfy the quantity of chuño required by the “empresario” (Ricafrut manager)
- The firm (Ricafrut) no longer refuses our chuño
- In the local market our clean chuño also receive higher price.
- We need peeler machines in each community, however the price is high (400 US Dollars each) and we are not able to buy it.
- We will try to get founds from the local government to buy more machines.

Peeler machine first model

Peeler machine second model

Peeler machine final model

Adapting and improving the classifier machine

To start the process of research, PROINPA´s researchers bought a classifier from CIFEMA and exposed it to farmers. In order to make the machine usable to classify chuño, the first idea that they proposed was to change the sieves used to classify potatoes in the original model for sieves specially designed to select chuño. However, the farmers refused this idea arguing that the process of selection starts with the classifications of fresh potatoes and therefore the only think that they had to do was to adapt the shape and size of the sieves according to the kind of potatoes that they use to obtain chuño.

This information was communicated to CIFEMA experts, who transformed the sieves and then sent it back to the farmers´ field. As with the peeler machine, the new classifier was distributed to be tested in 4 communities and after two months the following suggestions were made:

- The new sieves worked properly with the potatoes used to produce chuño
- It was necessary to reduce the inclination of the sieves to permit better selection
- The classifier was too heavy to be transported; therefore there was the necessity to add 4 wheels, instead of the 2 suggested by CIFEMA and PROINPA experts.
- The lateral metal sheets of the machine were too small and short; they needed to be enlarged in order to avoid looses.

Coming back to the CIFEMA´s mechanic shop, the experts worked introducing the changes proposed by farmers and additionally on modifications to improve the mechanisms of rotation and to facilitate the operation of changing sieves.

Twenty four improved potato classifiers are currently used in 16 different communities. Initial information about its performance has been gathered interviewing farmers:

- The time required to classify potatoes was reduced from 12 hours to 5.
- Normally women were in charge of this extremely hard work; our hands suffered injuries. Now we join this work with men and our hands no longer suffer.
- We have chuño of better quality because working with selected potatoes the frost acts uniformly.
- We obtain benefit also from selling our fresh potatoes, because classifying potatoes by size we obtain better prices in the local market.
- As well as with the peeler we are not able to buy this machine due the price (350 US Dollars each), but we want it. We are going to look for support from the local government.

Classifier machine initial model

Classifier machine final model

Viewing the experience from the innovation systems perspective: Lessons learned

At first glance the experience of adapting and improving technology shown in the precedent lines doesn´t differ in a significant manner from other experiences of participatory research. Nevertheless, viewed from the angle offered by the innovation system perspective, this experience permits to draw some lessons to aid agricultural R&D organizations and other development agencies to be responsive to farmer´s needs and market opportunities at the same time.

Very frequently market opportunities have been signaled as a trigger for innovation mainly in the private sector and recently in the small rural household sector in developing countries. When participants in a well functioning market chain share information on market opportunities and challenges, they also provide important information to shape the direction of the innovation processes (Word Bank, 2007, p. 24). However, in developing countries where poor farmers are marginalized or have disadvantages to participate in market chains, there is a need to strength farmers´ capabilities to participate in favourable conditions and to have a feedback flow of information on poor farmers´ needs.

In this sense, the experience has shown that ANDIBOL offered the space to guide the direction of the technical innovation not only on the base of farmers demands but also incorporating the interests and knowledge of actors close to the demand side, making in this way that market opportunities effectively function as triggers for innovation. The experience also illustrates that in the context of stakeholder interaction, the participating R & D organizations have access to useful information to define and adjust its research agenda according to what end users really need. This last point has been highlighted by PROINPA and KURMI referring to the advantages to receive concrete assignments (ANDIBOL´s research mandates) to look for technical solutions to solve specific constraints.

Take advantage of market opportunities and allow farmers to effectively participate in making profit from it, requires among other things that the process of technical innovation, and its associated research activities, follow the pace with which market evolves. ANDIBOL as a space where information and knowledge can be directly obtained from interested parties and where market demand can be combined with information on what farmers require to respond to those demands, speeds the process of decision making on what has to be investigated and reduce the transaction cost associated with the search of useful information.

On the other hand, the experience has shown that during the process of participatory research the combination of different sources and types of knowledge, tacit or codified, coming from farmers, firms and scientists, and the use of feedback mechanisms, speeds the achievement of technical solutions to concrete problems and opens the possibility of further adoption of technologies. This point has been illustrated by the fact that both machines have been adapted during a short period of time (less than one year) and because farmers have demonstrated their willingness to adopt them.

Working in the context of multi stakeholders platforms like ANDIBOL, means that agricultural research organizations confront the challenge to gain new skills and capacities and to change their working schemes to closely cooperate and coordinate with a wide range of actors.

Different groups have different internal laws, rules, regulations, norms, cultural habits, values, attitudes, practices and interests. It is necessary to understand the institutional context in which innovation takes place and identify those components that constitute an impediment or a potential for innovation. This task involves the development of skills and capacities to:

- Interpret different institutional contexts and harmonize different agendas.
- Integrate different sources and types of knowledge in the process of innovation.
- Create mechanisms that enhance information and knowledge flows.
- Enhance different forms of interaction.
- Create incentives to participate and innovate collectively.

The fulfilment of these functions could result in the formation of "spaces for innovation" in which social learning, social capital formation and joint activities can be fostered.

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