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INTERACTIONS BETWEEN LIVELIHOODS AND PRO-POOR VALUE CHAINS: A CASE STUDY OF NATIVE POTATOES IN THE CENTRAL HIGHLANDS OF PERU

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ABSTRACT

Pro-poor value chains seek to integrate smallholding farmers into high value markets in ways that improve income and alleviate food insecurity. As this market-oriented development approach gains prominence, research must investigate how value chains interact with local places and the livelihoods of the people who live there. Through a case study of one community in the Peruvian central highlands and the native potato value chains implemented there, this study explores the horizontal dynamics among community livelihoods and vertical dynamics among value chain actors.

Based in Actor-oriented Perspectives (AP) theory, this study posits that development is (re)constructed by the actors participating. Though a mixed methods approach, this study investigated the experiences that households have had since a national NGO implemented native potato value chains with (trans)national corporations. During five months of fieldwork, 149 of 152 households (98%) were surveyed and 36 interviews were conducted among community members, NGO coordinators, and company executives. Multivariate regression and thematic analysis explored specific livelihood components of community members: dietary quality, project participation, on-farm diversification, livelihood activity diversification, social interaction, and demographics. Analysis also considered the native potato value chains and how the livelihood decisions of community members influence their structure and function.

According to the findings, farmers recognize economic and social benefits of value chains, yet struggle to adhere to quality requirements, are frustrated by inconsistencies in demand, and lack organizational capacity. The facilitating NGO stretches its resources across civil society and commercial functions, and purchasing firms are detached from development objectives. These value chains have not negatively affected potato biodiversity, although social stratification existed according to project participation. Participating households were found to have higher

dietary diversity, though this likely has less to do with any causal effects of the project than participation itself acting as a marker of social status. Significant predictors of dietary diversity also included animal ownership, social interaction, and crop diversification. Beyond dietary diversity, social/cultural acceptability and stability were identified as other relevant food security components. Findings also revealed that households are dedicating their potato production increasingly to home consumption as they pursue other livelihood activities, sometimes out of necessity and sometimes because other activities are deemed more lucrative. Decreasing commercial production limits the scalability and sustainability of native potato value chains.

Based on the findings, several recommendations emerged. To increase value chain viability, actors' roles and objectives must be mutually established, and enhancing capacity of farmer associations must constitute a primary programmatic focus. In order to mitigate social stratification, support must also be given to the commodity and informal market outlets that households typically access. Expanding economic opportunities in the region should be pursued through projects based on product transformation and high value alternative crops. Agroecological projects in particular can simultaneously address production constraints and fears that pesticide residues cause health problems. By targeting both the function of value chains and the livelihoods of local producers, pro-poor value chains can be beneficial in ways that avoid damaging social and ecological consequences.

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Chapter 1

Introduction

The complex global challenges facing agricultural development mean that it must focus on enhancing income stability in ways that improve food security, maintain ecological integrity, and manage other forces including market structures and climate change. Successful development outcomes, therefore, must extend beyond purely economic indicators (Seers, 1979; Sen, 1999). Increasingly, models are incorporating assets other than financial capital that are critical to utilize during the development process including natural resources, social relationships, human capacity, and physical infrastructure (Bebbington, 1999; Carney, 1998; Long, 2001; Moser, 1998; Scoones, 1998). Still, economic concerns remain prominent, as market-oriented development approaches are pursued in order to help low-resource households primarily relying on agricultural activities access competitive markets (Arias, Hallam, Krivonos, & Morrison, 2013; Bolwig, Ponte, du Toit, Riisgard, & Halberg, 2010; Mooney & Hunt, 2009; USAID, 2012). Integrating smallholding farmers into value chains – the series of activities involved in bringing a product from production to consumption – is rapidly emerging as an important strategy to help accomplish development goals (Brinkerhoff & Brinkerhoff, 2011; Prowse, 2012). Implicit in efforts to create better market accessibility for smallholding households is the assumption of linearity between income and other outcomes such as food security (Rivera & Qamar, 2003).

The linkage between higher incomes through market opportunities and improved food security, however, is not necessarily guaranteed (Battersby, 2011). Furthermore, market integration does not operate in isolation; natural resource management and social relationships, for example, are tightly intertwined with market access (Bolwig et al., 2010; Mooney & Hunt, 2009; Pretty, 2008; Windfuhr & Jonsen, 2005; Sen, 1999). Trade-offs among these important

resources on which households rely can occur: more efficient production systems catering to market opportunities often result in degradation of natural resources or social relationships (Altieri & Toledo, 2011; Evenson & Gollin, 2003; Moser, 2008; van der Ploeg, 2008). Therefore, a critical need exists for research to thoroughly investigate the dynamics that exist during the emergence of high value markets for farmers traditionally excluded from such opportunities and better determine how people who are targeted are either benefitting or being excluded, engaging in these new opportunities or responding to them in alternative ways. Doing so requires analysis of both the relationships along the market chain, as well as local dynamics among those who are able to access market opportunities and those who are not (Bolwig et al., 2010). The task requires explorations of how structural and natural forces converge in specific places and affect the lives of the people who live there. Bolwig et al. (2010) help clarify the conceptual linkage between market opportunities and development outcomes:

> Many contemporary development policy prescriptions place emphasis on the potential for closer integration of poor people or areas with global markets. But the prospects for poverty reduction depend in great measure on the nature of the broader economic processes that, according to how they are configured, can either exacerbate or alleviate poverty, and also on the forms of local economic growth that impact on the lives of those stuck in long-term poverty or threatened with impoverishment (p 173).

Research that explores the intersection of poverty and market opportunity can therefore be positioned within the literature on livelihoods – that is, how individuals and households respond to external pressures and opportunities using their local resources in order to achieve desirable outcomes such as poverty alleviation and food security (Bolwig et al., 2010; Chambers & Conway, 1992; Moser, 2008; Scoones, 1998).

The Andean highlands of Peru present a compelling opportunity to explore the dynamics of market development interventions. Classified as an upper-middle income economy that has undergone sustained economic growth nationally (World Bank, 2014), Peru can provide important lessons to other countries that are attempting to achieve a similar development

trajectory. Despite the economic successes, chronic poverty and malnutrition continue to plague the rural highlands of Peru (World Bank, 2011; Zorrilla & Cafferata, 2006). In order to help address this inequality, the International Potato Center (CIP), a member of the Consultative Group on International Agricultural Research (CGIAR), has sought to create market niches which are competitively advantageous for poor potato producers (Hellin & Higman, 2005). These CIP-led efforts have been pursued in partnerships with private businesses, national NGOs, government agencies, and smallholding farmers (Devaux et al., 2011). The pursuit of this work has been guided by the notion of pro-poor development, which couples competitive economic opportunity with greater equity (Besley & Cord, 2007). Attempting to leverage the impressive potato biodiversity which exists in the Peruvian highlands, CIP and its partners have based their efforts on the assumptions that strong social relationships among community members and traditional knowledge provide the necessary assets to connect resource-poor, potato-producing households to dynamic (trans)national corporations (Meinzen-Dick, Devaux, & Antezana, 2009). Through formal business relationships in potato value chains facilitated through these efforts, the introduction of several new products has been achieved in national markets (Devaux et al., 2009).

By stimulating demand for the diverse potato varieties that Andean farmers cultivate, the intention is to produce competitive income opportunities that help address the malnutrition commonly faced by rural households in the highlands, as well as contribute to the conservation of potato biodiversity. There is evidence that those who are able to access these opportunities are benefitting financially, although scant documentation exists regarding food security outcomes as well as market effects on agrobiodiversity conservation (Buckley, 2013; Cavatassi, González-Flores, Winter, Andrade-Piedra, Espinosa, & Thiele, 2011; Ordinola et al., 2011; Proexpansión, 2011). Investigating how participant and non-participant farm households alike are responding to emerging market opportunities, therefore, both provides important information regarding the specific challenges and opportunities of native potato value chains and also contributes more

broadly to better understanding whether and how pro-poor value chains achieve development goals (Brinkerhoff & Brinkerhoff, 2011; Bolwig et al., 2010; Mutersbaugh, Klooster, Renard, & Taylor, 2005).

In the region of Junín[1], neighboring the coastal capital of Lima to the east in the Andean highlands, the Peruvian non-governmental organization (NGO), FOVIDA, has been spearheading efforts to integrate mountain communities that traditionally cultivate native potato varieties into value chains. Acting as both the technical support for production and the market intermediary, FOVIDA has linked farmer associations with PepsiCo, owner of the potato chip manufacturer, Frito-Lay. Since 2008, PepsiCo has been producing their potato chip line, Lay's Andinas, which are processed using native potato varieties with colored flesh purchased from farmer associations with which FOVIDA works. Since 2012, the national supermarket chain, Plaza Vea, has been purchasing other native varieties from the same farmer associations and selling raw, colored-fleshed potatoes to its clientele in several regions of Peru. Although this project has existed for multiple years, research has not yet comprehensively addressed it.

The purpose of this research is to examine the experiences of development actors, especially rural households which have directly or indirectly interacted with emerging native potato value chain opportunities, with a particular focus on food security given the chronic malnutrition that continues to plague the Peruvian highlands (Acosta, 2011). In doing so, this study positions itself broadly within theories of the peasant economy (Chayanov, 1986; van der Ploeg, 2008) and specifically within development literature on livelihoods (Chambers & Conway, 1992; Long, 2001; Moser, 2008; Scoones, 1998). Through the case study of one district[2] in the region of Junín where FOVIDA is working, this study sheds light on how rural households

[1] Regions are first-level administrative divisions in Peru, roughly equivalent to a state in the U.S. There are 25 regions in total in Peru.
[2] Districts are administrative units roughly equivalent to municipalities in the U.S.. They lie within provinces, similar to counties which are second-level administrative units under regions (≈ states).

interact with and respond to market forces. This research is based on the conviction that those primarily affected by development interventions should be active participants in their own development processes (Escobar, 1995; Freire, 1993). Epistemologically, this study supposes that variations in human experiences contribute to the (re)production of the social world and so better understanding actor perspectives contributes to the growth of knowledge (Berger & Luckmann, 1967; Naples, 2003). To better assure that development processes reflect the perspectives of people themselves, research has an obligation to listen to and validate their perspectives (Chambers & Jiggins, 1987; Creswell, 2007).

Theoretically, this research is guided by a livelihoods framework, specifically of Norman Long's (2001) neo-Chayanovian Actor-oriented Perspectives (AP). By assessing the various resources upon which the people who live in a place have access, livelihoods analysis helps unpack how people make a living and achieve desirable outcomes. AP provides emphasis on the dialectical process of development, which helps rescue other livelihoods frameworks, most notably Sustainable Livelihoods (SL), from some of its theoretical limitations. Instead of assuming linear development processes, AP embraces their unpredictability. Its social constructionist roots guide the understanding that externally planned interventions are transformed when they enter the everyday realities of individuals. This does not preclude that structures influence action so that patterns can emerge based on certain characteristics that actors share, but recognizes that this tells only part of the story; through their actions, individuals also shape emergent trends. In order to more fully capture the process of development, AP emphasizes the sites of social interaction, for it is in these places where meanings and values are negotiated (Long, 2001). An imperative, therefore, exists for research to document and validate the experiences of development actors.

With AP guiding the framework, this study assesses how households interact with market opportunities and how these interactions, in turn, modify these market opportunities. Specifically, this study is guided by four research questions:

1) What are the perspectives of development actors, and especially community members, regarding efforts to develop value chain linkages for smallholding native potato producing households?
2) What is the relationship between and among project participation and other predictors including on-farm diversification, livelihood activity diversification, social interaction, and household demographics, and the dependent variable of dietary diversity?
3) How do native potato value chain stakeholders, and especially community members, understand the concepts of on-farm diversification, livelihood activity diversification, social interaction, and dietary quality?
4) How do livelihood decisions affect the structure and function of native potato value chains?

The effort to answer these research questions demand a methodological approach that accounts for both patterns in social behavior and experiences of this behavior. Given the complexity that this study seeks to address, mixed methods were applied so that multiple sources of information could be used to adequately – however partially – reflect the context under investigation (Small, 2011). In using mixed methods, my intention is to bring multiple sets of knowledge, including my own as the researcher, into concert with one another, as the research questions demand.

The findings of this study hold important theoretical and applied implications. In the first place, this research project investigates the experiences of diverse development actors, and especially rural households. Doing so helps unpack the various priorities and values that different

actors carry with them when they approach value chains. By taking full account of what is important to different actors, a better comprehension of the opportunities and challenges of pro-poor value chain development will exist. In particular, the degree to which market chain development can both enhance food security and conserve agrobiodiversity – the goals outlined by CIP - can be assessed. Furthermore, considering how these different development actors describe their experiences provides potential to analyze the mismatches in perceptions that exist. Ascertaining points of contestation that must be negotiated is essential in order to improve these types of development interventions. This study will conclude by offering concrete recommendations targeted to relevant actors within native potato value chains so that activities can be modified to improve program viability.

Operation definitions

Activity diversification represents the types of labor which households undertake to either access capital or for direct consumption. Activity diversification considers household participation in different activities which include self-employed agriculture, wage agriculture, self-employed non-agriculture, wage non-agriculture, and non-labor (specifically receiving remittances, taking out loans, and accessing inputs on credit) (Barrett & Reardon, 2000; Barrett, Reardon, & Webb, 2001).

Development actors are those directly or indirectly involved in value chain development. For the purposes of this study, these actors include community households (both participants and non-participants in the native potato value chains), the NGO FOVIDA, the companies of PepsiCo and Plaza Vea, and local government representatives.

Dietary diversity is one of several aspects of the multi-facetted concept of food security (FAO, 2010). It denotes the nutritional quality of the household diet, as indicated by the Household Dietary Diversity Score (HDDS).

Households are defined as the members living under the same roof and sharing meals (Ellis, 1998; ICF International, 2012). They are considered to be either male-headed or female-headed if only one female or one male presides over the household, or double-headed if a presiding couple resides in the household.

Household Demographics are household size, the age of the household head, household age dependency, household structure, educational status of the household head, and wealth status of the household.

Household Members are those living in a household for at least six months during the previous year (Beaman & Dillon, 2010).

Livelihoods are about survival and improving one's existence (van der Ploeg, 2008). For this study, Long (2001) provides a useful definition: "the idea of individuals and groups striving to make a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, responding to new opportunities, and choosing between different value positions" (p. 54).

On-farm Diversification collectively represents crop diversification and agricultural activity diversification (Mehta, 2009). Aspects of on-farm diversification that have been traditionally valued by Andean farmers and are therefore relevant to this study include access to numerous plots of land, the production of diverse crops generally and potatoes specifically, and the ownership of various types of animals.

Project participants distinguish households which are currently participating or have formerly participated in market schemes facilitated by FOVIDA to sell potatoes to (trans)national corporations from those households that have never participated.

Social interaction is the number of associations and organizations outside of formal work in which households participate, the number of leadership positions held in these groups, and the hours dedicated to these activities.

Outline of the study

This study is organized to comprehensively and systematically investigate the four research question presented in the introduction. The structure, divided into eight chapters, presents the complete research process, beginning by framing the questions through the literature and finishing with offering recommendations based on the findings. Chapter Two provides an extensive literature review, organized based on the relevant concepts and themes to this study: the trajectory of agricultural development and the theories underlying it, value chain analysis, livelihoods, food security, livelihood activity diversification, social interaction, local knowledge, agrobiodiversity, and finally how these concepts apply to the setting of Peru. This literature review will establish the presentation of the theoretical framework presented in Chapter Three, in which I will trace the heritage of Actor-oriented Perspectives (AP) and demonstrate how it guides the study. Chapter Four outlines the methodological approach implemented for this study, and Chapter Five will exclusively focus on background: of the market development project facilitated by FOVIDA and of the research site including secondary data to compare the site to other similar locations in the region. Chapter Six presents the findings to each research question through thematic qualitative analysis and multivariate regression, and Chapter Seven synthesizes the quantitative and qualitative findings, explicitly triangulating data and drawing conclusions informed by the theoretical framework steering this study. In Chapter Eight, I focus on the implications and recommendations of the study in order to both guide future studies and improve the efforts of similar market development initiatives to the one analyzed at length in this study.

Chapter 2

Literature Review

Introduction

Development is a complex and contested process. The design and implementation of specific development interventions are products of and responses to historical context, global institutions and structures, and complicated challenges that span both the social and natural worlds. Any effort, therefore, which seeks to assess the ways in which development processes – that is, how interventions interact with the everyday realities of the involved actors - requires a comprehensive consideration of the forces and influences that help shape the contexts in which these processes evolve. The purpose of this literature review is to frame the market development intervention of FOVIDA, the nexus of this study, in its contextual moment. I will, therefore, explore the historical trajectory in which pro-poor value chain development occurs, positioning its emergence within political economic theory. Given that the objective of pro-poor value chain development is to leverage market opportunities in ways that are advantageous to rural households, I will next consider the global governance structures and mechanisms that are particularly relevant to the FOVIDA value chain development project. Having detailed the structure of markets, I next move to a consideration of the concept of livelihoods to better understand how rural households operate within these global forces. I then highlight specific aspects of livelihoods relevant to this study: food security as a development outcome, activity diversification as a livelihood strategy, and traditional knowledge, social interaction, and agrobiodiversity as livelihood resources. These resources are of particular interest as those identified by CIP as important to leverage in order for Andean smallholding farmers to

successfully participate in native potato value chains. Finally, I discuss how all of these concepts apply to Peru and introduce the Papa Andina Initiative, coordinated by CIP and from which the FOVIDA project emerged, in order to set the context for the remainder of the study.

Post-World War II economic development

The world in the 1940s was in crisis. Two world wars bookending a global economic depression challenged the viability of the liberal economic assumptions that had been undergirding global relations (Peet, 2009; Polanyi, 2001). With instability prevailing, challenges were directed at the presiding economic assumptions. Neoclassicism, the reigning economic paradigm, rooted itself in the belief that self-regulating markets would naturally find an equilibrium between supply and demand. The operating economic rationality of neoclassicism was based on the idea that rational individuals pursue the most efficient means in the pursuit of their self-interested ends (Peet & Hartwick, 2009). Based in the assumption that trade encourages peace and stability, efforts to enhance the autonomy of the market mechanisms increased during the mid- and late nineteenth century (Polanyi, 2001)

Increasingly, it came to be understood that a self-regulating market was prone to failure (Peet, 2009). Space, therefore, was opened for the reemergence of the state to play a critical role in the functioning of economic affairs. Such was the cornerstone of Keynesian economics, which posited that growth and stability could be achieved only through an economy that was managed by the state (Bonnano, 1998). Through monetary policy and deficit spending, governments could create conditions that would encourage investment, create demand, and ensure full employment (Peet & Hartwick, 2009). It was in this post-World War II context that the notion of development first appeared. During his 1949 inaugural address, Truman outlined Point Four, which focused on advancing the Third World through technical knowledge and scientific innovation (Rist, 2002).

Technological diffusion, coupled with the tenets of Keynesian economics, would spur mass production and consumption and encourage traditional societies to follow a linear and inevitable process of growth that would modernize their economies into ones that emulated the First World[3] (Rostow, 1959).

The impetus to industrialize also emerged from within Third World countries themselves, as they were also assessing the consequences of neoclassical economic relations (Peet & Hartwick, 2009). Disadvantageous terms of trade meant that economically powerful countries could exploit weaker nations (Cardoso & Faletto, 1979). What was needed was a change in economic relations so that less powerful countries became more self-sufficient. As a result, import substitution policies were widely implemented which sought to replace imported goods with ones that were domestically manufactured (Love, 1980). Agricultural self-sufficiency also began to gain traction among periphery countries, especially as the World Bank increasingly funded social development projects and the newly established CGIAR system began to diffuse their technological innovations (Goldman, 1997).

The state interventionism that marked the post-World War II era began to be called into question as productivity declined, inflation increased, and economic recession plagued the global economy in the 1970s and 1980s (Peet & Hartwick, 2009). Stagflation, marked by high inflation and unemployment, crippled growth and gave rise to perceptions that Keynesianism was ill-equipped to combat such economic problems (Harvey, 2005). Developing countries fell into deeper debt as the World Bank cavalierly administered loans to encourage agricultural modernization and poverty reduction (Goldman, 1997). These hobbled economic conditions

[3] I use First World intentionally here, for this economic perspective was filled with political interest, as the Cold War accelerated and geopolitical relations were considered in the context of First World, Second World, and Third World.

presented opportunity for neoliberalism, an economic theory that had emerged during the 1930s, to rise as the political economic hegemony (Lemke, 2001).

Neoliberal economic development

An ethic, however skewed, to develop Third World economies through active intervention seemed to accompany Keynesianism and its approach to development. (Goldman, 1997). As neoliberalism cemented its prominence, it reconfigured the relationship between state and economy. As opposed to Keynesianism, neoliberalism asserted that state actions which intervened into economic affairs were threats to growth (Harvey, 2005; Peet & Hartwick, 2009). Neoliberalism builds upon the rational choice assumptions inherent in neoclassical economics, asserting that individuals are atomized agents in all aspects of their life; all decisions, even traditionally non-economic ones, are actually economic. If, as neoclassical economics assumes, the economy functions best when rational individuals can act free from external influence, then society also operates optimally when it is liberated from government interference (Lemke, 2001). Gone is the recognition built into economic liberalism that the state should indeed interfere in aspects of society for which the market fails to account (Smith, 1976). Instead, the role of the government is to "universalize competition and invent market-based systems of action for individuals, groups and institutions" (Lemke, 2001, p. 197).

Neoliberal efforts to restructure the relationship between state and economy include structural readjustment programs coordinated by international institutions like the World Bank and IMF. Structural adjustment is marked by policies that remove government controls from the economy through privatization, deregulation, and trade liberalization (Goldman, 1997; Harvey, 2005; Peet & Hartwick, 2009). With the implementation of these policies, national economies shifted from inwardly-focused to again export-oriented (Peet & Hartwick, 2009). The driving

assumption guiding economic restructuration was that markets undistorted by government interference will self-regulate, foster productivity and efficiency, and create space for innovation (Harvey, 2005). Theoretically, the free flow of capital should be widely beneficial as economies naturally gravitate to their comparative advantage and stabilized economies attract foreign direct investment. As Harvey (2005) explains:

> under the assumption that 'a rising tide lifts all boats', or of 'trickle down', neoliberal theory holds that that the elimination of poverty (both domestically and worldwide) can best be secured through free markets and free trade (p. 64-5).

Thus, social problems are to be resolved by an economic doctrine that emphasizes privatization; squeezed out is the notion that the state must play an active role to stimulate productive economic growth and protect valuable public goods (Peet & Hartwick, 2009; Smith, 1976).

Economic governance in the age of neoliberalism

What has occurred as a result of neoliberalism is not so much of a dilution in the power of the state but its radical reconstitution (Busch, 2010). Diminished in regulatory power are national governments but new technologies, organizations, and institutions that govern market relations have emerged. According to Tallontire (2007), "governance refers to the processes by which power is exercise in society" (p. 776). Private governance such as certification and standardization that compress time and space manage neoliberal relations (Bitzer, 2012; Busch, 2010; Fuchs, Kalfagiania, & Havinga, 2011; Harvey, 1990). New governance mechanisms, in turn, have changed the structure and relations within the agrifood system (Busch, 2010; Busch & Bain, 2004; Reardon, Barrett, Berdegue, & Swinnen, 2009; Simmons, 2002). With commodity chains frequently transcending national borders, the changes in the agrifood sector are marked by increased standardization, consolidation, and vertical coordination (Barrett et al., 2012; Hatanaka, Bain, & Busch, 2005; Reardon & Barrett, 2000).

In order to assess how market structures and relations have been reconfigured, value chain analysis (VCA) has emerged as a useful framework. Kaplinsky (2000) offers an apt definition of a value chain:

> The value chain describes the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use.

According to Gereffi, Humphrey, and Sturgeon (2005), VCA provides the tool to analyze how production is organized and coordinated across time and space, as activities along the commodity chain (production, processing, distribution, and retailing) become increasingly fragmented due to neoliberal economic globalization. By assessing the relations at different nodes – sites where goods or information are exchanged – a clearer picture emerges of private governance structures, as well as where and how power is wielded (Gereffi et al., 2005; Tallontire, 2007). Many scholars point to certification, labeling, and standardization as prime organizing tools used in private governance schemes (Busch, 2010; Busch & Bain, 2004; Fuchs et al., 2011; Hatanaka et al., 2005; Mutersbaugh et al., 2005). Lead firms, generally downstream market chain actors, implement quality and/or certification requirements to ensure that the products they are receiving are embedded with particular characteristics and/or are produced under certain conditions (Bolwig et al., 2010; Gereffi & Lee, 2012; Gibbon & Ponte, 2008; Hatanaka et al., 2005; Kaplinksy, 2000; Raynolds, 2004).

Concerns, however, have emerged that these governance structures mark power asymmetries and exclusion (Bitzer, 2012; Bolwig et al., 2010; Fuchs et al., 2011; Reardon et al., 2009; Tallontire, 2007). Because lead firms often push risk up the commodity chain by implementing standards to which upstream actors must adhere, smallholding farmers in developing countries are often excluded (Fuchs et al., 2011; Hatanaka et al., 2005; McMichael, 2009; Reardon et al., 2009). On the other hand, carefully managed governance mechanisms may

offer opportunity for smallholding farmers, as they may be well positioned to enter into niche markets demanded by downstream actors looking to distinguish themselves from competition (Hatanaka & Busch, 2008; Henson & Reardon, 2005). In this way, producers have the potential to "upgrade" or link into high value markets (Gereffi & Lee, 2012). If able to achieve inclusivity, high value markets are theorized to encourage social progress while they simultaneously stimulate economic growth (Brinkerhoff & Brinkerhoff, 2011; Fuchs et al., 2011; Porter & Kramer, 2011).

Contract farming, a common form in which vertical supply chains are actualized, provides an instructive example of the constraints and opportunities of neoliberal governance schemes on development objectives (Bolwig et al., 2010). Contracts facilitate coordination throughout the supply chain, allowing firms to exercise a degree of control over the production process and quality of the product (Prowse, 2012). Differing from conventional forms of vertical integration, in which a firm directly invests its resources into the production process, contract farming relinquishes a degree of this extreme control and instead establishes an agreement stipulating exclusive purchasing rights provided that certain conditions are met and often entail the provision that particular inputs are provided to contract farmers (Prowse, 2012). In agriculture, contract conditions generally relate to production methods as well as quality and quantity characteristics (Escobal & Cavero, 2012; Watts, 1994).

Within agricultural development, contracts have been viewed as a strategy to provide smallholder producers with opportunities to participate in national and global supply chains (Barrett et al., 2012; Bellemare, 2011; Escobal & Cavero, 2012; Masakure & Henson, 2005; Prowse, 2012; Reardon et al., 2009; Simmons, 2002). Although corporate firms are often thought to prefer working with large-scale farmers due to their economies of scale and ability to adhere to quality requirements, smallholders can present lower labor costs and more willingness to engage in labor-intensive methods (Bernet, Lara, Urday, & Devaux, 2002; Prowse, 2012). Those who

support contract farming as an important development opportunity for smallholders point to the increases in income that participating farmers often reap (Escobal & Cavero, 2012; Little, 1994; Miyata, Minot, & Hu, 2009; Prowse, 2012; Reardon et al., 2009), leading some to the conclusion that contracts are important mechanisms to help reduce poverty (Bellemare, 2011). In addition to income, smallholders may find other advantages in engaging in contractual schemes: fixed prices buffer against volatile price fluctuations in other markets; tapping into new markets is often accompanied by access to new technical information and technologies and easier access to credit; and time and cost spent negotiating and transporting products are often reduced (Escobal & Cavero, 2012; Masakure & Henson, 2005; Prowse, 2012; Reardon et al., 2009; Simmons, 2002).

For all the perceived benefits of contract schemes, criticism also exists. Some contend that contracts merely represent another form of capitalist penetration in which powerful firms flexibly accumulate by pushing their risk onto upstream actors (Hatanaka et al., 2005; McMichael, 2009). As smallholders become further integrated into global commodity chains, they lose autonomy over decision-making and risk losing traditional agricultural practices (McMichael, 2009; van der Ploeg, 2008; Watts, 1994). Although producers who enter into contracts avoid the instability of spot markets, they confront the risk of the global market (Little, 1994; Reardon et al., 2009). Smallholders also take on risk due to contractual stipulations that enable firms to reject any product that does not meet quality standards at the total expense of the producer (Escobal & Cavero, 2012). Firms that unfairly reject products and make late payments also pose risks to smallholders (Barrett et al., 2012). Furthermore, the conditional requirements of contractual agreements can encourage monocropping and intensified use of inputs (Prowse, 2012). The exclusive tendencies of contract farming schemes can also cause other problems such as intensified social stratification. Given the initial investments and higher production costs that accompany contracts, wealthier producers are generally the ones able to take advantage of the market opportunity (Barrett et al., 2012; Escobal & Cavero, 2012; Little, 1994). Spillover effects

of market integration can impact local communities in ways such as reduced food availability in local markets as well as intensified competition for land and resources (Little, 1994; McMichael, 2012; Prowse, 2012).

The criticisms targeted at contractual schemes critique the potential for them to exacerbate existing social and environmental problems that already contribute to the disadvantaged market position of smallholding producers. To help address these concerns, experiments with evolving governance schemes are occurring which attempt to promote transparency, accountability, and inclusivity (Brinkerhoff & Brinkerhoff, 2011; Fuchs et al., 2011; Tallontire, 2007). Efforts to diffuse power relationships are involving multiple stakeholders, often including actors from the public sector and civil society, especially NGOs (Bäckstrand, 2006; Bloom, 2013). Through creating partnerships, the objective is to shift the concentration of decision-making and enforcement processes within supply chains from the exclusive hands of private actors. Through doing so, power should theoretically be better distributed throughout the commodity chain (Brinkerhoff & Brinkerhoff, 2011; Fuchs et al., 2011). Multi-stakeholder partnerships are seen as a development approach that "make markets work for the poor," an aspect under the umbrella of the pro-poor growth, which strives for "growth that is good for the poor" (Hellin et al., 2009, p. 16).

While marrying development goals with economic processes has been heralded as an important opportunity for innovation and progress by some (Porter & Kramer, 2011), others are more skeptical, questioning the degree of participation that is actually achieved and therefore the degree of power that is actually distributed in the value chain (Bolwig et al., 2010). Bitzer (2012) concludes that value chain governance simply extends "the legitimacy of neoliberalism, including the efficiency of private enterprises and market-based solutions to social and environmental issues" and therefore questions the ability of these markets to improve the position of smallholding farmers (p. 30).

Regardless of theoretical debates, creating partnerships within market chains is being advanced as an important policy agenda by development organizations since market opportunities are viewed as a means by which smallholding farmers can produce better livelihoods (Bitzer, 2012; Tallontire, 2007). From this perspective, goals beyond merely maximizing profit are embedded into the function of the economy in ways that are win-win: competitiveness is enhanced and social goals are achieved simultaneously (Porter & Kramer, 2011). Corporate social responsibility (CSR), for example, "refers to corporate actions that focus on enhancing stakeholder relations while aiming at enhancing social welfare" (Gond, Kang, & Moon, 2011, p. 643). CSR is seen as a mechanism that provides corporations the opportunity to actively pursue governance that is more inclusive and addresses externalities of market behavior while maintaining competitiveness (Bitzer, 2012; Gond et al., 2011; Tallontire, 2007). However, the authenticity of CSR has been questioned: Blowfield (2007), for example, notes that the lack of a third-party audits can undercut the validity of company claims of responsible action, and Bitzer (2012) doubts that corporate control over decision-making and enforcement processes of governance is changed in any meaningful way (p. 27).

When pursuing CSR initiatives, corporations often partner with other stakeholders (Brinkerhoff & Brinkerhoff, 2011; Bitzer, 2012; Bloom, 2013). These partnerships ideally encourage "closer integration of poor people or areas with global markets" in advantageous ways (Bolwig et al., 2010, p. 173). In many cases, NGOs help mediate relationships between corporations and smallholding producers (Bloom, 2013; Kudadjie-Freeman, Richards, & Struik, 2008; Prowse, 2012). To ensure economic viability in the supply chain, NGOs often work directly with producer associations, which help diffuse information and technology and aggregate products from its members for distribution (Bitzer, 2012; Prowse, 2012). Conceptualized as a form of collective action, these associations are viewed as critical to allow smallholding producers to overcome competitive disadvantages of individual farmers and achieve economies

of scale required by high value markets (Devaux et al., 2009; Hellin et al., 2009). However, associations do not always function smoothly. Hellin et al. (2009), for example, identifies several cases in which farmer associations have failed due to mistrust among its members. Insufficient capacity within farmer associations also means that they often require support in managing their organization as well as market relations (Hellin et al., 2009).

NGOs commonly fill this need, often providing technical and organizational support as well as acting as a commercial intermediary (Bloom, 2013). Acting in this dual capacity substantially makes the roles of NGOs more complex: in addition to pursuing civil society benefits, they also become economic actors whose goals must be dictated by market interests (Bloom, 2013). When executed well, NGOs can help create and maintain well-functioning pro-poor value chains (Prowse, 2012). At the same time, the multi-facetted responsibilities of NGOs – which may include financial and technical assistance, supply chain coordination, and bargaining – create challenging conditions for success. Failure to adequately fulfill any of these responsibilities may damage the viability of smallholder participation in value chains (Kudadjie-Freeman et al., 2008; Prowse, 2012). Other common challenges include NGOs excluding farmers who are low-resource and unable to adhere to market requirements; unsustainable market relations due to NGOs taking on too much financial burden on behalf of producer associations; and NGOs damaging farmer inclusivity in market relations when negotiating on behalf of farmer associations (Bitzer, 2012; Bloom, 2013; Kudadjie-Freeman et al., 2008; Prowse, 2012).

What is clear is that pro-poor value chains are complex. Mutersbaugh et al. (2005) usefully notes that value chains are sites of contestation and negotiation; they are emergent and evolving. As a result, compelling questions exist regarding value chains and the actors who operate within them. Hellin et al. (2009) calls for attention to the opportunities and constraints of farmer associations, and Bloom (2013) explores how NGOs negotiate their civic and economic identities. Other questions remain regarding the ability of partnerships to impact the public good

in the desirable ways that are theorized (Brinkerhoff & Brinkerhoff, 2011). In fact, social and environmental impacts of governance mechanisms are not well understood (Bitzer, 2012; Blowfield, 2007). Mutersbaugh et al. (2005) identify an essential research need in documenting the consequences of pro-poor value chains on producers and communities. Bolwig et al. (2010) explain that evaluations of value chains must extend beyond income benefits and include the risks presented to rural livelihoods.

How these market forces evolve in real places and affect real people's lives needs to be better considered by VCA (Bolwig et al., 2010). Among the questions that need answering: "What do people's livelihood strategies mean for their ability and willingness to participate and upgrade in a given value chain?" (Bolwig et al., 2010; p. 185). Efforts to assess the interaction between value chains and livelihoods must remember that value chains do not only affect those development actors who actively participate. Understanding the experiences of those who are excluded are also important to consider in order to more accurately depict pro-poor value chain dynamics (Bloom, 2013; Bolwig et al., 2010). Not only should the vertical relations among supply chain actors be investigated, so too should the horizontal relations among smallholding farmers:

> Understanding the implications for poverty of integration or repositioning within value chains thus requires analysis not only of the power relations that exist within the chain itself, but also of power and inequality in the local systems and relationships within which chain actors and their communities are situated (Bolwig et al., 2010, p. 178).

In essence, this type of research agenda explores how market forces, specifically ones that are considered to be pro-poor, converge in real world settings and interact with the people who live there.

Livelihoods

Changes in the economic landscape during the rise of neoliberalism was accompanied by shifts in development perspectives. During the 1980s and 1990s, development theorists and practitioners were working in a context emphasizing agricultural modernization through technology and markets (Mooney & Hunt, 2009; Scoones, 2009). From the perspective of neoliberalism, self-regulating markets would inevitably address global poverty and food insecurity (Harvey, 2005). Modernized efficient production of agricultural commodities would make cheaper food more available across the world (McMichael, 2009). It would also spur economic modernization in the form of industrial development and integration into export-oriented markets.

Operating in this context, agricultural development needed to adapt to address the consequences. Witnessing the damaging social and environmental consequences of the top-down approaches of technology diffusion and market mechanisms (Antonio, 2009; Bunker, 2005), new conceptualizations of the processes and outcomes of development were emerging. Increasingly, focus within agricultural development shifted to decentralized efforts that focused on contextual situations of poor people (Arce, 2003; Harris & de Renzio, 1997). Recognition of the value of adaptable micro-level frameworks emerged from observations that the diffusion of technology and linkages to neoliberal markets do not impact all people in the same ways and are not appropriate in all cases (Altieri, 2002; Chambers & Jiggins, 1987; Leeuwis, 2004; van der Ploeg, 2008). Flexibility is widely validated, even by institutions like the World Bank that have traditionally operated according to market ideology (Goldman, 1997; Moser, 2008; Narayan, 2005). Indeed, the launch of the Millennium Development Goals in 2000 seemed to mark an understanding among global institutions that econometrics were no longer the only suitable indicators of development.

As development frameworks have scaled down, livelihoods have been increasingly emphasized (Chambers, 1989a; Chambers & Conway, 1992; Long, 2001; Scoones, 1998, 2009; van der Ploeg, 2008). The concept began to gain traction in the late 1980s and was popularized in 1990s when static conceptions of poverty based on income indicators were being replaced by dynamic views of systems-based vulnerability (Moser, 2008). According to Chambers (1989), vulnerability and poverty are not synonymous: whereas poverty relates to material deficits, vulnerability is about exposure and susceptibility to shocks and stresses and the inability to cope with them. Assumptions that raising incomes would translate to positive development outcomes, therefore, are overly narrow, for while income serves as an important indicator for poverty, it could not comprehensively account for vulnerability and so should not be viewed as the primary ends of development (Chambers, 1989a; Sen, 1999). Instrumental in the evolving understanding of poverty reduction was Amartya Sen's capabilities approach, which conceives development to depend on reshaping institutional contexts in order to expand the ability of individuals to make choices and lead lives that they value (Sen, 1981, 1999).

Chambers and Conway (1992) conceptualized livelihoods through a range of factors which affect the ways people meet their basic needs, cope with vulnerability, and take advantage of opportunities: Chambers and Conway (1992) developed the term "sustainable livelihood":

> a livelihood comprises the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capacities and assets, and provide sustainable livelihood opportunities for the next generation (p. 6).

Fundamentally, the concept of livelihood intended to embrace diversity; livelihoods varied according to the people involved, the assets available, the activities undertaken, and the resulting outcomes (Chambers 1989). In expanding livelihoods beyond income consideration, the concept attempted to shift to a more empowering form of development, one which started with the priorities and perspectives of poor people themselves (Arce, 2003).

Throughout the 1990s, the concept of livelihoods was increasingly embedded into development frameworks. Although variations existed among scholars and organizations (Hussein, 2002), livelihoods were understood to be complex and multi-faceted, comprised of assets, activities, and outcomes shaped by broader structural factors: institutional rules and norms, organizational presence, social relations and cultural customs, environmental stresses, and long-term socio-economic trends like population growth and movement (Amekawa, 2011; Carney, 1998; Ellis, 2000; Niehof, 2004; Scoones, 1998). Livelihood strategies – what people do – are dependent on the different resources to which they have access and how those resources are configured, all of which is influenced by external forces (Scoones, 1998). Therefore, development efforts must seek to understand the context in which people operate, the assets that they possess and how they can be converted or regenerated in to achieve desirable outcomes (Ellis, 2000; Moser, 2008; Scoones, 1998). Desirable livelihood outcomes include income stability, food security, reproduction of natural resources, reduced vulnerability, improved health, and empowerment (Ashley & Carney, 1999; Hussein, 2002). Available resources may be categorized into those that are financial, natural, physical, social, and human (Moser, 2008). Commonly, emphasis is placed on the need to maintain and strengthen asset bases, for their composition determine livelihood activities, options, and security (Bebbington, 1999; Moser, 1998). For people to cope with shocks, reduce vulnerability, and lead lives they deem valuable, asset bases need to be protected, accessed, and expanded (Bebbington, 1999; Moser, 1998).

Sustainable Livelihoods (SL) in particular became widely known and applied by scholars and development organizations alike (Moser, 2008). From the perspective of Scoones (2009), "the appeal is simple: look at the real world, and try to understand things from local perspectives" (p. 172). Livelihood outcomes emerge from livelihood strategies (what people do), which depend upon the different assets to which access exists and how those assets are configured (Scoones, 1998). Like other similar frameworks, SL considered assets to be filled with different kinds of

capitals (Moser, 1998; Scoones, 1998). Moser (2008) provides a useful characterization of these capitals:

> **Physical capital** (also known as produced or man-made capital): Comprises the stocks of plant, equipment, infrastructure, and other productive resources owned by individuals, the business sector, or the country itself.
> **Financial capital**: The financial resources available to people, such as savings and supplies of credit.
> **Human capital**: Includes investments in education, health, and the nutrition of individuals.
> **Social capital**: An intangible asset is defined as the rules, norms, obligations, reciprocity, and trust embedded in social relations, social structures, and societies' institutional arrangements, which enable its members to achieve their individual and community objectives.
> **Natural capital**: Includes the stores of environmentally provided assets such as soil, atmosphere, forests, minerals, water, and wetlands (p. 50).

However, SL recognized that capitals are not the only determinant of livelihood outcomes. Livelihood options are also shaped by broader structural factors, including institutional rules and norms (market practices, land tenure, etc.), organizational presence (NGOs, government agencies, etc.), social relations and cultural customs (gender, class, etc.), environmental stresses (drought, flood, etc.), and other macro trends (population, migration, technological advancements, etc.) (Ellis, 2000). Recognizing these external factors supposedly establishes the ability to analyze across scales so that how people construct their livelihoods is understood within the context of broader forces (Scoones, 1998). In other words, a given situation should be analyzed holistically so that vulnerability, shaped by natural and structural pressures and processes, is assessed in combination with the resources available and accessible (Meinzen-Dick et al., 2009). Through comprehensive analysis, the idea is to leverage existing assets in ways that reduce vulnerability to external forces and take advantage of promising opportunities to improve wellbeing (Chambers & Conway, 1992; Meinzen-Dick et al., 2009; Scoones, 1998, 2009).

Within development literature, the capitals asset base remains popular, though not without contention and debate (Butler & Mazur, 2007; Donovan & Stoian, 2012). SL in particular has suffered decline among development organizations (Moser, 2008; Scoones, 2009). Moser

(2008) notes that though the SL framework intended to account for broader structural trends and ecological dynamics, the model struggled to effectively link the micro with the macro. In a review of the rise and decline of SL, Scoones (2009) concurs with this assessment, noting that "one of the persistent failings of livelihoods approaches has been the failure to address wider, global processes and their impingement on livelihood concerns at the local level" (p. 187). Likewise, Dorward, Poole, Morrison, Kydd, and Urey (2003) assert that because market dynamics are fundamentally important to the livelihoods of rural households, livelihood approaches must better integrate market structures into analysis. Failing to adequately address market structures in livelihoods analysis leaves important questions ignored. As Dorward et al. (2003) write:

> First, we may ask if competitive neo-classical markets are always the most desirable institutional model, or if there are conditions where other forms of institutional arrangement perform better….For example, we need to ask what institutional arrangements (market or non-market) will best support development of particular livelihood opportunities under particular circumstances, and what features of the institutional environment are needed to support these institutional arrangements (p. 324-5).

The homogenizing tendencies of livelihoods is further articulated by Scoones (2009), who acknowledges that during its glory years, SL poorly accounted for power and politics by uncritically operating under normative assumptions. Questions of which livelihoods are desirable, who decides, and how discourse and institutions favor certain livelihoods over others were too commonly overlooked (Scoones, 2009). To rescue SL, Scoones (2009) contends that research must investigate how power is exercised and politics are performed across scales and converges in particular places.

Assumptions imported by the SL framework are problematic in another way as well. The focus on different capitals constituting an asset base has proved to encourage the conquest of economic logic into a model that had the very intention of encouraging expansive and cross-

disciplinary analysis. Although Scoones (2009) views the economic language as an "unfortunate diversion," he also recognizes that:

> The input-output-outcome elements of the livelihoods framework were of course easily recognised by economists, and were amenable to quantitative analysis and the application of numerous long questionnaires. Some livelihoods analysis has unfortunately never moved much beyond this, missing out on wider social and institutional dimensions. In particular, the focus on 'capitals' and the 'asset pentagon' kept the discussion firmly in the territory of economic analysis (p. 177).

However, conceptualizing livelihood resources as capitals implies deeper theoretical problems, for the term "capital" suggests a kind of resource that should be leveraged in ways guided by rational behavior in the classical economic sense: atomized and purposive agents in pursuit of self-interest (Beall, 2002).

The emphasis on accumulating and leveraging different kinds of capitals, Arce (2003) contends, obscures the broad range of values and understandings that are contested and negotiated by actors as they pursue their livelihood strategies. Scoones (2009) counters, pointing to the type of work Bebbington (1999) conducted, which described assets as capitals but claimed that these capitals extended well beyond utility in the economic sense. According to Bebbington (1999), various capitals have both function and meaning, in that they are "vehicles for instrumental action (making a living), hermeneutic action (making a living meaningful) and emancipatory action (challenging the structure under which one makes a living)" (p. 2022). Nonetheless, the economic assumptions that accompanied the economic language came to dominate and contain inherent risks:

> Capital can imply easy measurability and transferability. Since the value of something can be assigned a monetary value, then it can appear not to matter if it is lost, as the required money could simply be allocated to purchase another asset or to transfer it from elsewhere. But nature and its wider values is [sic] not so easily replaceable as a commodity (Pretty, 2008, 451-2).

The shortcomings of SL does not mean that the idea of "sustainable livelihoods" needs to be entirely discarded. People make decisions about meeting their basic needs, mobilize available

resources, and take action to change their positions in life, and this process occurs within the opportunities and limitations of broader structural and ecological forces. What is needed, therefore, are theoretical bases to break SL from its overly economized trajectory and better account for the influences of institutional processes. On this latter point, Scoones (2009) agrees: "Livelihood perspectives must look simultaneously at both structure and agency and the diverse micro- and macro-political processes that define opportunities and constraints" instead of operating with "a preference often towards locality and agency, black-boxing wider structural features" (p. 186). Thus, livelihoods analysis must be better at linking the micro with the macro, thus confronting the same problem identified by value chain scholars, only from the opposite direction (Mutersbaugh et al., 2005; Bolwig et al., 2010). In short, theoretical linkages across scales are needed.

Livelihood outcome: Food security

Among the multiple desirable livelihood outcomes[4] are income stability, reduced vulnerability, and sustainable natural resource management (Hussein, 2002; WFP, 2009). Food security is another livelihood outcome, one that is receiving intensive attention following the spikes in food insecurity resulting from the 2007-2008 food crisis, coupled with predictions that inflated volatile prices will continue (FAO, 2010; McMichael, 2009; von Grebmer et al., 2011). Halving the proportion of hungry people between 1990 and 2015 constitutes a primary component of the first Millennium Development Goal of the UN. Although progress has been made in the form of an overall reduction in the percentage of undernourished people between

[4] It is important to note that many livelihood outcomes can also be considered as resources. For example, in their framework to assess value chain development based in livelihoods analysis, Donovan and Stoian (2012) identify health and nutritional status as both a resource and an outcome. In general, strengthening an asset base is often considered to be a desirable livelihood outcome (Meinzen-Dick et al., 2009; Moser, 2008).

1990 and 2012 from 18.9% to 12.0%, “the rate of progress appears insufficient to reach international goals for hunger reduction” with 842 million continuing to face food insecurity (FAO, 2013, p. 9).

Food security is widely accepted as “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2010, p. 8). Embedded within this definition are multiple dimensions, including sufficient caloric quantity and nutritious quality, yearly/seasonal stability, and cultural and social acceptability (de Haen, Klasen, & Qaim, 2011). The complexity of food security is compounded when considering that it spans across scales: from individual to global (Babu & Sanyal, 2009; FAO, 2003). Measurement of food security, therefore, proves to be exceedingly difficult, for capturing one particular dimension does not guarantee an understanding of all other aspects. For example, sufficient quantities of food globally or nationally do not ensure that individuals can access it (Sen, 1981) or that vitamin and mineral requirements are fulfilled (Graham et al., 2006).

A term that first emerged in 1974 when the international community was contending with a global food crisis (FAO, 2003), food security has a foundation based in food availability, or whether the number of calories produced fulfill energy needs of the population. Sen (1981) provided the inspiration to expand food security after finding that food insecurity was not often the result of inadequate availability but inability to access food for either physical or economic reasons. Sen's work was so influential that “the debate shifted from macro supply…to household-level issues relating to food access; that is, the ability of households to obtain food in the marketplace or from other sources (such as transfers or gifts)” (Webb et al., 2006; p. 1405).

Scholars have subsequently spent decades attempting to adequately operationalize food access. This effort has proven to be particularly difficult because not all access is equal: dietary quantity (sufficient number of calories) must be complemented with dietary quality (Ruel, 2003;

Webb et al., 2006; Wiesmann, Basset, Benson, & Hoddinott, 2009). Nutrient adequacy is often the primary focus of dietary quality, but the cultural and social acceptability of the food being accessed is also important (Vargas & Penny, 2009). Various measurement scales have been developed to indicate food access through documenting household strategies to cope with external shocks (Maxwell & Caldwell, 2008), household food consumption (Kennedy et al., 2010), and subjective experiences of food insecurity (Coates, Swindale, & Bilinksy, 2007).

Specific sociodemographic variables related to household size, education, and income are often linked with food insecurity and integrated into studies (Arimond et al., 2011; Arimond & Ruel, 2004; Babu & Sanyal, 2009; Devereux, 2006; Gonzáles et al., 2007; Maxwell & Caldwell, 2008; Weingartner, 2010). Higher education levels of household heads and economically better-off households have been found to be positively associated with food access, while the opposite typically occurs with large households, those with high age dependency (fewer working-age adults), and those with elders who are household heads (Babatunde, Omotesho, & Sholotan, 2007; Bashir, Schilizzi, & Pandit, 2012; Belachew et al., 2012; Haile, Alemu, & Kudhlande, 2005; Maharjan & Joshi, 2011).

While shifting focus to the household level has provided better understanding regarding the uneven distribution and consumption patterns of available food, important dimensions of food security still remain. Food access and availability do not ensure that all individuals can live an "active and healthy life" (FAO, 2010, p. 8). Indeed, important differences can exist within households regarding food distribution (Devereux et al., 2004; Maxwell & Frankenberger, 1992). Individual consumption differences are best addressed through another pillar of food security, food utilization: the ability of individuals to sufficiently absorb and metabolize nutrients so that the body can function properly (WFP, 2009).

Food stability represents the final pillar of food security, so that food availability, access, and utilization will be achieved "at all times" (FAO, 2010, p. 8). Stability introduces a time

component into the concept intersecting all of the other dimensions (Weingartner, 2010). Chronic food insecurity refers to situations in which a persistent (six months or more) inability to fulfill basic food requirement exists, while transitory food insecurity occurs when people are unable to fulfill their dietary needs temporarily (de Haen et al., 2011). To determine the nature of food insecurity (chronic or transitory), situation analyses are important to determine whether vulnerability has been caused by unexpected shocks or rigid structural conditions (WFP, 2009).

Complex and multi-facetted as the food security concept is, no gold standard currently exists to comprehensively measure it; indeed, efforts to measure even one of the dimensions prove exceedingly difficult (Kennedy et al., 2010). Care needs to be exercised in selecting indicators so that the data collected reflect the goals and objectives of a study (Swindale, & Bilinksy, 2006). Understanding the specific aspect of food insecurity to which people are most vulnerable in a particular place helps to focus measurements.

Livelihood strategy: Activity diversification

The activities that households pursue to meet their basic subsistence needs figure prominently in the concept of livelihoods. Based on Long's (2001) definition of livelihoods used for this study, activities are what people do to in order to "make a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, responding to new opportunities, and choosing between different value positions" (p. 54). Since the late 1990s, livelihood and income diversification have received extensive attention from scholars who view expanding economic activity as an important form of insurance to reduce vulnerability and manage risk (Barrett et al., 2001; Ellis, 1998; Valdivia, Dunn, & Jette, 1996). Indeed, the importance of diversified economic activities has been supported by empirical evidence. Reardon, Taylor, Samoulis, Lanjouw, & Beliscan (2000) found that non-farm sources comprised on

average 42% of rural household income in Africa, 40% in Latin America, and 32% in Asia. The prominence of non-farm sources of income continued to be confirmed throughout the 2000s in various places around the globe (Carletto et al., 2007; de Janvry & Sadoulet, 2001; Escobal, 2001; Senadza, 2012).

As the intermediary between assets and outcomes, activities are particularly important to assess, for they offer insight into the preferences of and options available to households (Barrett et al., 2001; Valdivia & Quiroz, 2003). Studies of income diversification seek to place monetary values on assets and activities (Barrett & Reardon, 2000). In doing so, these studies aim to categorize the activities based on whether they are farm or non-farm, wage or self-employment, local or migratory (Barrett et al., 2001). However, income diversification studies often have difficulty comprehensively accounting for the diversity of economic activities that households actually utilize, meaning that estimations are challenging to calculate and often imprecise (Barrett & Reardon, 2000). For example, in addition to labor and product exchange on the market, barter, gifts, transfers, and reciprocity are viable economic strategies among rural households to satisfy their "productive, social and cultural needs in the short term as well as on medium- and long-term bases" (Rist, 2000, p. 310). Furthermore, attempts to represent all economic activities through market value tends to obscure the various meaning and other values embedded within those activities (Arce, 2003; Long, 2001).

Conceptually, livelihood diversification expands the narrowness of income diversification. While income diversification is oriented towards the conversion of productive assets, livelihood diversification encompasses the ways in which people utilize both economic and non-economic assets such as social relations or institutional norms (Barrett & Reardon, 2000; Ellis, 2000; Niehof, 2004). Although usefully expanding the understanding of what people do to make a living, this conceptualization of livelihood diversification risks vagueness. Expanding the

concept of livelihood activities to such a degree makes it difficult to imagine what does not constitute it, making it difficult to capture through measurements (Niehof, 2004).

Still, despite the conceptual weaknesses, a move to operationalize activity diversification is needed, for conceptually, the idea of activities mediating resources and outcomes is useful. Mehta (2009) is helpful in this regard, recognizing that because rural households in development contexts often mix their agricultural and off-farm activities, "there may still be need to develop composite indicators of work participation for the household, aggregating multiple activities pursued by the members of the households" (p. 7). To do so, Mehta proposes multi-dimensional measurements of livelihood diversification which consider crop diversification (to indicate production practices and capacities), farm sector diversification (to include agricultural activities other than crop production), and economic diversification (to account for the different kinds of occupations and industries in which households engage, as well as other sources of income flow such as rents and remittances). Reflecting these diverse sectors on which rural household typically rely, the reductionism of income diversification is expanded while the nebulousness of livelihood diversification is bounded. Furthermore, because "the diversity of production and economic activities of the people results into income flows from diverse sources," accounting for their diversification provides insight into available resources (Mehta, 2009, p. 3-4).

Recognition that households may be motivated for different reasons to diversify their activities is also present within the literature. Although commonly understood as a desirable development goal that will buffer against risk, activity diversification is not always so: while wealthier households commonly expand their activities as a planned economic strategy, poorer households often do so out of desperation (Barrett et al., 2001; Dorward et al., 2009; Ellis, 1998; Niehof, 2004; Reardon et al., 2000). As opposed to a conscious attempt to reduce vulnerability, poor households may seek unskilled labor as a coping mechanism to simply survive; the decision may be one of necessity devoid of preference (Barrett et al., 2001; Reardon et al., 2000).

Households have also been shown to pursue off-farm income sources as a way to reinvest their agricultural production to make it more viable as the primary economic activity (van der Ploeg, 2008). Thus, studies that simply seek to document the patterns of activities among households without considering motivations miss an important layer of analysis regarding motivations for and desirability of doing so.

Livelihoods resource: Social interaction

Collective action, "defined as voluntary action taken by a group to achieve common interests," has been identified as important for the rural poor to achieve desirable development outcomes (Devaux et al., 2009; Luloff & Bridger, 2003; Meinzen-Dick & Di Gregorio, 2004, p. 3; Pretty, 2008). It has been identified as a key ingredient for communities to successfully navigate major development issues including natural resource management (Moore & Cisse, 2005; Pretty, 2003, 2008) and climate change adaptation (Adger, 2003). Collective action is also necessary for smallholding producers to successfully integrate into pro-poor value chains; farmers unable to aggregate their products generally cannot produce and deliver sufficient products of adequate quantity and quality (Hellin et al., 2009; Prowse, 2012). Collective action, however, does not simply exist *a priori*; it must somehow be generated, a topic that has garnered the focus of social scientists for several decades.

The concept most commonly identified as providing the impetus for collective action is social capital, defined as "the norms and networks that enable people to act collectively" (Woolcock & Narayan, 2000, p., 226). Although scholars have mused about social capital for several generations, the term gained traction beginning in the 1980s through the theoretically divergent works of Bourdieu (1986) and Coleman (1988) (Woolcock, 2010). Increasingly, livelihood analyses also incorporated the notion of social capital as an important resource which

could be leveraged to achieve desirable outcomes (Bebbington, 1999; Moser, 2008; Scoones, 1998). However, it was the work of Putnam (1993, 2000) and the concept's adoption by the World Bank that caused its explosion in popularity in the 1990s. As Woolcock (2010) and others (for example, Fine, 2003; Pritchett & Hammer, 2006) explain, the World Bank's embrace of social capital stemmed from the need to incorporate social explanations to accompany their economic analyses that were deemed inadequate to fully account for development outcomes:

> For organizations like the World Bank, for example, which itself had only established a department for social development concerns in 1995, the timely emergence of 'social capital' seemed to offer a convenient discursive bridge between economics (the dominant discipline at the Bank) and the other social sciences (Woolcock, 2010, p. 475).

What resulted over the last two decades is the routine incorporation of the term across diverse social science disciplines, giving rise to the assumption that social capital underlies collective action and economic development (Woolcock, 2010).

Drawing on Coleman (1988), Putnam (2000) laments the erosion of communities, a trend that was revealed, he claims, through declines in civic engagement. To Putnam, the cause of social deterioration results from growing disconnect among individuals and a degradation of cooperation. In other words, community decline is caused by a loss in social capital, which he defined as "connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them" (p. 19). Viewing social capital as a collective resource, Putnam expands its scope beyond its utility at the individual level as conceptualized by Bourdieu (1986) and Coleman (1988). Through generalized reciprocity – the idea that individuals act in good faith for the collective good under the assumption that they will one day reap benefits from the aggregation of similar behavior - people are motivated to conform to the norm of reciprocity, for it ensures that the long-term consequence of deviation will likely be more harmful than any short-term benefit. As a result, those who place trust in their fellow citizens are more likely to engage in civic activities and stimulate social progress.

Given his emphasis on the collective, Putnam (2000) has been influential within development literature (Luloff & Bridger, 2003; Woolcock, 2010). Through analysis of different kinds of social capital including bridging, bonding, vertical, horizontal, and negative and the consideration of different configurations of these in diverse settings, attempts have been made to help account for diverging development outcomes (Fine, 2003; Flora & Flora, 2003; Grootaert & van Bastelaer, 2002). The presence and functions of different kinds of social capital can help explain the degree to which collective capacity exists for local citizens to self-direct their development process (Flora & Flora, 2003).

As the prevailing concept explaining social relationships, social capital is accompanied by its fair share of detractors, causing Woolcock (2010) to designate it an "essentially contested concept" (p. 470). Among the critiques that have been leveraged include: its constraints on individual freedom and innovation (Quibria, 2003; Portes, 1998; Pretty, 2003; Wall, Ferazzi, & Schryer, 1998); its potential for exploitation (Portes, 1998; Portes & Landolt, 2003); its tautology (i.e. strong social capital breeds strong social capital) (Bridger & Alter, 2006; Fine, 2003; Harris & de Renzio, 1997); its operational and conceptual vagueness (Fine, 2003; Portes & Landolt, 1998; Quibria, 2003; Wall et al., 1998; Woolcock, 2010); an insufficient explanation of how exactly social capital is generated (Harris & de Renzio, 1997); and its lack of fungibility (Bridger & Luloff, 2001; Luloff & Bridger, 2003; Quibria, 2003; Pretty, 2003).

The association that social capital has with rational choice theory has also been questioned, for harmonizing individual and collective interest is not straightforward (Bridger & Luloff, 2001; Fine, 2003; Wall et al., 1998). Perhaps due to this connection with rational choice, the concept has been denounced as simply a façade for the further penetration of capitalistic rationale into social affairs (Arce, 2003; Beall, 2002). As Woolcock (2010) explains, critics have asserted that the term "amounted to a sell-out, a naïve capitulation of social theory and social spaces to the ever-encroaching forces of economic logics, which in turn would only overwhelm

and further marginalize anything distinctively 'social'" (p. 475). This critique – that capitalistic logic is inherently embedded in social capital – can also be applied to livelihoods frameworks like SL because, as explored above, their capitals-based categorizations have made it easy for economic perspectives to dominate (Scoones, 2009).

Despite the prevalence with which social capital is used, it does not have a monopoly on theoretical explanations of how social relationships underlie collective action. Like social capital, interactional theory posits that social relationships are an important resource in the development process, conjecturing that social interaction is the key ingredient in catalyzing collective action. From this perspective, a community is considered "a place-oriented process of actions through which members of a local population express a shared sense of identity while engaging in the common concerns of life" (Theodori, 2005, p. 663). Within a community, several social fields – unbounded processes of social interaction around specific interests – exist (Kaufman, 1959; Wilkinson, 1991). Although various social fields might overlap, individuals often identify with and dedicate their efforts to specific interests which often limits interaction across fields. Little interaction among the different social fields is a barrier to the ability for communities to identify and act on solutions to mutual problems (Bridger & Luloff, 1999).

Through engaging in efforts to facilitate coordination across fields, another field - that of the community - develops. The emergent property of the community suggests that it does not exist *a priori* but must be cultivated through the development and maintenance of social networks (Wilkinson, 1991). In short, through interaction, the community field helps facilitate community-wide coordination across interests regarding common problems and issues (Brennan & Israel, 2008; Bridger & Luloff, 1999; Luloff & Bridger, 2003; Theodori, 2005; Wilkinson, 1991). When relationships are built across social fields, the collective capacity of community members to access and mobilize resources in ways resolve common problems or take advantage of collective opportunities is enhanced (Brennan & Luloff 2007; Luloff & Bridger, 2003).

This conceptualization of collective action is problematic in that it assumes that all interaction is productive. Interactional theory attempts to sidestep this problem by embracing conflict, calling it inevitable and important to engage (Bridger & Luloff, 1999; Wilkinson, 1991). However, much like social capital can have a dark side resulting in exploitation and exclusion (Portes, 2003; Portes & Landolt, 1998), it seems that some interactions can potentially be destructive as well, a point with which interactional theory has not yet contended. Here, social capital may be useful in recognizing that norms and value mediate social relationships. The problem with social capital enters when norms and reciprocity are viewed from an economically rational perspective. Norms like trust and reciprocity themselves are not problematic; these norms may instigate people to act in ways other than economically rational (Polanyi, 2001). Thus, assessing the quality of interaction, as indicated by the degree to which interactions are marked by norms, may help provide interactional theory with a further degree of theoretical robustness.

Livelihood resource: Local knowledge

From a livelihoods perspective, human capital, consisting of capacities, skills, competencies, education, and health status, is an important resource on which individuals and households rely in their pursuit of desirable outcomes (Donovan & Steier, 2012; Moser, 2008; Scoones, 1998; Sen, 1997). Among the key attributes of human capital that have been identified is local knowledge, increasingly deemed a critical component in ensuring the success of development initiatives, even among multilateral institutions like the FAO (2004) and the World Bank (Leautier, 2004). As "knowledge rooted in local or regional culture and ecology," local knowledge is unique, contextual, and essential to consider in development because it "can contribute to measures which begin where people are, instead of where others want them to be" (Antweiler, 1998, p. 469-470). Growing emphasis on the importance of local knowledge in

development initiatives reflects the broader trend within development recognizing the importance of resources other than economic ones (Chambers & Conway, 1992; Long, 2001; Sen, 1999).

Strands of agricultural development were among the first disciplinary efforts to value local knowledge as a way to "put people first" (Cernea, 1985, p. 3). The participatory methods that emerged were a response to the hyper-emphasis on science and technology as the solutions to overcome resource shortages, environmental problems and social inequities (Antonio, 2009; Buttel, 2005; Scott, 2011). The conventional methods to development, those guided by science and technology fixes, had a top-down approach: scientific findings and technological innovations from the experts at research centers and experiment stations should be extended to end users for adoption (Kloppenburg, 1991). The diffusion methods that arose as a result were based on a one-way communication flow, known as the transfer-of-technology (TOT) model, in which scientists predetermine research priorities and then simply pass their results along to extension agencies and businesses for the passive adoption by farmers (Chambers & Jiggins, 1987; Chambers, 1989b; Cohen & Uphoff, 1980). Ignored were any alternative priorities held by those being targeted by these new technologies. Scientific knowledge was simply assumed to be complete and uncontestable (Harding, 2006; Kloppenburg, 1991). As a result, negative consequences externalized by the heedless implementation of technology often resulted, displayed through environmental degradation and intensified social stratification (Altieri, 2000; Chappell & LaValle, 2011; Scott, 2011).

To overcome the shortcomings of the TOT model, the importance of local priorities and perspectives began to receive attention in the 1980s (Cohen & Uphoff, 1980; Chambers & Jiggins, 1987). Participatory methods were designed to respectfully include local people in setting the research agenda, conducting research, and making decisions (Antweiler, 1998; Chambers & Jiggins, 1987; Chambers, 1989b). The goal of validating local people as experts with an important set of knowledge was to better ensure that they "themselves…meet and work out what

they need and want" (Chambers & Jiggins, 1987, p. 50). The duty of outside experts and their innovations was simply to support local people in their pursuit of their self-identified priorities (Chambers, 1989b).

Participatory methods do not exist without their detractors. In particular, scholars have been concerned that they can be exclusionary and reinforce existing power structures within localities (Cornwall, 2003; Guijt & Shah, 1998). Nonetheless, their arrival on the scene of agricultural development marks an important turning point for the way in which knowledge is viewed. Instead of privileging one set of knowledge over another, participatory methods implicitly understand the partiality of knowledge sets (Kloppenburg, 1991). As opposed to a one-size-fits-all approach, success is more likely to result if development is considered a learning process, during which scientists, development practitioners, and community members can continually interact to find the most appropriate solutions to mutually agreed-upon problems (Cohen & Uphoff). Local knowledge, therefore, is viewed as an important companion in this process, for its insights into, for example, the natural environment, cultural heritage, agricultural production, local politics, social relationships, and power structures are essential to incorporate and often help avoid reductionistic assumptions imported by outside experts (Antweiler, 1998; Kloppenburg, 1991).

Livelihood resource: Agrobiodiversity

Within livelihoods analysis, natural resource management figures prominently, since the availability and accessibility of these resources help to determine agricultural systems in rural areas (Altieri, 2002; Amekawa, 2011; Pretty, 2003, 2008). While a great deal of emphasis within the livelihoods literature emphasizes the importance of off-farm diversification as a way to buffer against risk (Barrett et al., 2001; Ellis, 1998), on-farm diversification has also been recognized as

a valuable strategy (Mehta, 2009; Niehof, 2004). However, the value of diversity within agricultural practices is not new. Although the roots of agroecology date back to the 1930s, it has gained impressive popularity in the last 20 years (Amekawa, 2011; Tomich et al., 2011). Like other complex concepts, agroecology is subject to definitional variation and can be considered as a scientific discipline, a social movement, or as an agricultural method (Wezel & Soldat, 2009). At its most basic, agroecology is about the dynamic and interdependent relationship which exists between the human activity of agriculture and naturally occurring ecological processes (Tomich et al., 2011).

For the scientific perspective, Gliesmann (2007) provides a useful definition of agroecology: "the science of applying ecological concepts and principles to the design and management of sustainable food systems" (p. 369). Sustainability has both social and biological dimensions: agroecology strives for agricultural productivity, environmental conservation, economic viability, and social justice (Altieri, 2002). Among the basic tenets of agroecological practices are utilizing natural inputs, recycling resources (e.g. nutrients, water, energy), promoting agrobiodiversity, and integrating cropping and livestock production (de Schutter, 2011; Tomich et al., 2011). These principles are seen as flexible guidelines that can be implemented in unique ways in varying environmental and cultural contexts (de Schutter, 2011). Diversity, thus, is the centerpiece of agroecology at all levels: from plot and field to farm and food system (Wezel & Soldat, 2009). Applying the concepts is intended to enhance the resiliency of agroecosystems and reduce the vulnerability of those who adopt the principles (Power, 1999; Tomich et al., 2010).

While scientific evidence is mounting that encouraging biological relationships has a range of benefits including enhanced productivity (de Schutter, 2011), the core tenets of agroecology should not be viewed as a recent advancement. Traditional farming practices have long incorporated practices that promote synergistic relationships between farm and environment,

thus embodying many of the basic principles of agroecology and highlighting the importance of local knowledge (Altieri, 2002; Kremen, Iles, & Bacon, 2012; Mijatovic, 2011). Small farms in rural areas using traditional agricultural practices in which modern inputs and technologies are largely absent or at least less prevalent are often rich in biodiversity, as diverse crop and genetic variation adapted over thousands of years continue to serve as a primary source for subsistence (Altieri & Toledo, 2011). Agrobiodiversity, particularly relevant for the purposes of this study, exists at several different levels, "from the different ecosystems in which people raise crops and livestock, through the different varieties and breeds of the species, to the genetic variability with each variety or breed" (Frison, Cherfas, & Hodgkin, 2011, p. 239).

Agrobiodiversity marks resilient systems that are better equipped to withstand and adapt to social and environmental pressures (Altieri, 2002; Power, 1999). The importance of agrobiodiversity is being increasingly validated by scholars and international organizations alike (de Schutter, 2011; FAO, 2011; Frison et al., 2011; Mijatovic, 2011). Concerns that the emphasis on specialization, modern inputs, and monocropping of conventional agriculture is eroding biodiversity has led the FAO (2011) to assert that such losses limit the ability of agricultural systems to respond to the inevitable challenges of urbanization, water and resource scarcity and climate change. Similar conclusions are emerging from the CGIAR, which is promoting crop diversity as essential for agricultural production to confront the stresses that climate change has in store for both the environment and food security (Beddington et al., 2012).

The unique genetic traits which exist across and within crops are valuable for plant breeders to develop seed varieties resistant to the drought-like conditions, flooding, and pest and disease invasions that will likely occur with more frequency and intensity (IPCC, 2007; Kotschi, 2010). However, beyond the breeding possibilities, high levels of agrobiodiversity have been commonly found to increase productivity, promote ecosystem services such as beneficial organisms and insects that enhance soil health and pollination, and reduce the impact of pest and

disease invasions which often target only a few vulnerable varieties (Altieri & Toledo, 2011; Frison et al., 2011). Furthermore, fields that contain rich biodiversity are more likely to contribute to positive health and nutrition outcomes (de Schutter, 2011; Frison et al., 2011). Given the wide-ranging benefits provided by on-farm diversification, it continues to hold relevance for the majority of the rural poor around the globe who continue to rely on agriculture as an important economic activity (IFAD, 2010).

However, the future of agrobiodiversity is not secure. Explanations accounting for the loss of agrobiodiversity, despite the array of benefits it provides, often point to an array of factors. Efficient production systems specialize in efficient and specialized production generally focusing on only a few commercial crops (Brush, 2004; FAO, 2011). The high-yielding crop varieties, for example, that emerged from the Green Revolution were widely adopted at the expense of diverse native varieties that had been traditionally cultivated (Brush, 2000; Evenson & Gollin, 2003; Fowler & Mooney, 1990; Scott, 2011). Furthermore, the market relations fostered by neoliberalism are often governed by homogenizing mechanisms such as standardization and certification (Busch, 2010), which neither value diversity nor are advantageous to low-resource farmers cultivating traditional crops (Altieri & Toledo, 2011; Freidburg, 2004; Reardon et al., 2009).

The danger of losing genetic diversity is being widely recognized by scholars and multilateral organizations alike (Altieri & Toledo, 2011; Brush, 2004; FAO, 2011; Mijatovic, 2011; Pretty & Smith, 2004; Zimmerer, 1996). Calls for policy reform have been made so that plant genetic resources are viewed as global public goods in order to foster sharing and innovation (de Schutter, 2011; Hoeschle-Zeledon & Jaenicke, 2007). Increasing seed access can help bridge scientific and local knowledge sets. Participatory plant breeding, for example, has been one approach that explicitly attempts to merge these two knowledge sets in ways that are mutually beneficial (Brush, 2004; Ceccarelli & Grando, 2007; de Shutter, 2011). In addition, *in*

situ conservation is also commonly heralded as a necessary strategy to preserve agrobiodiversity (Hoeschle-Zeledon & Jaenicke, 2007). While *ex situ* conservation provided by gene banks are important to protect genetic resources, on-farm maintenance provides means for consumption, preserves local knowledge, maintains genetic integrity, and encourages local adaptation (Brown, 2000; Brush, 2004).

Some see promising opportunities to simultaneously achieve agrobiodiversity conservation and economic goals by creating market niches which demand the crop varieties maintained by smallholding farmers (Hellin & Higman, 2005; Hoeschle-Zeledon & Jaenicke, 2007; Keleman & Hellin, 2009; Giuliani, Adbulkarim, & Buerli, 2006; Meinzen-Dick et al., 2009). However, these efforts have emerged only recently and need greater attention, particularly regarding the roles required of businesses and development organizations to facilitate these market opportunities, as well as the exclusion that may take place in accessing these markets (Hellin et al., 2009; Keleman & Hellin, 2009). Lockie and Carpenter (2010) explicate this research need:

> While many authors have critiqued the role of global capitalism in establishing an environmentally destructive treadmill of technology, little attention has been paid to the specific ways in which actors such as agribusiness firms and food retailers influence on-farm biodiversity management, the potential for market relationships in general to internalize the costs of biodiversity protection, or the strategies that farmers use to maintain their own agency, or influence, over the management of agrobiodiversity assets (p. 2-3)

Despite the potential, some warn that market-oriented approaches to conservation must be considered one among multiple strategies, since market potential in demanding diversity is inherently limited by quality characteristics (Hellin, Higman, & Keleman, 2010; Keleman & Hellin, 2009).

Concepts in context: Peru

Throughout this literature review, I have intended to highlight that context matters when considering development initiatives; livelihoods analysis demands it. Understanding how concepts are displayed in real world settings is critical to avoid reductionistic assumptions. Therefore, in this section I use the themes explored in the literature review thus far to demonstrate how they are applicable to Peru, the country of interest for this study. Doing so, I hope, will provide contextual reference and make the case for why Peru provides a compelling example to explore value chain dynamics and their implications on the livelihoods of smallholding farmers.

Economic development

The economic trajectory of Peru has typified the global trends that have taken place since World War II. After the war, government policy helped Peru expand its exports, particularly of fish products, lead, zinc, iron, sugar, and cotton. In rural areas, inequality was prevalent as vast estates dominated the landscape and peasants often fulfilled their subsistence needs as hacienda workers beholden to rigid labor obligations (Mayer, 2009). The decay of this semi-feudalistic system culminated in 1969 when agrarian unrest led to reform, breaking up hacienda estates and giving control of land to newly constructed cooperatives as well as peasant communities (Mayer, 2002, 2009). Although government rhetoric indicated that agrarian reform would help usher in greater equity, the import substitution policies that were being pursued at the same time were skewed to the urban manufacturing sector meaning that peasants had greater access to land but hardly benefitted from national economic policy (Zimmerer, 1996).

Sustained economic growth in Peru after World War II ended in the 1970s with economic crisis (Figueora, 1984). High inflation, declining productivity, and national debt plagued the Peruvian economy throughout the 1980s, the same time that the Shining Path began to accelerate

its terrorism that would devastate the country psychologically and economically (Gorriti, 1999; Zorrilla & Cafferata, 2006). In the 1990s, as the Shining Path was being defeated, strict structural adjustment reform was implemented in order to remove the government intervention that had prominently propped up the Peruvian economy for decades (Zorrilla & Cafferata, 2006). Although economic recession afflicted the economy in the late 1990s, Peru withstood the strains and has experienced strong growth for the past decade with industries related to manufacturing, construction, fisheries, mining, and agriculture leading the way (Escobal & Cavero, 2012; USAID, 2011; Zorrilla & Cafferata, 2006).

Due to the strong economic performance, Peru has made significant strides in socioeconomic indicators: poverty has been reduced from 54.4% in 1991 to 27.8% in 2011 and extreme poverty has declined from 23.0% to 6.3% during that same period (INEI, 2013a). Despite such significant national strides, inequality remains prevalent as rural peasants, particularly those who live in the Andean highlands, have not reaped the benefits (Zorrilla & Cafferata, 2006; USAID, 2011). In fact, when analyzed by region, 56.1% of those living rural areas lived in poverty in 2011 compared to only 18.0% in urban areas. In the highlands, 41.5% lived in poverty (INEI, 2013a).

Food security

The sustained economic growth that Peru has experienced over the last decade has been accompanied by improvements in food security. From a food availability standpoint, the daily calories available for the Peruvian population per capita are estimated to be 2,563, well above the number of calories that the FAO and nutritionists estimate are needed on average (IFPRI 2012; MIT, 2014). According to the Global Hunger Index, which takes into account rates of undernourishment, child mortality, and underweight children, Peru has experienced a 50%

improvement in hunger from 1990 to 2012, moving the hunger status of the country from serious to moderate (von Grebmer et al., 2012). Despite these positive trends, the severe inequality in Peru limits the benefits for the entire population. Stark differences regarding chronic malnutrition for children under five were present in 2011: 29.3% of the children in the highlands experienced chronic malnutrition, while only 4.1% of children in metropolitan Lima and 11.9% of children in other coastal areas suffered from malnutrition (INEI, 2013a). In Junín, the region of interest for this study, 24.9% of children under 5 experienced chronic malnutrition in 2012 (INEI, 2013a).

Child malnutrition in the Peruvian highlands likely has many causes, food insecurity among them. For many rural households, potatoes and rice serve as primary staples, exactly the kind of starchy, limited diet that poses the threat of micronutrient deficiency (Rose, Burgos, Bonierbale, & Thiele, 2009; Ruel, 2003). Furthermore, difficulties in accessing quality food also exist for a variety of reasons including income constraints, challenging weather and climatic conditions, low education levels, and unstable food commodity prices (Aguiar et al., 2007; Antezana et al., 2005; IFAD, 2011; Robles & Torero, 2010; World Bank, 2010; Zorilla & Cafferata, 2006).

Livelihoods

Andean culture in the highlands of Peru has long been marked by diverse economic activity. Although agriculture has traditionally been the basis for meeting subsistence needs for most households in the region, market exchange has long existed alongside home consumption (Antezana et al., 2005; Brush et al., 1995; Mayer, 2002; Rist, 2000; Zimmerer, 1996). Within Andean communities, reciprocity, gift-giving, and social obligations also help structure economic activity. Commonly, community members will provide labor to one another in exchange for in-kind compensation or the expectation that the labor will be reciprocated at a later date (Mayer, 2002). The importance of tightly-knit social relationships in Andean indigenous societies is

reflected in the prominence of "comunidad campesinas" (peasant communities), which Hurtado (2012) defines as "units that combine functions of social and economic regulation over their members, share land, and act as a collective within broader society" (p. 26). Formally recognized under the 1920 constitution and popularized during the 1969 land reform, these peasant communities emulate the decentralized organizational structure of the Incan empire which legally entitled subjects to land (Marti, 2012; Mayer, 2009). Comunidad campesinas continue to collectively govern their land and resources (Mayer, 2002; Vincent, 2012). Importantly, the comunidad must be distinguished from the broader community which includes all residents who identify with particular political boundaries (Vincent, 2012). Although peasant communities continue to be prevalent throughout the highlands (Hurtado, 2012), their integrity is being challenged by encroaching capitalist influences and reform policies which have made it easier for communal land to be converted into private property (Deere & Lion, 2001; Marti, 2012).

The changing economic landscape is having effects on Andean peasant livelihood activities, as many households often complement their farming with off-farm activities (Horton & Samanamud, 2012; Zimmerer, 1998). Escobal (2001) found that on average 51% of income in the rural areas of Peru is derived from sources other than the household farm – either from off-farm activities or agricultural wage labor. Out-migration from rural areas is also common (Ho & Milan, 2012). In the highlands, the type of activity diversification that households pursue varies by poverty status (Escobal, 2001). Poorer households tend to enter agricultural wage labor, whereas wealthier households engage in self-employment or non-farm wage labor.

Although agriculture comprises only about 7% of GDP in Peru, it nonetheless remains one of the most important economic activities in the country, particularly true in the rural highlands (Ho & Milan, 2012; USAID, 2011). Escobal (2001) found that two-thirds of the population in the highlands relies on their own farms to satisfy their basic necessities. Agriculture in the highlands is primarily small-scale in nature, as most producers cultivate less than five

hectares of land (Thiele, 1999). In the Andean region, traditional farming practices and knowledge that have evolved over hundreds of years mark agricultural production (Zimmerer, 1996). Developed by the indigenous groups who populate the highlands, the traditional agricultural systems are steeped in on-farm diversity, an observation made by Brush (1992):

> From their point of view [of Andean farmers], diversity is natural and a given of the Andean ecosystem, rather than something strange or unusual to be explained. They manage one of the most heterogeneous and complex agroecosystems in the world, and diversity within a single crop and a single field is a logical corollary of the variety of the world around them (p. 179).

The impressive diversity that exists in the Andes, which extend from Venezuela to Argentina, begins with the wide-ranging climatic conditions that are present. Vast as the Andes are, it is geographically separated into three regions; Peru is home to the central highlands portion which extend from northern Peru south to northeast Argentina and displays a wide range of ecosystems and micro-habitats (Antezana et al., 2005; Brush, 1982; Zimmerer, 1998). Peru contains 28 of 34 climates that exist in the world, most of which are experienced in the Andes (Ho & Milan, 2012; Zimmerer, 1996). Climatic diversity, coupled with dramatic altitude changes that occur in the Andes, provide fertile ground for biodiversity: the Tropical Andes, which encompasses nearly the entirety of the Andean chain, contains 45,000 plant species, 20,000 of which are endemic (Myers, 2000). Unfortunately, the region has been identified as 1 of 20 biodiversity hotspots on the globe, meaning it is an area "featuring exceptional concentrations of endemic species and experiencing exceptional loss of habitat" (Myers, 2000, p. 853).

Commonly populating the mountain valleys of the central highlands, Andean farmers have developed agricultural practices over thousands of years that are adapted to the harsh environmental conditions (Brush, 1992, 1995; Mayer, 2002; Stadel, 2008; Zimmerer, 1996). Historically, Andean communities have aimed to access production zones at different altitudes in order to diversify production (Mayer, 2002; Zimmerer, 1996). Pasture in the highest of altitudes where the cold temperatures made crop cultivation difficult was reserved for grazing animals and

parcels extended downward through different production zones where a diverse array of crops could be grown, including roots and tubers, cereals, and grains (Brush, 1982, 1992; Mayer, 2002; Zimmerer, 1996, 2003). Crops were rotated through different parcels with several years dedicated to fallow in order to regenerate soil (Bianco & Sachs, 1998; Brush, 1992; Zimmerer, 1996). Across these landscapes, land management is done individually and collectively (Mayer, 2002). Most plots receive water through rainfall, though many communities have irrigation systems that connect to some production zone areas (Bianco & Sachs, 1998; Zimmerer, 1996).

In highland communities, diversity across and within crops is prominent. Native tuber crops still found in the central highlands include potato, oca, mashua, ulluco, and achira; common root crops are maca and mauka (Flores, Walker, Guimaraes, Bais, & Vivanco, 2003). Maize, which appeared in the Andes an estimated 5,000 years ago, has up to 6,000 cultivars present in Peru, and quinoa was adapted to different environmental conditions by Andean farmers over the course of thousands of years (Zimmerer, 1996). Of the crops cultivated in the Peruvian highlands, the potato is the most important (Brush, 1992, 1995; Mayer, 2002; Meinzen-Dick et al., 2009; Thiele, 1999). Domesticated an estimated 6,000 years ago, an estimated 5,000 landraces are in existence, most of which are cultivated above 3,500 meters (Brush, 1992; Horton & Samanamud, 2012; Meinzen-Dick et al., 2009; Zimmerer, 1996). Landraces are diverse varieties of crops that are adapted by farmers to environmental conditions and have unique traits:

> Land races have a certain genetic integrity. They are recognizable morphologically; farmers have names for them and different land races are understood to differ in adaptation to soil type, time of seeding, date of maturity, height, nutritive value, use, and other properties. Most important, they are genetically diverse (Harlan, 1975, p. 618).

Although smallholder farmers have historically been the keepers of the diverse array of native potato varieties, they have needed to adapt to changing historical circumstances (Stadel, 2008). The tributes that farmers had to provide to the Inca empire in the form of crops were limited in their diversity, as were the crops grown for haciendas during Spanish colonial rule.

Nonetheless, during both eras, agrobiodiversity was maintained on the small plots that households cultivated for home consumption. Specific landraces were selected based on the culinary attributes that households preferred (Zimmerer, 1996). Culinary preferences intersected with what is considered a "fit livelihood," an Andean ethic that prescribes ideal conditions including vertical access to land, the cultivation of diverse crops, and consumption satisfaction (Zimmerer, 1996, p. 21). The potato also figures prominently in Andean myths, rituals, and religious festivals (Graves, 2001; Zimmerer, 1996). According to Rist (2000), the way in which potato production mediated social relationships and was harmonized with ritual celebrations helped embed a strong ethical constitution into the Andean economy.

Beyond the cultural components, diverse landraces offer other functional benefits. Farmers have adapted their landraces upwards in altitude so that they can increasingly withstand cold temperatures, particularly important since frosts are occurring more frequently due to intensified climatic variation, a trend that is expected to continue (Brush, 1992; Perez, 2010; Silva et al., 2006). It should be noted, however, that many native varieties have not been found to be particularly resistant to pests, disease, or drought (Brush, 1992). Health advantages can also result from potato agrobiodiversity. The fourth most important staple crop globally, potatoes are low in fat and are good sources for several micronutrients (Lutaladio & Castaldi, 2009). Because potatoes contribute protein, iron, and vitamin C to the diets of rural peasants in the Peruvian highlands, researchers have suggested that landraces rich in these nutrient sources be used as the basis for formal breeding efforts help address the chronic malnutrition in the region (Rose et al., 2009).

The introduction and increasing adoption of improved varieties since the 1950s has caused concern that potato agrobiodiversity is eroding as native varieties are replaced by those that are high yielding (Perez, 2010; Scurrah, Winge, & Andersen, 2008). Despite such predictions, evidence exists that households continue to cultivate diverse varieties of native

potatoes even as they adopt improved varieties (Brush, 1992; Mayer, 2002; Zimmerer, 1996). In the 1990s, hundreds of landraces were still being found in Andean valleys in the central and southern highlands and individuals households continued to produce between 10-12 native varieties on average (Brush, 1992, 1995). Zimmerer (1998) found even higher levels of potato diversity in southern Peru, where 21 varieties were cultivated on average per field.

Nonetheless, improved seed and changing market conditions mean that new decisions are facing household regarding how to balance their potato production across the purposes of home consumption, seed, and market (Brush, 1992; Rist, 2000; Zimmerer, 1996, 2003). Studies over the last two decades have shown wealthier farmers with better access to agricultural resources, including more labor, land, and livestock, are becoming the keepers of agrobiodiversity (Bianco & Sachs, 1998; Mayer, 2002; Zimmerer, 1996). Less endowed farmers have been shown to be shifting their production to improved varieties or other commodities for markets, and the pressures that come along with this type of production has meant that chemical inputs are increasingly used, fallow periods are shorter, and that commercial varieties are replacing diverse crops in fields (Zimmerer, 1996). The resulting environmental degradation should help diminish any tendency to overly romanticize current Andean agriculture (Mayer, 2002). More recently, a study concluded that agricultural production among low-resource households is increasingly focused on home consumption (Horton & Samanamud, 2012). The authors summarize that "over time, a declining number of potato farmers is producing and marketing an increasing share of the potatoes" (p. 4). Thus, as has happened historically, Andean agriculture appears to be undergoing changes as it interacts with important structural shifts.

Pro-poor native potato value chains

As described above, rural households in the Peruvian highlands continue to confront economic and food security challenges, despite the strides that Peru has made nationally. These chronic problems have presented the International Potato Center (CIP) with opportune conditions to experiment with pro-poor value chain development (Devaux et al., 2009). Headquartered in Lima, Peru, CIP is a CGIAR member whose mission is to address poverty, food insecurity and gender inequality through research for development focused on root and tuber crops. Given that the potato continues to be the most important staple crop produced in the Andean highlands and is a popular product for a rapidly urbanizing population, CIP has recently dedicated extensive efforts to upgrading the market opportunities available to smallholding potato producers in the highlands (Horton & Samanamud, 2012; Ordinala et al., 2011; Proexpansión, 2011). Between 1998 and 2011, CIP coordinated the Papa Andina Initiative, the focus of which was to create market niches which are competitively advantageous for poor potato producers of the Andean highlands (Hellin & Higman, 2005; Meinzen-Dick et al., 2009). Papa Andina has taken a systems approach, working to stimulate demand for the diverse potato varieties that Andean farmers cultivate while and addressing production constraints confronted by smallholding farmers (Meinzen-Dick et al., 2009).

Within the Papa Andina Initiative, CIP led the Project for Promoting Competitiveness of the Potato Sector (INCOPA) in Peru, the idea of which was to establish partnerships among stakeholders in the private and public sector to make the potato chain more competitive and more advantageous for smallholder farmers (Ordinola et al., 2011). Using the Sustainable Livelihoods (SL) framework as a guide, CIP identified the opportunities and challenges confronting these rural households. Climatic conditions, low market prices coupled with high transaction costs, inadequate health conditions and dietary diversity, smallholdings of land, poor soil quality, lack of access to credit, and low education contributed to vulnerability (Escobal & Cavero, 2012;

Meinzen-Dick et al., 2009). At the same time, Papa Andina also recognized that smallholding farmers possessed important resources that could give them a competitive advantage in a value chain that demanded the native potato varieties that they cultivated at 3,500 meters and above (Meinzen-Dick et al., 2009; Ordinola et al., 2011; Thiele & Devaux, 2011). As Meinzen-Dick et al. (2009) explain:

> Papa Andina has picked up on what people do have – the strong social capital and the often overlooked assets of diverse potato varieties, especially native potato and the knowledge of how to grow them, plus the cultural heritage of the communities who have been growing potatoes for generations (p. 241).

The native varieties were viewed as key; since smallholding producers in the highlands are commonly the conservers of agrobiodiversity, developing market chains based on these potatoes would present these producers with a comparative advantage (Meinzen-Dick et al., 2009; Thiele & Devaux, 2011).

The challenge of leveraging these assets and integrating smallholding producers into potato value chains was addressed through the development of a new methodology, the Participatory Market Chain Approach (PMCA). By forming partnerships among stakeholders in the public and private sector, PMCA reflects the hybrid governance that is emerging as a pro-poor development approach (Bernet et al., 2011; Bloom, 2013; Hellin et al., 2009). PMCA seeks to explicitly integrate Corporate Social Responsibility (CSR) into the market chain in a manner that is inclusive, relies on partnerships, and spurs innovation (Thomann et al., 2011). PMCA requires identifying the important supply chain actors, encouraging those actors to collaboratively assess market opportunities, and then implementing activities to take advantage (Bernet et al., 2011).

To navigate this process, an array of stakeholders must be included: direct market chain actors (farmers, distributors, processors, retailers, restaurants, etc.) collaborate among one another and with any combination of researchers, NGOs, and policymakers (Devaux et al., 2011). Through interaction, the idea is that mutual learning will occur, trust will be enhanced, and

innovation will be achieved (Bernet et al., 2011; Devaux et al., 2011). Smallholding farmers who participate commonly do so through membership in a farmer association so that they can overcome their production limitations[5] (Bernet et al., 2002; Thomann et al., 2011). What has emerged in Peru as a result of PMCA is the introduction of several new potato products, including sacked whole native potatoes sold in supermarkets as a gourmet item, instant mashed potatoes, and potato chips (Ordinola et al., 2011). Most notably, a partnership established in 2007 with PepsiCo, owner of Frito Lay's, led to the development and sale of Lay's Andinas, the colored native potato chip product line (Thomann et al., 2011). Due to its relevance to this study, the background of the PepsiCo partnership will be further described in Chapter Five.

The focus on potatoes that has taken place appears to have had success in Peru nationally, for both production and consumption have experienced sustained growth since the 1990s when the potato sector was devastated due to the effects of land reform and terrorism (Horton & Samanamud, 2012; Proexpansión, 2011; Scott, 2011). However, questions exist about the actual inclusivity of these potato value chain initiatives. Escobal and Cavero (2012), for example, assessed the impacts of a separate initiative potato value chain initiative in Peru also involving PepsiCo and the NGO FOVIDA. In that study, findings indicated that producers who have higher education levels, larger plots of land, better access to credit and inputs, and higher involvement in social organizations are more likely to participate in contracts with PepsiCo, causing concern that this new market opportunity is marked by inequality. Other uncertainties also remain. Studies have shown that farmers able to participate in pro-poor potato value chains reap income benefits (Buckley, 2013;

[5] According to Bernet et al. (2002), many Peruvian peasants are skeptical of joining farmer associations because the cooperative model that had come into existence in the 1970s in the aftermath of land reform failed when the state expropriated hacienda land and commonly distributed it to cooperatives as opposed to individuals (Mayer, 2009). The lack of confidence that Peruvian smallholding farmers have towards associations appears to challenge the assumption of CIP that strong intra-community relationships can be leveraged to mobilize collective action.

Cavatassi et al., 2011; Escobal & Cavero, 2012; Proexpansión, 2011; Thomann et al., 2011), yet very limited evidence exists regarding food security impacts (Buckley, 2013).

Summary

My intention in introducing the history of the Papa Andina Initiative has been to achieve two objectives: 1) provide context for the case which is the focus of this study and 2) highlight how this case reflects broader theoretical trends related to pro-poor value chains. The scant evidence that exists regarding experiences with potato value chains in the Peruvian highlands translates into a need for further analysis so that program decisions can be based on evidence. The native potato value chain also exists within a broader structural context, in which, among other forces, political economic and development rhetoric and processes shape the way in which projects are constructed, implemented, and evaluated. Pro-poor development has emerged in a particular historical moment. In tracing the trajectory of economic development, I intended to set the stage for the arrival of value chains and the way in which they are articulated as a pro-poor approach that can deliver desirable outcomes for the livelihoods of smallholding farmers. My exploration of governance issues within these value chains intended to articulate exactly how value chains are conceived of as pro-poor and identify specific content areas that are not well understood. In doing so, I highlighted that more attention must be dedicated to the livelihoods of smallholding farmers and how they interact with and experience value chain opportunities. I attempted to engage with the expansive concept of livelihoods through a discussion of the themes that are particularly relevant to this study. In selecting these conceptual areas, I was guided by the assets identified by CIP as most important to the smallholding farmers in the Peruvian highlands: social capital, local knowledge, and agrobiodiversity. In considering Peru specifically, I aimed to ground the discussion and exhibit how the various conceptual strands explored in the literature

review play out in actuality. Through this discussion, my hope is that I have demonstrated the context in which this case study is embedded and highlighted that research is needed to further understand the dynamics of pro-poor value chains.

Chapter 3

Theoretical Framework

Introduction

The review of literature in Chapter Two intended to explore concepts relevant to this study. I attempted to explain the broad economic forces at play and indicate that these structural factors help shape the contexts in which people live. Developed as a mechanism to encourage pro-poor growth, value chain governance serves as an important link between global economic processes and the livelihoods of the rural poor. Investigating how stakeholders engage with pro-poor value chains, and how smallholding farmers in particular interact with new market opportunities, constitutes a necessary research agenda (Bolwig et al., 2010; Donovan & Stoian, 2012; Mutersbaugh et al., 2005). To account for the development objectives of pro-poor value chains, livelihoods is a useful concept, for they encompass the resources, activities, and outcomes of rural households and consider the context in which they live (Donovan & Stoian, 2012; Meinzen-Dick et al., 2009). Understanding that development interventions also have implications for non-participants requires expanding analysis to better explain wide-ranging effects (Bolwig et al., 2010; Moser, 2008; Mosse, 2004). The challenge is complex: both the vertical relationships among market chain actors and the horizontal relationships within communities must be considered (Bolwig et al., 2010; Tallontire, 2007). Using Norman Long (2001) as a theoretical basis, this chapter presents the theoretical framework guiding this study which seeks to account for the multi-dimensional dynamics of pro-poor value chains and overcome the common limitations of livelihoods analysis discussed at length in Chapter Two (Scoones, 2009).

Actor-oriented perspectives

Long (2001) and his insights related to development sociology in the form of Actor-oriented Perspectives (AP) provide the theoretical backbone of this study. Based in social constructionism, Long avoids a version of reality based on *a priori* assumptions and instead opts for a dynamic view of the world, one which evolves dialectically. In doing so, Long embraces the assorted array of meanings and values embedded within action while also understanding that institutions are influential in patterning behavior. AP contends that peasant decision-making is unpredictable as structural forces interact with the subjective meanings and social values of actors. As people come into contact with capitalist markets, the outcomes are not uniform; not all people base their economic decisions solely on the demands of the market or transform their economic activities to those that are purely competitive (Long, 2001). Instead, economic value mixes with social values, creating not either the acceptance or rejection of capitalist logic, but complicated blends of values that are socially negotiated:

> commoditization processes take shape through the actions of a diverse set of interlinked social actors and are composed of specific constellations of interests, values and resources. Commoditization has no given and necessary trajectory, except that negotiated by parties involved, and as a process it is never 'complete'….In this way things are seen to move in and out of the status of being a commodity or are viewed by the same or different persons as simultaneously embodying both commodity and non-commodity values (p. 108).

Long (2001), thus, does not deny that the logic of the capitalistic firm is a present and influential force but simply recognizes that it can co-exist with and converge with other rationalities in unique ways that guide decisions and action.

In this point, Long (2001) theoretically roots himself in Chayanov (1986). Analyzing the persistence of Russian peasants in the early 20th century despite predictions to the contrary made by Marx (1977) and Kautsky (1988), Chayanov (1986) contended that peasant households operated as a single economic unit that pursued a balance between household well-being and the

drudgery of labor. They, therefore, operated according to a distinct logic from the capitalistic firm guided by mathematical calculations. Production decisions were based on the desire to fulfill the needs of the family, so landholdings and labor time fluctuated based on the lifecycle of the household; larger households and those with more dependent members required a different labor-consumption balance than smaller households or those with more labor availability (Chayanov, 1986).

Chayanov understood that peasant households did not operate in isolation, unaffected by natural conditions or market opportunities. Capitalist markets did penetrate the countryside and the degree of their presence influenced the decision-making of peasants. However, peasants incorporated market opportunities into their own logic – the pursuit of an optimal balance between labor and well-being. This, according to Chayanov, was Marx's (1977) fundamental miscalculation in predicting the demise of peasants: Marx assumed that the spread of capitalism would mean that capitalist categories were universally appropriate. Instead, different economic logics could co-exist simultaneously, disrupting the accuracy of Marxist class categories. Despite Chayanov's theoretical insights, they were largely ignored by the dominant discourses of modernization and structural Marxism (Mann & Dickinson, 1978; Rostow 1959; Vandergeest, 1988). As neoliberalism began to take hold in the 1990s, Chayanov's (1986) basic observation that the peasant household is distinct from the capitalistic firm also experienced re-emergence, most explicitly in the works of van der Ploeg (2008) and Long (2001) (Buttel, 2001).

Although rooted in Chayanov (1986), Long (2001) even more explicitly bases his theorization of the development process in social constructionism. Because AP conceptualizes development as a dynamic and negotiated process, the dialectic outlined by Berger and Luckmann (1967) provides a useful foundation. Berger and Luckmann posited that reality is an ongoing process that unfolds according to the way that individuals iteratively internalize and then reproduce external objectivity; subjective and objective realities evolve dialectically. Livelihoods

analyses, therefore, must understand the ways in which actors interact with situations and reproduce their realities. Investigations that avoid homogenizing the reasons for decisions will provide clearer evidence on which development organizations can base their programming instead of misconstrued understandings of the motivations for which people act (Long, 2001). Because people interact with and exert their influence on realities in varying ways, development is not a linear process that adheres to deterministic ends. Reality does not proceed according to the aggregated actions of deliberate and calculating actors but in a complex web of social relations that are filled with a multiplicity of meanings, values, reasons, subjective experiences, rationalities, and ethics.

To capture the dynamics at play, AP emphasizes the importance of investigating the processes of development interventions. Studies must be centered on problems relevant to the actors involved and pursue in-depth understandings of how these actors – which may include development practitioners, intended beneficiaries, and onlookers among others – engage with intervening forces as well as with one another (Long, 2001). With strong echoes of social constructionism, Long (2001) explains:

> One advantage of the actor approach is that one begins with an interest in explaining differential responses to similar structural circumstances, even if the conditions appear relatively homogenous. Thus one assumes that the differential patterns that arise are in part the joint creation of the actors themselves. Social actors, however, must not be depicted as simply disembodied social categories (based on class or some other classificatory criteria) or passive recipients of intervention, but as active participants who process information and strategize in their dealings with various local actors as well as with outside institutions and personnel (p. 13).

Development interventions that assume similar outcomes regardless of context distort the process that occurs in actuality. Goals and objectives of externally planned interventions are transformed when they enter the everyday realities of individuals. This does not preclude that structures influence action; patterns can emerge based on certain characteristics that actors share and these are important in reproducing structures. Long (2001) helps elucidate this point when he observes

that individuals' active engagement or avoidance of particular forms of economic transactions contribute to the structure of market relations.

Highlighting the dialectical process of development, Long (2001) opens room for the needed linkage between the macro and the micro. Development projects are constructed and implemented within a normative discourse and thus deliver structural forces to local sites (Scoones, 2009). Outcomes of these interventions, however, are not pre-determined; they depend on the reactions and responses of individuals expressed in their livelihood decisions. Thus, sites of interaction between sets of different actors are critical to examine to better understand the process by which conflict, worldviews, power, and discourses are negotiated and contested (Long, 2001). These interfaces are where different scales and the meanings and values embedded within them meet:

> Rather than seeing the 'local' as shaped by the 'global' or the 'global' as an aggregation of the 'local', an actor perspective aims to elucidate the precise sets of interlocking relationships, actor 'projects' and social practices that interpenetrate various social, symbolic and geographical spaces. In order to examine these interrelations it is useful to work with the concept of 'social interface' which explores how discrepancies of social interest, cultural interpretation, knowledge and power are mediated and perpetuated or transformed at critical points of linkage or confrontation (p. 50).

Thus, social interfaces provide analytical opportunities to assess cross-scalar interactions and the mix of discourses, knowledge, and rationalities that converge.

Theoretically, the insights of AP help to resolve two of the major shortcomings of livelihoods frameworks like SL. By explicitly validating partial knowledge sets and multiple realities, AP avoids the reductionistic assumptions embedded in using capitals to describe resources. Economic language makes it too easy, despite the efforts of some to do otherwise (for example, Bebbington, 1999), to ignore the "multiplicity of rationalities, desires, capacities and practices, including of course those also associated with various modes of instrumentalism" people use to make decisions (Long, 2001, p. 15). Because of the slippery slope that using 'capitals' presents, I will, from this point on, opt for 'resources' as opposed to 'capitals.' Further,

the analytical concept of social interfaces provides the opportunity to link livelihoods that operate in micro contexts with broader structural forces, a point Scoones (2009) observes is necessary to advance livelihoods analysis. Using these insights of Long to guide this livelihoods analysis, the following model represents the conceptual framework:

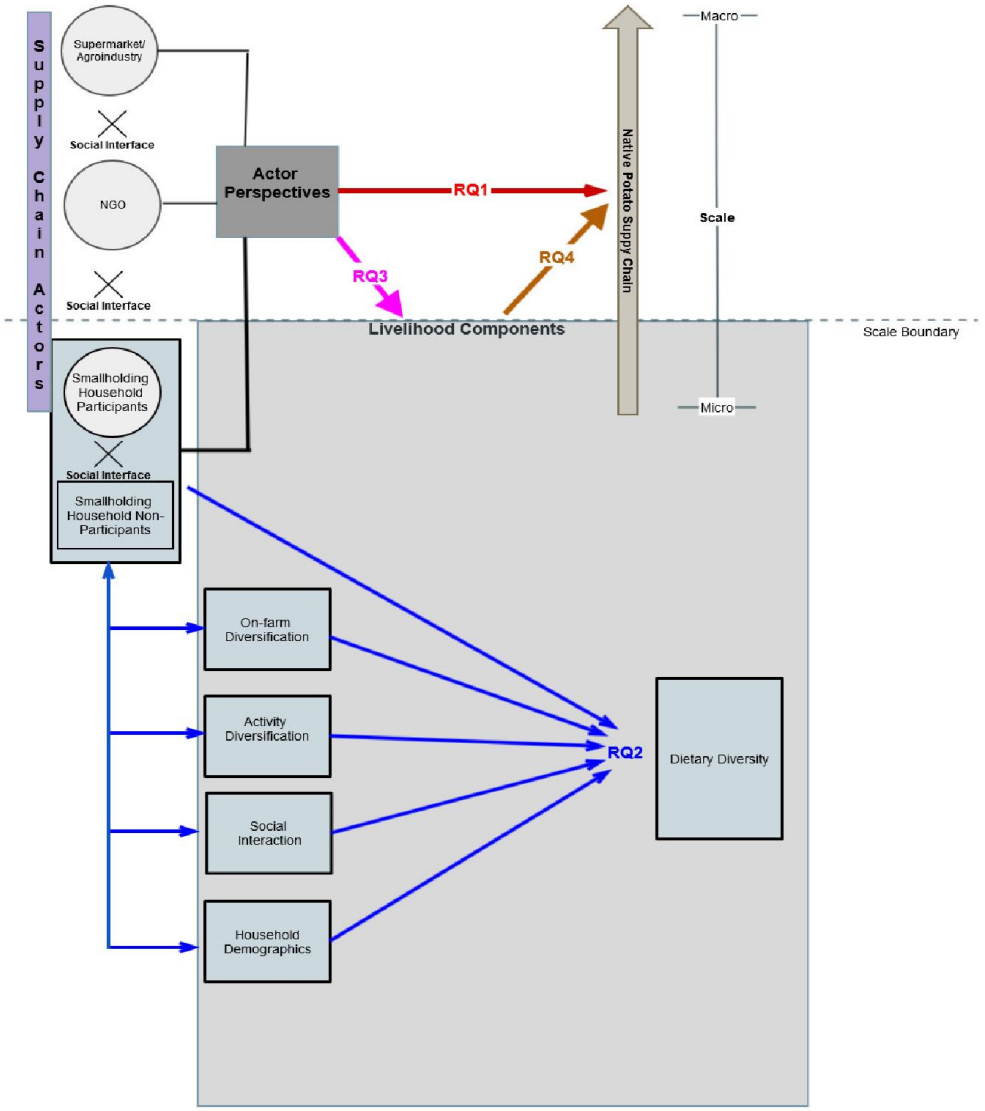


Figure 3-1. Conceptual framework.

This diagram conceptualizes theoretical linkages that exist across and within scales of native potato value chains with a focus on livelihoods. Considering the theoretical framework, the following research questions guide this study:

1) What are the perspectives of development actors, and especially community members, regarding efforts to develop value chain linkages for smallholding native potato producing households?
2) What is the relationship between and among project participation and other predictors including on-farm diversification, livelihood activity diversification, social interaction, and household demographics, and the dependent variable of dietary diversity?
3) How do native potato value chain stakeholders, and especially community members, understand the concepts of on-farm diversification, livelihood activity diversification, social interaction, and dietary quality?
4) How do livelihood decisions affect the structure and function of native potato value chains?

Using Long (2001) as its guide, Research Question 1 investigates how different supply chain actors, and especially smallholding households, perceive native potato value chains as a way to better understand the priorities and values at play. Following the recommendations of scholars who have called for better considerations of local dynamics during the implementation of pro-poor value chains (Mutersbaugh et al., 2005; Bolwig et al., 2010), I extend analysis to the livelihoods of smallholding participating and non-participating households. Grounded in a livelihoods approach, Research Question 2 investigates the livelihood patterns among participating and non-participating households. However, as Long (2001) makes clear, multiple realities exist and so in Research Question 3, I seek to elicit the diversity in perspectives that

exists among actors regarding relevant livelihood concepts. Admittedly, the concepts that reflect livelihoods in this study are not comprehensive. Through my literature review, I have opted to include the concepts that appear to be particularly apt for rural Peruvian households. In doing so, I recognize that I fill the role as an outside expert categorizing and constructing the lives and experiences of the households under study and so by allowing households themselves to reflect on these concepts, my intention is to recognize and validate multiple sets of knowledge. Finally, as Long (2001) asserts, the perspectives and decisions of actors hold implications for structural phenomena. Research Question 4, therefore, explores this dynamic of the dialectical process in order to explore how the livelihood decisions of participating and non-participating households affect the organization and function of native potato value chains.

Selection of concepts

Before proceeding to Chapter Four, where I describe the methodological approach of this study, I think it worthwhile to briefly explain my justifications for the livelihood concepts which I have selected. Given that livelihoods approaches intend to present multi-dimensional representations of local contexts, essentially everything that exists in a particular micro-reality can be viewed as relevant. The difficulty in comprehensively accounting for livelihoods quickly becomes apparent: health and food security can be viewed as both a resource and an outcome, as can the natural resource base (DFID, 2001; Donovan & Stoian, 2012). Education, social relations, natural resources, and perceptions to climate change have all been considered as livelihood resources, and this list is not complete (Antezana et al., 2005; Below et al., 2012; Donovan & Poole, 2011; Liang, Li, Feldman, & Daily, 2012; Morse & McNamara, 2012). Given the extensiveness of the livelihoods concept, therefore, decisions must be made regarding what specifically will be included in a study.

Dietary diversity

Since alleviating food insecurity was an explicit goal of the Papa Andina Initiative, it will be considered in this study as a livelihood outcome in the form of dietary diversity. Given that the World Bank (2011) identifies malnutrition as a more serious problem than lack of calories in Peru, dietary diversity appears to be a more relevant dimension than quantity of calories. Dietary diversity, considered to be the number of food groups consumed by a household over a given reference period (Arimond & Ruel, 2004; Hoddinott & Yohannes, 2002; Ruel, 2003), has been validated as an important indicator of dietary quality and has been linked to higher levels of consumption, better nutritional outcomes, and improved socioeconomic status (Arimond et al.,2011; Arimond & Ruel, 2004, Hoddinott & Yohannes, 2002; Swindale & Bilinsky, 2006).

Project participation

Project participation serves as a key variable, for it provides insight into differences among those households who participate in native potato value chains and those who do not. Highlighting this variable allows for deeper analysis to better understand how value chain participation is an indicator for other differences among household livelihoods. Doing so extends development analysis beyond only smallholding farmers who access these types of market chains to also incorporate, importantly, the onlookers of development (Bolwig et al., 2010; Little, 1994; Long, 2001).

On-farm diversification

On-farm diversification in the form of crop diversification and agricultural activity diversification have been recognized as important livelihood strategies (Mehta, 2009). This is

particularly relevant for Andean peasants who have long incorporated diversity into their traditional agricultural practices. Accessing a diversity of landscapes, cultivating a variety of crops generally and potatoes specifically, and tending multiple animals all constitute important aspects of Andean agriculture (Bianco & Sachs, 1998; Brush, 1992; Mayer, 2002; Rist, 2000; Valdivia & Quiroz, 2003; Zimmerer, 1996). In addition, on-crop diversification can also help provide insight into resources available to households. In particular, households that continue to pursue aspects of diversity that characterize traditional Andean agriculture likely rely on traditional knowledge and potato agrobiodiversity, both of which were identified by CIP as important resources to leverage when developing native potato value chains (Meinzen-Dick et al., 2009).

Activity diversification

Expanding labor off the farm has been identified as an important livelihood strategy for rural households to buffer against risk and reduce vulnerability (Barrett et al., 2001; Dorward et al., 2009; Ellis, 1998; Scoones, 1998; Validivia et al., 1996). Activity diversification is likewise a growing trend in Peru, where Escobal (2001) found that on average 51% of income of rural Peruvian households derive their income from sources other than their farm. Horton and Samanamud (2012) concur that many rural households are increasingly looking to other economic sectors such as mining, construction, and other commercial ventures to generate capital. Conceptualized by SL as a mediator between resources and livelihood outcomes, activity diversification is therefore essential to assess when analyzing dietary diversity (DFID, 2001; Scoones, 1998).

Social interaction

In addition to traditional knowledge and agrobiodiversity, strong social relationships among households within communities was another available resource identified by CIP as critical to leverage for collective action among smallholding potato producers (Meinzen-Dick et al., 2009). Although CIP characterized these relationships as social capital, I attempted to demonstrate the theoretical limitations of social capital in Chapter Two. Instead, using in interactional theory (Wilkinson, 1991), I consider interaction a less ambiguous approach in order to account for social relationships and collective action (Brennan & Luloff, 2007; Bridger & Luloff, 2003).

Household demographics

Demographic variables are commonly incorporated into food security studies as control variables that help to account for the differential influence of characteristics that have been identified as important to food security status (Arimond et al., 2011; Arimond & Ruel, 2004; Babu & Sanyal, 2009; Johnson & Christensen, 2012). Using previous studies to inform the inclusion of specific demographic variables, the following characteristics constitute household demographics: size of the household, age of household head, household age dependency ratio, household structure (single-headed or double-headed), educational status of household head, and social status (Arimond et al., 2011; Babatunde et al., 2007; Belachew et al., 2012; Leah et al., 2012; Maharjan & Joshi, 2011; Mallick & Rafi, 2010).

Chapter 4

Methodology

This study uses a mixed methods approach to answer its research questions. Survey research and semi-structured interviews were used to gather the bulk of the data, supplemented by participant observation and secondary data. Utilizing mixed methods requires consideration across the scope of methodology: from philosophical assumptions to data analysis (Creswell & Plano Clark, 2011). This chapter, therefore, aims to address all of these methodological aspects through the following sections: 1) philosophical considerations, 2) researcher positionality, 3) type of study, 4) units of analysis, 5) site selection, 6) population and sample, 7) operationalization of concepts, 8) validity and reliability, 9) data collection, 10) data analysis, 11) data quality, and 12) limitations.

Philosophical considerations

Methods inherently carry implicit philosophical assumptions, although these often receive scant attention by researchers (Creswell & Plano Clark, 2011). My intention in this section is to avoid that oversight and to elucidate the philosophical orientation underlying this research project. Quantitative methods are often marked as a postpositivist approach, which begins with the acceptance of an external reality and views the scientific method as able to generate objective knowledge about the nature of that external reality to the greatest extent possible. Qualitative methods are often thought to stem from constructivist paradigms which assert that subjective experiences produce the world in which we live and so this strand of inquiry focuses on better understanding multiple realities and partial knowledge sets (Creswell, 2007;

Creswell & Plano Clark, 2011; Johnson & Gray, 2010). Based on these distinct – and seemingly contradictory – epistemological orientations, debate exists regarding the potential contradiction that mixed methods carry (Greene & Hall, 2010). While not exclusively, mixed methods often seek to resolve this contradiction with an appeal to pragmatism, in which the primary questions are not philosophical but rather, simply, what works to best answer a given set of research questions (Biesta, 2010; Creswell & Plano Clark, 2011; Small, 2011; Teddlie & Tashakkori, 2010). According to Biesta (2010), pragmatism roots itself in the interactions between experience and environment and so knowledge and action operate in an iterative process. Emphasis, then, is placed on consequences and potential solutions and not on epistemological foundations (Small, 2011).

As an applied research project, this study demands that attention was most immediately dedicated to the research problem. As such, this study has affiliations with pragmatism, for the methods I selected were based on gathering the kind of information necessary to best address the problem (Teddlie & Tashakkori, 2010). In conducting this study, my methodological concerns centered on gathering useful and commensurate data, not harmonizing philosophical inconsistencies; I view chronic malnutrition and skewed market relations as more immediate and important problems to address than epistemological musings. Yet, I also recognize that the theoretical framework I have constructed to guide this study is rooted in social constructionism and so inherently imports philosophical assumptions. As such, I do think it important, albeit briefly, to engage with the epistemological implications of using mixed methods within a framework so staunchly based in subjective knowledge.

Although Creswell and Plano Clark (2011) identify constructivism as one viable philosophical worldview under which mixed methods can be used, serious questions do present themselves regarding how quantitative methods, typically associated with objective knowledge, can be implemented without contradiction. This is precisely the problem that I think Berger and

Luckmann (1967) were confronting when they explicitly characterize their work as contributing to the sociology of knowledge and not to epistemological questions. And yet, despite their evasion of epistemological questions, the theory presented by Berger and Luckmann (1967) can, I think, help resolve the tensions that exist in using mixed methods that valorize both objective and subjective knowledge.

To arrive at my point, a brief consideration of Berger and Luckmann (1967) is necessary. According to their theory, reality is socially constructed through the ongoing process of externalization, objectivation, and internalization. Externalization occurs when consciousness is expressed outwardly through the use of mechanisms (objects, signs, symbols, gestures, language, etc.) that reflect subjective experiences. Objectivation occurs when the expression of consciousness produced by a person – whether material or non-material – becomes separate from the producer. These objects and meanings, created by humans, exert a power of their own and therefore regulate behaviors and understandings. Humans then internalize the objective world back into their own subjectivity, meaning that consciousness is, in part, ordered by an objective yet socially constructed world. Through this dialectical process, people both act and are acted upon by objective reality. Structures and conditions are not predetermined but are continually reproduced and reinterpreted, sometimes in unpredictable ways.

As a theory that posits that subjective experience is primary in constructing the world, the need for qualitative methods, often associated with constructivism, is apparent. More difficulty, however, arises when considering the validity of quantitative methods, often associated with postpositivism and the idea that the scientific method can verify an external reality (Creswell & Plano Clark, 2011; Johnson & Gray, 2010). In other words, if the world is socially constructed, what could the place possibly be for methods that seek to reveal a singular, objective knowledge? However, if the objective knowledge is repositioned as knowledge of the objectivated within the social constructionist framework, then the inconsistency is eased. According to Berger and

Luckmann (1967), subjective experiences reproduce an objective reality full of the material and non-material. Presumably, some of that non-material objective reality such as structures, institutions, and discourses extends across subjective experiences and scales up. Johnson and Gray (2010) concur, contending that Berger and Luckmann "interconnect the macro, meso, and micro" (p. 84). If this is the case, more comprehensive analysis occurs when research can account for different scales, for which mixed methods is particularly useful (Johnson & Gray, 2010). Extending the argument one step further: if different sets of knowledge exist, an assumption that is present in both constructivist and pragmatic paradigms, then different kinds of knowledge can provide different kinds of insights at different scales (Jones, 2013). Scientific inquiry that seeks to generalize, as quantitative methods typically do (Creswell & Plano Clark, 2011), therefore, is well positioned to represent that objective reality which influences subjective experiences across contexts - at least in a cross-sectional moment during the ongoing dialectical process between subjectivity and objectivity. Elaborating a sociology of quantification, Espeland and Stevens (2008) remind us that the process of quantitative measurement is part of the process of social construction; it contributes to institutionalizing and formalizing social categories and characteristics.

For this study, quantitative methods provide insight into the generalizability of socially constructed concepts across contexts; they assess and contribute to the way in which structural and institutional aspects of objective reality influence individual experiences. Quantitative methods provide one set of knowledge among many that help expand understandings of a socially constructed world that is constituted by both subjective and objective realities. In this way, mixed methods are particularly effective in providing a comprehensive depiction of reality. According to Small (2011), complementarity - "the ability of one type [of data] to compensate for the weaknesses of the other" – provides one of the primary benefits of mixed methods since any given type of data can only offer partial knowledge (p. 64). Creswell and Plano Clark (2011)

agree, asserting that quantitative data is better at generalizing while qualitative data more effectively account for meanings and experiences. Mixed methods, therefore, are particularly apt for this study, for my intent in using Long (2001) is to investigate native potato value chains across scales in a way that accounts for both lived experiences and patterns of behavior.

Researcher Positionality

Based in constructivism, this study is explicit in its assertion that researchers are active participants in the production of knowledge. All aspects of a study are filtered through the perspective of the researcher and so the assumptions imported by researchers into the research process are of consequence (Creswell, 2007; Emerson et al., 1995). Given the epistemological discussion in which I engage above and which inevitably carries with it insights into my subjective worldview, I think that this moment is most appropriate to discuss my positionality as the researcher conducting this study. As an entry point with an immediate connection to the conceptualization and execution of this study, the genesis of this research project is where I first turn my attention.

As I am specializing in Agricultural and Extension Education, I think it important to consider that this discipline emphasizes the importance of applying social science to real world problems. Given this focus, I believe that an easy allegiance can exist between pragmatism and Agricultural and Extension Education as a discipline; results and outcomes should be prioritized over ontological and epistemological considerations.[6] It was, thus, from a pragmatic perspective

[6] I recognize that the history of Agricultural Extension may indicate otherwise, for it has traditionally been utilized as a system to facilitate the one-way transfer of technology in order to develop efficient production systems (Buttel, 2005; Leeuwis, 2004). However, perspectives are multiplying that critique Extension's historical function and instead embrace multiple perspectives and pragmatism when addressing problems (Birner et al., 2009; Foster et al., 1995; Leeuwis, 2004; Tobin, Thomson, Radhakrishna & LaBorde, 2013).

that I initiated this study. Through a dissertation project, I wanted to realize a study that not only fulfilled degree requirements but also produced information that would be useful to the organizations and people I decided to study.

After being compelled by the literature I was reading on the Papa Andina Initiative and its pursuit of pro-poor value chain development, I initiated contact with CIP to identify research needs. A two-week exploratory visit in May, 2012 to CIP headquarters in Lima, Peru and CIP offices in Quito, Ecuador, provided opportunities to intensively discuss research needs with CIP researchers and their NGO partners. From both my own analysis and the feedback from these researchers, I concluded that more information was needed on the relationship between pro-poor native potato market chains and food security outcomes. By constructing a research project around this topic, I felt confident that the study I would conduct would fulfill my objective of utility.

Theoretically, I approached this research from a critical perspective. The structural critiques levied at capitalism by the likes of Marx and Polanyi provided groundwork for my political economic perspective, and the echoes of early Marx in the social constructionism of Berger and Luckmann made sense to me sociologically. These theoretical influences combined to create robust skepticism of the market economy in me, particularly its effects on low-resource rural populations. Despite the reservations I have regarding market-oriented approaches, they do not overtake the influence of pragmatism. Rather than uniformly adhering to an ideology, I would unquestionably prefer to use an "all of the above" strategy, provided that desirable (from the perspectives of people themselves) outcomes are occurring. Should capitalistic markets prove to be a viable approach to achieving this goal, then they should be pursued. My point is that applied results hold much greater value to me than theoretical consistency.

My emphasis on the applied stems from my Peace Corps service in rural Bolivia. During that time, I realized how complex development is and how difficult it is to responsibly intervene

in other people's lives. Getting results is already not easy and so to limit options makes achieving success all the more difficult. This is important for what is contained in this study in that my applied development experience made fieldwork difficult. I struggled with the role of researcher. I never quite knew how to answer the inevitable and understandable question of what I had to offer to the community members who served as research participants. Consistently, I agreed to participate in activities outside the scope of the research. Doing so was useful ethnographically, but I approached these interactions hoping to indicate to community members my investment in their wellbeing. Never did I abandon the role of researcher, but in truth, I wanted to be a development worker.

The way my identities competed and my roles shifted while in the field also relates to the insider/outsider status that researchers inevitable experience. I think Naples (2003) rightly argues that insider and outsider are not mutually exclusive categories but instead a fluidity exists between them. Because the Andes were home to my Peace Corps service, I felt that I already crossed the boundaries between insider and outsider. My fluency in Spanish and comfort with the culture, customs, and geography provided me with a set of knowledge useful to flexibly navigate Peru both physically and socially. Developing relationships with many community members came with ease and were, at least from my perspective, enjoyable and beneficial. I was invited into homes to share meals, into farm fields to observe – and at my insistence participate in – agricultural traditions, and stopped in the street constantly for casual conversations. On one occasion, while assisting a group of farmers planting dozens of native potatoes for the purposes of characterization, I witnessed the state-employed agronomist supervising the planting interact with the farmers degradingly with tones of elitism. In this moment, the shifting boundaries of insider/outsider were obvious, as the farmers preferred my company at the exclusion of the engineer's.

Yet, no matter the degree to which I was able to penetrate insider-ness, I was never, not even for a moment, not an outsider. My cultural background, privilege, tongue, and skin color, to name only a few characteristics, deny the possibility. While many embraced my presence, others were reserved and seemed skeptical. Once, while helping to mound potatoes with a group of farmers, I felt excluded acutely, as the farmers joked among themselves and occasionally chided my work pace. Other community members wondered what project I would bring to the community or in what way I worked with FOVIDA. Though I explained my independence at every opportunity, the assumption that I was in cahoots with FOVIDA likely contributed to some of the reticence I encountered and had to carefully navigate when asking questions about how the value chain project could be improved. I did what I could to deconstruct the barriers that existed between community members and me; I always graciously accepted and finished whatever meal offered, never arrived in luxurious transportation, and invited community members to share my coca. Nonetheless, perceptions about me existed and they influenced the kinds of interactions and information provided.

My intention here is not solipsistic, though I do apologize to the reader if this discussion has presented itself as self-indulgent. I think not considering my standpoint in a study situated in constructivism would fail in its rigor; I think not disclosing my sentiments regarding market-based development in a study focused on market-based development would be irresponsible. As the architect, executor, analyst, and author of this research project, I am responsible for what is presented and the way it is done. I am embedded in this study and so my aim in highlighting aspects of my positionality is transparency. My hope is that readers are better positioned to interpret my interpretation.

Type of study

In structuring this study, initial difficulty arose in determining how exactly to account for the dynamics of both value chains and livelihoods. The former extend across scales and the latter require a focus on micro-contexts while still accounting for external forces. To engage with such multi-layeredness, case study methodology presented itself as a viable option as a way to thoroughly investigate a system from a constructivist epistemological orientation (Stake, 2000). In addition, case studies do not demand any particular methods but provide flexibility for the research to select the kinds of methods that best suit the research questions (Creswell, 2007; Greene & Hall, 2010). Seeking to comprehensively depict the inner-workings of a particular case, studies often rely on triangulation of data, a particular strength of mixed methods (Greene & Hall, 2010; Small, 2011; Stake, 2000). Stake (2000) distinguishes different kinds of case studies, including the instrumental case study which seeks to apply the knowledge derived from a single case more generally to a broader issue. Thus, case studies appear to be positioned to consider both the micro and macro and explore how they are linked.

Selecting the case study as the methodology, however, does not resolve how to bind the case, necessary to avoid losing focus (Baxter & Jack, 2008). For this particular study, this is no easy task, for I seek to both account for livelihoods within a micro-context and cross-scalar market forces. The scope of the research extends upwards from a single community but also outwards from a single value chain. Here, Long (2001) is helpful in his articulation of an arena, which he defines as "social locations or situations in which contests over issues, resources, values and representations take place" and identifies as a particularly useful concept to analyze development projects in which a multiplicity of actors come into interaction (p. 59). Using the idea of an arena, I decided to bind my case vertically through the native potato value chain and horizontally through one population center in a Peruvian district where value chains have been

implemented. In doing so, the study includes the national supermarket and PepsiCo to which potato farmers in the rural district sell their potatoes, the NGO that acts as both market intermediary and technical support for the farmers, the district participants who sell their native potatoes, and the district non-participants. It must be noted that because this study positions itself as a livelihoods analysis, emphasis is placed upon community members. Visually, Figure 4-1 represents the bounded case:

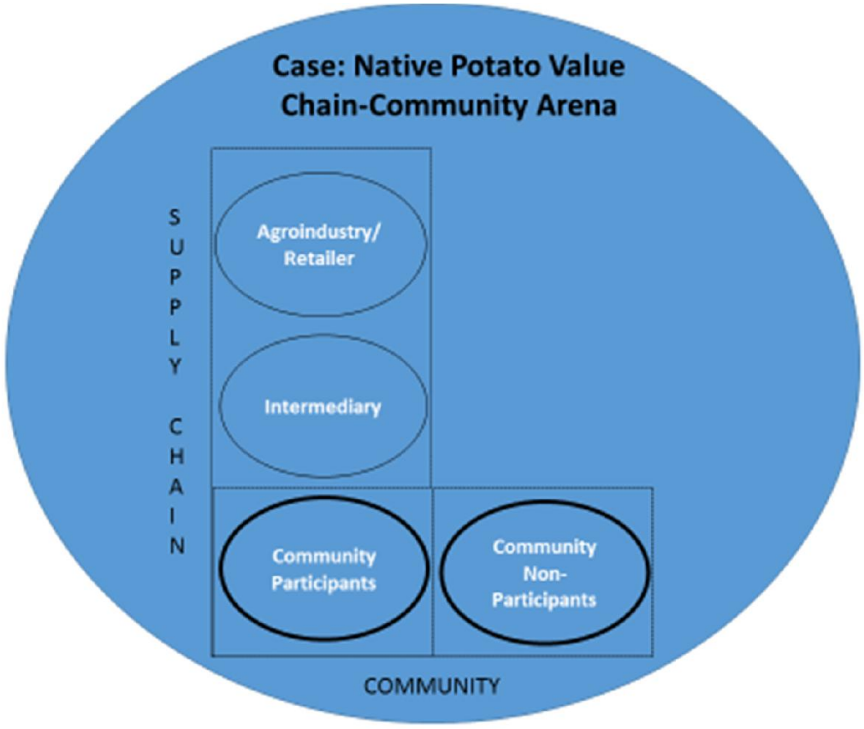


Figure 4-1. Native potato value chain-community arena case.

This depiction is not intended to be all-inclusive or comprehensive of value chains. As discussed in the literature review, value chains can have a range of public and private actors that may include funding organizations, government agencies, researchers, and universities (Brinkerhoff & Brinkerhoff, 2011). However, by bounding the case to the principal supply chain actors and the

fellow community members who live alongside active project participants, I am able to maintain focus on horizontal and vertical dynamics of pro-poor value chain development.

The next step in the methodological process is selecting a research design (Creswell, 2007; Creswell & Plano Clark, 2011). Since cases are multi-layered and complex systems, they often present conditions for which mixed methods are optimal (Baxter & Jack, 2008; Greene & Hall, 2010). Because I intended to first collect quantitative data and use it to facilitate sampling for the qualitative phase, the design may appear sequential. However, this decision was purely pragmatic and not with the intention of collecting a second data set to provide further insight into the first data set collected (Creswell & Plano Clark, 2011). My intention in using mixed methods was to pursue complementarity so that the strengths of each data type reinforce the weaknesses of the other (Creswell & Plano Clark, 2011; Small, 2011). Specifically, I implemented exploratory, cross-sectional research that utilized a one-shot survey for quantitative data and a qualitative case study design that relied on semi-structured interviews and direct observation for the qualitative data (Creswell, 2007; Trochim, 2005).

Units of analysis

Typically, the unit of analysis in a case study is considered to be the case, but identifying sub-units within can provide better insight into the complexities of the case (Baxter & Jack, 2008). Brewer and Hunter (2006) contend that data can be collected on different units and sub-units of analysis within one study, particularly when mixed methods are being used. As they explain:

> In any given piece of research one might collect data on different types of units simultaneously, as when a fieldworker or an experimenter studies the group as a whole as well as the individuals, subgroups, or dyads that comprise the group. As units of study shift, so too does the nature of the data collected and the types of problems that can be explored (p. 83).

Shifting units of analysis is used in this study due to the nature of the research questions that guide the research agenda.

The quantitative strand of the study focuses on the relationships between livelihood components among households in the community being studied. Household, the quantitative sub-unit of analysis for this study, is functionally defined as "a family-based co-residential unit that takes care of resource management and the primary needs of its members" (Niehof, 2004, p. 323). In the Andes, households are typically multi-generational, although the extent to which out-migration from rural areas is occurring often limits the number of generations who reside in the same household (Ho & Milan, 2012). Household members were considered as those living under the same roof and sharing meals (Ellis, 2000). Households are commonly used as the unit of analysis in livelihoods studies (Barrett et al., 2001; Ellis, 1998; Niehof, 2004; Reardon et al., 2000). Furthermore, the household is the primary unit of organization for production and consumption in the Andes (Mayer, 2002) and has been commonly utilized as the unit of analysis in other studies in the region (Antezana et al., 2005; Bianco & Sachs, 1998; Brush, 1992; Brush & Guillet, 1985; Valdivia & Quiroz, 2003; Zimmerer, 1996, 2003). It should be noted that treating the household as a homogenous unit is not unproblematic conceptually. Struggles and inequities occur within households, often along gender lines (Niehof, 2004). Furthermore, efforts and activities to fulfill livelihood needs are linked to other households as well as family members who reside elsewhere (Ellis, 1998; Mayer, 2002). Nonetheless, the household is still an analytically important concept in that it fundamentally contributes to explaining how people organize their livelihoods (Niehof, 2004). Considering it as the sub-unit of analysis for the quantitative portion of the study allows investigation into the variations in livelihoods which exist within the case.

The qualitative strand of this study shifts the sub-unit of analysis from the household to the individual. Distinguishing between units of observation and units of analysis helps explain my

rationale for doing so. According to Brewer and Hunter (2006), an individual may serve as the unit of observation and provide information on a separate unit of analysis: "one may collect data from a housewife (unit of observation) about the size of her family (the family being the unit of analysis)" (p. 88). In seeking to compare livelihoods across households quantitatively, differentiating between the unit of observation (individual) and sub-unit of analysis (household) seems appropriate for this study. However, the research questions which demand qualitative data focus on subjective meanings and experiences; they seek to elicit actor perspectives (Long, 2001). Therefore, harmonizing the unit of observation and sub-unit of analysis to the individual makes more sense for the qualitative aspect of the study. To assume that a household member's experience could represent his/her entire household, or that one NGO or company employee could represent his/her entire organization would erroneously assume that all experiences within a collective are the same; it would violate the assumptions embedded in social constructionism which emphasize the partiality and uniqueness of individuals' subjective experiences (Berger & Luckmann, 1967).

Site selection

As a bounded case study that includes both a community and its native potato supply chains, selecting the research site needed to be treated carefully. I relied on the NGO coordinating the value chain project for access to the research community. According to its annual report, FOVIDA (2012) is working with farmer associations in three provinces in the regions of Junín and two in Huancavelica. Junín and Huancavelica which are located in the central highlands of Peru (Figure 4-2) and are important centers for potato biodiversity (Brush, 1992; de Haen et al., 2010). Across these five provinces, FOVIDA is working with 23 communities in 11 districts in total.

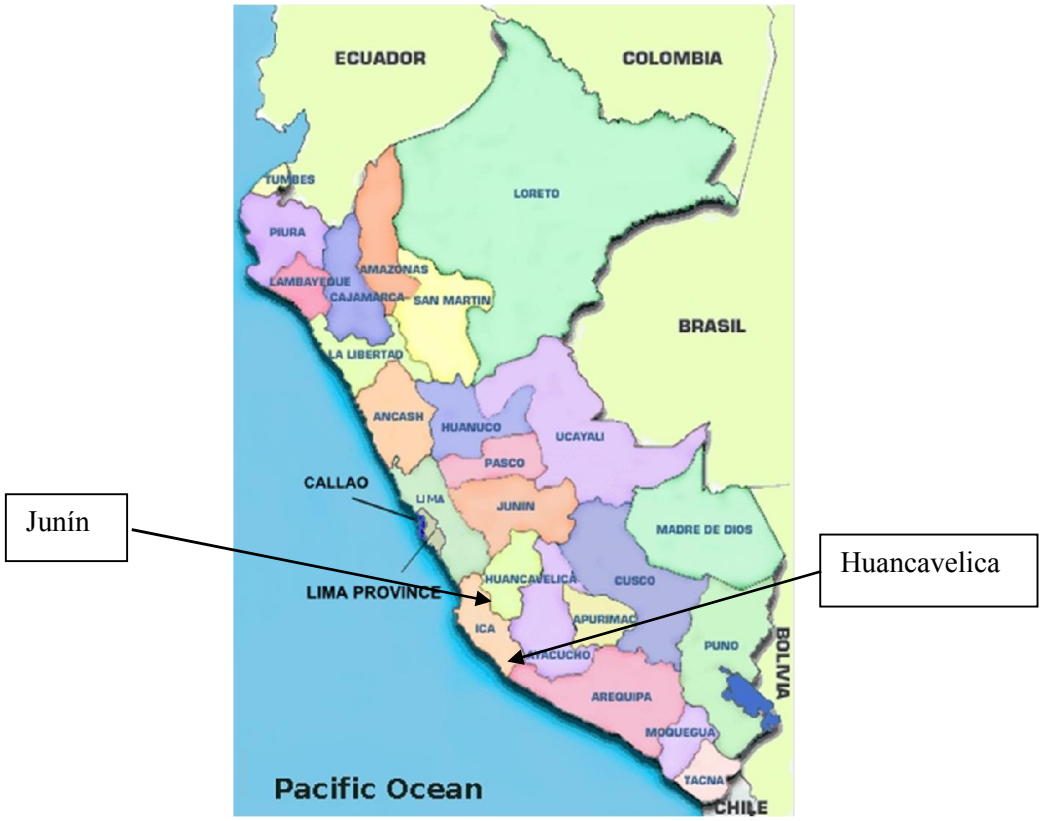


Figure 4-2. Region of study.
Source: http://en.wikipedia.org/wiki/Wikipedia_talk:WikiProject_Peru/Maps_task_force

To select the research site, I traveled to Huancayo, Peru, the capital of the Junín region and home to the central highland offices of FOVIDA, in May, 2013 for a two-week period in order to coordinate with FOVIDA. I had established several criteria that I wished the final research site to fulfill:

1) Farmers in the community needed to have been participated in the native potato value chain project for at least one year in order to ensure that the producers had adequate time to integrate the activities required to meet value chain demands into their production (Escobal & Cavero, 2012).
2) The community had at least 15 farmer participants who were currently or had formerly participated in the project. I established this criterion because, of the 18

communities where FOVIDA (2012) worked, only 10 had more than 15 participating producers.

3) The community needed to be accessible. Because many communities are remote and difficult to access due to poor infrastructure, the community needed to be regularly serviced by public transportation.

Based on these criteria and site visits to several communities in the region, I concluded that the district of Chaki Takia[7] in the province of Jauja, region of Junín, would provide the ideal research site. Within Chaki Takia, two population centers exist, one called Chaki Takia and the other named Churu. Although they are governed politically as one entity, they are 1.5 hours from each other by foot and mostly operate independently, each with its own school, comunidad campesina (peasant community), access roads to the central highway, and farmer associations participating in the FOVIDA project. This study binds its case in the population center of Chaki Takia and excludes Churu. When I refer to Chaki Takia from this point, I mean the population center within the district, unless otherwise indicated. Further information regarding the natural and social background of Chaki Takia will be provided in Chapter Five.

Population and sampling

The relevant actors in the native potato value chain-community arena depicted in Figure 4-1 served as the population for this study. Specifically, this included all households in the community of Chaki Takia, FOVIDA (NGO), and the market outlets of PepsiCo (agroindustry processor) and Plaza Vea (national supermarket). As a mixed methods study with shifting units of analysis, care needed to be taken with sampling. Teddlie and Yu (2007) explain that sampling for

[7] The name of the location has been changed in order to assure confidentiality of research participants.

mixed method studies have not been comprehensively conceptualized but recognize that mixed methods often require multiple samples of different sizes depending on the research questions. Generally, probability sampling occurs for the quantitative strand of a mixed methods study for generalization purposes, whereas purposive sampling is used for the qualitative component in order to generate rich, in-depth information (Teddlie & Yu, 2007). As a study that seeks to compare livelihoods across households and explore perspectives among value chain actors, the population frame for the quantitative and qualitative strands of the study shifted. For the quantitative portion – the household comparison – the population frame consisted of all households in Chaki Takia, while the frame for the qualitative strand included the supply chain actors as well. Although the sampling process for this study does not exactly align with any of the four sampling designs outlined by Teddlie and Yu (2007), this study most closely adheres to sequential mixed methods sampling, during which the quantitative strands was first addressed and used to subsequently inform the qualitative strand.

The sampling methods primarily differ from sequential sampling outlined by Teddlie and Yu (2007), in that I surveyed the entire census for the quantitative strand as opposed to conducting any form of sampling. I arrived at this decision due to the number of households which exist in Chaki Takia. After investigating possible sources to access a population frame of households in Chaki Takia, I finally had to settle on a list of households provided by the local government. Although this list quickly proved inaccurate, it nonetheless allowed me to estimate that roughly 150 households existed in Chaki Takia. In order to derive a representative random sample, the number of households I needed to survey already exceeded 100, so I decided to conduct a census. During data collection, described later in this chapter, I revised the frame provided by the local government and found that 152 households resided in Chaki Takia. In total, 149 surveys were completed for a response rate of 98.0%.

After collecting the quantitative data and entering it into Statistical Package for Social Sciences (SPSS) software version 20, I used preliminary analysis to help guide purposive sampling for the qualitative strand. Assessing households according to key variables facilitated household selection with the intention of saturating diversity in perspective (Creswell, 2007; Teddlie & Yu, 2007; Weiss, 1994). In addition, other individuals with important roles in the value chain-community arena were also purposively selected for semi-structured interviews including local government officials, NGO representatives, and agroindustry and supermarket employees. In total, 36 semi-structured interviews were conducted which included 27 household members, the mayor of Chaki Takia, the former mayo, one local government administrator, the local nurse, three FOVIDA employees, one PepsiCo executive, and one Plaza Vea executive. Of the household members, 14 of the 27 were members of households that were either currently or had formerly participated in the FOVIDA project.

Operationalization of concepts and variables

This study seeks to bring different sets of knowledge into concert with one another. Guided by the goal of complementarity between qualitative and quantitative strands (Small, 2011), this study allows actors to reflect on the concepts relevant to this study. Doing so will allow their knowledge to interact with the way I, as an outside observer, have conceptualized relevant constructs. This section, therefore, primarily focuses on how I operationalized concepts for the quantitative survey (Appendix A). For each concept, questions were posed to interviewees during semi-structured interviews that compelled them to reflect on their experiences as related to that concept.

Dependent variable: Dietary diversity

Given the emphasis on malnutrition in rural Peru (Acosta, 2011; World Bank, 2010), dietary diversity was been selected as the dependent variable. Dietary diversity is defined as the number of food groups consumed by a household over a given reference period (Arimond & Ruel, 2004; Hoddinott & Yohannes, 2002; Ruel, 2003). The USAID-funded Food and Nutrition Technical Assistance Project (FANTA), tasked with helping to enhance the food security policies and programs of national governments and non-profit organizations, has developed a standardized scale to measure household dietary diversity (Swindale & Bilinsky, 2006). Known as the Household Dietary Diversity Score (HDDS), this scale has been adopted by the FAO to assess household food security (Kennedy et al., 2011). To apply HDDS, the household member responsible for the preparation of meals is asked a series of yes/no questions on the food that has been consumed in the household over the last 24 hours. Each question relates to one of twelve food groups (cereals; white tubers and roots; vegetables; fruits; meat; eggs; fish and other seafood; legumes/nuts/seeds; milk and milk products; oils and fats; sweets, spices/condiments/beverages; to determine the HDDS). A simple composite score is then summed, ranging from 0 to 12; a higher score indicates a more diverse diet. It is important to note that this score constitutes a formative rather than a reflective variable and so internal consistency is not relevant (Jarvis, Mackenzi, & Podsakoff, 2003). Formative variables assume that the direction of causality flows from the measures to the construct, whereas reflective variables assume the opposite (Jarvis et al., 2003).

Although this study focused on dietary diversity quantitatively, interviewees were encouraged to reflect more broadly on dietary quality, which is composed of both nutritional considerations and subjective assessments of the acceptability of food (Barrett, Beaulieu, & Shewfelt, 2010; Vargas & Penny, 2009). Food quality has historically been an integral component

of a fit livelihood among Andean households. Households who have increasingly incorporated modern varieties into their production at the expense of preferred native varieties often express dissatisfaction in their dietary quality (Zimmerer, 1996). Semi-structured interviews, therefore, pursued not only perceptions of dietary diversity but also the perceptions of the cultural and social acceptability of the diet.

Independent variables and measurement

Project participation

Expanding market opportunities for poor potato producers in the highlands of Peru has been an important pro-poor growth strategy (Hellin & Higman, 2005; Meinzen-Dick et al., 2009). Within value chain analysis, a need has been identified to more thoroughly investigate the differences within communities among those households who access these markets and those who do not (Bolwig et al., 2010). In their study in the same region of Peru on a value chain for a different potato variety, Escobal and Cavero (2012) found that access to the market opportunity was stratified along the lines of education, size of land tenure, and access to inputs and credit (Escobal & Cavero, 2012). Considering project participation, therefore, will not only indicate if differences exist among households with regards to dietary diversity but also whether differences occur with other independent variables. For quantitative purposes, project participation will be considered as a nominal variable: project participants are those households that currently participate or previously participated in the project and non-participants are those households which have never participated. For qualitative purposes, differences in perspectives among current project participation was disaggregated so that differences between former and current perspectives could be considered.

Activity diversification

Diversifying activities has been identified as an important livelihood strategy in general and in Peru in particular (Barrett et al., 2011; Ellis, 2000; Escobal, 2001). Activity diversification represents the types of labor which households undertake for either income generation or direct consumption. Non-labor economic activities including receiving remittances, accessing credit, and borrowing inputs have also been identified as important components of activity diversification (Escobal & Cavero, 2012; Mehta, 2009). To quantitatively account for activity diversification, this study developed an index which asked respondents whether (yes/no) they engaged in different labor activities typical to the region under the categories of self-employed agriculture, wage agriculture, self-employed non-agriculture, and wage non-agriculture (Barrett et al., 2001). Non-labor activities of receiving remittances, taking out loans, and receiving inputs on credit were included. A simple composite score across categories (ranging from 0 to 5) was then summed and treated as interval data; the assumption is that a higher score reflects more diversification. As a formative variable, internal consistency was deemed not relevant (Jarvis et al., 2003).

From a qualitative perspective, interviewees were asked to consider their experiences with their livelihood activities, including the desirability of the different activities in which they participate. Exploring this aspect of activity diversification was intended to account for the possibility that activity diversification was pursued out of desperation and not as a planned strategy to reduce vulnerability (Barrett et al., 2001; Ellis, 1998; Niehof, 2004; Reardon et al., 2000).

On-farm diversification

Crop diversification and agricultural activity diversification, collectively considered on-farm diversification, have been identified as an important livelihood strategy in general and in the Peruvian highlands in particular (Brush, 1995; Mayer, 2002; Mehta, 2009; Zimmerer, 1996). In the Andes, households have historically relied on diverse farming systems to achieve a fit livelihood (Zimmerer, 1996). Accessing a diversity of landscapes, cultivating a variety of crops generally and potatoes specifically, and tending multiple animals, all constitute important aspects of Andean agriculture (Bianco & Sachs, 1998; Brush, 1982, 1992, 1995; Mayer, 2002; Rist, 2000; Valdivia & Quiroz, 2003; Zimmerer, 1996, 1998, 2003). Understanding dimensions of on-farm diversification also provides insight into access households have to the livelihood resources of agrobiodiversity and traditional knowledge, both of which CIP identified as important (Meinzen-Dick et al., 2009). To quantitatively measure the concept of on-farm diversification, respondents were asked the number of parcels to which they have access for cultivation (as a proxy for vertical land diversity that Mayer (2002) among others have indicated is important to Andean households). In addition, number of cultivated crops, number of different types of commonly-owned animals, and number of native potato varieties were measured in order to collectively represent on-farm diversification.

Qualitatively, interviewees were asked to reflect on the importance of the various agricultural activities in which they participate to their livelihoods. Beyond merely an activity to meet consumption and other economic needs, the production patterns of Andean agriculture have traditionally been culturally and socially significant (Graves, 2001; Zimmerer, 1996). Questions related to the value of agrobiodiversity and traditional knowledge were explicitly pursued with interviewees to further explore perceptions of those livelihood resources.

Social interaction

Social capital served as another important livelihood resource which CIP identified as an asset that could be leveraged to integrate smallholding farmers into value chains (Meizen-Dick et al., 2009). Due to the theoretical shortcomings of social capital that I intended to convey in the literature review, I opted to focus on interaction as the basis to reflect social relationships (Wilkinson, 1991). I consider social interaction to form the basis of collective action and so consider it quantitatively through measures of the number of different community organizations or associations in which households participated, the number of hours dedicated to those group activities, and the number of leadership positions held (Brennan, 2003). The items of this social interaction scale were then tested for internal consistency and based on the adequate reliability (Cronbach's $\alpha = .73$), were summed into a composite score ranging from 0 (low social interaction) to 9 (high social interaction) (George & Mallery, 2003).

For qualitative purposes, the quality of relations that occur during social interactions was explored. While social capital may suffer from theoretical ambiguity, I argued in the literature review that its recognition that norms like trust and reciprocity are embedded in social relationships is valid. Allowing actors to characterize their social interactions, therefore, provides deeper insight, and thus complements, quantitative measures.

Household demographics

Demographic variables are commonly incorporated into food security studies as control variables that help to account for differential influence (Johnson & Christensen, 2012). In particular, size of the household, age of household head, household structure, household age

dependency ratio, educational status of household head, and wealth are critical demographic variables to consider (Babatunde et al., 2007; Belachew et al., 2012; Maharjan & Joshi, 2011).

Quantitatively, size of household was measured according to the number of household members, defined as those living under the same roof and sharing meals for at least six months during the previous year (Beaman & Dillon, 2010; Bianco & Sachs, 1998; Brush, 1995). For household structure, the household head was identified by the respondent and if this head had a partner, the household was considered double-headed; otherwise, the household was classified as single-headed. This helps recognize that both men and women in Andean households are active participants in the decision-making and organization of the household (Mayer, 2002; Zimmerer, 1996). For age, whichever head was older in the case of a double-headed household was used for analysis. Likewise, the educational status of the household head in a doubled-headed household with the highest educational level was considered. Educational status was measured on a seven-level ordinal scale, which was then collapsed into five levels (incomplete primary, complete primary, incomplete secondary, complete secondary, above secondary) and treated as interval data (Achen, 1991). Age dependency corresponds to the ratio of household members who are dependent upon the labor of other household members. Dependents are considered those members under 15 and over 64. An age dependency ratio is calculated by dividing the number of dependents into the total number of household members (Maharjan & Joshi, 2011; World Bank, 2013). Wealth is difficult to measure and the intensiveness required for accurate measurements risks informant fatigue (Mehta et al. 2009). Although in no way comprehensive, the total value of animals and land access were used as a proxies for wealth, given that households commonly invest their savings in animals and that landholdings is an important indicator of wealth status (Mayer, 2002). Because of normality problems with the data related to animal value, the data were collapsed into three nominal categories (low, medium, and high). Table 4-1 clarifies quantitative variables and their measurements.

Table 4-1. Concepts, Variables, Scales of Measurement, and Related Survey Questions for Quantitative Data.

Concepts, Operational Definitions, Variables, Scales of Measurement for Quantitative Data			
Concept	Variables	Scale	Survey Question
Dietary Diversity (Dependent)	• HDDS	I/R	11
Project participation (Independent)	• Participating or not participating	N	1
Activity Diversification (Independent)	• Composite score across the categories of self-employed agriculture, wage agriculture, self-employed non-agriculture, wage non-agriculture, and non-labor	I/R	9, 10
On-farm Diversification (Independent)	• Total # Land Parcels • # of Crops • # of Native Potato Varieties • # of Different Types of Animals	I/R N I/R I/R	2[a] 2h 4a 3
Social Interaction (Independent)	• Composite score of total # of activities, total # of hours dedicated to activities, and whether a leader position is held	I/R	12
Demographics (Independent)	• Size of HH • Age of HH head • HH Age dependency • Education of HH head • Household structure • Animal Value • # of Hectares	I/R I/R I/R O N N I/R	15 15 15 15 15 3 2f

Validity and reliability

Establishing instrument validity was an extensive process to which I needed to attend to carefully, given that ideas were being conveying in a foreign language (Spanish) to a distinctly different cultural audience. The extensive review of literature, along with dialogue with CIP researchers and NGO technicians during two preliminary research visits in May, 2012 and May, 2013, aided the robustness of construct validity (Trochim, 2005). To establish face and content validity, the survey instrument was first shared in English with a panel of experts. I then translated the survey into Spanish and reviewed it with four Peruvians who had extensive experience with similar populations. During a two-week research visit during May, 2013, I field

tested the instrument with 12 farmers in Churu, the other population center located in the district of Chaki Takia. Based on the recommendations that first emerged from the English-speaking and Spanish-speaking panels of experts as well as field testing, several improvements were made to the survey. Finally, I intended to establish criterion validity through using a second quantitative measure of dietary quality, which is a recommended technique (Johnson & Cristensen, 2012). However, problems implementing this second scale during data collection damaged the quality of the data, thus posing a limitation to this study's criterion validity. During preliminary research in May, 2013, I also intended to pilot test the survey. However, time constraints prevented me from doing so and so this missing step which would have enhanced reliability must be considered a weakness of this study. Nonetheless, reliability tests were run on constructs whenever appropriate to establish internal consistency of constructs.

Pilot testing is also important for qualitative methods so that interview questions can be refined and investigators can become more aware of their observer bias (Creswell, 2007). In order to enhance the quality of the qualitative data, my interview guide (Appendix B) was shared with a community development expert and extension specialist, the latter of whom had recently conducted similar research in Spanish. Their recommendations provided revisions to the interview guide before I conducted a practice interview with a Peruvian farmer in Churu during my site visit to Peru in May, 2013. Based on the fluidity of the conversation and his feedback regarding clarity, I made further revisions to the interview guide.

Data collection

As indicated in the sampling section above, data collection took place in a two-step process, during which survey research was conducted to collect quantitative data, and I subsequently used semi-structured interviews to gather qualitative data. All surveys and

interviews were conducted in Spanish. The Office for Research Protections approved the research instruments (IRB# 41475) in March, 2013. Before initiating data collection, I focused primarily on forming relationships with community members. In the first two weeks, I attended community meetings, held a workshop on the benefits and challenges of working collectively, met with the mayor and other local government officials, attended a town celebration, had countless informal conversations with community members, and provided labor during a community workday. I was committed to developing relationships, viewing them important to build trust among research participants. According to Lofland and Lofland (1995), building trust is a key element in qualitative research.

This initial effort proved to be worthwhile, particularly when the mayor agreed to encourage the community to participate in my research via a radio announcement, and he committed a local government official to accompany me on the first day of surveying. Any potential bias introduced by this official was minimal, given that he was present for only 5 of 149 interviews. My effort to cultivate relationships within the community did not end after gaining initial access. Instead, throughout the several months of fieldwork, I continued to informally converse with community members and labor in their fields. With one farmer in particular, who is the primary potato conservationist in the community with 300 different varieties, I planted potatoes and later participated in the labor-intensive, traditional technique to mound the potatoes. Throughout the entirety of fieldwork, I utilized participant observation in order to collect data not addressed by the survey or semi-structured interviews. At the end of each day of fieldwork, I wrote extensive fieldnotes. In documenting my experiences, I aimed to provide rich description, reflect on my own reactions, and identify any potential biases that I held (Emerson et al. 1995; Patton, 1990).

During the initial process of relationship-building within the community, I was simultaneously organizing a research team. During my previous preliminary fieldwork, I had

connected with several sociology professors at the local branch of the national university in Huancayo. I contacted one of these professors who had previously indicated an interest in my research plans, and he identified several university students who were completing their requirements for a bachelor's degree in sociology. After receiving the contact information for each of these students, I interviewed each of them and selected four to help me conduct interviews. Additionally, I was in contact with another NGO that had worked extensively in Chaki Takia, and one of their development specialists agreed to also assist in conducting surveys. Including myself, the research team consisted of six individuals. After reviewing the survey with each individual of the research team, I then held a one-day group training session.

Surveys were conducted every day from September 8 through September 24, 2013 except for Wednesdays and Sundays when many community members descended to the regional commercial hub of Jauja for market day. On the days when surveys were conducted, I contracted a local driver to leave the city of Huancayo at 4:45 am and arrive to Chaki Takia between 6:00-6:30 am. Because many households eat breakfast and prepare their children for school between the hours of 6:00-8:00 am before walking to their dispersed fields to labor for the day, the intention was to take advantage of this morning time frame. Upon arrival to the research site, a team meeting was held during which each team member was assigned five households to locate and survey. Any member of the household above 18 years old was deemed appropriate to survey, although preference was given to either the male or female household head. Whomever the household member, the respondent was asked to provide answers that represented the entirety of the household. Household assignments were based on the population list provided by the local government. However, the inaccuracy of this list quickly became apparent and so the research team adapted the population frame during door-to-door surveying. Although the early morning proved to be the most efficient time to survey, we found that not all households went to their fields each day and so continued to survey until between 12:00-1:00 pm. If a research team

member successfully identified their assigned households, they received a new series of households to locate. In the event that a member could not locate a particular household on a given day, his/her first task the following day was to find that household and either survey a household member in that moment or schedule another time. When survey work was completed each day, the team held a meeting to discuss any issues that had arisen. I collected all surveys and dedicated the afternoon and evening to reviewing the quality of work and updating a population frame that I had been developing and managing as a more accurate representation than the list provided to me by the local government.

After completing this survey research phase, I then entered the data into SPSS version 20. Preliminary data analysis on key variables facilitated the construction of a purposive sample of community members with whom I intended to conduct semi-structured interviews. Sample selection was based on maximizing diversity in perspective and so I pursued interviews with community members who provided different representations of project participation, livelihood activities, native potato cultivation, social interaction and dietary diversity (Creswell, 2007; Weiss, 1994). In addition, I also needed to access other supply chain actors for this sample. Having already established a working relationship with FOVIDA, no challenge existed in interviewing its employees. Given the rapport I had with the NGO and because they acted as the commercial intermediary between farmer associations and Plaza Vea and PepsiCo, I asked the project coordinators at FOVIDA to contact both Plaza Vea and PepsiCo. While their contact in Plaza Vea, a regional executive for the company, agreed to an interview, PepsiCo indicated that company policy prevented its participation. I therefore contacted PepsiCo directly and after several weeks of correspondence via both telephone and email, I was granted permission to interview an executive with knowledge of the PepsiCo's native potato value chain.

Interviews were conducted between October 1, 2013 and January 30, 2014.[8] Interviews lasted between 30 minutes and 2 hours and averaged about 45 minutes each. I was the only person who conducted interviews and all, except for PepsiCo, were audio recorded and transcribed in Spanish. However, PepsiCo permitted note-taking on a computer during the interview. In order to conduct interviews with community members, I located each individual and scheduled a convenient time. For this phase, I traveled to Chaki Takia in public transport. No more than three interviews were conducted on any given day. Three FOVIDA employees were also interviewed in their Huancayo office, each interview scheduled several weeks beforehand. The interview with the Plaza Vea executive occurred in regional offices in Huancayo, while the PepsiCo interview took place at its headquarters in Lima.

Data analysis

As a case study, this research project seeks in-depth and layered explanations and thus utilized mixed methods in order to pursue complementary datasets (Small, 2011; Stake, 2000). As a parallel convergent mixed methods design, I adhered to the recommendation made by Creswell and Plano Clark (2011) to analyze the quantitative and qualitative data separately using conventional techniques before attempting to integrate the findings. The nature of each research question guided analysis and therefore qualitative data were used to address the first and third research questions, quantitative data for the second research question, and the two datasets were considered together for the fourth question (Table 4-2).

[8] Of the 36 interviews, 35 were conducted by December 4, 2013. Due to challenges in accessing PepsiCo and coordinating schedules, this interview did not occur until January 30, 2014.

Table 4-2. Type of Data Used to Analyze Research Questions.

Research Question	Data Type
1) What are the perspectives of development actors, and especially community members, regarding efforts to develop value chain linkages for smallholding native potato producing households?	Qualitative
2) What is the relationship between and among project participation and other predictors including on-farm diversification, livelihood activity diversification, social interaction, and household demographics, and the dependent variable of dietary diversity?	Quantitative
3) How do native potato value chain stakeholders, and especially community members, understand the concepts of on-farm diversification, livelihood activity diversification, social interaction, and dietary quality?	Qualitative
4) How do livelihood decisions affect the structure and function of the native potato value chain?	Both

While findings for each of these research questions are presented in Chapter Six, this section will explain the procedures used for analysis. Because each type of data were analyzed independently, they will be considered separately in this section.

Quantitative analysis

Quantitative data were analyzed to assess the relationships among independent variables, as well as between independent variables and the dependent variable of dietary diversity. In order to do so, the ultimate objective of analysis was to develop an overall linear regression model allowing all variables to interact simultaneously. Although a census normally precludes the use of inferential statistics (Urdan, 2005), the community members of Chaki Takia serve as a "slice of life" sample of other communities in the region also interaction with pro-poor native potato value

chains (Oliver & Hinkle, 1981).[9] To arrive at an overall regression model, several steps were first taken. Preliminary analysis included a variety of descriptive statistics and all variables were tested for normality, which is important because multiple regression assumes normality for both independent and dependent variables (Morgan, Leech, Gloeckner, & Barrett, 2011). Logarithmic transformations were performed on those interval/ratio variables that violated assumptions of normality, and if skewness continued to be a problem, the interval/ratio data were then converted into nominal data. When inadequate variation occurred across levels of a nominal variable, it was not considered for analysis (Tabachnick & Fiddell, 2007).

Data cleaning was followed by a series of bivariate analyses between each independent variable and the dependent variable of dietary diversity, as well as between project participation and each variable. Bivariate tests were selected based on scales of measurement. Following this step, initial regression models were developed based on conceptual area. Only on-farm diversification and household demographics had multiple variables and so warranted preliminary regression analysis; for other concepts – activity, social interaction, and project participation – a single variable represented the construct and so multivariate analysis was not appropriate. For all regression models, threats of multicollinearity were reviewed and deemed acceptable.

Statistical analysis proceeded through the development of saturated and parsimonious regression models across all concepts. However, sample size limitations required careful consideration of the number of independent variables to include. According to Tabachnick and Fidell (2007), the equation to determine the appropriate number of variables is $n = 50 + 8 (v)$ with "v" representing the number of independent variables. Using listwise exclusion meant that the number of respondents included in analysis reduced from 149 to 129. Including all variables would mean 16 inputs, violating Tabachnick and Fidell (2007). To better harmonize the number

[9] Demographic statistics comparing the population characteristics of Chaki Takia and other relevant districts will be presented in Chapter Five.

of independent variables with the population size, I aimed to reduce the number of inputs to 11, which still exceeds the number of desirable cases only by nine. To eliminate variables, I systematically conducted a manual backwards stepwise process. I first inputted all variables into a 16-variable saturated model and assessed the variables furthest from significance. Then, using the initial regression models that analyzed dietary diversity according to each conceptual area, I evaluated the individual variables furthest from significance. I only eliminated a variable after cross-referencing the significance across both regression models and ensuring consistency. I continued until I achieved 11 independent variables. During this process, I found that those variables that were significant in the overall model only become stronger in significance as the model became more parsimonious, thereby providing further evidence that my approach to developing an overall model was sound.

Qualitative analysis

Given that that the utilization of mixed methods in this study aimed for complementarity between data sets (Small, 2011), qualitative data collection and analysis was oriented according to the key conceptual areas. These concepts (project participation, activity diversification, on-farm diversification, social interaction, and dietary quality) provided the substantive frame of the study, which Weiss (1994) defines as "the set of topics the study explores" (p. 15). This substantive frame provided the structure for categorizing, coding, and generating themes during qualitative analysis (Creswell, 2007). However, before describing that process in detail, a comment on transcription and translation is merited, given that translations are not always smooth across languages (Temple & Young, 2004).

The presentation of qualitative data, even when it exists in only one language, is already filtered through a series of interpretations that can potentially distort the perspectives and

experiences of interviewees (Creswell, 2007). The necessity of translating the material to another language at some point in the research process adds another layer of interpretation and thus must be considered carefully (Regmi, Raidoo, & Pilkington, 2010). Researchers who conduct studies in other languages often first transcribe interview scripts in the language in which interviews were conducted and then produce translated transcriptions (Regmi et al., 2010). However, I opted to omit this latter step, viewing it as unnecessary filter of interpretation. Instead, the interviews were transcribed in Spanish and coding acted as the point of translation for this study. This is a practice used in other studies (Bloom, 2013). Thus, interviews were conducted in Spanish, transcribed in Spanish, and then coded and analyzed in English.

I approached qualitative data analysis guided by Creswell (2007), who recommends organizing the data before coding and generating themes. To do so, I first read each transcript several times before using my substantive frame to categorize the data, a practice is recommended by some qualitative researchers (Creswell, 2007, Weiss, 1994). This two-step process allowed me to consider within-case analysis – that is, relating the data gathered from each interviewee to itself – before moving to cross-case analysis, in which data are considered across interviewees (Creswell, 2007). After categorizing the data, I subsequently used horizontal coding, an analytical method that validates each statement, regardless of how frequently it was articulated across the sample (Creswell, 2007). This approach allowed me to both identify patterns that existed across the qualitative data and consider evidence that diverged from those apparent patterns (Creswell, 2007). With the intention of exploring the breadth and diversity of perspectives, I did not count codes as an indicator of their importance, for I concur with Creswell (2007) that "a count conveys that all codes should be given equal emphasis and it disregards that the passages coded may actually represent contradictory views" (p. 152). Rather, I aimed for an inductive analytical process in which emergent themes stemmed from the words of the interviewees themselves.

The identification of emergent themes provided the data with an organizing structure and readied me to then present the data, a task presented in Chapter Six. As Weiss (1994) explains, the presentation of qualitative data should be done in such a way that quotes are selected to represent the broader point being made. In presenting quotes, I selected a compromise between preservationist and standardized approaches, the former of which maintains the quote exactly as spoken while the latter edits the quote to more clearly convey the speaker's point. I attempted to eliminate words that were distracting to understanding while still allowing the speaker's words to remain as much as possible (Weiss, 1994). When translating a quote, my intention was to present the meaning I believed was being conveyed by the speaker in a way that was clear and understandable in English.

Integrative analysis

The final research question of this study is best assessed through the integration of both quantitative and qualitative data. As I explained above, parallel convergent mixed methods designs typically require that both data sets are first analyzed independently before being considered together (Creswell & Plano Clark, 2011). As such, I rely on the findings that emerged from the quantitative and qualitative analyses described above in my attempt to provide insight into the final research question. Thus, the findings from the two sets of data are compared and considered together to generate a further level of results. In doing so, my intent was to triangulate the data in a way that allowed me to more deeply probe the research question (Creswell & Plano Clark, 2011).

Data quality

Questions of data quality need to be considered as extensively in qualitative research as quantitative. Among the critical aspects to consider when assessing data for quality are relevancy, validity, reliability, objectivity, integrity, completeness, utility, and generalizability (Radhakrishna, Tobin, Brennan, & Thomson, 2012). For mixed methods research, data quality is even more complex because the language and techniques by which data quality of quantitative and qualitative data often diverge (Creswell, 2007). To account for quality across both sets of data, I present Table 4-3 to detail the various strategies upon which I relied in order to ensure data quality.

Table 4-3. Procedures Taken to Enhance Quantitative and Qualitative Data Quality.

Quantitative Aspect of Data Quality	Procedures taken for quantitative data	Qualitative Aspect of Data Quality	Procedures taken for qualitative data
Relevancy	Literature review; Preliminary fieldwork	Relevancy	Same as for quantitative
Validity	Panel of Experts survey review; field-test of survey	Credibility	Prolonged engagement in the field; pilot-testing interview guide; triangulation of data and methods
Reliability	Tests (Cronbach's alpha) used to determine reliability of constructs when appropriate	Dependability	Detailed fieldnotes; in-depth description of methods used in the field
Objectivity	Assumptions of normality tested; scales of measurement treated appropriately	Confirmability	Triangulating data and methods
Integrity	Dataset reviewed for mistakes; steps to assure confidentiality	Integrity	Recorded and transcribed interviews; steps to assure confidentiality
Completeness	Appropriate procedures to handle missing data	Completeness	Recorded and transcribed interviews
Generalizability	Statistical consideration of research site to other similar communities using secondary data	Transferability	Rich description of research context
Utility	Findings from study will be reported shared with FOVIDA, CIP, and with other scholars in journal articles; Recommendations provided to FOVIDA and CIP to adapt their market interventions to be more inclusive and responsive to actor perspectives	Utility	Same as quantitative

Limitations

Despite the steps taken to enhance data quality, several limitations nonetheless exist, which are important to consider when assessing the contribution that this study makes to the literature. While I have made the case that this study can serve as a "slice of life" sample, extreme care must be used when doing so, considering the small census (N=149) size within a singular community. Given the exploratory nature, the findings should be approached as a foundation for future studies and not absolute conclusions. Given the small census size, limitations exist in the robustness of the regression model. To adhere to statistical assumptions necessary for regression analysis, I could not develop a saturated model filled with all independent variables. Although I believe that the systematic process used to conduct a backwards stepwise procedure explained above is an adequate fallback, all relevant variables were not able to interact simultaneously. Quantitatively, the absence of a secondary measurement of dietary diversity damages validity and robustness. Construct validity weaknesses exist in using only animal value and land access as a proxies for wealth and not considering other dimensions such as income. My inability to conduct a pilot test on the survey instrument also diminishes reliability. Errors to measurement can be introduced both through respondent and interviewer error; survey responses and interview transcripts reflect what respondents told me (Kasprzyk, 2005; Trochim, 2005). Particular concern exists with the measurement of dietary diversity; local officials indicated that both under- and over-reporting were likely, the former to enhance the appearance of poverty and so the likelihood of financial support and the latter out of embarrassment. Given these threats, and in accordance with social constructionism, the findings should not be viewed as a verification of objective truth but as a production of objectivated knowledge. Finally, the lack of baseline data means that this study must be considered exploratory and not as an evaluation determining the effects of value chains on dietary diversity.

Chapter 5

Background

Positioned as a livelihoods analysis, this study takes context seriously. The places that people live in and the influences that shape those places are important. This chapter intends to provide social and natural backgrounds to contextualize the findings. The region in general will first be considered followed by a more specific discussion of the community of Chaki Takia. I will then turn attention to the history of the FOVIDA native potato value chain project and its implementation in Chaki Takia.

Mantaro Valley

Natural setting

To the east of Lima, 266 kilometers and 7 hours by road, lies the one-time capital of Spanish Peru, Jauja. A town populated by roughly 20,000, Jauja marks the northern point of the Mantaro Valley, which extends 45 kilometers southeast to the current capital of the Junín region, Huancayo, which has a population of about 350,000 (Figure 5-1). Situated in the central highlands of Peru, the valley bottom exceeds 3,000 meters above sea level and some agricultural land in the slopes above the valley reach 4,500 meters (Antezana et al., 2005). Climatically, the region is diverse, ranging from semiarid to dry-sub-humid. Rainfall, varying from 150 mm – 1000 mm in the region, generally occurs most intensively from November through April, although the season is variable (Antezana et al., 2005). Although mostly mountain slopes are treeless, reforestation projects are occurring. Previously these projects often intensively planted eucalyptus, although pine, as a less invasive species, is now commonly used.

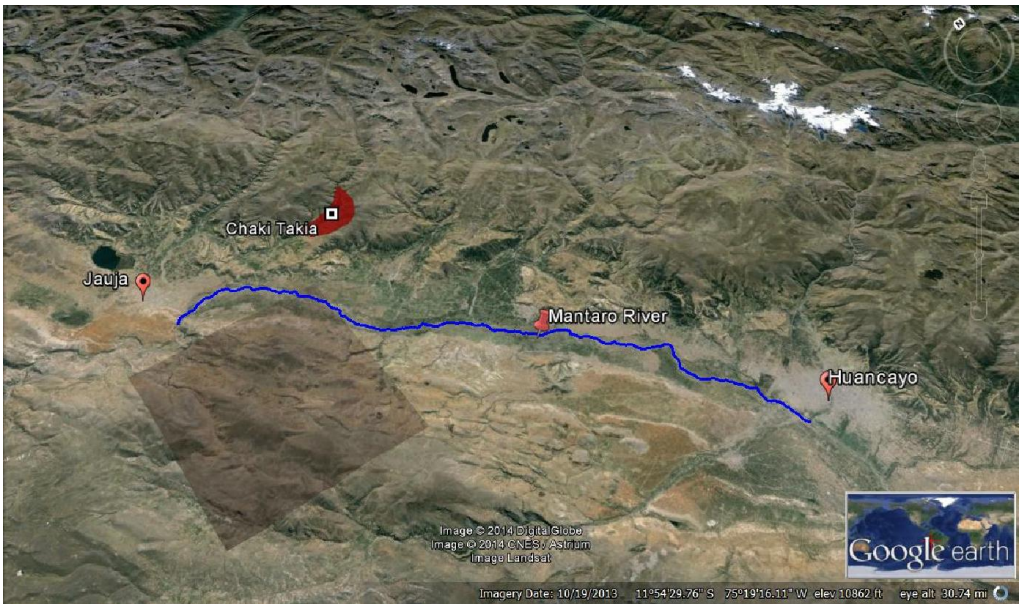


Figure 5-1. Mantaro Valley.
Source: 11˚54'26.76S and 75˚19'16.11W. **Google Earth.** October 19, 2013. June 6, 2014.

In the Mantaro Valley region, soil fertility varies but is often poor (Antezana et al., 2005; Meinzen-Dick et al., 2009). Nonetheless, the Mantaro Valley is an important food production zone serving Lima; its central geographic location also means that it functions as a gatekeeper to Lima as transport from the jungle lowlands to the east and highlands to the south pass through the valley in order to arrive to the capital (Lagos, 2007; Long, 2001). Vertically, the Mantaro region contains three distinct agro-production zones: in the low zone at the valley bottom, where intensive production typically occurs in the region and the risk of frost is low, farmers can produce a variety of crops including maize, artichokes, grains, and other vegetable crops; in the intermediate zone between 3,500 – 4,000 meters, frost poses a greater risk and so tubers, grains, and some legumes are grown but no maize; in the high zone, between 3,950 – 4,250 meters, the land extends upwards and can be used only for frost-resistant crops and grazing (Antezana et al., 2005; Mayer, 1979). In all three production zones, potatoes are grown, although potato biodiversity is typically conserved in the intermediate and high zones (Horton & Samanamud, 2012; Meinzen-Dick et al., 2009). The Mantaro Valley region accounts for 50% of all production in Junín, third among regions nationally in terms of potato production (Escobal & Cavero, 2012).

As part of the tropical Andes, the Mantaro Valley is marked ecologically by its extensive biodiversity and glacial presence (Lagos, 2007). Freshwater for the region originates primarily from the Huaytapallana Glacier, which, according to a 2007 study, had already lost approximately 22% of its surface area (Lagos, 2007). This threat to future water availability not only poses risks for future agricultural production but also the generation of hydropower from the region which supplies about 35% of the country's electricity (Silva et al., 2006). Analysis of climatic trends over the last half-century has indicated that the weather in the spring-like Mantaro Valley is becoming dryer and hotter and has more frequent frosts (Lee et al., 2009; Silva et al., 2006). Rainfall has been decreasing by 3% per decade on average, particularly problematic since about 75% of agricultural producers in the region rely primarily on rainfall (Lee et al., 209; Silva et al., 2006). However, the cause of weather variability cannot be conclusively tied to climate change. El Niño Southern Oscillation (ENSO) is a natural climatic occurrence that causes inter-annual weather variability due to interactions between the ocean and atmosphere in the tropical Pacific Ocean (Sperling et al., 2008). The alternating phases of oceanic warming (El Niño) and cooling (La Niña) often result in extreme weather events that are difficult to predict and vary in intensity according to geographic locations (Ho & Milan, 2012). In the tropical Andes, the extreme weather events that might take place include drought, flooding, hail, erratic snowfall, and extended cold periods (Sperling et al., 2008). Commonly, El Niño years are associated with hotter and dryer conditions in the region, although the intensity is highly variable (Silva et al., 2006; Sperling et al., 2008).

Social setting

Culturally, the heritage of the Mantaro Valley is rooted in the Huanca people, who fiercely battled the Incas before being conquered and later allied with the Spanish against the Incas (Stern, 1982). Although migration has changed the ethnic configuration of the region,

many proudly identify the Huancas as ancestors, although few community members continue to speak Huanca or Quechua in Chaki Takia. In the slopes above the Mantaro Valley, the focus of this study, comunidades campesinas (peasant communities) continue to be prevalent, though their strength is declining due to land privatization and out-migration (Deere & Lion, 2001; Ho & Milan, 2012; Marti, 2012). Whether a member of a comunidad campesina or not, households continue to serve as the primary organizational unit among peasants (Antezana et al., 2005; Mayer, 2002). As Antezana et al. (2005) explain, collectivity is inherent within communities: "conflicts within communities take place between interest groups and extended families rather than between individuals" (p. 54). Organizing as a household does not produce gender equality; women participate in agricultural activities and household decisions but generally do not enjoy any meaningful power outside of the household (Antezana et al., 2005). Communities are also organized according to social status: a small upper stratum of peasants who control large swaths of land and have more market opportunity; a large intermediate stratum who primarily rely on agriculture for their livelihoods but typically are secure in their assets; and a low-stratum of peasants who are unable to independently meet their subsistence needs and therefore often labor for other wealthier households (Antezana et al., 2005; Mayer, 2002).

According to Mayer (2002), "it is better to consider transmission of landholding through partition rather than inheritance" since parcels of land are sectioned off to both male and female children when they marry (p. 7). What has resulted is land fragmentation in the Mantaro Valley region, where 85.7% of producers cultivate less than five hectares (Ho & Milan, 2012). Stresses on agriculture were further exacerbated by the presence of the Shining Path in the 1980s and 1990s, whose terrorist tactics drove out many peasants from the Mantaro Valley region (Antezana et al. 2005). Attacks in the valley were constant and fierce, claiming thousands of lives, and often targeting public services (water, hydroelectricity, railroads), local government offices, private property of government officials, and police stations (Manrique, 1998). Despite the consistent threat of terrorism during this period,

Antezana et al. (2005) state that smallholders of the Mantaro Valley region generally rejected the Shining Path, unlike in neighboring regions (Gorriti, 1999). Nonetheless, agricultural production was devastated during the war years and the scars that resulted often translate into skepticism of strangers (Antezana et al., 2005). While the civil war spurred out-migration in droves, concerns regarding the viability of agriculture has continued to cause many households to leave rural areas for urban centers (Ho & Milan, 2012). This trend has caused shifts in household structures, as women increasingly act as household heads due to the absence of their male counterparts (Antezana et al., 2005).

Chaki Takia

Ascending in elevation from Jauja (3,400 meters) eastward 17.3 kilometers lies the small district of Chaki Takia (3,650 meters at the central plaza) (Figure 5-2[10]). A dirt road connects Jauja to the population center of Chaki Takia (where the district government is also located), although the road is currently being widened and paved. Consisting of two population centers (Chaki Takia and Churu), the population of the entire district is 843, although the majority resides in the population center of Chaki Takia, which lies in a highland valley (INEI, 2013b). In addition to the government office, the population center of Chaki Takia[11] is comprised of four neighborhoods (Figure 5-3), a comunidad campesina (peasant community), a newly constructed primary and secondary school, and a health post that is attended part-time by a nurse three days a week. While residents live in adobe houses in the valley, their agricultural fields are scattered plots in the lands around and above the residential

[10] In order to assure confidentiality, the coordinates reported in the citation for Figure 5-1 will be used for Figures 5-2, 5-3, and 5-4 in order to make the specific location of Chaki Takia more difficult to identify.

[11] Chaki Takia refers to both the district and the population center. Given that this study focuses on the population center, Chaki Takia will refer to the specific population center from this point, unless otherwise indicated.

section. Some of the parcels are located in the immediate vicinity, but others are situated thousands of feet above the population center and require a few hours by foot (Figure 5-4).

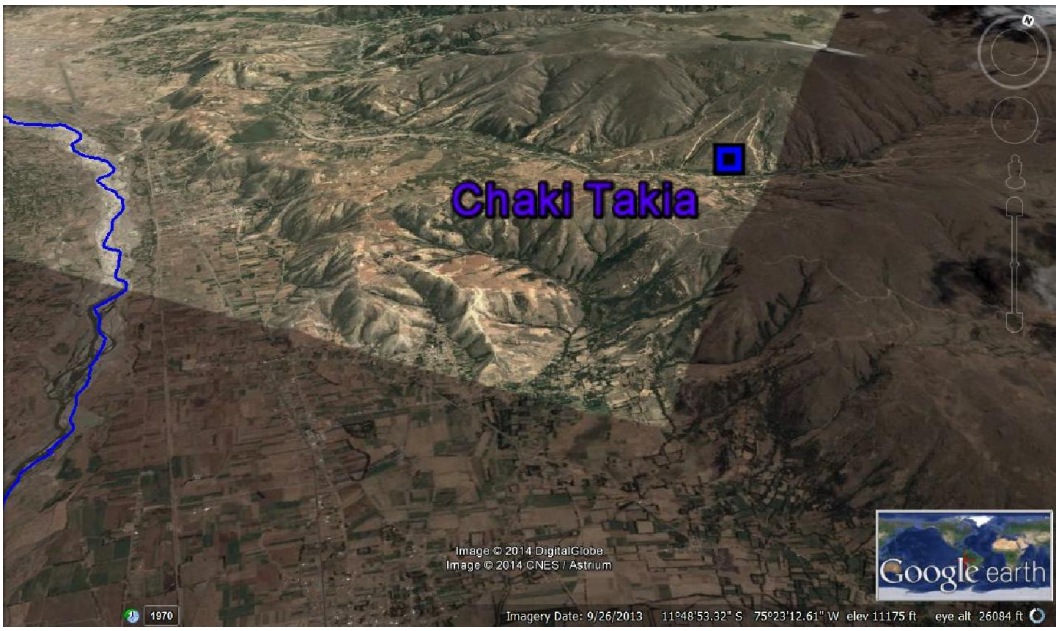


Figure 5-2. Chaki Takia in relation to the Mantaro River.
Source: 11˚54'26.76S and 75˚19'16.11W **Google Earth.** September, 26, 2013. June 6, 2014.

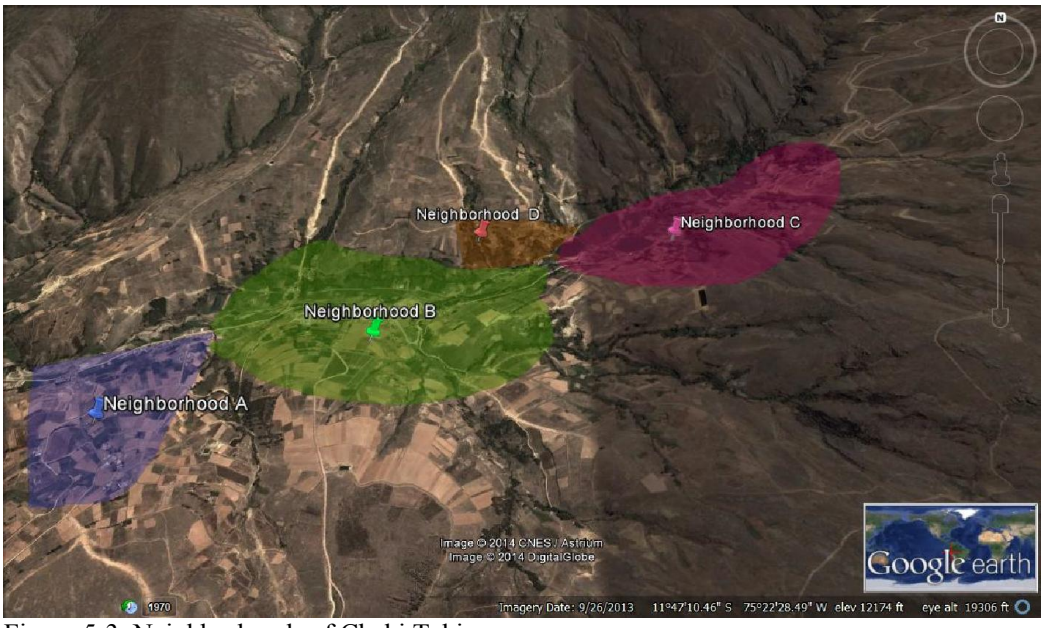


Figure 5-3. Neighborhoods of Chaki Takia.
Source: 11˚54'26.76S and 75˚19'16.11W. **Google Earth.** September 26, 2013. June 6, 2014.



Figure 5-4. Chaki Takia and surrounding agricultural lands.
Source: 11˚54'26.76S and 75˚19'16.11W. **Google Earth.** September 26, 2013. June 6, 2014.

Although impoverished, Chaki Takia does not lack natural resources, particularly water. Fresh water is fed from highland glaciers and while not potable, irrigation water is currently plentiful. The former mayor installed an extensive sprinkler system in the immediate surroundings of the population center, and that system is being expanded by the current administration. The purpose of doing so is to stimulate production of legumes and grasses for grazing. The soil in and around Chaki Takia has been diagnosed as acidic. A small river runs through the residential section. It is not typically used for either drinking water or agricultural activities but is prone to flooding. The slopes above Chaki Takia are mostly denuded, although pine reforestation projects were started about five years ago and are currently being continued. Given its elevation, the production zone of Chaki Takia is intermediate in the valley and high in the slopes above and so the focus of production is tubers, grains, and some legumes. The primary market outlet is Jauja, which holds its spot markets every Sunday and Wednesday. Jauja is accessed via collective taxis that make continuous trips, although no fixed schedule exists; taxis depart only when the driver deems that a sufficient number of people have boarded.

As a case study, this research project focuses on the population center of Chaki Takia. However, as I argued in Chapter Four, case studies can offer useful insight into other similar areas. In particular, this study is concerned with other districts in which FOVIDA is implementing native potato value chains. Based on secondary data from the 2012 Agricultural Census, Table 5-1 provides a comparison of Chaki Takia to the average of all seven districts in Junín where FOVIDA is working.[12]

Table 5-1. Comparison of Chaki Takia to Averages for 7 Junín Districts on Selected Variables

	Chaki Takia	Average of 7 districts	Range
Population	843	2,682	767 – 6,961
Altitude (meters)	3,650	3,471	3,284 – 3,675
Distance (km.) to closest market town	17	23	12 – 54
Total agricultural land area (hectares)	1,261	22,502	1,261 – 60,475
% of population with more than primary education	32%	46%	31% - 64%
% of population agreeing that agriculture provides enough income for subsistence needs	16%	19%	9% - 37%

(INEI, 2013b)

Data at the district level are limited, but the 2012 Agricultural Census has provided some basis for comparison between Chaki Takia and the average for all seven districts in Junín with which FOVIDA is working (INEI, 2012b). It must be noted that the data reflect both population centers of Chaki Takia, not only the population center of Chaki Takia. The only variable on which Chaki Takia provides the extreme (low) end of a range is on total agricultural land. Although both population and educational level are on the lower ends of their ranges, they are not the minimal points. Its altitude is higher than the mean altitude, but

[12] FOVIDA is also working in five districts in the region of Huancavelica but due to the distinct cultural differences between regions, comparisons are limited to only Junín districts.

its agreement level for the degree to which agriculture provides sufficient income and distance to closest market town are both lower than the mean. Nonetheless, except for total agricultural land area, Chaki Takia is within range for all variables under consideration, providing some evidence that the findings of this study are applicable to other districts in the region that are also interacting with pro-poor native potato value chains.

History of the FOVIDA project

Interest in potato chip production began in Peru in the 1970s and increased substantially in the 1990s, thanks in part to the linkages that agroindustry made with producers in the Mantaro Valley (Bernet et al., 2002). During that decade, Snacks America Latina S.R.L., a subsidiary of PepsiCo, established direct contracts with farmers in the Mantaro Valley with at least five hectares for the potato variety, Capiro, which could adhere to the quality requirements to process potato chips (Escobal & Torero, 2006). The presence of PepsiCo provided an opportunity for the region, for the company dominates at least 50% of potato chip production market in Peru (Escobal & Cavero, 2012). Although this market opportunity requires higher investments in inputs and is marked by higher transaction costs, the fixed prices of contracts are substantially more than spot markets (Bernet et al., 2002; Escobal & Cavero, 2012; Escobal & Torero, 2006).

Seeing the market potential of the Capiro variety, FOVIDA began to organize smallholding producers in the Mantaro Valley unable to establish direct contracts with PepsiCo. Acting as a commercial intermediary between smallholding farmer associations and PepsiCo, FOVIDA filled various roles: they reduced monitoring costs for companies, provided technical support on production and post-harvest handling, distributed quality seed, facilitated business relationships, and strengthened organizational capacity among farmers (Bernet et al., 2002; Escobal & Cavero, 2012; Escobal & Torero, 2006). While smallholding farmers enjoyed the advantages of the higher prices in their first campaign with PepsiCo in

1999-2000, the following year demonstrated the difficulties of this initiative, due to drought-like conditions affecting the quality of the harvest (Bernet et al., 2002).

During the early 2000s, when FOVIDA was first experimenting with organizing farmer associations and connecting them to large purchasing firms, the Papa Andina Initiative was beginning to formulate its pro-poor value chain strategy to further develop native potato market niches advantageous to smallholding farmers. Due to smallholder willingness to engage in intensive manual labor, their ability to adapt diverse varieties, and the potential to market products as pro-poor, Bernet et al. (2002) concluded that opportunity existed to successfully integrate smallholding farmers into dynamic value chains.

FOVIDA likewise saw potential, and thus found funding for a project focusing on smallholding farmers in the intermediate zones above the Mantaro Valley where potato biodiversity was conserved. FOVIDA targeted districts based on their native potato production, and focused its work in seven districts in Junín and five districts in Huancavelica (FOVIDA, 2012). The structure of this project reflected the work that had been conducted in the Capiro project with smallholding farmers in the Mantaro Valley: the NGO would act as both commercial intermediary and extension service until farmer associations themselves could manage direct business relationships. Reflecting the literature on value chains, FOVIDA incorporated an explicit focus on public/private partnerships into this project, collaborating with local and regional governments, the National Institute for Agricultural Innovation (INIA), CIP, farmer associations, and private companies (FOVIDA, 2012). In addition, a general governing body representing all of the farmer associations was established to manage a seed bank and eventually negotiate business relationships on behalf of farmer associations (FOVIDA, 2012).

During the 2007-2008 agricultural campaign, PepsiCo experimented with varieties that could provide the necessary quality requirements for potato chips. A contract between FOVIDA and Pepsi was prepared for the 2008-2009 agricultural season, which fixed the price of the potato in exchange for a guaranteed supply of potatoes that adhered to quality

requirements relating to potato size and sugar content (verified by a fry test). Settling on seven varieties with colored flesh that would not burn when fried, PepsiCo began to purchase these varieties from farmers during the 2008-2009 agricultural campaign (Appendix C, Image I). Purchases continued the next agricultural season as well, but were then suspended during the 2010-2011 season. The high price of the oil that was being used to fry the native potato chips, along with a review of their marketing strategy for the product, compelled PepsiCo to reformulate processing and suspend contracts. A year later, during the 2011-2012 season, contracts were reinitiated, although the number of varieties that were accepted was reduced from seven to three. This second phase lasted for two years until the 2013-2014 season, when contracts were again suspended. Whether PepsiCo will again restart its purchase of colored native potatoes is currently unknown.

FOVIDA also sought to develop other market outlets since 2007. Their most promising effort to date has been the relationship developed with Plaza Vea, a major national supermarket chain. Observing the demand for native varieties, Plaza Vea encouraged FOVIDA to undergo the formal process to become a licensed distributor so that it could deliver the native varieties of farmers in the highlands. FOVIDA completed this process for the 2012-2013 season and began to act as a formal distributor to Plaza Vea. During this time, five varieties were accepted by the supermarket. The quality requirements demand colored flesh, no external damage, and long shelf lives. In addition, they must be selected for size, washed, and packaged. Of these five varieties, only one is also purchased by PepsiCo. Purchases between FOVIDA and Plaza Vea occur more flexibly than with PepsiCo. Instead of a season-long contract, agreements are established for specific orders: Plaza Vea inquires whether FOVIDA can provide the quantity necessary, and the price can be negotiated.

Native potato value chain development in Chaki Takia

In 2007, FOVIDA began its work with Chaki Takia, although this did not mark the onset of projects with native potatoes in the district. In the years prior, the local government had partnered with INIA, the National Institute of Agricultural Innovation, and worked with local farmers to recuperate native varieties and sell them at the local market in Jauja. However, FOVIDA's entrance does mark the point when experimentation began with selling native varieties to agroindustry. When FOVIDA first entered Chaki Takia, two formal[13] farmer associations existed: Association 1 and Association X. When FOVIDA entered, the local government developed a partnership with the NGO and provided support to the farmer associations, in addition to other informal, small groups of producers. While FOVIDA delivered technical support and seeds, the government contributed fertilizers and pesticides, and the farmers their labor and land. This arrangement continued until 2010, when a new government administration entered and discontinued public participation. As a result, the small groups, consisting of roughly 18 producers in total, disbanded and no longer continued cultivation for high value market outlets. Likewise, the eight members of Association X disbanded after two seasons.

Association 1 continues to exist, its members mostly residing in Neighborhoods A and B (Figure 5-3). During its first season of participation, Association 1 planted their industrial native potatoes in a communal plot, but after difficulty adhering to the quality standards of PepsiCo, the group decided to plant individually in subsequent years. Although the association originally contained 14 members, at least six members have stopped planting either due to emigration or discouraging experiences with the project. Several new members - and four households who participated in previous years - have joined the association for the 2013-2014 season and intend to plant small plots of the industrial varieties. In addition, a new formal association, Association 2, consisting of eight members primarily from Neighborhood

[13] Formality is denoted by whether the group has formally registered with the government.

C (Figure 5-3), was formed in the 2010-2011 season. Like members of Association 1, these participants plant individually. Table 5-2 summarizes the various associations and years of existence.

Table 5-2. Characterization of Project-participating Groups and Associations in Chaki Takia

Group/Association	Years of Project Participation	Production Structure (Individual or Communal)
Municipal Small Groups	2008 – 2010	Communal among 2-3 person small groups
Association X	2008 – 2010	Communal
Association 1	2008 – present	Communal for one campaign and then individual
Association 2	2010 – present	Individual

Chapter 6

Findings

This chapter presents the findings of this study, derived from qualitative analysis of 36 semi-structured interviews and participant observation as well as 149 household surveys. As explained in Chapter Four, I approached the qualitative data using thematic analysis, while a variety of statistical methods were applied to quantitative data including descriptive, bivariate, and multivariate analyses. The sections of this chapter are structured according to the four research questions:

1) What are the perspectives of development actors, and especially community members, regarding efforts to develop value chain linkages for smallholding native potato producing households?
2) What is the relationship between and among project participation and other predictors including on-farm diversification, livelihood activity diversification, social interaction, and household demographics, and the dependent variable of dietary diversity?
3) How do native potato value chain stakeholders, and especially community members, understand the concepts of on-farm diversification, livelihood activity diversification, social interaction, and dietary quality?
4) How do livelihood decisions affect the structure and function of native potato value chains?

The first and third questions rely on qualitative data for analysis, the second on quantitative data, and the fourth on a combination of the two datasets. Each question reflects an aspect of the conceptual model provided in Chapter Three (Figure 3-2).

Research Question 1: What are the perspectives of development actors, and especially community members, regarding efforts to develop value chain linkages for smallholding native potato producing households?

Price

Regardless of association membership, project participants universally agree that the price for potatoes that are sold to either PepsiCo or Plaza Vea is desirable. The contracted price offered by both companies is more than three times the prices received at the local market in Jauja. Given the price difference, farmers in Chaki Takia have experienced benefits when they have been able to sell their product in value chains. One farmer, an ex-participant of the now-defunct Association X and new participant of Association 1, explained that the price he received when he successfully sold his potatoes to PepsiCo one year helped to ease financial stress. Believing that a secure market exists, many non-participants mentioned their desire to participate in the project if inputs were made more accessible and desirable prices were maintained. The executive at PepsiCo listed the high price as the first advantage for farmers who sell their potatoes to the company, while the executive at Plaza Vea reported that he had been told that farmers are satisfied with the prices they receive. Likewise, a FOVIDA coordinator in charge of commercialization emphasized the "fair price" received by farmers as a cornerstone of the project.

Quality requirements

For all the benefits of the desirable price, individuals who had participated in the project were also uniformly frustrated by the inconsistency of the market outlets, particularly PepsiCo. The majority of project participants complained that they regularly had at least part of their harvest rejected by PepsiCo for failing to adhere to quality requirements. To ensure that potatoes contain suitable quality, a fry test is performed and those that burn are rejected.

Farmers blamed weather conditions such as hail and frost for damaging quality and, while FOVIDA coordinators agreed that stressful weather has affected harvests, they also indicated that poor management has also diminished quality. According to one project coordinator, a limited window of opportunity exists to harvest the potatoes so that they have appropriate levels of water and sugar; if farmers leave the potatoes in the field, sugar content rises, causing problems during the fry test. Regardless of cause, the difficulty farmers have confronted in selling their potatoes to PepsiCo has instilled skepticism among farmers. Oscar, president of Association 1, indicated his frustration: "We have to have a secure market, we can take and sell and…because, if we don't have a market, we plant for what? To lose, no?" From farmers' perspectives, the security of the market is conditional, based on quality conditions farmers have struggled to meet. One ex-participant of a small group supported by the municipality indicated that in the 2009-2010 season, 40% of his harvest was rejected; another current producer indicated that he has not yet sold any of his potatoes to PepsiCo in three harvests.

As a result of weather conditions and less than optimal management, FOVIDA has struggled to deliver the number potatoes to PepsiCo has contracted. According to a FOVIDA coordinator:

> The last year, the contract was signed for 50 tons, but we only delivered 37 tons. This year that just passed, it's 100 tons and we didn't arrive to 20%. What happened was that the producers didn't harvest good quality potatoes. The potatoes burned.

Failure to meet contractual stipulations has unnerved FOVIDA, which fears that PepsiCo will take legal action in order to financially recuperate. Although PepsiCo executive indicated that he understands the difficult conditions that farmers confront in the highlands and so sees no tension with FOVIDA, this message has either not been communicated with FOVIDA at all or at least not in a way that has alleviated fears.

Like PepsiCo, Plaza Vea also implements quality standards. However, unlike PepsiCo, the quality is based more on external quality – size, undamaged, and cleanliness – as

opposed to internal characteristics such as sugar content. Based on the success of purchases over the past year, both the supermarket and FOVIDA have optimism that the relationship will grow in the future. Indicating his satisfaction with the arrangement, the Plaza Vea executive indicated that nearly all potato shipments delivered this past year by FOVIDA were accepted by the supermarket. Despite this success, concerns still exist that rural households are not accustomed – and therefore are not dedicated – to supplying products that adhere to quality standards. The process of selecting, cleaning, and bagging potatoes is distinct from other markets to which farmers are more acquainted. As a FOVIDA director explained:

> These markets like PepsiCo, the same Plaza Vea, have their quality standards. Every destination has their quality standards….[Farmers] show some resistance: 'I have my potato, I sell like I harvest at the market, I select a little bit and I sell but it's not done like these markets.'

Despite this perspective, the majority of participants in Chaki Takia seemed to understand the quality expectations of Plaza Vea and enthusiastically spoke of a new processing unit received through donation to help with selection and washing. Nonetheless, quality demands are met with frustration by other community members. One widow, a mother of a project participant, explained: "In order for FOVIDA to take [the potatoes], they select them for those that have no spots, not one worm that produced a hole…they don't want you touch it. It doesn't work for me."

Market stability

In addition to difficulty adhering to quality requirements, farmers were also frustrated by the market opportunity being available at all. When PepsiCo suspended contracts for the 2010-2011 season, needing to re-evaluate its native potato chip processing, it did not inform FOVIDA until December, months after planting typically begins. As a result, participating households harvested their PepsiCo native varieties with no possibility to sell to the company. Because these native varieties are primarily used for frying (and not the preferred cooking

method of boiling for consumption), they are not well known in the local market and thus have low demand. Without alternative market options, many households sold their harvests for minimal prices in Jauja. Put off by the taste, other households fed the potatoes to their pigs.

This bad experience also caused fragmentation within the farmer associations. While one ex-participant reported that unity and organization suffered, another ex-participant explained that this year caused her to cease planting PepsiCo varieties:

> For 2 years it was going well, we harvested well and we sold…it was the jijurani [a potato variety] and these were accepted by Lay's Potatoes and we were taking them to the Lay's Potato market, and it was going well. I believe…there was a problem with the company of Lay's Potatoes and there it went down and nobody wanted to purchase the jijurani potato. From there, we left, because this year, we didn't recuperate anything, it was a loss and we stopped planting.

Concerns regarding the inconsistency of the PepsiCo market were reinforced by the suspension of contracts again for the 2013-2014 season. Rumors of unreliable market demand have spread around town, causing many non-participants to question the desirability of the project. Several community members, who indicated that they would be interested in the project if a secure market existed, explained that their fear of investing and losing prevented them from becoming actively engaged.

Although nearly every (ex-)participating household articulated frustration with the FOVIDA project, one farmer, Grover, explained that his experiences had been positive. Recognizing that market fluctuations inevitably exist, Grover explained that one difficult year when his potatoes burned did not discourage him since the market rebounded the following year. Furthermore, he was under the impression that even during the year that PepsiCo had suspended contracts, the high quality of his potatoes had allowed him to sell his harvest to PepsiCo anyway. While Grover did successfully sell his potatoes for a high price that particular year, a FOVIDA project coordinator explained that it was not to PepsiCo. Instead, FOVIDA worked vigorously to find alternative market opportunities like health food stores, supermarkets, and Sunday spot markets. In the case of Grover, this coordinator clarified:

> What happened is that we had other businesses with which we have developed. He thinks that it's PepsiCo like we developed. It's that we sell to businesses like Wong [a supermarket] in Lima and other small stores.

Thus, although FOVIDA located market options after PepsiCo had suspended contracts, farmers lacked understanding about exactly what had happened.

For both FOVIDA and participating farmers, the recent market opportunity provided by Plaza Vea is an important expansion to the project. However, the degree that this can be considered an alternative market is questionable, since Plaza Vea accepts only one variety in common with PepsiCo. This causes a problem for farmers in that their planting decisions must reflect the available market opportunity. One project participant emphasized that he needed to be told with anticipation which varieties would have market demand for the upcoming agricultural season. He feared that without proper information, he would plant PepsiCo varieties for a year that Plaza provided the primary market outlet. Likewise, a FOVIDA coordinator tasked with production support, was distraught that PepsiCo had again suspended contracts for the 2013-2014 season. Many farmers, she explained, had saved seed for the PepsiCo varieties from the previous season, only one of which would be accepted by Plaza Vea, the market that would be providing the bulk of the demand for the agricultural season. Once again she feared, FOVIDA would have to scramble to find alternative markets for the PepsiCo varieties that Plaza Vea would not purchase and were undesirable in the local market. Concerns regarding market unpredictability existed downstream as well. The PepsiCo executive, for example, worried that the interruptions in contractual arrangements from year to year made it difficult for small producers to plan ahead.

Supply chain coordination

FOVIDA, PepsiCo, and Plaza Vea all expressed concern that rural farmers struggle to understand and integrate themselves into supply chains. The PepsiCo executive believed it difficult to adequately explain quality demands to small producers in the highlands, while the

Plaza Vea executive emphasized the complexity of the market chain. When asked if he believed he could coordinate directly with the potato producers, the Plaza Vea executive explained the challenges prohibiting direct interaction:

> We know that the farmers don't function alone. Many times, it's a big problem.…The producers, very difficult that they first dedicate themselves to this commercial labor: to bring, clean, deliver, wait, bill, fill documents, understand the theme of costs, time, taxes, etc. So many things….the emails that they do…the telephone calls, time coordination. So they're not in this dynamic, the producers, so it's very difficult for them to do it.

Transaction costs extend even beyond what is mentioned in this quote. When selling to Plaza Vea, growers are responsible for delivering the potatoes to the FOVIDA office in Huancayo after selecting, washing, and packaging.[14] Once the order is ready, FOVIDA then coordinates delivery to supermarket. As part of the delivery, a specified surplus of potatoes must be delivered to the supermarket as a reserve in the event that the "sell by" date expires. FOVIDA must also actively market the product, which other companies often do through promotional events at the supermarket.

In the case of delivering product to PepsiCo, FOVIDA coordinates with the 11 different farmer associations in Junín a particular day for the farmers to descend to specified points along the main highway in the Mantaro Valley, where a truck contracted by FOVIDA collects the potatoes. The truck then drives to Lima to deliver the potatoes to the PepsiCo headquarters. If the potatoes are rejected, FOVIDA coordinates other transportation to carry the potatoes to a storage space. A FOVIDA coordinator then works to find alternative markets. If natural health food stores are interested, the FOVIDA coordinator bags the potatoes into small nets and splits the cost of the taxi with the store. Both this preparation and delivery are costs that FOVIDA assumes with no help from producers. If the potatoes are not purchased by health food stores, FOVIDA will sometimes purchase the potatoes from the farmers and attempt to sell them at Sunday spot markets in Lima. Whatever the intended

[14] In the event that producers are not able to complete the processing themselves, FOVIDA contracts a service to do so and deducts the cost what the growers receive for their payments.

market destination, project participants are unaware of all the details required for successful transactions to occur. Knowledge of the supply chain seemed to stop at the point that potatoes were delivered to FOVIDA.

PepsiCo and Plaza Vea's roles in the supply chains

Neither PepsiCo nor Plaza Vea claimed to reap meaningful profits from their native potato products since they are seasonal for both. However, the product does provide value in other ways. For Plaza Vea, the native potatoes fill a cultural niche for customers and therefore help the supermarket distinguish itself from competition. PepsiCo sees profit potential if the native potato producers could expand production; international demand exists but PepsiCo cannot yet source enough potatoes to currently even fill the national market. Beyond the economic promise, the PepsiCo executive also alluded to native potato chips contributing to pro-poor development, claiming that the company wants to invest in sustainability in ways that transform agriculturalists into entrepreneurs. However, corporate social responsibility is not at the forefront of concerns. The PepsiCo executive reported that the company in no way uses its connection with rural producers for advertisement purposes, and neither company extends any support in the form of credit, inputs, or technical assistance to farmer associations. Instead, both companies wait at the end of the supply chain to receive potatoes from FOVIDA. Business is negotiated through FOVIDA with very limited contact with farmers. As the Plaza Vea executive explained:

> We don't have the mission to support [farmers]….For us, it's to wait that the distributor comes with sufficient quality and sufficient capacity in order to sell their product like is happening now with native potatoes.

The role of FOVIDA in the supply chain

Given all the commercial steps for which FOVIDA is responsible, both PepsiCo and Plaza Vea view the NGO's distribution role as the essential link in the supply chain; without FOVIDA, the infrastructure does not exist for the companies to directly interact with the smallholding native potato producers. Farmers in Chaki Takia also view FOVIDA as a commercial intermediary, linking farmer production to market outlets otherwise not accessible. However, the NGO's identity is also more complex for farmers: in addition to market intermediary, FOVIDA is also responsible for extension services. FOVIDA project coordinators train farmers on production methods, organizational management, and commercialization. In addition, FOVIDA represents farmers in the negotiation process with both Plaza Vea and PepsiCo – and in fact, the contract exists between PepsiCo and FOVIDA, not the producers of the potatoes. In actuality, no person in Chaki Takia has seen the contract or knows the specific conditions other than the quality requirements outlined. The multi-facetted roles for which FOVIDA is responsible was most explicitly revealed by one FOVIDA project coordinator, who referred to his NGO at once as technical outreach, socially "just intermediary," and representative of farmers' interests.

FOVIDA makes sense of their various functions by viewing their role as facilitating the "learning process" for rural households to become integrated into stable markets with fair prices. In order to do so, FOVIDA has implemented mechanisms throughout the project for educational purposes. FOVIDA visits farmer fields, conducts workshops and training sessions, and assumes the cost of many logistical steps during delivery. For example, farmers are charged only minimally for the truck that collects their potatoes to bring to PepsiCo in Lima; FOVIDA pays for the majority of the cost. The idea is that deducting at least a small portion of the sales from the farmers without burdening them with the entire fee will make them aware of the costs entailed. As explained by a FOVIDA coordinator:

> When this is within the project, it's a learning process. Once the people learn, they can assume the costs, and they need to continue knowing that these costs are costs that they have to assume.

In providing these different training experiences, the awareness that FOVIDA has in the need to gradually minimize its role is understood. Funding will end at some point, leaving the farmer associations to navigate the supply chain themselves. The goal of the project was clearly outlined by a FOVIDA director:

> Our permanence as a project that has funding will not be forever; it has a limit and from there, a view and vision is that the producers have the capacity to interrelate with the association or the industry based in these lessons so that they don't need an institution. So that they know the quality of product that will go, how is the payment, how is the time of delivery, the whole process…so this is what we, you could say, strive for as an institution. That they really form a big group of producers and can assure supply to these markets.

Despite its necessity in the function of native potato value chains, FOVIDA still receives criticism from farmers. Although, for example, many project participants understood that PepsiCo had internal problems when contracts were suspended in 2010-2011, many farmers perceive that FOVIDA was also at fault. One former participant of Association 1, who left the project after this failed year, explained:

> [FOVIDA] was the intermediary in the market. FOVIDA was responsible, it had to collect in order to pay the producer the value…[FOVIDA] didn't concretize the contract that they had with this factory.

Thus, for farmers, FOVIDA, as an intermediary, has an obligation to secure and guarantee the market. FOVIDA, however, has a distinct perspective, believing it unfair to burden the NGO with so much responsibility. Implying its role as market facilitator, a project coordinator explained that the farmers must understand that they are the ones responsible for market success:

> Many producers think that FOVIDA is the one with responsibility. They still don't identify that it's their business and that they need to be involved in this theme. FOVIDA creates the spaces, motivates them to participate….

From this perspective, farmer participants must take more ownership over their role in the market chain to successfully access these opportunities.

Production support

Farmer participants overwhelmingly indicated that the quality demands of these markets were so challenging that they lacked the capacity to be reap the benefits of these outlets. Interviewees consistently expressed concern that they lacked technical support in the fields to produce potatoes of adequate quality. Although participants readily agreed that FOVIDA conducted workshops and training sessions and occasionally visited fields, the farmers questioned both the consistency of visits and the method of program delivery. One participant of Association 2 had mixed reviews, first explaining how FOVIDA is helpful: "Technically, they support us; their engineer comes, she comes to the fields and evaluates what your plants lack." However, he continued to describe the problems with this style of support: "They come once a month, month and a half when the blight is already there. Technically they lack a little bit." Project participants commonly voiced complaints that visits from FOVIDA too often occur after the potato plants have already been affected by poor weather conditions or disease. While project participants agreed that the NGO organizes workshops, they were frustrated by the emphasis on theory, a perspective represented by this farmer: "[FOVIDA] gives us [support] technically in paper and this should be in practice." The current mayor assessed FOVIDA's efforts similarly: "FOVIDA lacks a little bit in involving themselves in the work…It's only the theoretical part, but in the technical part, the part in the fields, they lack."

The problem, according to farmers, is that the quality demands of the industrial native varieties require more intensive management to which they are not accustomed. Oscar, president of Association 1, detailed some of the various factors that could affect the potato quality and the need, therefore, for FOVIDA to be present more consistently. Considering the difficulty he has had in passing the fry test, Oscar observed:

> It could be a factor of the soil or it could be the fertilizer or the treatments that one puts on. It could be a problem that the potato absorbs too much sugar [and] burns. For that there has to be good engineers here on the part of FOVIDA, who come and monitor on a strict schedule…

Other farmer participants echoed this sentiment. To them, goals of commercialization needed to be considered secondarily to the primary objective of producing high quality potatoes which required more assistance on soil amendments, disease treatment, and input application.

According to FOVIDA interviewees, the complaints of farmers are misplaced because the NGO addresses both theoretical and practical issues through workshops and field visits. The primary problem, according to a FOVIDA coordinator, results from the lack of follow-through by project participants. The NGO schedules comprehensive programming on production, organizational management, and commercialization with all associations but lack of participation prevents FOVIDA from completing all of the material. This FOVIDA interviewee explained:

> We arrive to this place and the people aren't there and only one person or two people showed up. One cannot work with one person. Another time they don't come because they don't have time; they are working. Another time, nothing. Another time, nothing, nothing.

Likewise, schedules are established for harvesting, but often farmers do not adhere to the timeline, letting the potatoes stay in the ground for weeks and even months too long, causing sugar contents to rise. Even field visits have been difficult. A FOVIDA coordinator detailed an experience her colleague had when trying to visit one of the project participants:

> When my colleague went to her parcel [to see] how much potato there was, she was not there in the harvest; her laborers were there. We didn't train the hired laborers, we trained her, we gave her the training, what size, how does the potato need to be…

These frustrations caused this interviewee to question the dedication of the farmer associations, and she indicated that she wanted to speak frankly with the groups in Chaki Takia to see if they wanted to continue with the project.

For their part, the PepsiCo and Plaza Vea executives perceived that their distance from production sites does not provide them adequate knowledge regarding what happens in the fields. Because Plaza Vea has experienced positive results regarding quality adherence, its executive figured that FOVIDA was doing solid work with the farmers. However, given the

quality failures experienced by PepsiCo, its executive imagined that FOVIDA needed to dedicate more effort to supporting farmers during production. Neither executive offered any indication that its company should play any role in production support, although PepsiCo employs agronomists who provide some technical support to farmers who grow the Capiro variety in the Mantaro Valley and also offers those farmers inputs on credit. This assistance, however, has not been extended to highland producers who provide native potatoes.

Social Interfaces of Value Chain

Based in the different perspectives of actors in the supply chain, these findings of this question reflect the concept of a social interface, described in Chapter Three (Long, 2001). Given that the findings span the perspectives of supply chain actors, Table 6-1 considers them in direct comparison with one another.

Table 6-1. Actor Perspectives of Native Potato Value Chains.

Characteristic	Participants	Non-participants	FOVIDA	PepsiCo	Plaza Vea
Price	Desirable	Desirable	Socially just	Fair	Fair
Quality Requirements	Difficult to attain for PepsiCo; easier for Plaza Vea	Undesirable	Add value	Necessary	Necessary
Market Stability	Inconsistent	Inconsistent	Need for alternative market outlets	Difficult for farmers to plan ahead	Stable
Supply Chain Coordination	FOVIDA is responsible	Do not consider	FOVIDA now, farmers in the future	FOVIDA is necessary	FOVIDA is necessary
PepsiCo/Plaza Vea Roles	Market outlet	Market outlet	Contractual counterpart	Market outlet	Market outlet
FOVIDA role	Intermediary and extension	Intermediary and extension	Socially just intermediary, extension, and farmers' representative	Intermediary	Intermediary
FOVIDA's production support	Insufficient	Insufficient	Sufficient; problem is farmers' follow-through	FOVIDA likely needs to do more	Does not know

Research Question 2: What is the relationship between and among project participation and other predictors including on-farm diversification, livelihood activity diversification, social interaction, and household demographics, and the dependent variable of dietary diversity?

A household survey was conducted with a census of Chaki Takia households (N=149) to better understand their livelihoods. Questions on the survey were constructed to reflect the conceptual areas of dietary diversity, project participation, on-farm diversification, activity diversification, social interaction, and household demographics. To analyze quantitative data, a variety of statistical procedures were utilized beginning with descriptive analysis and culminating in linear regression. The process of analysis will provide the structure for this section.

Overall descriptive statistics on survey items

A review of household livelihood characteristics will be presented in this section, which will proceed according to conceptual area. Household demographics will first be presented, followed by the dependent variable of dietary diversity, and then independent variables of project participation, on-farm diversification, activity diversification, and social interaction.

Household demographics

To characterize households, the survey included questions regarding household size, household structure, age of household head, age dependency, education level of the household head, size of land access, and animal value. Table 6-2 presents this household demographic information.

Table 6-2. Household Demographics. (N=149)

	Percent	Mean	Standard Deviation	Range Min	Max
Household Structure*					
Double-headed	70.5%				
Male-only	7.4%	-------	-------		-------
Female-only	22.1%				
Size of Household	-------	3.54	2.04	1	11
Household Head Age	-------	53.81	16.01	21	90
Household Head Education Level					
None	10.1%				
Incomplete primary	20.1%	-------	-------		-------
Complete primary	37.6%				
Incomplete secondary	9.4%				
Complete secondary or More	22.8%				
Household Age Dependency Ratio** (N=149)		0.43	0.35	0	1
Household Animal Value (N=145)					
S/0-999	30.3%				
S/1,000-4,999	51.0%	-------	-------		-------
S/5,000 or more	18.6%				
Land Size (hectares) (N=146)					
0-.24	53.0%				
0.25-0.49	24.8%	-------	-------		-------
0.5 or more	20.1%				

*For multivariate analysis, household structure was aggregated into 2 categories (double-headed or single-headed) in order to address inadequate distribution across categories (Tabachnick & Fidell, 2007).
** Age dependency is the ratio of dependents (those under 15 and over 64) dependent on the labor of other household members. An age dependency ratio is calculated by dividing the number of dependents into the total number of household members and thus closer to one indicates more labor dependency within the household (Maharjan & Joshi, 2011).

Descriptive analysis indicates that the majority of households (70.5%) are double-headed with an average of 3.54 members. The average age of the household head (whomever is older in the case of a double-headed household) is 53.81, although the range (21-90) is expansive. Among households, 69.8% were headed by someone with at least a primary education. On average, the age dependency ratio was 0.43, indicating that for nearly every

household member dependent on labor (under 15 or above 64), two members provide labor. Finally, the majority of households (51.0%) own between S/1000 – 4,999 of value in animals, while only 18.6% own S/5,000 or more in animal value. As a proxy for wealth, this finding reflects the small upper- and large middle-strata that are typical of Andean households in Peru (Antezana et al., 2005; Mayer, 2002). Likewise, a minority (20.1%) had access to more than one hectare, while a majority of 53.0% claimed to have access to under 0.25 hectares. This again reflects Mayer's (2002) characterization that larger landholdings are typically associated with a minority of wealthy peasants in communities.

Dietary diversity

Dietary diversity, measured according to the Household Dietary Diversity Score (HDDS), served as the dependent variable for quantitative analysis. HDDS asks respondents whether each of 12 food groups was consumed in the household within the last 24 hours (Swindale & Bilinsky, 2006). Table 6-3 presents descriptive information for HDDS.

Table 6-3. Household Dietary Diversity Score Results. (N=149)

In the last 24 hours, did household consume:	Percent		Mean	Standard Deviation	Range	
	Yes	No			Min	Max
Cereals?	96.6%	3.4%	----	----	----	
Roots or tubers?	90.6%	9.4%	----	----	----	
Vegetables?	68.5%	31.5%	----	----	----	
Fruits?	38.3%	61.7%	----	----	----	
Animal meat or offal?	38.3%	61.7%	----	----	----	
Eggs?	24.2%	75.8%	----	----	----	
Fish?	4.0%	96.0%	----	----	----	
Legumes?	29.5%	70.5%	----	----	----	
Milk or milk products?	44.3%	55.7%	----	----	----	
Oils, fat, or butter?	36.2%	63.8%	----	----	----	
Sugar or honey?	63.1%	36.9%	----	----	----	
Condiments or coffee/tea?	49.7%	50.3%	----	----	----	
Total number of food groups*		----	5.83	1.77	2	9

*The theoretical range is from 0 – 12.

Because no standard cut-off points exist to analyze dietary diversity according to HDDS, Kennedy et al. (2011) recommend looking at percentages of consumption across food groups as well as the mean across respondents after HDDS has been calculated through a simple composite score. According to the results, cereals (96.6%), roots and tubers (90.6%), vegetables (68.5%), and sweeteners (63.1%) were the most commonly consumed food groups among households. Households consumed the food groups of fish (4.0%), eggs (24.2%), and legumes (29.5%) the least. For 61.3% of households, sweeteners constituted one of their food groups. On average, households consumed nearly half (5.83) of the 12 food groups, with a range from 2 to 9. Since the theoretical midpoint for this scale is 6, the mean score indicates

that moderate dietary diversity exists in Chaki Takia. Cumulative HDDS scores were utilized for the purposes of bivariate and multivariate analyses.

Project participation

Project participation marks those households who currently participate, formerly participated, and have never participated in the FOVIDA value chain project. Table 6-4 presents the distribution of households according to project participation.

Table 6-4. Household Project Participation. (N=149)

	Frequency	Percent
Current Participants	14	9.4%
Ex-participants*	16	10.7%
Non-participants	119	79.9%

*In order to address inadequate distribution across categories, current participants and ex-participants were aggregated into one category for the purposes of bivariate and multivariate analysis (Tabachnick & Fidell, 2007).

Among the 149 households in the census, 14 (9.4%) currently participate in the FOVIDA project, and 16 had formerly done so. Together, these households represent 20.1% of households.

On-farm diversification

To account for on-farm diversification, households were asked the number of land parcels to which they had access for cultivation, the number of potato sacks that could be planted on available parcels (to calculate size of land access in hectares)[15], number of different crops planted, the number of different native potato varieties planted, and the

[15] After field testing the survey, it was found that respondents did not think of land size in terms of hectares. Based on the insight from several NGO technicians, it was decided that number of hectares could be calculated based on the total number of seed potato that could planted on available land of households. Roughly 1,500 kilograms of seed potato can be planted on one hectare and so households were asked the number of potato sacks and their weight to determine land size.

number of different types of animals owned. Table 6-5 provides an overview of household responses.

Table 6-5. Household On-farm Diversification

	Percent	Mean	Standard Deviation	Range Min	Range Max
Number of Land Parcels (N=146)	---	4.40	3.10	0	17
Number of Crops (N=148)	---	2.32	1.54	0	15
Number of Native Potato Varieties (N=149)	---	10.06	31.38	0	300
Number of Animal Types* (N=148)	---	2.95	1.52	0	7
Households owning:					
Alpaca	5.4%				
Bee Hives	3.4%				
Cows	66.4%				
Fowl	46.3%				
Guinea Pigs	43.0%				
Horses/Donkeys	36.9%				
Pigs	36.9%				
Sheep	57.0%				

*The theoretical range is from 0 – 8.

Descriptive statistics indicate that households have access to 4.40 land parcels on average for crop cultivation; the normality issues due to the large range (0-17) required that this data undergo logarithmic transformation for bivariate and multivariate analyses. Regarding number of different crops grown, the mean was 2.32, skewed closer to the minimum of 0 than the maximum of 15 and also required logarithmic transformation. A maximum of 300 varieties of native potatoes are grown by households in Chaki Takia, although households cultivate 10.06 on average. Problems of normality given the large standard deviation (31.38) and expansive range demand logarithmic transformation for further analysis. Finally, of eight animal types, households own nearly three on average (2.95) with the most common being cows (66.4%), followed by fowl (46.3%) and guinea pigs (43.0%).

Activity diversification

To account for activity diversification, household members indicated their engagement in specific activities relevant in the Peruvian highlands under the categorizations of independent agriculture, wage agriculture, independent non-agriculture, wage non-agriculture, and non-labor (Barrett et al., 2001). Table 6-6 specifies the activities that were considered.

Table 6-6. Engagement in Livelihood Activities among Households.

	Frequency	Percent
Independent Agriculture (N=147)	141	95.9%
Farm for consumption (N=148)	135	91.2%
Farm for market (N=148)	79	53.4%
Rear animals for consumption (N=148)	133	89.9%
Rear animals for market (N=147)	91	61.9%
Wage Agriculture (N=148)	70	47.3%
Farm for wage (N=148)	66	44.3%
Rear animals for wage (N=148)	16	10.8%
Post-harvest handling for wage (N=148)	19	12.8%
Independent Non-Agriculture (N=148)	54	36.5%
Make handicrafts for market (N=148)	35	23.5%
Own business (N=148)	7	4.7%
Self-employed in profession (N=148)	20	13.5%
Wage Non-Agriculture (N=148)	21	14.2%
Work for company (N=148)	7	4.7%
Work for public institution (N=148)	14	9.5%
Work for civil society organization (N=148)	0	0.0%
Non-labor (N=149)	69	46.3%
Receive remittances (N=149)	39	26.2%
Have a loan taken out (N=149)	24	16.1%
Receive inputs on credit (N=149)	24	16.1%

The data indicate that wage agriculture is the most common (95.9%) set of activities in which households engage. Within that category, farming (91.2%) and rearing animals (89.9%) for consumption are more frequent activities than farming and rearing animals for the market (53.4% and 61.9% respectively). Non-independent wage agriculture was the next most common category (47.3%) with farming crops for others as the primary activity (44.3%).

Among households, 46.3% of them engage in non-labor activities, most commonly receiving remittances (26.2%). Making handicrafts was the most frequent activity (23.5%) in the category of independent non-agriculture (36.5%). Few households (14.2%) participated in wage non-agriculture.

Data at the activity level were aggregated to consider whether households engaged in each category and composite scores were derived, theoretically ranging from 0 – 5. The intent of these scores was to reflect activity diversification. Table 6-7 provides the results.

Table 6-7. Household Activity Diversification. (N=147)

	Mean	Standard Deviation	Range* Min	Max
Activity Diversification	2.40	1.02	0	5

*The actual range matches the theoretical range (0 – 5).

The average number of activity categories in which households engage is 2.40, meaning that the average household is diversifying its activities outside of agriculture.

Social interaction

To account for social interaction, households were asked about the groups and organizations outside of livelihood activities in which they participate. In doing so, respondents indicated the number of activities and organizations, the number of hours per month they dedicated to each activity (0 = None, 1 = <10 hours, 2 = 10 hours or more), and whether or not they held a leadership position (0 = No, 1 = Yes). Responses were then combined into a composite score which could theoretically range from 0 – 9. This data are presented in Table 6-8.

Table 6-8. Social Interaction among Households

	Percent	Mean	Standard Deviation	Range Min	Range Max
Number of Activities (N=146)	---	1.47	1.19	0	6
Number of Hours per Month (N=146)					
0	26.1%				
< 10	32.1%	---	---		---
10 or more	41.8%				
Leadership Position Held (N=149)					
Yes	25.5%	---	---		---
No	74.5%				
Social Interaction Score* (N=134)	---	2.79	2.10	0	9

*The actual range matches the theoretical range (0 – 9).

Households indicated that its members participated in 1.47 activities on average and most commonly (41.8%) dedicated more than 10 hours to those activities. One quarter (25.5%) of households have members who are leaders in their community activities. Overall, the mean social interaction score was 2.79, below the theoretical midpoint and actual midpoints of 4.5, indicating low social interaction among households.

Bivariate analysis

Following the descriptive overview, bivariate analyses were conducted between project participation and all other variables, and between all independent variables and the dependent variable of dietary diversity. The former explicitly addresses one aspect of the second research question, in that it asks that relationships around project participation be explored. The other aspect of bivariate analysis - relationships with dietary diversity - provided further information regarding likely significant predictors for the subsequent

analytical step of developing regression models. Based on levels of measurement, the appropriate statistical procedure was selected. Table 6-9 provides the results from a series of Chi-square tests between project participation and other nominal independent variables; Table 6-10 presents the findings for point-biserial correlations between project participation and all other variables.

Table 6-9. Chi-Square Tests Relating Project Participation with Other Nominal Independent Variables.

	Project participation (%)		$\chi 2$ (*df*)	Cramer's
	Yes	No		V
Household Composition (N=149)				
Double-headed (N=105)	90.0%	65.5%		
Male-headed only (N=11)	3.3%	8.4%	6.93* (2)	0.03
Female-headed only (N=33)	6.7%	26.1%		
Animal Value (N=145)				
S/0 – 999 (N=44)	10.0%	35.7%		
S/1,000 – 4,999 (N=74)	50.0%	51.3%	14.45** (2)	0.32
S/5,000 or more (N=27)	40.0%	13.0%		
Household Head Education (N=149)				
None (N=15)	3.3%	11.8%		
Incomplete Primary (N=30)	23.3%	19.3%		
Complete Primary (N=56)	36.7%	37.8%	3.03 (4)	0.14
Incomplete Secondary (N=14)	6.7%	10.1%		
Secondary or more (N=34)	30.0%	21.0%		
Land Size (Hectares) (N=146)				
0 - < 0.25 (N=79)	23.3%	62.1%		
0.25 - < 0.5 (N=37)	30.0%	24.1%	19.47** (2)	0.36
0.5 or more (N=30)	46.7%	13.8%		

*Significant at $p < .05$
**Significant at $p < .001$

All four variables included in these chi-square analyses are conceptual components of household demographics. Based on the results of Chi-square tests, a significant relationship occurred between project participation and animal value ($\chi 2(2, N=145) = 14.45, p < .001$). Project participants were more likely to own S/5000 or more worth of animals, as opposed to non-participants who were more likely to own little value in animals. According to Cohen (1992), the association (V=0.32) may be characterized as moderate.[16] Project participation is

[16] According to Cohen (1992), associations may be characterized according to the following criteria: weak: V=0 - 0.29, moderate: V = 0.30 - 0.49, strong: 0.50 and above.

also significantly associated with land size ($\chi 2(2, N=146) = 19.47, p < .001$). Those (currently or formerly) in the project were more likely to have access to 0.5 hectares of land or more and those who do not participate were more likely to have access to only between 0 – 0.24 hectares. This relationship is also moderate (V=0.36) (Cohen, 1992). A very weak relationship (V=0.03) existed between project participation and household composition ($\chi 2(2, N=149) = 6.93, p < .05$), with the households of non-project participants more likely headed only by a female. No relationship existed between project participation and the education level of the household head.

Table 6-10. Point-biserial Coefficient Correlations between Project Participation and Other Independent Variables.

Concept and Variables	Project Participation
Demographics	
Household Size (N=149)	0.21**
Age Dependency (N=149)	-0.14
On-farm Diversification	
# of Land Parcels (Lg) (N=146)	0.14
# of Crops (Lg) (N=148)	0.17*
# of Native Potato Varieties (Lg) (N=149)	0.37**
# of Animal Types (N=149)	0.27**
Activity Diversification	
Composite Score (N=147)	0.31**
Social Interaction	
Composite Score (N=134)	0.27**

*Significant at $p < .05$
** Significant at $p < .01$

The findings from point-serial analyses indicate that household size has a positive significant relationship with project participation ($r = 0.21, p < .01$), meaning that those households who currently participate or formerly participated in the value chain project are slightly more likely to have more members. According to Fink (1995), weak relationships may be characterized as 0 – 0.29. Several aspects of on-farm diversification were also significantly correlated to project participation. Those who are participants are slightly more likely to cultivate more types of crops ($r = 0.17, p < .05$) and own different types of animals

($r = 0.27$, $p < .01$) and moderately more likely to grow a more diverse array of native potatoes varieties ($r = 0.37$, $p < .01$). In addition, project participants were also moderately more likely *(*$r = 0.31$, $p < .01$) to engage in diverse livelihood activities, as indicated by the composite score calculated according to the five activity categories of independent agriculture, wage agriculture, independent non-agriculture, wage non-agriculture, and non-labor. A nearly moderate relationship ($r = 0.27$, $p < .01$) characterizes the association between project participation and social interaction, as indicated by a composite score of items regarding number of organizations in which households participate, number of hours they participate, and whether they hold leadership positions.

The other variable of interest for bivariate analysis was the dependent variable, dietary diversity. As an interval/ratio variable, dietary diversity was considered using independent t-tests, Analysis of variance (ANOVA), and PPMr. Table 6-11 presents the findings from t-tests and ANOVA, and Table 6-12 provides the results for PPMr.

Table 6-11. Mean Differences in HDDS according to Selected Independent Variables.

Variable	Mean[a] (SD)	T	Cohen's d	F	η^2
Project Participation (N=149)					
Participants	6.83 (1.65)	-3.58***	0.69	---	---
Non-participants	5.58 (1.95)				
Land Size (Hectares) (N=146)					
0 < 0.25	5.58 (1.66)	---	---	2.08	.03
0.25 - < 0.49	6.30 (1.82)				
0.5 or more	5.90 (1.99)				
Household Structure (N=149)					
Single-headed	5.41 (1.88)	-1.90	-0.34	---	---
Double-headed	6.01 (1.71)				
Animal Value** (N=145)					
S/0 – 999	5.32 ^{A} (1.84)				
S/500 – 4,999	5.76 ^{A} (1.64)	---	---	5.80**	.08
S/5,000 or more	6.78^{B} (1.85)				
Household Head Education (N=149)					
None	5.20 (1.90)				
Incomplete Primary	5.43 (1.91)				
Complete Primary	5.95 (1.65)	---	---	3.00*	.08
Incomplete Secondary	6.56 (1.83)				
Secondary or more	5.83 (1.78)				

[a] Means followed by the same letter are not significantly different from each other at p > .05 using the Scheffe post-hoc test.
*Significant at $p < .05$
**Significant at $p < .01$
***Significant at $p < .001$

But for project participation, which stands alone conceptually, all other variables considered in Table 6-11 are components of household demographics. Results of t-tests and ANOVAs indicate several variables in which significant differences exist. Households that are project participants eat 1.25 more food groups on average than households that are non-participants ($t = -3.58$, $p < .001$, *Cohen's d* = 0.69). According to Becker (2000), effect sizes characterize the magnitude of a difference and those that are $d \leq .2$ are small, $d \leq .5$ are medium, and $d \geq .6$ are large. When considering animal value, significant differences also exist, although the effect is low ($F = 5.80$, $p < .01$, $\eta^2 = 0.08$). Those who own S/5,000 or more of value in animals ate a mean of 6.78 (of 12) food groups, while those in the middle group ate a mean of 5.76 food groups and those in the lowest group consume 5.32 food groups on average. The final significant result was between household head education and

dietary diversity ($F = 3.00$, $p > .05$, $\eta^2 = 0.08$). However, despite the significance, no significant differences occurred between groups when analyzed according to the Scheffe post-hoc test, selected because appropriate conditions were met to assume equal variances; the significant difference was found according to the Games Howell unequal variance post-hoc test and so not suitable for these particular conditions.

Table 6-12. PPMr Relationships between Dietary Diversity and Other Variables.

Concept and Variables	Dietary Diversity
Demographics	
Household Size (N=149)	0.23
Age Dependency (N=149)	-0.19*
On-farm Diversification	
# of Land Parcels (Lg) (N=146)	0.10
# of Crops (Lg) (N=148)	-0.10
# of Native Potato Varieties (Lg) (N=149)	0.15
# of Animal Types (N=149)	0.30
Activity Diversification	
Composite Score (N=147)	0.24**
Social Interaction	
Composite Score (N=134)	0.32**

*Significant at $p < .05$
** Significant at $p < .01$

The results reported in Table 6-12 indicate that within household demographics, only age dependency is significant ($r = -0.19$, $p < .05$), although the relationship is weak (Fink, 1995). The negative relationship indicates that those with less labor dependency in the household were slightly more likely to consume a more diverse diet. No variables within on-farm diversification were found to have significant associations with HDDS. Activity diversification, as indicated by the composite score across livelihood activity categories, was found to be significant with HDDS ($r = 0.24$, $p < .01$), a weak – though approaching moderate – relationship. This signifies that those who engage in more livelihood activity categories are slightly more likely to consume more food groups. Social interaction had a moderate association with dietary diversity ($r = 0.32$, $p < .01$), meaning those who are more

active in community activities and organizations are more likely to have a higher HDDS score.

Multivariate analysis

Multiple regression is a common statistical procedure used to simultaneously assess the influences of numerous independent variables on a dependent variable (Tabachnick & Fidell, 2007). In particular, regression examines the strength of relationships that exist among variables, the predictive power of a set of independent variables on a dependent variable, and the extent to which individual variables are factors in that predictive power by controlling for other variables (Urdan, 2005). For this study, the second research question asks the degree to which project participation, on-farm diversification, activity diversification, social interaction, and household demographics contribute to variance in dietary diversity. To collectively analyze the effects of these independent variables, regression was deemed a useful analytical tool. As a dependent variable comprised of interval/ratio data and normal distribution, linear regression (OLS) was selected as an appropriate regression procedure.

To continue the analysis, a series of models based on conceptual areas were conducted before arriving at a final model that integrated variables across concepts. These first models served two primary purposes: 1) to ensure systematic analysis and 2) to provide evidence in eliminating variables for the final model to adhere to the statistical assumption that the number of independent variable considered do not exceed fifty more than eight times the sample size, which is considered the limit by Tabachnick & Fidell (2007). For all regression models, multicollinearity was checked according to correlations, tolerance estimates, and variance inflation estimates, but no problems were found in any case, and listwise deletion was used. For nominal variables, dummy coding was used. In order to account for the three levels of data provided by the variables of animals value and land size, two dummy variables were created to account for all three levels (Munro, 2004).

Although five independent conceptual areas exist for this study (project participation, activity diversification, on-farm diversification, social interaction, and household demographics), only two preliminary models were developed. In the cases of project participation, activity diversification, and social interaction, single variables represented these conceptual areas (project participation: participants/non-participants); activity diversification (composite score across livelihood activity categories); social interaction (composite score combining participation in community organizations, number of hours dedicated to those organizations, and whether leadership positions are held). Preliminary regression was therefore only used on the conceptual areas of on-farm diversification and demographics (Table 6-13).

Regarding the variables not considered in preliminary regression analysis, bivariate analysis found significant differences in dietary diversity according to project participation ($t = -3.58$, $p < .001$) and significant relationships between dietary diversity and both activity diversification ($r = 0.24$, $p < .01$) and social interaction ($r = 0.32$, $p < .01$). Given the significance in each case, each of these three variables was automatically included in the final model. Based on bivariate analysis, the significance of number of crops grown, number of native potato varieties grown, and number of animal type provided basis for the expectation that these variables would also be significant in the on-farm diversification regression model. For the household demographic model, the significant variables in bivariate analysis were size of the household, educational status of the household head, and value of animals owned.

Table 6-13. Models of Regression on HDDS according to On-farm Diversification and Household Demographics.

Concept and Variable	Model 1 Standardized Regression Coefficients	Model 2
On-farm Diversification		
Number of Land Parcels (Lg)	-.025	
Number of Crops (Lg)	-.231*	
Number of Native Potato Varieties (Lg)	.125	
Number of Different Animal Types	.346**	
Household Demographics		
Household Structure Dummy (1=Double-headed)		.019
Size of Household		-.037
Age of Household Head		.088
Household Age Dependency		-.124
Education Status of Household Head		.176
Animal Value Dummy 1 (1=S/1,000 – 4,999)		-.246*
Animal Value Dummy 2 (1=S/0 – 999)		-.312*
Land Size Dummy 1 (1=0.5 hectares or more)		-.033
Land Size Dummy 2 (1=0.25 – 0.49 hectares)		.087
R^2 Adjusted	0.130	.078
F Value	6.38**	2.32*
Cases	145	142

*Significant at $p < .05$
**Significant at $p < .001$

The results from regression analysis indicate that both models are significant. In terms of on-farm diversification ($F = 6.38$, $p < .001$), 13.0% of variance in HDDS was explained. In particular, the number of different animal types ($r = .346$, $p < .001$) was positively correlated with HDDS. The number of crops grown ($r = -.231$, $p < .05$) was negatively correlated with HDDS, which marked a change in associational direction from bivariate analysis.

The model focused on household demographics, Model 2 ($F = 2.31$, $p < .05$), found only the two dummy coded variables for animal value (Dummy 1: $r = -246$, $p > .05$; Dummy 2: $r = -.312$, $p > .05$) as significant. Since those who owned S/5,000 or more in animal value was used as the reference group, the negative correlation indicates that those in this category are more likely to have higher dietary diversity than either those who own S/0 – 999 or those

who own S/1000 – 4,999 in animal value. Neither household head education nor household size, both of which were significant in bivariate analyses, were found to be significant in the regression model.

The final step for quantitative analysis was to develop saturated and parsimonious final models that integrated independent variables across categories to understand their predictive power collectively of dietary diversity. However, as explained in Chapter Four, the total number of independent variables (16) exceeds the number of variables that should be included in a model based on the census size. According to Tabachnick and Fidell (2007), the number of variables that should enter a model should be based on: $n = 50 + 8(v)$ where "v" represents the number of independent variables. Because listwise deletion was used, the census size in the final regression model declined from 149 to 129, meaning that inputting all 16 variables would violate assumptions.

To approach a more appropriate number of variables, systematic backwards analysis was used to individually eliminate the variables furthest from significance. A model with all 16 variables was first conducted, and the variable furthest from significance was cross-referenced with its significance level in the preliminary models. If the variable was far from significance in both cases, it was eliminated from consideration and the process continued until the model arrived at 11 independent variables. This total number of independent variables still violates Tabachnick and Fidell (2007) but closely approaches the standard (exceeding the census size of 129 by only 9). The order by which variables were eliminated was: Household Structure, Land Size Dummy 1, Land Size Dummy 2, Animal Value Dummy 1, and Animal Size Dummy 2. When the land size variables were eliminated, both animal value variables were actually further from significance, but because both animal value variables were significant in the preliminary models (Table 6-13), a decision was made to maintain those variables in the model for at least another model. When the animal value variables continued to have minimal significance, they were eliminated for the final model. Appendix D presents the standardized regression coefficients and significance levels for all

six models that were used during the process of backwards analysis. During backwards analysis, careful scrutiny was given to how other variables were influenced by the elimination of specific variables. In all cases, all variables that were significant only became more significant and those close to significance more closely approached significance, further indicating that the systematic approach to backwards analysis was sound. Table 6-14 presents the findings from the 11-variable model in both saturated and parsimonious forms.

Table 6-14. Saturated and Parsimonious Regression Models of HDDS

	Saturated	Parsimonious
	Standardized Regression Coefficients	
Project Participation	.173	---
On-farm Diversification		
# of Land Parcels (Lg)	-.122	---
# of Crops (Lg)	-.222*	-.262**
#of Native Potato Varieties (Lg)	.080	---
# of Animal Types	.245**	.225**
Activity Diversification		
Composite Score	.128	---
Social Interaction		
Composite Score	.190*	.221*
Household Demographics		
Household Structure	---	---
Size of Household	-.112	---
Age of Head	.103	---
Age Dependency	-.106	---
Education Status of Household Head	.131	
Animal Value Dummy 1 (1=S/1,000 – 4,999)	---	---
Animal Value 2 (1=S/0 – 999)	---	---
Land Size Dummy 1 (1= ≥ 0.5 ha)	---	---
Land Size Dummy 2 (1=0.25 – 0.49 ha)	---	---
R^2 Adjusted	.225	.226
F Value	4.38***	8.48***
Cases	129	129

*Significant at $p < .05$
**Significant at $p < .01$
***Significant at $p < .001$

According to the results, both the saturated ($F = 4.38$, $p < .001$) and the parsimonious ($F = 8.48$, $p < .001$) were found to significant. In each case, the same three variables were found to be significant predictors and the overall models accounted for 22.5% and 22.6% of

variance respectively. Specifically, the significant variables were: number of crops grown (Saturated: r = -.222, p < .05; Parsimonious: r = -.262, p < .01), number of different animal groups owned (Saturated: r = .245, p < .01; Parsimonious: r = .225, p < .01), and the composite social interaction score (Saturated: r = .190, p < .05; Parsimonious: r = .221, p < .05). All three of these variables were significant in the preliminary regression models (Table 6-13) or bivariate analysis (as in the case of social interaction; Table 6-12). According to both models, as households grew more crops, they had lower dietary diversity, but as they owned more animal types and engaged in more social interaction, they had higher dietary diversity. In both models, project participation very closely approaches significance: in the saturated model, p=.052 and in the parsimonious model, p=.057. Unlike the preliminary regression model for household demographics, animal value was not found to be significant in the final model. Significant bivariate relationships for age dependency, household head education, and activity diversification were not found to maintain their statistical importance in regression analysis.

Research Question 3: How do native potato value chain stakeholders, and especially community members, understand the concepts of on-farm diversification diversity, livelihood activity diversification, social interaction, and dietary quality?

Considered experts of their own lives, the perspectives of community members provide the content of this section, although other development actors, particularly FOVIDA coordinators and local government representatives, are incorporated when they provide unique insight. Although the research question is oriented towards the conceptual areas of livelihoods that were used for survey research, the value of this question rests in its juxtaposition of complementary sets of knowledge in concert with one another (Small, 2011). While the conceptual areas measured by the survey were developed and designed according to the knowledge of outside experts, the perspectives of Andean households, infused with local knowledge, are featured in this section. Given the emphasis on community member

perspectives, and adhering to the emergent quality which accompanies qualitative methods (Creswell, 2007), the thematic categories do not strictly mirror the conceptual areas used for survey research. Approaching analysis inductively, I continually adapted categories and themes (Creswell, 2007; Emerson et al., 1995). As a result, this section is structured according to the categories that emerged during analysis.

Diet

Source of access

Staples for consumption consist of the crops that households grow: potatoes, chuño (naturally freeze-dried potatoes), olluco (tuber), mashua (tuber), oca (tuber), fava beans, and other legumes. Household animals also provide some protein occasionally: milk from cows, eggs from chickens, and meat from cows, chickens, guinea pigs, and pigs. Market purchases also provide households with means for consumption. The mix in consuming some food self-produced and other purchased in the market aligns with quantitative results, which found cereals, roots and tubers, vegetables, and sweeteners were the most commonly consumed food groups (Table 6-3).

The closest market is below Chaki Takia in the Mantaro Valley town of Jauja. There, every Wednesday and Sunday, a spot market is held, providing households the opportunity to travel down the dirt road to sell their products and make their own purchases. Sugar, oil, rice, noodles, flour, lentils, cereals, vegetables, fruits, meat, and fish were the products most commonly mentioned as purchases from Jauja. Among the vegetables most often cited were spinach, carrots, peas, chard, celery, squash, onions and cauliflower. Oats are occasionally grown by households and more regularly bought at the market. However accessed, oats with milk is a popular breakfast item and is, interestingly, commonly referred to as quaker, as in the label “Quaker Oats” owned by PepsiCo.

The ability to access goods in Jauja depends on the capital currently available to households. The frequency that households travel down to the market ranges from twice per week to once every 15 days. One household, low in capital, responded after being asked how often they consume vegetables: "Vegetables sometimes. When they are finished, we have to go down to Jauja, sometimes when there are no possibilities, we don't go down to Jauja." All households, regardless of capital, descend to Jauja less frequently from September through January, when money is being invested into planting and households are digging into their reserves from the previous harvest. Many households stock up on oils, sugars, cereals, and carbohydrates for this period. They also limit their purchases of fruits, vegetables, and proteins. As a result, there is always enough to eat but what is consumed is mostly tubers and carbohydrates.

Vegetable consumption

Households which make market purchases in Jauja less frequently cannot consistently eat a diversified diet due to storage limitations. Many households attempt to purchase enough vegetables to last one week, although doing so does not mean that fruits and vegetables are consumed daily; many households reported consuming fruits and vegetables only a few times during the week. However, even households that claimed to eat fruits and vegetables daily are not likely consuming them in sufficient quantity. Of the roughly 15 meals to which I was invited in households during fieldwork, none had adequate servings of vegetables. Rice with potatoes with perhaps an egg was the most common dish. Soups with a base of potatoes or wheat were also common. Vegetables often entered the dish in some way, but in the form of one leaf of lettuce when served rice and potatoes, or a few peas and carrots in the case of soup. Multiple times in interviews people explained that they occasionally "inserted" vegetables into the meal, a most apt description of the way vegetables are treated: they are generally more of a garnish than a substantial aspect of the meal.

Chronic malnutrition and social programs

Limited dietary diversity does have serious repercussions: the part-time nurse estimated that chronic malnutrition for children under five[17] in Chaki Takia is about 50%. The problem, according to the nurse, is not the first six months of life, when all children exclusively nurse on breast milk but rather after the first six months, when other foods should be introduced to the diet but only breast milk is continued. This issue has not gone unnoticed. National social programs administered by the local government focusing on chronic malnutrition have been implemented. These programs provide rations to low-resource households with children under six years old and offer daycare and free, nutritious meals to children under three years old. Though these programs have their problems, the local nurse still perceives an improvement: when she first arrived 15 years ago, she estimated that chronic malnutrition among children reached 80-90%. Still, some community members feel that they are ill-equipped to properly nourish themselves and their children. One farmer worried that he did not have a comprehensive understanding of the vitamins and minerals that each food group provides, while another community member explained the barrier to eating healthily lay in applying nutritional knowledge, not simply having the information.

Dietary quality

While vegetables are not commonly grown in Chaki Takia, many households indicated that their access to the market in Jauja has allowed them to eat more vegetables and other diverse foods than previously. According to several interviewees, the change occurred about 30 years prior, when a dirt road from Jauja up the mountain to Chaki Takia was made (which is now being paved). However, more access to food is not viewed uniformly as a positive among all households. Concerns were frequently voiced that the foodstuffs being

[17] The nurse indicated that chronic malnutrition is assessed based on height compared to age.

bought at the market lack nutritional quality. One woman, a shopkeeper, explained why she preferred her childhood diet to her current one: "Before. Because it was more nutritious, better. Now what? Noodles aren't nourishment." The recognition that purchased foodstuffs were replacing traditional foods was common: cooking oil for pig fat, processed flour for toasted wheat, rice and noodles for fava beans and barley. Several interviewees expressed concern that households too frequently exchange their wholesome crops for processed goods. For example, the local government representative in charge of social programs summarizes:

> We sell [our products] and we bring another thing. We should drink our milk, what there is in the house – quinoa, toasted wheat – this is good for children, but they sell it and bring noodles.

Although many households expressed concerns regarding the nutritional quality of the foods bought from the market, worries about food treated with chemical inputs were more prevalent. Comparisons with the past informed these perspectives. One elderly woman recalled, "Just a little bit they used to fumigate and it was healthy food, but now it's all chemicals, nothing more." According to interviewees, the effects of eating treated foods include increased frequency of gastritis, stomach pain, and stomach cancer. And the problem is not just from the foods bought at the market; changes in production in Chaki Takia has meant that more inputs are used for production. For example, Carlos, a farmer and volunteer Justice of the Peace, detailed that the quarterly injections given to cows cause households to sell their own raw milk and purchase canned milk:

> The milk has chemicals. When you drink the milk, now it gives you colic. Your head hurts because of this….you don't consume your own milk, it makes you feel bad and you don't drink it, and so you have to sell it.…I tell you, when I was young, we milked the cow, and you drank it …but now, no, your head hurts and you feel lightheaded, so you have to leave it. You sell it. So you drink the canned milk and it doesn't make you feel bad.

Thus, concerns regarding chemicals spanned both purchased and produced food, causing individuals to feel as if they could not escape the health consequences.

Agricultural production

On-farm diversification

Agricultural production primarily consists of potatoes, ulluco, mashua, fava beans, oats, and forage crops (mostly rye grass and alfalfa). While potatoes provide the primary staple, quantitative results indicate that 75.6% of the households in Chaki Takia grow more than one crop, and 80.5% own more than one type of animal (Table 6-5). Many community members explained their diversification economically: because potatoes require more inputs and labor than other crops, people reduce their potato production. When I asked Valentina, an elderly woman who solely presided over her household, her reasons for growing several different crops, she responded, "It's that one spends little on insecticide. The potato, lots of insecticide. More management, one has to be there daily with [potato], if not, they'll go bad." Beyond economics, Vicente, a leader in Association 2, explained that integrating crop production and animal rearing were synergistic activities that buffered against risk:

> What we do, we dedicate ourselves as much to agriculture as to pastoralism. Because if we dedicate ourselves only to rearing animals, not profitable either. And to dedicate oneself to agriculture only? No, because look. If we were not to dedicate ourselves to pastoralism, there would be no organic fertilizer. That's very important for the planting….Sometimes in agriculture, sometimes it's not sure, sometimes there is frost, hailstorms, drought, blight, weevil, so all of that means that if we're not with the pastoralism, there's no income, it would be a disaster.

Based on this perspective, on-farm activity diversification serves as an important livelihood strategy to reduce vulnerability.

One aspect of diversity which people value is access to land both in the highlands above Chaki Takia and in the valley around the population center. One young female whose household relies on alpacas and sheep as its primary source of income, explained that having access to land in both locations allows their animals to graze in the open above but be corralled below so as to minimize losses due to foxes. Having access to various parcels of land can also buffer against difficult weather conditions. As the former mayor pointed out,

"Of course, one lot, one sector can be ruined but the rest can be saved." For those who grow crops, the rich soil of the highlands above which approach 4,000 meters provide the better conditions to dedicate production to home consumption, whereas the more accessible land close to the population center (3,650 meters) is more often used to grow crops for the market.

Production zones

In the land below, close to the population center, households often grow forage for animals, white potatoes (potatoes varieties grown from certified seed), and a handful of native varieties. Considered "industrial potatoes" or "commercial varieties," the potatoes grown for PepsiCo and Plaza Vea are also generally grown in this lower area. Although primarily dedicated to market-oriented production, at least part of the harvest from below ends up in reserve for consumption. Nonetheless, people consider these white and native potatoes distinct from the tasty native varieties that are grown in the highlands. Consistently, households indicated that the native potatoes that they grow at elevation have much better taste than the commercial varieties grown in the valley. One community member who also held a position in the local government detailed the difference between improved and native varieties:

> It's that those that they take to the market, they put a lot more [pesticides] and there is more production and they put the hormones so that the potatoes grow more. But these potatoes don't have flavor. But the natural potatoes, yes they have flavor.

Agreement exists that more inputs are used in the valley than in the highlands. And the target is not only crops; hormones and antibiotics are being used increasingly on livestock as well.

Given the extent to which households are applying inputs to their crops in the valley lands, most have noticed a change in the quality of soils. One farmer, Tomas, explicitly outlined the different trajectories of the soil between the lands above and below:

> For the white potato, we use a lot [of inputs] but the part above, no. Because in the first place, the land is of black soil. It is land that is resting for a lot of time, but here [below] no: every year they are being cultivated and they are infected, the land.

The idea that chemical inputs are contaminating the land is not uncommon: people reported an inability to cultivate sufficient yields without inputs. With these treatments, people are noting the deterioration of their soil quality. In fact, according to several community members, the Ministry of Agriculture has conducted soil analyses indicating that the soils are acidic. Valentina, a 76-year old widowed household head, perceived that a significant change in production had taken place over the course of her life: "Before, when I was a girl, they didn't use insecticide. But they had a harvest, but now without insecticide, without fertilizer, there is no harvest." Memories of adequate production without chemical inputs were common as was agreement that yields would dramatically suffer without them. In contrast to the depleted soils in the valley, people consider the land above to have better quality soil and produce better quality products. One female household head explained: "The potato isn't the same in the highlands, from there they're creamier and worms want them only a little bit." Farmers readily admit that they use inputs – especially fertilizer – on their native potatoes in the highlands, but claim that they do so to a much lesser degree.

Native potatoes and their qualities

Native potatoes are described as "tasty," "delicious," "creamy," "satisfying," and "flavorful." The preferred form of preparation is boiling the native varieties and eating alone, while white potatoes are more often dedicated to putting in soup or frying. The value of flavor cannot be understated. Two women, who are heads in households which formerly participated in the FOVIDA project, complained about the taste of one of the commercial native varieties they had grown for PepsiCo. When their product was rejected, they were so put off by the taste that they fed the potatoes to their pigs and ended their participation in the project.

Farmers generally plant their native potato varieties as a mix in small parcels. Valerio and his wife plant their 300 varieties in two plots that approach a half-hectare (Appendix C, Image II). As another farmer explained, "We plant various varieties because we can lose one or the frost takes one or blight gets it in another case, but yes we have some to eat, so we have to plant various things." Some native varieties provide strong resistance to frost, hail, and disease, although farmers also explained that the majority are delicate to difficult weather conditions. In addition to the practicalities, Valerio described how his favorite aspect of planting hundreds of varieties was aesthetical: his household members enjoyed admiring the beauty of his potato fields when they flower. Even more important for many is the preservation of cultural heritage. One farmer who cultivates 32 varieties of native potatoes linked his production with the past: "Our ancestors were nourishing themselves with these potatoes and we continue with this custom." Others see intersections between biodiversity and tradition. Vicente, a leader in Association 2 and who is currently participating in a characterization study of 26 varieties, provided insightful analysis: "The intention is to recuperate the varieties that our grandfathers had before. The Incas had these varieties and for situations related to the climate and economic factors, they are being lost." To Valerio, who cultivates 300 varieties, the biodiversity of native potatoes represented cultural richness: "We conserve because [native potatoes are] the most beautiful of what we have…one could say, in other words, the wealth of Peru, it's the wealth of Peru." However, to another farmer who cultivates about 200 native varieties, the fact that chemicals are used on native potatoes compromises its essence. For this interviewee, organic production and native potatoes are inseparable; when chemicals are used, cultural identity is eroded: "We are saying that we are native. Because we are utilizing Tamaron [a pesticide], we are using fertilizer, this is not native."

Connections with the past embedded in native potatoes extend to the methods by which they are produced. The cultivation of native potatoes is a labor intensive process: household members, pack animals, and often peons transport materials to the highlands,

prepare the land, and plant, weed, mound, and harvest their potatoes using traditional tools. When potatoes are mounded, for example, each row requires three laborers: the first man leads with a traditional shovel/spear tool called a chaki taquia and digs between two rows of potatoes; a woman follows him and lifts and sets the clumps of dirt on the potato rows beside her; and the third laborer follows behind, breaking up the newly placed dirt with the blunt side of a pickaxe (Appendix C, Image III). Despite the difficult labor, this process is a source of pride for many older community members. One widowed household head explained why she relies on intensive manual labor instead of oxen on her native potatoes:

> This is the custom from our grandfathers that had this custom to plant native potatoes with chaki taquia. And this is how we cultivate until now. The culture of the grandparents. We have the pride to plant with the culture of the grandfathers.

At the same time, this interviewee expressed concern that these traditions are being lost as youth continue to emigrate or prefer more efficient production intended for the market when they do stay in Chaki Takia.

Livelihoods activities

Viability

Agropastoralism constitutes the primary activity by which households use to make a living: 95.9% of those who responded to the survey indicated that they either grow crops or raise animals (Table 6-6). Potatoes, mashua (a tuber), olluco (a tuber), oca (a tuber), oats, and forage crops are the most commonly grown crops, while cows, sheep, chicken, guinea pigs, and pigs are the animals that households most often own. Across agropastoral activities, home consumption is more common (90.6% for crops and 89.9% for rearing animals) than selling products on the market, although a majority of households still are market-oriented (53.0% for crops and 61.9% for rearing animals) (Table 6-6). Some households, especially those which lack labor availability but have access to land, sometimes enter shareholding

agreements in which they provide land to another household in exchange for a portion of the harvest.

Although agropastoral activities serve as the economic base for households in Chaki Takia, this does not mean that they are economically viable. In fact, all households which were interviewed observed that their agriculture is currently a losing proposition. Households are experiencing pressures at both ends of the market: low market prices for their crops mean insufficient capital to purchase the expensive inputs. As a female shopkeeper whose household also engages in agropastoral activities explained, "you take [your potatoes] to the market, they pay you 5 or 6 soles [$1.79-$2.15] for an arroba [11.5 kilograms] of potatoes. Imagine the cost of fertilizer, 100 soles [$35.87] the bag. It doesn't add up…." This squeeze on both ends of the market chain compels some households to reduce their production. As a widowed household head who primarily dedicates production to home consumption explained, when growing potatoes "one needs to treat them when they are first emerging, for the blight, for the worms and then when they are growing and the inputs are expensive. Therefore, I plant only a small parcel." Chemicals to treat the plants, of course, are not the only cost during production. With little access to machinery – and much land inaccessible to machinery anyway – manual labor is required throughout the production process. For Valerio, the farmer with 300 native potato varieties, insufficient market demand means that his biodiverse production is not economically viable. With no support from public or private institutions, this farmer detailed that the financial infeasibility of his conservation compelled him to consider whether to sell his seed stock and dedicate himself to other livelihood activities.

Low market prices and high input costs also make rearing animals difficult. Among the households that own cows, the majority sell their milk to an intermediary that arrives to Chaki Takia three times a week, and the S/1.10 ($0.39) per liter that was being paid during fieldwork is not a favorable price. Investments in antibiotics and hormones, coupled with feed expenses, diminish the return on milk production. As one agropastoralist, described, S/1.10

for the liter is low: “When you do the comparison, one doesn’t get back what is consumed by the animal. The animal consumes more than it produces and it’s not profitable because it would need to be at least S/2. Maybe, then, one could cover the costs.” The pressure that low market prices exert on households was clearly displayed when Oscar, president of Association 1, observed, “Pretty much agriculture has no profit. It’s pretty much for consumption.” Asked why they continue to engage in the same activities year after year, households consistently explained, resignedly, that they were “accustomed” to this way of living.

Livelihood constraints

The constraints that markets place on households caused some to feel hopeless, like no opportunity existed for the situation to improve in rural areas. Carlos, a farmer also serving as Justice of the Peace, clearly articulated his frustration with structural economic pressures:

> The capitalist, those that have money have; he that doesn’t have doesn’t have. One can never rise. If I had capital, I wouldn’t be here. I’d be in Lima, I’d open a chicken restaurant, a restaurant or some kind of business. No, that’s the capitalist, but we poor people, how are we going to leave?

For this interviewee, the domination of capitalists extended into agricultural production: “When someone is a big capitalist, you plant hectares. You already have your business,…already your fixed market,…but in our case, we don’t have a market.” The difficulty in accessing capital was further emphasized by another farmer who also worked in the local government:

> I’m going to tell you really honestly that there is nothing here to be able to survive well because, yes, we have water, we have hydric resources, we have everything but what we lack is capital.

Matters are not helped by the fact that households annually have their resources stretched from September through February when planting season is underway and their food stocks from the previous season are stretched. In these months, households adopt different

strategies to cope. Several interviewees explained that their households often seek labor outside Chaki Takia during this period. Other households reduce the quantity of vegetables and meat they consume or sell their own stocks of potatoes or chuño (naturally freeze-dried potatoes). When years are particularly harsh due to weather conditions – or in some cases the need to pay off loans – households will sell their animals. A 65-year old farmer, president of his neighborhood, described one year that he borrowed from the bank and "there wasn't enough product that I had planted and I had to sell an animal in order to return the loan or else I'd still be paying it off." Having to sell animals is not uncommon. Another interviewee commented, "'Everyone, everyone complains and says that 'I'm selling my cow in order to keep planting, I'm selling my pig to keep on planting.'"

Activity diversification

Given the difficult circumstances of common agricultural activities, many households seek other alternative agricultural and non-agricultural activities to meet their livelihood needs. When resources are scarce, working as an agricultural laborer is a common activity, although this was often viewed as an undesirable option pursued out of necessity. Other households with more capacity pursue other activities. For example, one household observed that growing crops and rearing cows did not generate sufficient revenue and so has lucratively dedicated their efforts to raising alpaca and sheep. A few years ago, this household started with only three alpacas and has rapidly grown it to a herd of over 300. Others are beginning to experiment with alternative crops that have not been traditionally grown in Chaki Takia and have higher market prices such as quinoa and tarwi (a legume).

Non-agricultural activities are also being pursued by many households. According to quantitative analysis, over a third of households are engaging in non-agricultural labor and nearly half in non-labor activities (Table 6-6). Households with limited resources and older community members receive support from public social programs, although both they and

local government representatives indicate that the provisions are inadequate. Others mentioned that family members who have emigrated elsewhere sometimes send remittances, although the frequency is sporadic and quantity is insufficient. Many women knit functional clothing for their household members and stitch traditional clothing to sell. Several households either own or are paying off cars that serve as taxis. While business transporting people to and from Jauja is steady, loans are often necessary and the various investments required to work for a taxi agency reduces the financial gain. Some households have members who work for the local government and while this too provides a steady income source, it is marginal and distracts from agricultural production. Owners of the six small stores throughout the community concurred that the profit they made was minimal at best. The most desirable non-agricultural local activity available during fieldwork was working construction of a new school and helping to expand irrigation infrastructure. This work, however, was temporary and interviewees predicted that after completion, many of those local workers would leave to find work elsewhere.

Emigration was among the most common livelihood strategy that household members were using to reduce their reliance on agriculture. Government officials and households alike agreed that people were leaving in droves because little economic opportunity existed in Chaki Takia. A local government administrator explained:

> It's true that [many youth] leave to the capital because here, there is no income and they go. They finish high school and sometimes they don't even finish high school, they go because they've seen the income there, in Lima, no. There are many forms of work, they go to the capital, and there are no people here anymore.

Another farmer concluded, "Many go, and the region is depopulating. There are no income streams." With limited capital and fewer people in the region, many households, especially older ones, had difficulty finding labor help and so reduced their agricultural production and relied more heavily on social programs, family networks, and working as a laborer. However, some households stayed in Chaki Takia, understanding the financial disadvantages but

valuing other aspects of country life. To several interviewees, the open space, fresh air, and slower pace are more desirable than the crowded streets and threat of crime present in cities.

While many households designated their living conditions as just enough for survival, others were more optimistic. One male farmer explained that he might emigrate to find work as a taxi driver after his construction work ended because "we have to play the best form in order to improve our economy." Another female farmer concurred that diversifying her household's economic activities was helpful to the quality of life in their household. Between her store, her work in the municipality, her husband's wage labor in a town project, and their small agricultural production, this interviewee assessed her situation as more restful and lucrative than when her household dedicated itself only to agriculture. However, a project coordinator at FOVIDA worried that too much diversification also presented risks. When energy is dedicated to too many activities, the potential of one particular opportunity will likely remain untapped.

Opportunities

Given the challenges that exist, many had a bleak outlook of their circumstances, believing that opportunities did not exist to improve their condition. Still, many others readily had ideas which relied on their accessible assets. Constructing a dairy processing plant in order to increase the value of their milk was the most prevalent idea. Nearly as popular was the vision to produce alternative agricultural products that had higher market value. Identifying the drawbacks of potato production, one male farmer explained that he wanted to engage in:

> Other products that have a price at least. We dedicate ourselves to the potato, to olluco, to mashua and it's not profitable, no? …Now analyzing the land here, quinoa can produce. Really, we're not accustomed, all of us don't dedicate ourselves to alternative products.

In addition to quinoa, maca (another tuber), tarwi (a grain), linseed, chuño, and wheat were all mentioned as viable crops that could be cultivated in the area. Guinea pigs and alpacas were also pointed to as animals that carry higher market value than the cow milk that is commonly produced. Other households focused on the deficiencies that existed in the community. More machinery and technology for both agriculture and textiles, more modern buildings and homes, a more accessible marketplace, and the installation of factories and other businesses were all mentioned as possibilities that would be helpful for development.

Social interaction

Benefits of collective action

The advantages of cooperation are readily recognized by many community members and in some cases are actualized. While describing the agricultural calendar, Valentina, a widowed household head, explained that until February:

> little by little we take [from the stock] to eat. In February, there isn't potato yet. From neighbors, from there we buy or borrow until [our potatoes] mature. Everyone in general is just about like this. Yes, we borrow, we help each other.

Beyond sharing for subsistence, recognition existed that working together could enhance the common good, a perspective encapsulated by the former mayor as he reflected on the value of community workdays:

> I say that one should become aware of the beauty of your town…then one should take into consideration that working from one's heart, one should leave your work behind for one day, two days in order to better your town.

Specifically, enhanced economic bargaining power was recognized as a primary benefit of collective action. Several interviewees noted that if milk producers would sell collectively, they could receive better prices than those paid by the intermediary to which they currently sell. The potential for higher market prices was the motivating reason for many

farmers to participate in the FOVIDA project. Grover, the farmer who has had success in the FOVIDA project, explained that collective marketing helped him overcome barriers to high value markets:

> Look, we work at the level of a producer network because one can't supply a certain quantity [of commercial native potatoes] because every time you enter, they're going to ask 1000 kilos and to deliver so much alone, you can't supply that much, so I'm working with a producer network so all of the producers supply the potatoes because one producer can't supply [that much].

The importance of working cooperatively is further reinforced externally. Much government aid supporting rural projects is only accessible to formal associations, and FOVIDA limits their support to groups, excluding individual producers.

Participation

Despite awareness of the benefits of working collectively, the associations that have been formed are struggling for a variety of reasons including lack of participation. Failure of members to attend meetings and trainings was repeatedly mentioned as a debilitating weakness among both FOVIDA farmer participants and project coordinators. One NGO coordinator explained that of the 12 workshops FOVIDA scheduled the previous year, Chaki Takia completed only about half due to lack of participation. According to her, failure to participate in these training sessions has larger implications, as producers are then unprepared to harvest and handle potatoes that can adhere to the quality standards of markets like PepsiCo and Plaza Vea. As an example, she referred to an organization in another district, which was only able to deliver 2 (of 8 contracted) tons of native potatoes of sufficient quality to PepsiCo because the potatoes were harvested two months late.

Leadership

Among the contributing factors to such disorganization is the lack of effective leaders. One member of the comunidad campesina insinuated that both lack of administrative skills and corruption contribute to poor leadership:

> the administration of the community does not have persons with the capacity to administer machinery or economic affairs….This is one of the failures that the community has because there is always money that's escaping, and sometimes its bad investment.

Reflecting on the administrative capabilities of farmer associations, a FOVIDA project coordinator believed that farmers misconstrued the function of associations:

> They think that an association is to meet for one thing and then goodbye, somebody will gift us something and they're ready to leave. It's not for that, an organization should have an institutional life. If they love their strategic plan, they already know where to go, advancing, advancing, but it lacks leadership.

Even more concerning is the suspicion of corruption that many have for organization leaders. In the case of Association X, accusations that the former president kept the potato harvest for himself disintegrated the association. Although the former association president claims that blame is misplaced, the former members perceive that he stole for personal gain and was thus described as a "parasite," and a "liar."

From the perspective of a FOVIDA coordinator, the primary problem with the leadership is the failure to "internalize the aspect of association as collective work. Up until now, members are seeing their participation individualistically." Clear evidence for her is the inability for association leaders to step aside and allow others to fill leadership roles. In both Associations 1 and 2, the current presidents have failed to effectively lead due to lack of interest and time, but both recently advocated for their re-election within their respective associations. According to the FOVIDA coordinator, leaders "think that the person who has led the group, it's his association." Oscar, the president of Association 1, has a different perspective. As the founder of association, he feels a particular responsibility to motivate the

members to achieve a vision: "I believe that I am the founder of the association and I want to continue to carry it forward and there are some fruits we haven't yet achieved."

Individualism

Given the poor management of community organizations, a common effect is disunity. As one widowed member of both the comunidad campesina and Association 1 remarked, "…people want to gain personally. They don't want to unify; they don't want to work collaboratively, no. Now in the association of Don Oscar, we are all disunited." Another member of Association 1 echoed this sentiment, explaining that to improve the project, "we should unify more within the association." According to both community members and FOVIDA coordinators, the problem is that people are individualistic, wanting to reap personal benefits as opposed to working for a collective good. One farmer noticed a change in attitude during his lifetime:

> Now it's more that everyone is more ambitious, everyone wants for themselves. However, before, no. I realize in the case of the comunidad campesina, the community before was more unified. Everyone worked for one and one worked for everyone, which was the mode of work but now it's different. There are young people that have entered the community and they have another mentality.

The former mayor concurred, also implying that motivations for personal gain too often supersede collective action:

> Before, the style was to do comunidad campesina workdays for free, for their town, repair streets, irrigation canals, irrigation ditches…. Together they would do so. But that's not the case today. People participate only when they are paid.

Insufficient individual benefits within the comunidad campesina have caused several to cease membership. Similar trends are occurring with the FOVIDA project as well. After negative experiences related to quality rejections and suspended contracts, many former participants left the project, discouraged. As articulated by one former participant who left the project after PepsiCo suspended contracts in 2010-2011: "from that point, we left the project

because that year, we didn't recuperate anything, we were left with a loss and so we stopped planting."

Summary

Based on the findings to the third research question, understandings of conceptual areas are expanded. To highlight the complementarity between quantitative and qualitative conceptualizations, Table 6-15 juxtaposes them.

Table 6-15. Quantitative and Qualitative Conceptualizations.

Quantitative		**Qualitative**	
Concept	Variable	Concept	Dimensions
Dietary Diversity	• HDDS	Diet	• Access (Market and subsistence production) • Stability (difficult months: October – January) • Quality (fear of health consequences of pesticide residues; Traditional; Culinary satisfaction) • Diversity (Childhood malnutrition a problem)
On-farm Diversification	• Access to land parcels (#) • Crops grown (#) • Native potato varieties grown (#) • Animal groups owned (#)	Agricultural Production	• On-farm diversification (mix of crops, animals, and land parcels buffer against risk and is link to past) • Production Zones (above: better soil and quality of products for home consumption; in valley: commercial crops grown with many inputs on poor soil) • Native Potatoes (flavor, resistance to weather conditions, cultural heritage, and agrobiodiversity all important)
Activity Diversification	• Composite score across categories in which households engage	Livelihood Activities	• Viability (agropastoralism a losing proposition) • Constraints (production capacity and market conditions) • Diversification (limited options varying in desirability) • Opportunities (alternatives based in accessible local resources)
Social Interaction	• Composite score considering dimensions of number of organizations, hours, and leadership positions	Social Interaction	• Benefits (economic and collective good) • Participation (poor) • Leadership (lack of capacity and corruption) • Individualism (personal gain increasingly motivation behind decision-making)

Research Question 4: How do livelihood decisions affect the structure and function of native potato value chains?

This final research question seeks to adhere to the dialectical perspective that informs this study (Berger & Luckmann, 1967; Long, 2001). According to Long (2001), the decisions that actors make and the actions they take affect market structures. Decisions to be active or passive, to engage in or avoid, development projects have implications for market viability and social stratification. While the first research question explored how native potato value chains are perceived, and the second and third questions provided in-depth consideration of livelihood components among community members, this final question offers insight into how decisions made by development actors affect native potato value chains.

Farmer participation

Characteristics

Engaged in a supply chain requiring adequate quantity and quality, the number of farmers who participate in native potato value chains impact their structure and function. According to the PepsiCo executive, demand exists internationally for its native potato chips but the supply from smallholding farmers cannot at this point even fulfill national demand. The Plaza Vea executive also indicated his hope to expand native potato sales nationally beyond the central highlands region, but again, the number of smallholding farmers who have the capacity to adhere to quality standards compromises this vision. In Chaki Takia, only 30 of 149 (20.1%) research participants have engaged in the project thus far. Of those 30, only 14 (46.6% of participants and 9.4% of total respondents) currently participate (Table 6-4).

According to quantitative analysis, differences exist between current/former participants and non-participants (Tables 6-9 – 6-10). Participants are moderately more likely to have higher animal value, own more animal types, grow more native varieties, have more

land in hectares, engage in more livelihood activities, and have more frequent social interactions than non-participants. They are slightly more likely to have double-headed households, larger households, and grow more crops than non-participants. In addition, bivariate analysis indicated that project participants are also more likely to have higher dietary diversity and though not found as significant in the saturated regression model, project participation very closely approached significance. Based on these statistical findings, it appears that participation in the project is stratified along the lines of social status, for Andean farmers with more land access, on-farm diversification, livelihood activity diversification, and social resources are often those who are wealthier and more able to achieve desirable livelihood outcomes (Escobal & Cavero, 2012; Mayer, 2002; Zimmerer, 1996). Therefore, as Ferris et al. (2014) assert, those farmers with more resources are better equipped to access high value markets, a phenomenon reflected in the dynamics of Chaki Takia. On the one hand, this means that those farmers who participate are most likely to successfully engage in high value markets. On the other hand, exclusivity limits numbers of participants and intensifies social and economic differences (Escobal & Cavero, 2012).

Participant Selection

Explanations of why higher status households more likely engage in the FOVIDA project likely extend beyond the simplicity of those who have more gain more. In Chaki Takia, FOVIDA is removed from key decision-making that takes place in both the formation and the maintenance of the associations. To begin a project in a new place, FOVIDA contacts community leaders and then leaves group formation entirely to the discretion of the community. While the hope is that a general meeting open to all takes place to form the group, a FOVIDA project coordinator explained one instance when, “the community president invited only his family and did not do an open invitation.” In Chaki Takia, members Association 1 indicated that they initially gained interest in the project after the president had

specifically invited them. Many who do not participate in the project claim to have no knowledge of the project. One household indicated that it would like to join the group but was told that its land was too far from the road, despite the claim by the president that anyone can become an association member. Because it views association elections internal business. FOVIDA also keeps its distance when associations engage with leadership decisions. Thus, self-selection among community members targets those who already possess more resources at the exclusion of others.

Perspectives on Collective Action

Project participation cannot merely be explained by the self-selection, assuming that non-participants enact no agency. Certainly, some low-resource households have been denied access to the project by participants, but other households actively opt out. Quantitative findings indicate that social interaction among all community members is already low: the composite mean score for social interaction among all community members was 2.79 on a scale from 0 to 9 (Table 6-8). Significant differences on social interaction according to project participation exist ($t = -3.62$, $p < .001$) with a mean difference of 1.42 (Table 6-10). In other words and somewhat obviously, those who engage in more social activity are more likely to participate in a project that requires group action. While some non-participants who have wanted to participate have been actively excluded, as indicated above, other households simply do not see the benefits of engaging in projects requiring collective action. One farmer, for example, who had been invited to participate in Association 1, but declined, detailed that he had never had a successful experience in all the various times he had previously participated in community projects. Summarizing his perspective on collective action in Chaki Takia, this interviewee explained: “They don’t work together, they don’t say here, there’s this much to distribute to every beneficiary.” Likewise, Valerio, the farmer whose household conserves 300 native potato varieties, has been invited by FOVIDA coordinators

and project participants to join Association 2 but he prefers to work individually, skeptical of the actual benefits his household would receive. Just as project participants actively decided to enter the FOVIDA project, some non-participants, especially those who join the participants socially in the upper status strata in Chaki Takia, exercise agency by not engaging. As Long (2001) articulates, non-participation holds implications for market structure. In this case, a limited number of participants means a limited supply to market outlets.

Livelihood Activity Diversification

Although project participants view group work more positively than their community counterparts, findings above indicate that lack of follow-through and poor leadership have crippled organizational effectiveness and poor management hampers production output. Perhaps some insight into the disappointing management of the farmer associations lie in secondary effects of activity diversification. As indicated by quantitative findings, project participants are more likely to engage in different kinds of activities than non-participants. Of five livelihood activity categories, project participants engage in 3.03 on average, while the mean for non-participants is 2.25 (t = -3.92, p < .001) (Table 6-10). Activity diversification is commonly viewed as a positive livelihood strategy (for example: Ellis, 1998, 2000; Niehof, 2004) and indeed was associated with higher dietary diversity in bivariate analysis (r = 0.24, p > .01) (Table 6-12).

However, in the case of native potato value chains, participants who pursue diverse activities may have insufficient time to fulfill the obligations of their associations, a concern articulated by a FOVIDA project coordinator. Several former participants have emigrated elsewhere and abandoned the association; a number of current participants communicated that they too would readily leave Chaki Takia if an opportunity arose. Grover, the member of Association 1 who has had success in the project, noted that the quality of leadership declined

dramatically after the association president accepted an administrative position in the local government. Likewise, the president of Association 2 explained that he dedicated his time primarily to taxi service and secondarily to agricultural production. Based on these cases, it appears that activity diversification may influence the quality of collective action. As discussed above, participants are not currently producing industrial native potatoes of sufficient quantity and quality and so cannot adequately fill demand. Whatever its effect, activity diversification should be viewed as only a partial explanation regarding the inadequacies of collective efforts. Mistrust among members, corruption, and individuality were all also identified as aspects detrimental to productive group work in Chaki Takia.

Livelihood decisions among non-participants reducing potato production made engagement with native potato value chains not appealing or not viable. Non-participants can be viewed as comprised of two sub-groups: lower-resource households and market-viable households (Ferris et al., 2014). Although both sub-groups engaged in fewer livelihood activity groups than participants, they appeared to do so for different reasons. Often constrained in options due to scarce resources, poorer households more likely opted to work as laborers, a trend uncovered during qualitative analysis. One female household head reflected, “We work as laborers so that we can buy a bag of fertilizer and so we can plant. If not, we wouldn’t be able to.” In cases like this household’s, production was most often dedicated to home consumption. Market-viable households, on the other hand, have the capacity to engage in the FOVIDA project but choose not to because they deem the quality requirements undesirable or other activities more valuable. For whatever reason, the livelihood decisions made by non-participants, which preclude their engagement with the FOVIDA project, place inherent constraints on the scale of production that can emerge from Chaki Takia.

Perspectives on Potato Production

Across both participants and non-participants, potato production was generally characterized as a losing proposition. Nearly all households cultivated potatoes, but many explained that production costs and low market prices compelled them to reduce production. A member of Association 1 explained that she plants potatoes primarily for home consumption and only minimally for the market. Likewise, a former participant of Association 1 implied that he has reduced his potato production due to its expense: "For only my consumption, I'm growing…because it's just a little, because…if you want to grow at a bigger scale, you need capital." The interviewee from the household who lucratively rears alpaca and sheep explained her reluctance to join the FOVIDA project due to the high cost of production. Instead, she was content in her pastoral activities and limiting potato cultivation for home consumption.

Based on these observations, the livelihood decisions of participating and non-participating community members imply that native potato value chains are constructed around a product not viewed by community members as commercially favorable. Certainly the prices offered by PepsiCo and Plaza are advantageous, but households are increasingly dedicating their efforts to activities other than potato production. Some are doing so out of necessity, as in many of the cases of agricultural wage laborers. Others are doing so because they have calculated potato production to be less beneficial than other activities. Former participants have been influenced, in part, by the failures they experienced in selling their potatoes when they engaged in the FOVIDA project. Current FOVIDA participants indicate a certain skepticism in the potential of potato production. Quality rejections and inconsistent contracts have compelled many to diversify their activities instead of intensifying industrial native potato production. All of these decisions hold implications for native potato value chains. As smallholding farmers look to other livelihood activities, the likelihood that they dedicate the attention needed to produce standardized potatoes diminishes.

Summary

This section has sought to elucidate how livelihood decisions among community members affect the scope and viability of native potato value chains. Both participants and non-participants actively select certain activities in favor of others for various reasons. Table 6-16 summarizes the differences of livelihoods and perspectives between participants and non-participants. In Chaki Takia, the choices made by community members regarding whether they wanted to engage in the FOVIDA project were based in their desire to work collectively, their efforts to diversify their livelihoods, and their perceptions of potato production. All of the reasons contribute to a very limited supply of native potatoes of sufficient quantity and quality leaving Chaki Takia for high value markets.

Table 6-16. Differences in Characteristics and Perspectives between Participants and Non-participants Affecting Native Potato Value Chain Structure.

	Participants	Non-Participants
Stratification	• Higher animal value • More animal types • More size of land access • Higher activity diversification • More social interactions	• Lower animal value • Fewer animal types • Less size of land access • Less activity diversification • Less social interaction
Selection	Invited by association leaders	Excluded or declined to participate
Collective Action	Desirable to pursue but difficult to achieve	Prone to fail; insufficient benefits
Activity Diversification	Actively seek other opportunities aside from traditional agricultural production	• Low resource non-participants: commonly seek agricultural wage-labor • Market-viable non-participants: seek more profitable activities than potato production
Potato production	Engaged in production for market but as one among many activities	Production primarily for home consumption

Summary

This chapter has presented the findings related to the four research questions guiding this study based on both qualitative and quantitative data. The results regarding the first research question found diverse perspectives about native potato value chains (Table 6-1). While the high prices offered in the native potato value chains were universally viewed as desirable, product rejection and market inconsistency caused frustration among farmer participants. As both commercial intermediary and extension service, NGO project coordinators expressed aggravation with the organizational capacity of farmer associations, and concern that the NGO would be legally liable for breach of contract. Company executives articulated that they were distant from production, as their role was primarily that of market outlet.

The second research question required quantitative analysis, as it explored the relationships that existed among livelihood components and between these components and dietary diversity. Project participation was found to be stratified along the lines of number of animal types owned, number of native potatoes grown, number of crops grown, activity diversification, social interaction, household composition and size, animal value, and size of land access in hectares (Table 6-9 – 6-10). According to regression analysis, the number of animal types owned, the degree of social interaction, and the number of crops grown were significant predictors of household dietary diversity, while project participation closely approached significance (Table 6-14). Preliminary bivariate and regression analysis found other significant relationships with dietary diversity including project participation, animal value, household head education, age dependency, and activity diversification (Tables 6-11 – 6-13).

Following these quantitative results, qualitative analysis explored actor perspectives of the livelihood concepts considered in this study (Table 6-15). In doing so, findings indicated that, along with diversity, dietary considerations must include types of access, food

stability, and dietary quality, specifically regarding the health consequences of consuming agricultural inputs. Interviewees assessed their agricultural production based on the benefits of on-farm diversification, the advantages and disadvantages of their different production zones, and the various meanings embedded in native potatoes. More generally, livelihood activities were viewed according to their economic viability, constraints, diversification, and opportunities. Finally, results explored the quality of social interactions, finding benefits, participation, leadership, and individualism as the primary themes.

The final research question aimed to ascertain how livelihood decisions of community members, as explored through the previous research questions, influenced the structure of native potato value chains. In particular, it was found that an array of reasons limited production of industrial native potatoes in Chaki Takia. Explanations for these project constraints were found to be related to social stratification, degree and quality of social interaction, activity diversification, and potato production decisions.

Chapter 7

Discussion and Conclusions

Utilizing a mixed methods approach, this study presents findings from survey research and semi-structured interviews that provide insight into the livelihoods of community members where native potato value chains exist, as well as the dynamics among different actors along these supply chains. The intention of this chapter is to elucidate the meanings of these findings, particularly from the social constructionist perspective of Long (2001), who contends that development projects unfold unpredictably, as the actions of development actors interact dialectically with structural influences. What occurs in the social interfaces of development actors, therefore, holds important implications for the trajectory of development initiatives (Long, 2001). This study considers horizontal interfaces between project participants and non-participants as well as vertical interfaces among value chain actors. The chapter proceeds accordingly, first considering the findings related to the livelihoods of community members, followed by discussion of the native potato value chains existing Chaki Takia.

Livelihoods

Although this study includes the perspectives of some other development actors, community households constitute the primary focus. The rationale for this decision is rooted in Long (2001), a livelihoods scholar (Scoones, 2009) who presents a framework extending analysis horizontally and vertically from the primary sites of development interventions. Long, influenced by social constructionism, theorizes that agency and structure are in dynamic interplay. Structural influences that may be evidenced in aggregated patterns of behavior are important and help shape livelihood conditions, and the decisions that people make and the values that therefore become objectified contribute to the reification or

adaptation of structures. As a result, contexts are complex and ever-evolving and require consideration of both conditions and decisions (Long, 2001; Scoones, 1998). As argued in Chapter Four, mixed methods provide a most apt approach to assessing contexts, for quantitative analysis provides important insight into patterns, while qualitative analysis offers complementary information regarding decision-making processes. This section on livelihoods will therefore consider the qualitative and quantitative findings presented in Chapter Six, integrating them to pursue deeper understandings.

Demographically, the majority of households are headed by a member whose highest education level is primary, an indication that poorer households are prevalent (Antezana et al., 2005). Likewise, that the majority of households have less than 0.5 hectares of land and have animal value in the intermediate range (Table 6-2) reflects the small upper social strata of peasants in communities who generally have more access to land and more savings invested in animals than their community counterparts is lower social strata (Mayer, 2002). The relatively low household size was consistent with other studies (Antezana et al., 2005; Bianco & Sachs, 1998) and the fact that household heads are over 50 on average provide further evidence that youth are frequently emigrating from rural settings in the region, as described in interviews by community members and documented by Ho and Milan (2012) .

As is typical in the region, the vast majority of households are small landholders (Table 6-3) engaged in agricultural production (Table 6-6) (Antezana et al., 2005; Bianco & Sachs, 1998; Meinzen-Dick et al., 2009). Agropastoralism best characterizes these agricultural activities as most households both produce more than one crop and own more than one animal (Table 6-5). These quantitative findings were supported through qualitative analysis, which found that households actively pursue diverse on-farm activities as buffers against risk. However, at the same time, qualitative findings also provided more nuance, discovering that not all activity diversification is desirable. As documented in the literature, some households, particularly those that are low-resource, seek agricultural wage labor, an activity that was characterized as necessary. Thus, warnings in the literature that not all

livelihood diversification is desirable appear to be present in the case of Chaki Takia (Ellis, 1998; Niehof, 2004). However, other households actively pursuing alternative agricultural activities are seeking to produce commodities that demand higher market value. Households also commonly participate in non-agricultural livelihood activities and non-labor activities (Table 6-6), and in fact generally diversify their activities beyond only one category (Table 6-7). These findings are consistent with previous studies which have found that rural Peruvian households are diversifying their livelihood portfolios and dedicating their labor time increasingly away from their own farms (Escobal, 2001; Ho & Milan, 2012).

Nonetheless, the continued production of native potatoes does not appear to be in question, a finding that supports the assumption that despite social and economic changes, Andean households will continue to produce native potatoes since they serve important cultural functions (Brush, 1992; Mayer, 2002; Zimmerer, 1996). Native potatoes are an important crop in Chaki Takia with one conservationist farmer preserving 300 varieties (Table 6-5). Qualitative findings provided more nuance. Although production persists, households are increasingly dedicating their native potato production to home consumption, especially as other agricultural and non-agricultural activities are deemed to have more market potential. This trend supports Horton and Samanamud's (2012) conclusion that households are increasingly dedicating their potato production for sustenance as they pursue off-farm activities. For native potato production for home consumption, economic concerns were not a primary consideration; instead, the reasons native potatoes continue to be produced relate to culinary attributes, cultural preservation, and ecological integrity. This finding concurs with Zimmerer's (1996) observation that rural Andean households frequently make production decisions based on what they consider a fit livelihood, a concept largely constituted by culinary satisfaction and the risk buffers provided by biodiversity.

Native potato production and the values embedded in it provide a useful starting point to explore the organizing principles of agricultural production. As documented in the literature and confirmed in this study, Andean households typically access different

production zones to cultivate an array of crops (Brush, 1982, 1992; Mayer, 2002; Zimmerer, 1996, 2003). Beyond facilitating on-farm diversification, various production zones seem to conceptually organize agricultural production for households. The native potatoes and other traditional tubers cultivated in the highlands are tastier, healthier, less compromised by chemical inputs, linked to cultural heritage, and dedicated to home consumption. The crops produced in the lands near the population center are generally, though not exclusively, viewed as market-oriented and so inputs and production practices are used to enhance yields and efficiency. What emerges, therefore, is the existence of two independent production systems[18] that have different meanings and values embedded in them.

Native potatoes, perhaps, provide the clearest example, for they are produced both above and below. However, while the varieties cultivated above are valued for their culinary attributes, linkage to tradition, and occasionally their resistance to stressful weather conditions, the handful of varieties cultivated below typically enjoy market demand and are thus considered "commercial." Mayer (2002) is helpful in understanding the existence of two production spheres when he describes economic thinking of Andean peasants:

> It is not out of ignorance that peasants disregard the assignation of value to their labor and resources as part of their production costs. Rather, this neglect is the result of a conscious strategy to separate commercial and subsistence spheres (p. 229).

The existence of separate production spheres also links with Long's (2001) observation that commodification is fluid. Based on the values that actors embed into what they produce, a particular crop may move in and out of commodity status. Native potatoes provide an apt example for they are at once commodities and non-commodities, depending on where and how they are produced, as well as their intended destination.

[18] Characterizing the two production systems as independent does not mean that they are mutually exclusive. For example, although production in the valley by the population center is more often considered for commercial purposes, at least a portion of the harvest is generally used for home consumption.

Dietary Diversity and Its Associations

Dietary diversity was considered as the dependent variable in this study, selected because chronic malnutrition is a serious problem in the region (Acosta, 2011; World Bank, 2010) and because one objective of native potato value chains is to improve this livelihood outcome. Qualitative results confirmed the seriousness of chronic malnutrition in Chaki Takia, with the local nurse estimating that roughly 50% of children under five are malnourished. According to the Household Dietary Diversity Score (HDDS) used for quantitative analysis, dietary diversity was moderate with cereals, roots and tubers, vegetables, and sweeteners as the most common food groups consumed (Table 6-3). However, care must be taken in interpreting any linkage between HDDS results and malnutrition. As a measurement for food access, HDDS indicates consumption at the household level and does not account for distribution and consumption patterns within the household (Kennedy et al., 2011; Swindale & Bilinsky, 2006). A household, therefore, could conceivably consume diverse food groups but fail to properly nourish their young children. In other words, HDDS helps indicate the array of foods accessible to households but is not an indicator of individual nutritional status. This is important because the Chaki Takia nurse indicated that a primary problem causing the frequency of childhood malnutrition in Chaki Takia was due to the sole reliance on breast milk to feed infants older than six months.

Qualitative findings provided some support to the HDDS results and some divergence. Rice, maize, and wheat were cited as vital staples, as were potatoes and other tubers. However, vegetable consumption was found to be inconsistent and insufficient, thereby calling into question the results from quantitative analysis. More broadly, and as discussed in Chapter Four, using only one measurement of dietary diversity weakens construct validity. HDDS, a cross-sectional measurement covering only a 24-hour period, is a crude one. Interviews and observations repeatedly questioned whether households were consuming particular food groups like vegetables in sufficient quantities. Therefore,

measurements of diversity that do not consider quantity, as is the case here, can only be considered partial.

Based on bivariate analysis, those households with more animal value – a proxy for wealth (Mayer, 2002) - have higher dietary diversity. This finding reflects that of Arimond and Ruel (2004), who found that wealthier households in Peru typically have higher dietary diversity. In addition, statistical analysis revealed that those households headed by members with higher education levels and lower age dependency (a proxy for labor availability) also have higher dietary diversity. These findings align with previous studies that have considered food security (Arimond & Ruel, 2004; Babatunde et al., 2007; Belachew et al., 2012).

Livelihood activity diversification was moderately associated with dietary diversity, providing support for the assumption that diversification is an important livelihood strategy that commonly enhances livelihood outcomes (Barrett et al., 2001; Ellis, 1998, 2004; Scoones, 1998; Valdivia et al., 1996). Examining this quantitative result alongside the qualitative finding that not all activity diversification is desirable provides deeper insight. According to interviewees, entering into agricultural wage labor constituted the unappealing form of diversification; engaging in non-agricultural activities was perceived as much more desirable. According to statistical analysis, the mean of activity diversification was 2.40 (of 5), indicating that households with more activity diversification are expanding their activities outside the agricultural sphere. Based on this, the relationship between activity diversification and dietary diversity can be better qualified as those households who are able to diversify into non-agricultural activities have higher dietary diversity.

Social interaction also had a moderate relationship with dietary diversity, reflecting what Leah et al. (2012) found, which is that those who were members of farmer associations in the central highlands of Peru were more food secure than those who did not belong. That finding and this study provide a strong case that social relationships are a critical component of livelihoods that must be cultivated and managed to improve development outcomes (Meinzen-Dick et al., 2009; Moser, 2008; Pretty, 2008; Pretty & Smith, 2004). The need to

emphasize social relationships is further substantiated by the qualitative findings. Though statistical analysis indicated that those more active socially had higher dietary diversity, the overall mean (2.40 of 9.00) showed fairly low engagement overall (Table 6-10). Furthermore, qualitative results revealed the quality of social interactions to be poor due to weak organizational capacity and poor leadership, problems that are not uncommon according to the literature (Hellin et al., 2009). Based on these results, a logical conclusion is that while collective work in Chaki Takia has an association with better food security, these organizations have not yet maximized their potential due to lack of capacity. Given the negative memories that many households have of cooperatization efforts during agrarian reform (Mayer, 2009), Peru in particular requires intensive focus on building the social infrastructure necessary for productive collective efforts.

Bivariate analysis further revealed that those households who formerly or currently participated in the FOVIDA value chain project had higher dietary diversity. Support for this finding may be located in Leah et al. (2012), whose study also in the central highlands of Peru documented better food security among those who were members of farmer associations. Although project participation did not maintain its significance in multivariate analysis, it very closely approached significance and as a variable of particular interest to this study, deserves further attention. Given the difficulty participating farmers expressed in successfully selling their industrial native potatoes in the value chain in previous years, the actual effect of the project must be questioned. Similar to the results of Escobal and Cavero (2012), this study found that project participants in Chaki Takia are stratified along the lines of wealth (measured by animal value and land access in hectares) as well as social interaction (Table 6-9). In terms of social interaction, it comes as no surprise that those who generally are more socially active are those who have become participants in the FOVIDA project. In addition, project participants are also more likely to engage in diverse livelihood activities. That project participants are also those who typically have more diverse livelihood portfolios provides further evidence that social stratification exists among participating and non-participating

households, because higher-resource households are most often those who are able to desirably diversify their activities (Dorward et al., 2009).

Assuming that project participation indeed marks social stratification, the concern raised by Escobal and Cavero (2012) that social constraints limit accessibility to high value markets appears to apply to Chaki Takia. Project participation was not the only a variable of interest stratified along the lines of wealth, social interaction, and activity diversification; significant differences in the same variables occurred on dietary diversity as well (Table 6-11 – 6-12). Based on the lack of success that project participants explained they have had thus far in the FOVIDA project, this study concludes that social status has more explanatory power to dietary diversity than project participation specifically. Project participation may be another indicator of social staus and so an indirect indicator of dietary diversity but the causal effect it has on dietary diversity has likely been minimal thus far.

When all variables were considered collectively, the number of those that were significant reduced dramatically. In regression models that considered conceptual areas independently, animal value was the only significant demographic variable in a model that accounted for 7.8% of dietary diversity variance (Table 6-13). This result provides further support regarding the influence of wealth status on dietary diversity, though this variable did not maintain its significance in the final regression models that considered variables across concepts. When considering the concept of on-farm diversification, number of animal types, and number of crops grown, neither of which were significant in bivariate analysis, were both found to be significant in a model which had 13.0% predictive power (Table 6-13). In the final saturated and parsimonious regression models, which accounted for 22.5% and 22.6% of variance respectively, social interaction, number of animals owned, and crop diversification were the three significant predictor variables (Table 6-14). Given the bivariate findings, no surprise came when social interaction emerged as significant and must thus be considered an important factor in influencing dietary diversity. The number of different animals owned was the strongest predictor of the three and supports Valdivia (2001), who found that animal

ownership contributed to household food security in the Andean region. As animal diversity provides more access to protein and micronutrients (Kariuki, Mburu, & Waithanji, 2013) and is an investment strategy for Andean households to buffer against risk (Mayer, 2002; Valdivia et al., 1996), the importance of this variable is logical.

Interpretation is more difficult when considering the significance of crop diversification. Although a weak positive correlation with dietary diversity existed in bivariate analysis, the direction of the relationship changed in multivariate analysis, meaning that, unexpectedly, those who grow fewer crops had higher dietary diversity. This is a counterintuitive result, given that on-farm diversification has been consistently documented as an important livelihood strategy in the Andes to reduce vulnerability (Mayer, 2002; Valdivia et al., 1996; Zimmerer, 1996). In the pursuit of explanation, bivariate analyses on crop diversification were run on all other independent variables and only positive associations were found, most of which were the very same variables that also had positive associations with dietary diversity. Given the positive relationships, these bivariate analyses failed to provide insight. Perhaps a lead rests in the perspective of the FOVIDA coordinator who worried that too much diversification could tip households past the benefits and actually be detrimental because insufficient attention is distributed across activities. However, with scant evidence for reasons of the inverted relationship between crop diversity and dietary diversity, the validity of this statistical conclusion must be questioned. With a small census size and vulnerabilities to both reliability and construct validity, conditions in this study are ripe for a statistical error that falsely rejects a null hypothesis (Trochim, 2006).

Meanings

According to Long (2001), livelihoods are important to understand because they provide insighton the realities into which development interventions enter. Comprehending the various ways people act to meet their basic needs helps determine the reasons that

particular development projects take certain trajectories. Critical in this pursuit of understanding is an exploration of the various meanings and values that actors embed into their lives, for Long (2001), as a neo-Chayanovian, maintains that a multiplicity of rationalities exist alongside capitalistic logic. Considering diverse perspectives helps reveal the harmonies and dissensions that exist among development actors. Furthermore, as argued in Chapter Three, exploring different rationalities rescues livelihoods analysis from the linear assumptions that are commonly imported (Scoones, 2009). And indeed, findings from this study reveal that an array of meanings and values underlie decisions and actions among community members in Chaki Takia. Their perspectives provide more robust understandings of the relevant conceptual areas explored quantitatively.

For example, dietary diversity served as the dependent variable of interest, selected because malnutrition appeared to be the primary aspect of food security plaguing rural households in the central Peruvian highlands (Acosta, 2011; World Bank, 2010). Fieldwork in Chaki Takia confirmed that child malnutrition is a rampant problem and that dietary diversity is a concern. Observations led to the conclusion that important food groups like vegetables are not being consumed in adequate quantities and interviewees concurred that their households often lacked dietary diversity. Beyond simply confirming the problem, actor perspectives offered helpful insight into how to address it. Accessibility to knowledge does not appear to be a barrier; the several social programs which exist in Chai Takia targeting malnutrition include frequent presentations on dietary needs. Instead, interviewees indicated that they struggled with application, finding it difficult to integrate the knowledge into their consumption behaviors.

However, findings also revealed that food security concerns in Chaki Takia extend beyond dietary diversity. Whether accessed through independent cultivation or market purchases, food was commonly deemed as unsatisfactory, given the perceived health consequences resulting from consuming pesticide residues. Fuller conceptualizations of dietary quality, therefore, are relevant that account for both dietary quality as well as social

and cultural acceptability (Vargas & Penny, 2009). In addition, food stability presents a further limitation to food security for community members, who use various coping strategies from October through February to ensure that they are able to consume adequate calories. Based on these findings, it may be concluded that development interventions should rightfully continue to target malnutrition, but failing to simultaneously address the food safety and stability concerns will not likely inspire behavior change among some food insecure households.

Considerations of economic rationale are more explicitly reflected in other conceptual areas. Rational choice decision-making appears when community members speak of their customary agricultural production. They assess both input and output market conditions as unfavorable, and calculate that maintaining the status quo is not economically viable. Many households seem to be scaling their potato production back as they pursue other activities. In this pursuit of diversification, households viewed economic potential in alternative crops, product transformation, and non-agricultural activities. These evaluations were based on economic calculations regarding costs and benefits. This type of economically rational thinking is further reflected in production decisions. For those crops which are market-oriented, efficiency is pursued, as households apply inputs in order to maximize yields. In social relationships too, evidence of rational choice decision-making appeared. Several community members who did not engage in many social activities indicated that not enough personal benefit existed. More broadly, interviewees explained declining collective engagement through the rising trend of individualism.

At the same time, rational choice thinking did not dominate all decisions, supporting Long's (2001) contention - and Chayanov (1986) previously - that a multiplicity of rationalities, rational choice included, may exist and be acted upon simultaneously. Despite recognition that traditional activities are a losing proposition, households continue to maintain them, albeit commonly at a reduced scale. Still, particularly in the highlands where native potatoes for home consumption are cultivated, households use traditional methods - a form of

local knowledge - that are more labor intensive and apply fewer inputs. Households cultivate in this way to produce potatoes that they consider delicious; to preserve agrobiodiversity and cultural heritage; and to feel prideful. A swirl of values are also in operation when considering social relationships. As indicated above, rational choice logic is at work when community members calculate the benefit of their participation in collective activities. However, at the same time, community members valued social interactions more generally for their ability to improve wellbeing and the common good, broad concepts in which economic assets are only partial.

Summary

Given the existence of multiple rationalities, rational choice theory can only explain part of the local dynamics in Chaki Takia. This finding supports Scoones' (2009) contention that livelihoods analysis must expand beyond economic thinking. Other values are also important, confirming the conclusions made by Mayer (2002) and Rist (2000), who both insinuated that capitalistic logic only partially explained local dynamics in the rural Andes. A collection of values - not just economic considerations - influence how community members engage with externally-derived opportunities and challenges. Neither agricultural production nor social relationships are viewed simply as a cost/benefit ratio and so danger exists if development interventions assume that this type of logic unilaterally prevails. Through this discussion, my intention has been to comprehensively consider livelihoods in Chaki Takia by assessing not only what people do but also why they do so (Long, 2001). Given this understanding, attention will now turn to the implementation of native potato value chains. Doing so provides an opportunity to examine the process that occurs when outside interventions interact with local realities (Long, 2001).

Native Potato Value Chains

The implementation of native potato value chains presented an opportunity for this study to apply Long (2001) to examine how different actors interact with and influence the structure and function of this development intervention. This aspect of the study intended to shed insight on cross-scalar dynamics as (trans)national companies collaborate with a national NGO and come into contact with local smallholding farmers. Assessing these sites of social interface, a term Long (2001) uses to describe interactions among diverse development actors, elucidates the various values and priorities embedded in actor perspectives and can help explain the trajectory of particular development interventions. In addition, this type of analysis also helps to overcome the shortcomings of livelihoods analysis in inadequately analyzing the linkages between macro forces and micro contexts. Using Long (2001) as a guide, this section will comprehensively consider the findings related to native potato value chains, drawing conclusions on its inclusivity, structure, and viability.

Project Participation

As concluded in the previous section, project participation is stratified along the lines of wealth status in Chaki Takia. Interviewees explained that community leaders invited fellow community members with whom they wished to collaborate. This process of self-selection resulted in the participation of households with higher levels of wealth, activity diversification, and social interaction; in other words, higher-resource households were chosen. This result demonstrates the social constructionist underpinnings of Long (2001), who contends that though conditions are shaped by structures, they are challenged or reified, adapted or reproduced, by how actors internalize them and take action. Synthesizing the knowledge provided by qualitative and quantitative results demonstrates the applicability to this case study of the common structural patterns in Andean communities in which a small

upper strata with more land and animals exist alongside larger groups of middle- and low-resource households (Antezana et al., 2005; Mayer, 2002). As assumed by livelihoods analysis and found in this study, those households with more resources also have more livelihood options available and as a result, better livelihood outcomes like dietary diversity (Moser, 2008; Scoones, 1998). However, these social differences are reified by the actions of community members, who, when presented with a new market opportunity, select along the lines of social status. In doing so, the decisions of community members reproduce social categories and affirm their relevance.

Market Structures and Responses

While social patterns are reflected in project participation, other structural influences are also on display as smallholding farmers engage in new market opportunities. As is common in high value market chains, quality requirements exist for native potatoes (Bolwig et al., 2010; Busch, 2010; Gereffi & Lee, 2012; Hatanaka et al., 2005; Kaplinksy, 2000). For PepsiCo, this means that the selected varieties can be fried for potato chips without burning; for Plaza Vea, aesthetic appearance is most important. To integrate smallholding farmers into these kinds of markets, farmer associations are often encouraged so that individual farmers who otherwise could not adhere to standards of quantity and quality are able to collectively engage (Hellin et al., 2009; Prowse, 2012). To enhance collective capacity, negotiate transactions, and diffuse power along the supply chain, multi-stakeholder partnerships are becoming common as a governance mechanism (Bloom, 2013; Brinkerhoff & Brinkerhoff, 2011; Fuchs et al., 2011; Hatanaka et al., 2005; McMichael, 2009). This arrangement appropriately characterizes the native potato value chains: multiple stakeholders representing the private sector (PepsiCo/Plaza Vea), civil society (FOVIDA), and public sector (local government) have coordinated in the creation and maintenance of value chains that rely on the supply of farmer associations. As has been found elsewhere (Bloom, 2013; Prowse, 2012),

an NGO serves as both extension service to farmer associations and commercial intermediary between these associations and private firms. And as these market conditions come into contact in local contexts, this study, in accordance with others, provides further documentation that high value markets are most often accessed by higher-resource households (Bloom, 2013; Escobal & Cavero, 2012). Thus, the demands of high value markets - native potatoes in this case – that are also pro-poor shape how interactions are structured among different actors.

However, structural influences do not solely determine outcomes; configurations of value chains can vary depending on actors' decisions and success or failure often depends upon how exactly different actors execute their roles (Kudadjie-Freeman et al., 2008; Minten, Randianarison, & Swinnen, 2009; Prowse, 2012). While purchasing firms will sometimes extend inputs or credit to their supplying smallholding farmers, this is not the case for either PepsiCo or Plaza Vea (Prowse, 2012). Their low level of engagement seems to reflect the underlying values of both companies: native potatoes are not a development project but instead are viewed as a commodity whose success will be determined by market forces. Native potato value chains only transform into development work through the actions of FOVIDA, which serves as both extension service and market intermediary. This role, however, is not pre-determined, for other studies have found situations in which multiple partners share the responsibilities that FOVIDA takes on alone (Kudadjie-Freeman et al., 2008). The actions of FOVIDA appear to be motivated by the way in which its project coordinators conceptualize their roles as both technical support to build farmer capacity and socially just intermediary. Thus, as social constructionism theorizes, influential structures exist but are (re)constructed by actors, their actions, and the values underlying them (Long, 2001).

The actions of smallholding farmers also hold important implications for the structure and function of pro-poor value chains. As Long (2001) contends, decisions to engage in or avoid development interventions are consequential to their trajectory. In Chaki Takia, local

dynamics and livelihood decisions affect households' ability and desire to engage in native potato value chains. As these market opportunities enter local realities, households interact with them in varying ways. Some households, already disadvantaged structurally, do not receive an invitation and so remain excluded. Other households possess more capacity to engage in native potato value chains but are hesitant to do so based on rumors of negative experiences or objections to quality requirements. Still other non-participating households believe other livelihood activities than potato production are more lucrative. Participants also interact with native potato value chains in various ways. Frustrated by the inconsistency in the PepsiCo market, some households who formerly participated have discontinued doing so. Other households have persisted planting but are skeptical of the actual benefits and treat this production as another activity among several in their livelihood portfolios. And still another perspective exists which views native potato value chains positively and is optimistic about its potential. Even more nuance occurs as participating households differentiate among and prefer certain market outlets over others. General agreement existed that the market opportunity with Plaza Vea, one which required aesthetic evaluation, was more desirable to that of PepsiCo, which demanded internal characteristics that were difficult to achieve.

The actions and reactions among development actors in native potato value chains appear to mutually reinforce one another, reflecting the dialectical process Long (2001) theorizes is at play during development interventions. Since its launch in 2008, only about a quarter of households in Chaki Takia have engaged with the FOVIDA project. This level of engagement has occurred because of both structural stratification and decisions made by households regarding the desirability of entering a demanding market opportunity focusing on a crop that is generally considered as lacking market viability. Already a minority divided according to social status, participants expressed increasing weariness with PepsiCo, due to product rejections and suspended contracts. These frustrations have contributed to a high drop-out rate: over half of the initial participants no longer grow for the high value markets. As potato output continues to decrease, private firms would be expected to respond

accordingly. And indeed, evidence of a stressed market appears with the second round of contract suspensions by PepsiCo for the current growing season. In contrast, smallholding farmers are more optimistic about the potential with Plaza Vea, a new market opportunity with more manageable quality expectations. Positive experiences this past year have meant that Plaza Vea is interested in expanding its demand for native potatoes, a possibility that appears viable as several ex-participants in Chaki Takia have decided to re-enter the project for this growing season. Thus, these diverging trajectories of the PepsiCo and Plaza Vea markets reveal that local perspectives matter to project outcomes (Long, 2001).

The decisions made by FOVIDA and their interactions with smallholding farmers also hold implications for native potato value chains. Although denied by the NGO, numerous current/former project participants expressed frustration that the technical support offered by FOVIDA occurs in fits and spurts and so production is compromised. Operating as a commercial intermediary, FOVIDA has the responsibility to ensure that market stipulations are being met. To meet demand, FOVIDA extends its support beyond the handful of participants in Chaki Takia to hundreds of farmers across two regions, organized into 23 different farmer associations (FOVIDA, 2012). On a daily basis, project coordinators travel to the various provinces to train farmer participants and monitor production, seeking to ensure that they fulfill their commercial obligations (as contracting party with PepsiCo and formal distributor for Plaza Vea). In the central highlands office of FOVIDA, a small team of about six technicians coordinate the production, post-harvest handling, and delivery of all 23 farmer associations.

Based on its limited human resources, FOVIDA appears to be caught in a bind: the market demands hundreds of farmers, but these farmers require extensive individual attention. This dynamic seems to have created some tension among supply chain actors: contracts by PepsiCo have been suspended twice since the onset of the project; FOVIDA is worried about legal ramifications for not fulfilling their contractual responsibilities: FOVIDA coordinators question whether Chaki Takia participants want to continue with the project; and Chaki Takia

farmers are dropping out of the project due to inconsistent market opportunity and dissatisfaction with the support they are receiving from FOVIDA. Given these difficulties, market viability, especially with PepsiCo, is tenuous. With no technical or financial support from either PepsiCo or Plaza Vea, FOVIDA stretches its inadequate resources across their complicated functions of market intermediary and extension service. With external funding serving as the prop keeping the project afloat, market sustainability becomes even more fragile. PepsiCo, Plaza Vea, and farmers all view FOVIDA as a necessary market entity; the companies' lack of confidence in and engagement with smallholding farmers, coupled with the lack of knowledge and capacity among farmers mean that they and companies are not currently equipped to directly interact.

Assumptions

According to Long (2001), examining the assumptions embedded in externally planned development interventions and how they interact with local realities is important. In the case of native potato value chains, potato biodiversity, local knowledge, and social relationships were identified as assets possessed by smallholding farmers that could be leveraged to advantageously integrate them into upgraded markets (Meinzen-Dick et al., 2009). Furthermore, the project also supposes that the successful integration of smallholding farmers into high value markets will help address the malnutrition problems prevalent in the Andean highlands. This section, therefore, will consider each of these assumptions in turn.

Because potato biodiversity is viewed as a public good (de Schutter, 2011), an important characteristic to buffer against risk (Altieri, 2002; Frison et al., 2011), and a component of Andean cultural heritage (Brush, 1995; Zimmerer, 1996), it has been identified as crucial to preserve. In fact, pro-poor value chains have been recognized as one strategy to encourage conservation (Hellin & Higman, 2005; Hellin et al., 2010). Findings from this study, however, call into question the degree to which the native potato value chains can

contribute to agrobiodiversity conservation. At this point, only a handful of varieties are accepted by PepsiCo and Plaza Vea. Although both companies expressed interest in expanding the varieties they accept, quality requirements will always be limiting factors. Furthermore, the potatoes cultivated for these high value markets are categorized by farmers as part of commercial production and are not currently being integrated into the highland production where potato agrobiodiversity is being conserved. As part of market-oriented production, practices like input application are used to enhance efficiency. This contrasts the traditional methods and minimal application of inputs used to cultivate delicious and diverse potato varieties in the highlands. Because biodiversity is generally conserved in a distinct production sphere from that which is commercial, it appears that value chains will only contribute minimally to conservation.

For similar reasons, the utility of local knowledge in native potato value chains is also suspect. While findings revealed that potato production constitutes an important component of agricultural activities in Chaki Takia, farmers are not accustomed to the rigid quality requirements demanded by PepsiCo and Plaza Vea. Traditional methods and local knowledge are more applicable to traditional crops, of which the varieties targeted for value chains are not considered. Instead, farmers need new knowledge related to efficient production, evidenced by their concern that they neither have the necessary knowledge nor technical support to consistently produce potatoes that adhere to quality standards. Farmers' labor intensive methods and traditional knowledge of how to produce potatoes that are culinary satisfactory are not particularly useful for their value chain production activities.

The extent to which tight-knit social relationships can be considered an asset for integrating smallholders into native potato value chains also requires scrutiny. Given the demands of high value markets, smallholding farmers often need to work collectively to access these outlets (Hellin et al., 2009; Prowse, 2012). A strong social infrastructure, therefore, would certainly serve as an important basis in efforts that require collective action. Yet, however well community members in Chaki Takia know one another, this study's

findings indicate low capacity to effectively work in associations. Ineffective management, lack of follow-through, spotty leadership, and even accusations of corruption plague the farmer associations in Chaki Takia. As a result, concerns of increasing individualism are being expressed, the kind of conditions which breed mistrustful relationships and inhibit the capacity of farmer associations to exploit the benefits of value chains (Hellin et al., 2009). This is not to say that potential does not exist to develop productive social relationships in Chaki Takia. Findings indicated that, despite erosion, social relationships are still marked by some degree of cooperation, as households with stretched resources during difficult months rely on neighbors for help. However, given how social relationships were described by community members, they are not currently positioned to harmoniously work together in projects that require collective action.

While potato biodiversity, local knowledge, and social relationships are considered as livelihood resources in this study, the last assumption explored here relates to the livelihood outcome of food security, relevant because native potato value chains were conceptualized as a development intervention designed to increase income and alleviate food insecurity. While evidence exists that native potato value chains increase income (Cavatassi et al., 2009; Proexpansíon, 2011), scant attention had been given to food security. Guided by the assumption that better food security results from higher income levels, pro-poor value chains operate according to the idea that those households able to increase their capital flow will have greater purchasing power. Findings from this study in part concur with this linear assumption: higher-resource households do have greater dietary diversity than their counterparts. However, although this study does not contain conclusive evidence, the findings suggest that even those households with higher dietary diversity do not consume nutritionally rich food groups in sufficient quantity. Although some voiced concern regarding malnutrition, interviewees more strongly conveyed concerns related to the cultural and social acceptability of their food. Emphasizing the culinary importance of their traditional crops and worrying about the health consequences of consuming pesticide residues, interviewees reflected

Zimmerer (1996), who observed that Andean peasant households are motivated by what they consider a fit livelihood. This is important since the traditional diet does not likely fulfill nutritional requirements. This causes doubt that households would diversify their diet in nutritionally adequate ways even with higher incomes. Thus, though not conclusively, this study provides further support that income alone does not adequately account for food security (Battersby, 2011; Hoddinott, 2001; Sen, 1981, 1999).

Collectively, these assumptions related to agrobiodiversity, local knowledge, social relationships, and food security exemplify why Long (2001) contends that analysis of development interventions must examine what happens when projects enter local realities. From a linear theoretical perspective, native potato value chains should work perfectly: smallholding farmers use their local knowledge of potato agrobiodiversity and their strong pre-existing social relationships to advantageously participate in a market niche that will pay substantially higher prices and will, in turn, alleviate malnutrition. However, as this model has entered farmers' realities in Chaki Takia, it appears flawed. Instead of clean paths between resources, activities, and outcomes, a more appropriate portrayal is: smallholding farmers struggle to reap benefits from market niches, challenged by low collective capacity and the incompatibility between their local knowledge and the demands of high value markets.

Chapter 8

Implications and Recommendations

The purpose of this study was to investigate the dynamics that exist as smallholding farmers' livelihoods interact with value chains. In doing so, it sought to address gaps in understanding related to both livelihoods analysis and value chain analysis (VCA). From a livelihoods perspective, needs have been identified to better consider macro forces, including the influences of market structures, on local contexts (Dorward et al., 2003; Scoones, 2009). Using a different lens, VCA provides a useful framework to assess cross-scalar market dynamics but has not adequately considered impacts on local places, livelihood outcomes, and exclusivity (Bitzer, 2012; Bolwig et al., 2010). Focused on native potato value chains initially conceptualized by the CIP-led Papa Andina Initiative and implemented by FOVIDA, this study used Actor-oriented Perspectives (AP) to provide the guiding framework (Long, 2001). Research questions were constructed to address the identified conceptual gaps in general and provide insight into the Peruvian highlands in particular. Specifically, this study was informed by the literature that emerged out of the Papa Andina Initiative, which identified agrobiodiversity, social relationships, and local knowledge as important assets that could be leveraged to link Andean farmers to high value markets (Meinzen-Dick et al., 2009). Studies have documented income benefits among participants (Cavatassi et al., 2011; Proexpansión, 2011), but scant information exists regarding the degree to which native potato value chains enhance food security.

Through a case study of one community in the central Peruvian households and the native potato chains that are currently being implemented there, this research project sheds insight into the opportunities and constraints of this type of market-oriented development approach. Considering the content of this dissertation collectively, this final chapter seeks to summarize the most pertinent implications emerging from the study, and subsequently provides recommendations for programming, policy and research. In concluding this work, I

hope this chapter is read with particular care. The limitations discussed in Chapter Four remain relevant. One case study may offer important insight into wider social phenomena (Burawoy, 1991), but its representativeness and conclusiveness are inherently limited.

Implications

Guided by Long (2001), this study examined sites of social interface among relevant development actors in native potato value chains. Horizontal dynamics were investigated through livelihood components and vertical dynamics through the perspectives of value chain actors. Long (2001) suggests that social interfaces provide entry into understanding how development interventions are transformed when they enter local realities and help determine underlying reasons explaining the diverging trajectories of these interventions. At work during this process are the interactions of different sets of assumptions and knowledge – those of locals, as well as actors from civil society, the private sector, and the public sphere. Given inevitable tensions existing among these different sets of knowledge, Long (2001) cautions that interventions import assumptions that reflect local realities to varying degrees and so often fail to adhere to a linear path ending in desirable outcomes.

In this particular case, interventions focusing on pro-poor value chains began with the assumption that native potatoes are an apt product to link into high value markets. Given the historical importance of native potatoes in the region, these value chains presume that the lure of market opportunity will motivate farmers to adhere to quality requirements and work collectively. The prospect of native potato value chains is particularly compelling according to these development interventions, for potato agrobiodiversity, local knowledge, and social relationship are assets possessed by smallholding farmers in the Andean highlands that can be leveraged as a comparative advantage (Meinzen-Dick et al., 2009). And finally, the higher incomes that result from more competitive prices will supposedly convert into improved food access helping to combat malnutrition in the region.

Each of these assumptions possessed a certain degree of accuracy. The production of native potatoes has been and continues to be an important livelihood activity; a history of collective activity exists, most notably through organizations like peasant communities; agrobiodiverse native potatoes continue to be cultivated using traditional knowledge; and chronic malnutrition plagues the countryside. However, local perspectives reveal that complexity and nuance are at play within each of these assumptions. Although native potato cultivation is a traditional agricultural activity, farmers are reducing their production and seeking other livelihood activities they deem more lucrative, which reflects a trend occurring regionally (Escobal, 2001; Horton & Samanamud, 2012). And though this study has confirmed that the assets identified by Meinzen-Dick et al. (2009) are in existence, the perspectives of community members indicated that their social infrastructure was eroding and that their agrobiodiverse native potatoes and the local knowledge that accompanied them had marginal applicability to the kind of activities required by high value market chains. Furthermore, community members substantiated concerns of malnutrition but expanded conceptions of food insecurity to include stability as well as social and cultural acceptability. As Long (2001) outlines, the interaction that occurs between the assumptions embedded within development interventions and local realities, the interventions are transformed. Chapter Seven intended to elucidate this process by describing how the responses of smallholding farmers to value chain opportunities influence their structure and viability of these market chains.

The discrepancies existing between assumption and reality reinforces Long's (2001) contention that local perspectives must be a primary consideration during development pursuits. This study provides empirical evidence validating Long's hypothesis that development interventions do not precede deterministically but in a way that is dynamic and unpredictable. Therefore, local knowledge must be validated through participatory research and development methods. This is particularly important because as Long contends – and Chayanov (1986) before him – actors may operate according to a multiplicity of rationalities.

To anticipate behavior without fully understanding the values, meanings, and decision-making processes at play risks implementing development projects based on distorted assumptions. In this case, conducting an in-depth needs assessment, for example, may have anticipated deteriorating social relationships, the existence of separate production spheres, and potential limitations in capacity to adequately fill market demand.

Listening to local perspectives further helps identify other potential development interventions. If local citizens are considered experts of their own contexts, then their knowledge becomes fundamental to formulating specific development interventions – a foundational assumption of participatory methods (Chambers, 1994). In Chaki Takia, farmers have assessed their status quo agricultural production as a losing proposition and so are seeking to diversify their activities. To do so, much of the external support they desired related to activities they were already doing. For example, projects that helped to produce high value agricultural products or transform animal products were frequently viewed opportunistically. Further credibility in these locally-derived ideas for projects can be found in the findings from this study, which showed that diverse animal ownership is the most important predictor to dietary diversity, and animal value also holds significance. Many community members also hoped that industrial non-agricultural activities would become more available to them, a perspective supported by the significant bivariate relationship which showed that those who extended their livelihood activities outside of agriculture also had higher dietary diversity. The perspectives of community members also indicated that they wanted to reap the benefits that could be obtained through collective action. Although they often encountered problems when working groups, social interaction was nonetheless an important predictor to dietary diversity. Together, these findings indicate that local citizens want to build their development process based in the livelihood aspects they know are valuable to their wellbeing; the knowledge local citizens have of their contexts can inform interventions so that they are appropriate and more likely to work.

Social interfaces were also useful to this study to examine differences in perspectives among supply chain actors. Points of harmony and dissension indicated aspects that are working well and those that require improvement. For example, in this case study, all supply chain actors agreed that the competitive prices offered in native potato value chains were desirable and served as a motivating factor for smallholding farmers to participate. Actors also concurred that market instability constrained the actual benefits enjoyed by farmer participants, indicating it as an area that must receive joint focus. However, less consistency in perspectives existed regarding the roles of various supply chain actors. For example, although native potato value chains were conceived as an opportunity to apply Corporate Social Responsibility (CSR) in advantageous ways to smallholding potato farmers, this study shows that the engagement of purchasing firms in the value chain is limited. They view their responsibility conventionally as market outlets and not as development agents who pursue social change. Questions, therefore, arise regarding what actions constitute CSR and whether different corporate actions reflect varying degrees or conceptualizations of responsibility. What can be said, however, is that the arrangement in this case, in which purchasing firms make decisions based purely on market conditions, does not appear to be one that effectively distributes decision-making power across the supply chain: both PepsiCo and Plaza Vea wield skewed control over whether their markets remain open to smallholding farmers.

Among actor perspectives, the most contested role was that of FOVIDA, which served commercial and civil society functions simultaneously. Both the purchasing firms and smallholding farmers viewed the presence of FOVIDA as necessary for the value chains to continue functioning. While the purchasing firms viewed FOVIDA in commercial terms, farmers added technical support to the NGO's responsibilities. FOVIDA viewed its role as temporary; it was the catalyzing agent that would enhance farmer capacity so that they themselves could eventually sustain the project. In the meantime, FOVIDA viewed its role even more expansively than farmers: in addition to serving as a market intermediary and technical support, the NGO is also farmers' representative and capacity-building educator.

Fulfilling all of these various functions stresses FOVIDA. The NGO receives criticism from smallholding farmers for not providing sufficient attention, feels legally liable as a contractual party to PepsiCo, and scrambles to find alternative markets in ways that are not transparent to farmers when their products are rejected or contracts are suspended. Beyond the limited human resources FOVIDA has to fulfill all their obligations, questions exist regarding the degree to which NGOs can effectively accomplish both civil society and commercial roles without their compromising one another. For example, the potential damage that being held legally responsible for contract violations would likely hamper FOVIDA's ability achieve development objectives.

Despite the precarious state of native potato value chains, positives and potential do exist. The high prices offered in value chains would serve as beneficial income boosts to smallholding farmers. While the PepsiCo opportunity has been hobbled thus far due to production shortcomings and inconsistent demand, more optimism surrounds the Plaza Vea, given that this outlet also offers competitive prices and has more comprehensible quality requirements. This indicates that for farmers who are otherwise unconnected to high value markets, considering the kinds of standards to which they must adhere is an important variable in implementing these types of projects.

Further good news presents itself in terms of minimal spillover effects related to potato biodiversity. Although product rejections and contract suspensions can intensify vulnerability in livelihoods, concerns that commodification will reduce biodiversity (Altieri & Toledo, 2011; de Schutter, 2011; Scurrah et al., 2008) do not yet present danger in this case. Because separate production spheres exist, households continue to produce multiple native varieties to fulfill components of what they consider a fit livelihood; any substitutions in production will likely occur among commercial crops grown in the valley and not in the highlands where traditional crops are cultivated. This is not to say that potato biodiversity is not under threat. Lack of market demand constrains the financial viability of maintaining rich pools of genetically diverse potatoes; intensified climatic events threaten the delicacy of

biodiversity conservation; and emigration trends mean that fewer potential conservationists remain. However, native potato value chains do not appear to exacerbate the peril, showing that capitalist markets do not necessarily compromise biodiversity, contrary to an existing assumption that traditional varieties are typically replaced by improved ones (Narloch, Drucker, & Pascual, 2011; Scurrah et al., 2008). In this case, biodiversity maintenance exists alongside market production because other rationalities operate alongside capitalistic logic, just as Long (2001) surmises.

However, other secondary effects that are concerning secondary effects do exist. The findings from this study build on previous research documenting pro-poor value chains are often exclusive, favoring higher-resource households (Bloom, 2013; Escobal & Cavero, 2012; Ferris et al., 2014). Nothing emerging from this study offers contrary evidence to the conclusion that pro-poor value chains often intensify social stratification (Escobal & Cavero, 2012). Important questions, therefore, exist regarding what pro-poor intends to mean and what it actually means. While the households who participate in native potato value chains in Chaki Takia may be characterized as poor from a nation-wide perspective, they are nonetheless the households in the community who have more livelihood options and are best positioned to emerge from poverty (Dorward et al., 2009). As I argued in Chapter Seven, the social divisions existing around native potato value chains not only reinforce social structures but they also limit market scale. Ferris et al. (2014) present a compelling point when they argue that exclusive opportunities are not problematic inherently; an appropriate match would likely not exist between low-resource households and high value markets. Instead, exclusivity is a problem when adequate attention is not given to other types of markets for households in lower social strata. As Ferris et al. (2014) suggest, supporting households with different kinds of market opportunities corresponding appropriately to asset possessions offers one strategy to mitigating the intensity of social stratification.

Recommendations

Programming and Policy

The implications of this study suggest several areas relevant for programming and policy. To begin with, the importance of needs assessments and systematic evaluation are highlighted. As the conclusions of this study have intended to convey, listening to community members provides useful information in the desirability, viability, and scope of a potential development intervention. Comprehensive analyses that cover social and environmental conditions and actor perspectives must be conducted before capital is invested and resources are dedicated to a particular project. Preparatory research not only provides basis for targeted projects that have realistic expectations, it also helps generate relevant curricula, educational materials, and delivery methods (Rennekamp, 1999). In addition, preliminary assessments are useful in developing program objectives, the basis of outcome evaluation. Collecting baseline data and conducting evaluations according to program theory enhance rigor and support for causal program effects (Braverman & Engle, 2009). Evaluation findings are particularly

useful for program improvement, resource reallocation, and funding considerations (Radhakrishna & Relado, 2009).

In many ways, a thorough livelihoods analysis closely relates to needs assessments and so the findings of this study point to several possibilities for development interventions. More so than native potatoes, locals are excited about the possibility of experimenting with crops like quinoa and tarwi that have higher market demand. They also want to transform their animal products to increase market value. In addition, rearing animals like alpaca provide another lucrative agriculturally-based activity. These activities should be explored as possibilities for future development projects. Product transformation may also present other employment opportunities to community members looking to diversify their livelihood portfolio, although the viability of activities like processing and marketing must be

pragmatically assessed before implementation. Policy supports could increase the prospects of these types of development initiatives by offering financial backing to NGOs dedicated to this type of work. Public investments in rural development may also enhance feasibility. Strengthening regional food systems can link smallholding producers to expanded market options; offering financial incentives such as low-interest loans or tax benefits to entrepreneurs who open agribusinesses in the region and source locally can expand market opportunity and present off-farm employment possibilities.

Specifically focused on a market-oriented development intervention, this study provides several recommendations for programming and policy to strengthen these types of initiatives. Projects that attempt to create high value market opportunities are a worthwhile endeavor, but their demands mean that they are more often accessed by high-resource households (Bloom, 2013; Escobal & Cavero, 2012). Given the investments required by high value markets, they are perhaps best suited for these high-resource households (Ferris et al., 2014). This, however, does not mean that other markets on which households rely should not receive attention. Organizing farmers into associations that can market their products collectively is a worthwhile pursuit by NGOs, but need not only exist for high value markets. By matching the levels of household resources with appropriate market opportunities, development efforts can target either typical commodity markets (like milk in Chaki Takia) or high value markets (like native potatoes) (Ferris et al., 2014). In doing so, more upfront attention must be given to strengthening trust and leadership in local relationships. To alleviate exclusion, NGOs should participate in the creation of farmer associations, and to address leadership weaknesses in those associations, NGOs should play an advisory role during elections. Furthermore, NGOs must explicitly dedicate efforts to community development from an interactional perspective to help develop social infrastructure. Capacity-building should precede projects whose success depends on collective action. Initial activities like establishing internal lending services can help improve the quality of the existing social infrastructure (Ferris et al., 2014).

Policy measures might also help enhance market benefits for smallholding producers. Regional agricultural marketing boards could help stabilize market prices for commodities typically grown by smallholders (Barrett & Mutambatsere, 2005). Though rejected by neoliberalism, marketing boards acting in the interest of vulnerable smallholding farmers neatly fits within the broader trend of pro-poor development (Besley & Cord, 2007). In places assessed to benefit from local exchange, local marketplaces could be funded through government programs, which should also provide financial support to farmer associations seeking to work collectively to become more competitive in either commodity or high value markets.

Frequently ignored, informal markets must also receive attention and be supported in appropriate ways (Sperling & McGuire, 2010). In the Peruvian highlands, native landraces produced in the highlands comprise an important component of informal exchange; many of the varieties households grow for their home consumption are neither formally certified nor demanded by markets. Public and civil society efforts should build on previous work in the region with seed banks, seed fairs, and conservationist associations to facilitate exchange and maintain genetic integrity (Tapia et al., 2000). As a public good for which farmers are not compensated, payments for ecosystem services should be considered in the case of native potato conservation (Narloch et al., 2011). As found in this study, the financial drain of maintaining potato biodiversity causes conservationists to consider abandoning this activity. *In situ* conservation qualifies as an ecosystem service that can be incentivized through payments, and schemes can be established through public and civil society partnerships to financially recognize conservation (Narloch et al., 2011). While policy instrument that proactively recognize the public value provided by biodiversity is ideal, at the very least, policy should not make conservation activities unnecessarily difficult. Brush (2005) identifies "credit provisions that require the use of improved crop varieties, crop insurance restrictions, and price subsidies for certain varieties" as policies that would need reform in order to remove policy disadvantages to conservationists (p. 19).

Non-market incentives must also continue to be promoted to encourage biodiversity conservation. Brush (2005) lays out a research agenda that calls for identifying target areas, establishing partnerships among the public and civil society sectors, and investigating biodiversity from both natural and social science perspectives. NGOs should play key roles in supporting community-based conservation in ways that train local conservationists as seed producers, build networks regionally among conservationists and research and development organizations, and enhance genetic integrity and local and regional exchange through mechanisms like community seed banks (Brush, 1994). Programming should also extend beyond the limited number of conservationists in each locale and promote appropriate agroecological methods more broadly among community members (Brush, 1994). In the case of the central Peruvian highlands, agroecology may be particularly useful in not only enhancing ecological conditions but also in pursuits of food security. Given the concerns found in this study regarding the consumption of pesticide residues, agroecological methods are a promising strategy to address food security aspects of social and cultural acceptability.

Based on the findings, this study conclusdes that food security initiatives in the central highlands of Peru can also be expanded in other ways. Despite moderate dietary diversity, malnutrition is a problem because important food groups are not being consumed in adequate quantities. Despite numerous presentations provided by social programs and public officials, households have difficulty applying the nutritional information into their diets. Activities like cooking classes that work collaboratively with community members to develop appropriate recipes could provide experiential learning opportunities and ensure that these foods adhere to what community members consider a fit livelihood (Zimmerer, 1996). Identifying key community members who have the potential to reach swaths of their neighbors with food is an important place to start with these kinds of food preparation activities. Working with the local government and the peasant community, two institutions that often host community events, is a promising place to start experimenting with new recipes, as are the handful of small restaurant owners and the municipal employee who cooks

meals to sell to schoolchildren and staff. Renewed efforts to establish family gardens can serve as a useful linkage point to both agroecological methods and enhanced dietary quality. Of course, increased income must continue to be a prominent aspect of food security efforts, so that households have more capital to access food during the difficult months starting in October. Explorations into innovative storage possibilities and pilot tests can complement efforts to increase income as a multi-pronged strategy to alleviate food instability. In the public sector, funding opportunities should be made available to local governments and regional NGOs to implement these types of activities, so that food security can be more comprehensively addressed.

Finally, the findings and implications of this study also provide insight into specific recommendations to improve pro-poor value chains, initiatives that can provide income opportunities for smallholding farmers. As discussed above, attention to the quality of social relationships needs to be emphasized among smallholding farmers so that they are better positioned to act collectively. At the same time, communication networks and interactions among supply chain actors must also be strengthened. As shown in this study, different perspectives exist among supply chain actors regarding roles within and goals of native potato value chains. Encouraging participation among these diverse actors is necessary, as explicitly identified by the Participatory Market Chain Approach (PMCA) developed by the Papa Andina Initiative (Bernet et al., 2011). In doing so, specific activities should be incorporated which strive to leverage points of harmony in perspectives and alleviate dissension. Reflecting the tenets of participatory methods, value chain actors should be encouraged to collectively establish value chain objectives, participate in their evaluation, and adapt their activities for program improvement. 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.

Of course, attempts to facilitate communication are easy to recommend and difficult to execute. Extending focus among market chain actors to the entire value chain requires flexibility, adaptation, commitment and even new stakeholders. For example, in this case study, findings indicate that the current roles of purchasing firms limit their engagement, presenting implications to the degree that their activities in the value chain actually resemble Corporate Social Responsibility (CSR). As shown, if market concerns are the only consideration among private firms serving as the market outlets in value chains, companies are apt to make self-interested decisions without regard to how smallholding farmers are affected. This should include a multi-year commitment by purchasing firms to purchase products from smallholding farmers in order to avoid discouragement of smallholding farmers resulting from unstable demand, as witnessed in the case of PepsiCo in this study. Working through difficult years initially better position the value chain for long-term viability. Private firms may contribute to the value chain in ways other than simply purchasing products, such as through extending access to credit and/or inputs with low interest or helping to subsidize the activities of organizations tasked with technically supporting smallholding farmers (Bloom, 2013; Prowse, 2012). If companies decide to pursue these types of activities, they should leverage the potential financial benefits in non-exploitative ways; when done appropriately, branding and labeling can reinforce the strength of the market niche (Ferris et al., 2014; Morgan, 2010). To encourage pro-poor value chains marked by CSR, the public sector could implement financial benefits such as tax breaks to firms which actively engage in responsible activities.

Other value chain actors must consider the appropriate scope of their roles. In this case, for example, the facilitating NGO has taken on too much responsibility as both commercial intermediary and extension service. To alleviate its burden, FOVIDA should seek partnerships with organizations that can provide assistance. This will not only compel FOVIDA to focus its efforts in ways that leverage their existing strengths, but will also help the NGO clarify its institutional mission by considering how effectively it can fulfill both

market and civil society goals. Although FOVIDA wants to be a socially just intermediary, it may be better positioned to facilitate commercialization, not be responsible for it. Continuing to strengthen a representative farmer network serves as one possibility to diminish FOVIDA's commercial role. Subsidizing several employment positions within this farmer network is an opportunity to train farmers themselves to be responsible for transactions; as the farmer network becomes more financially viable, external funding could be phased out and the farmer network might assume the responsibility. Although difficult to achieve, approaching commercialization in this way would involve farmers in all steps of product delivery. As a result, the gap between purchasing firms and farmers will be better filled and farmers will be exposed to and gain the necessary skills and knowledge to navigate the complexities of value chains.

Involving other stakeholders is also important to ensuring robust and beneficial value chains. Findings from this study indicate that local governments can be partners who can help with access to inputs, facilitate commercial connections, and oversee organization. Researchers from universities and organizations should be continually included to evaluate programs, facilitate communication, identify areas for improvement and promising opportunities, and experiment with innovations (Brush, 1994; Devaux et al., 2011). Other NGOs which focus on complementary areas – in this case, biodiversity conservation, commercialization, community development, and food security – should be identified and included into efforts. The public sector can contribute in other meaningful ways as well. Investment in publicly-funded agricultural extension, a reversal of neoliberal policy, must be pursued in order to offer technical support to smallholding farmers, facilitate partnerships, and ease the burdens currently placed on civil society organizations. As agriculture continues to be an essential livelihood activity among the rural poor in general and households in the central Peruvian highlands in particular (Escobal, 2001; IFAD, 2010), it needs to be supported through the services of agricultural extension, which should be considered under the umbrella of pro-poor development (Besley & Cord, 2007; Ferris et al., 2014).

Directions for Future Research

As an exploratory study, this research project points to several areas that need further attention from future research. Because this study examined just a single case, replication must occur both regionally and globally to understand the commonalities and differences that exist when smallholding producers interact with high value market chains. These points of comparison should include both livelihood configurations of smallholding farmers as well as the operating structure of the particular value chain under scrutiny. As this study has found, utilizing Long (2001) is useful to account for both horizontal and vertical dynamics of market-oriented development. Theoretically, the evidence emerging from this study indicates that future studies should start with the assumption that multiple rationalities exist simultaneously in the locales under investigation, not that rational choice in the economic, profit-seeking sense (Ulen, 1999), trumps all else. Examining the different priorities and interests which exist within communities and among value chain actors and how they influence decision-making is critical to developing interventions that are relevant, appropriate, and desirable. Sites of social interaction among diverse development actors in particular can serve as useful analytical opportunities. Meetings, for example, between NGO practitioners and community members can provide insight into power dynamics, discrepancies in priorities and perspectives, and points of harmony. Considering this study specifically, an open question remains regarding the invasiveness of capitalistic logic, given that the native potato value chains had minimal success thus far. Future research should, therefore, investigate whether multiple rationalities continue to exist as capitalistic markets become more accessible and beneficial to smallholding farmers.

Specifically, the findings from this study should be corroborated with other case studies and larger sample sizes. Confirming that animal ownership and social interaction are important predictors of dietary diversity should constitute research hypotheses, and the negative relationship that existed in this study between crop diversification and dietary

diversity should be investigated to determine its validity. Conceptions of food security should be expanded in Peru to incorporate dietary quantity, social/cultural acceptability, and stability alongside dietary diversity. Analyses in other regions should be adapted so that they consider the most pressing elements of food security. Multiple dimensions should also be considered when assessing social interaction; both quantity and quality components are important. In Peru, trust, leadership, and organizational skills are promising candidates to help account for the quality of social relationships. Likewise, livelihood diversification should not be treated as uniformly positive; the desirability of its different forms must be explained. Based on this study's findings, both emigration and supplies provided by social programs should be included in constructs of livelihood portfolios.

When conducting similar studies in the future, the limitations weakening this research project should be avoided. Pilot tests must be utilized to ensure reliability, and sample sizes must be expanded to better assure conclusion validity. Multiple dimensions of concepts should be measured to enhance content, construct, and convergent/divergent validity. To effectively accomplish these types of improvements, transdisciplinary collaborations are recommended. An economist, for example, could better account for income as well as the financial costs and benefits of value chain participation; nutritionists could provide expertise on food and nutrition security; botanists and agronomists can provide deep understanding of the characteristics related to production capacity and agrobiodiversity; and geographers and climatologists could provide important additions related to climactic patterns and the spatial dynamics, for example, of production and seed exchange. Studying gender and how it influences value chain participation and viability, as well as intra-farmer association relationships, is also crucial to better comprehending collective action among smallholding farmers. Likewise, investigating intra-household dynamics is another important avenue for study to produce accurate portrayals of consumption patterns. Collectively, in-depth explorations guided by the expertise of these diverse disciplines can provide comprehensive livelihoods analyses and foundations for programming activities and policy instruments.

Value chains too must receive continued attention. Outcomes should be evaluated based on an array of variables. One possibility lies in comparing value chains according to region to account for cultural and historical differences. Evaluations based on crop can also provide a useful analytical point to determine whether perishability or other crop characteristics have any bearing on success. In addition, future research should examine whether differences exist among different outlet types and the quality requirements that accompany them. Considering, for example, whether products are intended for supermarkets or agroindustry processors, and for export or national markets, will help further identify which types of opportunities are best suited for different groups of smallholding farmers. Value chains should also be analyzed according to their structure – more specifically, the configurations of relationships existing among stakeholders. Differentiating among value chains based on the degree to which purchasing firms engage, and whether and how NGOs play roles as facilitators can elucidate the most promising value chain structures that serve as beneficial development interventions. Further analysis of farmer associations and how they may overcome barriers related to information flow, access to credit and inputs, and organizational capacity is also a critical component to ensuring that value chains are viable and advantageous to smallholding farmers. In these types of investigations, other stakeholder groups should also be incorporated into analysis: the ways that the public sector, research organizations, and universities, for example, involve themselves in pro-poor value chains are also worthwhile research pursuits.

Together, these lines of inquiry into value chains hold important ethical considerations for market-oriented development. Exploring the roles of purchasing firms merges into broader questions of what constitutes Corporate Social Responsibility (CSR) and the degree to which private firms should actively engage in the development process. Exploring the various responsibilities that NGOs undertake within value chains leads to necessary considerations of whether ventures into private sector roles can accompany their civil society goals without tension. Studies should also continue to focus on farmer

associations, how they function, when they are able to succeed, and when they are not. Social stratification should figure prominently in research investigations to determine whether value chains among smallholding farmers are exclusively accessible to those that have more resources. Examining the inclusivity of value chains to households with varying levels of resources will allow further scrutiny into the meaning of pro-poor and the degree to which value chains should actually be considered as such. Collectively, these types of explorations constructively interrogate theoretical assumptions revolving around pro-poor value chains: can capitalist firms actualize CSR in meaningful ways? Should NGOs pursue commercial and civil society goals simultaneously? To what extent is it realistic to assume that smallholding farmers can aggregate their products if high value market opportunities present themselves? In pursuing these types of questions, markets should not be viewed as necessarily positive nor negative but as an object of analysis, open to whatever findings result from systematic inquiry.

Conclusion

As a research project that intended to explore horizontal dynamics among community members and vertical dynamics among native potato value chain actors, this study addressed the cross-scalar considerations that often lack in livelihoods analysis and Value Chain Analysis (VCA) (Bitzer, 2012; Bolwig et., 2010; Dorward et al., 2003; Scoones, 2009). Long (2001) guided the theoretical framework of this study through his dialectical approach to development interventions which emphasizes the importance of actor perspectives and responses to structural forces. Through analysis, findings indicated that participation in native potato value chains is stratified along the lines of social status, reflecting the influence of social institutions at play. Those households who participate are those that have more diverse livelihood portfolios, are more active socially, have more financial assets, and enjoy more dietary diversity. At the same time, these structures are reified when community members

self-select participation according to social status. Structural forces also enter the realities of smallholding potato farmers through native potato value chains. Households respond to quality requirements and the complexities of coordination in varying ways – through enthusiastic or tepid participation, through active or passive avoidance. These decisions, in turn, hold implications to the function of the market to which other supply chain actors react. This dialectical process causes the viability of value chains to follow different trajectories.

Through comprehensive analysis of both local livelihoods and value chain dynamics, this study was also able to interrogate the assumptions embedded in pro-poor native potato value chains. The assets identified as important for smallholding potato farmers to leverage in order to successfully upgrade their market opportunities all exist, but the social infrastructure is eroding and agrobiodiversity and local knowledge are not particularly useful to farmers when they engage in value chains. In this case, competitive markets neither act as natural catalyst to collective action nor do they necessarily injure agrobiodiversity. The maintenance of agrobiodiversity should debunk any assumptions that smallholding farmers are only rational agents that make calculated decisions to maximize economic benefits. While this form of rationality is certainly in operation, others are too. And they are the ones that motivate farmers to conserve potato biodiversity, preserve their cultural heritage, and fulfill their culinary preferences. The value that households place on enjoying delicious potatoes also intersects with food security considerations. Based on traditional staple crops, the diet heavily relies on cereals and starches, and so what is deemed a fit livelihood does not likely fulfill nutritional requirements, thus problematizing the linear assumption existing between increases in income and food security. The importance community members assign to a desirable diet indicates that social and cultural acceptability is a crucial component of food security in the region, a conclusion only strengthened by the concern regarding the health consequences of consuming pesticide residues. Certainly malnutrition is a serious problem but must be considered alongside acceptability and stability in order to comprehensively address food insecurity in the region.

Collectively, the conclusions that emerge from this study point to critical areas regarding pro-poor value chains that require further attention from researchers, policymakers, and development practitioners. Value chains are not so simple that they may be characterized as good or bad, advantageous or not. Their success largely depends on how they are managed, their adaptability to diverse interests and priorities, and the way that they are perceived by and responded to by the actors involved. Apparent areas that require substantial attention relate to building collective capacity, enhancing communication and information flow among value chain actors, and establishing common goals and objectives among those actors. In cases in which value chains are marked by social stratification, program and policies must be implemented to support the market opportunities for those households that do not access high value markets. Through a comprehensive approach that targets both the function of the value chain and the livelihoods of local producers, these types of market opportunities might prove to be beneficial in ways that avoid damaging social and ecological consequences.

Appendix A

Surveys (Spanish and English)

ENCUESTA DE ACTIVIDADES DE SUBSISTENCIA Y CALIDAD DE LA DIETA EN LA COMUNIDAD

Fecha: _____ Numero de Respondiente_____ Nombre de Encuestador: _____

Introducción y Objetivo: Buenos días/tarde. Yo soy un miembro de un equipo de encuestadores que representa el trabajo de un estudiante de La Universidad de Pennsylvania State en E.E.U.U. y estamos haciendo encuestas para entender como Ud. y los miembros de su hogar satisfacen sus necesidades de alimentos y cómo obtienen sus ingresos. Me gustaría compartir parte de esta información con algunas organizaciones de desarrollo y con la municipalidad (gobierno local) para que puedan implementar programas de apoyo para mejorar su bienestar.

Confidencialidad: Sus respuestas serán confidenciales. Sus respuestas serán procesadas junto con las respuestas de otros hogares. Es decir que la información que me provea no será conocida por los demás encuestados.

Instrucciones: Le haré una serie de preguntas sobre los miembros de su hogar: Cómo se ganan la vida, y los alimentos que los miembros de su hogar consumen en la casa. Cómo el/la representante de su hogar, debe contestar en nombre de los otros miembros que viven actualmente en su hogar y estimar lo mejor de su capacidad cuando sea necesario. La encuesta tendrá una duración de 30 minutos. Le hago las preguntas y anoto sus respuestas.

Participación Voluntaria: La decisión de Ud. en participar es completamente voluntaria. No es necesario contestar ninguna pregunta que Ud. no desea contestar. Se puede dejar de participar en la encuesta en cualquier momento. Ud. debe tener dieciocho años o más para participar en este estudio.

Consentimiento: ¿Está de acuerdo en participar en este estudio? ❑ Sí ❑ No

Datos de Identificación:

Barrio: _____

Género de Entrevistado/a: ❑ Varón ❑ Mujer

Género del Jefe/la Jefa del Hogar: ❑ Varón ❑ Mujer

1) **Está en el proyecto con FOVIDA:** ❑ No ❑ Sí

Género del Contratado/a: ❑ Varón ❑ Mujer

¿Con qué asociación? ❑Asociación 1 ❑Asociación 2 ❑Asociación X ❑La municipalidad

2) ¿Qué parentezco tiene Ud. con el jefe/la jefa del hogar?

❑ Soy el jefe/la jefa ❑ Esposo/a ❑ Padre/Madre ❑ Hijo/a

❑ Otro/a (Especifique:_____)

En primer lugar me gustaría hacerle a Ud. algunas preguntas sobre sus prácticas agrícolas. Cuando digo hogar, hogar quiere decir solamente las personas quienes viven con Ud. en la casa aquí durante por lo menos seis meses del año.

3) Uso de la Tierra

a) ¿Cuántas parcelas (chacras) tiene disponible para sembrar sus cultivos?		
b) ¿De estas, cuántas son propias?		
c) ¿De estas, cuántas son de secano?		
d) ¿De estas, cuántas tienen riego?		
e) ¿De estas, cuántas parcelas han sembrado o va a sembrar para esta campaña?		
f) ¿Si fuera papa, cuántos sacos de semilla de papa podría sembrar en todas sus parcelas?		sacos de _____ kg
g) ¿Cuántos cultivos diferentes siembra su hogar?		
h) ¿Cuántos cultivos diferentes sembraba su hogar hace 5 años?		

4) ¿Cría animales? ❑ No ❑ Sí

→ **En caso afirmativo**: ¿Qué tipos de animales cría en su hogar?

Tipo de Animal	Marque el cuadro para los casos afirmativos	# Actual	Valor Aproximada (en Soles)	# Hace 5 Años
Vacunos	❑			
Ovinos	❑			
Alpacas/Llamas	❑			
Mulas/Burros/Caballos	❑			
Aves de Corral	❑			
Cuyes	❑			
Cerdos	❑			
Abejas (colmenas)	❑			
Otros	❑			

5) ¿Cultiva papas? ❑ No ❑ Sí

En caso afirmativo:

a) ¿Cuántas variedades de papas nativas siembra su hogar ahora y hace 5 años?

# Actual	# Hace 5 Años

b) ¿Si tuviera su hogar 10 sacos de papas nativas, cuántos sacos usaría para:

Consumo Propio:
Semilla:
Venta:
Intercambio (Trueque):

c) ¿Cuántas variedades de papas mejoradas(blancas) su hogar siembra y hace 5 años?

# Actual	# Hace 5 Años

d) ¿Si tuviera su hogar 10 sacos de papas mejoradas (blancas), cuántos sacos usaría para:

Consumo Propio:
Semilla:
Venta:
Intercambio (Trueque):

6) Con qué frecuencia usa su hogar los siguientes canales para vender sus productos agrícolas?

Canales	Nunca	Rara Vez	Con frecuencia	Siempre
a) Miembros de su familia, amigos, o conocidos	❑	❑	❑	❑
b) Mercados locales (como Jauja o Concepción)	❑	❑	❑	❑
c) Intermedario(s)	❑	❑	❑	❑
d) Mercado mayorista	❑	❑	❑	❑
e) Directamente a compañías (procesadores, supermercados, etc.)	❑	❑	❑	❑
f) Directamente a restaurantes	❑	❑	❑	❑
g) Otro (Especifique): _____	❑	❑	❑	❑

7) (**Para los que aportan al contrato con PepsiCo):**

a) ¿Por cuántas campañas ha participado su hogar en la siembra y venta de papas nativas a PepsiCo?

❑ 0 ❑ 1 ❑ 2 ❑ 3 ❑ 4 ❑ 5

b) ¿Siembra su hogar papas nativas para vender a PepsiCo. individualmente?

❑ No ❑ Sí

→ **En caso afirmativo**:

¿Cuántos sacos han cosechado el año pasado para:

	# de sacos	# de kilos
Consumo Propio:		
Semilla:		
Venta:		

c) ¿Siembra su hogar papas nativas para vender a PepsiCo. En conjunto?

❑ No ❑ Sí

→ **En caso afirmativo**:

¿Cuántos sacos han cosechado el año pasado para:

	# de sacos	# de kilos
Consumo Propio:		
Semilla:		
Venta:		

8) (**Para los que no participan en el proyecto):**

¿Porqué no participa su hogar en el proyecto de la venta de papas nativas a PepsiCo?

(*Marcar todas las respuestas que corresponden)*

- ❑ Requiere demasiado tiempo
- ❑ Es difícil conseguir semilla
- ❑ Hay demasiados requisitos con respecto a la calidad de la papa
- ❑ La ganancia no es suficiente
- ❑ Hay demasiado riesgo por el clima
- ❑ La inversión es demasiado
- ❑ No vale la pena trabajar en grupo
- ❑ El manejo del cultivo es diferente a nuestros costumbres
- ❑ Otro: (Especifique: _____)

Ahora me gustaría preguntarle a Ud. sobre las actividades que hace su hogar para ganarse la vida. Cuando pregunto si la actividad es local, lo que quiero decir es que el miembro del hogar vuelve a dormir a la casa todos los días. Otra vez, cuando digo hogar, hogar quiere decir solamente las personas quienes viven con Ud. en la casa aquí durante por lo menos seis meses del año.

9) Tipos de Trabajo

Actividad		**En caso afirmativo:** ¿es el trabajo local?	¿En una escala de ***1=Muy Poco, 2= Poco, 3=Mucho, 4=Muchísimo,*** cuánto contribuye esta actividad a ganarse la vida para su casa**?**			
Trabajo Agrícola Independiente						
a) ¿Algún miembro siembra cultivos en sus terrenos propios para consumo propio?	❑No ❑Sí	❑ Local ❑ No local	1	2	3	4
b) ¿Algún miembro siembra cultivos en sus terrenos propios para ventas?	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
c) ¿Algún miembro cría animales propios para consumo propio?	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
d) ¿Algún miembro cría animales para venderlos o vender sus productos?	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
Trabajo Agrícola Jornal						
e) ¿Algún miembro trabaja en el terreno de otra persona en labores agrícolas por un jornal (como siembra, deshierbo, aporque, cosecha)?	❑No ❑Sí	❑ Local ❑ No local	1	2	3	4
f) ¿Algún miembro cuida los animales de otra persona por un jornal?	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
g) ¿Algún miembro trabaja para otra persona haciendo otro trabajo agrícola como limpiando, empacando, o procesando cultivos?	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
Trabajo No Agrícola Independiente						
h) ¿Algún miembro hace artesanías para vender?	❑No ❑Sí	❑ Local ❑ No local	1	2	3	4
i) ¿Algún miembro tiene su propio negocio (como una tienda, restaurante, vende gas para cocinar, vende gasolina, alquila carro/camión)? Especifique : _____	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
j) Algún miembro trabaja individualmente con su ocupación (como albañil, transportista (taxista), carpintería, etc.?) Especifique : _____	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
Trabajo No Agrícola Salario Dependiente						
k) ¿Algún miembro tiene trabajo en una compañía por un salario (como minería, fábrica, construcción, transporte)? Especifique: _____	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
l) ¿Algún miembro trabaja para instituciones públicas o estatales (como una municipalidad, hospital pública, ministerio de educación, gobierno regional, etc.)?	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
m) ¿Algún miembro trabaja para instituciones privadas (como ONG u organización civil)?	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4
Otro						
n) ¿Hay otros tipos de trabajo que hacen los miembros del hogar para ganarse la vida? 1)_____ 2) _____ 3) _____	❑No ❑ Sí	❑ Local ❑ No local	1	2	3	4

10) Otras Fuentes de Capital

Fuente		En caso afirmativo: ¿En una escala de ***1=Muy Poco, 2=Poco, 3=Mucho, y 4=Muchísimo,*** cuánto contribuye este fuente a ganarse la vida para su hogar?			
a) ¿Algún miembro de su hogar recibe dinero de alguien quien emigró a otro lugar?	❑No ❑ Sí	1	2	3	4
b) ¿Alquila sus terrenos?	❑No ❑ Sí	1	2	3	4
c) ¿Alquila maquinaria u otros equipos?	❑No ❑ Sí	1	2	3	4
d) ¿Se presta dinero de un banco u otra institución formal como un proyecto microfinanzas o grupos registrados?	❑No ❑ Sí	1	2	3	4
e) ¿Se presta dinero de una fuente informal como una prestamista o un pariente?	❑No ❑ Sí	1	2	3	4
f) ¿Se presta insumos de una fuente formal como una compañía?	❑No ❑ Sí	1	2	3	4
g) ¿Se presta insumos de una fuente informal como un pariente?	❑No ❑ Sí	1	2	3	4

Ahora me gustaría preguntarle a Ud. sobre los tipos de comida que Ud. y los miembros de su hogar comieron en la casa durante el día y por la noche ayer. Debe mencionar solo la comida que fue consumido en la casa ayer, no fuera de la casa.

11) Diversidad Dietética del Hogar

¿Ayer la comida que comieron la familia en la casa fue parecida a la comida que comen todos los días? (En el caso de no, deben preguntar por anteayer)

¿Que Uds. comieron en su casa ayer?	Marque el cuadro en los casos afirmativos
¿Algún pan, arroz, fideos, galletas, cebada, u otros alimentos hechos de quínua, maíz, trigo, o kiwicha?	❑
¿Papas, yuca, oca, ulluco, mashua, camote o cualquier otro alimento hecho de raíces o tubérculos?	❑
¿Verduras?	❑
¿Frutas?	❑
¿Carne de res, de cerdo, de cuy, pollo, hígado, riñón, corazón, u otra carne u órganos?	❑
¿Huevos?	❑
¿Pescado?	❑
¿Algún alimento hecho de haba, arveja, lenteja, u otro legumbre?	❑
¿Queso, yogur, leche, u otros productos hecho de leche?	❑
¿Alimentos a base de aceite, manteca de chancho, o mantequilla?	❑
¿Azúcar o miel?	❑
¿Otros alimentos, como condimentos, café, té?	❑

12) Ahora me gustaría preguntarle a Ud. sobre su consumo típicamente en el hogar.

#	Pregunta	¿Con qué frecuencia ocurrió este?	
1	¿En los últimos 12 meses, le preocupó que en su hogar no hubiera suficientes alimentos?	❑ 0 = Nunca ❑ 1 = Solo 1 o 2 meses	❑ 2 = Algunos Meses (entre 3 - 7 meses) ❑ 3 = Casi cada mes (entre 8 -12 meses)
2	¿En los últimos 12 meses, Ud. o alguien de su hogar no pudo comer alimentos preferidos debido a la falta de recursos?	❑ 0 = Nunca ❑ 1 = Solo 1 o 2 meses	❑ 2 = Algunos Meses (entre 3 - 7 meses) ❑ 3 = Casi cada mes (entre 8 -12 meses)
3	¿En los últimos 12 meses, Ud. o algún miembro del hogar tuvo que comer una variedad limitada de alimentos debido a la falta de recursos?	❑ 0 = Nunca ❑ 1 = Solo 1 o 2 meses	❑ 2 = Algunos Meses (entre 3 - 7 meses) ❑ 3 = Casi cada mes (entre 8 -12 meses)
4	¿En los últimos 12 meses, Ud. o algún miembro del hogar tuvo que comer alimentos que realmente no deseaba debido a la falta de recursos para obtener otros alimentos?	❑ 0 = Nunca ❑ 1 = Solo 1 o 2 meses	❑ 2 = Algunos Meses (entre 3 - 7 meses) ❑ 3 = Casi cada mes (entre 8 -12 meses)
5	¿En los últimos 12 meses, Ud. o algún miembro del hogar tuvo que comer menos de lo que sentía que necesitaba porque no había suficientes alimentos?	❑ 0 = Nunca ❑ 1 = Solo 1 o 2 meses	❑ 2 = Algunos Meses (entre 3 -7 meses) ❑ 3 = Casi cada mes (entre 8 -12 meses)
6	¿En los últimos 12 meses, Ud. o algún miembro del hogar tuvo que comer menos comidas diarias porque no había suficientes alimentos?	❑ 0 = Nunca ❑ 1 = Solo 1 o 2 meses	❑ 2 = Algunos Meses (entre 3 - 7 meses) ❑ 3 = Casi cada mes (entre 8 -12 meses)
7	¿En los últimos 12 meses, alguna vez no hubo absolutamente ningún alimento que comer en su hogar debido a la falta de recursos para adquirirlos?	❑ 0 = Nunca ❑ 1 = Solo 1 o 2 meses	❑ 2 = Algunos Meses (entre 3 - 7 meses) ❑ 3 = Casi cada mes (entre 8 -12 meses)
8	¿En los últimos 12 meses, Ud. o algún miembro del hogar se fue a dormir por la noche con hambre porque no había suficientes alimentos?	❑ 0 = Nunca ❑ 1 = Solo 1 o 2 meses	❑ 2 = Algunos Meses (entre 3 - 7 meses) ❑ 3 = Casi cada mes (entre 8 -12 meses)
9	¿En los últimos 12 meses, Ud. o algún miembro del hogar se pasó todo el día sin comer nada debido a que no había suficientes alimentos?	❑ 0 = Nunca ❑ 1 = Solo 1 o 2 meses	❑ 2 = Algunos Meses (entre 3 - 7 meses) ❑ 3 = Casi cada mes (entre 8 -12 meses)

Ahora me gustaría preguntarle a Ud. sobre la participación de su hogar en actividades comunales e interacciones con otras personas en la comunidad.

13) ¿Algún miembro de su hogar participa en una actividad colectiva con otras personas de la comunidad fuera de su trabajo?

❑ No ❑ Sí

→ En caso afirmativo, en qué organizaciones participa su hogar?

Miembro del Hogar	***Nombre de la Organización***	***Tipo de Org. (Usa el código abajo)***	***Rol en la organización (Usa el código abajo)***	***Número de horas por mes que dedica a la actividad (Usa el código abajo)***	***Nivel de Participación (Usa el código abajo)***

Tipo de Organización		**Participación**	**Número de Horas por Mes**	**Nivel de Participación**
1 = Asociación de Agricultores	11 = Asociación Cultural	1 = Presidente	1 = Nada	1 = No Activo
2 = Grupo de Agricultores	12 = Grupo Político	2 = Secretario/a	2 = Menos que una hora	2 = Algo Activo
3 = Grupo de Negocios	13 = Grupo Juvenil	3 = Tesorero/a	3 = 1-4 horas	3 = Muy Activo
4 = Asociación Profesional	14 = Grupo de Mujeres	4= Otro Dirigente	4 = 5-10 horas	
5 = Grupo de Crédito/Fondos	15 = APAFA	5 = Miembro	5 = Más que 10 horas	
6 = Comité de Agua	16 = Comité de Salud			
7 = Comité Saneamiento	17 = Club de Deportes			
8= Grupo de Manejo de Recursos Naturales	18 = Comunidad Campesina			
9= ONG	19= Otro			
10 = Grupo Religiosa				

14) ¿Algún miembro de su hogar ha participado en un proyecto fuera del trabajo con un ONG o agencia del gobierno en el pasado?

❑No ❑Sí

→ **En caso afirmativo:**

¿Qué miembro del hogar participó?:_____

¿Cómo se llamaba la ONG o agencia gubernamental?: _____

¿Cuántos años participó?: _____

¿Me puede explicar el proyecto?:

_____

_____

_____

Ahora me gustaría preguntarle a Ud. sobre los miembros de su hogar. Como siempre, hogar quiere decir solamente las personas quienes viven con Ud. en la casa aquí durante por lo menos seis meses del año.

15) ¿Alguien en su hogar es un comunero activo? ❑No ❑Sí

16) ¿Por favor, Ud. puede contarme sobre todos los miembros quienes viven en su hogar?

Miembro	Género (Usa el código abajo)	Edad	Educación (Usa el código abajo)
1 = Jefe/Jefa del Hogar 2 = Esposo/Esposa 3 = Hijo 4 = Hija 5 = Abuela 6 = Abuelo 7= Otro/Otra (Especifiqué)	1 = Varón 2 = Mujer		1 = Ninguna 2 = Primaria Incompleta 3 = Primaria Completa 4 = Secundaria Incompleta 5 = Secundaria Completa 6 = Superior Incompleta 7 = Superior Completa 8 = Otra

17) ¿Hay algo más que le gustaría contarme de su hogar?

_____
_____
_____
_____
_____
_____

Muchas Gracias por su Participación

SURVEY OF LIVELIHOOD ACTIVITIES AND DIETARY QUALITY IN THE COMMUNITY

Date: _____ **Number of Respondent:** _____ **Name of Surveyor:** _____

Introduction and Objective: Good morning/afternoon. I am a member of the survey research team that is working with a student from Penn State University in the United States, and we are conducting surveys in order to understand how you and your household members satisfy your food necessities and obtain your income. I would like to share this information with some development organizations and the local government so that they can better impelement support programs to help improve your wellbeing.

Confidentiality: Your responses are confidential. Your responses will be analyzed together with the responses of other housholds. In other words, the information that you provide will not be made available to other research participants.

Instructions: I will ask you a series of questions about your household members: How you make a living and the food that your household members consume while in the house. As the repsentative of your household, you should respond for the other members that actually live in your house and estimate to the best of your ability when necessary. The survey wil last about 30 minutes. I will read the questions and note the responses.

Voluntary Participation: The decision to participate is completely voluntary. You are not required to answer any question to which you would rather not respond. You may end your participation at any time. You should be at least eighteen years in order to participate in this study.

Consent: Do you agree to participate in this study? ❑ Yes ❑ No

Identification Information:

Neighborhood: _____

Gender of Interviewee ❑ Male ❑ Female

Gender of the Household Head: ❑ Male ❑ Female

1) Are you in the FOVIDA Project? ❑ No ❑ Yes

Gender of Participant: ❑ Male ❑ Female

With what farmer association? ❑Association 1 ❑Association 2 ❑Association X ❑Municipality

2) What relationship do you have with the head of household?

❑ Head ❑ Husband/Wife ❑ Father/Mother ❑ Son/Daughter

❑ Other (Specify:_____)

In the first place, I would like to ask you some questions about your agricultural practices. When I say household, household means only those who live with you in the house for at least six months during the year.

3) Land Use

a) How many parcels do you have available in order to plant crops?		
b) Of these, how many do you own?		
c) Of these, how many are rain-fed?		
d) Of these, how many have irrigation?		
e) Of these, how many parcels have you planted or will you plant for this season?		
f) If you were planting potatoes, how many sacks of seed could you plant on all of these parcels?		sacks of _____ kg
g) How many different crops does your household plant?		
h) How many different crops did your household plant 5 years ago?		

4) Does your households raise animals? ❑ No ❑ Yes

→ **If yes**: What types of animals does your household rear?

Animal Type	Mark square if household owns	# Actual	Approximate value (in Soles)	# 5 years ago
Cows	❑			
Sheep	❑			
Alpacas/Llamas	❑			
Mules/Donkeys/Horses	❑			
Fowl	❑			
Guinea Pigs	❑			
Pigs	❑			
Bees (colonies)	❑			
Others	❑			

5) Does your household cultivate potates? ❑ No ❑ Yes

→ **If yes:**

a) How many native potato varieties does your household currently cultivate and how many 5 years ago:

# Actual	# 5 years ago

b) If you had 10 sacks of native potatoes , how many sacks would your household use for:

	# of sacks	# of kilos
Home Consumption:		
Seed:		
Sale:		

c) How many improved (white) potato varieties does your household currently cultivate and how many 5 years ago:

# Actual	# 5 years ago

d) If you had 10 sacks of improved (white) potatoes, how many sacks would your household use for:

	# of sacks	# of kilos
Home Consumption:		
Seed:		
Sale:		

6) How frequently does your household use the following market outlets to sell your agricultural products?

Outlets	Never	Rarely	Frequently	Always
a) Members of the family, friends, or acquaintances	❑	❑	❑	❑
b) Local markets (like Jauja o Concepción)	❑	❑	❑	❑
c) Intermediaries	❑	❑	❑	❑
d) Wholesale market	❑	❑	❑	❑
e) Directly to companies (processors, supermarkets, ets.)	❑	❑	❑	❑
f) Directly to restaurants	❑	❑	❑	❑
g) Other (Specify): _____	❑	❑	❑	❑

7) (For those who have had contracts with PepsiCo):

a) ¿Por cuántas campañas ha participado su hogar en la siembra y venta de papas nativas a PepsiCo?

❑ 0 ❑ 1 ❑ 2 ❑ 3 ❑ 4 ❑ 5

b) Does your household plant native potatoes in order to sell to PepsiCo individually?

❑ No ❑ Yes

→ **If yes**:

How many sacks did you harvest last year for:

	# of sacks	# of kilos
Home Consumption:		
Seed:		
Sale:		

c) Does your household plant native potatoes in order to sell to PepsiCo collectively?

❑ No ❑ Yes

→ **If yes:**

How many sacks did you harvest last year for:

	# of sacks	# of kilos
Home Consumption:		
Seed:		
Sale:		

8) (For those who do not participate in the project):

Why does your household not participate en the project of the sales of native potatoes to PepsiCo? (*Mark all the responses that are provided)*

- ❑ Requires too much time
- ❑ It is difficult to get see
- ❑ There are too many quality requirement
- ❑ There is not enough financial benefit
- ❑ There is too much risk with the climate
- ❑ The investment is too muc
- ❑ It is not worth working in groups
- ❑ The management is different from our traditional practices
- ❑ Other: (Specify: _____)

Now I would like to ask you about the activities your household does to make a living. When I ask if the activity is local, what I mean is if the person of the household returns to sleep at the house every day. And again, when I say household, household means only those who live with you in the house for at least six months out of the year.

9) Types of Work

Activity		**If yes:** is the work local?	On a scale ***1=Very Little, 2= Little, 3=Much, 4=Very Much,*** how much does this activity contribute to making a living for your household?			
Independent Agricultural Labor						
a) Does any member plant crops on your lands for home consumption?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
b) Does any member plant crops on your lands to sell?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
c) Does any member rear your own animals for home consumption?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
d) Does any member rear animals in order to sell them or their products?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
Wage Agricultural Labor						
e) Does any member work on the land of another person in agricultural work for a wage (like planting, weeding, mounding, harvesting)?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
f) Does any member dare for animals of another person for wage?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
g) Does any member work for another person doing other agricultural wok like cleaning, packing, or processing crops?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
Non-Agricultural Independent Labor						
h) Does any member make artisenal goods to sell?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
i) Does any member have his/her own business (like a store, restaurant, sell cooking gas, sell gasonline, rents out cars/trucks)? Specify : _____	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
j) Does any member work individually in his/her occupation (like masonry, transport (taxi driver), carpenter, etc.)? Specify : _____	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
Non-Agricultural Wage Labor						
k) Does any member work in a company for a salary (like amine, factory, construction, or transport)? Specify: _____	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
l) Does any member work for public/state institutions (like a municipality, public hospital, ministry of education, regional government, etc.)?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
m) Does any member work for private instiutions (like an NGO or other civil society organization)?	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4
Other						
n) Are there other types of work that your household does to make a living? 1)_____ 2) _____ 3) _____	❑No ❑Yes	❑ Local ❑ Not local	1	2	3	4

10) Other Income Sources

Sources		If yes: On a scale of ***1=Very Little, 2=Little, 3=Much, y 4=Very Much,*** how much does this source contribute to making a living for your household?			
a) Does any member receive money from someone who emigrated to another place?	❑No ❑Yes	1	2	3	4
b) Do you rent out your lands?	❑No ❑Yes	1	2	3	4
c) Do you rent out machinery or other equipment?	❑No ❑Yes	1	2	3	4
d) Do you borrow money from a bank or other formal institution like a microfinance project or other registered groups?	❑No ❑Yes	1	2	3	4
e) Do you borrow money from an informal source like a money lender or family member?	❑No ❑Yes	1	2	3	4
f) Do you borrow inputs from a formal source like a Company?	❑No ❑Yes	1	2	3	4
g) Do you borrow inputs from an informal source like a family member?	❑No ❑Yes	1	2	3	4

Now I would like to ask you about the types of food you and the members of your household ate during the day and night yesterday. You should mention only the food that was consumed in the hosehold yesterday, not outside of the household.

11) Dietary Diversity of the Household

What did your household eat yesterday in the house?	Mark all mentioned
Some bread, rize, noodles, crackers, barley, or other food made from quionoa, maize, wheat, or kiwicha?	❑
Potatoes, yucca, oca, ulluco, mashua, sweet potato, or some other food made from roots or tubers?	❑
Vegetables?	❑
Fruits?	❑
Meat from cow, pig, guinea pig, chicken, liver, kidney, heart, or other meat or organ?	❑
Eggs?	❑
Fish?	❑
Some food made from fava,peas, lentils, or other legume?	❑
Cheese, yogurt, milk, or other products made from milk?	❑
Foods with bases of oil, pig lard, or butter?	❑
Sugar or honey?	❑
Other foods like condiments, coffee, or tea?	❑

12) Now I would like to ask you about what the typical consumption behaviors of your household?

#	Question	How frequently did this occur?	
1	In the last 12 months, didyou worry that your household would not have enough to eat?	❑ 0 = Never ❑ 1 = Only 1 or 2 months	❑ 2 = Some Months (between 3 - 7 months) ❑ 3 = Almost every month (between 8 -12 months)
2	In the last 12 months, could you or any member of your household not eat your preferred foods because of a lack of resources?	❑ 0 = Never ❑ 1 = Only 1 or 2 months	❑ 2 = Some Months (between 3 - 7 months) ❑ 3 = Almost every month (between 8 -12 months)
3	In the last 12 months, did you or someone in your householdhave to eat a limited variety of food because of a lack of resources?	❑ 0 = Never ❑ 1 = Only 1 or 2 months	❑ 2 = Some Months (between 3 - 7 months) ❑ 3 = Almost every month (between 8 -12 months)
4	In the last 12 months, did you or any member of your household have to eat foods that you really did not want because of a lack of resources to obtain other types of food?	❑ 0 = Never ❑ 1 = Only 1 or 2 months	❑ 2 = Some Months (between 3 - 7 months) ❑ 3 = Almost every month (between 8 -12 months)
5	In the last 12 months, did you or someone in your household have to eat a smaller meal than what you felt was necessary because there were not enough resources?	❑ 0 = Never ❑ 1 = Only 1 or 2 months	❑ 2 = Some Months (between 3 - 7 months) ❑ 3 = Almost every month (between 8 -12 months)
6	In the last 12 months, did you or any member of your household have to eat fewer daily meals because there was not enough food?	❑ 0 = Never ❑ 1 = Only 1 or 2 months	❑ 2 = Some Months (between 3 - 7 months) ❑ 3 = Almost every month (between 8 -12 months)
7	In the last 12 months, at some point was there absolutely nothing to eat in your household because of a lack of resources?	❑ 0 = Never ❑ 1 = Only 1 or 2 months	❑ 2 = Some Months (between 3 - 7 months) ❑ 3 = Almost every month (between 8 -12 months)
8	In the last 12 months, did you or any member of your household have to go to sleep at night hungry because there were not enough resources?	❑ 0 = Never ❑ 1 = Only 1 or 2 months	❑ 2 = Some Months (between 3 - 7 months) ❑ 3 = Almost every month (between 8 -12 months)
9	In the last 12 months, did you or any member of your household go a whole day and niht without eating anything because there were not enough resources?	❑ 0 = Never ❑ 1 = Only 1 or 2 months	❑ 2 = Some Months (between 3 - 7 months) ❑ 3 = Almost every month (between 8 -12 months)

Now I would like to ask you about your household's participation in community activities with other community member outside of work.

13) Does any member of your household participate in a collective activity with other community members ouside of work?

❑ No ❑ Yes → If yes, in what organizations does your household participate?

Household Member	***Name of Organization***	***Type of Organization (use code below)***	***Role in the organization (use code below)***	***Number of hours each month dedicated to activity (use code below)***	***Level of participation (use code below)***

Type of Organization		**Participation**	**Number of Hours each Month**	**Level of Participation**
1 = Farmer Association	11 = Cultural Association	1 = President	1 = None	1 = Not Active
2 = Farmer Group	12 = Political Group	2 = Secretary	2 = Less tan 1 hour	2 = Somewhat Active
3 = Business Group	13 = Youth Group	3 = Treasure	3 = 1-4 hours	3 = Very Active
4 = Professional Association	14 = Women's Group	4= Other Administrative Position	4 = 5-10 hours	
5 = Credit/Finance Group	15 = APAFA	5 = Member	5 = More than 10 hours	
6 = Water Committee	16 = Health Committee			
7 = Basic Santitation Committee	17 = Sports Club			
8= Natural Resource Management Group	18 = Peasant Community			
9= NGO	19= Other			
10 = Religious Group				

14) Has any member in your household paricipated in a project outside of work with an NGO or government agency in the past? ❑No ❑Yes

→ **If yes:**

Which member of the household participated?:_____
What was the name of the NGO or government agency?: _____
How many years did your household participate?: _____
Could you explain to me the project?:
_____
_____
_____

Now I would like to ask you about the members of your household. As always, household means only those living with you in the house during at least six months of the year.

15) Is any member a peasant community member? ❑No ❑Yes

16) Please will you tell me about all the members who live in your household?

Member	Gender (use code below)	Age	Education (use code below)
1 = Household Head 2 = Husband/Wife 3 = Son 4 = Daughter 5 = Grandmother 6 = Grandfather 7= Other (Specify)	1 = Male 2 = Female		1 = None 2 = Incomplete Primary 3 = Complete Primary 4 = Incomplete Secondary 5 = Complete Secondary 6 = Incomplete Post-secondary 7 = Complete Post-secondary 8 = Other

17) Is there something else you would like to tell me about your household?

_____
_____
_____
_____
_____
_____

Thank You Very Much for your Participation

Appendix B

Interview Guides (Spanish and English)

COMMUNITY MEMBERS – SPANISH

Introdución y Objetivo: Buenos días/tarde. Yo soy un estudiante de La Universidad de Pennsylvania State en E.E.U.U. y me gustaría entrevistarle a Ud. sobre las experiencias que Ud. y los miembros de su hogar tienen para tratar de satisfacer sus necesidades por su alimento y sus ingresos. Me gustaría compartir partes de esta información con algunas organizaciones de desarrollo y el gobierno municipal para que puedan implementar programas que apoyan su hogar en ganarse la vida.

Confidencialidad: Las respuestas de Ud. son confidenciales. Su nombre y otra información de identificación no conectará a Ud. o los miembros de su hogar. Sus respuestas estarán incluidos juntos con las respuestas de otros hogares. Es decir que la infomación que me provee no estará conectado a Ud.

Duración: La entrevista debe tomar alrededor de 60 minutos.

Participación Voluntaria: Su decisión de participar en la entrevista es completamente voluntaria. No es necesario contestar ninguna pregunta que Ud. no desea contestar. Se puede dejar de participar en la entrevista en cualquier momento. Ud. debe tener dieciocho años o mayor para participar en este estudio.

Consentimiento: ¿Da su consentimiento para participar en este estudio? _____Sí
_____No

Cinta de Audio: Me gustaría grabar el audio de la entrevista. Yo soy el único que tendrá acceso a esta grabación. ¿Me da permiso grabar el audio de esta entrevista? ___Sí ___No

Datos de Identificación :

Comunidad: _____
Nombre de Respondiente: _____
Género de Respondiente:_____
Género del Jefe/ la Jefa del Hogar:_____
Contrato Participante con Pepsico: _____Sí _____No

1. Prácticas Agrícolas

a. ¿Me puede describir su finca y sus prácticas agrícolas?¿Consideraría Ud. las prácticas agrícolas que utiliza su hogar modernas o tradicionales?

b. **Para los hogares en el proyecto:** ¿Ha realizado su hogar cambios en sus prácticas agrícolas desde vender sus papas a PepsiCo?
Para los hogares no en el proyecto: ¿Ha realizado su hogar cambios en sus prácticas agrícolas en los últimos cinco años?

c.¿Cultiva su hogar papas nativas? ¿Por qué?

d. ¿Cuales características de sus prácticas agrícolas le dan orgullo?

e. ¿Cuáles son los cambios que le gustaría realizar en sus prácticas agrícolas? ¿Hay prácticas que ha dejado su hogar en los últimos cinco años que lamenta Ud.?¿Qué le gustaría hacer diferentemente en su finca en los próximos cinco años?

2. Experiencias de las Actividades Económicas

a. ¿Me puede describir los fuentes que utiliza su hogar para accesar la comida y los ingresos incluyendo agricultura? ¿Cuales miembros del hogar son responsables para cual tipo de trabajo?

b. ¿Ha habido un riesgo que tomó su hogar que fue éxitoso en los últimos cinco años? ¿Qué cambios le gustaría hacer su hogar en las maneras que accesa la comida y los ingresos?

c. ¿Cuáles son los factores que le apoyan a su hogar para lograr sus objetivos? ¿Cuáles son los factores que le impiden a su hogar lograr sus objetivos?

3. Experiencias de Seguridad Alimentaria

a. ¿Accesa su hogar suficiente comida para satisfacer sus necesidades? ¿Había un plazo de tiempo durante el año pasado cuando no tuvo su hogar suficiente comida? ¿Qué pasó y como resolvó la situación?

b. ¿Ha cambiado el tipo de comida que come típicamente su hogar en los últimos cinco años?¿Está comprando su hogar más comida para comer? ¿Están comiendo los miembros de su hogar nuevos tipos de comida? ¿Han dejado de comer los miembros de su hogar algunos tipos de comida?

4. Experiencias en el proyecto de FOVIDA

Para hogares en el proyecto:

a. ¿Por cuánto tiempo ha participado su hogar papas en el proyecto de FOVIDA? ¿Por qué tomó su hogar la decisión de participar en el proyecto al principio?

b. ¿Me puede describer los paso cuando vende a PepsiCo? ¿A Plaza Vea?

c. ¿Qué tan importante son los ingresos del proyecto de FOVIDA. a su hogar para accesar suficiente comida y dinero para sus necessidades?

d. ¿Cuáles son los beneficios principales de los mercados accesado por el proyecto de FOVIDA en comparación con los otros mercados que son disponibles?

e. ¿Por otro parte, cuáles son los principales dificultades de los mercados de FOVIDA? Me podría dar un ejemplo de un reto específico que ha enfrentado? (*Por ejemplo: producción, calidad, producto devuelto, tiempo de pago*).

f. ¿Tiene recomendiaciones para que FOVIDA puedan mejorar el proyecto? ¿Le gustaría que FOVIDA haga algo diferente particularmente? se

Para hogares no en el proyecto

a. ¿Vende su hogar papas en los mercados? ¿En cuáles? ¿Qué son los beneficios de estes mercados? ¿Las desventajas?

b. ¿A su hogar le interesa el proyecto de FOVIDA? ¿Qué es deseable? ¿Hay algo que causa preocupación?

COMMUNITY MEMBERS –ENGLISH

Introduction and Objective: Good morning/afternoon. I am a student from Penn State University in the United States. I would like to inverview you about the experiences that you and your household members have in order to satisfy your basic food and income needs. I would like to share parts of this information with some development organizations and the municipal government so that they can implement programs that help your household make a living.

Confidentiality: Your responses are confidential. Your name and other information will not be connected to you or your members. In other words, the information you provide me will not be connected with you.

Duration: The interview should last about 60 minutes.

Voluntary Participation: Your decision to participate in this interview is completely voluntary. It is not necessary to answer any question you would rather not answer. You can stop participating in the interview at any time. You should have eighteen years or more to participate in this study.

Consent: Do you give consent to participate in this study? _____Yes
_____No

Audiorecording: I would like to audiotape the interview. I am the only one who will have access to this recording. Do you give me permission to audiorecorde this interview?
___Yes ___No

Identification Data:

Community: _____
Respondent Name: _____
Respondent Gender:_____
Gender of Household Head:_____
Project Participat: _____Yes _____No

1. Agricultural Practices

a. Can you describe to me your agricultural practices? Do you consider them modern or traditonal?

b. **For households in the project:** Has you household changed your agricultural practices since participating in the FOVIDA project?
For households not in the project: Has your household changed your agricultural practices in the last 5 years?

c. Does your household cultivate native potatoes? Why or why not?

d. Which characteristics of your agricultural practices give you pride?

e. What changes would you like to make in your agricultural practices? Have there been activities you have stopped doing in the last five years? What would you like to be doing differently in five years?

2. Livelihood Activities

a. Can you describe to me the sources by which your households accesesed food and income including agriculture? Which household members are responsible for each type of work?

b. Has there been a risk in the last five years your household took that was successful? What changes would your like your household to make in the ways it accesses food and income?

c. What are the factors which support your household in achieving its objectives? What are the factors that impede your household in achieving its objectives?

3. Food Security Experience

a. Does your household access sufficient food in order to satisfy its needs? Was there a time during the past year when your household did not have sufficient food? What happened and how was the situation resolved?

b. ¿Has the type of food that your household typically eats changed during the course of your lifetime? Is your household purchasing more food to eat?Are new types of food being eaten? Has your household stopped eating other types of food?

4. Experiences in the FOVIDA project

For households in the project:

a. How many years have you participated in the FOVIDA project? Why did you decide to participate initially?

b. Can you explain to me what the steps are when you sell to PepsiCo.? To Plaza Vea?

c. How important are the sales from the FOVIDA project to your household is accessing sufficient food and money for necessities?

d. What are some of the primary benefits to the markets accessed through the FOVIDA project as opposed to other possible market outlets?

e. On the other hand, what are some of the principal difficulies presented by the FOVIDA market outlets? Can you tell me about a time when you experienced one of these challenges? (*For example: production, quality, product rejects, time of payment*).

f. Do you have recommendations for FOVIDA to improve the project? Would you like FOVIDA to do anything differently in particular?

For households not in the project:

a. Does your household sell in markets? In which ones? What are the benefits of these markets? The drawbacks?

b. Is your household interested in the FOVIDA project? What is desirable? Are there things things that would cause you to worry?

FOVIDA – SPANISH

Introdución y Objetivo: Buenos días/tarde. Yo soy un estudiante de La Universidad de Pennsylvania State en E.E.U.U. me gustaría entrevistarle a Ud. sobre las experiencias que Ud. y FOVIDA ha tenido con el proyecto con productores pequeños productores para vender sus papas nativas a PepsiCo y Plaza Vea. Mi intención es compartir los resultos y mis recomendaciones con Uds. para que pueda mejorar el proyecto.

Confidencialidad: Las respuestas de Ud. son confidenciales.

Duración: La entrevista debe tomar alrededor de 60 minutos.

Participación Voluntaria: Su decisión de participar en la entrevista es completamente voluntaria. No es necesario contestar ninguna pregunta que Ud. no desea contestar. Se puede dejar de participar en la entrevista en cualquier momento. Ud. debe tener dieciocho años o mayor para participar en este estudio.

Consentimiento: ¿Da su consentimiento para participar en este estudio? _____Sí
_____No

Cinta de Audio: Me gustaría grabar el audio de la entrevista. Yo soy el único que tendrá acceso a esta grabación. ¿Me da permiso grabar el audio de esta entrevista? ___Sí ___No

1) ¿Qué es la intención del proyecto? ¿Por qué las papas nativas le interesa a FOVIDA?

2) ¿Cómo empezó el proyecto? ¿Cómo ha cambiado el proyecto desde el principio? ¿En qué sentido?

3) ¿Como inicío las relaciones con PepsiCo y Plaza Vea? ¿Como diferencia la relación entre FOVIDA y PepsiCo y entre FOVIDA y Plaza Vea? Cuales los beneficios y retos de cada relación? ¿Qué son las responsibilidades de FOVIDA? ¿De las compañias?

4) ¿Cuales son las ventajas de estos mercados para los productores? ¿Las desventajas? ¿Cuales exítos ha tenido el proyect hasta aquí? ¿Y fallas?

5) ¿Cómo escogío FOVIDA los productores que participan en el proyecto? ¿Por qué FOVIDA solamente trajabas con asociaciones y no individuales? ¿Qué son las responsibilidades de FOVIDA? ¿De las asociaciones? ¿Comó funciona las asociaciones?

6) ¿Qué es el proceso para entregar las papas nativas a PepsiCo? ¿A Plaza Vea? ¿Qué pasa si la entrega es rechazado? ¿Qué hace FOVIDA?

7) ¿Porque las relaciones formales existen entre las compañias y FOVIDA y no entre los productores y las compañias?

8) ¿De su perspectiva, qué es el rol actual de FOVIDA? ¿Qué debe ser el rol de FOVIDA en cinco años? ¿Qué son los roles de las compañias y que debe ser sus roles en cinco años? ¿Qué son los roles de los productores y que debe ser sus roles en cinco años?

9) ¿Qué significa responsibilidad social de empresas a Ud.? ¿Piensa que el producto de papas nativas pertenece a la responsibilidad social de empresas?

10) ¿De su perspectiva, cómo FOVIDA podría mejorar su trabajo? Cómo pueden mejorar sus trabajos los productores pequeños? ¿Y las compañias?

11) ¿Para asegurar la sostenibilidad del proyecto, que tiene que cambiar exactamente? ¿Cuáles cosas deben seguir haciendo para tener éxito?

FOVIDA – ENGLISH

Introduction and Objective: Good morning/afternoon. I am a student from Penn State University in the United States, and I would like to inverview you about the experiences that you and FOVIDA have had with the project with smallholding farmers to sell their native potatoes to PepsiCo and Plaza. My intention is to share the findings and recommendations with FOVIDA in order to improve the project.

Confidentiality: Your responses are confidential.

Duration: The interview should last about 60 minutes.

Voluntary Participation: Your decision to participate in this interview is completely voluntary. It is not necessary to answer any question you would rather not answer. You can stop participating in the interview at any time. You should have eighteen years or more to participate in this study.

Consent: Do you give consent to participate in this study? ____Yes _____No

Audiorecording: I would like to audiotape the interview. I am the only one who will have access to this recording. Do you give me permission to audiorecorde this interview? ___Yes ___No

1) What is the intention of the project? Why do native potatoes interest FOVIDA?

2) How did the project start? What changes has the project undergone since te beginning? In what ways?

3) How did your relationships start with PepsiCo and Plaza Vea? What is the difference between the relationship between FOVIDA and PepsiCo and FOVIDA and Plaza Vea? What are the benefits and challenges of each relationship? What are the responsiblities of FOVIDA? Of the companies?

4) What are the advantages of these markets for producers? The disadvantages? What successes has the project had so far? What failures?

5) How did FOVIDA select the producers to participate in the project? Why does FOVIDA only work with associations and not individuals? What are the responsiblities of FOVIDA? Of the associations? How do the associations functipm?

6) What is the process to deliver native potatoes to PepsiCo? To Plaza Vea? What happens if the delivery is rejected? What does FOVIDA do?

7) Why do the formal relationships exist between the companies and FOVIDA and not between the producers and the companies?

8) From your perspecitve, what is the actual role of FOVIDA? What should its role be in five years? What are the roles of the companies and what should they be in five years? What are the roles of the producers and what should they be in five years?

9) What does corporate social responsibility mean to you? Do you think the native potato products pertain to corporate social responsibility?

10) From your perspective, how could FOVIDA improve its work? How could the smallholding farmers improve their work? And the companies?

11) In order to achieve sustainability of the project, what needs to change exactly? What are the things that should keep happening to have success?

PEPSICO/PLAZA VEA - SPANISH

Introdución y Objetivo: Buenos días/tarde. Yo soy un estudiante de La Universidad de Pennsylvania State en E.E.U.U. y me gustaría entrevistarle a Ud. sobre las experiencias que Ud. y su compañía han tenido desde comprar papas nativas de FOVIDA, la cual obtiene las papas nativas de pequeños productors. Me gustaría compartir partes de esta información con algunas organizaciones de desarrollo para que puedan mejorar el proyecto.

Confidencialidad: Las respuestas de Ud. son confidenciales.

Duración: La entrevista debe tomar alrededor de 60 minutos.

Participación Voluntaria: Su decisión de participar en la entrevista es completamente voluntaria. No es necesario contestar ninguna pregunta que Ud. no desea contestar. Se puede dejar de participar en la entrevista en cualquier momento. Ud. debe tener dieciocho años o mayor para participar en este estudio.

Consentimiento: ¿Da su consentimiento para participar en este estudio? _____Sí _____No

Cinta de Audio: Me gustaría grabar el audio de la entrevista. Yo soy el único que tendrá acceso a esta grabación. ¿Me da permiso grabar el audio de esta entrevista? ___Sí ___No

1) ¿Porqué le interesan a su compañía las papas nativas? ¿Cuáles ventajas hay para tener papas nativas como producto? ¿Cómo escogió su compañía las variedades de papas nativas? ¿Qué fue el proceso?

2) ¿Cómo empezó la relación entre FOVIDA y su compañía?

3) ¿Cómo funciona la compra de papas nativas? Hay contrato? ¿En caso afirmativo, que son las condiciones del contrato? ¿Qué son los castigos su compañía aplica del contrato? ¿Alguna vez tenía que aplicar estos castigos del contrato a FOVIDA y/o a un productor(es)?

4) ¿Cómo sale la venta de su(s) (producto de) papas nativas? ¿Piensa que su compañía logra crear un nicho en el mercado con este producto?

5) ¿Cómo funciona la relación entre su compañía y FOVIDA? ¿Porqué su compañía trabaja directamente con FOVIDA y no con los pequeños productores?

6) ¿De su perspectiva, cuáles son las ventajas para los productores de vender sus papas a su compañía? ¿También desde su perspectiva, cuáles son las dificultades para los productores de vender sus papas a su compañía?

7) ¿Cuáles son los riesgos para su compañía comprar papas nativas de pequeños productores?

8) ¿Qué significa responsibilidad social de empresas a Ud.? ¿Piensa que su producto de papas nativas pertenece a la responsibilidad social de empresas?

9) ¿De su perspectiva, cómo FOVIDA podría mejorar su trabajo? Cómo pueden mejorar su trabajo los productores pequeños? ¿Es posible que su compañía pueda apoyar a FOVIDA y/o a los productores pequeños a realizar estos mejoramientos? ¿En cuáles sentidos?

PEPSICO/PLAZA VEA - ENGLISH

Introduction and Objective: Good morning/afternoon. I am a student from Penn State University in the United States. I would like to inverview you about the experiences that you and your company have had since purcasing native potatoes from FOVIDA, which sources them from smallholding farmers. I would like to share parts of this information with some development organizations so that they can implement programs to help improve the project.

Confidentiality: Your responses are confidential.

Duration: The interview should last about 60 minutes.

Voluntary Participation: Your decision to participate in this interview is completely voluntary. It is not necessary to answer any question you would rather not answer. You can stop participating in the interview at any time. You should have eighteen years or more to participate in this study.

Consent: Do you give consent to participate in this study? _____Yes _____No

Audiorecording: I would like to audiotape the interview. I am the only one who will have access to this recording. Do you give me permission to audiorecorde this interview? ___Yes
___No

1) Why was your company interested in native potatoes? What are the advantages to have native potato products? How did your company select the native potato varieties? What was the process?

2) How did your company's relationships start with FOVIDA?

3) How does the purchase of native potatoes function? Is there a contract? If so, what are the conditions of the contract? What are the contract penalties your company can apply? Have you ever had to penalize FOVIDA or a producer?

4) How well are you selling your native potato products? Do you think your company is able to create a niche in the market for this product?

5) How is the relationship between your company and FOVIDA? Why does your company work directly with FOVIDA and not the smallholding farmers?

6) From your perspective of, what are the advantages for smallholding producers to selling native potatoes? From your perspective, what are the difficulties for the smallholding producers to sell their potatoes to your company?

7) What are the risks for your company in buying native potatoes from smallholding farmers?

8) What does corporate social responsibility mean to you? Do you think that native potato products pertain to corporate social responsibility?

9) From your perspective, how can FOVIDA improve its work? How can the smallholding farmers improve their work? Is it possible for your company to suport FOVIDA and/or the farmers to help them attain these improvements? In what ways?

Appendix C

Images



Image I. Photo by author, May 6, 2013.
Some of the colored-flesh native varieties to PepsiCo.



Image II. Photo by author, October 5, 2013.
A few of the 300 native potato varieties cultivated by a household in Chaki Takia



Image III. Photo by Author, November 27, 2013.
Mounding potatoes in the highlands above Chaki Takia.

Appendix D

Regression Models

Model 1 (16 Independent Variables)		
	Standardized Regression Coefficients	Significance
Project Participation	.134	.177
On-farm Diversification		
# of Land Parcels (Lg)	-.184	.127
# of Crops (Lg)	-.229	.027
#of Native Potato Varieties (Lg)	.097	.347
# of Animal Types	.229	.034
Activity Diversification		
Composite Score	.146	.116
Social Interaction		
Composite Score	.167	.097
Household Demographics		
Household Structure	.000	1.000
Size of Household	-.101	.346
Age of Head	.125	.334
Age Dependency	-.097	.325
Education Status of Household Head	.133	.258
Animal Value Dummy 1 (1=S/1,000 -4,999)	-.064	.604
Animal Value 2 (1=S/0 – 999)	-.087	.568
Land Size Dummy 1 (1= ≥ 0.5 ha)	.081	.494
Land Size Dummy 2 (1=0.25 – 0.49 ha)	.100	.312
R^2 Adjusted	.217	.224
F Value	3.11*	3.35*
Cases	123	123

*Significant at $p < .05$

Model 2 (15 Independent Variables)		
	Standardized Regression Coefficients	Significance
Project Participation	.134	.174
On-farm Diversification		
# of Land Parcels (Lg)	-.184	.123
# of Crops (Lg)	-.229	.027
#of Native Potato Varieties (Lg)	.097	.345
# of Animal Types	.229	.034
Activity Diversification		
Composite Score	.146	.113
Social Interaction		
Composite Score	.167	.095
Household Demographics		
Household Structure	--	--
Size of Household	-.101	.298
Age of Head	.125	.327
Age Dependency	-.097	.321
Education Status of Household Head	.133	.209
Animal Value Dummy 1 (1=S/1,000 –4,999)	-.064	.601
Animal Value 2 (1=S/0 – 999)	-.087	.566
Land Size Dummy 1 (1= ≥ 0.5 ha)	.081	.482
Land Size Dummy 2 (1=0.25 – 0.49 ha)	.100	.304
R^2 Adjusted	.224	
F Value	3.35*	
Cases	123	

*Significant at $p < .001$

Model 3 (14 Independent Variables)		
	Standardized Regression Coefficients	Significance
Project Participation	.155	.098
On-farm Diversification		
# of Land Parcels (Lg)	-.141	.167
# of Crops (Lg)	-.236	.022
#of Native Potato Varieties (Lg)	.097	.339
# of Animal Types	.222	.038
Activity Diversification		
Composite Score	.147	.112
Social Interaction		
Composite Score	.155	.114
Household Demographics		
Household Structure	--	--
Size of Household	-.155	.223
Age of Head	.114	.368
Age Dependency	-.097	.321
Education Status of Household Head	.129	.221
Animal Value Dummy 1 (1=S/1,000 – 4,999)	-.084	.485
Animal Value 2 (1=S/0 – 999)	-.115	.429
Land Size Dummy 1 (1= ≥ 0.5 ha)	---	---
Land Size Dummy 2 (1=0.25 – 0.49 ha)	.069	425
R^2 Adjusted	.228	
F Value	3.57*	
Cases	123	

*Significant at $p < .001$

Model 4 (13 Independent Variables)		
	Standardized Regression Coefficients	Significance
Project Participation	.162	.080
On-farm Diversification		
# of Land Parcels (Lg)	-.123	.219
# of Crops (Lg)	-.249	.014
#of Native Potato Varieties (Lg)	.094	.354
# of Animal Types	.226	.032
Activity Diversification		
Composite Score	.139	.128
Social Interaction		
Composite Score	.164	.090
Household Demographics		
Household Structure	--	--
Size of Household	-.105	.263
Age of Head	.089	.469
Age Dependency	-.072	.452
Education Status of Household Head	.135	.199
Animal Value Dummy 1 (1=S/1,000 – 4,999)	-.074	.528
Animal Value 2 (1=S/0 – 999)	-.111	.437
Land Size Dummy 1 (1= ≥ 0.5 ha)	---	---
Land Size Dummy 2 (1=0.25 – 0.49 ha)	---	---
R^2 Adjusted	.225	
F Value	3.76*	
Cases	125	

*Significant at $p < .001$

Model 5 (12 Independent Variables)		
	Standardized Regression Coefficients	Significance
Project Participation	.175	.052
On-farm Diversification		
# of Land Parcels (Lg)	-.122	.222
# of Crops (Lg)	-.249	.014
#of Native Potato Varieties (Lg)	.099	.326
# of Animal Types	.242	.018
Activity Diversification		
Composite Score	.131	.146
Social Interaction		
Composite Score	.175	.067
Household Demographics		
Household Structure	--	--
Size of Household	-.111	.231
Age of Head	.101	.408
Age Dependency	-.078	.412
Education Status of Household Head	.143	.173
Animal Value Dummy 1 (1=S/1,000 – 4,999)	---	---
Animal Value 2 (1=S/0 – 999)	-.111	.437
Land Size Dummy 1 (1= ≥ 0.5 ha)	---	---
Land Size Dummy 2 (1=0.25 – 0.49 ha)	---	---
R^2 Adjusted	.229	
F Value	4.06*	
Cases	125	

*Significant at $p < .001$

Model 6 (11 Independent Variables)		
	Standardized Regression Coefficients	Significance
Project Participation	.173	.052
On-farm Diversification		
# of Land Parcels (Lg)	-.122	.220
# of Crops (Lg)	-.222	.023
#of Native Potato Varieties (Lg)	.080	.422
# of Animal Types	.245	.009
Activity Diversification		
Composite Score	.128	.146
Social Interaction		
Composite Score	.190	.038
Household Demographics		
Household Structure	--	--
Size of Household	-.112	.213
Age of Head	.103	.388
Age Dependency	-.106	.249
Education Status of Household Head	.131	.200
Animal Value Dummy 1 (1=S/1,000 – 4,999)	---	---
Animal Value 2 (1=S/0 – 999)	---	---
Land Size Dummy 1 (1= ≥ 0.5 ha)	---	---
Land Size Dummy 2 (1=0.25 – 0.49 ha)	---	---
R^2 Adjusted	.225	
F Value	4.38*	
Cases	129	

*Significant at $p < .001$

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Awards

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2012 Andrew V. Kozak Memorial Graduate Fellowship for Leadership, Research, and Public Service, The Pennsylvania State University
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Selected Publications

Tobin, D., Thomson, J., LaBorde, L., & Radhakrishna, R. (2013). Factors affecting growers' on-farm food safety practices: Evaluation findings from Penn State Extension programming. *Food Control, 33*(1), 73-80.

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