



# Nutrition-Sensitive Value Chains in Peru

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# Introduction

Peru has a country area of 128,522 (1000 ha), 24,330 (1000 ha) of cultivable land and a population of 31,377,000 (WHO 2014). This is mainly concentrated in the urban area, where today 78% of the population lives, with a median age of 27 years old. Despite a sustained economic growth occurred between 2005 and 2014, Peru maintains today high levels of inequality. Recent statistics highlight how 22.7% of the population lives in poverty and 4.3% in extreme poverty. Extreme poverty is mostly concentrated in rural communities, especially in the mountain region and among women, with 30.4% of women not having access to personal income or earning 30% less per month than their male counterparts. In addition, in the northwest, and the southern-central region, extreme poverty peaks at 25.7%. Due to its geographic position, Peru is particularly prone to natural disasters, from occasional devastating earthquakes and recurrent floods and droughts, to severe cold waves that may persist for several months. In addition, Peru is affected, every three to seven years by El Niño, which warms the Pacific, modifying the local climate and triggering torrential rain, increased snow melt, flooding, or droughts. These conditions contribute to lower food production due to the death of cattle and damage to crops, increase food prices and worse nutritional status of the poorest.

From a nutrition security point of view, since the early nineties, a number of social and health policy and programs led to the improvement and amelioration of the nutrition conditions of the overall population. This has been more relevant around the urban areas, while in rural areas and the mountain range region poverty and severe malnutrition still persist. Nevertheless, up to 5.2 million Peruvians are still today highly or very highly vulnerable to food insecurity due to Peru's vulnerability to climate and natural disasters as well as international commodity market fluctuations and limited purchasing power.

According to the CFS framework (CFS 2016; Reardon, 2016), the benefits of nutrition-sensitive value chains (NSVC) for farmers, enterprises and consumers, include:

1. On one hand, from the biodiversity point of view, the possibility to climb the “value ladder” (by producing fruits, vegetables, dairy, and animal-source foods of higher standards) and satisfy diversifying diets. Consumers benefit from a greater supply of more diverse and nutritious foods, and all year-round access to previously seasonal foods with increased food safety;
2. On the other hand, with regards to food prices, consumers will enjoy reduced food costs thanks to competition and longer supply chains that allow sourcing from productive zones farther afield and those with the greatest comparative advantages; this is furthermore supported by the promotion of needed job, and therefore increased income for producers and greater affordability of less costly food products.

Crop diversification enhances nutrition-sensitive value chains. Among the less industrialized countries, Peru has one of the lowest proportions of agricultural land per capita. In 1998, only 3.2% of the land was under cultivation (this is equivalent to 4.4 million hectares or 10.4 million acres). By crop diversification, it is meant the addition of new crops or different cropping systems to the production of agricultural products, through the experimentation of new varieties by the farmers or directly through the introduction of new crops species with the aim to diversify and prevent the financial dependency on a unique and specific crop and its possible fluctuating price. Diversifying crops allows farmers to take into consideration the different returns which might be produced from value-added crops,

but also and more importantly, prevent the risk of being excessively exposed to climate conditions: varieties that are being chosen for their resilience to heat stress, water salinity, water stress and possible diseases may enhance an overall benefit and reduce vulnerability and risk of failure due to the climate events (i.e. pests and the sudden onset of frost or drought), which can have a disruptive huge impact on the cultivations and generate deep crises. Crop diversification thus strengthens the ability of the agro-ecosystems to respond to these events. Furthermore, the altitude and the state of the earth require special rhythms based on a crop rotation system, which is essential to compensate for the exploitation of the soil. Some of the benefits that can result from the diversification of the crops include: an increase of production yields, an overall improvement in health conditions of the population, facilitated by diet diversification, an improvement resilience to drought, the boost of resistance to pests and diseases, and also new market opportunities. The Quinoa case study offers a comprehensive demonstration of these benefits.

Looking into the history, the Peruvian agriculture has been deeply affected by the Agrarian Reform Law of 1969, which abolished large private landholdings mainly in favor of cooperatives, in which fields are communally planted and harvested, and the produce or the profits divided. Despite Peru's richness in natural resources, inadequate distribution systems and lack of technical expertise have had a deep impact on the productivity of the cooperatives and by 1981 about 80% of them were operating at a loss. Recently, agro-commercial operations have been very successful thanks to a series of factors including land privatization, the expansion of land through irrigation projects combined with excellent climatic conditions, leverage on foreign expertise, and a strong organization in opening up to new markets, allowing Peru to become a prominent actor in global trade. Nowadays, Peru owns a very large biodiversity, which makes it possible to develop various native crops that are of interest to the international market.

Peru's agriculture is highly diversified but not well integrated; the major portion of the coastal farmland is devoted to the raising of export crops, while the *sierra* and the *selva* are used primarily for the production of food for domestic consumption: cotton, sugar, rice, soybeans, pulses, organic bananas, tobacco, flowers, cocoa, fruits and nuts, tea, coffee, asparagus, and forest products. The main agricultural deficiencies, such as wheat, livestock and meat, animal and vegetable fats, and oils, are covered by imports. Crop diversification provides an opportunity not only to increase income and reduce financial risk but also to increase the variety of food needed to meet the population's nutritional needs through a good supply of high quality food. Markets can provide opportunities for growers to invest in further processing such as pressing, juicing, pulping or drying (of relevant crops), constituting niches for potential investments, either on the farm or through local business partnerships. Farm groups, local entrepreneurs and local industry receive a boost by this value adding, enhancing a positive value chain. Peru needs to establish a sectoral strategy for all those profitable crops to leverage the success of the industry and its entry into the value chain has served to further diversify the sector's export basket. As a result, if the market became more competitive, firms and countries within the chain would be obliged to constantly innovate in order to retain their position in the value chain and find new opportunities to add value to their marketable products.

# Chapter 1

## Government, Policies, Regulatory Frameworks

In the last 15 years, the number of VC initiatives in Peru has risen significantly. The state, through a consistent number of international and national agreements and policies, is to be considered responsible for the promotion of such economic models. As underlined by Niebuhr (2016), the role of the state in agribusiness development, much more than in other countries:

*“is considered across all groups, from value chain participants to service providers, as key to fostering broad-based growth through value chain integration. Value chain development depends on the public making of private markets.”* (Niebuhr 2016: 134)

Nutrition-sensitive VCs can benefit from this pre-existing framework by which the state presents itself as a potential referent at each level of the VC.

### 1.1. International and National Policies

The key policy frameworks at the international level include: the Convention on Biological Diversity (1992); the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003); the UN Declaration on the Rights of Indigenous People (2007); the proposal for the protection of traditional cultural expressions of the World Intellectual Property Organization (WIPO); and the Nagoya Protocol on Access to Genetic Resources (2010), among others. In Central and Southern America agricultural policies are coordinated by the IICA, a supranational institution with headquarters in San José, Costa Rica. As indicated in an IICA manual on agribusiness, the interest in understanding, analyzing and enhancing the organization of production activities along chains is increasing:

*“Gradually, over the last years, the [value] chain approach has gained momentum and is utilized by technical experts, researchers, public officials, entrepreneurs, teaching staff and students in several countries of Latin America. As such, it has emerged as a topic of great interest and in different entities we hear about the importance of ‘working in chains.’”* (IICA 2006a: 20, cited in Niebuhr 2016)

A new frame of reference for agriculture and rural life in Latin America emerged from the Summits of the Americas in 2001, 2004 and 2005, where the ministerial delegates of agriculture endorsed the concept of *agrifood chains*. This marked the departure from a singular focus on production-oriented agriculture. Recently, the US Government has drastically cut its Official Development Assistance to Peru. Yet, USAID remains the largest absolute donor with 87603 million USD spent in 2010. The value chain approach in Latin America is moving towards a systemic approach that considers rural territories and agricultural production chains in the national and international contexts. In the IICA Medium Term Plan 2006-2010 maintained that:

*“[t]he concept adopted by the ministers of agriculture goes beyond measures intended to improve the productive and trade-related aspects of agriculture. It addresses rural territories where productive activities take place; the agricultural production-trade chains, which add value to primary production; and it extends to the national and international contexts that*

*condition agricultural development. Further dimensions of sustainable development, such as the social, environmental and institutional aspects of those territories, chains and the national and international context are also considered.” (IICA 2006b: 85, cited in Niebuhr 2016)*

Over the last decade, several public policy instruments were created to produce an enabling environment for enhanced competitiveness via value chain integration. Besides policies, plans and strategies, laws are common instruments of public policy. In Peru, the Congress launched three laws that buttress agricultural development based on a value chain perspective: Law N. 28062 of 2003, for developing and strengthening agrarian organizations, law N. 28846 of 2006, for strengthening production chains and clusters, and law N. 29064 of 2007 for the establishment of an Agricultural Bank. Consequently, four steps were undertaken: First of all, national councils on value chain development were founded in Peru to foster dialogue and coordination of private and public agencies. Moreover, commercial agreements between producers and entrepreneurs were established. In addition, farmers were organized into groups, and finally, access to financial services was enhanced. Through this law, the Peruvian government pleaded for a market-oriented approach to reach competitiveness. It emphasized that henceforth this approach would serve as reference for agricultural development. The law explicitly promotes the establishment of platforms for dialogue between chain actors and supporting entities. Public agencies are called to foment the cooperation and better organization of chain participants and to provide funds for small and medium-sized enterprises (SMEs), smallholder farmers (SHFs) and for institutions. The law addresses all the stages and processes of the value chains: from production to transformation. Previously, this was not the case; in the early 2000s, in fact, policies promoting a market-oriented perspective targeted only producers, whereas other chain participants and segments were blinded out. As a senior project coordinator argued, “There is a law that promotes the value chain perspective, right? You have read the law? It’s very general. It’s basically the type ‘it’s good to promote value chains’” (2013\_19: 44). Ministry officials and development consultants equally consider the law on value chains as a rather unspectacular enforcement tool and see it just as another paper with the only difference that “by law, the [regional] government in San Martín must support the economic promotion of its value chains” (2013\_32: 154), as one entrepreneur argued. Despite the broadly indifferent attitude towards the law, the introduction of legal norms and regulations for value chain development has enabled the approach to gain stronger legitimization among policy actors and development organizations.

Nutrition has been a central concern for Peruvian national policies aiming to create an enabling environment for enhanced competitiveness via VC integration. For example, the Ministry of Agriculture for the time period 2012-2016 clearly states that:

*“Today, the value chain approach is pertinent in the development of the current global economy. (...) Agriculture and livestock farming are no longer elements that are detached from the rest of the economy. This approach allows us a systemic perspective of the agricultural activities that derive from the formation of clusters.” (2012: 9)*

Nutrition-sensitive VCs benefit from policies promoting focus on nutritious food in the country at every level of the VC, some of these policies include:

- **Compensation for Competitiveness Programme** (1969-Ongoing), development of rural entrepreneurship by incentivizing associativity, management and adoption of new technologies;



- **National food security strategy** (2004-2016), promoting a wide number of nutrition-oriented national campaigns among different ministries aimed at providing sufficient and quality food to guarantee an active and healthy life.
- National program of school nutrition ***Qali Warma*** (2012-2016, DS N° 008-2012-MIDIS, Art. 1), focused on providing nutritious food in food meals and nutritional education to students.
- **Agenda for Environmental Research** (2013-2021), allowing the integration and strengthening of TK and innovations for territorial management, promoting adaptation to climate change, management and improvement of agrobiodiversity, management of water resources, etc;
- **National Strategy on Food Security and Nutrition** (2013-2021 Decreto Supremo N. 021-2013), aimed at guaranteeing to everyone in every moment the satisfaction of nutritional needs by ensuring the availability in sufficient quantities, access and consumption of healthy and nutritious food respecting the habits and cultures of each region; contributing to the recognition of local and innovating practices conserving agrobiodiversity in a sustainable way. Implementing policies and institutional changes at the three levels of government aimed to a shared programme of food security and nutrition;
- **National Program on Biotechnology** (2013- 2016), which opens the possibility of collaborative projects between the Potato Park and research institutions;
- **National plan on Human Rights** (2014-2016, Decreto Supremo N. 005-2014-JUS), which guarantees sustainable production of adequate food, with the respect of traditions of every culture in Peru.

## 1.2. Legal Framework

Besides policies, plans and strategies, laws are common instruments of public policy. Even though laws have often poor practical applications the laws for value chain development have enabled the approach to gain stronger legitimization among policy actors and development organizations, the main laws responsible for nutrition-sensitive VCs are the following:

- **Law N. 28062 of 2003** for developing and strengthening agrarian organizations
- **Law N. 28846 of 2006** for strengthening production chains and clusters that promotes the establishment of platforms for dialogue between chain actors and supporting entities. Public agencies are called to foment the cooperation and better organization of chain participants and provide funds for SMEs, smallholder groups and for institutions. The law addresses all stages and nodes of the value chain: from production to transformation and services around value chains.
- **Law N. 29064 of 2007** for the establishment of an Agricultural Bank.
- **Law N. 29571 of 2010** the code of defense and protection of the consumer setting the right to consume food which has a clear indication of its true nature (namely the contents of trans fats, GMOs etc.).
- **DS 006-2012-AG of 2012** the Regulations of the General Seed Law offering the possibility of producing native seeds and selling them in a non-certified way.

These laws ended up in the creation of national councils on VC development promoting dialogue and coordination between private and public agencies, in the establishment of commercial agreements between producers and entrepreneurs; in the organization of groups of farmers having access to financial services.

### 1.3. Development Actors

Nutritional support and food assistance programs comprise one component of Peru's overall health policies. They represent about 0.4 percent of GDP and reach approximately 9.5 million beneficiaries (Cotlear 2006, p.26). Table 1 below captures some key elements of existing social guarantees and pre-guarantees in Peru relating to education, health and nutrition (World Bank, 2008).

*Table 1: Accessing social guarantees in education, health and food in Peru (From: World Bank 2008)*

Sub-Guarantees	Education	Health Access	Food
<i>Are the beneficiaries and services clearly defined?</i>	Yes — children aged 4-16; Basic education (initial, primary and secondary) is guaranteed	Yes for most health programs and strategies.	Yes, for all food programs.
<i>Are there institutional procedures for monitoring access?</i>	By law, the parent associations, APAFAs, are responsible to watch for it. There is no information on actual procedures or statistics of APAFAs intervention.	No, not on a regular basis. (Coverage achieved by the Integrated Health System, SIS was measured in 2006.)	An institutional framework for monitoring food programs exists. <sup>5</sup>  The state does receive information on breaches to access.
<i>Are there legal or institutional mechanisms that ensure non-discrimination in the access to services?</i>	APAFAs are responsible for ensuring that no one gets excluded (their effectiveness to this end is questionable, since the parents of excluded children generally have less opportunity to participate in such associations).	The right of access to health is legally guaranteed for all citizens, and an emphasis is placed on citizens with disabilities.  There are no special procedures/mechanisms that ensure non-discrimination.	Not specified.
<i>Are services guaranteed for the amount of time needed?</i>	Yes, by law, though there is a high incidence of drop-outs.	Not clearly, and not for all treatments. For hospitalization there is a maximum period of 10 days.	There is no definition of the "amount of time needed."
<i>Is there a maximum waiting period for receiving the service?</i>	Not clearly specified.	No.	No.
<i>If service is unavailable within this waiting period, what is a guaranteed alternative (in the same time period)?</i>	None: Alternative education programs exist for adults who did not complete basic education but they are not a replacement of timely education.	None.	No.

<sup>5</sup> Unified Regional Registry for Beneficiaries of Social Programs, created by Law 28540. Through it the state is supposed to monitor under-coverage.



With the aim of strengthening small-scale farmers and revive indigenous identity, six indigenous social movements have come together in Peru to form an alliance called the *Pacto de Unidad* or the Unity Pact to draft policies towards self-determination, and that promote *Buen Vivir* or “well-being,” a way of doing that is essentially community centric, ecologically balanced and nutrition and culturally-sensitive (Zavala 2015). Amongst the members are the National Organization of Indigenous Andean and Amazonian Women of Peru (ONAMIAP), and the National Federation of Women Peasant Farmers, Artisans, Indigenous, Native and Salaried of Peru (FEMUCARINAP), two social movements founded in the last decade to highlight the enormous role women play in food sovereignty and climate change, and provide them with leadership opportunities (Zavala 2015). In addition, as reported by the International Centre for Not-for-Profit Law (ICNL), NGOs in Peru have played an important role in national development because of the country's history of military rule, democratic instability and corruption. Although NGOs have long existed in Peru, an NGO boom truly began in the 1970s under the government of Juan Velasco Alverado. There was a second proliferation of NGOs in the 1980s with the re-emergence of a democratic government, which focused on grassroots issues. Because of the political environment in which many of these organizations emerged, they were committed to the idea of development that did not originate from a top-down approach. Nonetheless, high levels of corruption, particularly under the Fujimori government in the 1990s, coupled with a politically-left NGO community, has led to frequent tensions between NGOs and the government and crackdowns on NGO activities for several decades.

The Rome-based Agencies (RBAs), namely the United Nations Food and Agriculture Organization (FAO), the International Fund for Agricultural Development (IFAD) and the World Food Programme (WFP) provide support to the Peruvian government in different ways. In particular, FAO prioritizes four areas: food and nutrition security; technical assistance to the formulation of public policies for improving family farming; sustainable management of natural resources; and disaster risk management and adaptation to climate change. WFP mainly provides technical assistance and policy support using an approach based on capacity development, focusing on two areas: food security and nutrition, and emergency preparedness and response. IFAD follows three strategic objectives in the country: enhance SHFs' property and resources through better natural resources management; improve their access to technical assistance and services by developing markets; and promote rural-urban linkages.

The rescuing of traditional or local crop varieties (*variedades criollas*), their in-situ conservation via community seed banks and their exchange through hundreds of seed fairs (*ferias de semillas*) is already object of effort in Peru', being mostly promoted by NGOs and peasant organizations. This would mean to convert the most traditional crops to more nutritious, resilient and sustainable food crops, such as: amaranth, quinoa and *cañihua* (already object of project by Bioversity International). An increasing number of indigenous groups or *cabildos* in the Andean and Mesoamerican countries have adopted agroecology as a fundamental strategy for the conservation of their germplasm and the management of agriculture in their autonomous territory. These efforts are tied to their struggle to preserve their land and cultural identity (Altieri 2012). The project Healthy and Sovereign Land, funded by the Belgian Development Cooperation agency and the Belgian NGO ADG (Aide au Développement Gembloux) is an example of the perfect integration between agro-ecology and nutrition-sensitive value chain. The project aims to raise the profile of family farming and smallholder farming by focusing on its significant role in eradicating hunger and poverty, providing food security and nutrition, improving livelihoods, managing natural resources, protecting the environment, and achieving sustainable development, in particular in rural areas.

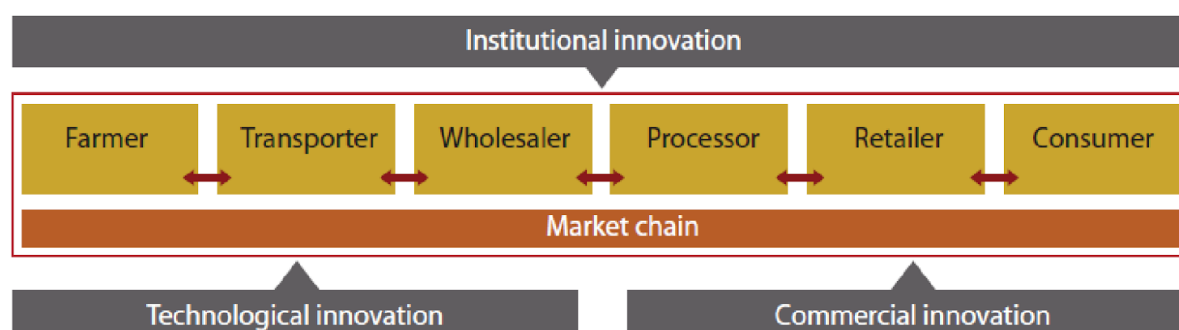
## 1.4. Scaling Up Nutrition (SUN)

Scaling Up Nutrition (SUN) is a multi-stakeholder movement aimed at supporting national leadership for nutrition, focusing and aligning financial and technical support behind nutrition-sensitive national plans, and ensuring broad ownership of nutrition and development goals. Since its launch in 2010, SUN has built up a global coalition of more than 100 partner organizations and secured high-level political commitment to nutrition in 26 high-burden countries. The long-term development objective of the movement is to support SUN countries in realizing their national nutrition goals and targets, including the MDG-1 target. Many countries have also developed specific nutrition targets for the years beyond 2015.

The SUN framework employs a dual approach to reducing under-nutrition. The first approach champions direct, nutrition-specific interventions such as promoting good nutritional practices, increasing intake of vitamins and minerals through supplementation and fortification, and therapeutic feeding for severe malnutrition. The second approach incorporates specific pro-nutrition actions into other sectors and development areas such as health, food security and agriculture, gender, social protection, education, and water and sanitation. Both approaches focus on the thousand-day window from the start of pregnancy to a child reaching two year. Agricultural research organizations usually keep their distance from NGOs, farmer groups and traders. The quest for market-led innovation made it necessary to look beyond the research community and build relationships with a broader range of public and private actors. Stakeholder platforms have been established at different levels. Local platforms facilitate interactions between potato producers, local authorities and service providers to empower small farmers, reduce marketing costs, and increase efficiency in service delivery. Market chain platforms bring farmers' associations together with traders, processors, supermarkets, researchers, extension agents, chefs and others to foster pro-poor innovation. In some cases, platforms also serve as representative bodies for interaction with policy-makers.

In 2002, INCOPA initiated the participatory market-chain approach (PMCA) in Peru with a market chain survey.

### PMCA approach



producers, wholesalers, processors, supermarket managers, researchers, and professionals from NGOs and international agencies. Based on this survey, two cycles of PMCA were implemented, one for potatoes in general and one specifically for native potatoes. Innovations resulting from the first cycle included: 'Mi Papa' (a new brand of high-quality, fresh potatoes for the wholesale market), 'Papy Bum' (a new native potato chip product),

and a series of online bulletins with daily information on wholesale prices and supplies for more than 20 types of potatoes. A national organization, CAPAC-Peru, was established to promote marketing of high-quality potato products, reduce transaction costs, and add value through innovation. Founding members included farmer organizations, NGOs, traders and processors. Today CAPAC represents 22 core members including five farmer organizations with 600 members. In the second PMCA application, several new actors joined the process to develop new native potato products. CAPAC-Peru played a key role (Ordinola et al. 2007), and results included two new products: T'ikapapa and Tunta Los Aymaras. T'ikapapa is the first brand of high-quality, fresh, native potatoes sold in Peru's leading supermarkets. First marketed in 2004, sales grew from 14 tons to over 70 tons in 2006. This has allowed more than 300 families in 10 highland communities to obtain 10–30% above the going market price for native potatoes. An agro-processing company, a member of CAPAC, owns the brand and contracts farmers to supply potatoes to the supermarket. CAPAC helps to organize small farmer groups to supply potatoes that meet market requirements. In 2007, INCOPA and its partners received a United Nations award for 'Supporting Entrepreneurs for Environment and Development'. *Tunta Los Aymaras* is a brand of high-quality, freeze-dried, native potatoes developed through a coalition of farmers' groups, local government agencies, NGOs and a private service provider. Tunta is produced traditionally from native 'bitter potatoes' by small farmers in the high Andes and has generally been restricted to traditional Andean markets. Through collective action, farmers' marketing and processing capacities were strengthened, quality norms developed, and market studies undertaken. A farmers' association, '*Consortium Los Aymaras*', was created to market this new product, and it also owns the brand.

As shown in the cases, joint marketing can reduce transaction costs. However, commercial innovation and development of high-value niches for potato products have generated more significant benefits for small farmers as well as other market chain actors. In Peru and Bolivia, use of the PMCA led to the development of new products based on native potatoes. In contrast, in Ecuador, where attention focused on organizing farmers' groups to respond to existing market opportunities for modern varieties, fewer commercial innovations, and benefits, have resulted.

#### News Box \*1

##### Application of PMCA in Peru

PMCA has been applied to the potato sector in Peru twice: first to promote innovation throughout the whole potato marketing system and, second, to add value to native potato varieties. The commercial innovations fostered by the application of PMCA in Peru include promoting the development of new products (fresh or processed) that add value to Andean native potatoes and modern potato varieties. The PMCA has allowed the development of segmented potato chains for each new product, namely: colored potato chips, selected potatoes for fresh consumption, and processed or boiled mashed potatoes.

## 1.5. Institutional Innovation

Peru introduced two different ways of creating roundtables in which different actors along the VC can communicate and share ideas, concerns and solutions.

1. **Mesas Técnicas:** these are regional technical roundtables created to strengthen the linkages between the actors along the VC (local stakeholders, service providers, regional state officials, consultants of international development organization etc.);
2. **Alianza del aprendizaje:** founded in 2004, it is a regional development practitioner network including donor organizations such as development organizations and NGOs.

Participants compare past and ongoing programs and institutions that are active VC development actors often influencing policy-making.

## **1.6. Technological Innovation**

Technological innovations are considered the practical use of new knowledge derived from the interaction of the components of biocultural heritage, or the interaction between traditional knowledge and science (or external knowledge), in accordance with the *Ayllu* system. They are classified into four sub-categories reflecting their role in reducing risk:

### **1.6.1. Technologies that spread risk across space:**

- **Shifting the range of potato cultivation**

For the past 25 years farmers in the park have expanded the range of established potatoes varieties to higher elevations. Because of the increase in pest and diseases, as well as changes in rainfall and temperature, potato yields in the area have been decreasing. Shifting potato fields to higher elevations has been shown to reduce such problems.

- **Expanding the cultivation of new crops into higher areas**

New crops and cropping systems for market production (e.g. vegetables and pulses) and livestock fodder have been added to the traditional agricultural production in the park. These practices are combined with the use of traditional terraces for soil conservation and pond construction for water reserves.

- **Experimenting with local cultivars in different areas to adapt to changing conditions**

Each potato cultivar does not need to be resistant to all climate effects; rather, the farmers use a selection of varieties that include resistance to different effects to increase the chance of survival overall.

- **Changing the time and the location for *chuño* Production**

The production of this freeze-dried potato for food storage has been moved to higher and colder areas and times where the climate allows the freeze-drying method used by local farmers. In the last few years, *chuño* has been produced at about 4,000 meters above sea level, mostly during the months of June and July.

### **1.6.2. Technologies that spread risks across time**

- **Establishing a community seed bank**

The Potato Park's seed bank serves as a backup for local seed self-sufficiency by providing farmers with access to a wide diversity of native potato seeds and thus a reliable source of planting material year round. It also plays a key role in enabling communities to improve their income and serves as a repository of local potato diversity, including climate-related desirable characteristics adapted to local conditions. The Seed Bank stores seeds in a building and thus represents an ex-situ conservation and management strategy.

- **Reducing the traditional potato fallow period**

The traditional fallow period has been reduced from seven years to four years without losing its benefits. The new four-year rotation system combines traditional elements with new tools and agro-ecological practices for the management of fertility, humidity, and soil erosion.

- **Using net houses (tents) for clean potato seed production throughout the year**

This technique prevents infection by viruses, bacteria, fungi and other pests and enhances physiological characteristics such as turgidity and firmness. The technique was introduced by the International Potato Center (CIP) and adapted by local farmers. Quechua farmers in collaboration with CIP and ANDES built net house facilities.

- **Improving water capture through the construction of family and community micro-reservoirs**

These reservoirs combine the traditional water harvesting technology (*aruna*) and the use of modern materials and techniques to ensure water availability for irrigation and consumption.

### Reflections from the *Quinoa* case

The growing demand for organic products in the international market has generated an increase in the number of hectares destined to certain types of crops in Peru. *Quinoa* has been consumed for thousands of years in South America and was a staple of the Incas. It is not a grain but the seeds of a broad-leaved plant from the Chenopodiaceae family, which is a close relative of the weed (Saturni, Ferretti and Bacchetti 2010). Quinoa has become a case of interest due to its global success in the international market and its increasing demand in the US and Europe. The reasons of its success range from its great adaptability and resistance to its unique nutritional values. Quinoa is a reliable option for celiac consumers (it is in fact gluten free) and has an ideal amino acids composition, in both quality and quantity, as it contains all the essential amino-acids needed for human growth and development (Table 2). Quinoa is also a good source of linoleic acids (omega-3), amylases, calcium, magnesium, potassium, iron, zinc, as well as vitamins A and E, especially if compared to wheat, maize, barley, rice and oats. For these reasons, Quinoa has been recognized by the National Aeronautics Space Administration (NASA) as a superfood and is used in long-duration space travels.

Table 2: % of amino acids contained in 100 gr of protein in quinoa, wheat and milk; (Source: PROCISUR-ICCA, 1997)

Amino acids (%)	Quinoa (%)	Wheat (%)	Milk (%)
Histidine *	4.6	1.7	1.7
Isoleucine *	7.0	3.3	4.8
Leucine *	7.3	5.8	7.3
Lysine *	8.4	2.2	5.6
Methionene *	5.5	2.1	2.1
Phenylalanine *	5.3	4.2	3.7
Threonene *	5.7	2.7	3.1
Tryptophan *	1.2	1.0	1.0
Valine*	7.6	3.6	4.7
Aspartic Acid	8.6	--	--
Glutamic Acid	16.2	--	--
Cysteine	7.0	--	--
Serine	4.8	--	--
Tyrosine	6.7	--	--
Argine *	7.4	3.6	2.8
Proline	3.5	--	--
Alanine	4.7	3.7	3.3
Glycine	5.2	3.9	2.0
*Essential amino acids			

The FAO, which in 1996 recognized Quinoa as of the most promising crop, today has promoted it as an alternative food source for countries suffering from acute food insecurity due to its "exceptional nutritional properties and its resilience and adaptability to adverse climatic and soil conditions" (Diaz 2015). The increased demand and increased production for quinoa have risen sharply between 2007 and 2013. Quinoa is native to all countries of the Andean region, from Colombia to northern Argentina (Jujuy and Salta) and southern Chile. However, the cultivation of quinoa is expanding, and it is currently present in more than 50 countries. Peru is however still one of the three globally leading producers, along with Bolivia and Ecuador. It is estimated that approximately 90% of the world's quinoa production is concentrated in Peru and Bolivia.

**\* News Box 2**

**Quinoa's adaptability and Resistance Properties**

- Can be harvested from sea level up to 4.500 m
- Temperature range: -8C to 38C
- Humidity: from 40% to 90%
- Tolerates saline soils
- Highly water efficient plant: low rainfalls levels (100-200 mm p.a.)

Nevertheless, Peru is currently the world's largest producer and exporter of quinoa: nutritional properties of quinoa have prompted the opening of quinoa to the international market and a gradual increase in the price; accordingly, "the price of quinoa tripled from 2006 to 2013 as America and Europe discovered this new super-food" (Bellemare, Fajardo-Gonzalez and Gitter 2016). Exports grew by 81% in 2014, while in the last decade Peruvian quinoa has contributed to 52% of the world's production.

Quinoa has a value chain with strong market potential and is considered a successful example of nutrition-sensitive value chain in Peru. There are a number of cost-effective techniques and technologies that contribute to improve the profitability of the SHFs' agricultural activity, as well as viable business models to provide products and services.

Four market opportunities deriving from quinoa have been identified to allow an increase in SHFs' incomes and to generate decent and sustainable employment in their territories. These opportunities are:

1. Certification: increase value added with certification; enhance fair trade and the creation of a collective framework that indicates to the consumer the origin of quinoa (brand development) and its special properties.
2. Traceability and quality control system: ensure the quality of Peruvian quinoa, through traceability and quality control systems.
3. Improved productivity and reduce post-harvest losses: improve the productivity of farmers in the Sierra, which have a traditional type of production. It is proposed to develop and standardize technological packages with the aim of increasing the productivity of quinoa; it is an opportunity for very poor small producers who have less than one hectare for their production.

**\* News Box 3**

While the quality of the quinoa produced in Ecuador is well below that produced in Bolivia and Peru, average yield is 30–50% higher. The future competitiveness of Ecuador may depend on the ability not only to increase the area under production but also to increase the productivity, quality and recognition of this output (Jacobsen and Sherwood, 2002).



4. Improved seeds quality, diversity and variability: producing high-quality quinoa seed, improve productivity and increase the production of conventional (natural) quinoa, which is based on the renewal of seeds and constitutes an opportunity in that market.

**\* News Box 4**

- Quinoa Diversity and Variability: Quinoa has 66 different grain colour varieties with a protein content varying from 10.21 to 18.39% according to the different variety.
- In Bolivia, more than 3.000 different ecotypes are conserved at the INIAF gene-bank.

By pursuing the above market opportunities, new jobs will be created for agricultural workers in the quinoa value chain. On the demand side, the consumption of quinoa expanded enormously, moving from being consumed predominantly in the areas of production to the European and North American markets. This was at the same time followed by a sharp increase in prices, which grew at a rate faster than the potential of the traditional producers. Early 2014 represented a peak for quinoa prices and international data show that quinoa prices began a decline in February of 2014. By the fourth quarter of 2015, the international price of quinoa had returned to its 2012 level. As a result of rise in prices at the global level, quinoa is largely recognized in the most developed countries as a superfood: a food for the richer, a food for the elite, unaffordable by the most. Meanwhile, in the developing countries where quinoa is produced, the increase in the quinoa prices led to a reduction in the consumption and a change in the local diet. This has been especially true among the poor quinoa producers. If in the past families used to consume quinoa from three to seven times per week, this quantity drastically dropped down due to the high prices. As a consequence, the consumption of less expensive cereal substitutes increased. Therefore, the rise in quinoa prices can favor diet variability. However, the average quinoa consumption of the poor quinoa producers is still only about half of that of households that do not produce any quinoa (Bellemare, Fajardo-Gonzalez and Gitter 2016).

The common belief that rising quinoa prices were hurting those who had traditionally produced and consumed it was recently proved to be false. A recently released paper, which studied the impact of rising quinoa prices on the welfare of Peruvian households using ten years of large-scale, found that increases in the purchase prices of quinoa are associated with a significant increase in the welfare of the average household in areas where quinoa is consumed, which suggests that quinoa prices' increase has had general equilibrium effects extended to non-producers as well. The study also found that quinoa production is associated with a faster rate of growth of household welfare, but only at the height of the quinoa price boom (Bellemare, Fajardo-Gonzalez and Gitter 2016).

Money availability and increase in informal local trade allowed for an easier access to different types of previously inaccessible food, both geographically and financially, like fruit and vegetables. Therefore, the quinoa has generally improved food conditions, but export demand has focused only on three specific varieties of quinoa among the 3,000 available. These varieties cover more than 75% of the entire production, prompting farmers to abandon the cultivation of the others, with a negative impact on biodiversity. Land degradation and the reduction of cultivated varieties are the most important challenges caused by the boom of the quinoa: more than 50% of farmers define the soil poorer compared to three years ago, and the situation is expected to get worse. The increase of quinoa production has led to the expansion of areas for quinoa cultivation, which, coupled with the increase of soil erosion in the Southern Altiplano, has caused adverse impacts on

other farming activities. Moreover, the cultivation of quinoa has already blown far away from the source areas, concentrated around the Andes (Peru, Bolivia, Argentina, Chile, Colombia and Ecuador), to spread out in Europe (France, Britain, Italy, Sweden, Denmark and the Netherlands), the US, and Canada (Lake Ontario). While production gradually moves away from traditional areas, the denomination of origin of the quinoa becomes increasingly more important in the Peruvian highlands to protect the Andean productions and allow a differentiation from produce grown in other areas.

In conclusion, the sharp rise in the price of quinoa over the period 2004-2013 has had positive impacts on the welfare of quinoa consumers and producers in Peru: more specifically, for a 1% increase in the price of quinoa, household welfare increased by a modest 0.07%. On the demand side, an increase in the purchase price of quinoa translated into positive general equilibrium effect on the welfare of consumers. On the supply side, the rising price of quinoa has had positive effects, both direct and indirect, on the welfare of producer households (Bellemare, Fajardo-Gonzalez and Gitter 2016). Future research should try to address how international price drops have influenced prices within Peru and how this affected its consumption among Peruvian producers and households. Moreover, there is no available data on the indirect effects that a change in quinoa consumption has provoked on the population: these could range from nutritional and health outcomes to agricultural wages, technology adoptions, or educational outcomes.

# Chapter 2

## Barriers

### 2.1 Fragmentation of policies

In Peru policies on NSVCs are endorsed by several public entities, including: the Ministry of Agriculture, dealing with producers; the Ministry of Environment; the Ministry of Export Promotion; the Ministry of Production, dealing mostly with the industrial product transformation; the Ministry of Culture; the Ministry of Health; and the Ministry of Foreign Trade and Tourism. Each one of these ministries developed its own policies and approaches to “crosscutting frameworks” of VCs, causing confusion and tension over competences and malcontents in some ministries. Moreover, there have been tensions between such entities located in Lima and decentralized regional entities. This has strengthened the fragmentation and led to different prioritization given to VCs depending on their connection to the capital. The fragmentation has thus doubled: between different ministries and between the capital and the regional entities, causing a non-unitary state support. In addition, policies and the concept of VC are up to interpretation each one of these state entities can have different ideas and take different measures in acting their strategies (Niebuhr 2016).

Another element that could contribute to the fragmentation of policies is a certain ideological dualism. Since Peru is a country with a long history of market-adverse policies, the VC approach was introduced through reforms influenced by the World Bank, The Inter-American Bank, foreign development organizations and NGOs. Left parties tend to see VCs as a “surrender” to capitalistic ideologies (Niebuhr 2016); the risk involved in this belief is that future left-oriented governments at national or regional levels could interrupt the development of similar models for which long-term investments are critical.

### 2.2 Market Access Barriers

Access to markets by smallholder farmers and rural populations is not just fundamental for their produce but also for inputs, assets and technology, consumer goods, credit and labour. Better access by small producers means that they can sell reliably more produce at a higher price. This encourages farmers to invest in their own businesses and increase the quantity, quality, and diversity of the goods they produce. Access to markets is just as compelling for a poor rural household in Rwanda, India or Peru. Without good access to markets, a poor household cannot market its produce, obtain inputs, sell labor, obtain credit, learn about or adopt new technologies, insure against risks, or obtain consumption goods at low prices (Taylor 2009). A study in Peru found that transaction costs represented 50% of the value of sales. They were considerably higher for small producers (67%) than large producers (32%). The components of these transaction costs included: distance and time to market, the producers’ experience in the market, the stability of their relationships with buyers, and their investment of resources in supervising the implicit contracts related to their market transactions (Escobal 2000).

Some of the main value chains’ elements constituting an obstacle to smallholder farmer's market access in Peru are geography (market isolation) and transportation, poverty traps, safe storage facilities, and information (knowing in real time about market prices and demand is vital for participation in modern value chains). Smallholders lack access to improved technologies due to weak linkages between research and extension and between research systems, the private sector, and development projects. Market access can motivate

farmers to increase their dairy production, as well as productivity and quality, which will increase incomes and improve food security and nutrition. A conceptual barrier to market access also persists: thinking in terms of agribusiness value chains is not any more sufficient or appropriate, in fact

*“The concept of ‘value chain’ as the organizing principle of markets to which small-scale producers are invited to connect is inappropriate for several reasons. It projects an image of linear connections that does not correspond with the more web-like relationships that link actors in territorial markets. It begs the question of who decides what kind of “value” is concerned and does not accommodate the multiple functions and multiple values (social and cultural as well as economic) that territorial markets include. Borrowing from the language and ideas of business administration, formal value chains conceive of value generation, allocation, and enhancement as a linear and mechanical process whereby each link of the chain is associated with particular actors and value adding processes. In this approach, smallholders occupy the lowest end of the chain as the providers of primary products, where the least value is generated and captured” (Kay and Transnational Institute 2016).*

## **2.3 Access to Grants in Nutritional Value Chains**

Small and medium commercial family farms in Latin America represent a large and important portion of the agricultural sector, with significant potential for catalyzing economic growth in the region. Despite this potential, small and medium producers often face several key constraints when looking to traditional lenders for credit. First, small and medium producers in Latin America lack capital and have limited cash flow. Their tenure often is not secure enough to be able to use their land as collateral, and banks often do not accept the collateral they do have, such as livestock, equipment, and other moveable property. Small and medium farmers and agribusinesses often have poor credit histories, or lack them altogether. They also tend to lack business plans, financial statements, and the ability to project cash flow realistically. Peru’s banks are focused almost exclusively on lending to medium and large producers with crops for export, while its municipal and rural banks and finance companies are focused on lending to micro producers with financing needs of uS\$2,000 or less the largest barriers to finance for small and medium producers in Latin America are information asymmetries between small and medium producers and lenders, lack of acceptable collateral, and the lack of financial institution presence in rural areas. His potential hinges on the region’s small and medium farmers’ integration into value chains, and their transformation from traditional, low productivity growers into modern, commercial agricultural producers. Access to finance for small and medium producers in Latin America however, continues to be a major constraint to this type of transformation (IFC 2011). Many financial institutions in the region view small and medium agricultural producers as inherently riskier than other clients, due to their high levels of informality and to external factors outside of their control, like weather and price fluctuations.

## **2.4. Food Safety Standards**

The global expectation on consumers' demand for food and agricultural products that have specific characteristics has increased in the last decades. These expectations led to the establishment of a growing number of standards, certifications, labels and food Agreement such as the Sanitary and Phytosanitary (SPS) Agreement and the Agreement on Technical

Barriers to Trade (TBT Agreement). In addition, the parameters set by the World Trade Organization (WTO) on food quality, food safety, and the sustainability of food systems have raised the standards. These agreements have clearly impacted Peru's internal and international market. While on one hand the product certification process can be an opportunity for rural development to provide a better income and to contribute to the conservation of natural and local resources, on the other hand it is still perceived as extremely costly. Limited technical, human, and financial resources continue to hamper the country's ability to achieve the required food safety objectives.

One of the main problems Peru is facing is having a legislative and regulatory framework on sanitary and phytosanitary issues, which is not currently harmonized with the SPS and TBT Agreements or with the other standards set by the international organizations. Although Peruvian agricultural products, such as *camu-camu*, quinoa or cocoa, have a great growth potential in the external market, one of the main constraints Peru has to deal with is that the EU Novel Food Regulation (NFR) (EC No 258/97) prohibits the importation of foods, like *camu-camu*, which do not have a proven safety record and that have not existed in the EU market before 1997. The costs associated with the documentation and studies needed to assess the safety of a product and for it to comply with the requested procedures are extremely high, providing *camu-camu* with zero chances to enter European markets. Peruvian authorities have argued that these regulations are excessive since they consider products as novels, even if they have a history of safe consumption in other markets, thus presenting no risk. Another example is represented by the cocoa production. The sector is still facing many challenges: many of the producers are smallholder farmers, with little organization and knowledge on modern technologies to maintain the harvesting. This lack of knowledge, especially on the post harvesting processes and techniques associated with inadequate cropping practices (cacao drying and fermentation), seriously compromises the quality of the produce. Besides, farmers do not have any knowledge about prices in the market. Additional preparation must be put in place in order to produce this crop competitively and to ensure that cocoa production gains a permanent place in the Peruvian economy. The increase of this local crop production would bring about dramatically positive results. It is in fact an example of sustainable production and of a cash crop, able to generate income if properly settled. Beside, being a shade crop, cacao can be grown in forests and agroforestry systems, thus helping to enrich soils and protecting them from the menace of erosion.

Experience shows that those that adopt food safety standards in the country comply with the requirements thanks to the support of exporting companies through farming contracts and technical advice. Information on the GlobalGap standard in the country relies on government organizations, producers, exporting organizations, and NGOs, thus major coordination among these actors is required. Smallholder farmers have two options to obtain certification: they can apply individually or collectively for a producer group certificate. A producer group certificate represents the most feasible way for local farmers to become certified since it allows reducing the individual cost of compliance with standards and reduces the transaction costs of accessing input and output markets, improving the negotiating power of smaller farmers against large buyers or sellers.

In Peru, the most important institution that frames the regulatory environment for food products is SENASA, based on the Codex Alimentarius and GlobalGAP. Sometimes smallholders are not fully aware of this standard due to a lack of information. If on the one hand certification and quality standards for food products represent a burden for smallholders, on the other hand opportunities increase when farmers comply with both domestic requirements and international standards such as GlobalGAP (it sets "voluntary" standards for the certification of production processes and it was designed to

ensure consumers know about how food is produced, in terms of quality and sustainability of the process). These standards are rules and guidelines about a product; theoretically, they are not mandatory regulations but in practice, farmers must comply with them if they want to access the international market.



## **Chapter 3**

# **Opportunities and Solutions within the RBA framework**

The issue of governance is crucial to the topic of sustainable NSVCs development (CFS 2016). Within the discussion on governance, the topic of conflicts of interests is one of central concern (Kay and Transnational Institute 2016). According to FAO (Neven 2014), sustainable food value chains' development is centered on governance strategies that take behavioral assumptions and governance mechanisms. One of the key factors is the unbalanced power among the different stakeholders. Actors differ in terms of market power, and greater market power is typically associated with firms that have the most influence over Value Chains. For a better inclusion of vulnerable and marginalized groups in the process of sustainable NSVCs development, it is important to acknowledge and address the existence of issues of power. Keeping this in mind, the concept of multistakeholderism, which, according to the CFS (2016), constitutes the basis for concerted action amongst various stakeholders in terms of policy, research, strengthening partnerships and coordination, can be challenged.

According to McKeon (2017), the 'multistakeholderism' proposed by CFS differs a lot with the kind of practice—often termed 'multi-actor' in civil society circles—in the sense that everyone enters the room on the same footing, ignoring differences in interests, roles, and responsibilities among parties, thus abolishing power imbalances. For example, if small-scale farmers and agro industry are all reduced to "value chain actors" with no consideration to the power relations between them, the negative impact can even affect nutritional outcomes. Using the 'multi-actor' approach rather than multistakeholderism can make an important contribution to combatting inequality, social injustice, and the degradation of the environment. By paying attention to the power differences among the stakeholders, tensions, trade-offs and conflicts in the development of NSVCs, it is possible to build democratic governance in the public interest. This will enhance an effective social participation of all the actors.

To illustrate the above-mentioned issues, through a case study of one community in the central Peruvian households and the native potato chains, Tobin (2014) examined the social interface among relevant development actors by assessing the horizontal dynamics through the livelihoods components and the vertical dynamics through the perspectives of VC actors. This research project sheds insight into the opportunities and constraints of the market-oriented development approach seeking to integrate smallholder farmers into high value markets in ways that improve income and alleviate food insecurity. Based on the research's findings, several recommendations emerge. One of the key insights from the study is that in order to increase market development and nutrition-oriented VCs viability, actors' powers must be taken into consideration and their roles and objectives must be mutually established. In this sense, attention must be given to the quality of social relationship among smallholders, communication networks and interactions among the VC actors. This encourages participation among the different actors, leads to leverage points of harmony in perspectives and alleviates dissent. Reflecting the tenets of participatory methods, VC actors are then encouraged to collectively establish value chain objectives, participate in their evaluation and adapt their activities for program improvement or implementation. Joint efforts to construct mutual goals and objectives will allow different actors to take into account the interests and priorities of one another and hold potential in more effectively

distributing decision-making power among different supply chain actors. The Participatory Market Chain Approach (PMCA) developed by the Papa Andina Initiative in the development of the Peruvian native potato chains has demonstrated success in some ways (Tobin 2014).

The value chain concept reached out beyond policies and laws and into academia. Given the great importance of the academia in the field of food security, an overview on the presence of the topic is worth a reflection. One of the early efforts to inscribe the value chain concept in educational institutions was a course on agribusiness in rural associations and firms that was developed by the Inter-American Institute for Cooperation and Agriculture (IICA) and FAO (Zavala 2006). The value chain approach has been incorporated into several bachelor and master degrees on agribusiness development, international economics and sustainable development at universities all over the country. A prominent example is the Master's Program "Biotrade and Sustainable Development" at the Pontifical Catholic University in Lima, in which development consultants have had lectureships to teach practical knowledge on value chain development. They are "academicum-consultants" (Niebuhr 2016) and hence occupy a central position, which provides these experts' influence in both spheres – development practice and academia. In the Master's program, the consultant's influence has been remarkable, since the analysis and governance of value chains has been linked to biotrade, which is one of the "hot" topics in political debates on competitiveness, export promotion and agribusiness development as well. GIZ and the Ministry of Production at the University La Molina have also developed a virtual course on value chain management. Several attempts by development agencies to institutionalize the value chain approach in university curricula of agribusiness departments at the national level have, however, not been a sure-fire success, as the experience of a senior project leader confirms:

*"Here in Lima, I have been teaching a seminar on value chains for three years in the context of the Master diploma on Biotrade and Sustainable Development, but before there were also attempts. (...) In 2006, we succeeded to establish a diploma with a university in Chiclayo in the North of Peru, at the University Santo Toribio, and we established a curricula for the diploma course. The idea was to provide a formation to public officials of the Ministry of Agriculture 16 The "Management of value chains" is taught in a 5-months course at La Molina University. A diploma can be obtained as well. (...) But the problem was at first place the lack of qualified people who could then do the implementation. For me, this is the central issue, the inexistence of a methodological line of research. This was what did not provide sustainability to the model and the diploma. Basically, the diploma was installed, a group of people was capacitated and that was it." (2013\_16: 368-369, cited in Niebuhr 2016)*

Two workshops for academic staff took place in Northern Peru in 2013, which aimed at enrolling universities to integrate the value chain development methodology in curricula. However, due to a lack of capacity among teaching staff to develop new lines of research, initiatives to inscribe the framework consistently in universities outside of Lima failed. Beyond lacking human capacities, a key challenge were the diverging interests of partner institutions: universities aimed at diversifying their academic offer; development organizations sought to develop capacities for the promotion of local development; and the Institute for Irrigation Management, another financial donor, hoped to position itself as an expert institution in the topic of value chains. After these experiences, efforts to inscribe the methodology in public institutions focused on ministry officials, as the outcome seemed to be more promising. We believe that a systemic approach to the study of NSVCs and a broader engagement of the RBAs' academic partners could greatly benefit the future creation of frameworks and approaches, minimizing monitoring and evaluation data gaps.

The multiplicity of the stakeholders in the NSVCs with different interest can be exploited in a way to create an adequate environment to foster social learning and stimulate innovations be it technical, commercial or socio-organizational (institutional). This will facilitate products and process upgrading (product quality, efficiency of production, productivity, etc.) and consequently influence the demand and supply for nutritious foods. The following example showcases a case from Peru where the PMCA has been developed (Devaux et al. 2009).

In 2002, INCOPA initiated the PMCA in Peru with a market chain survey. Results were discussed in a meeting with the different stakeholders including potato producers, wholesalers, processors, supermarket managers, researchers, and professionals from NGOs and international agencies. Based on this survey, two cycles of PMCA were implemented, one for potatoes in general and one specifically for native potatoes. Innovations resulting from the first cycle included: 'Mi Papa' (a new brand of high-quality, fresh potatoes for the wholesale market), 'Papy Bum' (a new native potato chip product), and a series of online bulletins with daily information on wholesale prices and supplies for more than 20 types of potatoes. A national organization, CAPAC-Peru, was established to promote marketing of high-quality potato products, reduce transaction costs, and add value through innovation. In the second PMCA application, several new actors joined the process to develop new native potato products. CAPAC-Peru played a key role and results included two new products: T'ikapapa and Tunta Los Aymaras. T'ikapapa is the first brand of high-quality, fresh, native potatoes sold in Peru's leading supermarkets. First marketed in 2004, sales grew from 14 tons to over 70 tons in 2006. This has allowed more than 300 families in 10 highland communities to obtain 10–30% above the going market price for native potatoes. Through collective action, farmers' marketing and processing capacities were strengthened; quality norms developed, and market studies undertaken. A farmers' association, 'Consortium Los Aymaras', was created to market this new product, and it also owns the brand.

The above mentioned example provides some concrete examples of how these two fields can be bridged – how collective action involving diverse stakeholders can contribute to innovation processes that benefit small farmers, consumers etc. Based on this case, three broad policy implications come out with collective action:

- First, institutional innovations in R&D (such as use of the PCMA and stakeholder platforms) can lead to technical and institutional innovations that enhance small farmer market participation.
- Secondly, market chain innovation for indigenous agricultural products can aid in situ conservation of biodiversity.
- Lastly, for R&D organizations to contribute to market chain innovation, they must develop their capacity to facilitate and participate constructively in collective action.

In line with the idea that opportunities to improve NSVCs can arise at each stage and beyond the productive side of activities, entry points multiply. Following the identified barriers to making inclusive value chains work for nutrition in Peru, the below-listed areas of intervention have been identified as opportunities of improvements within the proposed RBA framework in the country:

➤ **Public intervention** for nutrition-sensitive value chains

- *Addressing fragmentation of policies:*

A narrower definition of VCs and of nutrition-sensitive policies should be proposed in order to avoid misinterpretations (by different state actors)

that might contrast one another and make VCs less effective. A shared common ground is essential to define competences and propose policies and solutions. Hence, it is necessary to achieve a better dialogue between different ministries and between central and regional entities that would end up in shared strategies, shared prioritization of VCs and a more efficient state intervention at every level on the VC.

- Addressing *market access* problems:

A multi-actor approach is key to supporting purchases from local markets by coordinating development actors and public-private sector buyers, including agri-businesses, millers and supermarkets, as well as government-run home grown school feeding (HGSF) programs and national food reserves. A good strategy requires farmers to be organized into groups of farmers' associations or cooperatives, involving them in controlled forms of contract farming and prioritizing a programmatic participatory approach. Government-led interventions, in collaboration with private sector groups, including financial institutions and input suppliers, can increase farmers' access to credit for the purchase of seeds and fertilizers and support collective group sales to formal markets.

➤ **Private intervention** for nutrition-sensitive value chains

- Addressing *access to grants*:

Financing arrangements that mitigate the risk of lending to “unknown” small farmer borrowers should be developed. Other solutions include: championing models that directly link small producers with formal financial institutions to help them build credit histories to access future long-term finance; piloting crop insurance programs and other risk mitigation tools to enable more small farmers who lack titles to land to access finance; guarantee financial protection such as loans and grants, constituting a capability for rural households, rural town residence, and landless poor rural population to have access to food and be food secure; support financial sources to help urban population to avoid degradation of their lands through overexploitation, which could provoke a tragedy of the commons paradox.

- Addressing *food safety standards* issues:

The private sector can highly influence the public sector and national entities to make the national level standards of food safety appropriate and harmonized with international standards.

The private sector can highly influence the public sector and national entities to make the national level standards of food safety appropriate and harmonized with international standards.

Peru has a well-developed food safety and regulatory system. Regulations are generally based on sound science but the risk assessment and rulemaking process can be slow and burdensome. The Ministry of Health's Office of Environmental Health (DIGESA) is the Peruvian counterpart to the Food and Drug Administration (FDA) regarding sanitary supervision and registration for processed food and beverages. The National

Agricultural Sanitary and Phytosanitary Service (SENASA), part of the Ministry of Agriculture, is responsible for developing and implementing Peru's sanitary and phytosanitary regulations and is the counterpart to APHIS and FSIS. Peruvian standards and input requirements pose no major problems for U.S. exports. Most issues linked to market access relate to customs procedures, including HS classifications, and inadequate or improperly completed documentation (Fairs Country Report 2011).

➤ **Policies and interventions** which impact nutrition:

Policies that promote dietary diversity among rural populations are deliberately nutrition-sensitive and essential to improving nutrition in low-income countries where the economy remains agriculture-based and consumption of energy, protein, fat and micronutrients may be below recommended levels. In these contexts, semi-subsistence farms and traditional local markets are often the anchors of the value chain/food system and diets consist of one or two carbohydrate-based staples. Policies that promote dietary diversity provide incentives and support to the following:

- Production, marketing and consumption of nutritious, low-input, short duration crops that do not interfere with (and ideally compliment) staple crop production cycles; cultivation of home gardens; and production, marketing and consumption of animal source foods. Each of these strategies aims to improve intake patterns through increased availability and/or accessibility. The former is achieved by expanding the immediate availability of high-nutrient foods, the latter via income effects, which may result in increased purchase of high-nutrient foods.
- Industrial fortification policies have long been recognized as an important strategy for increasing the micronutrient content of available foods. They do not require compliance on the part of individual consumers and, when delivered via a vehicle that is regularly consumed by the target population (e.g. salt, flour, milk or bread), they have the potential to maintain nutrient stores very efficiently. However, depending on the choice of vehicle, nutrient in question, and fortification method, implementation may increase the price of the vehicle and make it less affordable to those who need it most. In addition to overcoming this challenge, successful fortification policies must also include a regulatory structure to ensure accountability. This is especially necessary when more than one producer is creating the fortified product (e.g. private sector salt iodization).
- Biofortification programmes aim at increasing micronutrient availability in staple crops themselves. This approach differs from policies promoting dietary diversity and is most appropriate in low-income country contexts where the ability to cultivate or afford sufficient volumes of fruits, vegetables and animal source foods to meet nutrient requirements is low. Biofortification may also be a better choice than industrial fortification in rural areas where access to markets and commercially fortified products is poor. Evidence to date indicates that biofortification is cost-effective after



an initial research outlay. However, its success depends in large part on farmers' adoption of fortified seed and consumers' acceptance of the biofortified product, as well as their willingness to pay a higher price if necessary. If they are, these programmes also promise high returns in regards to sustainability, as once a biofortified crop has been introduced, its additional costs are zero. This is because there is no price difference between a biofortified crop and its unfortified equivalent. In contrast, both industrial fortification and micronutrient supplementation programmes incur the same costs year after year.

- Policies that strengthen the food supply chain reduce waste and losses caused by deficits in storage, transportation and other food system activities. Such policies can range from direct investments in cold chain storage and other infrastructure to initiatives aiming at increasing working capital and providing trainings to smallholders. The former deliberately and explicitly improve nutrition by protecting the nutrient value of food and reducing food safety risks. The latter serves a number of nutrition-related functions, not least of which are: (1) improving safety and quality standards for locally produced and consumed foods and (2) increasing market viability of locally produced foods.
- Policies to improve the nutrient content of processed foods, which for the most part are not designed with nutrition goals in mind, offer many opportunities for improving nutrition along value chains. Technological innovations that may be used in the creation of reduced energy and controlled-portion size products include sugar substitutes, fat replacers, addition of fibers, use of chemical additives produced by biotechnology, new production methods, and different food packaging strategies. Designing foods that promote satiety or suppress appetite are active areas of research, and many food products with reduced energy density or controlled portion size are already being marketed successfully. However, such opportunities must be viewed in the context of consumer demand, which in turn may be influenced by the industry. The success of nutrition-sensitive policies depends on how well they align with other food priorities, namely meeting and generating economic demand and production goals. This caveat is especially important in the context of the profit-driven processed foods industry. Future commercial success of these types of products also hinges on government regulations and the knowledge and attitudes of health professionals.
- Research and technology may generate an economic surplus by improving productivity of land, water or labor, not only in agriculture but also at other stages of the value chain. Depending on supply and demand, elasticities and market structure, conduct and performance, the surplus may result in higher incomes (in cash or kind) for farmers, traders and other food agents, lower prices for consumers, or a combination of the two. For example, policies that prioritize a portfolio of food crops as opposed to R&D of a single commodity are essential to fulfilling agriculture's role as a source of income and food for smallholders and other members of the rural sector. To date, many crops that are high in



micronutrients have been all but ignored by research. Increased attention to production diversity can correct distortions created by conventional R&D agendas; it may also lead to increased dietary diversity and reduction of micronutrient deficiency.

- Public and private investments in the food-marketing sector may alter the nutritive quality of available foods for better or worse. For example, penetration of super and mega-market companies throughout the developing world has increased availability of animal source foods, fruits, and vegetables and has been instrumental in establishing food safety standards and increasing access to cold chain storage. However, these companies have also increased the availability of highly processed foods of minimal nutritional value. Encouraging positive outcomes while discouraging negative ones will require innovation, and trade-offs are inevitable wherever investment goals are subsumed to nutrition goals. Turning trade-offs into “win-wins” which increase compatibility between market signals and improved nutrition is essential to reversing this trend.

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## Annexes

### Annex 1

#### ***Policies and approaches to promote institutional, technological, commercial and biocultural innovation: the Potato Value Chain***

Background: "A wide range of potato varieties can be grown even at the highest altitudes, where harsh climatic conditions are a limiting factor to growing other crops. Peru holds the widest collection of potato varieties, estimated at more than 2 800 native landraces."

Small farmers generally live in remote areas and have little or no access to technical assistance. This results in limited and non-homogeneous production surpluses for marketing. Additionally, they have a community-oriented, rather than market-oriented, organizational structure. All this increases costs of marketing and transaction, and the per-unit costs of assembly, handling and transportation. Consequently, profitability of small-scale farmers is low. An innovation policy and strategy that focuses only on improving potato production will not help them out of poverty. Potato production has to be associated with market-oriented strategies in order to improve living standards.

#### ***Perspectives on the role of the potato as a resource for development:***

The Papa Andina Network helped to change the perspectives of policy-makers in Peru on the role of the potato in development efforts and on market-led strategies for improving the livelihoods of the rural poor. Through its advocacy work, Papa Andina has helped raise public awareness of the nutritional value of native potatoes and the importance of maintaining biodiversity in Andean crops.

#### ***Policy implications***

Three broad policy implications came out of Papa Andina's experiences with collective action.

First, institutional innovations in R&D (such as use of the Participatory market chain approach PMCA and Stakeholder Platforms) can lead to technical and institutional innovations that enhance small farmer market participation. For example, as a result of the PMCA, new native potato products were launched. This stimulated the formation and strengthening of farmer organizations, which facilitated marketing and improvements in production and post-harvest practices. At the market chain level, formal associations were established, such as the Bolivian Andean Platform in La Paz and CAPAC-Peru.

Secondly, market chain innovation for indigenous agricultural products can aid in-situ conservation of biodiversity. In Peru, commercial innovation with native potatoes has been a key element in linking small farmers to markets. Until recently, urban consumers did not appreciate the cultural value and nutritional characteristics of native potatoes. However, recent concerns for food quality and safety have stimulated demand for locally grown, organically produced foods, reflected in the number of gourmet restaurants serving dishes based on indigenous products. These trends have created new market opportunities for indigenous foods, including native potatoes. The resulting products also have export potential, because they are seen as exotic and nutritious. As Smale (2006) and others have shown, increasing farmer returns to crops with a high public value, such as native potatoes, will enhance the incentive for farmers to maintain agro-biodiversity. Applications of collective action approaches such as the PMCA may also prove useful for the conservation of other indigenous agricultural products in other settings.

Lastly, for R&D organizations to contribute to market chain innovation, they must develop their capacity to facilitate and participate constructively in collective action. Pro-poor innovation goes far beyond the traditional R&D. Implementing the PMCA requires R&D organizations to have the capacity to diagnose innovation systems and facilitate group processes involving people with diverse stakes in a commodity's production, marketing and use. Women's opportunities for participation in collective action processes like the PMCA and the potential benefits need to be addressed more systematically. To effectively facilitate such processes, R&D organizations need new skills and resources. Retooling themselves to play these new roles is likely to pose major challenges for many R&D organizations.

## **Annex 2**

### **Other types of innovations include biocultural aspects (Biocultural innovations)**

#### **Example of Potato Park / SIFOR - Smallholder Innovation for Resilience: Strengthening Innovation Systems for Food Security in the Face of Climate Change**

Research explored the factors that support innovation, including individual factors such as elders, women, and the appointment of key individuals as members of the Potato Park's potato expert group and specialized groups for marketing innovative products; participation in learning networks linking communities, respectful collaboration with external innovators and scientists, and capacity building; institutional factors such as legal recognition of indigenous peoples' values, lands and customary seed systems; and community factors such as a community innovation fund.

National policies that can support innovation processes in the Potato Park and are significant in the context of the SIFOR project include (see also Annex 1):

- the Agenda for Environmental Research (2013–2021): this allows the integration and strengthening of traditional knowledge (TK) and innovations in the Potato Park for territorial management; adaptation to climate change; management and improvement of agro-biodiversity; management of water resources, etc.
- the National Strategy on Food Security and Nutrition (2013–2021): this contributes to the specific recognition of local practices and innovations aimed at conserving agro-biodiversity



and generating local innovations that support improved productivity and agricultural sustainability

- the National Program on Biotechnology (2013– 2016) which opens the possibility of collaborative projects between the Potato Park and research institutions, and
- the Regulations of the General Seed Law DS 006-2012-AG (2012) that offers the possibility of producing native seeds and commercializing them (in a non-certified way).

In the Cusco region a series of relevant ordinances have been implemented, including those related to the prohibition of GMO cultivation in Cusco (2007) and on access to biodiversity and protection of traditional knowledge (2008). Reviewing the policy and legal framework enabled an understanding of how the different dimensions of biocultural innovations in the Potato Park can be directly or indirectly supported by external rules, policies and/or programmes. In addition, it allowed the identification of the types of support (financial, technical, commercial, legal, etc.) that can be accessed by the communities for the protection of their biocultural heritage and related innovations. The Policy Matrix in Annex 1 lists relevant policies and their potential impacts on the Potato Park and the SIFOR objectives.

***National policies that support innovation processes in the Potato Park and are significant in the context of the SIFOR project include:***

- the Agenda for Environmental Research (2013–2021): this may allow the integration and strengthening of TK and innovations in the Potato Park for territorial management; adaptation to climate change; management and improvement of agro-biodiversity; management of water resources, etc.;
- the National Strategy on Food Security and Nutrition (2013–2021): this contributes to the specific recognition of local practices and innovations aimed at conserving agro-biodiversity and generating local innovations that support improved productivity and agricultural sustainability;
- the National Program on Biotechnology (2013– 2016) which opens the possibility of collaborative projects between the Potato Park and research institutions;
- the Regulations of the General Seed Law DS 006-2012-AG (2012) that offers the possibility of producing native seeds and commercializing them (in a non-certified way).

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***Conclusions and lessons learned***

The findings show that the Potato Park's biocultural innovations have been effective in strengthening resilience to climate change, by enhancing food security, incomes, biocultural heritage (including crop diversity) and community organisation/social capital.

This is due to key innovations, such as the Potato Park Association established in 2000 and the 2004 CIP agreement, developed with support from ANDES, which have spurred a number of other innovations. This highlights the importance of such community managed landscapes – or ‘Biocultural Heritage Territories’ – for adaptation to climate change.

## **Annex 3**

### ***Sacha Inchi Nut - The creation of a nutritional value chain:***

*Sacha inchi* presents a perfect example to illustrate the challenges involved in introducing “unqualified” products to global markets. Scientists at work in the framing of value For an “unknown” product to enter global markets, information has to be provided that defines the product qualities. Research institutions generate scientific studies that are used to legitimize interventions, policy shifts or uphold a marketing strategy. Circulating knowledge about the plant as generated by scientists is combined with embodied knowledges of mobile development consultants so as to draw the “exotic” plant of the Peruvian Amazon into the center of value chain promotion. The scientific interest in *sacha inchi* noticeably precedes investments from private actors or other institutions, as one of the few reports on the *sacha inchi* value chain confirms, which features a timeline of the establishment in San Martín. In the mid-1980s, for the first time, bromatological and bio morphological analyses of *sacha inchi* were conducted by American scientists of Food Science of Cornell University. They indicated that *sacha inchi* seeds are an important source of omega 3, 6 and 9 and rich in proteins (Nima 2007).

The interest in the plant stemmed from foreign researchers and focused on defining the qualities and features of the plant. Every year, the Peruvian Ministry of Agriculture publishes a list of prioritized value chains at the national level. In 2013, prioritized value chains included coffee, cocoa, plantain, potato, yellow maize, oranges, rice, quinoa, avocado, palm oil and cotton. *Sacha inchi* figures as a “prioritized” commodity at the regional, yet not at the national, level. Therefore, financial resources and support are limited.<sup>25F 25</sup> Biotrade targets market niches for an affluent and ecologically oriented, health-aware international clientele that is willing to pay for additional certifications

## **Standards**

In the case of the *sacha inchi* value chain, the *mesa técnica* has pushed forward standardization processes. Members of the *mesa técnica* founded the “Technical times private sector standards like Certified Organic are adopted by states as regulations, which is the case in several European countries as well as the EU. Process standards refer to labour conditions, the use of resources or wages along the entire cultivation and manufacturing process, whereas product standards refer to the features of the final product. Standards and the making of an economic good 185 committee for the standardization of *sacha inchi*” in 2008 in cooperation with national research institutes, export firms, standard agencies, the Ministries of Agriculture and of Export Promotion.

Standards, after all, are not only devices that, once accomplished, enable access to global markets. They create new frontiers due to high costs and require technical expertise. To the

present day, few countries in the Global South have been able to produce internationally recognized standards. Knowledge transfer remains for the vast majority, as the quote demonstrates, linked to a unidirectional flow from the Global North to the Global South. Sacha inchi is no exception, yet it is particular as it is both cultivated and entirely processed in a country of the Global South.

In the Peruvian case, the costs for applying and overcoming the Novel Food regulation amounted to more than 300000 USD (Niebuhr 2016). These were split among the Peruvian Ministries of Trade and Tourism and of Export Promotion, APISI and European counterparts which campaigned for the abolition of the import barrier of sachá inchi. Hence, the bureaucratic and juridical procedures for the application were entirely financed by the petitioners. The conflict over market boundaries occurs in a highly politicized sphere where battles are fought out concerning the role and scope of responsibility of institutions, public agencies and firms. It is a constant struggle of market agents with diverging interests.