

Feeding local economies:
Bolivia's edible biocultural heritage and rural
territorial development

by

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Abstract

The biocultural heritage and diversity of localised food systems are resources that some communities, governments and other actors are mobilising to pursue their development objectives. However, further understanding is needed to determine how regimes of access and benefit surrounding this collectively held heritage are affected by its use in development projects. This dissertation examines rural development involving interventions in the food systems of the Central Valley of Tarija, Bolivia, and the ripple effects on the people who depend on these systems for their survival as producers, intermediaries and consumers. Core themes relate to personal histories and experiences of change and continuity in household economies and diet, and the role of biocultural heritage within localised food systems. These are examined in relation to processes of territorial construction and ordering through development programs and less planned processes of global and environmental change. Data were gathered through a food systems methodology, acknowledging the complex, interdependent relationships among production, transformation, exchange and consumption. The primary methods used were semi-structured interviews with local producers, intermediaries, consumers and government and non-governmental organisation key informants, complemented by participant observation, surveys, and document review. I found edible biocultural heritage to be a key resource in territorial projects seeking to alter current and future conditions of the Central Valley territory. From the 1970s onward, agricultural production possibilities available to research participant households have narrowed because of land enclosures, market integration, and other intersecting factors ultimately favouring transition towards commodity production (Chapter 2). Some smallholder viticulturalists, however, have incorporated grape production within multi-species agroecosystems to balance the risks and benefits of participation in the expanding commercial sector (Chapter 3). Edible biocultural heritage is being mobilised within multiple territorial projects in the Central Valley, including a gourmet project (Chapter 4) and an alternative food network around campesino gastronomic heritage (Chapter 5), with distinct ecological, economic and sociocultural implications. Whose heritage (or aspects of heritage) is carried forward and given precedence within development processes, and whose is rendered less viable and visible, has significant impacts on food systems' form and function, the representations of local identity they manifest and the livelihood possibilities they entail.

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Chapter 1: Introduction

1.1 Introduction

Development – broadly understood as a process of intentional social change often with opaque goals of ‘improvement’, ‘progress’, ‘modernisation’ or simply ‘building a better life’ – has arguably been one of the most powerful discourses of the late 20th and early 21st centuries, underwriting societal and environmental transformations around the globe. What constitutes a better life or better society, what acceptable trade-offs are, and whose criteria are used to frame such judgements are equally persistent subjects of social struggle and academic inquiry. A particular concern relates with how rural peoples, their ways of life and the cultivated and uncultivated environments that constitute their food systems are experiencing, responding to and engaging with externally and internally driven development processes.

This dissertation examines rural development involving interventions in food systems of the Central Valley of the Tarija Department of southern Bolivia and the ripple effects on the people who depend on those systems for their survival as producers, intermediaries and consumers. Core themes relate to personal histories and experiences of change and continuity in household economies and diet and the production, reproduction and circulation of biocultural heritage within localised food systems. These are examined in relation to processes of territorial construction and ordering through development programs and broader, less planned processes of global social and environmental change and how these shape ways of life and the range of livelihood possibilities available to local people. These themes are woven together in different configurations in the four findings chapters that comprise the body of this dissertation.

Following an overview of the framework of analysis and methods presented in Chapter 1, Chapter 2 examines historical shifts in the production strategies of campesino households in relation to processes of sub-regional specialisation in commodity production. Chapter 3 documents how some campesino producers have incorporated commercial viticulture as part of their production systems that also include commercial and subsistence crops and livestock. Chapters 4 and 5 develop a biocultural sustainability framework to examine two co-occurring strategies using edible biocultural heritage as

central resources in rural development. Chapter 4 focuses on a territorial development strategy aimed at building a competitive advantage for the Central Valley based on gourmet food production, while Chapter 5 examines a valorisation process promoting campesino food heritage within the local economy. The four perspectives on rural development and food systems offered in Chapters 2 to 5 allow an examination of changing relations among edible biocultural materials, local economies and ways of life in the Central Valley and the meanings of these changes for the people living there. Finally, Chapter 6 reflects upon the contributions of this research to understanding the relationships between edible biocultural heritage and rural territorial development processes in the Central Valley.

1.2 Research purpose, objectives and focal questions

The purpose of this study was to examine how rural development processes have shaped the food system of Tarija's Central Valley, and what these processes of change and continuity in biocultural heritage use have meant for those engaged as producers, intermediaries and consumers in the localised food-based economy. The specific objectives were to:

1. Document the recent history (c. 1950 to the present) of the study area through the lens of the food system.
2. Document the components and dynamics of the contemporary food system.
3. Analyse the characteristics and forms of rural development connected with the use of edible biocultural heritage and their meanings for communities and households in the Central Valley.

These objectives formed the primary rubric around which data were collected. (Details of the research methodology and data collection procedures are elaborated on in Section 1.4.) As the research and chapter manuscripts evolved, each paper came to focus on a specific question touching on and sometimes bridging these objectives and the data associated with them. Chapter 2 picks up on themes from Objective 1, while themes from Objectives 2 and 3 are the primary focus of Chapters 3, 4 and 5. In Chapter 6, I return to the objectives and draw out from each chapter the main findings related to the objectives and research purpose.

1.3 Framework of analysis and literature review

This research centres on local experiences and perspectives on change and continuity within the localised food system of Tarija's Central Valley in relation to rural development projects that have taken place there over many decades. A fundamental question in approaching this subject is why look at processes of rural development through the lens of food and food systems? In many respects, it is an obvious pairing because of the historical and continuing importance of agricultural production in rural areas, the central role of food in local economies and the focus on agriculture and food production within rural development programs. Using food systems as an analytical lens, however, also has the advantage of directing attention beyond the realm of primary production, which has often been the focus of rural development interventions and evaluation, to the relationships among production and processes of transformation, exchange and consumption and how individuals and households engage with biocultural materials in these different domains of daily life.

By examining the flows of materials and the actors involved in each of the linked domains of the localised food system, a more complex picture is generated of how intentional change through rural development activities directly associated with one aspect of a food system, such as promoting market-oriented production, has ripple effects, both intended and unintended, on other aspects of the system as well. These secondary impacts often intimately touch people's lives through their allocation of labour and sense of identity reflected in where foods originate, how and by whom they are produced, what sociocultural meanings are attached to them, how they are prepared, whom they are shared with and under what conditions they are shared. Food becomes a tangible touchstone for individuals and households to discuss and reflect upon their changing relationships with the local environment, biodiversity, and each other in different dimensions of daily life, and how associated shifts are perceived, experienced, responded to and navigated.

This project builds on previous work on processes of change, continuity and innovation surrounding the use of biodiversity and other local resources undertaken at the Natural Resources Institute at the University of Manitoba (c.f. Davidson-Hunt et al., 2012; Davidson-Hunt, Idrobo, & Turner, Submitted; Davidson-Hunt & Turner, 2012;

Idrobo Medina, 2014; Kuzivanova, 2016; Sylvester, 2016). It is also inspired by a long tradition of work on the anthropology of food and political economy analysing complex social processes through the lens of selected commodities, their journeys from sites of production, through transformation, exchange and consumption and their significance for the people and environments they interact with (c.f. Mintz, 1986; Topik, Marichal, & Frank, 2006; Wolf, 1982). Within contemporary rural societies, “development” as discourse and practice is one of the dominant forces shaping economies, foodways and processes of change and continuity within them. Drawing on insights from the interdisciplinary fields of development theory, bringing together work from anthropology, sociology, political economy and geography, and biocultural diversity and heritage, with roots in ethnobiology and ethnoecology, I examine rural development endeavours as expressions of territorial projects, which reflect ideas about the organisation of society, allocation of resources, and values related with identity (Escobar, 2008).

The following sub-section examines central concepts informing my framework of analysis. It begins by defining food systems and proceeds to unpack the key components in the subsequent sections. These include: situating food as a material outcome of processes of production reflecting situated human-environment (or biocultural) relationships; conceptualising food as edible biocultural heritage; and examining the articulation of food as a resource in rural economic development through processes of territorial ordering.

1.3.1 Defining localised food systems

There are multiple approaches to studying food. Some of these, such as food chains, food webs, food cycles and food contexts, focus only on single components or disciplinary interests (Sobal, Khan, & Bisogni, 1998). In this work, I adopt a systems approach for considering the relationships between food and society that allows for a more complex framework of analysis (Hinrichs, 2003; Lang & Heasman, 2004; Sobal et al., 1998). Food systems, at the broadest level of definition, are constituted by intersections among diverse processes of production, exchange, and consumption that allow energy from the sun and nutrients from many sources to be transformed and accessed by human beings (Lang & Heasman, 2004). The multiplicity of ways in which such processes are constructed,

adapted, and endowed with meaning by populations in different times and places engender food systems with a significance that transcends their utility in providing caloric energy and situates them as key constituents of local economies, ways of life and aspects of individual and collective identity. As a result, changes to a food system ensuing from planned development interventions, or less planned processes of global and environmental change, have wide ranging impacts on ways of life, local environments and society at large.

Within this framing, food systems are heterogeneous, dynamic, and biocultural processes with substantive and subjective implications for those producers, intermediaries and consumers who depend on them both directly and indirectly. For the purposes of this research, food systems are the biological materials, norms and networks associated with food production, exchange and consumption embedded in processes of territorial ordering that may exist at multiple, intersecting levels (Figure 1). Territorial ordering is an effect of social practices inside and outside the territory that stabilize patterns of relationships, including resource use, access and identity (Brighenti, 2010; Painter, 2006, 2010), and reflect the territorial projects of different groups of actors (Hinojosa et al., 2015). The organisation of a territorial space intimately affects the food systems nested within it by shaping modes of agricultural production, trade relationships and internal and external flows of materials, and consequently how people within that territory access and relate with the foods they consume. The history, norms, processes and possibilities food systems embody have wide-ranging ecological, sociocultural, political, and economic significance that reflect the interplays of power within and between societies (Mazoyer & Roudart, 2006; Mintz, 1986, 1996; Scott, 1976; Strandage, 2006; Wolf, 1969).

My use of the term ‘localised food systems’ builds on the work of Pimbert (2010, p. 8), who explains that localised food systems:

...start at the household level and expand to neighbourhoods, municipal and regional levels. Food systems include not just the production aspects of food but also processing, distribution, access, use, recycling and waste. They include the actors that both participate in and benefit from these activities.

I use the adjective *localised* to suggest that local, or territorial, food systems are not naturally bounded units. Rather, they consist of multidimensional biocultural resource networks that may be more or less densely related through particular nodes of interaction

and are shaped by internally and externally driven processes of territorial creation, including planned development interventions.

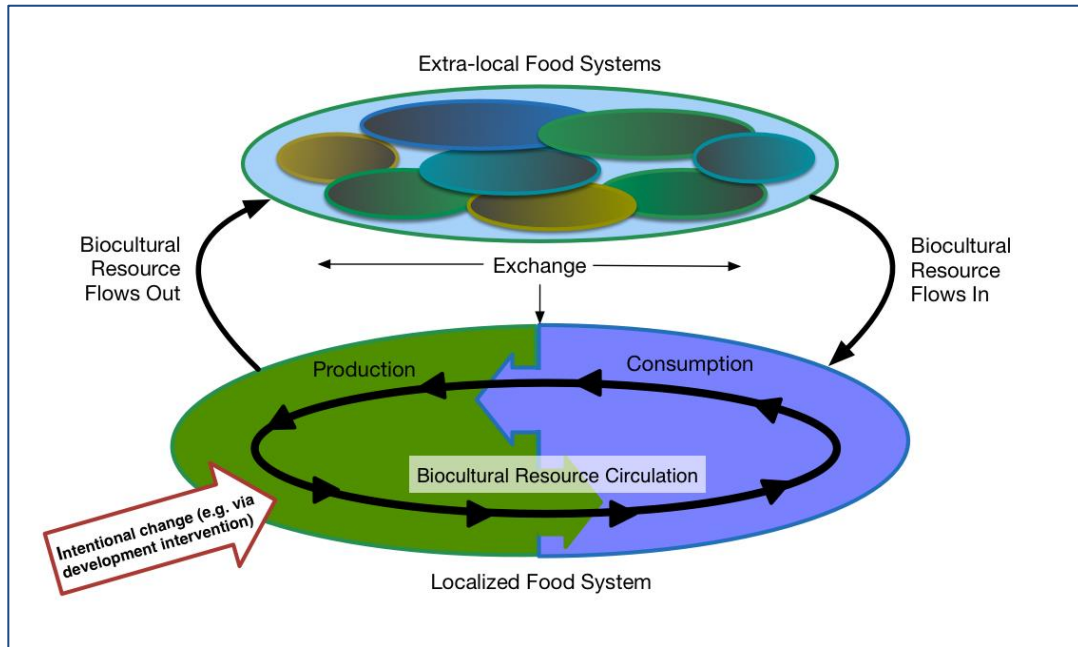


Figure 1. Analytical model of a localised food system embedded in territory and connected through exchange to extra-local food systems operating at different scales.

1.3.1.1 Defining collective biocultural heritage and edible biocultural heritage

Processes of co-construction between humans and environment are increasingly credited with generating and sustaining much of the diversity of life and landscapes found on Earth (see overview in Anderson, Pearsall, Hunn, & Turner, 2011). This synergistic human-environment relationship has been recognised in a range of scholarly work (See reviews in Davidson-Hunt & Berkes, 2003; Maffi, 2005), including concepts of biocultural diversity and heritage (Davidson-Hunt et al., 2012; Swiderska, 2006).¹ Through sustained and evolving interactions, unique expressions of collective biocultural heritage of peoples and places emerge and are endowed with all of the social and individual meanings these processes embody (i.e. the cumulative material products of human-environment relations). Specifically, collective biocultural heritage refers to:

Knowledge, innovations and practices of indigenous and local communities which are collectively held and inextricably linked to traditional resources and

¹ Other parallels are found in social-ecological systems (Berkes, Colding, & Folke, 2003), the human-in-environment/dwelling perspective (Ingold, 2000, 2011), processual ethnobiology (Heckler, 2009) and theories of practice (Jones & Murphy, 2011).

territories, local economies, the diversity of genes, varieties, species and ecosystems, cultural and spiritual values, and customary laws shaped within the socio-ecological context of communities (Swiderska, 2006, p. 3).

Biocultural heritage approaches focus on the development of *sui generis* strategies, such as community biocultural protocols (Bavikatte & Jonas, 2009; Swiderska et al., 2012) and biocultural design (Davidson-Hunt et al., 2012), to support community efforts to protect and use their biocultural heritage to further their needs and interests. The rights of local and Indigenous Peoples to self-determination is a fundamental tenant of such approaches.

The language of heritage also shifts the concept from a metric of diversity (e.g. the richness of species or languages in a given area) to highlight the historical co-constructing processes by which biocultural diversity is generated. In his discussion of cultural heritage commons, Gonzáles (2015) outlines two modes of heritage commons: the first as something pre-existing the individual and the second as a productive force in which heritage is put to work as a material or symbolic resource in social projects. With this idea in mind, biocultural diversity may be seen as a manifestation of biocultural heritage and as a set of resources that communities may mobilise toward addressing their current and future needs, desires and aspirations (Davidson-Hunt et al., 2012).

Biocultural heritage and regimes of access surrounding it (see Ribot and Peluso, 2003) are also shaped by power relations and political forces reflecting how that heritage is mobilised by groups of actors to pursue their interests and visions for the future (see section 1.3.2.1 and discussions in Chapter 4 and 5).

Biocultural heritage, manifest in the lifeways and productive activities of individuals and the organisation of society, informs the context in which new processes of production and reproduction take place. The material and social processes that create a food system, therefore, are a product of biocultural heritage, including ideas and practices related to what is edible and desirable to eat and what is not. Consequently, the edibility of food – the ideas and practices that turn a biophysical organism into a resource – exists in direct relation to the biocultural heritage of a particular population. What I term *edible biocultural heritage* parallels what Kuhnlein et al. (2006, p. 19) describe as a traditional food system, defined as:

[A]ll food from a particular culture available from local resources and culturally accepted. It includes sociocultural meanings, acquisition/processing techniques, use, composition, and nutritional consequences for people using the food.

The materials available to create a traditional food system reflect both the biophysical characteristics of a place as well as the role humans play in changing those characteristics through habitat creation and population management, domestication, and/or trade of genetic materials (Anderson et al., 2011). In short, traditional food systems are biocultural processes, dependent on local ecosystems, that evolve over time.

Etkin (2009, p. 206) argues that a biocultural perspective is essential to an integrated approach to studying food because it:

...reflects an understanding that the tangible characteristics and physiologic effects of all aspects of foods and beverages (production/collection, transformation, circulation and consumption) both undergird and are influenced by their cultural constructions and social transactions.

Similarly, Hadley and Wutich (2009) argue that biocultural heritage is so vital to individual experience that recognising the role of culture in determining what is edible, in what amounts and under what conditions, alters the meaning and measure of concepts such as food security and water security (i.e. the basic requirements for a healthy life). The authors found that the embodiment of biocultural needs for water and food were different from and could not be adequately captured by biological measures of need. In summary, edible biocultural heritage is the product of sustained engagement between people and environments that has given rise to the distinct configurations of food systems evident over human history. Practical engagement (as producers, consumers and intermediaries) with the social-ecological environment persists as the mechanism by which contemporary processes of change and continuity within food systems and other aspects of daily life are experienced, negotiated and responded to (Jones & Murphy, 2011), including within contexts of global and environmental change (Zimmerer, 2010).

1.3.1.2 Human-environment relations, production and food systems

The term *biocultural* has taken root in many veins of scholarship and the work packages of international organisations in recent decades to express what the International Society of Ethnobiology (ISE, 1988) describes as the ‘inextricable link’ between human societies and their environments (Davidson-Hunt et al., 2012). Concepts of production as

articulated in Marxist political economy provide an analytical lens for considering how biocultural systems come into being, and enrich understandings of food and food systems as products of the sustained, situated engagement linking peoples and their environments.

Through the theoretical lens of Marxist political economy, what food systems are, how they are formed, sustained and adapted over time, and what they come to mean, are rooted in foundational concepts linking humans and environment. Within this framing, there are always consequences of human activity, whether foreseen, unintended or otherwise, and it is the end goals of this activity that are identified as production (Engels, 1940). Production is a complex set of dependent relations among nature, work, social labour and social organisation (Wolf, 1982, p. 74). Within the Marxist lexicon, human activity is understood as labour² and is an unavoidable part of being alive (Ingold, 2011; Wolf, 1982). By virtue of being in the world, it is unavoidable to respond to that world, and different environmental contexts require and enable different human activities (Heckler, 2009; van der Ploeg & Long, 1994; Wolf, 1982).

As a result, labour is a dialectic process of both hands and minds (Wolf, 1982, p. 75) with the images, or goals, pursued through labour and the creation of objects, or products, of that activity as co-creating phases of the same production process (Ingold, 2000, 2011). Thus it is through being, that both the materials of production and the producers themselves become part of a dynamic process of on-going, contingent adaption and transformation. In other words, human activity aimed at manipulating the environment, including biodiversity, to human uses through technology, organisation, and ideas, triggers a dialectic process in which humans simultaneously shape and are shaped by their environments (Wilson, 2010, 2012a, 2012b).

The co-constituting interconnections between humans and environment are perhaps most readily evident within agricultural landscapes. Long and Van der Ploeg (1994, p. 1) conclude that agricultural landscapes are characterised by diversity deriving from the dynamic, historical interactions between biophysical factors (e.g. topographies, soils, species, climatic conditions) and “the goal-oriented and conscious activity of the people involved.” As a consequence, the diversity of peoples and places, including food

² Labour is distinguished from work, which is the activity of expanding energy to produce energy (Wolf, 1982, p. 73).

systems, is neither random nor insignificant (van der Ploeg & Long, 1994). It is the result of on-going processes of interaction among particular peoples, at particular times, within specific biodiversity, biophysical and social environments, within a historical material context of produced biocultural landscapes (Argumedo, 2008; Verschuuren, Subramanian, & Hiemstra, 2014). Notably, the historical dimensions of biocultural diversity are often unrecognised and misunderstood within contemporary societies (Rotherham, 2015).

Production is also an inherently social phenomenon, as individuals and networks of individuals are unavoidably nested within broader, more or less densely connected spheres of social organisation (Roseberry, 1989; Wolf, 1966). By virtue of being social, production is transfused with power in many overt and covert guises (Wolf, 1999; Wolf & Silverman, 2001). Power, according to Wolf (1999), is manifested in culturally distinctive patterns of ideation (the process of forming and creating ideas or images), which acquire substance through discursive and performance forms of communication, and come to dialectically construct and be constructed by material and organisational processes, which are reflected in modes of production. Modes of production (e.g. tributary and capitalist) are categories capturing the major ways by which different human populations, responding to the variability of diverse local and regional environments, organise their productive processes through the political and economic relationships that underlie, orient and constrain interaction and resource access (Wolf, 1982). As a result of the indispensability of food in sustaining life, modes of production are not easily disconnected from the food systems that support them, since changes in the social relations of production also necessitate changes in food system governance (McMichael, 2009; Mintz, 1986). Modes of production consequently shape the form and function of food systems, including how and by whom food is produced, whether and in what proportions it is sold or traded, and who consumes it under what conditions.

As a result of being embedded within modes of production, Wolf (1982, p. 78) explains, “[b]etween people and resources stand the strategic relationships governing the mode of allocating social labour to nature.” Frequently, power groups use their influence to build and enact ideologies that perpetuate their own positions of power within a social system, including through the mode of production governing accumulation and distribution of wealth (Wolf, 1999). Therefore, productive processes are political and are

shaped by uneven concentrations of power within and between societies, as well as how power is consolidated and contested over time and how it is manifested in material forms, including as ideas and ideologies (Roseberry, 1989; Wolf, 1999; Wolf & Silverman, 2001). Individual producers enter the world not solely as actors, but as actors within a lifeworld already shaped by past dynamics of production (Roseberry, 1989, p. 39).

In spite of these contingencies, processes of production are invariably dynamic. Historical material patterns are not inherently predictive structures that preclude certain behaviours or actions. Rather, as Scott (1976, p. 166) elaborates with respect to individual agency and socio-cultural norms, "...it is merely to recall that they [individual actors] do not walk out on an empty stage and make up their lines at random." They are informed by their environment, but can also respond to it and thereby also come to change it through production. Furthermore, as Wolf (1969, 1982) has demonstrated, no population persists in isolation. The matrix of social interactions extends beyond any artificially bounded unit, be it a 'culture', 'society', 'community', or 'territory', to link all populations in more or less densely concentrated networks. Trade, interchange, and other processes of encounter – many of which are linked with food systems – also inform historical material contexts and contemporary processes of production. Flows of materials, including ideas, link populations and are mobilised through individual and collective action as loci of change within societies. Human-environment relations, therefore, are inherently changing and processual.

When applying these insights from Marxist political economy to the specific phenomenon of food systems a particular theoretical framing begins to emerge. First, food systems are created through processes of production in order to sustain and create the conditions for social and biological reproduction. They are embedded within historical material contexts that are shaped by social relations embodying power. Food systems are also not naturally bounded units in either time or space. They are constituted through production and institutions that shape flows of materials, including ideas, that are used to both sustain and transform the system over time. Also, as the mechanism by which humans produce through their hands and minds the necessary conditions for living, food systems are an indispensable keystone within all other domains of productive life. As a result of their indispensability, food systems are the focus of particular articulations

of power that work to shape them in order to meet the requirements of the governing mode of production (Mintz, 1986; Wolf, 1982), including through global food regimes (Bernstein, 2015; McMichael, 2009).

1.3.1.3 Food, power and meaning

The complex role and meaning of food in daily life and society at large is a richly studied area of academic inquiry dating back to the 19th century (Mintz & Du Bois, 2002).³ A crosscutting theme linking much of this work is the ways by which food – as material and symbol – is a political product. Power shapes the social organisation of productive processes and also relationships with foods in complex ways that are deeply entwined with daily life, status and sense of identity (Billiard, 2006, 2010; Counihan & Van Esterik, 2013; Mintz, 1986, 1996; Rubin, 2008; Wiessner, 1998). In this way food, including its acquisition, sharing and consumption, is bound with concepts of morality, skills, social ties and networks, and is a powerful physical embodiment of access to resources and, through procurement or production, is an indicator of control over one's own or others' labour.

What is considered acceptable, desirable and possible to eat reflects biocultural heritage, including how regimes of value (Appadurai, 1986), or meanings (Mintz, 1986, 1996), are constructed and encoded in particular foods and dishes, or biocultural materials. Such processes of meaning making inform what becomes 'culturally acceptable' to eat (e.g. in Kuhnlein et al.'s 2006 definition of traditional food systems) as well as the calculus of availability, affordability, desirability and feasibility surrounding particular foods, and who benefits and in what ways from particular regimes of value. "Meanings," as Wolf (1982, p. 388) explains, "are not imprinted into things by nature; they are developed and imposed by human beings." A food is a food, not only because it may offer a source of nutrition, but because it is also socially constructed as one

³ This work also includes examinations of the relationships between food and identity construction through the lens of food and social memory (c.f. Holtzman, 2006), the role of food in social (ex)inclusion and the construction of social status (c.f. Cruz García, 2006; Wiessner & Schiefenhövel, 1998), the intersections of diet with gender, ethnicity, class and other dimensions of identity (c.f. Etkin, 2009; Howard, 2006; Rubin, 2008; Slocum, 2010; Soron, 2010), livelihood and other food related practices (c.f. Camacho, 2006; Quandt, Arcury, Bell, McDonald, & Vitolins, 2001), and most recently, how these relationships with food are changing within increasingly globalized environments (c.f. Pimbert, 2010; Young, 2004).

(MacClancy, Macbeth, & Henry, 2007; Mintz, 1986). Such meanings, however, are not fixed in time and space (Etkin, 2009; Macbeth & Lawry, 1997; MacClancy et al., 2007). The transformation of the meanings surrounding foods reflects how they are mobilised in different economic and political contexts, giving foods what Appadurai (1986) calls “a social life”.

Mintz (1986, 1996) decodes the unfolding of such processes of change through the interplay of two sorts of meaning-making taking place within societies – inside and outside meanings – reflecting interactions of forces of agency and structure. Inside meanings relate most directly to the daily life conditions of consumption. They also reflect the ways in which individuals alter the immediate environment surrounding their consumption patterns to match their preferences (i.e. “...the where, when, how, with whom, with what, and why...”: 1996, p. 20). “Those who create such *inside* meanings,” he argues, “do so by imparting significance to their own acts and the acts of those around them” (p. 23). Mintz’s concept of inside meaning-making has parallels with Bourdieu’s (1984) analysis of how cultural capital is manifested in food choices generating distinction (power) within different fields of action. Such processes of meaning-making reflect the exercise of individual agency within the frame of reference afforded by governing structures.

By outside meanings Mintz (1996, p. 20) refers to “...the envioning economic, social, and political (even military) conditions...” which set the terms against which inner meanings are negotiated. His outside meanings concept, he acknowledges (p. 22), is analogous to Wolf’s (1982, 1999; Wolf & Silverman, 2001) understanding of structural power: “...the power manifest in relationships that not only operates within settings and domains but also organizes and orchestrates the settings themselves, and that specifies the direction and distribution of energy flows” (1999, p. 5). Outside meanings, therefore, are highly influential on the daily life of individuals but also form and operate within other scales of social action. Structural power influences the food system in which individuals participate through numerous, interconnected tools including land ownership patterns, trade regulations, technologies for production, transportation, storage and processing, and ideational processes related with cultural acceptability and prestige (themes picked up again in Chapter 2).

The structural forces shaping food systems have been named and conceptualised in several ways within the literature and tend to take changes in relationships of production and the rise capitalist modes of production as a point of departure. The capitalist mode of production grew out of the crisis of feudalism and finally the transformation of mercantile wealth in England and later in other parts of Europe (Wolf, 1982). Within the capitalist mode of production, members of society are coerced into selling their labour to the owners of the means of production in order to garner wages to purchase their requirements for living (Roseberry, 1989). Thus, labourers are dependent on a market, which in turn has distinctive requirements for competition, accumulation and profit-maximization. The owners of the means of production focus on extracting a maximum surplus value from their hired workforce by selling commodities (i.e. anything produced to be bought and sold on the market: Polanyi, 1957) produced through their labour on an open market, regulated by a balance of demand and supply. In order to generate the greatest surplus value, competition within the capitalist market necessitates constant change in the conditions and methods of production (Wolf, 1982: 77-78).

Industrial production and urbanity are more commonly associated with capitalism than agriculture and rurality; however, the rise of industry and, concurrently, the city is inextricably linked to changes in agricultural production and in nature of the countryside (Mazoyer & Roudart, 2006; Meiksins Wood, 2000; Pimbert, 2010). Moreover, it is the food system that ensures the reproduction of labour necessary to maintain industrial and other production under capitalism (Magdoff et al., 2000a; McMichael, 2009). A cheap food supply to sustain the capitalist work force in tandem with overt and covert manipulations of consumer choice and preference are essential to the functioning of the capitalist system and maintaining low production costs (Mazoyer & Roudart, 2006; Kay, 2009; Lang & Heasman, 2004; Magdoff et al., 2000b). Food systems therefore play an underlying and strategic role in the maintenance of the capitalist system as a whole (Magdoff et al., 2000a; Mintz, 1986; Scoones, 2009; Van der Ploeg, 2008; Wolf, 1982).

Capitalist agriculture, based on profit maximization through technical and social innovations and simplifications to minimize production costs, came into being 150 to 200 years ago and mirrors many of the logics of the capitalist mode of production as a whole (Wolf, 1982; Lang & Heasman, 2004:3). Changes to customary tenancy arrangements,

enclosures of common lands, and reinterpretations of private ownership as tantamount to exclusive ownership were key processes that allowed the incursion of capitalism into the countryside and fed rural to urban migration processes providing cheap labour to support urban industrialisation (Meiksons Wood, 2000; Polanyi, 1957; Magdoff et al., 2000b). Many of these same underlying mechanisms of enclosure and livelihood insecurity remain central to enabling the spread of capitalist modes of production into new contexts. (Some of the effects of enclosure on producer autonomy in the Central Valley of Tarija will be examined in Chapter 2.)

The processes of agricultural transformation and the development of the capitalist mode of production as a whole taking place in England were unfolding within the context of European colonialism and imperialism, during which the capitalist mode of ordering became the governing force, or suprastructure, in which capitalist and non-capitalist modes of production are embedded (Berman, 1982; Scott, 1999; Van der Ploeg, 2008; Wolf, 1982). The capitalist world market "...is an articulated system of capitalist *and* non-capitalist relations of production, linked by relations of exchange dominated by capitalist accumulation" (Wolf, 1982: 353, emphasis added).

The capitalist drive for commodification, wage labour and the pursuit of surplus value, Scott (1999) argues, are intertwined with the wider tendency towards high modernism, which is not limited to capitalism, but is a dominant characteristic of modern states. He defines high modernism as:

[A] strong version of the self-confidence about scientific and technical progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including human nature) and, above all, the rational design of social ordering commensurate with the scientific understanding of natural laws (p. 4).

Within the logic of high modernism, trade structures and other policy frameworks are organized through forms of control based on processes of simplification (the identification of interested, utilitarian facts to render social and economic systems understandable to a technocratic governance structure), legibility (tools to quantify and understand the simplified elements of a system), and manipulation (the application of a scientific and technical apparatus to control the functioning of the system) (p. 11).

Van der Ploeg (2008) identifies the tendency towards "Empire" – an affinity for "expansion, hierarchical control and the creation of new, material and symbolic orders"

(p. xv) – as another feature of capitalist world markets. Empire operates as a project of intertwining different elements, relations, interests and patterns in such a way that they become mutually supportive (p. 4). Van der Ploeg contends it is a project that is increasingly carried out through modes of social coercion and takes a particular form in agribusiness groups, large retailers, laws, technologies and other elements that contribute to the formation of Food Empire. Food Empire is a critical feature of Empire as a whole. It is through this tendency towards Empire that the production and consumption of food have become increasingly disconnected from each other in both time and space.⁴

Van der Ploeg's (2008) concept of Empire also supports Wolf's (1982: 353) conclusion that within a capitalist mode of ordering, non-capitalist modes of production may at times be tolerated, and even encouraged, however only under conditions of progressively declining autonomy. Over time, non-capitalist populations are drawn into the capitalist reserve labour army as a result of their declining capacity to reproduce social systems without participation in capitalist markets. Consequently, with few exceptions, contemporary modes of production are embedded within the dominant mode of ordering – the world capitalist market – which pre-dates and is distinct from, yet shares many of the logics of, capitalist modes of production. (Peasant modes of production and integration of smallholders into market economies are examined in Chapter 3.)

Over the last century, the high modernist agricultural model has been disseminated around the world through government policy, capitalist consolidations, and other means, with little attention to compatibility or discord with local conditions (Sage, 2012; Scott, 1999). Friedmann and McMichael (1989; McMichael, 2009) identify three

⁴ Marx originally described this tendency of capitalism as a break in the social-ecological metabolism sustaining food production (Wittman, 2009). The resultant metabolic rift was formed and deepened by the tendency towards specialisation resulting in the breakdown of the closed (or near closed) production cycles necessary for the nutrient cycling needed to maintain soil fertility (Bellamy Foster & Magdoff, 2000). This process began by separating animal and crop production, then deepened by removing people from the agricultural landscape, and finally entrenched by stretching that landscape of production around the world (Bellamy Foster & Magdoff, 2000; Pimbert, 2010). More recently this phenomenon has been described as the “distancing”, which has both mental and physical dimensions, and tends to be used in relation to consumers’ distance from the foods they eat, expressed in knowledge gaps and geographic distance (Pimbert, 2010; Wittman, 2009; Clapp, 2012). The disconnection between local production conditions, use values and commodity prices (c.f. Scott, 1976; Vanhaute, 2010) also suggests an important economic component to distancing.

distinct regimes (colonial food regime, ~1870-1930s; corporate food regime, 1950s-1970s; and neoliberal food regime, 1980s-present)⁵ surrounding food production and consumption that have contributed to the functioning of global capitalism and the dominance of the modernist agriculture paradigm and food system.

The colonial food regime was a primary instrument for the expansion of capitalist agriculture through the transformation of plantations into “highly capitalized, crop factories” and the growth of specialized, cash-crop small farms (Wolf, 1982). Cash-crop production of coffee, tea, sugar and other commodities was one of the ways that many peasant populations transitioned to become capitalist farmers and this system is the first instance of long-distance trade routes supplying large quantities, not of luxury goods, such as spices, but of staple food supplies for large segments of the urban population in industrialising countries like Britain (Mintz, 1986; Pomeranz & Topik, 1999; Topik et al., 2006; McMichael, 2009). These new sources of mass food supply allowed cheap provisioning of the industrial work force – thereby enhancing European economic growth – and provided an economic base for the European settler diaspora (McMichael, 2009). The colonial food regime was promoted within the doctrine of comparative advantage, free trade and the efficiency of regional specialisation (McMichael, 2009). During this period, the suppliers of European foods remained largely self-sufficient in their own food grains and other foodstuffs (Holt Giménez & Shattuck, 2011).

The Corporate Food Regime emerged with the post-war rise of the modernist development project enabled by state-intervention, US hegemony, and the Cold War (McMichael, 2009; Fairbairn, 2010). A ‘productionist paradigm’ for agricultural development (Lang and Heasman, 2004), typified by the rise of monocultures, with artificial inputs enabling agro-industrialisation, was given a new push through investment in the Green Revolution during the 1960s. This was a largely state- and multi-lateral agency-led endeavour linked to ideals of increased production and efficiency in order to meet the nutrition needs of the world’s growing population.

⁵ These epochs within the history of capitalism are similar to those identified by Magdoff et al. (2000b) and Lang and Heasman (2004), although some debate remains about how the periods should be defined and grouped (e.g. Fairbairn, 2010)

The industrialisation of agriculture in newly independent states was also believed to be a critical component of transitioning their ‘backward’ economies based on small-holder, rural agriculture to urban, industry-based economies, complemented by large corporate and entrepreneurial farming (Kay, 2009; McMichael, 2008). This transition was central to the national development project (McMichael, 2008), in which the function of agriculture was “...to supply food, raw materials, capital, labour and foreign exchange for industry as well as creating a home market for domestically produced industrial products” (Kay, 2009: 106). Investments were made in green revolution technologies focused on production and processing mechanisation, the use of chemical fertilisers, insecticides and herbicides, as well as the breeding of high yield varieties of staple food crops including corn, rice and wheat (McMichael, 2008; Shiva, 2000).

During this period, agricultural commodity prices were stabilised by national governments through trade barriers and support for commodity cartels as part of the state-led modernisation paradigm of development. These protections helped regulate the boom and bust cycles inherent in commodity markets (McMichael, 2009). Many developing countries also became dependent during this period on cheap food aid from the United States, as American agricultural subsidies and protectionism created a situation of systemic overproduction. Ironically, in developing countries dependence on food aid undercut national agriculture, led to dietary change and eventual reliance on food imports (Camacho, 2006; Fairbairn, 2010; McMichael, 2008, 2009).

The corporate food regime began to unravel during the 1970s with changes in US food aid priorities, including decreasing willingness to fund developing world cartels with the end of the Cold War, and the rise of the market-led ‘globalisation project’ (Fairbairn, 2010; McMichael, 2008). The neoliberal food regime is characterised by the growing ubiquity of foods disassociated from time and place, increasing corporate power and the shift from state to world market provisioning of food security (Fairbairn, 2010; McMichael, 2008; Pimbert, 2010). The neoliberal era began in the Global South with a wave of Structural Adjustment Policy reforms (SAPs) imposed by the International Monetary Fund (IMF) and the World Bank following the international debt crisis of the early 1980s. Alongside other measures, including dramatic reductions in social services and support for agriculture, SAPs demanded that developing countries reform their

macroeconomic policies by reducing their tariff and trade barriers and allowing a free flow of goods, including food and agricultural products, in and out of their national marketplaces (Clapp, 2012; Rapley, 2002). The transformation of the geopolitical landscape was cemented with the 1995 launching of the World Trade Organization (WTO),⁶ particularly the Agreement on Agriculture (AoA), and the subsequent mushrooming number of bilateral and multilateral free trade agreements (Bello & Baviera, 2010; Clapp, 2012; Desmarais, 2007; McMichael, 2008).⁷

Following World War II, Food Empires have established a well-defined agenda to promote and solidify their domination over production, trade and consumption (Van der Ploeg, 2008, p. 6). In the neoliberal era this agenda includes a continued expansion of industrialised food production and consumption through globalization and liberalization, as well as the widespread adoption and acceptance of genetically modified organisms (GMOs) and other biotechnologies associated with what has been called the corporate-led, second green revolution (McMichael, 2008, 2009, 2010).⁸ The growing financialisation of food and agricultural commodities relating to the growing trade and speculation in these markets is another expression of commodification characteristic of the neoliberal period (Clapp, 2012). The generation of claims to food safety provision by the food industry and the assertion that there is no alternative for meeting the nutritional needs of the world's population apart from the continued and accelerated industrialization of food production are other neoliberal discourses (Lang & Heasman, 2004; Van der Ploeg, 2008: 6). Holt Giménez and Shattuck (2011: 111) summarise the current food regime as:

[C]haracterized by the unprecedented market power and profits of monopoly agrifood corporations, globalized animal protein chains, growing links between food and fuel economies, a 'supermarket revolution', liberalized global trade in

⁶ The formation of the WTO was the result of the Uruguay Round of Trade Talks (1986-1994) held by the signatories of the General Agreement on Tariffs and Trade (GATT) and builds on the legacy of that post-war institution.

⁷ While the World Trade Organisation (WTO) gained unprecedented regulatory power over domestic market conditions (Bello, 2009; Fairbairn, 2010; Rosset, 2006), the Agreement on Agriculture (AoA) firmly ascribed to global agricultural markets the responsibility for global food security. It also downgraded the role of the state to that of creating an enabling economic environment in which corporations could undertake the business of agricultural production, exchange, processing and supply (Clapp, 2012; Fairbairn, 2010).

⁸ It correlates to what Lang and Heasman (2004) refer to as the 'life science integrated paradigm' (1990s-present) based on biotechnology and biological inputs.

food, increasingly concentrated land ownership, a shrinking natural resource base, and growing opposition from food movements worldwide.

This system of agriculture relies on increasing mechanisation and control over natural processes, overproduction of certain crops (particularly grains, seed oils and livestock), and the continued expansion of global agricultural markets (Holt Giménez & Shattuck, 2011). Holt Giménez and Shattuck also identify strong engagement from large Northern-dominated philanthropy groups and development institutions in shaping international food policy. Often these groups push for reforms within the capitalist global food system through the promotion of a food security discourse based on the modernist thesis of state-led development and new market penetration strategies.

Within this frame, ‘aid’ and ‘development’ have concentrated on the growth of export-oriented niche markets to help different groups compete in the global market place and on the mainstreaming of less environmentally harmful and more socially-just practices within production and exchange networks (Bello & Baviera, 2010; Holt Giménez & Shattuck, 2010, 2011). (Many of these trends are evidenced in the Central Valley; see Chapter 4.) Export-oriented niche markets focus on ‘non-traditional exports’, such as fruit, vegetables, and animal protein (including shrimp, fish, and poultry) from the Global South (McMichael, 2009). McMichael (2008, 2009) identifies the countries involved in this type of new agricultural trade in fresh products, rather than durable, ‘traditional’ tropical commodities (e.g. sugar, coffee, and tea), as New Agricultural Countries (NACs). Other countries and rural regions have also sought to compete within global markets by building competitive advantage through niche market products linked with biocultural heritage. This approach, termed Rural Territorial Development (RTD), is typified by the experiences of European regions in promoting regional food products through certification and labelling tools (OECD, 2006; Papadopoulos & Fonte, 2010) and has been exported around the world through development programs. This follows a long pattern in agricultural market opportunity seeking described by Mazoyer and Roudart (2006), as well as by Magdoff et al. (2000a). As Magdoff et al. (2000b, p. 18) point out, “...once a particular niche grows into a large-scale operation (as is the case with today’s organic industry) it will inevitably face new pressures from agri-business determined to monopolize all large-scale, lucrative markets,” suggesting the limitations and challenges of such strategies.

These flows of food from the Global South to the North are one side of a feedback loop that sees seeds and agricultural inputs from the North being used to facilitate and control NAC production processes (McMichael, 2009). Sites of production in NACs are linked within a global complex controlled by agribusiness corporations in order to facilitate year-round production and sale (McMichael, 2009). These linkages and vertical integration of food supply chains are part of dramatic changes in trade and retail patterns around the world. Increasing flows of food to consumers in the Global South and North are being routed through transnational supermarket chains (Lang & Heasman, 2004; McMichael, 2009; Seth & Randall, 2005). These patterns reveal the escalating processes of horizontal and vertical integration taking place within the global food system (Clapp, 2012; Lang & Heasman, 2004; McMichael, 2009) and the extensions of state control through regulation over production and exchange within food systems (Vorley, 2013).

These global processes shape the outside meanings surrounding foods and set the structural contexts in which individuals participate through numerous, interconnected mechanisms including land ownership patterns, trade regulations, technologies for production, transportation, storage and processing, and ideational processes related with cultural acceptability and prestige (themes picked up in Chapter 2). Another key dimension of structural power relates to the generation of new configurations of subjective values attached to different elements of edible biocultural heritage (i.e. food cultures: Lang & Heasman, 2004; regimes of value: Appadurai, 1986), which are shaped by prestige associations, health impacts, acceptability, nationalism and heritage, and other attributes (c.f. MacClancy et al., 2007; Mintz, 1986; Pomeranz & Topik, 1999; Roseberry, Gudmundson, & Kutschbach, 1995; Topik et al., 2006). These processes are critical because they shape what are constituted as resources and how regimes of access to those resources are constructed (Coombe & Weiss, 2015; González, 2015; Ribot & Peluso, 2003). The role of market segmentation is also important in shaping the social life of foods, since it allows a single commodity to walk multifunctional 'life paths' differentiated by ideas related to quality and, in some cases, discourses of 'authenticity' (Appadurai, 1986, p. 46; also see, Chapter 4).

The multiple social lives that a single commodity might lead, both during the arc of its life history and concurrently at different moments within it, reflect interplays of

power among different groups seeking to benefit from the same commodity or biocultural material. (Examples of biocultural materials given distinct form and function within different territorial projects are elaborated on in Chapters 4 and 5). Appadurai (1986) and Mintz (1986) argue that power relations are the medium through which commodities are produced, desired, exchanged, and consumed (also see MacClancy et al., 2007; Wiessner, 1998). As Mintz (1986) and Pomeranz and Topik (1999) document, the mainstreaming of formerly luxury items does not change the utility of these commodities for elites, since the same classes that benefited from commodities as items of ‘conspicuous consumption’ (Marichal, Topik, & Frank, 2006, p. 354) are often those who control the supply chain linking commodities to mass markets through different forms of social manipulation (Appadurai, 1986, p. 57). Some current rural development strategies emphasise local resource mobilisation through the reconstruction of some elements of edible biocultural heritage as items of elite consumption through processes of valorisation aimed at enhancing their prestige associations within a globalised regime of values (a process examined in Chapter 4; also see Billiard, 2006, 2010; Coombe & Weiss, 2015; González, 2015; Leitch, Counihan, & Van Esterik, 2013).

Such processes of valorisation are linked with what Lang and Heasman (2004) term the ‘battle over minds’ in which illusions of consumer choice, created through corporate investment in marketing to pre-emptively shape consumer preferences and demands, have become vital to the functioning of the contemporary food system and the prominent place of large corporations within it (also see Baker, 2009; MacClancy et al., 2007). Often the relations of power underlying these processes are obscured through their encodement in everyday life and forms of ideation that give meaning to the self and one’s environment (Wolf, 1999). In this way, food is often used to construct and identify membership in a particular community (Etkin, 2009; Mintz, 1986; Wiessner, 1998; Wolf, 1999). “[T]ransformations of diet,” Mintz (1986, p. 13) concludes, “entail quite profound alterations in people’s image of themselves, their notions of the contrasting virtues of tradition and change, the fabric of their daily social life.” Consequently, eating implies a political act, since what is consumed, and what is perceived as desirable to consume, is informed by intersecting relations of power (Etkin, 2009; Wiessner, 1998). This echoes the importance of intentional otherness, or alterity, characterising alternative food

networks and movements to create distinction from industrial food systems (see Chapter 5: Goodman & Goodman, 2009; Renting, Marsden, & Banks, 2003; Tregear, 2011).

In contemporary contexts a significant and wide reaching structural force exerting influence on the daily lives of people around the world relates to processes of globalization and, with it, the spread of capitalism and the ideology of Western modernity (Counihan & Van Esterik, 2013; Young, 2004). As Berman (1982, p. 95) explains within this frame, individuals and societies “...must learn to yearn for change” and for the new. A component of this, enabled by technological and other changes mentioned above, is a pronounced shift in the consumption horizon from a local arena to a global one aided by the birth and promotion of an “ideal of economic cosmopolitanism” (Berman, 1982; Jiménez, 1995, p. 52). This ideal, Macbeth and Lawry (1997) argue, has particular pull on middle classes and the *nouveaux riche* who continually seek new objects of desire in order to demonstrate their proximity to the upper classes. The ideal of economic cosmopolitanism and increased access to a greater diversity of higher quality consumer goods can work to create social consent for globalisation of food systems accompanying neoliberal economic policies (Baker, 2009; Lang & Heasman, 2004), including the rapid spread of supermarkets across Latin America (Reardon & Berdegué, 2002).

These processes of sociocultural, economic and ecological change associated with capitalist globalisation are linked with an on-going ‘nutrition transition’,⁹ in which foods from global industrial networks replace those traditionally drawn from localised food systems. This pattern of dietary transition is a central part of wide-reaching dramatic changes in ways of life and economic organisation taking place in rural and urban areas around the world (Kuhnlein, Erasmus, & Spigelski, 2009; Kuhnlein, Erasmus, Spigelski, & Burlingame, 2013). However, recent social movements, including food sovereignty and numerous expressions of alternative food networks and food localism, reflect a counter-movement to the neoliberal food regime and are working to transform the current food regime by re-embedding local and long-distance food systems in principles of

⁹ The nutrition transition refers to an increased number of calories, usually in the form of simple sugars, fats, and proteins, available for consumption through the industrial food system. While in areas of caloric deficit such increases in available calories are critical, there are also negative health impacts associated with this transition, including incidents of obesity, micronutrient deficiencies, and other associated health risks (FAO, n.d.; Young, 2004).

ecological and socioeconomic justice and sustainability (c.f. Kloppenburg, Hendrickson, & Stevenson, 1996; Pimbert, 2010; Petrini, 2005; Wittman, Desmarais, & Wiebe, 2010). Whose interests and priorities shape processes of production and the range of choices facing consumers are critical in understanding how biocultural heritage, including local knowledge, preferences and uses of biodiversity, change over time in response to shifting regimes of value operating at different scales. These processes are linked to territorial projects and reflect different visions for food systems and the people who depend on them.

1.3.2 Development trajectories and mobilizing edible biocultural resources

Food systems are a reflection of the organisation of society. The following sections examine how such processes of organisation change over time in response to territorial projects, shaping the current and future trajectories of a territory and the role of local edible biocultural heritage within it. Within some territorial projects, edible biocultural heritage has been identified and mobilised as a resource to engage with or defend against economic, cultural and ecological globalisation.

1.3.2.1 Food systems and territorial projects

As social constructions, food systems reflect manifestations of power expressed in the flows of biocultural resources within them, including what edible biocultural resources are present, where they are drawn from, in what proportions, under what regimes of social and economic value, and through what conditions of access, production, exchange and consumption. Consequently, food systems are part of processes of territorial ordering within the nested geographic and political arenas in which they are situated (Trauger, 2014).

Territory, understood as a relational and processual concept, has emerged in recent decades as an important focus within rural development theory and practice (Berdegué, Escobal, & Bebbington, 2015; Fabricant & Gustafson, 2011). This interest is articulated most explicitly in Rural Territorial Development approaches (Anbrosio-Albalá & Bastiaensen, 2010; de Janvry & Sadoulet, 2007; Fonte & Ranaboldo, 2007; OECD, 2006; Ranaboldo & Schejtman, 2009; Schejtman & Berdegué, 2004). Within relational understandings of territory, territorial formation is a continuous and evolving ‘effect’ of

social practices produced and reproduced by actors inside and outside a territory that serve to render that territory as an identifiable entity, reflecting difference between what is part of the territory and what is outside it (Brighenti, 2010; Painter, 2006, 2010). Territory making is a form of social ordering that helps stabilize relational patterns, including the normalization of ownership and identity, that underlie productive processes. The ordering of a territory's attributes is part of the performance of 'territory' and the specific character, or assemblage, of these attributes reflects the generation of a "particular economy of objects and places" (Brighenti, 2010, p. 67). The form and function of different elements of a food system thus reflect the economy of objects and places constituting the territory of which it is part. This echoes Gonzales' (2015) understanding of heritage commons as the collective potential of social creativity, knowledge, information and life forms that can be articulated and mobilised in different configurations to pursue specific projects of territorial ordering.

Brighenti (2010, p. 61) argues territory is transformed into a resource through the projects, plans and strategies of territorial construction, which are shaped by "who is drawing [(defining) the territory]", "how the drawing is made", "what kind of drawing is being made", and, "why it is being made". This echoes Wolf's (1999) understanding of power as ideation (Section 1.3.1.2). Territory, thereby, creates and facilitates access to resources within it and also becomes a resource in and of itself, particularly with respect to identity formation. The social relevance, visibility and power of territory are enhanced through acts of demarcation, or boundary drawing, using discursive, symbolic, performative and material tools. In this sense, territories are imagined, but not imaginary, phenomena that are made visible through their assemblage of tangible and intangible attributes (Brighenti, 2010). This includes their distinctive biocultural characteristics (Porras, n.d.), as well as structures, institutions and coalitions of groups within the territory (Berdegué et al., 2015).

As social-material creations, territories are also contested, layered and textured entities nested within different scales of social organisation (Ambrosio-Abalá & Bastiaensen, 2010; Brighenti, 2010; Painter, 2006, 2010). Multiple, overlapping territorial projects, or acts of territorialisation, coordinated to greater or lesser degrees,

may take place within the same geographic spaces (Brighenti, 2010; Hinojosa et al., 2015). Hinojosa et al. (2015, p. 106) explain:

The concept of territorial projects draws attention to the ways in which actors and coalitions negotiate and construct visions of what territories should become, how and by whom they should be governed, the economic activities, patterns of resource access, and public investments on which they should be based, and the ways in which resources and revenues should be controlled.

Within development theory and practice, the concept of territory is a way to conceptualise the effects of past and future development processes as outcomes of territory building that may vary in depth, breadth and influence (Berdegué et al., 2015; Fabricant & Gustafson, 2011; Hinojosa et al., 2015; Ranaboldo & Schejtman, 2009).

Contemporary territorial projects take place against a complex historical backdrop, imprinted by the material legacies of past territorial projects, including encounters between modes of production and the respective ideologies that support them. Territorial “imaginaries” reflect the range of ideas held by local actors about what futures may be aspired to and what appropriate strategies may be applied to achieve those futures (Hinojosa et al., 2015). How different groups of actors come together to enact territorial projects is part of processes of territoriality, in which imaginaries, discourse and practice are evoked to position one strategy for territorial ordering as prevalent over others. Frequently competing territorial projects are at play that reflect both dominant and subaltern projects (Brighenti, 2010; Fabricant & Gustafson, 2011; Hinojosa et al., 2015). In their work on territorial construction in Bolivia, Gustafson and Fabricant (2011, p. 19) note that territorialising projects may be “targeted for appropriation and containment by defenders of the status quo.” Cultural and biocultural heritages (Coombe & Weiss, 2015; González, 2015) are powerful material and symbolic resources that different groups draw upon to build the legitimacy and influence of a territorial project, including how regimes of resource access are constructed (Ribot & Peluso, 2003). The mobilisation of heritage, González (2015, pp. 29–30) argues, harnesses it as a productive force, but by doing so also renders community a “terrain of struggle where certain forces tend towards disciplining, segmenting, and positioning the community in the market, while alternative forces push towards a governing through community and a reappropriation of collective values from below.” How heritage is represented, curated and constructed, González goes on to note, gives rise to “novel assemblages of value creation” reflecting the agency of

different groups to generate representations of the self and others. In this way identity becomes a resource mediated by regimes of access connected with flows of investment supporting some territorial projects, such as market integration or community autonomy, while undermining others (Billiard, 2006, 2010; Coombe & Weiss, 2015; González, 2015).

1.3.2.2 Development trajectories and rural economies

Modes of production, and the food systems they create and depend upon, shape the range of livelihood possibilities available to individuals, households, communities and regions, including the role of biocultural heritage within those livelihoods and lifeways. The enactment of modes of production is one lens through which territorial projects can be understood. The dominant territorial project playing out at multiple scales, over several centuries, is that of the capitalist mode of production (discussed above), which has found expression through modernist ideologies and institutions, including states, bi-lateral and multi-lateral agencies and non-governmental organisations, promoting a compatible ideal of development. Much of the literature on rural transitions is rooted in debates about the future of peasant (*campesino*) and other non-capitalist forms of production and concentrates on how non-capitalist societies become absorbed within capitalist modes of production (e.g. in the case of peasant societies through processes of depeasantisation). Some of the archetypal characteristics of peasant and capitalist modes of food production are presented in Table 1.

In addition to the characteristics of peasant modes of production, the social and ecological relationships of peasant modes of production also reflect the collective biocultural heritage of peasant communities, including religious and spiritual beliefs about how to live well with the earth. In Bolivia and other Andean contexts, relationships with the *patsha mama* (Mother Earth) are manifested in the biocultural landscapes in which campesino production takes place (Verschuuren et al., 2014). The relationships between campesino modes of production and the generation and conservation of agrobiodiversity are widely recognised, as are the importance of campesino farming systems in sustaining and rebuilding agrobiodiversity into the future (Altieri & Toledo, 2011; Barthel, Crumley, & Svedin, 2013; Graddy, 2013). Campesino identity relates with being from the countryside and forms of production, including *vida comunitaria*

(community life), *producción comunitaria* (community production) and relative control over the allocation of labour and resources (Vacaflores, n.d.; Vacaflores & Lizárraga, 2012), religious beliefs and a shared history of social organisation and struggle (Healey, 2009; Vacaflores, n.d.).

Table 1. Characteristics of capitalist and peasant agricultural systems.

Characteristic	Capitalist Agriculture	Peasant Agriculture	Reference(s)
Level of specialization	High	Low	Van der Ploeg, 2008
Economic logic	Profit Maximization	‘Safety first’ principle	Capitalist: Wolf, 1982; Peasant: Scott, 1976
Objective	Generation of surplus value	Maintenance of the household through generation of minimum subsistence requirements	Scott, 1976
Organizational orientation	Market	Household	Scott, 1976
Distribution horizon	Long-distance, vertically integrated commodity chains	Short-distance, local consumption	Van der Ploeg, 2008
Labour	Hired	Family	Van der Ploeg, 2008
Valuation of production	Market value	Use value	Scott, 1976; Van der Ploeg, 2008
Mode of intensification	Technical and capital intensive	Human and animal labour and skill intensive (‘self-exploitation’)	Van der Ploeg, 2008
Complexity of agro-ecosystem	Low	High	Lang & Heasman, 2004
Time frame for returns	Medium to long term	Short term	Scott, 1976
Relationships with like producers	Competitive	Cooperative (importance of social relations)	Van der Ploeg, 2008; Wolf, 1966
Level of external inputs	High	Low	Van der Ploeg, 2008
Way of ensuring energy transfer (solar to human-digestible calories)	<i>Neotechnic</i> , fossil fuels, with skills supplied by science High yield varieties, GMOs, pesticides	<i>Paleotechnic</i> , human and animal labour Diversity of landraces and species to mitigate risk of pests, or weather variability	Lang & Heasman, 2004; Scott, 1999; Wolf, 1966:19
Way of ensuring energy and nutrient cycling	Large-scale fertilizer and pesticide inputs	Maintenance of soil fertility through closed system production	Scott, 1999; Van der Ploeg, 2008
Agricultural paradigm	Productionist (1950-1990s); Life science (1990s-present)	Ecologically integrated; working with natural processes	Lang & Heasman, 2004

In Bolivia, agrarian unions representing residents of rural communities are described by Healey (2009) as a hybrid of trade unions and indigenous organisations. The unions are legal entities and a level of local government that were established following the 1952 revolution. They are organised nationally within a nested hierarchy of decision-

making mirroring the geopolitical divisions of the country (Healey, 2009; Vacaflores, n.d.). Across the country agrarian unions continue to fight for greater political recognition, control over production practices and better livelihood opportunities (Fabricant & Gustafson, 2011; Healey, 2009; Lizárraga Aranibar & Vacaflores Rivero, 2007). (Details of campesino production practices and livelihoods in the Central Valley study communities are provided in Section 1.4.1 and in Chapters 2, 3 and 5.)

While more recent theories of rural development acknowledge the role of peasant agency in shaping how processes of change in the organisation of production unfold (Desmarais, 2007; van der Ploeg, 2008; Wittman et al., 2010), including the role of pluri-activity and non-agricultural activities in sustaining peasant ways of life (often referred to as new rurality: See Chapter 3, and Bebbington & Batterbury, 2001; Kay, 2006), processes of globalisation and environmental change have dramatically altered rural societies around the world. Such processes of resistance and negotiation with the challenges and opportunities presented by globalisation and environmental change play out at the level of individuals, households, communities and regions, as well as in broader national and transnational social movements, such as food sovereignty. The food sovereignty movement presents a vision for global, national and local food systems embedded in local control over the ways and means of agricultural production, the right to livelihood for small-scale farmers and rural people and ecological stewardship, and has been adopted within several national constitutions, including Bolivia's (McKay, Nehring, & Walsh-Dilley, 2014; Plurinational State of Bolivia, 2015). The food sovereignty movement presents an explicit challenge and alternative to the neoliberal model of food systems (Pimbert 2010; Wittman et al., 2010). The degree to which local control over different components of a localised food system is prioritised within territorial projects is a factor with potential to significantly alter the organisation of primary production and the flows of resources within a territory.

Wilson (2010, 2012a, 2012b) broadens the discussion surrounding the future of rural areas from a major focus on primary production. He describes the pathways pursued by communities as development trajectories, which reflect how available economic, social and environmental capital is mobilised within a range of available options (or within the “decision-making corridor”: Wilson, 2010, p. 372). He identifies three main

pathways (relocalised, low-intensity rural systems; deagrarianised rural communities; and super-productivist rural systems) that tend to fall within the decision-making range of rural communities after they have become embedded within the global capitalist system. These pathways exist within a continuum of strong and weak multifunctionality, which he correlates with community resilience and vulnerability. The idea of development pathways or trajectories is also discussed by Bebbington (2008), who examines how development processes tend to create what he describes as “landscapes of possibility” in which the range of choices available in some domains such as community production may be enhanced while substantive choices in other areas may be limited or eliminated (See Chapter 2).

The variables that might be reflected in different development pathways are infinite. Examples of characteristics within the food system that might be enabled to greater or lesser degrees depending on the organisation of the territory include: the farming style (or styles: see van der Ploeg, 1994); the relative importance of cultivated and uncultivated diversity (Orlove & Brush, 1996; Skarbø, 2006; Zimmerer, 2010); the degree of marketness or embeddedness surrounding processes of exchange;¹⁰ the globalising or localising – or convergent or divergent – economic orientation of the local economy (Boothroyd & Davis, 1993; Loxley & Lamb, 2007: Table 2), including where locally produced foods are exchanged and where locally consumed food comes from.

Sen (1999) asserted that development and measures of the success of development should focus on whether or not the range of substantive choices available to individuals, and by extension, societies, is enhanced or limited through development policies and programs. Similar concern related to the narrowing or broadening of development pathways, or landscapes of possibility, are also expressed within some of

¹⁰ In his analysis of Fair Trade coffee systems of production and exchange, Jaffee (2007) draws on the work of Block (1990) to describe a spectrum of economic relations ranging from high marketness to high embeddedness. Within economic relations of high marketness there is a significant reliance on price signals intersecting with optimistic, instrumental behaviour governing economic transactions. Conversely, in situations of lower marketness and higher embeddedness, there is less reaction to price signals and less instrumental attention paid to personal gain resulting from a transaction. In these interactions, other signals hold much greater sway. Therefore, the level of marketness has an inverse relationship with the level of embeddedness, which may be signalled by the degree of optimistic versus non-optimistic behaviour infusing the transaction.

the community resilience (Wilson) and livelihoods literature (Bebbington, 2008). Biocultural and agricultural conservation literatures have also expressed concern over loss of knowledge, practices and biological materials that can support a range of options in the future. These themes of choice, possibility and the role of edible biocultural heritage associated with different development pathways are important frames of analysis drawn on in Chapters 2 to 5.

Table 2. Convergent and divergent approaches to community economic development. Based on Loxley and Lamb (2007) and Loxley (2007).

CED Approach	Primary Objectives	Economic Logic	Reflection in Economic Policy	Strengths and Benefits	Weaknesses and Costs
Divergent	Economic growth through investment and expansion	Economies of scale	Export-led growth strategies Foreign direct investment	Provides (foreign) exchange and capital; Economic growth (boom cycles)	Vulnerability to externally induced shocks and stresses (bust cycles); Instability and unpredictability over the long term; Loss of local control over production and resource bases
Convergent	Stable economic base over the long term	Minimum level of production	Import Substitution; Industrialisation; Buy local initiatives	Reduced vulnerability to external shocks and stresses; Increased social capital	Often less economic gain; Frequent dependency on forms of subsidy

1.4 Methodology

How has intentional change in the food system of a region and of its communities been experienced by the people who depend on it? This guiding question places personal experience and histories nested in regional processes as the nexus of inquiry. I gathered data through twelve months of fieldwork in seven Central Valley communities as well as in the City of Tarija. During this time, my primary base was the community of San Lorenzo (San Lorenzo Municipality), approximately 20 minutes by bus north of the City of Tarija. Participant observation, interviews and surveys at markets and key events, complemented by document review of historical and contemporary development policy reports and associated materials from government and NGO sources, were the primary methods I used to gather data to help respond to this overarching question, and to meet the purpose and objectives of my study.

My methodology often drew my research to the margins of established networks and nodes of the food system, giving a more complex picture of how the economy surrounding food and biocultural heritage is woven throughout the social fabric of households, communities and individual life histories. Methods sections, detailing relevant methods associated with data for each findings chapter, are included in each of Chapters 2 to 5. Key data collection instruments are outlined in Appendices A, B and C. As journal length papers comprise the body of this “manuscript style” dissertation, it was necessary to focus each chapter on key findings associated with its particular central questions. Consequently, it was not possible to incorporate or discuss extensively in the chapters all relevant data collected during this project. In order to strengthen the empirical base of this dissertation and insure data are publically available, in accordance with the requirements of the Social Sciences and Humanities Research Council of Canada (SSHRC), additional data on primary production patterns in the study communities and the local foodshed are included in Appendices D, E, F and G.

1.4.1 Overview of study area and case study communities

Situated at the edge of the eastern range of the Andes, the Department of Tarija (Figure 2), bordering on Argentina to the South and Paraguay to the West, is characterized by valleys interspersed with parallel mountain ranges tapering from heights of up to 4500 meters in the west down to the low eastern ranges before the plains of the Gran Chaco (Preston, Macklin, & Warburton, 1997, p. 4). The Central Valley of Tarija is part of the sub-Andean valley system and sits at an elevation of 1,650 to 2,200 meters above sea level. It is home to approximately half of the Tarija Department’s 480,000 inhabitants (INE, n.d., p. 6), most of whom are Spanish-speakers of mixed Indigenous and Spanish descent, commonly known as Chapacos (Vacaflores, 2013a, 2013b). [A detailed history of agricultural production in the Central Valley, including an analysis of data provided in the 1950 and 1986 national agricultural censuses (MACyA, INE and ONUAyA, 2009; República de Bolivia, 1990), is provided in Appendix D].¹¹

The Central Valley has been a regional development planning unit since at least the 1970s and has sometimes included the highland areas (*Zona Alta*) to the west. In more

¹¹ A national agricultural census was also conducted in 2013. However, the results were not publically available at the time of writing.

recent government plans, however, the Central Valley consists of the municipalities of Cercado, San Lorenzo, Uriondo and the northeast part of Padcaya (CODETAR, 1974; Prefectura, 2006). My research was concentrated in three main areas of the Central Valley: the City of Tarija and the San Lorenzo and Uriondo transects (Section 1.4.2.3).

The ecological diversity of Tarija resulting from its mountainous topography allows for strategic use of different areas for food production and has encouraged agricultural trade within the region. Archaeological evidence suggests that this area has been heavily populated for millennia and has long served as a key route for exchange between highland and lowland populations in the region (Macklin et al., 2001; Preston et al., 1997). Indigenous Peoples organized their grazing, cultivation, and hunting practices around suitable areas (Preston et al., 1997). The arrival of the Spanish in 1539, followed by the foundation of the City of Tarija in 1574, initiated a period of significant ecological, economic and political change.

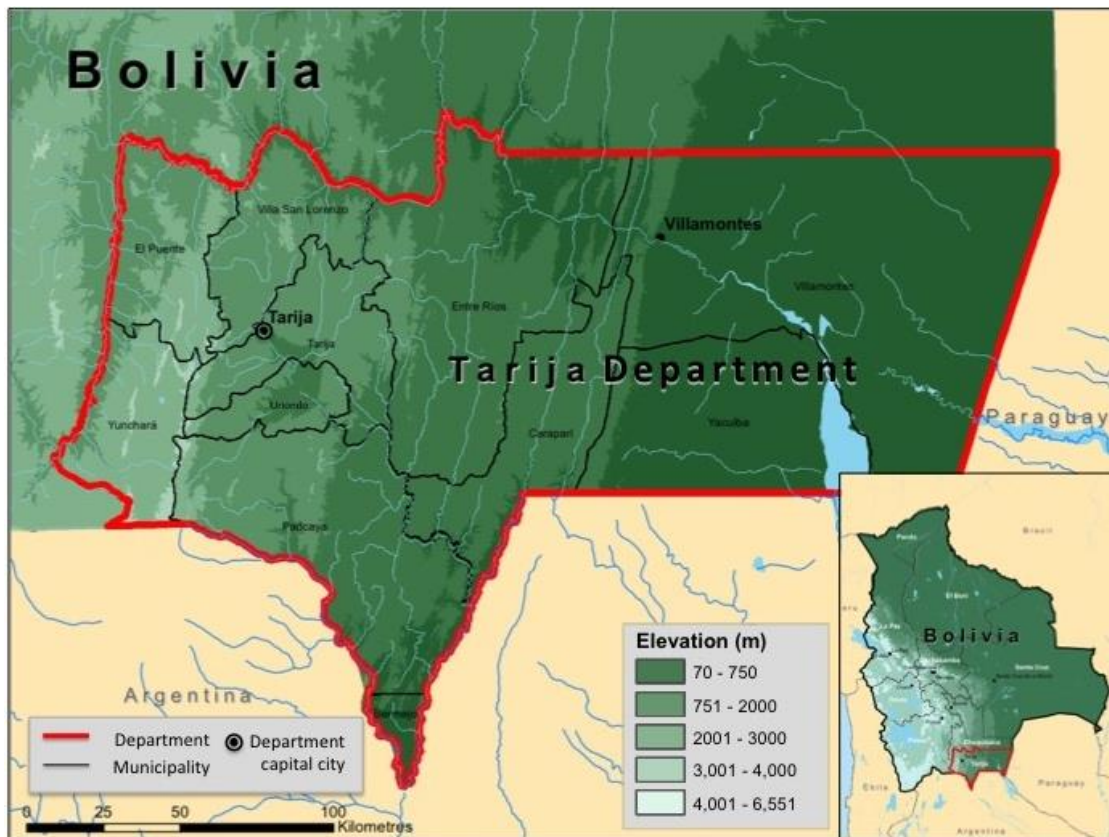


Figure 2. Map of the Tarija Department with municipal boundaries and the department capital city.

Several major economic cycles have driven the economy of Tarija over the last 400 years. These have included the production of livestock, maize and charcoal to supply

mining operations in other parts of Bolivia. The rapid introduction of European livestock was one of the most significant drivers that changed the regional landscape, vegetation and economy. By the 19th century, much of the area surrounding the City of Tarija was divided into large estates (Preston et al., 1997, p. 6). As well, during the 19th century, Tarija was an important commercial centre for trade between Bolivia and Argentina, until it was bypassed by railways and thoroughfares in favour of other routes. In 1953, there was a process of agrarian reform, which included land redistribution from the estates to the estate workers.

The contemporary regional economy reflects this history and is primarily based on food production, including grapes, maize, vegetables, potatoes, dairy and livestock, alongside public sector and service jobs in urban centres, primarily Tarija. Since the 1970s, regional development has focused on linking agricultural production with industrial development, particularly prioritizing the production of commercial agricultural products, including grapes and dairy (CODETAR, 1974, 1979, 1991). The importance of agricultural production at the department level has only recently been surpassed by the growth of hydrocarbon extraction in the Chaco region of the department (Hinojosa, 2012; Hinojosa et al., 2015).

Preston and colleagues (1997) conjecture that cereal crops, including maize and wheat, and tree fruits have likely been staples of the local diet since the colonial period (also see Super, 1988). Animal husbandry of cattle and other livestock remains important to livelihoods, particularly in highland and more isolated parts of the valley (Preston, 1998; Vacaflores, 2013). In recent decades, potatoes and other vegetables have also increased in importance (Preston et al., 1997), as have commercial dairy (Tapia & Pimentel, 1978) and viticulture, and associated alcohol manufacturing industries (FAUTAPO, 2010a, 2010b).

In spite of growth in commercial agriculture, most small producers do not live exclusively from agricultural production and complement their livelihood portfolios with migratory agricultural labour and work in urban centres (Böhrt, 2009; Preston, 1998; Preston & Punch, 2001; Punch, 2007). Preston et al. (1997, p. 10) summarise the trend also evident in other parts of the Andes (c.f. Bebbington & Batterbury, 2001; Rhodes, 2006):

For many of the smaller-scale farmers, land and livestock satisfy basic food needs and small cash requirements, while earnings elsewhere provide capital for clothes, consumer durables and home improvements.

Cyclical and long-term migration, primarily to Argentina and to urban centres, is also important for many households, particularly in rural areas (Böhrt, 2009; Preston & Punch, 2001; Punch, 2007). Viticulture, which dates to the arrival of the Spanish, has grown into a commercial sector since the 1970s, and the production of wine and singani (a grape-based spirit) is an important agro-industry. Production is primarily for the national market; however, limited quantities of wine are also produced for international export. This production is dominated by a few large wineries. Tourism, particularly wine tourism, is also beginning to increase in the area (CBI, 2014; Contreras Villaseñor & Elías Pastor, 2012; Preston & Clewer, 1993).

1.4.2 Overview of research methods

Data related with each research objective were gathered using a variety of methods. I relied most heavily on two main data gathering techniques: active participant observation and interviews. These primary data collection tools are consistent with a phenomenological approach and ethnographic strategy, which emphasise coming to understand the meanings individual agents develop related to phenomena (Wills, 2007). The data collected through these means are augmented by document review and surveys. I used field notes and journals, as well as photographs and short videos, to document my research process and gather visual data related to the food system. All data were collected in Spanish. Research assistants also aided in data gathering, accompanying me to interviews and collecting survey data.

Philosophically, my research is situated within a social constructivist worldview. From this perspective meanings are understood as multiple, variable and negotiated within social and historical contexts experienced by individuals (Butler-Kisber, 2010; Creswell, 2007, p. 20-21). Phenomenology is an example of a research approach in which social constructivist worldviews are manifested (Creswell, 2007). “Phenomenologists,” Butler-Kisber (2010, p. 50) summarises, “believe that meaning-making and understanding takes place in the everyday world of the individual.” Phenomenology is an approach that seeks to describe the meanings of lived experiences of groups of individuals related to a particular phenomenon (Creswell, 2007, p. 57). From this

standpoint, reality is indivisible from consciousness (Butler-Kisber, 2010). Butler-Kisber (2010) suggests that phenomenology is a methodological approach attuned to examining personal experiences, gaining insights into motives and actions, and unpacking normalised assumptions and beliefs. Phenomenology is, therefore, a highly compatible research approach when considerations of meaning and subjective experience, such as those surrounding processes of change and continuity within a localized food system, are a primary focus of investigation. In keeping with this a phenomenological worldview, I was guided by interactive-adaptive concepts that allowed for planned flexibility in the research process in order to adjust questions, techniques and focus areas to changing circumstances as well as integrate feedback from research participants and my own reflections over the course of the research project (Nelson, 1991).

1.4.2.1 Research process

My fieldwork was divided in two phases: Phase I, a scoping period (August-November, 2012); and, Phase II, a main data-gathering period (March-November, 2013). From August to November, 2012, I undertook a three-month internship as part of the Canadian International Development Agency's Students For Development Program, managed by the Association of Universities and Colleges of Canada (AUCC). I was hosted by the Rural Territorial Development with Cultural Identity Program (*Desarrollo Territorial Rural con Identidad Cultural: DTR-IC*) of RIMISP - Latin American Centre for Rural Development (*Centro Latinoamericano para el Desarrollo Rural: www.rimisp.org*; also see Porras, n.d.).

During this scoping period, I divided my time between La Paz, where the DTR-IC staff are located, and Tarija. In La Paz, I was able to meet members of the RIMISP team and better understand their approach to rural territorial development in Bolivia and Latin America, including their involvement with the incipient Bolivian gastronomy movement. I was also able to visit another of their project sites in Valle de los Condores, Peru. As an international NGO with on-going projects in Tarija, RIMISP-DTR-IC facilitated my entry to the field and helped me establish collaborative relationships with local NGOs (i.e. FAUTAPO and Comunidad de Estudios – JAINA), tourism associations (i.e. Asociación de Turismo de San Lorenzo and the Asociación de Turismo Uriondo) and government authorities (i.e. Gobernación – Sub-sección San Lorenzo). Establishing these

connections was a key outcome of the scoping period. I also undertook field visits with local experts to the municipalities of San Lorenzo, Cercado, Uriondo, Yunchará, and Entre Ríos. These visits were critical for building my preliminary understanding of the Central Valley, refining research objectives and identifying focal research areas.

Preliminary data gathered during Phase I allowed me develop territorial and sub-territorial profiles of potential study sites (Appendix H) in order to evaluate their logistical viability and case study suitability against the following set of criteria:

- 1) Edible biocultural heritage has a significant place in the localized economy;
- 2) Food production is taking place that is oriented toward local and extra-local markets;
- 3) Exchange of locally produced and non-locally produced foods is present;
- 4) There are economic development initiatives related to the use of edible biocultural heritage (e.g. evidenced through associations with RIMISP) taking place that reflect the characteristics of endogenous development;¹²
- 5) The population is small enough to capture the principal nodes of production, exchange and consumption comprising the localized food system; and,
- 6) The primary operational language is Spanish.

Three communities (San Lorenzo in San Lorenzo, Salinas in Entre Rios, and Yunchará in Yunchará) were originally selected in order to broaden the geographic coverage of the research. However, it was decided prior to my beginning Phase II that I should limit the scope of my research to the Central Valley for logistical reasons and should incorporate a transect methodology in order to capture the differences within the Central Valley that might arise in relation to distance to markets, available infrastructure and other factors.

The main period of data collection began when I returned to Bolivia in March 2013. During most of this time in Phase II, I lived in the Village of San Lorenzo. San Lorenzo and Tarija were the main starting points for data gathering. I then expanded data gathering to the San Lorenzo transect through frequent day trips by bicycle to the neighbouring communities. In addition to many day trips to Uriondo in the preceding

¹² Product transformation and innovation seem to also be important indicators of this type of development, as do the presence of networks and/or associations engaged in initiatives related to edible biocultural heritage.

weeks and months, I spent several days in October staying with a family in Saladillo, which facilitated the majority of the Uriondo transect interviews. Key events related to the promotion of edible biocultural heritage, such as the TAMBO festival and symposium in La Paz, were also important sites of data collection for me. I undertook data analysis during and post-field work, with the bulk of data processing and analysis taking place in spring and summer 2014 (see Section 1.4.3).

1.4.2.2 Active participant observation

Active participant observation was a key data gathering tool for me and took many forms. Between April and November 2013 I lived in the town of San Lorenzo and by virtue of doing so was provided many opportunities to participate in everyday aspects of community life. Examples include: regularly buying groceries at the local market, eating in local restaurants, taking public transportation to and from Tarija, and attending parades, festivals and other community celebrations. These and other everyday activities afforded many opportunities for informal conversations with San Lorenzo residents and helped me to get a feeling for life in the community, including the experience of frequent power outages, road blockades and water shortages, what meals were regularly sold at different venues, who ate at them, which products were available at the markets during different times of the day, week and year, and the jokes, music and social relationships that give colour to the local foodscape.

In addition to these everyday experiences that come with living and being interested in a place, I also sought out opportunities for active participant observation in specific contexts related to the food system. I was invited by the *Gobernación – subsección San Lorenzo* to participate in a weekly baking class (April to September, 2013) they sponsored for women in the community (Figure 3). These classes proved to be an excellent forum for getting to know the approximately 15 women (aged 18 to 75) who participated regularly in the class, five of whom I was able to visit and interview, in addition to interviewing our instructor. Several of the women and our instructor made all or part of their livelihoods from baking. The conversations around baking as an income generating activity and as part of local tradition and household consumption provided valuable insights into the local food culture and helped in the development of interview guides.



Figure 3. Preparing a cake during San Lorenzo baking class.

Common discussion themes during classes included reflecting and talking about community events (such as fairs, festivals, road blocks), the difficulty finding quality ingredients in Tarija, how baking provided our instructor with economic independence from her husband, how and what the women cooked daily for their families, and how excited they were to learn new recipes and to use particular ingredients, like amaranth. The recipes covered in class varied from traditional snacks, like *buñelos*, to cosmopolitan cakes, such as Black Forest cake. Together, our class also participated in a production fair called “2nd fair of Foods of Yesteryear” (*II Feria de la Comida del Antaño*: August 25, 2013, San Lorenzo), as part of the month-long festival of San Lorenzo, for which we individually had to prepare and sell one of the recipes we learned during the course. This was a fascinating behind-the-scenes experience of participating in a production fair and also provided many hours for me to sit and chat with women from the class and from other communities who were also attending government sponsored cooking and baking classes.

In addition to participating as a vender at the Foods of Yesteryear Fair and conducting surveys at three fairs (Section 1.4.2.6), I also attended numerous other production fairs and festivals taking place in San Lorenzo, Tarija and other communities. The production fairs are delineated in Table 3.

Table 3. Production fairs and expositions attended during fieldwork.

Theme (English translation)	Theme (Spanish)	Date	Location
6th fair for the exchange of traditional foods and creole seeds	<i>VI feria de intercambio de comidas tradicionales y semillas criollas</i>	October 28, 2012	Potreros, organized by the Sub Central Campesina de San Diego, Comunidad Campesina de Potreros
17th fair of cheese and milk	<i>XVII feria del queso y la leche</i>	April 6-7, 2013	Rosillas, Padacaya
10th Agriculture, livestock, artisanal and cultural expo	<i>Expo Agrícola, Ganadera, Artesanal y Cultural:</i>	April 12-15, 2013	Tarija, Cercado
Fair of Pork on the Cross	<i>La Feria de Chanco a la Cruz</i>	April 15, 2013	Tarija, Cercado
5th Producing and eating what is ours fair	<i>V feria producimos y consumimos lo nuestro</i>	April 27 and 28, 2013	Tomatas Grande, San Lorenzo
5th agricultural fair of milk and milk derivatives	<i>V feria agropecuaria de la leche y sus derivados</i>	May 5, 2013	Ranch Norte
21st fair of artisanal wine and singani	<i>XXI feria del vino patero y singani casero</i>	June 23, 2013	Sella Cercado, Cercado
Exposur (multi-sector fair)	<i>Exposur (feria multisectorial)</i>	November 9, 2013	San Jacinto, Cercado

I also attended events around the festival de San Lorenzo (August 9-11, 2013, San Lorenzo), the festival de Santa Anita (4th Fair of Santa Anita, July 21st, 2013, San Lorenzo and July 26, 2013, Calle Cochabamba, Tarija), Easter and *Semana Santa* (2013, Tarija), and *Todo Santos* (November 1-2, 2012, Tarija; November 1-2, 2013, San Lorenzo). I used photos and field notes extensively to document these events.

In addition to these Central Valley celebrations, I was also able to participate in promotional events related to Bolivia's National Food Movement, *Movimiento de Integricación Gastronómico Boliviano* (MIGA, n.d.) and *Tarija Aromas y Sabores* (Tarija Aromas y Sabores, n.d.). These included attending the launch of MIGA (2012, La Paz), and MIGA's first and second "TAMBO" symposiums (October 11-14, 2012, and October 16-20, 2013, La Paz), in which TAS participated through presentations and product displays and other groups from Tarija also participated. I was also fortunate to attend a TAS producer exposition related to the visit of Chef Claus Meyer (a Danish chef

involved in founding MIGA and who was interested in sourcing TAS products for a restaurant he was launching in La Paz: April 1, 2013), a symposium, “Gastronomy as a touristic product for local-territorial development” (*la gastronomía como producto turístico para el desarrollo local-territorial*), hosted by TAS and RIMISP (September 5-8, 2013), and a Territorial Development with Cultural Identity workshop and reflection hosted and facilitated by RIMISP (September 20, 2013).

While visiting large public events offered many insights into the changing relationships and ideas surrounding food, biocultural heritage and the local economy, spending time with families at their homes, in their kitchens and at their fields was also very important. In addition to regularly visiting farms, such as the Adana family’s dairy farm, I was also able to spend several days preparing meals with several small restaurant owners and cooks (Doña Rosa, Doña Betty, Doña Adriana and Doña Valentina). In these settings, they shared recipes and stories that offered glimpses into their lives and businesses that complemented my interviews with them. I spent many afternoons kneading the dough for making rosquetes with Doña Aide and her family, as well as visiting with Doña Candelaria and her daughters while they were boiling and baking rosquetes. Making cheese with Doña Sandra, spending *Todo Santos* with Doña Maria Luisa and her family, and sharing meals and visiting with Doña Jhanet and her family, the Valdez family, Doña Ubaldina, and many others were wonderful experiences of friendship entwined with exposure to local food culture.

1.4.2.3 Identification, selection and informed consent of research participants

Research participant selection was based on a purposive sampling strategy (Creswell, 2009; Palys, 2008) aided by a snowball sampling technique (Biernacki & Waldorf, 1981).¹³ Purposive sampling, or the process of purposefully selecting research participants, sites, or other research materials, is defined by Creswell (2009, p. 231) as when qualitative researchers, “...select individuals who will best help them understand the research problem and research questions.” This approach to sampling, which differs fundamentally from quantitative methods often based on random or large samples, is essential to qualitative social science research (Creswell, 2009; Palys, 2008). It reflects the interest of qualitative

¹³ A snowball technique involves asking research participants to recommend others who they believe would be informative on the subject of research and may be willing to become involved.

research in understanding *particularity* (i.e. why individuals or groups form particular attitudes and perspectives and how these inform social processes: Palys, 2008, p. 697). Reflective of this is the acknowledgement that key informants and other actors who are able to provide deep insights on a phenomenon are more valuable to the research process than larger groups of randomly selected individuals.

As a result, research participants were primary, secondary and service sector producers, as well as consumers, intermediaries (e.g. market vendors and other retail owners), NGO and government officials, primarily in the seven San Lorenzo and Uriondo study communities as well as the City of Tarija. They were selected based on their active involvement in the production, sale or household use of traditional products, past or current involvement in development programs involving some aspect of the food system and willingness to become involved in this research.

Initially, key informants in local NGOs involved in the development of the *Tarija Aromas y Sabores* (TAS) project were identified with the help of RIMISP, as many were part of their network of local contacts. These individuals, in turn, identified others, including entrepreneurs involved with TAS, who could provide current and historical perspectives on the use of local biocultural resources in development and changes in the food system over time. Once initial contacts were made, snowball sampling allowed me to extend the research participant group by helping me to identify networks of people involved in different aspects of the local food system.

The transect methodology was adopted to gain a regional perspective on the food system, particularly how dynamics and norms of production, exchange and consumption changed in relation to distance from urban centres. The two transects are situated to the north and south of the City of Tarija. The San Lorenzo Transect (Figures 4 and 5) is located in the Province of Mendez (*Provincia Mendez*), San Lorenzo Sub-section (*Sub-sección San Lorenzo*) of the San Lorenzo Municipality. The Uriondo Transect (Figures 6 and 7) is located in the Province of Aviles (*Provincia Aviles*), in the first municipal section, Uriondo (*primera sección, Uriondo*). Both transects fall within the broad area of influence of the City of Tarija, and both emanate from tertiary centres – the towns of San Lorenzo and Valle de la Concepción – and fall within their respective areas of influence (Prefectura, 2006).

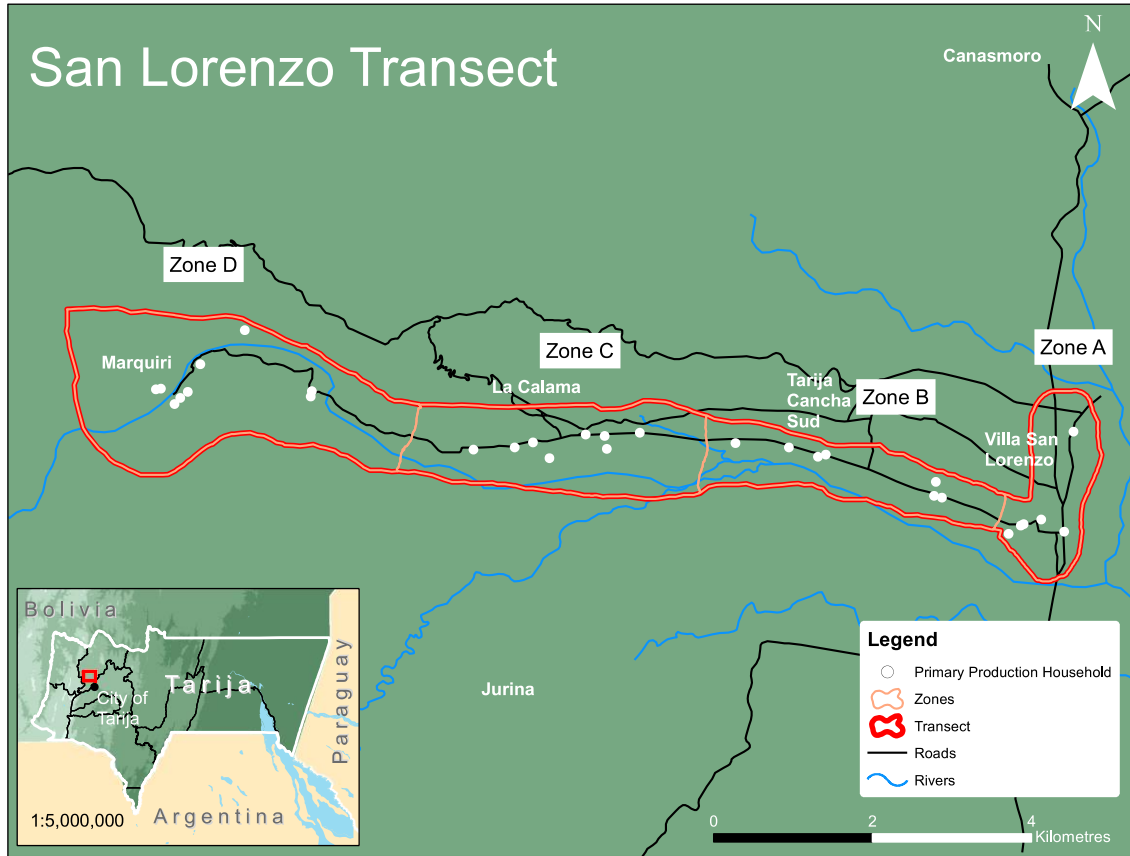


Figure 4. San Lorenzo Transect and the locations of participating households engaged in primary production activities in each transect zone.



Figure 5. View of the San Lorenzo Transect area, above La Calama.

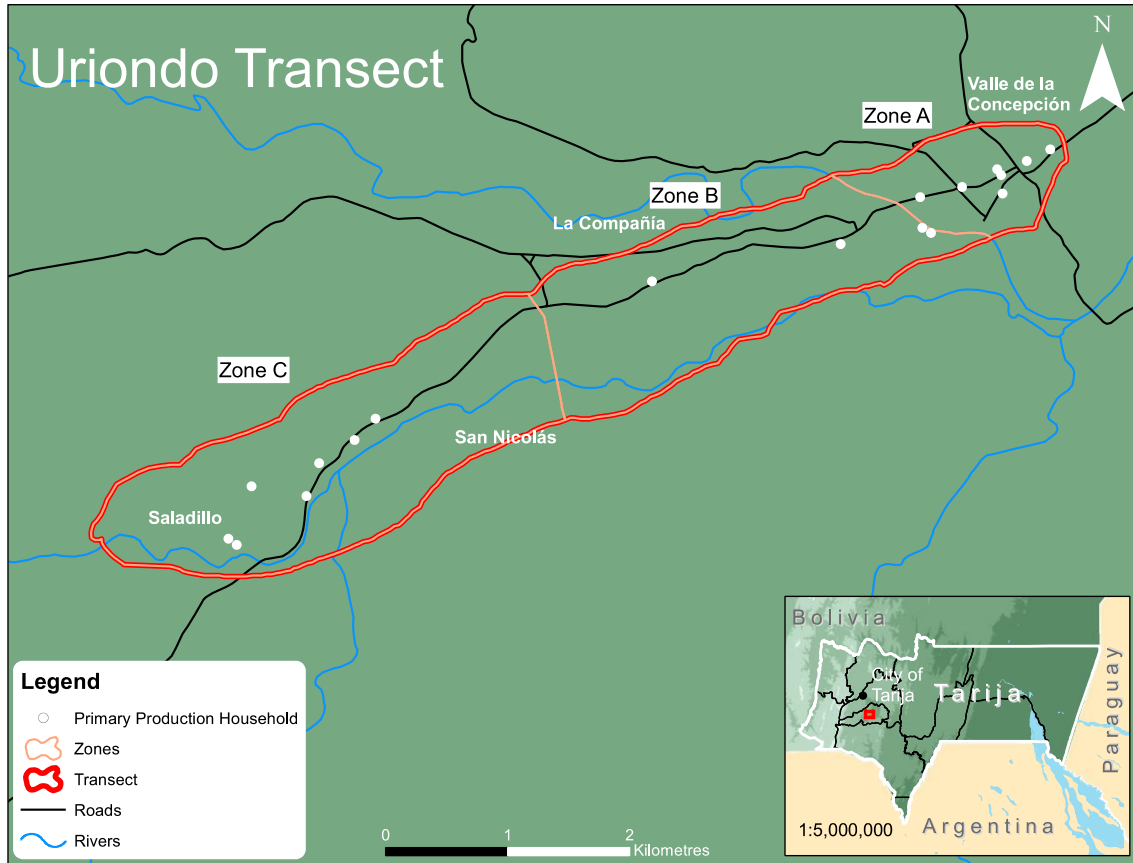


Figure 6. Uriondo transect and the locations of participating households engaged in primary production activities in each transect zone.



Figure 7. View of the Uriondo Transect area, above La Campaña.

The transects were divided into zones to facilitate data gathering and analysis. Zone A of each transect corresponds to the respective urban centre of each (e.g. San Lorenzo and Valle de la Concepción) and other zones correspond to the boundaries between the smaller communities along each route. To achieve representation from each zone, target numbers of interviews in each interview category were conducted. Primary and secondary producers, people involved in exchange and those who could provide

insights on household consumption and regional history were sought out in each community (Table 4). Basic descriptions of each transect and overviews of the primary production profiles of each are provided in Appendices E and F. Households in each transect were selected because of their reliance on, or active involvement with, primary production. Other households along each transect were also interviewed because of their involvement in secondary or tertiary production related to edible biocultural heritage.

Table 4. Total primary production households involved in transect.

Unit of Analysis	Total Households	Unit of Analysis	Total Households
San Lorenzo Transect	30	Uriondo Transect	18
Zone 1 - San Lorenzo	6	Zone 1 - Valle de la Concepción	7
Zone 2 - Tarija Cancha Sud	7	Zone 2 - La Compañía	4 (plus, 1 corporate vineyard)
Zone 3 - La Calama	8	Zone 3 - Saladillo	7
Zone 4 - Marquiri	9		

Key informants were helpful in identifying initial contacts in each community who then helped identify other possible research participants. Local research assistants, Leonela Valdez (San Lorenzo transect) and Marina Pastero (Uriondo transect), were particularly helpful in identifying research participants in their home and neighbouring communities. Business signs were also used to help identify producers and venders of certain products, such as artisanal wine and baked goods in the study communities. Clusters of interviews with producers outside the transect areas [in the communities of Canasmoro (n=2), Lajas (n=2) and Tomatitas (n=5)] were also conducted to fill key gaps related to high-value, non-traditional vegetable production, artisanal bread production and restaurants featuring traditional dishes respectively. During the research process, I attempted whenever possible to involve research participants offering a balance of gendered, age-informed, occupational and other perspectives.

Consent from research participants was obtained prior to all interviews. Because of low literacy levels and evident discomfort with written forms shown by many, consent was often obtained orally. Interviews were conducted in the location chosen by the participant, often in their home, field, business or office. Participants gave their consent to be digitally

recorded and were able to withhold their names and retract their participation or information provided at any time. For publications the names of participants have been withheld to protect their privacy and anonymity. In their place household numbers or pseudonyms are used. Recordings and other data were kept on my password-protected personal computer. Research assistants also signed confidentiality agreements.

1.4.2.4 Interviews

Interviewing, as the title of Rubin and Rubin's (2005) book aptly states, is "the art of hearing data," and constitutes a powerful data gathering tool when it is necessary to understand something in depth from another person's point of view. Interviews can be conducted with structured, semi-structured, or unstructured interview schedules that offer differing levels of reflexivity and standardisation (Hammersley & Atkinson, 2005). Howitt and Stevens (2005, p. 45) suggest that the interactive, conversational nature of informal, semi-structured interviews make them the most effective and respectful interview format in intercultural contexts (also see Rubin & Rubin, 2005).

For this reason semi-structured interviews were the main interview format used in this research. Semi-structured interviews are guided by a predetermined set of questions and list of topic areas that offer a focus to the interview (Hadley & Watich, 2009). However, there is flexibility to ask follow-up, probing, or new questions as the interview progresses, and to skip questions or change the order in which they are posed according to context (Dunn, 2005). Sample interview schedules are included in Appendix A.

Interview schedules were developed based on themes relevant to key areas of investigation associated with the research objectives. The interview schedules were piloted with key informants and adapted over the course of data gathering to refine their effectiveness and clarity. Distinct interview guides were created to focus on primary production, secondary production, household consumption and restaurants and food vendors. Tailored guides were also created for NGO and government institutes and as necessary in other contexts. The schedules, however, were designed around multiple thematic modules of questions that could be tailored by including or omitting modules for each interview. Examples include: personal history, family history of primary production, current household consumption, current primary production, exchange networks for cash crops, among many others. For example, an interview might be focused on contemporary

household primary production activities, but then be modified to include questions on household consumption or family history of primary production if it seemed advantageous to do so during the interview.

The type of questions that were posed and the focus of the interviews on individual and household experiences were inspired by narrative interview techniques (Butler-Kisber, 2010; Satterfield, 2001) and elements of appreciative inquiry (Kelm, 2015). Insights from ethnobiological work with food systems were also helpful in shaping lines of inquiry. Martin (1995, p. 112), for example, suggests the value of listening to local stories about particular plants, animals and foods and Kuhnlein et al. (2006) also caution that special attention is often needed to recognise and gather data related to little-used and currently unused foods.¹⁴ The elicitation of narratives (i.e. stories related to significant facets of experience or a life history: Butler-Kisber, 2010, p. 63) surrounding the role of food in household economies was a central component of most interviews. Narratives are an important tool because they tend to intertwine "...the physical and psychological dimensions of knowing" (Butler-Kisber, 2010, p. 62) and in so doing they point to "...the way humans account for their actions and events around them and shape their everyday experience."

Life history (Tierney, 2010, 2013) and intergenerational (Kuhnlein, 1992) interviews can provide a historical account of the dynamics of the localised food system, including the interplay of global and local discourses, captured in living memory and can also provide insights into the experiences of change over time (also see Vaccaro, 2008). Consequently, life history (n=19) and intergenerational and intra-household interviews (n=32) were conducted. Repeat interviews were conducted with five participants in order to revisit themes and examine new ones; however, generally follow ups were done more

¹⁴ These might be foods that were important in the past and are no longer used widely or frequently, famine or 'lean-year' foods, or foods such as harvested leafy greens that were obtained in conjunction with other activities. There are numerous reasons, ranging from substitution of other foods to environmental contamination, which may explain the current status of such foods and they can provide important insights into the forces shaping the historical and contemporary food system. Kuhnlein et al. (2006) suggest that elders are likely to be particularly important key informants on such foods. Mintz (1986) and Camacho (2006) also note that special foods eaten during celebrations or other events are often important expressions of the persistence of foods that may once have been eaten more frequently and have undergone a transformation of their social status.

informally through visits to homes and businesses and active participant observation activities. In total, 131 interviews were conducted with 139 people [accounting for multi-party (n=11) and repeat interviews (n=5)] as part of this research, and many fall into multiple categories (e.g. household production and consumption; restaurant owner and life history). A summary of interviews by category is presented in Table 5.

Table 5. Interviews by category.

Interview module	Sub-category	Transect	Non-transect	Category sub-total	Total
Household consumption	N/A	31	0	31	31
Primary producers	All	38	5	43	43
	Dairy	14	2	16	
	Viticulture	12	2	12	
	High-value, non-traditional fruit and vegetables	2	3	5	
	Agriculture and animal husbandry	10	0	10	
Secondary producers	All	15	4	19	19
	Wine and/or singani	10	0	10	
	Baked goods	4	3	7	
	Cheese	1	1	2	
Tertiary producers	All	24	13	37	37
	Tourism services	2	1	3	
	Restaurants	11	7	18	
	Retail	9	5	14	
	Other	2	0	2	
Life histories	N/A	19	0	19	19
Institutions	All	23	14	37	37
	NGOs		11	11	
	Tourism associations	7	0	7	
	Producer associations	5	0	5	
	Government agencies	11	3	14	

1.4.2.5 Product availability scans

Market scans were incorporated into the study in order to document the availability of products in the four principal markets of the Central Valley (the markets of San Lorenzo, Valle de la Concepción¹⁵ and the Central and Campesino Markets of Tarija). Scans were conducted in each market once a month for seven consecutive months (June-December 2013) and one additional month (March 2014).

¹⁵ The market in Valle de la Concepción is very small. Consequently, nearby stores (*tiendas*) selling fresh products were included in the scans in order to incorporate a more representative sample of the products available to consumers buying foodstuffs in the town.

Preliminary scans were conducted in each market to create the initial list of products. This list served as a checklist for subsequent scans and was added to as new products were encountered. The two initial scans of each market included non-perishable goods (e.g. canned goods, dry goods, dried herbs, fruit conserves, among others), baked goods, artisanal drinks (*refrescos*), snack foods and prepared foods. Subsequent scans only captured fresh produce (fruit, vegetables and tubers), eggs and dairy products, and meats and fish. A list of products identified through the scans and their patterns of occurrence and distribution are included in Appendix G.

1.4.2.6 Surveys

Several types of surveys were incorporated into the study in order to document dynamics of production, exchange and consumption taking place within specific contexts in which full interviews were not feasible. Survey schedules are included in Appendices B and C. Surveys have been critiqued for their tendency towards rigidity, intrusiveness and associations with ‘top-down’ research paradigms (Dowling, 2005; Howitt & Stevens, 2005; Jaffee, 2007; Martin, 1995). Consequently, surveys were not deployed until mid-way through fieldwork in order to ground the questions in knowledge of the local context gained during the preceding months and to ensure that the purpose of the surveys was clear, a strategy recommended by Martin (1995, p. 116) and Jaffee (2007). Instruments were also flexible and were adapted by refining or reframing questions as necessary to improve the survey process and resulting data.

Public markets

In addition to scans of product availability (Section 1.4.3), surveys were also conducted with vendors (n=43) at the four primary Central Valley markets: San Lorenzo (n=14), Valle de la Concepción (n=5), Tarija’s Mercado Central (n=12) and Mercado Campesino (n=12). Survey questions were flexible and adapted as necessary to the specifics of each type of stall and to include additional components such as the history of the market or a particular product when the research participant was interested and knowledgeable. Additionally, surveys were conducted with consumers (n=48) at the Central and Campesino markets (n=20 and n=28 respectively) in order to identify the area of influence of each market and better understand the shopping patterns of Central Valley

consumers. A summary of findings associated with the availability and circulation of agrobiodiversity and associated primary and secondary products is presented in Appendix G.

Production fairs

Surveys were conducted with participants at three production fairs: Alojias and rosquetes fair (*Feria de alojias y rosquetes*: July 14, 2013, San Lorenzo), 10th Corn fair (*X feria de maiz*: August 4, 2013, held in Marquiri and organized by the Sub Central de Choroma), and 2nd Tarija Aromas and Flavours Festival (*II Festival de Tarija Aromas y Sabores*: September 6 to 8, 2013, Tarija). Three categories of participants – exhibitors, food vendors and visitors – were identified, and tailored survey instruments (Appendix C) were used for each. Exhibitors were classified as participants who were displaying and/or selling the focal product of the particular fair (e.g. a vender selling rosquetes at the rosquetes fair). A total of 42 surveys of this type were conducted (rosquetes fair: n=10; corn fair: n= 6; TAS fair: n=26). Ten food vender surveys (classified as food vendors selling foods other than the event's focal product: rosquetes fair: n=3; corn fair: n=7; TAS fair: n=0¹⁶) and 72 visitor surveys (classified as residents or tourists visiting the events: rosquetes fair: n=12; corn fair: n=20; TAS fair: n=40) were also conducted. This data is drawn on in Chapter 5.

1.4.2.7 Document review

Document review involves the collection and review of texts in order to gather contextual data that might not be available through other means (Prior, 2008). Altheide et al. (2008, p. 127) explain that, “A document may be defined as any symbolic representation that can be recorded and retrieved for description and analysis.” These may include organisational reports and financial statements, public and private archival records, including maps, photographs, and texts, newspapers and other media, as well as ethnographic, socio-economic or other relevant information available in the academic literature.

¹⁶ Access to the fair grounds was controlled, restricting the participation of vendors who were not officially associated with the event.

Document review of publically available documents, including government (e.g. CODETAR, 1974, 1979, 1991; Prefectura, 2006; Tapia & Pimentel, 1978) and NGO (e.g. FAUTAPO, 2010a; FAUTAPO & OMIN, 2012a; Olarte Q., 2012b) development program reviews and plans, were of particular importance as sources of current and historical data on development projects in the Central Valley. Data from 1950 and 1984 national agricultural censuses (MACA et al., 2009; República de Bolivia, 1990) was also analysed to examine Central Valley agricultural production patterns (see Appendix D).¹⁷

1.4.3 Data processing and analysis

The research objectives served as the primary rubric against which data collection was organised. Table 6 outlines the key areas of inquiry and associated methods corresponding to each objective. Data processing and analysis took place in two main steps. During phase I of the research, I gathered preliminary data on the Central Valley and surrounding territories through field visits and interviews with key informants. This data was transcribed and analysed in order to develop territorial and sub-territorial profiles (Appendix H) and to select field sites for Phase II (Section 1.4.2.1).

The extensive body of data collected during Phase II was digitized in the field and transcripts of key interviews were undertaken. The majority of transcriptions, however, were done after my residence in the field, some with the help of a hired transcription assistant. Field notes and transcripts were organized and coded using a qualitative data analysis software (ATLAS.ti 7™). Survey and household production profile data were compiled in Microsoft Excel™. Once primary production data were compiled for each household and organised according to transect and transect zone, the program BioDiversity Pro 2.0™ was used to conduct a Bray-Curtis Similarity Cluster Analysis on the transect zones (see Appendix E). Household primary production profiles were also analysed and categorised according based on a Likert scale of 1 to 5 reflecting the use (market versus non-market orientation) of each product according to the frequency with which it was either sold or retained for household consumption (1 representing products exclusively for sale, 5 representing products exclusively for household use, and the range in between capturing multi-purpose products sold and consumed in different

¹⁷ Another national agricultural census was also conducted by the state in 2013; however, the results of the census were not made publically available in time for inclusion in this research.

proportions). This analysis was used to build the transect profiles and typology of production systems presented in Appendices E and F.

Table 6. Summary of how objectives informed areas of inquiry and research methods.

Research Objective	Key Areas of Inquiry	Associated Methods
1. Document the recent history (c. 1950 to the present) of the study area through the lens of the food system.	Document the social history of selected products that have played strategic roles in household economies	Life history and regional history interviews (including personal history sections of market venter surveys)
	History of rural development interventions in the Central Valley	Key informant interviews
	Identifying key nodes of food production, exchange, and consumption and distinguishing patterns related to local and extra-local food commodity flows, including patterns of market- and non-market-oriented production and consumption at the household level.	Document review
	(The scope is bounded by a focus on the life histories of middle aged and elderly research participants and their families as producers, intermediaries and consumers.)	
2. Document the components and dynamics of the contemporary food system.	Document the main characteristics of the contemporary food system through data on production, exchange and consumption patterns	Active participant observation
	Examine the form and function of different components of the food system through the experiences of primary, secondary and tertiary producers, as well as food venders, retailers and consumers	Primary, secondary and tertiary producer interviews
		Household consumption interviews
	Document the availability of products and dishes at markets, restaurants and food stalls	Market scans and surveys Production fair surveys
3. Analyse the characteristics and forms of rural development connected with the use of edible biocultural heritage and their meanings for communities and households in the Central Valley.	Identify, describe and analyse rural development initiatives related to edible biocultural heritage	Active participant observation
	Identify, describe and analyse their relationships with and meaning for the livelihood activities of research participants	Primary, secondary and tertiary producer interviews
		Household consumption interviews
		Market scans and surveys Production fair surveys

Through this analysis, coding and working with the body of data gathered over the course of this project, lines of narrative began to emerge surrounding different dimensions of the history, use and contemporary relevance of edible biocultural heritage

to different groups within the Central Valley. These narratives and related empirical findings coalesced around the key questions (Section 1.2) that structured the development and production of the four manuscript style findings chapters comprising the main part of this dissertation. Given the narrow focus and length of journal articles, tightening the research objectives to key questions was necessary and data that were not possible to include in these chapters have been summarised in appendices.

1.6 Organisation of dissertation

The body of this dissertation is comprised of four manuscript style findings chapters, accompanied by Introduction and Conclusions chapters. The four findings chapters (Chapters 2 to 5) examine processes of territorial development through different lenses. Each chapter is preceded by a short preface to situate it within the overarching research project, including by identifying connections among the findings chapters.

In order to understand current processes of territorial development related to local edible biocultural heritage it was essential to situate current processes within a historical and food system context. Chapter 2 examines historical norms of production in research participant households and how they have changed over time in relation to globalization and environmental change, both of which are closely related in many respects to rural development initiatives. This chapter traces how ways of life and food production for many households in the Central Valley floor have undergone profound changes from the 1970s to the present. These changes relate to the introduction and sub-regional specialization in the production of market commodities, specifically grapes and dairy. The construction of a productive landscape prioritizing selected commodity production shaped the range of possibilities available to research participant households, creating opportunities for commodity production while limiting possibilities for the production of historically important crops and livestock. Chapter 2 traces these processes of change through household experiences related with the production, and ultimately declining production, of pastured livestock (e.g. goats, sheep, and cattle) and grains (e.g. wheat, quinoa and amaranth) as households transitioned towards commodity production.

Chapter 3 analyses the experiences of households engaged in commercial viticulture (grape) production. In spite of decades of viticulture production promotion in

the Central Valley by government agencies and non-governmental organisations, some campesino producers are not transitioning their production portfolios to the exclusive production of grapes. Rather they have incorporated modern, commercial viticulture into agroecosystems that support family livelihoods, which also often include non- and off-farm activities. Although this strategy is under-recognized and under-supported by development agencies, producers maintain agrobiodiverse production systems, including commercial grape production, for economic, ecological and sociocultural reasons, that help them balance the benefits and risks of participation in the viticulture sector.

Chapters 4 and 5 focus on two contemporary territorial development processes taking place in the Central Valley: a gourmet project centred around a set of ‘star’ regional products intended primarily for consumption outside the Central Valley, and a campesino project loosely massing around a range of regional specialties widely produced and consumed locally. Both chapters develop and employ a biocultural sustainability framework organized around interconnected ecological, economic and sociocultural considerations to examine how the use and mobilization of biocultural resources in development projects shape current and future relationships with biocultural heritage. In the case of the gourmet strategy, preferential support for gourmet products risks fostering a closed-loop of elite production and consumption, in which those with the greatest economic and cultural capital are best positioned to shape and benefit from new biocultural heritage-based product markets, often to the exclusion of other producers and ‘non-gourmet’ products. By contrast the campesino project, reflected in an alternative food network around campesino products and dishes, appears to be supporting the livelihoods of numerous campesino producers, many of whom are women. Furthermore, the relatively small investments by local governments are having positive ripple effects in the local economy, creating conditions that are generally favourable to the continuity of biocultural heritage use.

Finally, my Conclusions (Chapter 6) integrates insights from the four previous chapters to provide an overview of the theoretical and practical contributions of this dissertation. I conclude with recommendations for policy and development practice.

1.7 A note on authors' contributions

The four manuscript style findings chapters (Chapters 2 to 5) that comprise the body of this dissertation are multi-authored pieces, reflecting the contributions of my co-authors in the conceptualization and production of this research project overall and their specific contributions to the journal article manuscripts/chapters. However, I am the lead author on all of these manuscripts and am responsible for data collection, analysis and writing.

Preface to Chapter 2: Household experiences of rural transformation

In examining current rural development processes and their effects on the localised food system it became very important to consider the historical food system and the changes that have taken place since development and agricultural modernisation became active discourses in the Central Valley. In particular, I wanted to better understand what led to the often-sharp contrasts between current production portfolios and historical production systems described by middle-aged and elderly people. This area of enquiry focusing on how the food system has changed over time allowed me to gain a more complete picture of biocultural heritage in the study communities. This chapter examines factors that have led some components of the historically prevalent production system to remain viable and active within contemporary production systems and what has led others to become less relevant or to be decommissioned.

This chapter provides a backdrop for those that follow in many respects. In Chapter 3, processes of landscape change (including decoupling livestock and crop production in some areas, as examined in Chapter 2), are important for contextualising campesino household responses to the opportunities and challenges surrounding the growing viticulture sector. The information in Chapter 2 also reminds us that, while agrobiodiversity maintained within some campesino viticultural households reflects continuity with past production, the viticulture described in Chapter 3 is a new production system reflecting contemporary needs, challenges and opportunities.

Understanding the biocultural heritage of the Central Valley is also vital for identifying and examining the territorial projects based on biocultural heritage revalorisation discussed in Chapters 4 and 5. In the case of the gourmet strategy (Chapter 4), it was the more complex, historical material narrative of the territory's edible biocultural heritage developed through data employed in Chapter 2 that helped identify how regimes of access were being constructed through the strategy. This includes an empirical basis for discerning which biocultural materials and components of the food system were being evoked within the strategy and which were being overshadowed, written out or silenced. Historical perspectives drawn from Chapter 2 also help identify

the differences between new interpretations of traditional products that are part of processes of gourmet construction and their contemporary artisanal counterparts. Similarly, Chapter 2's documentation of historical production systems and associated ways of life and foods helped bring the alternative food network surrounding campesino gastronomic heritage (as detailed in Chapter 5) into focus, including identifying which elements of biocultural heritage were widely represented and salient within the campesino food economy and which, such as wild plant foods, were less so.

The journal manuscript comprising Chapter 2, entitled “Household experiences of agricultural modernisation and rural transformation in the Central Valley of Tarija, Bolivia”, is accepted with revisions for publication in *Rural Landscapes: Society, Environment, History*. This manuscript is co-authored with Dr. Iain Davidson-Hunt and Dr. Annette Desmarais.



Figure 8. Doña Ubaldina in the Marquiri taking her goat herd to pasture.

Chapter 2: Household experiences of agricultural modernisation and rural transformation in the Central Valley of Tarija, Bolivia

Abstract

Rural transformations underway globally are resulting in profound changes to household economies and the compositions of agrobiodiversity they employ. This paper examines reconfigurations of household economies and agrobiodiversity through the experiences and responses of rural households to environmental change and globalisation in the Central Valley of Tarija, Bolivia, from the 1950s to the present. Research participant narratives from seven study communities document a widely experienced regional shift from rain-fed agriculture and pastured livestock production for household consumption to market-oriented production of regionally specialised commodities. Particularly important to this reconfiguration are changing land use and access regimes, household responses to changing opportunities, discourses and social requirements related with ‘modernising lifestyles’, market integration and dependence, changing environmental and ecological conditions, and greater availability of consumer goods and technologies. These processes have combined to reconfigure the range of livelihood possibilities available to rural households, or their landscapes of possibility, in ways that favour transition to specialised commodity production. Patterns of change, however, are entwined with threads of persistence, underscoring globalization’s contingent nature and the role of local agency and creativity in responding to and sometimes shaping how globalisation unfolds. Examining rural transition through the experiences of households in particular contexts offers insights for development policy and practice to support producers’ ability to respond to globalization and environmental change in ways they see as desirable and beneficial to their livelihoods and wellbeing.

Key words: Rural transformations; Environmental change; Rural household economies; Agrobiodiversity; Bolivia

2.1 Introduction

Agrobiodiversity has sustained human populations worldwide for millennia; however, declining use and loss of local crop and livestock varieties over the last century are well-documented (Orlove & Brush, 1996; Smale, 2006; Vandermeer, van Noordwijk, Anderson, & Ong, 1998; Zimmerer, 2010). Rather than resulting simply from replacement of farmer varieties with scientific varieties as part of a uniform unfolding of globalisation and modernisation, changes in agrobiodiversity use are intimately entwined with complex, multi-scalar, uneven and nonlinear processes of rural transformation that have restructured household economies, agroecosystems and rural landscapes (Zimmerer

2007, 2010; Zimmerer, Carney, and Vanek 2015). Understanding how such processes unfold in particular contexts offers insights for development policy and practice to support producers' ability to respond to globalization and environmental change in ways they see as desirable and beneficial to their livelihoods and wellbeing.

The composition of agrobiodiversity within household production systems comprises the sum of individual species, breeds and landraces, and depends upon household priorities and how the wider biophysical, sociocultural, regulatory and economic landscapes configure access to (or the ability to benefit from) key resources (Ribot & Peluso, 2003). Sustaining, adapting and reconfiguring household agrobiodiversity over time reflects producer creativity as well as local manifestations of environmental change and globalisation (Leichenko & O'Brien, 2008; Zimmerer, 2010).

Regions, economic sectors, social groups, and, consequently, households and individuals, often experience *double exposure* to environmental change and globalisation operating concurrently and shaping the context of rural livelihood activities (Leichenko & O'Brien, 2008). Globalisation manifests in rural areas through agricultural modernization, intensification and market-integration, often driven by development agencies and national development projects, as well as through changes in social norms and consumption patterns (Akram-Lodhi & Kay, 2009; Rhodes, 2006; van der Ploeg, 2008; Zimmerer et al., 2015). Climate change and other environmental change processes are increasingly demanding recognition as defining structural forces determining future livelihood strategies, quality of life and economic possibilities in rural areas (Rhodes, Ríos, & Aragundy, 2006). How these processes interact and come to ground in different settings through the experiences of households as they negotiate the incorporation, retention and rejection of practices, species and technologies that comprise evolving agricultural production systems and agriculture's role within household economies, shape the outcomes of rural transformations for people and the environment (Bebbington 2004; Skarbø 2006; van der Ploeg 1994, 2008)

These broader processes create what Bebbington (2008) has described as *landscapes of possibility* that support or hinder particular lifeways and associated uses of agrobiodiversity and in doing so, shape the range of substantive livelihood choices, or possibilities, including the degree of engagement in market and non-market-oriented

economic systems, available to rural people. We draw on Bebbington's notion to examine changes in household economies and agrobiodiversity. The landscapes of possibility concept directs attention to how landscapes, as constructed physical, economic and sociocultural systems, are produced in particular ways that enable certain resource flows and facilitate some livelihood practices, while hindering others. While Bebbington (2008) focuses on livelihood possibilities more generally, we narrow our focus to how shifting landscapes of possibility affect compositions of agrobiodiversity and associated practices within household production systems. As people respond to the specific policies and development programs that accompany globalisation and environmental change, or market and environmental events that are less planned, they re-fashion landscapes that expand opportunities in some domains, such as market-oriented production, while limiting possibilities for other options. These responses then shape their own future actions as well as influencing their neighbours' landscapes of possibility.

We examine agricultural modernization and rural transition through an empirical case study in the Central Valley of the Tarija Department, Southern Bolivia, focusing on changes in agrobiodiversity compositions within household production systems during the living memory of research participants (c. 1950 to the present). While new crop and livestock species and varieties have augmented campesino production systems in the Central Valley and elsewhere (Turner & Davidson-Hunt, 2016; Zimmerer, 2013), our discussion focuses on declining household production of pastured livestock (i.e. sheep, goats, and creole cattle) and grain crops (i.e. quinoa, amaranth and wheat) as an indication of local experiences and decision-making related with agricultural modernisation, environmental change and shifting landscapes of possibility.

Research participant narratives document multiple, interconnected factors influencing reconfigurations in their household agrobiodiversity away from species, varieties and breeds formerly central to household economies to new landscapes of sub-regional specialisation as the dominant organizing principle of production. Particularly important to these reconfigurations are land use and access regime changes; individual and household responses to opportunities, discourses and social requirements of 'modernising lifestyles'; market integration and dependence; changes in environmental and ecological conditions; and greater availability of consumer goods and technologies.

Understanding how individuals and households experience rural transformation offers insights into rural development policy and program outcomes (intended and otherwise) and their interplay with environmental change, existing production systems and agrobiodiversity, and suggests conditions necessary to retain possibilities for local agrobiodiversity use into the future.

2.2 Study area and research methods

The sub-Andean Central Valley of Tarija sits at an elevation of approximately 1,800 metres above sea level surrounded by mountain ranges reaching heights of 4,000 m. The majority of the population are Spanish-speakers of mixed European and Indigenous descent living in three main municipalities (San Lorenzo, Cercado and Uriondo) and the City of Tarija. Research centred around twelve months of ethnographic fieldwork (in 2012 and 2013) on rural livelihoods, the local food system and the local history of development interventions (Figures 4 and 6).

Semi-structured interviews on personal histories and experiences of change related with household food production, consumption and exchange were conducted with individuals and, when possible, multiple family members of different generations in 68 households in seven study communities selected through a transect sampling strategy (Figures 4 and 6). The transects, which were divided into zones to facilitate data gathering and analysis, allowed for sensitivity to possible differences related with distance and access to markets, urban centres, and infrastructure. Zone A of each transect corresponds to the largest urban centre (e.g. Villa San Lorenzo and Valle de la Concepción) and other zones correspond to the boundaries between the smaller communities along each route. Zone D around the community of Marquiri, San Lorenzo, was the most isolated community. While all interviews included historical components, 18 interviews focused primarily on life history and regional history. Many of the resulting narratives are of childhood memories of men and women now in their 50s to 80s.

A purposive sampling strategy, aided by snowball sampling, identified households and individuals presently or formerly engaged in primary production activities and willing to participate. Local research assistants also helped identify participants and with data gathering. Study community household data are complemented

by document review and interviews with key informants in local NGOs, government agencies and producer associations, and producers in study and neighbouring communities (n=41). All interviews were conducted in Spanish and pseudonyms are used to protect research participants' privacy and anonymity. As 76 interviews are drawn on in this paper, interviewees' seniority titles (Don and Doña) have been omitted for concision.

2.3 Agricultural production in the Central Valley, c. 1950 to present

Agriculture, although marked by periods of profound change in the organisation of production and composition of agrobiodiversity and other resources employed, has underlain the Central Valley economy for millennia (Macklin et al. 2001; Prefectura 2006).¹⁸ We focus here on agricultural production from the 1950s to the present (2010s), roughly corresponding to the living memory of the oldest research participants.

Participant narratives document a coarse pattern with respect to their household economic organization and production strategies over time, aligning with regional transformations in agriculture (Figure 9). Two distinct configurations of agricultural production are evident: 1) mixed agricultural system based on rain-fed crops and pastured livestock, primarily for household consumption; and 2) production of regionally specialised commodity goods, such as milk, grapes or other commercial fruit and vegetables. A period of reorganization in which households began reorienting their economies towards commercial production began 30-40 years ago (1970s-1980s). The following sub-sections describe these production systems and regional processes that contributed to household-level reconfigurations.

¹⁸ These periods include Spanish colonisation in the 1500s and following centuries, the 1953 agrarian revolution, and subsequent attempts in the 1990s and 2010s to complete the reform process, including the provision of collective land titles to campesino and indigenous communities (Kay & Urioste, 2007).

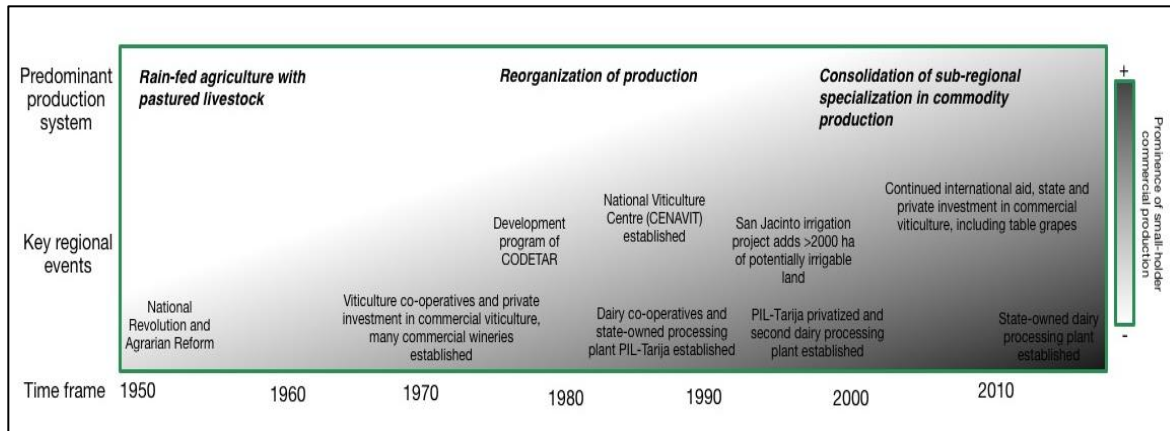


Figure 9. Timeline of rural transformation in the Central Valley (based on CODETAR, 1979, 1991; Prefectura, 2006; and interview data).

2.3.1 Rain-fed agriculture with pastured livestock

Before engaging in primarily market-oriented production, household economies of research participants were principally based on production and consumption of mixed crops and pastured livestock using family labour and common pasturelands. Figure 10 illustrates the primary crops and livestock and their flows between sites of production, transformation, exchange and consumption constituting a household food system organized around rain-fed agriculture and pastured livestock. This example is drawn from Andrea’s description of her childhood and adolescence in Tarija Cancha Sud, but echoes many of the features described by other research participants as well. As another participant, Pedro, put it when describing how his family and others used to live: “Before there weren’t [commercial] grapes or any of that and agriculture only meant sowing wheat to produce flour to make bread, [and growing] corn. They also made their living with animals.”¹⁹

Wheat, peas, corn, potatoes, quinoa and amaranth were all commonly reported crops, as were squash, beans, fava beans, Andean tubers (e.g. oca, papalisa, ajipa and yacón), peanuts, onions, tomatoes and other vegetables. Some households also had fruit trees and grape vines trained in Peruvian pepper trees (molle: *Schinus molle*) commonly planted around field edges (e.g. Consuela; Dalia; Dolores; Clara). As Consuela in Saladillo explained:

¹⁹ All materials in Spanish, including documents and interviews, are translated to English by the authors.

[My father] always grew quinoa. He grew wheat, [and] amaranth also... It grew beautifully. We would grow it, cut it, dry it, thrash it. It was a lot of work, but it was so good... We would mill it and make tortillas... That is how it was years ago. [...] My great grandmother had her garden with everything: apples, pears, peaches, figs, prickly pear cactus fruit.

The first national agricultural census (1950) confirms that corn (both maize and sweet corn, called *choclo*) was the most widely cultivated crop in the Central Valley, followed by wheat and potatoes (altogether comprising 63% of total cultivated area). Barley, peaches and peas were the next most widely produced (17% total) (MACA et al., 2009).²⁰ Crop diversity was also influenced by local microclimate. Around La Calama, Eva recalled: “We didn’t plant any [fruits or vegetables]. There wasn’t water. The only thing we had was *ulupica*²¹....”

Crop production was limited to the rainy season and most households maintained multiple plots in different locations and elevations for greater crop diversity and to spread production risks (Dalia; Andrea: Figure 10). As one of Eva’s three daughters said, “It helped a lot to have the mountains.” Uplands were also essential feeding areas for goats, sheep, cattle and donkeys, brought to different locations depending on season and forage and browse availability.

In Tarija Cancha Sud, mixed livestock herds were generally pastured in the valley floor and surrounding hillsides, but during the rainy season (December to May) the goats were separated and brought on a three-day journey to highland pastures in the El Puente Municipality to avoid illness from the Central Valley’s higher humidity (Andrea; Rosa). While in San Lorenzo goat herds were often brought to high pastures, cattle in Uriondo were taken from nearby hills eastward to pasture in the Tucumano Forest from April to December (Eva). Although people in Tarija Cancha Sud recall long-distance movements of livestock stopping in the 1980s, some research participants in La Compañía and

²⁰ Central Valley totals are calculated based on the figures provided for the provinces of Aviles, Cercado and Mendez, as no municipal level data were available.

²¹ *Ulupica* (*Capsicum eximium*) is a very spicy, tiny round pepper, which is classified as wild by the National Research Council (1989, p. 199).

livestock producers in other communities continue to bring cattle to the Tucumano Forest (Pedro).²²

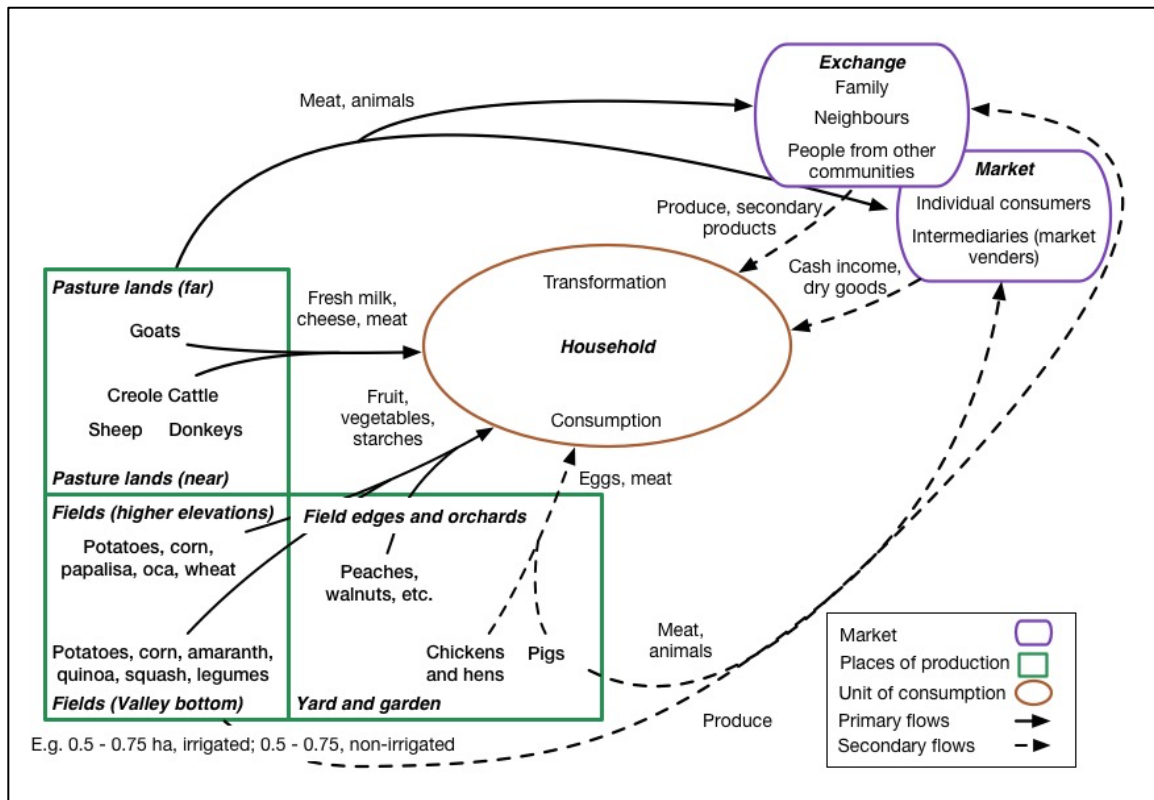


Figure 10. Household food system (c. 1975), example from Tarija Cancha Sud (Andrea’s childhood household).

Children played a vital role in caring for pastured livestock. Andrea’s sentiment – “I was raised with the goats” – was echoed by many older participants, remembering the responsibilities and hardships of this work (e.g. Alba; Maria; Fabián; Natalia; Patricia; Flor). Regardless of the weather, children would often leave home with their animals in the morning not returning until late afternoon: “If hail fell or what have you, we had to go look after them just the same. We had to cross many rivers so that they could go to eat” (Eva).

Pastured livestock also played an important role in sustaining agricultural production, supplying green fertilizers and bringing nutrients acquired through grazing natural pastures to fertilize cultivated plots. Consuela explained how dung was gathered

²² See Vacaflares (2013) for detailed descriptions of transhumance practices in Cercado. Also see Preston (1998) and Preston et al. (2003) for overviews of grazing and pasture activities in the highland areas of the Tarija Department.

for the fields: “[W]hen I was a girl and my father planted he would be moving from corral to corral moving the sheep, goats and cows to get the manure.... The corrals were to make fertilizer.”

Crops and livestock were key to household diets; however, campesino producers also sold or exchanged many primary and secondary products to cover household expenses or augment the diet.²³ As Flor explained, “My mom would bring hens, eggs to exchange for sugar [in Tarija].” While some durable or processed foods were purchased or bartered for in the towns or at the Tarija market, other goods, such as fruit, cheese, salt and tubers, were exchanged among neighbours or households across communities.

2.3.2 Reorganization of production

The transition to market-oriented production did not result from a single event. Rather it occurred over decades with uneven outcomes across space and time. Regionally, traditional agriculture and pastured livestock are still the basis of household production for some families, particularly those living beyond the valley bottom (Turner, field notes 23/10/2012 and 26/10/2012; Preston, 1998). Some households began the shift as early as the 1970s (e.g. in Valle de la Concepción and Tarija Cancha Sud), while others (e.g. in La Calama) transitioned their economies in the 2010s as new infrastructure and market linkages emerged (e.g. daily dairy collection by a processing company). The late 1970s and early 1980s, however, marked the beginning of the push for agricultural modernisation, and many households, including most research participant households (Section 3.3), began shifting their production towards government-prioritized agricultural commodities.

During this period, government agencies, particularly the newly established Tarija Department Development Committee (later CODETAR),²⁴ with aid from international

²³ These included: raw eggs (Santiago; Flor; Natalia), meat (Fernando; David), fruit and vegetables (Dalia; David; Consuela), and secondary products such as wheat flour (Eva), cheeses (Flor; Natalia), bread and other baked goods (Eva; Ana; Ernesto; Manuela; Juana; Marta), and dried fruit (Clara).

²⁴ The *Comité Departamental de Desarrollo de Tarija* (Tarija Department Development Committee) was established in 1971 (Arze Cuadros, 2002, p. 307), and became the *Corporación Regional de Desarrollo de Tarija* (CODETAR: Regional Development Corporation of Tarija) in 1978 with the mission of promoting economic and social development with agricultural production as a strategic priority (Prefectura 2006).

donors and non-governmental organizations, began implementing projects promoting sub-regional specialisation in economically profitable products with agro-industrial potential in accordance with the 'development poles' strategy being pursued by state development corporations country-wide (Avilés Irahola 2005, 60; Plaza, Vargas, and Paz 2003).

Their strategy included incorporating Green Revolution technologies, particularly agrochemicals (CODETAR, 1991, p. 5), and other agricultural sector transformations in order to:

[E]nsure the adequate supply of primary materials for agro-industries basic to the department (oil, grapes, sugar cane, wood, milk)... Expand the agricultural frontier, using better and more rational uses of land and water...[and] Increasing the production of stuffs with competitive advantages, whose destination is industrialisation or extra-regional export (CODETAR, 1979, p. 327).

Accordingly, specific crops and livestock were selected for technical and financial investment: soya, peanuts, cotton, grapes, pome and stone fruits, meat cattle, hogs, wood, (hard) yellow corn, soft corn, wheat, sugarcane, forage, dairy cattle and poultry (CODETAR, 1979, p. 329). In the Central Valley, viticulture (particularly in Cercado and Uriondo) and dairy (in San Lorenzo and Padcaya) were emphasized and supported through multi-party initiatives (e.g., irrigation projects, production cooperatives and processing plants) to facilitate agricultural modernisation, growth and market integration (CODETAR, 1979, 1991; Tapia & Pimentel, 1978).

Regional changes in agricultural production patterns and norms are reflected in the second national agricultural census of 1984 (República de Bolivia 1990). The area under cultivation in the Tarija Department had tripled (68,618 ha, from 25,867 ha in 1950), with less than half remaining of the 449,376 ha identified as natural pasture in 1950. Corn, wheat and potatoes remained the most common crops; however, their total area fell to 26% from 63% in 1950. A greater variety of crops were being produced at larger scales. Grapes, peanuts and market vegetables (i.e. peas, onions, carrots, garlic and tomatoes) increased significantly (e.g. grape production grew from 98 ha to 1029 ha; onion production increased six-fold). Animal feeds (e.g. alfalfa and oats) also increased. By contrast, production of some crops, such as oca, and to a lesser extent squash and

quinoa, fell between 1950 and 1984.²⁵ (Further details of the agricultural production history of the Central Valley are provided in Appendix D.)

2.3.3 Consolidation of sub-regional specialisation and commodity production

The trajectory of commodity production and sub-regional specialisation begun in the 1970s and 1980s continues to consolidate; strategic product promotion and production growth have remained economic priorities for the Central Valley through the 1990s to 2010s (Prefectura 2006; FAUTAPO and OMIN 2012a; Comité de Competitividad, n.d.). By 2012, 902 dairy producers were reported in the Tarija Department, with dairy production rising to 10,497,000 litres/year (Vásquez Mamani & Gallardo Aparicio, 2012, p. 159) from 1,600,000 litres/year in the mid-1970s, when only 44 of 4,490 recorded head of cattle were breeds other than creole (Sanabria L., 1974, p. 192). Similarly, by 2015 an estimated 3,500 ha of land were dedicated to viticulture in the Central Valley (Asociación Nacional de Viticultores, cited in El Diario 2015, 1). Over this period, population in the Central Valley (San Lorenzo, Cercado and Uriondo municipalities) also increased from approximately 140,000 in 1992, to 190,000 in 2001 and 245,000 in 2012 (INE 2015).

Regional changes are echoed by profound alterations for many households. As Andrea in a Tarija Cancha Sud summarized: “Now pasturing is over, and they’ve bought cows and one dedicates oneself to the cows. No one has goats here anymore.” Figure 11 schematizes Andrea’s current household production system organised around commercial dairy production, in contrast to the primacy of non-commercial household food production in the 1970s (Figure 10). Although some food for household consumption is still produced, land and labour are dedicated mainly to commercial dairy production, with cash income from selling fresh milk used to purchase most food and other household needs. Other activities, such as running small shops (*tienda*), also provide a small supplementary income, as do some off-farm activities.

²⁵ A third national agricultural census (The First Agricultural Census of the Plurinational State: *El Primer Censo Agropecuario del Estado Plurinacional*) was conducted in 2013; however, the results of the census were not publically available at the time of writing. No other comprehensive, current regional data are available.

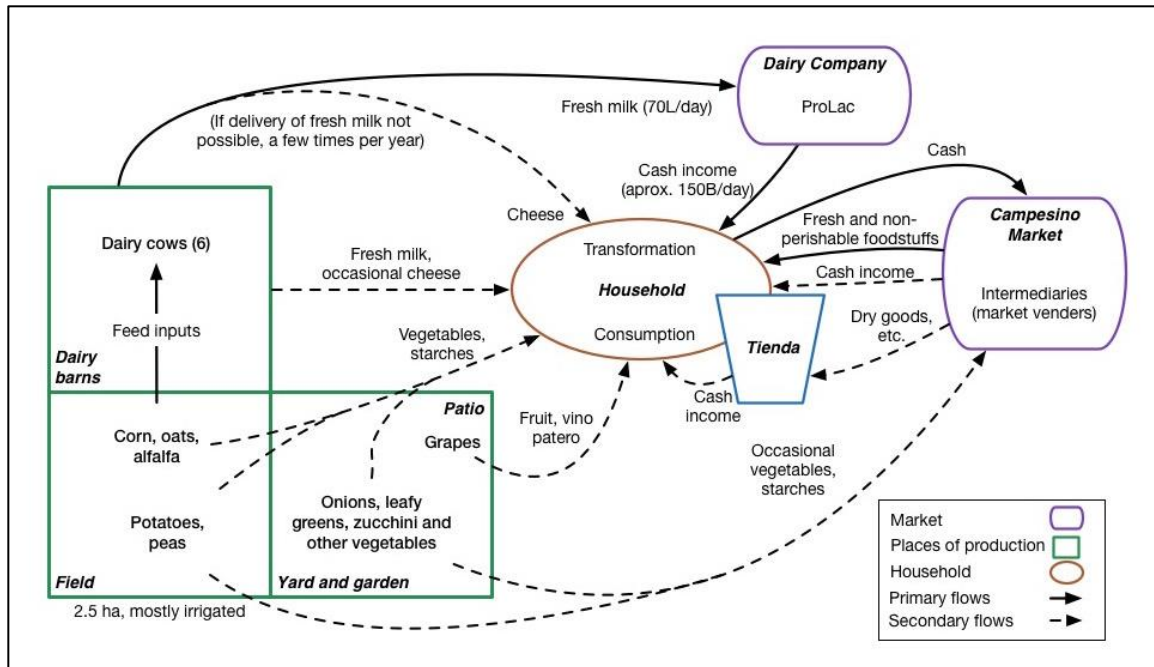
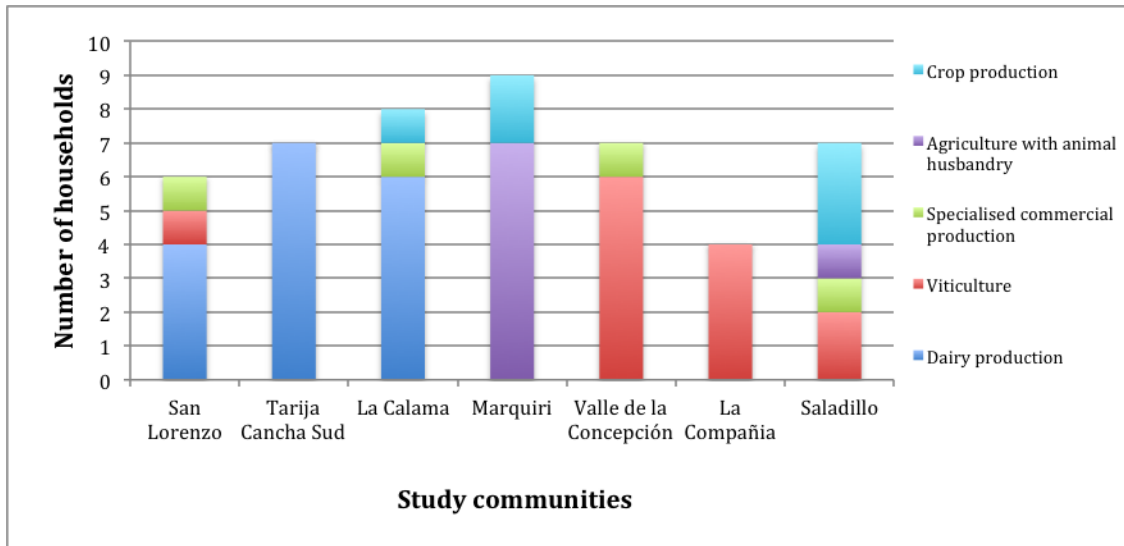


Figure 11. Household food system, example from Tarija Cancha Sud (Andrea's household c. 2013).

Interviews with the 48 primary production households (Section 2) found that in 2013 most (71%) engaged in commercial dairy (n=17), viticulture (n=13) or other specialised primarily market-oriented production (n=4) (commercial poultry, organic produce or high-value, non-traditional crops, such as strawberries) (Figure 12). Although, like Andrea's family, many households also produce some food for their own use, most depended on markets to acquire the majority of their foodstuffs, and 44% engage in off-farm activities as a significant part of their economy.²⁶ Only the Marquiri households (n=7) reported agricultural production patterns based on husbandry of pastured livestock and rain-fed agriculture similar to those many research participants described in their families' historical production profiles (Section 3.1).²⁷ The following sections analyse changes to agrobiodiversity composition within household production portfolios based on research participants' identification of factors influencing pastured livestock and ancient grain production declines.

²⁶ These include secondary production, food services, retail or other occupations such as teacher, office worker, or construction worker, or transportation services.

²⁷ Remaining households not engaged in commercial production (n=5) had limited their agricultural and other economic activities due to mobility and other age-related challenges.



Notes: Crop production refers to limited production of traditional agricultural products, such as field crops (e.g. corn, potatoes), vegetables (e.g. onions, tomatoes), and fruit trees (e.g. peaches). These are distinguished from specialised commercial production, which includes non-traditional fruits and vegetables, such as berries or asparagus, introduced during the late 1990s and 2000s. Viticulture refers to households involved in commercial grape production. In most cases, these households also produced other fruit and vegetables for market and household purposes. Dairy producing households (involved in commercial dairy production) also produced some or all of their livestock feed (e.g. corn, alfalfa). Agricultural with animal husbandry refers to households involved in mixed production, with pastured livestock playing a significant role alongside traditional crop production.

Figure 12. Contemporary household production strategies.

2.4 Patterns of change in household production

While the outcomes of change processes in San Lorenzo and Uriondo communities are distinct (as reflected in regionally-specialized production strategies), strong similarities exist across the study communities with respect to practices, livestock breeds, and crop varieties that constituted past primary production systems and which elements have declined or disappeared from the current production landscape (Table 7). Reasons for changes in household primary production strategies and agrobiodiversity composition are examined in the following sections through the lenses of pastured livestock and grain crops (Sections 4.1 and 4.2).

Table 7. Examples of livestock and crop production changes.

	Past Use		Current Use	
	Households (out of possible 43)	%	Households (out of possible 48)	%
Livestock				
Goats	22	51	10	21
Sheep	17	40	13	27
Creole cattle	18	48	9	19
Crops				
Wheat	11	26	0	0
Quinoa	6	14	0	0
Amaranth	8	19	0	0

Notes: Table 7 shows changes in occurrence of both certain crops and livestock within the households' production systems based on 43/48 households who commented on crops and livestock produced by their families in the past. Data were based on free listing, rather than exhaustive identification of all historic production activities of a given family. These general trends were also corroborated by research participants (e.g. Maria; Pablo; Leonardo; Ana) outside the primary production households included in Table 7.

2.4.1 Changes in livestock production

In the case of goats, sheep and creole cattle, it is not only the number of households with these types of livestock that have declined (Table 7), but also the herd sizes (Table 8).²⁸

Additionally, the distribution of households with pastured livestock has shifted, with most now concentrated in Marquiri in contrast to formerly wider distribution (Figure 13).

Table 8. Numbers of goats, sheep and creole cattle owned by households currently and in the past.

Household location	Interview	Historical livestock portfolio	Contemporary livestock portfolio
Tarija Cancha Sud	Flor	80 goats Several dozen sheep 7-8 creole cattle	1 sheep
Marquiri	Santiago	50 goats 50 sheep 10-12 creole cattle	A few creole cattle
Marquiri	David	120 goats	6 goats 6 creole cattle
Marquiri	Leticia / Cesar	Unclear	50 goats Less than her grandparents
Saladillo	Natalia	30 goats 30 sheep Several creole cattle	6 creole cattle
Saladillo	Claudia	50 goats 50 sheep	12 creole cattle

²⁸ Non-primary production households also corroborated this subtler trend. Pablo's household, with 10 goats and 1 cow, had up to 70 goats in the past. Similarly Consuela at the time of her interview had only chickens, but in the past had 40-50 goats, and when she was young her father had 70 goats and 55 sheep.

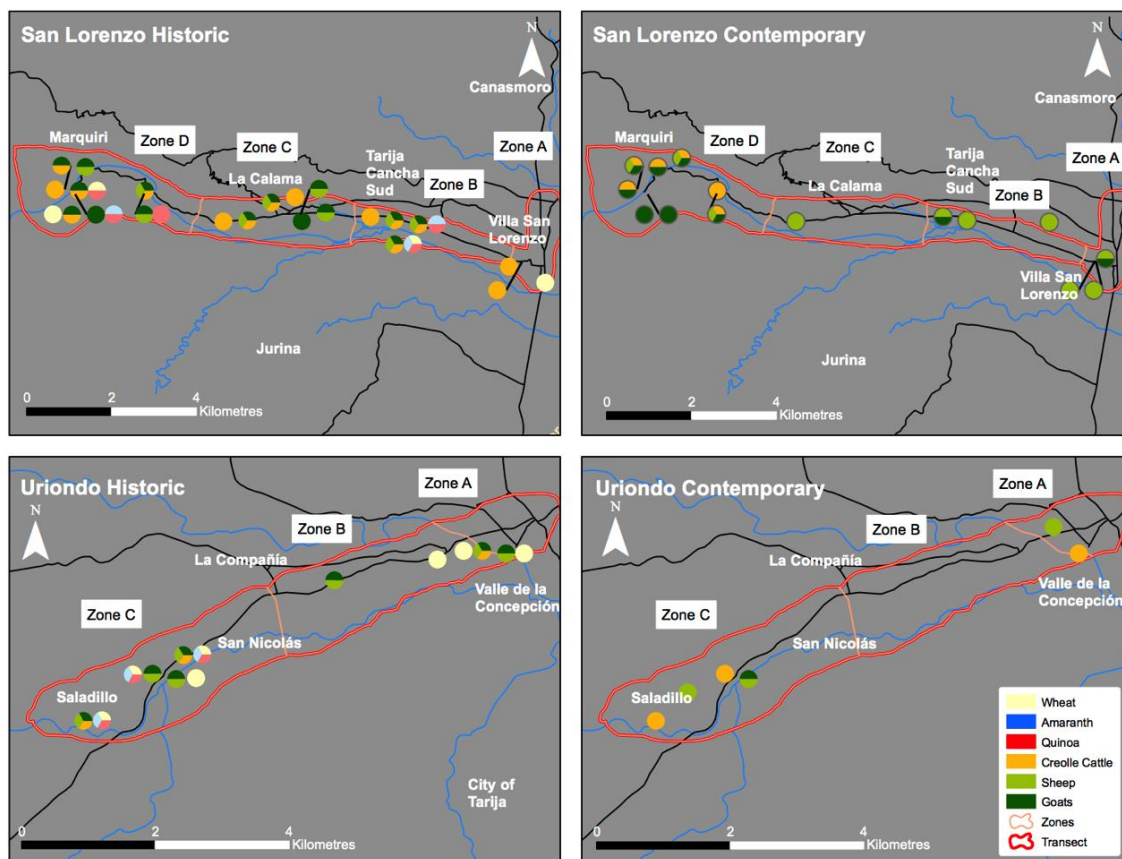


Figure 13. Historic and contemporary distribution of ancient grains (wheat, amaranth and quinoa) and pastured livestock (goats, sheep and creole cattle) producing households.

Although, for some, declines in pastured livestock are part of a broader reduction in primary production activities associated with ageing (e.g. Santiago; David), most participants relate declines to other cumulative and mutually reinforcing factors connected with changing regional agricultural production and modernization patterns, environmental change and responses to shifting socio-cultural, economic and ecological contexts of the Central Valley (Table 9).

Table 9. Factors prompting reductions in pastured livestock.

	Factor	Primary effect	Linked effects	Representative quotations
Changing land use and access	Landscape change	Higher density land occupation and commercial use (i.e. vineyards) restricted space for pastured livestock	Increased conflict between livestock herders and commercial producers	“There is very little common land now because there are lots of people now [and agricultural development]. On this side above here, there are vineyards.... And now also above – a little more above – there is the big vineyard. All of these hills, all of it is full of vineyards” (Manuel).
	Enclosure of common lands	Processes of land titling and development	Less access to pasture lands	“...before there was a lot of common lands and people didn’t plant...so the common lands, it was there they pastured their livestock...[now] the owners have taken it and sold it... because of that today the neighbours don’t raise animals because they don’t have anywhere to do it, anywhere to pasture them” (Alejandra).
	Establishment of ecological reserves	Restricted access to highland pastures	Fewer areas to pasture livestock	“When the Sama [Ecological] Reserve was created they weren’t able to pasture their animals there any more, so that was another reason that they stopped having goats” (Patricia).
“Modern” lifestyles, production methods, and household economies	Changing lifestyle norms	Children had to attend school	Less family labour for pasturing	“Before they had their children that would look after them, but now... there is nobody” (Emilia).
	Lack of institutional support	Incentives for other types of production (e.g. new livestock breeds)	Increased opportunity cost of having pastured animals	“There was nothing. For the [dairy] cows there is. I don’t know why” (Eva).
	Increased disease prevalence	Increased production costs	Less incentive to maintain herds	“If they aren’t vaccinated 3 or 4 times a year, they get sick” (Leticia).
	Higher opportunity costs	Other activities (e.g. dairy, vineyards) became possible	Land and labour became scarcer	“So becoming a dairy producer has also given rise to the substitution of crops like corn and wheat that stopped being profitable [for other commodities]. So there has been substitution” (Jose).

2.4.1.1 Changing land use and access

Landscape changes, particularly expansion of cultivated land, are linked with development programs facilitating irrigation network construction, improved transportation infrastructure and incentivising commercial production through new techniques (Section 3). As some households began to adopt new activities, other households were also affected by the transforming landscape around them. Certain

activities, such as pasturing livestock, formerly the basis of the campesino economy and way of life, became more costly and progressively less desirable.

Fátima explained this process in Tarija Cancha Sud. When she was little, her family had goats but now no one has any:

You can't because they plant here.... Years ago it wasn't cultivated, it wasn't fixed up. It was all a single *campo*.²⁹ Like that, with nothing and everyone had goats, sheep. Later we made the water infiltration gallery so now everything is irrigated – everything. That's why it is all green and we can't have goats because they are very damaging and harmful to people. Because of that we have plenty of [dairy] cows. Here everyone does. It is a dairy zone. It is all [dairy] cows, nothing more.

Goats can easily escape from corrals and into cultivated fields, eating whatever they find. “They finish everything,” she explained, which causes disagreements among neighbours.

Conflicts created by limited space and the primacy given to commercial production were also described in other study communities and were identified as a primary factor in liquidating or reducing herds (Xiomara; Huberto; Natalia; Teodor and Josefa; Manuel) and making life more difficult for those maintaining pastured livestock. Pedro keeps a herd of 18 creole cattle, but when he brings them to the Central Valley from Tucumano Forest, he must keep them in hills quite distant from the community because there is no suitable land closer by.³⁰

Changing access regimes have also contributed to enclosure of pasturelands needed by livestock-owning households.³¹ Pedro, for example, can no longer use communal land around a neighbouring community to pasture his animals:

Before it was communal, it was common. You could take a flock of sheep and put them up in the hills, you see. All of the community would put everything in the hills to pasture them. And now they don't allow you to put them in another

²⁹ *Campo* translates to countryside (non-urban areas) and is also used to describe uncultivated lands, including pastures, meadows or fields.

³⁰ In some cases, particularly in Uriondo, proximity of cultivated and inhabited areas also affects some households' ability to have other livestock. Because neighbours complain about the smell, Pedro must also keep his pigs away from the houses. Natalia in Saladillo explained, “I don't have a single hen. I can't raise them here because there is a proprietor (*dueño*) here, a proprietor there and you can't. The little animals scratch and so you can't raise them. Everything has to be bought.” Josefa affirmed: “[If you raise animals] you have to have land as well. And there isn't any. A house, another house. Because of that we don't raise anything.”

³¹ Land clearing is also limiting availability of wild species [e.g. *taco* (*Prosopis julifloras*), *chañar* (*Geoffroea decorticans*) and *tusca* (*Acacia aroma*)]. Several research participants mention trees being cut down that they used to harvest for fruit.

community. We, the people from here, used to put them in the hills in front but now those hills belong to that community. That community has prohibited it. Similarly, Alejandra described a process of enclosure that was taking place due to a new vineyard being established between La Compañía and San Nicolás. The several dozen hectares had been privately owned since the 1950s; however, *de facto* it was common land, unfenced and used by local residents to pasture livestock. Recently, a foreign developer bought the land and began bulldozing and fencing it for viticulture. The neighbouring household had to sell their livestock, since any damage caused to the vineyard would require compensation, which they could not afford. Manuel also discussed this event, emphasizing that similar landscape conversion processes were happening in other areas, leading to a general shrinking of common land: “There is very little common land now.... All of these hills, all of it is full of vineyards.”

Preston and colleagues (2003) report that by 1984 many campesino communities in the Tarija Department highlands had decided to restrict access to their lands and that ties between highland and valley areas have weakened in recent decades. The establishment of the Sama Ecological Reserve (*Reserva Biológica de la Cordillera de Sama*) in 1991, located in the municipalities of El Puente and Yunchará, was also identified as a factor limiting access to highland pastures necessary for healthy goat herds in the Central Valley (Patricia).

2.4.1.2 “Modern” lifestyles, production methods, and household economies

Narratives about the loss of land access echo others about labour scarcity and changes in social norms. Historically, child and family labour was vital to household production (Section 3.1). As children began attending school more regularly and social norms and expectations surrounding childhood changed, the labour requirements for maintaining pastured livestock became harder to meet (Emilia; Patricia; Turner, field notes 15/06/2013). When Patricia was a child, they had many goats, sheep and creole cattle, but when the children got older, no one could look after the animals. The passing of each generation, she reflected, distanced people from that way of life.

These changes came hand-in-hand with changes in consumption norms, as store-bought clothing, food, other household items and agricultural inputs became commonplace. Many older people reflected on a generational divide they feel with

younger people, including their own children and grandchildren, surrounding food preferences and eating habits. Discussing common foods from his childhood, Miguel reflected, “Those make them [young people] laugh. An *api de leche*³² is really good!” These changes in preference and declining social status of traditional foods have also influenced household and regional market demand for them, consequently increasing the material, social, and opportunity costs of maintaining pastured livestock.

Ideals of agricultural modernisation have also influenced government policies and shaped attitudes casting traditional production methods as less valuable and areas not under commercial cultivation as unproductive. A key informant (Cristobal) who has worked extensively with campesino communities in Cercado as a researcher with a local NGO, put it like this:

In the Central Valley, all campesinos know about livestock transhumance. That is to say bringing cows to the forest or bringing the animals to the hills for a season. Everyone, everyone knows this. Now, not everyone can do it because they have lost the legitimating support from the state.... It’s normally the technicians who recommend to the campesinos that they stop doing this practice, that they should stay in one place, because it’s inefficient. That’s what’s happened in San Lorenzo: Transform their food producing area into an area to produce alfalfa to produce milk, whereby they’ll make money, and with that they’ll buy some food.

Concepts of modernization and “rationalising” production are evident in the government policy documents (CODETAR 1974, 1979, 1991; Tapia and Pimentel 1978) underlying current development programs that promote commercial dairy production and viticulture, as well as other high-value, ‘non-traditional’ fruits and vegetables (e.g. Comité de Competitividad, n.d.; FAUTAPO & OMIN, 2012a, 2012b). Changing cattle production norms (e.g., year-round stabling in place of transhumance practices and removal of calves from their mothers directly after birth), were identified as essential to establishing a modern dairy industry in Tarija (Rodriguez & Pimentel, 1978). This also required introducing new genetic stock (Holstein dairy cattle) and converting pasture and croplands to growing livestock feed. Many communities and households (e.g. San Lorenzo Zones A – C) have adopted these production principles as a basic reorganising model for their primary production activities.

³² A preparation of cornmeal porridge often made with goat’s milk and salt.

Government and NGO promotion of non-traditional production strategies has also increased opportunity costs, including labour time and income associated with pastured livestock (as with other crops: Section 4.2). As commercial agricultural enterprises, such as dairy, became more common, people began to associate them with economic and lifestyle benefits. Tomas in La Calama explained that commercial dairy farming is preferable to raising creole cattle because it takes three years for a calf to be large enough to sell, whereas dairy provides a monthly income. Furthermore, unlike with creole cattle, he receives government and NGO support for building and maintaining his dairy herd. Incentives and production supports, readily acknowledged by dairy producers (e.g. Fátima; Alberto; Julio; Julia; Tomas; Huberto), include technical extension and veterinary services (dietary supplements, vaccinations and artificial insemination) and grants for alfalfa and other feed crop seed, as well as farming equipment.³³

Other research participants similarly cited receiving support for their dairy cattle, but no, or very limited, support for their other livestock (Tomas; Isabel; Pablo; Ignacio).³⁴ Few could afford veterinary services for their other animals if they got sick (Pablo). As a related issue, some participants cited increased prevalence of disease, such as hoof-and-mouth disease (*Apthae epizooticae*), within their herds as another factor increasing difficulty and cost of maintaining pastured livestock (Leticia; Ursula).

In addition to discourses of agricultural modernization, discourses of soil erosion supported conversion from pastured livestock to other production strategies. People identified overgrazing by pastured livestock as culpable in the “serious and alarming problem of erosion” (CODETAR, 1991, p. 71) in the Central Valley, a prominent and growing concern of development agencies and research institutions (CODETAR 1974, 1979, 1991). One municipal official (Carlos), for example, reflected that, although goats are important in the economies of more isolated communities (like Marquiri), “we know

³³ Most of these supports are through the government agency SEDAG (*Servicio Departamental Agropecuario*, Departmental Agricultural Service). Some producers have also received support through PROSOL, which redirects revenues from oil and gas development to campesino organizations for investment in agricultural development activities.

³⁴ During interviews, key informants with local governments and state agencies (Carlos and Victor) discussed some of the programs that are available to support creole livestock, including veterinary services and genetic improvement initiatives; however, these do not seem to be widely known or accessed by research participants.

that the goat goes against nature because their ways – their characteristics – provoke a lot of erosion.” Overgrazing was also part of the rationale for establishing the Sama Reserve (Brown & Stem, 2006; SERNAP, n.d.). A representative (Victor) from SEDAG (*Servicio Departamental Agropecuario*, Departmental Agricultural Service) also explained that they currently have no programs with goats, noting that although there is potential to improve goat productivity with new breeds and management techniques, there are few communities they could partner with because of,

...the issues of the environment, the [ecological] reserves, the protections. They [campesino producers] have been made aware and many times they have eliminated the goats, thinking that they are predatory animals that deforest, that mess up the environment, causing erosion. And so, many times, people have been getting rid of these animals.

Some research participants have internalized such discourses, identifying the harmful nature of goats, and to a lesser extent sheep, as reasons for changing their production strategies (e.g. Pedro; Fátima). Some also believed goats to be prohibited from irrigated areas because of their destructive behaviour (Turner, field notes 15/06/2013).

2.4.2 Changes in crop production

Pastured livestock declines are also linked with intersecting and oftentimes kindred processes influencing many households’ crop production portfolios (Table 8), including declines in the production of wheat, quinoa and amaranth (Table 10).

Table 10. Factors prompting changes in crop selection (e.g. abandonment of wheat, quinoa, and amaranth).

	Factor	Primary effect	Linked effects	Representative quotations
Production challenges and reliance on external inputs	Increased prevalence of crop diseases	Need to purchase agricultural inputs (pesticides)	Increased costs of production	“[In the past] it wasn’t necessary to treat anything. And now, how many treatments do you have to do to produce a harvest? You have to buy chemicals” (Consuela).
	Changes in soil fertility and composition	Need to purchase agricultural inputs (fertilizers)	Increased costs of production; Changes in soil composition	“It doesn’t give. It doesn’t produce... These lands don’t produce much... If you aren’t treating it with chemicals, it doesn’t produce anything” (Catia).
Weather and climatic conditions	Weather events	Loss of harvest and seeds (e.g. quinoa and amaranth seeds were lost in Marquiri)	Increased costs of production	“It was a drought year, 1983. In that year it didn’t rain and, like that, we lost quinoa, amaranth, everything. After that year, we didn’t go back to planting it” (Pablo).
Availability and access to market-bought alternatives	Availability of cheap imports	Wheat from Argentina is cheaper	Less demand for locally produced grains	“The flour is from Argentina, right? ... Everything, pretty much everything is from Argentina, right? It is brought from there” (Ernesto).
	Increased cash income	Greater ability to purchase food stuffs	Substitution of household production for purchased food stuffs (e.g. rice and pasta)	“They didn’t know how to buy. They grew... Now there aren’t beans, or fava beans, or wheat, nothing. Only what you can buy in Tarija” (Alba).
	More frequent and faster motorised transportation	Easier to purchase food stuffs	Easier to transport goods to and from markets	“It is more comfortable to bring it from the there [the Campesino Market]...since my husband has a car, we buy from there for the week. It is easy for us” (Gabriela).
New production technologies and infrastructure	Introduction of more profitable breeds, varieties and crops	Potential of production activities with higher returners	Increased opportunity costs associated with use of space	“We have seen that it [dairy production] gives better money, that it is better economically. It is more secure work, you could say, than producing potatoes or peas. [Dairy] cows are more secure” (Huberto).

2.4.2.1 Production challenges and reliance on external inputs

Local crops, like pastured livestock, are impacted by commercial agriculture’s land and labour requirements: “Now there isn’t wheat, everything is grass [forage] for the cows” (Osana). Increasingly viable commercial agriculture imposes rising opportunity costs for traditional household crops. Desirability of traditional crops was also affected by a widely shared perception of increasing production difficulties. Many research participants

said that crops are not as productive or reliable as in the past. “Now you can’t make it ripen” (Leticia) was a common refrain reflecting this experience.

Some blame agrochemical use for hardening the soils (Leticia), causing hail (Gonzalo) and making people sick (Fátima; Mariana), but many producers also believe that without chemical fertilisers, pesticides and fungicides crops will not produce at all (e.g. Fátima; Edwin; Consuela; Natalia; Miguel; Cesar). Cesar reflected, “years ago the foods were healthier. Now if we don’t apply chemicals, it doesn’t produce.” Fátima affirmed, “Years ago there weren’t blights. ... but now if you don’t treat it, it doesn’t give anything.... Everything is with chemicals; nothing is natural now.”

Consuela explained that her son is only able to grow peas because her daughter-in-law works off-farm and her income enables the agrochemical purchases necessary to coax a harvest. Many producers (e.g. Jesus; Edwin; Mariana; Teodor and Josefa; Manuel) continue using organic manure as well as chemical fertilizers; however, since many no longer have livestock, manure must be purchased and is often costly and difficult to find (Teodor; Jesus).³⁵ People also believe crop pests have worsened. Manuel, a producer of grapes, peaches and potatoes in La Compañía, remarked:

For years they grew wheat. They knew how to sow all of that. All of these lands were wheat. But you had to look after it everyday [because of birds]. ... Now the birds don’t even leave the peas. If you plant peas, if you do it, they eat it.

Using fertilizers, chemical pesticides and fungicides raises production costs and creates dependence on external inputs, even for subsistence production.

2.4.2.2 Weather and climatic conditions

Climatic conditions in the Central Valley are believed to have worsened in recent years. Initial results from the 2013 national agricultural census show that fully 98.1% of Tarija Department communities suffered adverse climatic events between 2012 and 2013 (INE, 2014, p. 11). Many participants report increased frequency and unpredictability of weather events, some explicitly attributing this to climate change (e.g. Beatriz; Manuel). Increased prevalence of frost and hail, and changing rain patterns were frequently mentioned challenges prompting conversion to production strategies, such as commercial

³⁵ A truckload of goat manure cost approximately 5000Bs (approximately 700 USD) at the time of research (Jesus).

dairy production (e.g. Normando; Julia; Tomas), seen as less weather-dependant. Climate change has also motivated changes in crop varieties to those with shorter production cycles (Nelida). Julia explained why she and her husband changed from traditional crops to dairy farming:

Because, in agriculture sometimes there are years when a frost comes or a hail comes and it destroys it. We changed to dairy because we saw that dairy was better than agriculture... Dairy pays a little more money and with that we had enough to look after our children.

Manuel, who has observed significant climatic changes during his lifetime working in agriculture, stated:

In those years [when I was young] everything was different. That is to say, the change lies in the climate itself... in the season it rained a lot and everything was, almost enough: what we planted, what we grew. [Now] when it rains, it's a cold rain. ... Now hail falls and the earth takes the water. In contrast, years ago it wasn't like that. It started to rain and thunderstorm and everything would be beautiful. ... Gentle, balanced... [Now] we are at the end of October and there isn't water – zero [water] here. There isn't any. By contrast in those years it would start to rain in August or September. The people would plant then! Corn above all... So by now, by now they would already be big.

Unpredictable rainfall, frost and hail can devastate crops. In Marquiri, Pablo and his wife, Catalina, walked through a field of their frost-killed potatoes and fava beans. “Now we don't have anything,” Catalina said, “nothing. Frost [took] everything, everything, everything.” Their neighbour, Santiago, also testified, “Now nothing wants to ripen. Very little ripens. Sometimes hail falls. This year it hailed here. We don't have corn, nothing.” In 1983 drought also led people in the community to stop producing quinoa and amaranth, previously major crops. “In that year it didn't rain and, like that, we lost quinoa, amaranth, everything. After that year, we didn't go back to planting it” (Pablo, corroborated by others, e.g. Fabián).

Crop failures were reported by thirteen other research participant households. Although peaches and grapes were the most commonly reported crops affected by frost and hail, these climatic events affect all crops to some degree. Protective netting can shelter a crop from hail, but it is very expensive and only used in vineyards. Fátima summarized production challenges faced:

What [was] produced before were peaches, grapes, figs, plums, pears. Now those don't produce much. That has been lost... Now when there is frost it doesn't produce anything. There is very little peach now. And others get diseases. Hail,

hail and [when] it falls, you can't even eat [the fruit]. It is better to buy little apples from the market that they bring from other places.

2.4.2.3 Availability and access to market-bought alternatives

Fátima's account alludes to increased availability and accessibility of market-bought substitutes for foods previously only available through local production. The substitution of Argentinian flour for locally-produced wheat flour is well illustrated by the story of artisanal bread production from Lajas de Merced (just north of Villa San Lorenzo). Bread-making began there 30-40 years ago (Marta; Ernesto). At first, all ingredients, including wheat, were locally sourced. "Everything was natural here," Anita, a Lajas bread-maker in her 70s explained. "It was made of wheat, creole lard, creole eggs from hens that we raised here. That is how my mom made bread, then I made bread too, but it came to be made more with Argentinian ingredients."

As availability of Argentinian flour increased, it was recognized as a profitable alternative, relieving supply limitations and allowing increased production. As bread-making grew into the local vocation, "they started producing all day and bringing flour from Argentina, and then produced more... the Argentinian [flour] is more profitable, it has more chemicals, and performs better than the creole" (Marta). Ernesto concurred, recounting that, although his mother used to buy wheat from producers in the Central Valley or highlands and mill it into flour, now "...pretty much everything is from Argentina, right?"

Local Miller, Leonardo, described how his business shifted from primarily milling wheat to corn:

We are milling more corn than wheat... before they didn't bring in flour from Argentina. Everything was what we grew here. Here we grew it, here we milled it, here we used it. With that we made San Lorenzan breads, *rosquetes*,³⁶ *empanadas*,³⁷ everything. Now Argentinian flour comes in and more cows appeared.

He remembered this shift beginning approximately 30 years ago, coinciding with increased dairy farming and fodder production.

³⁶ Rosquetes are a hand-sized ring of light, hard dough coated with sweet meringue.

³⁷ Empanada refers generally to a stuffed dough pocket. There are several types of empanada in the Central Valley; however, a characteristic example is the *empanada blanqueada*, which is a circle of sweet dough folded into a half-moon, stuffed with seven-year melon (*lacayote* in Spanish: *Cucurbita ficifolia*) jam and iced with meringue.

Availability of cheap imports, like Argentinian flour, coupled with improved transportation and more cash income, help make marketed foods more accessible and convenient (Gabriela; Eva; Sixta). Consuela explained, “Years ago we didn’t know how to use merchandise (*mercaderia*).” Now, most participant households report buying all or most of their food. Motorised transportation and improved infrastructure have also increased access to markets and urban centres, making food purchasing more feasible for many households. Older people recall that travel from Villa San Lorenzo to Tarija took half a day; now it takes less than half an hour with transportation available every 15-20 minutes.

2.4.2.4 New production technologies and infrastructure

During the late twentieth and early twenty-first centuries, many new crop species and land races also became available; the new genetic material was a critical enabler of agricultural modernisation. Government programs, NGOs, small groups and individuals all worked to increase access to genetic stock from elsewhere in the world, including dairy cattle from Uruguay (Alberto; Ricardo) and grapevines and other seed stock from Argentina (Sandra; Fernanda; Lara). These were often coupled with marketing and commercialisation support for strategic commercial crops. Programs such as AFRUTAR (agricultural cooperative operating primarily in San Lorenzo, late 1990s to late 2000s) also facilitated access to new species of fruits and vegetables – blackberries, raspberries, blueberries, asparagus – now under small-scale production in the Central Valley (e.g. Armando; Jaime; Jesus; Sixta).

Migration and immigration also facilitated introductions of new crops and learning about new production technologies. Many in the Central Valley, including many research participants (e.g. Hernán; Beatriz; Normando; Wilber; Sandra), have worked in agriculture in Argentina (Punch, 2007), and by doing so gained capital to invest in dairy cattle and other primary production activities back in the Central Valley. Ana explained, “[Many people] have gone to Argentina to work and come back... So they plant their lands with onion, peas, fava beans – big ones! – lettuces, Swiss chard, everything they brought. All the seeds are brought from Argentina.” Some of the first commercial grape plants were also Argentinian (Sandra; Lara). Before beginning strawberry production in La Calama, Wilber worked on strawberry farms in Argentina for several years. “I went to

work there and learned,” he explained, “then I tested it here on this little plot and it went well for me.” Jaime recalled few vegetables other than carrots, beans and tomatoes in Tarija 30 years ago when he immigrated from Europe. He brought broccoli and other vegetable seeds with him that have since become commonplace in local markets and producers’ fields.

With limited space, new crops, varieties and production methods often displaced wheat and other crops, as described by Teodor: “Before this [vineyard], it was more corn and potatoes.... That plot over there was all potatoes and wheat before we planted grapes. We grew wheat for years and then we took it out and we planted all vineyard.” Similarly, where Edwin now plants grapes he used to grow corn, potatoes and peanuts. He stopped producing peanuts and has reduced other crops because of limited space. Andrea’s family used to grow several varieties of maize, potatoes, quinoa, amaranth, squash, sunflowers, and many legumes when she was young; now she and her husband produce “alfalfa, oats and corn... all for the cows” (Normando). Other primary production activities, such as household-consumed crops, were constrained by priority given to commercial production (e.g. Catia; Isabel): “We would like to grow potatoes above all, but we don’t have a lot of land.... [We have] that little plot for cattle forage and that’s it” (Catia).

Infrastructure changes have also been important in expanding agricultural production possibilities by extending the season and enabling more water-demanding crops (e.g. alfalfa). Claudia and her husband relocated to Saladillo from a more isolated, neighbouring community around 1980, when irrigation networks were extended:

[Before] we had little plots and grew seasonally when there was rain. ... Working here [in Saladillo] with water, it was another thing. We decided to stay here and to grow in another way then. Doing it seasonally, is only one time. With irrigation, we plant until March.... And then we rest. And start again in June.

Conversely limited infrastructure is an underlying factor explaining the persistence of pastured livestock and rain-fed agricultural activities in Marquiri.

2.5 Evidence of persistence within trends of change in household production

Despite widespread changes in agricultural production and household economies, there are patterns of persistence in some elements of the historically important primary

production system. Regionally, traditional agriculture and pastured livestock are still the basis of household production for some families, particularly those living beyond the valley bottom (Turner, field notes 23/10/2012 and 26/10/2012; Preston, 1998). Among the study communities, contemporary production patterns in Marquiri most closely resemble the historically prevalent production systems described by research participants across the transect zones. The reasons for persistence of pastured livestock and rain-fed agriculture in this zone likely relate with the areas' comparative isolation and topographic conditions. The San Lorenzo transect overlays a sub-valley, which begins to narrow between La Calama and Marquiri. This limits the size of agricultural plots and requires terracing in the steepest slopes around the community.

The limited potential for forage production, combined with an unpaved road between Marquiri and La Calama, which increases the functional distance to existing dairy collection stations, and other limited infrastructure (e.g. irrigation networks and electricity to enable cold storage chains) restrict the viability of dairy production. In La Calama, which has only adopted dairy production in the last decade, dairy processing plants extending their daily collection networks to include the community was a key factor encouraging households to convert their production. Similarly, dairy production in other locations along the San Lorenzo Transect is made viable because of dairy collection centres and dairy collection routes, which are not available in Marquiri.

While the patterns of persistence in Marquiri are the most striking, there is a counter-current of persistence within other study communities as well related with: 1) relative compatibility or incompatibility among different productive elements within

production systems; 2) continuity linked with transformation; and 3) production flexibility, adaptation and renewed interest in traditional crops.

2.5.1 Relative compatibility or incompatibility of production regime elements

Among the study communities, contemporary goat production is almost exclusively limited to Marquiri. Small herds of sheep, however, have retained a slightly higher dispersion pattern in contemporary production (Figure 13). Underlying this are different production requirements, and thus different degrees of compatibility with household production systems. Xiomara explained, “There isn’t space here... We have to have each thing in its place. The cows in their corral and the pigs in their pigsty.” Unlike notoriously precocious goats, sheep transition more easily from pasture to corral management (Fátima). Small livestock now often require greater confinement due to proximity to cultivated fields (Huberto), and other factors (Section 4.1), including lower family labour availability resulting from greater participation of adults in waged labour off-farm and children attending school.

The ability to ‘fit in’ to new production regimes has also supported persistence of some fruit and vegetable crops. Fruit trees continue to be produced around field edges, and some crops – potatoes, onions, and other vegetables – are commonly planted alongside commercial grapes using the alleys between grape trellises and other open areas. This compatibility, albeit often at a small-scale, supports continuity of certain elements of the formerly dominant production system within a wider trend of transformation in primary production and household economies. High market value also supports continued production of some crops, such as peaches and potatoes (Teodor; Manuel; Claudia; Turner, field notes 29/10/2013).

2.5.2 Continuity of species, with changes in use and characteristics

In other cases, although certain species are still widely produced, or have grown in importance, changes have occurred with respect to varieties, breeds and landraces, their management and role within the household economy. New markets and regional prioritization of commercial viticulture and dairy production have shifted grapes and cattle from a position of ‘one among many’ within household economies to linchpins within household livelihoods and economic drivers of the entire region. Repositioning of

these species as market-oriented commodities, however, has meant replacement of traditional landraces with more profitable, commercial strains. For example, although several dozen varieties of commercial grapes have been introduced to the Central Valley in recent decades (FAUTAPO, 2010a) and viticulture production overall has proliferated, production of local creole varieties using traditional methods has declined.³⁸ Likewise, creole cattle have been replaced in many dairy zones, like Tarija Cancha Sud and La Calama, by Holstein dairy cattle.

Similarly, while corn and potatoes remain central to many households' primary production systems, the diversity of landraces has changed. Thirty varieties of corn were documented during this research,³⁹ but only seven were mentioned as part of producers' current production portfolios (five of which were mentioned only in Marquiri). There is also concern for loss of local landraces of other common crops. A key informant, Nelida, working in agricultural production department for the San Lorenzo Municipality, affirmed:

Seeds have been lost. For example, the potato, before we used to know the *papa la colore* – a native creole potato – and what happened was that it was produced very little... This has to do with the market. The market is asking for another potato, another seed, that is easier and faster to peel and so there are the new varieties, or those with a shorter [production] cycle. Now it is three months. [Producers also make these choices] because of climate change. There are shorter rains and there is little time, so you have to respond to that too – native seeds are being left or put in storage.

2.5.3 Flexibility, adaptation, renewed interest and recognition

Processes of change are both constant and complex. Many research participants reported a high degree of flexibility and experimentation in their production systems over time. For example, one of the largest dairy producers in the Central Valley, the Estrella family (Hernán and Beatriz), once had a commercial vineyard (early 1990s) and later a commercial strawberry field (late 1990s), before they began dairy production on the same land (early 2000s). Other households report similar shifts over time from vineyards to dairy or vice versa (e.g. Sixta; Sandra; Dalia; Edison). This suggests that while landscape

³⁸ A notable exception is Moscatel de Alejandía, an old grape variety, accounting for 42% of the area under grape production (FAUTAPO, 2010a, p. 14).

³⁹ Data were collected through market surveys, interviews and a census of varieties at the Jurina fair, August 4, 2013.

level environmental change processes may shape the range of choices and possibilities available, households use their resources, knowledge and judgement to adapt their production within this range according to ‘what works’ for their needs and objectives, including adapting to Climate Change.

Some individuals and households have successfully expanded that range of possibilities by introducing new production technologies and species (Section 4.2.4) and by modifying their agricultural systems to retain practices, such as transhumance, even within a broader context limiting their viability. Adaptations have been devised, such as transporting herds by truck for part of the migration route because of roads unsafe for herding and loss of traditional routes (Cristobal; Turner, field notes 17/04/2013).⁴⁰

Within a national and international context, quinoa and amaranth are both enjoying a period of revival, sparking renewed interest in them in the Central Valley (2013 International Year of Quinoa Secretariat and FAO 2013). By offering space for rural and urban residents to see, taste and access traditional products, local and regional production fairs organized by local governments, campesino unions, producer associations and NGOs are another means of bolstering recognition and connections with some traditional and non-traditional products (Cristian; Antonio; Irene; Maria).⁴¹ Some fairs – featuring corn, amaranth and quinoa, peanuts and many others – specifically highlight species and landrace diversity and associated traditional food products, and facilitate seed exchange. These events enhance the prestige associated with different forms of production and so contribute discursively to enhancing (or diminishing) values attached to different practices and products. In the future, particularly if local consumer demand for traditional products increases, this may further encourage reincorporating some of these within campesino production systems and household economies.

⁴⁰ However, trucking is not an option for everyone. Manuel reported the requirement for trucking livestock as one of the reasons he no longer maintains a goat herd: “We stopped because there isn’t space to have them and because they like open space. We would have to take them to the *campo* and then collect them. We would have to bring them in a vehicle like that.”

⁴¹ While some fairs focus explicitly on traditional crops, livestock, and related products, others promote new forms of production and modernist ideals of efficiency. For example, an annual fair in El Rancho, just south of San Lorenzo, celebrates the growth of the local dairy industry through prizes for the highest producing Holstein dairy cows among similar competitions (Turner, field notes 05/05/2013 and 15/05/2013). Similar events are held in other dairy producing locales like Rosilla in Padcaya, and at the regional level.

2.6 Conclusions

Restructuring of household economies, agroecosystems and rural regions are defining processes underway in societies worldwide, including other Andean regions (Bebbington, 2004; Mitchell, 1991; Rhodes, 2006; Skarbø, 2006; Zimmerer, 1996). Documenting how such processes of rural transformation are experienced and engaged with by rural households gives new insight into how such processes unfold and the key mechanisms that serve to orient patterns of change and retention in particular ways.

Although sometimes posited as linear, near-universal processes, change in rural lifeways rendered by globalisation. environmental change and other factors is seldom a uniform phenomenon resulting from single events or monolithic processes. Rather, local processes of change and rural transformation are often long-term, incremental, and uneven. They reflect an interplay of local manifestations of *double exposure* to environmental change and globalisation (Leichenko & O'Brien, 2008) and how local actors mediate and creatively respond to their shifting environments, including through the incorporation and deactivation of components of agrobiodiversity and associated production practices. The interplay of diverse local and extra-local interests, goals and ideas sets the context, or local *landscapes of possibility* (Bebbington, 2008), in which some avenues, such as commercial production, are expanded, while other possibilities, such as the production of traditional livestock and crops, are restricted.

Many research participant households in Tarija's Central Valley have experienced profound transformations in ways of life over recent decades as they transitioned their household economies from mixed agricultural production based on rain-fed traditional crops and pastoralism to prioritization of specialised commercial products. The transition towards greater commercial production, however, was not a uniform experience, either temporally or in terms of new commodities produced. In spite of the diversity of experiences and outcomes of agricultural modernization, there is a strong sense of a 'time before' and a 'time after' the reconfiguration of household economies. Ultimately, sub-regional specialisation in dairy production around San Lorenzo and grape production around Uriondo occurred, as did declines in other production activities formerly central to household economies.

Farming practices have always integrated function with multiple objectives (Vandermeer et al., 1998); however, it is not only the objectives of individual producers, families or communities, but also of the state or other agents whose policies and programs inform the landscape of possibilities in which production takes place. In the case of the Central Valley, the beginning of this period of transition coincides with the beginning of the integrated development program of CODETAR and their partner agencies and has continued in relation to ongoing promotion of agricultural modernisation and in the context of environmental change.

The push for agricultural modernisation and agro-industrial development repositioned campesino agriculture within a landscape of national and regional development ambitions operating through multiple mechanisms. Investments in infrastructure and technical extension services furthered agricultural modernisation and transformations of household production systems. These direct mechanisms, however, were also supported by equally vital secondary processes, including achieving a critical mass of commodity production in local areas, which led to enclosure of productive resources and landscape changes limiting traditional practices, ultimately prompting more producers to reorganise their production systems. These mechanisms were widely effective in drawing campesino production into the logic and function of the state's development vision through conversion (in whole or in part) of household economies to the production of agricultural commodities and agro-industrial inputs. However, while structuring forces work to set the environmental conditions against which the livelihood and production decisions of agricultural producers are made, the role of rural producers as active agents shaping their own household economies and livelihoods should not be downplayed (Bebbington 2004; McMichael 2008; van der Ploeg 1994, 2008). How rural households navigate and alter landscapes of possibility, including reconfiguring their agricultural production systems and the compositions of agrobiodiversity they employ, reflect household assets with respect to land, labour, knowledge and technology, priorities and creativity in terms of how they allocate those assets in relation to short and long-term objectives.

The experiences of households in the Central Valley also underscore the role of social power and discursive power (Wolf, 1999) in establishing the primacy of modernist

development trajectories within the local landscape and in doing so serving to elevate the interests of some (commercial and semi-commercial producers and agro-industrial actors) and marginalise those of others (traditional producers) by transforming the social conditions of production and the resource access conditions. Araghi (2009) describes enclosure and other tangible, material manifestations of power as the “visible foot” enabling the “invisible hand” of capitalism and capitalist expansion. Enclosures of land through production regimes, privatisation and the creation of protected areas are examples of actions that have restricted access to the resources needed to maintain historically prevalent practices of peasant production in study communities. In this case, while all of the households involved in the research have maintained ownership and control over some primary production assets (such as cultivated fields), processes of enclosure have restricted access to other productive resources (pastures). This has limited the range of available livelihood options, compelling many households to concentrate their productive activities within a narrower landscape of agricultural plots, yards, corrals and barns. Within this context, opting-in to commercial production became desirable and a more viable livelihood option.

Other manifestations of globalisation have created other types of enclosures as well, including over allocation of time. Lower availability of child and family labour, and increased need for cash income to purchase household food, agricultural inputs and other goods, have also served to lessen the desirability and feasibility of subsistence-oriented lifestyles and created dependence on commercial production. While some traditional production for household consumption persists in most cases, it is secondary to the role of commodity production and often at a reduced scale and under reorganised production conditions.

Environmental change, including observations of increasingly harsh climatic conditions and other production difficulties, are also increasingly shaping the production context of campesino households. Within the wider context of development agency support, over many decades, for modernist production strategies, exposure to extreme climatic events, such as hail and frost, and other production risks, including crop blights and soil infertility, have made commercial production options a prevalent adaptation strategy. Many, for example, view dairy production as a more reliable and less vulnerable

livelihood option than traditional agriculture because cattle and feed crops are less affected by adverse weather conditions, such as hail and frost. Some have also reallocated their time and labour towards non-farm and off-farm work where opportunities have opened or persisted.

Commercial production has afforded some households greater stability, livelihood security and access to consumer goods than subsistence crop production. Commercial dairy production and viticulture have also increased incomes and, although still requiring considerable and continual work, made life easier, including for research participants' children and grandchildren. Many appreciate the predictability (if punctuated by production risks) of dairy and grape production practices and income, and associate greater market access and purchasing power with more diverse diets than in the past. Consequently, for some research participants, experience of these changes is linked with a sense of improvement in quality of life and opportunity as well as with nostalgia for the past.

The new compositions of agrobiodiversity that comprise household primary production portfolios reflect production possibilities, limitations and the desires and needs of households. Incorporating new animals and plants necessitated redesigning primary production strategies to accommodate their particular requirements. At the same time, changes in the regional environment shaped processes of change in particular ways, including limiting the viability and desirability of some types of crops and livestock, while enhancing the viability and desirability of others. Some elements of the historically common production system were found to be more compatible with market-oriented systems than others and so have tended to persist within household production portfolios. The interplay of globalisation and environmental change has interacted with local resources and actions to create landscapes of possibility that have rendered some lifeways more viable than others and, in so doing, reorganized the social, economic and ecological context of production in the Central Valley towards market-oriented production and the market economy.

Preface to Chapter 3: Commercial production and agrobiodiversity in small-holder farming systems

The data informing this chapter emerged during the later half of fieldwork in the Central Valley. While I was gathering data along the Uriondo transect, I quickly began to notice the prevalence of both viticulture and mixed-agricultural fields, often with other crops planted in and around grape trellises. These fields stood out in lush contrast to the monoculture vineyards I had seen in the Santa Ana area of Cercado and scattered throughout Uriondo. This became an informative discussion point during interviews and provided valuable insights into how households at the margins of the intensive grape production zones were negotiating integration with market economies through commodity production under conditions that reduce risk and reflect local priorities. This chapter also highlights some of the gaps between policy and practice with respect to supporting ecologically sustainable agricultural and campesino economies.

This chapter draws on the data presented in Chapter 2 on how historical patterns of development are shaping current landscapes of possibilities and informing campesino production strategies. Chapter 3 also lends another perspective to the discussion of the territorial development strategy outlined in Chapter 4 by examining how some small-scale producers are strategically interacting with a well-funded territorial development initiative. Understanding the role of agrobiodiversity in campesino production systems also provides insights into the production of locally recognized, biocultural heritage-based regional specialty products, as discussed in Chapter 5. Many small-holder grape producers have begun making *vino patero* (artisanal wines) and, in addition to supplying corporate vineyards, their grape crops also provide primary materials for *vino patero* producers elsewhere in the Central Valley, such as in the Town of San Lorenzo.

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Figure 14. The vineyard of Bodegas y Viñedos de la Concepción S.A. located in La Compañía, Uriondo. Rows of modern grape trellises are juxtaposed to Peruvian pepper trees (*Schinus molle*) in which hundred-year-old grapevines continue to grow. When the vineyard was first founded, all their grapevines were trained this way. La Concepción has retained these trees within their vineyard landscape as tribute to the viticulture history of the Central Valley and to show clients touring their vineyard.

Chapter 3: Tensions and synergies in the Central Valley of Tarija, Bolivia: Commercial viticulture and agrobiodiversity in smallholder farming systems

Abstract

New policy directions supporting small-scale, ecologically diverse agriculture often remain unreconciled with decades of modernist agricultural development. We examine the case of campesino grape producers in the Central Valley of Tarija, Bolivia, and how and why they combine commercial grape production with species-level agrobiodiversity. High production costs and ecological and economic risks of viticulture, alongside other species' sociocultural and economic values, are factors informing campesino production strategies. The importance of agrobiodiversity for campesino viticulturalists, however, is under-recognized by rural development authorities and we discuss opportunities to narrow the persisting gaps between rural development theory and practice in the Central Valley.

Keywords: Campesino agriculture; Viticulture; Agrobiodiversity; Rural development; Tarija, Bolivia

3.1 Introduction: rural transitions and agrobiodiversity

Small-scale, biologically diverse family farming systems are central components of sustainable food systems and rural economies (FAO, 2015). Questions persist, however, with respect to how such systems and the producers that sustain them relate and interact with processes of agricultural modernisation and economic globalisation underway in many rural regions (Edelman et al., 2014). The production choices made by farmers as they negotiate the integration of intensification and agrobiodiversity conservation produce multiple rural development trajectories with distinct implications for livelihoods, biological diversity and resource use (van der Ploeg 1994; Zimmerer 2007, 2010, 2013; Zimmerer, Carney, and Vanek 2015).

Agrobiodiversity is understood as the biological diversity within agricultural systems, including the genes, varieties of crops and livestock, their distribution over space and time, and on-going modification through farmer selection (Zimmerer, 2010, p. 139). Modernist agricultural policy has focused on accelerating a transition from complex, multifunctional agroecosystems based on high agrobiodiversity to “simpler ones based on monocultures of intensively managed food crops or monocultural

plantations of tree crops” (Vandermeer et al. 1998, p. 2; also see, Perfecto, Vandermeer, and Wright 2009). Agricultural intensification – “the changing rate of inputs per unit area” (Zimmerer, 2010, p. 140) – is a key process of these transitions. This agricultural modernization perspective prioritizes the function of income generation and positions economic outputs as a primary objective of farming with other secondary functions, such as food production, to be supplied through the market.

Globally, agrobiodiversity has declined as agricultural modernization has accelerated (Vandermeer et al., 1998; Zimmerer, 2010). While such transitions are often seen as monolithic and irreversible, there are examples of alternative rural development trajectories that support rural livelihoods and agrobiodiversity (Zimmerer et al., 2015). Some research shows more complex relationships, particularly within smallholder farming systems. Smallholders are broadly defined in relation to their “limited resource endowments relative to other farmers in the sector” (Dixon, Tanyeri-Abur, & Wattenbach, 2004, p. n.p.). In some cases, small-scale farmers maintain agrobiodiversity managing it for multiple objectives, including food and income, alongside the transition to agricultural commodity production (e.g. Zimmerer, 2013; Isakson, 2009).

This alternate trajectory to the dominant narrative of agricultural modernization is sometimes referred to as the “new rurality” (Kay, 2006, pp. 463–464). New rurality transitions are characterized by rural livelihoods and incomes that become more diversified and integrated with globalization through greater participation in non-farm and off-farm economic activities, including migration (Kay, 2006; Zimmerer, 2014). These dynamics and the decision-making of smallholders is not always well understood, recognized or valued by development agencies and government authorities who play important roles in shaping the institutional and resource management context that enable or constrain the choices of smallholders. Understanding these choices and the viability of the subsequent transition trajectories for small holder farming systems should receive more attention from rural development policy makers and agricultural development agencies (Pimbert, 2010; van der Ploeg, 2008; Zimmerer, 2013).

These concerns are particularly pertinent in Bolivia, where the state has committed to supporting new development paradigms articulated in the 2009 constitution (Plurinational State of Bolivia, 2015) and subsequent supporting legislation, such as Bills

300 and 338 (Plurinational Legislative Assembly, 2012, 2013). Both of which affirm the importance of campesino (peasant) and Indigenous farming systems and the interdependence among sociocultural, ecological, and economic processes (Ministerio de Medio Ambiente y Agua, Cooperación Suiza en Bolivia, & Programa Nacional de Biocultura, 2015). How these ideals are to be grounded in rural development practice, however, remains less clear and governments, development agencies and campesino communities face the challenging task of actualising new rural development strategies and addressing ‘the contradiction between capitalist production and the conservation of biological diversity, natural resources and ecosystem integrity’ (Gobierno Municipal de la Ciudad de Tarija y la Provincia Cercado, n.d., p. 16),⁴² including integrating innovation with traditional knowledge to support food sovereignty (Delgado B. & Delgado Á., 2014). The case of viticulture development in the Central Valley of Tarija, Bolivia, reflects both persistent gaps and multiple opportunities to bring these ideals to ground in development practice.

For many decades rural development in the Central Valley, like other rural regions around the globe, has centred on the advancement of agricultural modernisation and intensification (Contreras Villaseñor & Elías Pastor, 2012, p. 55). In this case, modernization has been seen as a catalyst for economic growth and poverty reduction through the specialised production of selected market-orientated crops. The establishment and consolidation of a competitive commercial viticulture sector, linked with industrial development through wineries and distilleries, is forefront on the agendas of government agencies, non-governmental organizations and the private sector. Although much of the total production takes the form of grape monoculture, some campesino households are engaging in commercial viticulture while maintaining complex (multi-species) agricultural systems offering an alternative rural development trajectory.

This paper examines the production strategies of campesino households who engage in commercial viticulture as part of diverse commercial and subsistence production portfolios. Particular attention is given to producers’ reflections upon their production strategies and their motivations for maintaining agrobiodiversity alongside the

⁴² All materials in Spanish, including documents and interviews, are translated to English by the authors.

incorporation of modernized commercial viticulture. In a context of continued incentives and pressure to intensify and extend viticulture, as well as national efforts to create alternative development models, understanding and recognizing the contributions of agrobiodiversity to campesino livelihoods is vital in the development of policies and programs attuned to the ecological and socio-economic context of campesino production.

3.2 Research context and methods

The Central Valley of the Tarija Department of Bolivia is part of the sub-Andean valley system (Figure 15). With an elevation of 1,600 to 2,200 m above sea level, it is one of the highest grape-growing areas on Earth (Olarate, 2012). Grape production in the Central Valley began in the 1600s, but it was not until the 1970s and 1980s that it became a central pillar of Tarija's development strategy (CODETAR, 1974; 1979; 1991). The introduction of new genetic material and production technologies were priorities in order to intensify and modernize the sector seen as 'paralyzed, [and] predominated by rustic varieties and management systems' (FAUTAPO, 2010a, p. 3). The reconfiguration of the regional economy towards viticulture was consolidated during the 1990s through continued capital investment, the establishment of education, a plant nursery and research facilities [e.g. the National Viticultural Centre (*Centro Nacional Vitivinícola*: CENAVIT)] and a major irrigation project (the San Jacinto Reservoir) extending the production zone (Contreras Villaseñor & Elías Pastor, 2012; FAUTAPO, 2010a) Table 11).

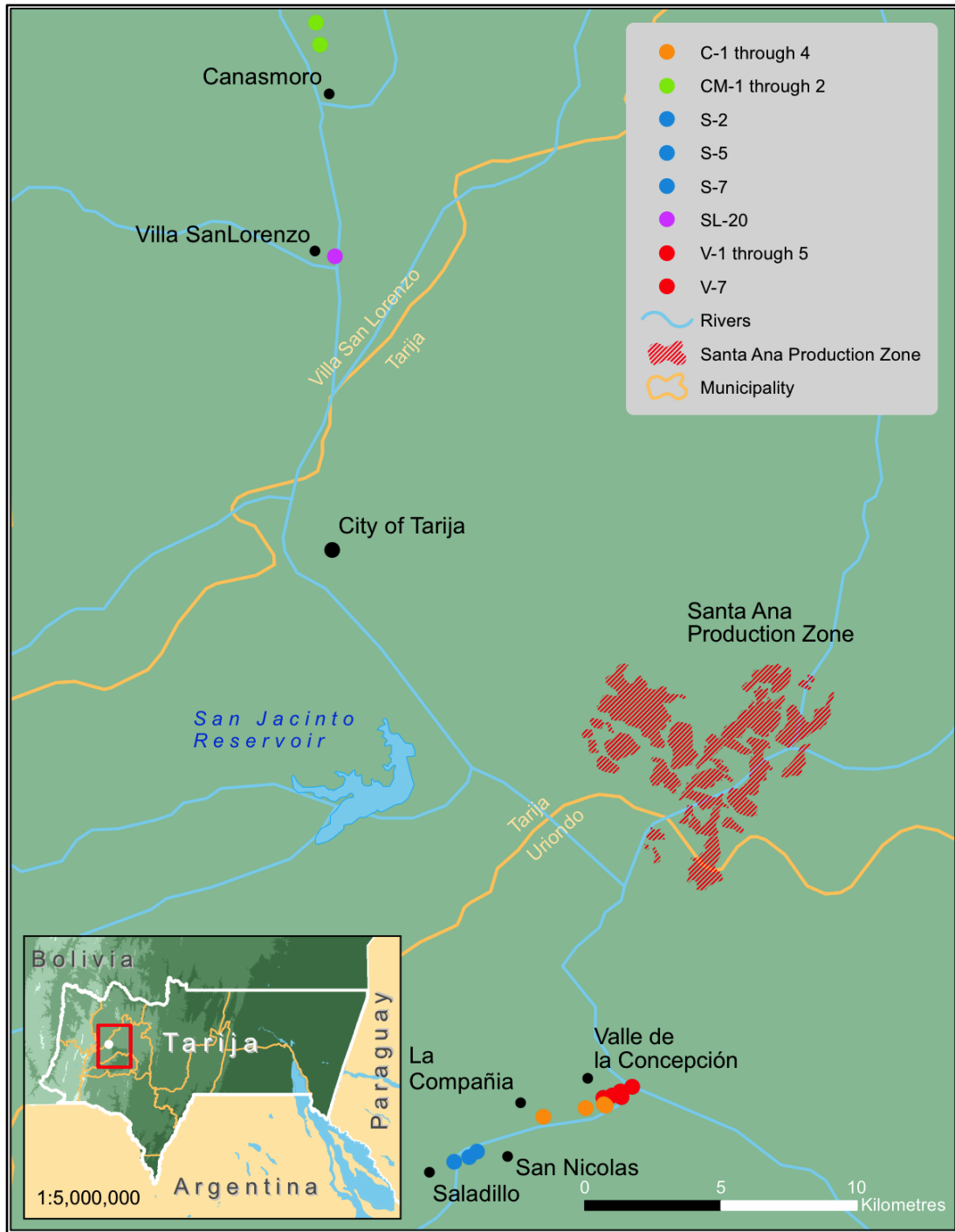


Figure 15. Map of the Central Valley and research participant households.

Table 11. Growth in Central Valley viticulture since 1950.

Year	Area of viticulture (hectares)	Source
1950	107	MACyA, INE and ONUAyA 2009, 115
1972	450	(CODETAR, 1979, p. 40)
1983	1,046	(República de Bolivia, 1990, p. 89)
2002	1,996	(Paniagua Requena, 2003, p. 6)
2015	3,500	National Viticulturists Association (<i>Asociación Nacional de Viticultores</i> , cited in (El Diario, 2015, p. 1))

The National Viticulturists Association estimates 250-300 ha of vineyards are added annually in the Central Valley (El Diario, 2015, p. 1) and grape and alcohol production generates a gross annual income of approximately 30 million USD (FAUTAPO, 2010a, p. 107), accounting for roughly 3% of the real gross domestic product of the Tarija Department (INE, 2011, p. 12).⁴³ Approximately 85% of grape producers (approximately 2,000 households in Tarija and the neighbouring Cinti region: (Comité de Competitividad Cadena Uva, Vinos y Singani, 2009, p. 15) are small-holders with 0.5 to 1 hectare of vineyards (Personal communication with FAUTAPO official, October 31, 2013). The majority of grape production in the Central Valley is concentrated in the region of Santa Ana (Tarija Municipality) and in the Municipality of Uriondo, particularly in the communities of Calamuchita and Valle de la Concepción (FAUTAPO, 2010a).

Expanding the sector, including small-holder participation, remains a strategic priority in regional planning and a focus of public, private and third sector investment (Comité de Competitividad, n.d.; FAUTAPO, n.d.; Ministerio de Desarrollo Sostenible, 2004). Technical support and training programs (FAUTAPO, n.d.) and targeted microcredit programs (Idepro, n.d.), alongside tourism development (Contreras Villaseñor & Elías Pastor, 2012; Ugarte, 2010) and marketing support (Comité de Competitividad, n.d.; FAUTAPO, n.d.), are examples of government and non-governmental development agency incentives to encourage viticulture development. Additionally, the wineries have also established contractual relationships with small producers providing “technical assistance, fertilizers, help with pruning and many things like that” in exchange for agreements to sell 80 to 90% of their production (Wine sector key informant 02).

⁴³ Based on 2009 GDP estimates.

To examine the on-going tension between modernization and policy support for small-scale producers we undertook the documentation of the primary production strategies of grape producing campesino households in five Central Valley communities (Figure 15; Table 12). The majority of the data were collected through semi-structured interviews (Dunn, 2005) in October 2013, during twelve months of field work (August-November 2012 and March-November 2013). Nineteen people (9 women and 10 men) from 16 households were interviewed. In addition to primary production strategies and portfolios, narratives of personal histories and experiences (Butler-Kisber, 2010) related to primary production, diet and changes over time were also elicited. A purposive sampling strategy (Bernard, 2006; Palys, 2008), aided by snowball sampling (Biernacki & Waldorf, 1981), was used to identify households currently engaged in viticulture and willing to participate in the research. As a result of the purposive sampling strategy and small sample size, the findings are qualitative and descriptive and are not statistically generalizable to the Central Valley or study communities. The data, however, offer an in-depth look into the histories, stories and experiences of change in agricultural production including the transition of the role of agrobiodiversity within these farm systems.

In order to understand household experiences within local and regional contexts, household interviews are complemented by interviews with former commercial grape producers, and government and NGO staff involved in viticulture development as well as document review (Prior, 2008) of contemporary and historical materials on Central Valley viticulture. Interviews were conducted in Spanish and local research assistants also helped identify participants and aided in data gathering. Names of research participants have been withheld to protect their privacy and anonymity. The 16 grape producing households are assigned household codes and interview codes have been assigned for other participants.⁴⁴

⁴⁴ A list of household codes is included in Table 12 under Household ID #. Other interviews are identified by category (e.g. sector key informant) and numbered according to appearance in the text. Other information related to the identity of research participants is withheld to protect their anonymity.

Table 12. Household assets in relation to the viticulture landscape.

#	Household ID #	Community	Land		Years producing commercial grapes	Number of species reported	Grapes sold	Secondary production (grape-based: e.g. alcohol) ¹		Labour		Non-farm income
			Land holdings (ha)	Vineyard size (ha)				Occurrence	Production sold	Family labour	Hired labour	
1	SL-20	San Lorenzo	Not revealed	0.25	20	6	No	Yes	Yes	Yes	Yes	Professional wage
2	CM-1	Canasmoro	2	0.25	> 1	11	Intend to sell	Intend to (small amounts)	Intend to (small amounts)	Yes	Yes	Pension
3	CM-2	Canasmoro	1	0.25	> 1	4	Intend to sell	Intend to (small amounts)	Intend to (small amounts)	Yes	Yes	Pension
4	V-1	Valle de la Concepción	1.5	1	10	6	Yes	Yes (small amounts)	Yes	Yes	Not revealed	Tourism (hostel), retail
5	V-2	Valle de la Concepción	2	1	12	5	Yes	No	No	Yes	Not revealed	Pension
6	V-3	Valle de la Concepción	30	30	40	1	Yes	Yes (small amounts)	No	Yes	Yes	Professional wage
7	V-4	Valle de la Concepción	4	0.75	8	10	Yes	Yes (small amounts)	Yes	Yes	Not revealed	Secondary production, retail
8	V-5	Valle de la Concepción	1.25	1.25	18 (parents had vineyards beginning 40 years ago)	8	No	Yes	Yes	Yes	Yes	Restaurant, winery, retail
9	V-7	Valle de la Concepción	Not revealed	Not revealed	15	5	Yes	Yes (small amounts)	Yes	Yes	Yes	Retail, restaurant
10	C-1	La	1.25	0.75	30	9	Yes	No	No	Yes	Yes	

Compañía												
11	C-2	La Compañía	0.25	0.05-0.1 (400 plants)	10	6	Yes	Yes (small amounts)	No	Yes	Not revealed	
12	C-3	La Compañía	0.25	0.25	12	8	Yes	No	No	Yes	No	Retail
13	C-4	La Compañía	1	0.5	18	4	Yes	No	No	Yes	Not revealed	
14	S-2	Saladillo	5	1.5	44	12	Yes	Yes (small amounts)	Yes	Yes	Yes	Agricultural equipment rental
15	S-5	Saladillo	2	0.25	> 1	14	Intend to sell	Not revealed	N/A	Yes	Not revealed	
16	S-7	Saladillo	0.75	0.50	12	15	Yes	No	No	Yes	Yes	

¹ Grapes are transformed in-house into wine and/or singani for household consumption and/or sale.

3.3 Grape grower production and income profiles

In spite of development policies and programs incentivising viticulture, all but one of sixteen households have diverse primary production portfolios involving multiple species of plants and animals for a mixture of market and subsistence purposes. Table 12 summarizes household assets. It shows that in addition to diversification on-farm, most households (n=11) also report various types of non-farm income, including tourism services (n=3) and the production (n=8) and sale (n=6) of secondary grape-based products, such as wines and singani (a distilled wine spirit).

Half of the producer group (n=8) have 0.5 ha or less of vineyards, while six households have between 0.5-1.5 ha. One household (V-3) reports 30 ha. Excluding V-3, the average holding size is $1.7 \text{ ha} \pm 1.38 \text{ ha}$.⁴⁵ All households (n=16) rely on family labour in their agricultural activities. Nine also report occasional contracting of labour, particularly to aid with picking and packing the grape harvest.⁴⁶ The frequency and number of hired workers varied according to availability of family labour, scale of production and economic ability. C-1 and S-2, for example, report hiring between 2 and 3 workers annually during the grape harvest, while S-7 hires 1 to 2. C-3 does not hire labour because they have three able-bodied, adult family-members working exclusively on their farm and their 0.25 ha is small enough for them to manage. In other cases (e.g. CM-1 and CM-2), workers are employed regularly, on a part-time basis, because of the low availability of family labour to meet production demands. CM-1, for example, hires someone to harvest asparagus daily and hires three or four others during peak harvesting and planting seasons. By contrast to the smaller-scale producers, V-3 hires approximately 40 works during the grape harvest season.

On average households produce 7.75 ± 4.05 of 41 types of crops and livestock reported. One household (V-3) reports exclusive grape production; however, seven households produce 4 to 6 crops, six report 8 to 12 and two report 14 to 15 (Figure 16).

⁴⁵ Numbers are mean \pm standard deviation.

⁴⁶ Many temporary agricultural workers come from surrounding rural communities in the Central Valley (Turner, field notes 26/10/2012 and 11/10/2013). One household (V5) has also had international volunteers through WWOOF (World Wide Opportunities on Organic Farms: <http://www.woof.net>).

With the exception of V-3, the households show no correlation between holding size and the diversity of production portfolios (Figure 17).⁴⁷ Table 13 presents the number of households producing each of the 41 reported crops and livestock and their use profiles. Apart from grapes, which are produced by 100% of households, the most common crops are potatoes (n=13), corn (n=10) and peaches (n=9). Although other individual crops are not as widely produced, when examined by categories (Figure 18), starches (potatoes and/or corn: n=13), vegetables (n=13) and fruit (in addition to grapes: n=11) are produced by a majority of households. Only five households report livestock, two of which also produce feed crops.

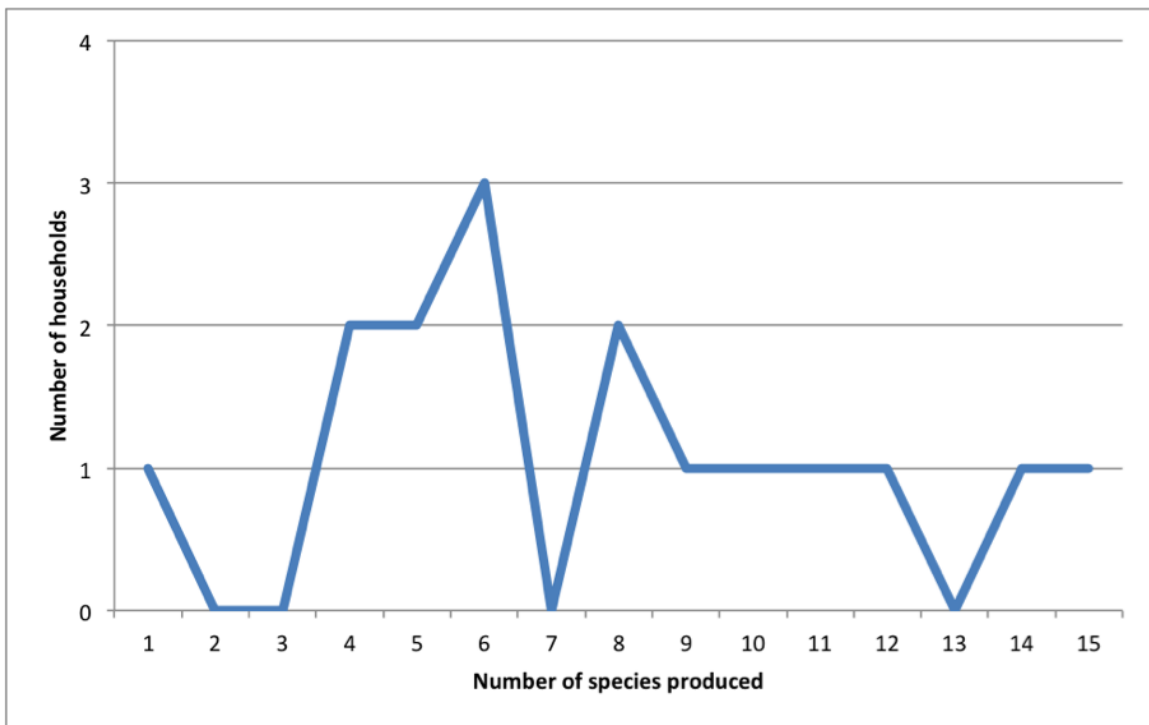


Figure 16. Distribution of agrobiodiversity across households.

⁴⁷ Pearson Product Moment Correlation found no significant relationship between the variables. (Pearson's $r=-0.44$, $t=-1.71$, $df=12$, $p=0.11$. With V-3 excluded from sample, Pearson's $r=0.35$, $t=1.24$, $df=11$, $p=0.24$).

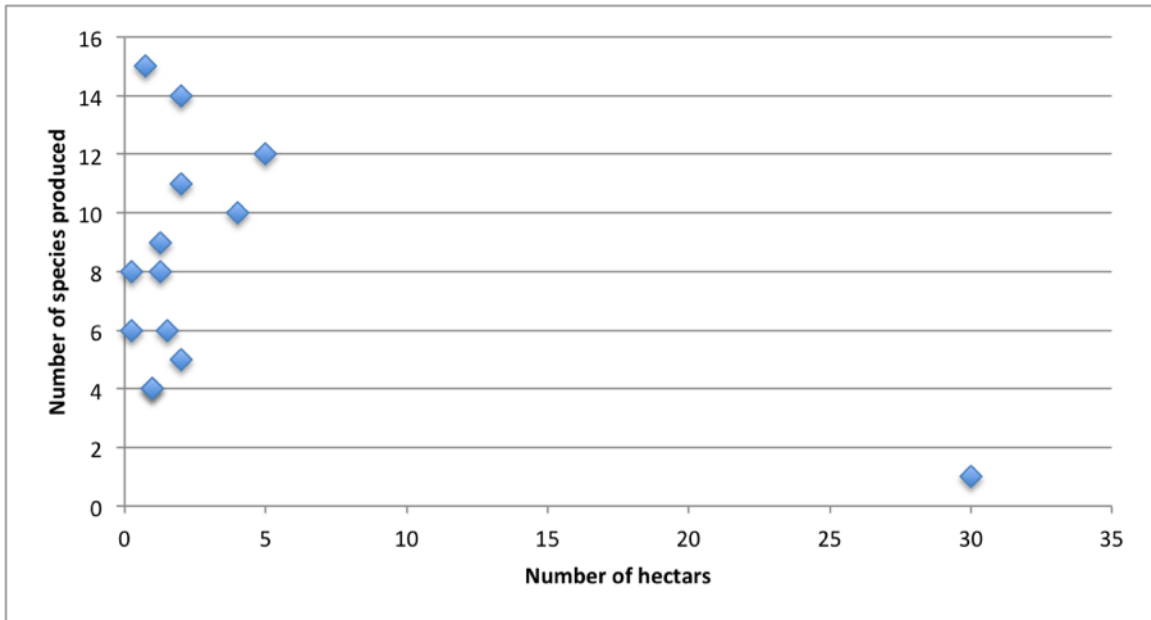


Figure 17. Relationship between holding size and agrobiodiversity.

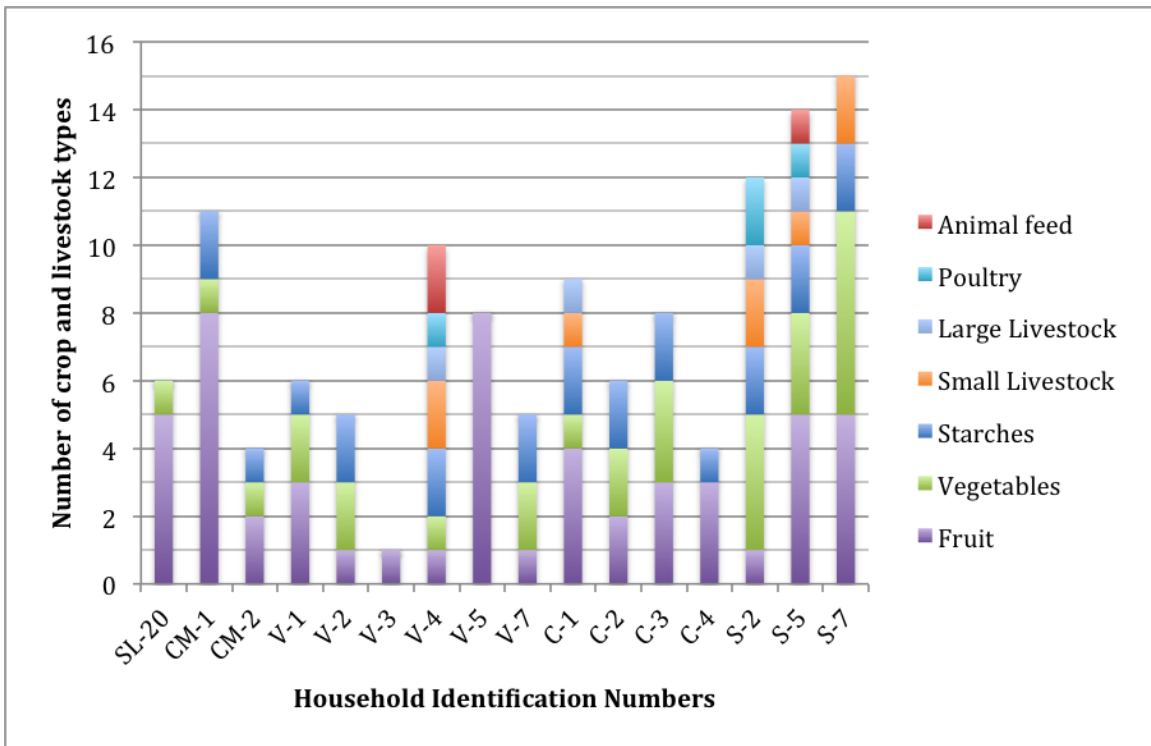


Figure 18. Crop and livestock types produced per household.

Table 13. Household production and use profiles of crops and livestock.

#	Crop/ Livestock	Occurrence		Average market/non-market orientation score	Usage (Sale, S; Household consumption, HC; Sale of surplus or occasional sale, SS; Household consumption of surplus or occasional consumption, HCS; Transformation, T; Fertilizer, F; Animal Feed, AF)
		# of HHs	%		
1	Grapes	16/16	100%	1.8	S (resellers and wineries), T (usually of lowest quality fruit, for S and/or HC)
2	Potatoes	13/16	81%	3.2	S, HC
3	Corn	10/16	62.5%	4.6	F, HC, S
4	Peaches	9/16	56%	2.3	S, HC, T (for S and HC)
5	Peas	5/16	31%	2.4	S, F (for vineyards), HCS
6	Figs	4/16	25%	3	HC, F (for vineyards), S
7	Pigs	4/16	25%	4	HC
8	Walnuts	4/16	25%	4	HC, SS
9	Apples	3/16	19%	4.3	HC, SS
10	Chickens/ hens	3/16	19%	3.6	S, HC
11	Leafy greens ¹	3/16	19%	3	HC, S
12	Onions	3/16	19%	2.3	S, HCS
13	Tomatoes	3/16	19%	2.7	S, HCS
14	Sheep	3/16	19%	4.7	HC, SS
15	Quince	3/16	19%	3.3	T, HC, S
16	Alfalfa	2/16	12.5%	5	AF
17	Asparagus	2/16	12.5%	1	S
18	Beans	2/16	12.5%	3.5	HC, SS
19	Blackberries	2/16	12.5%	1.5	S, HCS
20	Broccoli	2/16	12.5%	2.5	S, HC
21	Dairy cows ²	2/16	12.5%	4.5	HC, S (direct to consumers)
22	Fava beans	2/16	12.5%	3	HC, F (for vineyards), S
23	Peanuts	2/16	12.5%	2	S, HCS
24	Pomegranate	2/16	12.5%	5	HC
25	Pears	2/16	12.5%	5	HC
26	Beets	1/16	6%	2	S, HCS
27	Blueberries	1/16	6%	2	S, HCS
28	Cabbage	1/16	6%	5	HC
29	Carrots	1/16	6%	2	S, HCS
30	Chili peppers	1/16	6%	3	S, HC
31	Ducks	1/16	6%	5	HC
32	Goats	1/16	6%	4	HC, SS
33	Oats	1/16	6%	5	AF
34	Passion fruit	1/16	6%	5	HC
35	Peruvian ground cherries	1/16	6%	2	S, HCS
36	Plums	1/16	6%	2	S, HCS
37	Prickly pear cactus fruit	1/16	6%	5	HC
38	Raspberries	1/16	6%	2	S, HCS
39	Squash	1/16	6%	5	HC
40	Strawberries	1/16	6%	1	S
41	Creole cattle ²	1/16	6%	3.5	HC, S

¹ 'Leafy greens' includes lettuces, Swiss chard, parsley and other herbs. ² Although both cattle breeds, dairy (Holsteins) and creole, are included as different categories because of their distinct genetics and management requirements.

In order to identify crops and livestock contributions to the household economy, households described how much of a given product was normally kept for household consumption and/or sold. In Table 13, research participants' descriptions are represented on a Likert scale of their market/non-market orientation, with one representing products exclusively for sale, five representing products exclusively for household use, and the range in between capturing multi-purpose products sold and consumed in different proportions depending on scale of production, need and opportunity. Twenty crops and livestock are chiefly for the market, while 21 are principally for household consumption.

Figure 19 summarizes the flows of crops, livestock, and their secondary products within household economies from sites of production to sites of transformation, exchange or consumption. Grapes are predominantly a commercial product for all households (with a score of 1.8) and were commonly identified as the most important component of household production portfolios: 'Income from grapes is all that we have. From tomatoes, potatoes, there is very little' (S-2). Three classes of grapes are produced: table grapes, wine grapes and dual-purpose grapes. As shown in Table 2, eleven households sell to wineries, regional market buyers, and/or wholesalers who bring their crop to the national market.

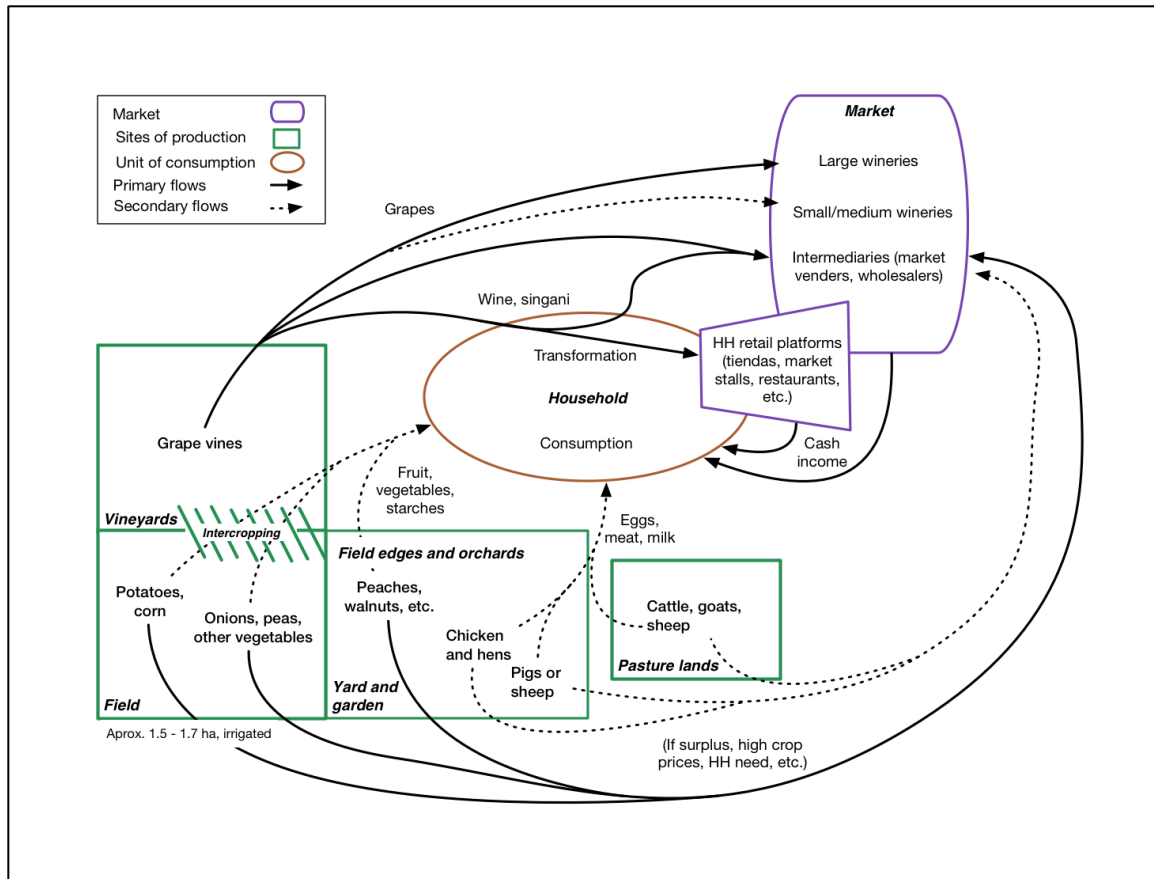


Figure 19. Product flows within grape producing household economies.

Multiple avenues for commercialisation allow producers relative security in finding buyers for their crop and reduces the market power of any one buyer to set prices (Viticulture sector development key informant 01; Wine sector key informant 02; S-2; V-3). The harvest can also be sold strategically by producers according to size and quality: ‘Moscatel is for the market and also for the wineries. All of the grapes, the largest bunches – the best – I harvest for the market. And all of the smaller bunches – those that are a little more deformed – are kept for the wineries’ (C-1). Some households (n=8) also transform all or part of their harvest to wine and/or singani for sale and/or household consumption.

Households employ multiple production strategies to create diverse farms. Planting vegetables or forage crops between the grape trellises is a common practice (n=8: Figure 20), particularly during times of the year when the grapes are not in season. Similarly, fruit trees are commonly planted around field edges or on slopes (n=8). Vineyards are also often limited to a section of land, with orchards and/or agricultural

plots occupying remaining areas (n=12: Figure 21). Livestock are maintained in pens (e.g. pigs or sheep), barns (e.g. dairy cattle), or allowed to free range (e.g. poultry). Some households also rely on common pasturelands for maintaining their herds (n=4).

Similar patterns of intercropping, use of field edges and rotation planting were commonly observed on small holdings throughout the research area, particularly in the Municipality of Uriondo (Turner, field notes 15/10/2013 and 28/10/2013), where viticulture is widespread (FAUTAPO, 2010a). However, with the exception of alfalfa, these patterns were not observed during visits to larger vineyards (Turner, field notes 22/09/2012 and 03/07/2013).



Figure 20. Small vineyard intercropped with potatoes.



Figure 21. Campesino vineyard with agricultural fields.

3.4 Seven limitations of viticulture: Producer perspectives

Producers describe several reasons why commercial viticulture is a desirable component of their livelihoods, including income generation, familiarity and cultural importance of grape and alcohol production, as well as ready markets and decades of sectorial promotion through technical extension and incentives. In spite of these compelling features, only one household exclusively specialises in viticulture. Seven intersecting factors influencing grape produces' production strategies are outlined in Table 14 and described in more detail below.

Table 14. Limitations of grape production for small holders.

Factor	Effect	Representative quotations
1 High costs of entering and staying in the sector	Some producers can only afford small vineyards, leaving land for other crops	You spend a lot of money. Lots (V-3).
2 Ecological and economic risks (e.g. hail, frost and disease)	High uncertainty costs, frequent chemical treatments and costly crop protection encourages diverse income sources	...there are always so many diseases for grapes that sometimes there isn't anything left and you loss the crop (C-2).
3 Small holdings and low incomes	Intercropping, rotation planting and other production techniques are used to maximize yields per unit of land	...in 'halves' (<i>medias</i>) we plant onions and put the trellises. [...] We don't want to leave any empty land (C-3).
4 Seasonality of grape production	Grapes provide an annual harvest, but have production costs throughout the year	...there are also peaches in the season when there aren't grapes... (Former producer 01).
5 Viable alternative crops	Other crops (e.g. peaches) have competitive prices	Peaches almost win over the grapes (C-4).
6 Ecological role of other species	Legumes and livestock provide fertilizer for the soil and flowers act as early warning systems for disease	If there aren't flowers from the roses, there aren't grapes (S-2).
7 Value of other species for household consumption	Other crops and livestock provide foods people value eating and reduce a household's dependence on cash income and the market	We occupy the alleys between the grape rows. Sometimes we also put in peppers, beans, all those little things – vegetables – to eat and also to sell (S-7).

3.4.1 High costs of viticulture

Research by development agencies in the area found that 0.6 ha of vineyard provides sufficient income for a family to move out of extreme poverty and 1 ha provides enough to rise above the poverty line (Viceministerio de Comercio Interno y Exportaciones 2014). In spite of this potential and the numerous financial and technical supports for producers available through development programs (FAUTAPO, n.d.; CENAVIT, n.d.; Idepro, n.d.), the majority of producers (n=13) have not converted all of their land to vineyards.

One reason for this is the high cost of entering and staying in viticulture. In 2010, FAUTAPO (2010a, p. 38) estimated that a hectare of vineyard requires 156 working days to maintain, excluding irrigation work and other labour. Additionally, producers must incur between USD 6,327 and USD 9,297 in start up costs in the first year and an average of USD 2,596 annually in maintenance thereafter (2010a, p. 39).⁴⁸

⁴⁸ These costs are 2010 figures are reported by FAUTAPO. All other prices we refer to have been converted from Bolivian Bolivianos to American dollars at the average exchange rate in 2013 of \$6.95 BOB to \$1 USD.

Production costs, including high wages and labour scarcity, as well as chemical and other inputs, such as green manure, were common concerns among the producer group (e.g. SL-20; V-3; CM-1; C-1; V-3). The dependence on hired labour varies among the research participant households (Section 3), however it was highlighted as an important cost of production by SL-20, V-3, and V-7. For SL-20, who produce and sell artisanal wine and singani, rather than raw grapes, finding workers is one of the most challenging aspects of producing their own grapes, particularly as the availability of family labour is limited by adults in the household working fulltime off-farm.⁴⁹ As a result, they have adapted their production strategy to harvest mainly on weekends when family labour is available. Another producer (V-3), who hires approximately 40 workers during the harvest, describes her production costs:

In those years [when we first started], we got hold of lots of money. But now the grapes instead of going up have gone down [in price]. And now the workers earn a lot. Now you pay USD 10.07 or USD 11.50 for a [day's] work. We pay up to USD 14.40. [...] Fertilizers, the fertilizers are organic fertilizers – that is from sheep. We have to buy it. It comes from the highlands in trucks. And the chemical fertilizer, there is another cost [...] and [pesticide and fungicide] treatments. You have to treat and treat, every 8 days, you have to treat the pests and now everything has pests and there isn't anything without treatments. [...] You spend a lot of money.

Producers also commented on the difficulty of accessing credit. One participant (S-2) explained that he sees credit as a significant limiting factor for small-scale producers. He had considered accessing credit through FAUTAPO or CENAVIT, but both agencies required significant amounts of paper work that made them too difficult to access. As a result, he took out a bank loan with 13% interest.

The high costs of viticulture have led some producers to only put in small plots of grapes, leaving their remaining land for other crops. These costs and the technical complexity of grape production have restricted or reduced the extent of viticulture activities for some, while for others it has pushed them to withdraw from the sector (Former producer 01; Former producer 02) or kept them from ever entering it (Primary producer 01).

⁴⁹ Many artisanal wine producers in the town of San Lorenzo do not produce their own grapes, instead purchasing them from Uriondo or Santa Ana (e.g. Artisanal wine producers 01 and 02).

3.4.2 Coping with grape production risks

Production costs are deeply interwoven with perennial risks and challenges associated with Central Valley viticulture, namely: hail, frost and crop disease. One producer (C-2) explained that his tiny vineyard can produce up to 70 boxes of grapes, but this is always uncertain: ‘there are always so many diseases for the grapes that sometimes not even a little is left and you lose the production... or sometimes hail falls, sometimes [there are] frosts. Nothing is secure.’ Others echoed this sentiment: ‘If it isn’t one thing, it’s another. And now it’s hail more than anything. Hail. As soon as it starts to rain in November, it starts and hail starts to fall’ (V-1). Others, including two former grape producers (Former producer 01; Former producer 03), also have stories of the destruction caused by hail. ‘When the hail comes,’ C-1 summarized, ‘nothing is left.’ Hail events can also have long-term impacts on the productivity of an affected vineyard (V-4).

In the last few years, many Central Valley producers, including participant households (n=5), installed netting to protect their vines from hail. CM-2 and CM-1 reported costs of USD 863 per 1000 m² for putting in a new vineyard with netting. While the netting is costly, many believe it is a more effective and economic solution than private crop insurance.⁵⁰ For some, however, the cost is prohibitive. Although C-2 put netting over some of his vineyard two years before through a government program, he could not afford to cover all his vines. Others continue to produce without any form of protection for their crop. ‘I am thinking about it,’ C-1 explained, ‘but I don’t have the cash. It is a lot of cash and I don’t have it.’

Crop diseases can also have devastating effects. V-3 described her son losing his vineyard because of diseases: ‘There was a disease and he lost 8 ha.’ He had to take out the vines and was only able to replant 2.5 ha after several years. Three other households reported chronic problems with fungus, mildew and insect infestations. C-1 affirmed:

I am producing less [than before]... Years ago when we were starting out with the practice of the vines, there weren’t a lot of infestations. Year after year, more infestations come. You can’t control them. [...] Now the infestations are resistant to insecticides. Years before I remember that we were able to use one insecticide to kill various infestations and now you need one for each... This poisons the grapes. [...] You have to fertilize the earth very well for it to produce grapes, but

⁵⁰ The household with the largest vineyard (V-3) was the only household who reported preferring crop insurance to netting.

then an infestation comes and it doesn't produce. It comes when the grapes are very little and then when they are maturing, they rot.

Insect infestations, such as phylloxera [*Dactylosphaera vitifoli*] and 'gray mold' [*Botrytis cinerea*], are some of the most common crop ailments in the Central Valley (Comité de Competitividad Cadena Uva, Vinos y Singani, 2009; Muñoz Oller, 2010; Muñoz Oller & Alvarado Romero, 2013; Villena, Alvarado, & Orozco, 2013).

These challenges, both as chronic stresses and specific shock events, have prompted some to abandon grape production altogether (e.g. Former producers 01 and 03). One former producer (03) explained why her parents took out their 1.5 ha of vineyard in the early 1990s and began commercial dairy production:

[We made] the change, because of problems. They didn't use the nets to protect against hail. And when hail would come it would leave all of the grapes on the ground. You would have to pick them up grape by grape to make singani those years. Because of that, for that reason, my father opted for the cows.

3.4.3 Maximising limited spaces of production

The small size of many holdings and low incomes also encourage producers to make the most of the available space through traditional agricultural techniques of intercropping, rotation planting and using field edges, yards and pasture areas (Section 3). Intercropping in the vineyards is a key example of how producers have adapted commercial viticulture to better suit their household requirements.

In traditional viticulture, grapes were trained in Peruvian pepper trees (*Schinus molle*) planted around field edges; however, commercial trellis-based grape production now used by commercial producers has different space requirements. If trellises are placed too close together it limits access for harvesting and maintenance and reduces ventilation between the rows (C-3), likely increasing the risk of fungal diseases (Section 4.2). While some producers space the rows as tightly as possible,⁵¹ others choose to maintain more space between the rows: 'Like this we can work with a tractor. Otherwise we would have to work with horses if it were that narrow. Or we'd have to leave it without putting anything in the middle' (C-3). The practice of 'planting up the middle' by intercropping grape vines with other crops planted between the trellises, is commonly

⁵¹ Some producers were observed to space rows 1-1.5 m apart (Turner, field notes 15/10/2013), significantly less than the 2.3-2.5 m distance used by CENAVIT and FAUTAPO in their test plots (see Muñoz Oller and Alvarado Romero 2013, 5; Muñoz Oller 2010, 2)

referred to by producers as planting ‘in halves’, or *a medias* in Spanish. C-3 explained, ‘...in ‘halves’ we plant onions and put in the trellises. We call it ‘halves’ because we have the lower part for onions and we have the grapes there... We don’t want to leave any empty land.’

C-2 identified the lack of land as the primary motivation in his view for planting potatoes or other crops among the grape vines. Similarly V-4 explained, ‘[It is] because of lack of land that we plant some in ‘halves’.’ Ideally, he explained, one would alternate a planted alley with an empty one in order to ‘leave room to walk through, apply treatments, work, and everything.’ However, this does not always happen: ‘Now, because of a lack of land, for things to eat, it is all full. Some years when there aren’t seeds they are left free, too.’

S-7 explained that the potential for intercropping was one of the features that made grape production attractive:

Here we used to plant corn. Tomatoes, we planted. Those were what we planted before putting in the grapes. Then we saw that grapes were well suited for us because they leave some space in the middle where we can plant tomatoes and all those things... the grapes help me economically, apart from what I plant in the middle. All of this, I could say, is what allows me to survive here in the countryside.

A former grape producer (01) affirmed, ‘[Planting in ‘halves’] is to use the space and also to have production throughout the year, otherwise, with only the little grapes, you wouldn’t survive.’

3.4.4 Seasonality of grape production

The seasonality of grape production is another motivation for maintaining a diversity of on- and off-farm income sources. V-7, for example, in addition to maintaining a vineyard, and growing corn, potatoes, peas, and fava beans, also has a restaurant and a store. She highlighted the complementarity between these activities; they are able to use the income from one to support the others at different times. The grapes, she emphasized, only offer returns once during the year, but require continual investment. Thus, the vineyard is often supported through the restaurant and store, which act as a source of short-term credit for the vineyard that is then recuperated during the harvest.

Grape prices also fluctuate during the harvest season, reaching their lowest at the harvest’s peak in February and March (Comité de Competitividad Cadena Uva, Vinos y

Singani, 2009, p. 26). The lack of cold storage facilities contributes to the market glut, post-harvest losses and the limited ability of producers to spread the sale of their harvest to take advantage of higher prices during other times of the year (El Diario, 2015; Uriondo Municipality agricultural development key informant; S-7).

Some producers are able to spread the income from their grape harvest over the year because the wineries pay producers for their crop in 3 to 4 instalments. One producer (V-3) reflected that for her, the system ‘works because we have to save money. With the instalments we have [money] to buy fertilizers and everything for the vineyard. The vineyards take a lot of money. And so if there is hail it is a huge loss. All the money goes.’ For others this system of payment was seen less favourably. ‘The wineries work because they buy everything,’ C-4 attested, ‘but they aren’t convenient as well because they don’t pay quickly.’ This has encouraged him to diversify his grape production into table as well as wine grapes.

In addition to annual challenges of viticulture costs and returns, grape vines also have multi-year productivity cycles. Many producers take out their vines after productivity begins to decline, either from age or illness, including from adverse weather events, in order to rejuvenate the vineyard with fresh plants (C-3; C-4; S-7). S-7 explained that after 12 years her vineyard needs renewal: ‘Now it is declining, because as the plant ages it declines. They lose their ability to produce well.’ New vines or grafts on to existing plants, however, take up to two years to produce a harvest (S-7), during which time they demand high investments and offer no returns (Section 4.1). These lapses in production create gaps in household incomes, unless there are other income sources to supplement the periods without grape harvests.

Additionally, the seasonality of grape production also means that there are multiple opportunities over the course of the year when other crops can be produced without compromising labour or access requirements of the vineyards. Winter crops, such as fava beans, and other crops with shorter production cycles of three to four months, like potatoes and peas, can be coordinated so as not to interfere with grape cultivation.

3.4.5 Alternative market products

Income from grapes is not always available or sufficient, as a result other market-oriented crops are important for most households. Income from grapes is seen as ‘good; but

nothing more' (C-3). Some producers attribute this to the number of other grape producers involved in the industry (C-4) as well as competition with imported grapes (S-2). Other sources of agricultural income identified by producers were peaches, potatoes, other market vegetables and high value, non-traditional crops (Figure 22).



Figure 22. Campesino producer harvesting onions planted in vineyard alleys.

C-4, for example, has 0.5 ha of vineyards and dedicates the remainder of his land to peach production. He explained that when there is a good peach harvest:

Peaches almost win over the grapes. They win in price because when a peach is well selected and everything it has better prices than grapes. It's like that. The grapes have gone down a lot in price. There is a lot of production. Many are dedicated to it. By contrast, only a few put in peaches.

Potatoes were also commonly observed and widely mentioned as part of producers' production profiles (n=13) because of their high prices that year (Turner, field notes 29/10/2013; S-5). Other vegetables, such as tomatoes and onions, may have lower prices, but have other advantages, including multiple harvests and the potential for re-planting in the event of crop failure (C-3).

Two households (CM-1, CM-2) also produce high-value non-traditional crops (i.e. raspberries, blueberries, blackberries and asparagus) to improve and diversify their

incomes. CM-1 was the president of a producer cooperative (activity from the late 1990s to mid-2000s) providing technical and marketing support for non-traditional crop production in Central Valley rural communities. He continues to grow these alongside traditional crops and advocates for a diversity-based production approach for his community and other producers, including CM-2, by sharing plant cuttings and production knowledge. He explained that while some communities have specialized in viticulture and continue investing in that specialization, he has cautioned against that approach in his community of Canasmoro, ‘I said, we’re putting in blueberries in Canasmoro. If you want grapes and blueberries, mix them.’ Mixing grapes with other crops and maintaining livestock helps producers balance the risks associated with dependence on any one species, diversify income sources to lessen seasonal fluctuations and maximise the areas available for production.

3.4.6 Retaining ecological services of other plants and animals

Campesino producers also recognize that other species contribute to successful viticulture. Sheep and other animals, for example, provide green fertilizers that lower production costs. In contrast to other producers (Section 4.1), when S-7 described her viticulture production costs, she noted:

For the grapes I almost don’t have to invest a lot, because I have my three crazy sheep there. They give all year. All year. That is, they give their guano, because of that I don’t have to buy a lot of everything you put on the vines. I sometimes buy chemicals, but mostly it’s that [guano], because the soil stays soft with the guano.

Crop residues, particularly of legumes, such as peas, are also ploughed into the soil to increase fertility (Turner, field notes 29/10/2013). V-7 explained:

Now we have put in peas and fava beans. We take advantage of the first peas, the first fava beans [by harvesting them], then we plough them in with the tractor so they decomposes as fertilizer.

Alfalfa is also used as a cover crop and fertilizer to fix nitrogen in the soil by some of the larger vineyards, such as *Kohlberg* (Turner, field notes 03/07/2013), while smaller producers, like V-7, tend towards peas or other edible legumes (Former producer 01).

In addition to food, feed and fertilizer crops, many producers also plant flowers, particularly roses, near their vines (Figure 23). Should the roses become infected, it is an indication that the grapes may also be at risk of disease. Reflecting on this practice S-2

explained: ‘We have always been accustomed to doing that. Always. [...] Because it is the beauty of life. If there aren’t flowers from the roses, there aren’t grapes. [...] That is nature. The grandparents taught that.’ Some of the larger vineyards (e.g. *Campos de Solana*) also plant roses at the end of their trellis rows (Turner, field notes 22/09/2012).



Figure 23. Vineyard planted with fruit trees and roses.

3.4.7 Household diet

Household production portfolios also contribute foods valued within the household diet and local food culture. ‘Onions, peas, fava beans, all that,’ mentioned S-7 as she described intercropping in her vineyard, ‘Sometimes we also put in peppers, beans, all of those little things, vegetables, to eat and also to sell.’ V-5 also explained the different uses of the crops they produce:

We produce grapes, which are for the production of our wines. We also grow a little peach that is around the edge of the field. And really, since it is in the Central Valley, one produces all kinds of fruits that are typical here. For example, figs, peaches, walnuts, obviously for the consumption of the family, right, because there aren’t a lot of plants.

C-2 also grows potatoes, corn and other crops for household consumption. His corn is harvested at the end of December and is always eaten as part of their New Year’s meal.

‘We were raised producing corn, potatoes, everything,’ he explained. When asked what the most important crops are that he produces, he declared, even though grapes are more profitable, ‘Potatoes, corn, onion, everything that you need every day.’

Producing these foods also allows households to avoid or reduce purchasing them thereby reducing dependence on cash income and the market. S-5 explained their corn production: ‘The house is full of corn. [...] We let it ripen, let it dry, and store it for when we need it. And if not we buy the flour right?’ SL-20 also affirmed the importance of producing for the household:

If there is a little piece of land, you have to produce on it. Because if you don’t, then you have to have more money in your pocket to go to the market, right? By contrast, if we have our own production, then it is easier – cheaper. [...] If there is a piece of land, it needs to be productive. That is the responsibility of having land – it’s my responsibility [for my land]...

In spite of the benefits and cultural relevance of maintaining complex agroecosystems presented in Section 4, these practices may not be representative of landscape level trends in the Central Valley, nor should it be assumed that these and similar households will continue the production practices documented here into the future should their conditions of production change. In the following section we discuss some of the regional factors shaping the production and livelihood context of research participant households and one household’s experience of agricultural transition from complex, multi-purpose production to single commodity production. These two lines of discussion underscore the contingency of current smallholder production and production strategies within wider trends of agricultural modernization and intensification trajectories based on specialisation, monoculture and external inputs (Processes also discussed in Chapter 1).

3.5 Regional factors affecting the agricultural landscape

In addition to the factors presented above (Section 4) that have shaped campesino farming systems through household decisions, regional processes have led to an uneven unfolding of intensification and extension of viticulture production across the Central Valley floor. The geographic placement of the San Jacinto Reservoir allowed the rapid expansion of viticulture development in the Santa Ana area, which became the focus of

corporate investment, and is now home to the largest vineyards.⁵² The focus of corporate viticulture development in Santa Ana had dramatic localized impacts on the landscape and rural lifeways as well as more diffused, but nonetheless important, ripple effects in other areas.

In anticipation of the San Jacinto irrigation project, pasture lands in the Santa Ana area with little market value were bought cheaply by investors before their value increased dramatically during the 1990s and 2000s (Turner, field notes 22/09/2012 and 17/04/2013). A key informant (03) working with Central Valley campesino communities explained, ‘The land started to acquire value. Lands that before were for grazing, that weren’t worth much, you put irrigation on that land and suddenly it’s worth twenty thousand [American] dollars.’ Campesino modes of production in Santa Ana have been dramatically altered, if not wholly transformed, as a consequence of the extension of modernist production, characterised by grape monoculture, and the loss of access to productive lands for cultivation and pasturing. Most campesinos in the area now work as waged labourers on the winery estates or in urban centres, while the few who continue producing do so under conditions of reduced autonomy and high competition (Key informant 03).

While campesinos in the communities of Santa Ana have lost much of their land and productive autonomy, concentration of corporate viticulture in this area may (at least in the earlier phases of viticulture development) have reduced pressure for land concentration in Uriondo and Villa San Lorenzo where research participant households are located. The concentration of landholdings and landscape conversion in Santa Ana and associated loss of productive autonomy and proletarianisation of campesino producers, however, may also be a foreshadowing of similar processes gaining moment elsewhere in the Central Valley. There are signs that reconfigurations of the productive landscape are taking place in Uriondo and other municipalities where a transition to single commodity production has not yet occurred.

⁵² This dam and reservoir delinked viticulture from the alluvial fields and river systems that had previously bounded the production zone and allowed dramatic expansion in the Tarija Municipality (Contreras Villaseñor & Elías Pastor, 2012). Nearly half of all grape production in the Central Valley is irrigated by the San Jacinto project (FAUTAPO, 2010a, p. 9).

Around Valley de la Concepción and other study communities in Uriondo there was the perception that the ownership pattern of vineyards showed signs of change. Interviews with farmers and local residents indicate that it was common for engineers, doctors and other professionals living in Tarija to purchase plots of land and establish vineyards in the area (Turner, field notes 15/10/2013; V-7; Uriondo area key informant 04). Several dozen hectares of land between the communities of San Nicolás and La Compañía were also recently purchased and converted to vineyards by a foreign developer (V-7; key informant 04). This suggests that people with income and access to capital are beginning to view land and viticulture as an investment, which may create conditions in which smallholders are encouraged to sell their holdings and exit agricultural production.

While the consequences of this regional process of change in land ownership patterns was not the focus of the study, our results indicate that declines in agrobiodiversity may result as land holdings become larger. In our dataset household V-3, the largest landholder, provides a glimpse into how one household's holdings grew and their production strategies transformed from mixed agricultural production of multiple species to single commodity production. V-3 explained how her son has expanded his vineyard by buying and clearing land in neighbouring communities:

They brought in tractors to take out the *sauce* [*Salix humboldtiana*] that had started to grow back and have cleared 2.5 ha to put the vineyard back in. It has just recently started to produce again. [...] They are also building a new vineyard in Pampa Redonda that they bought from six people. Now that land is secure. All of the hills there are his. He has more in Santa Rosa, and more in Pampa la Villa Chica.

As V-3 increased their land holdings household production transitioned from traditional crops, to a vineyard with other crops, and finally to grape monoculture. First they grew potatoes, peas and other crops, then when development programs began promoting viticulture, they, along with other members of their community, began incorporating grape production:

We planted half a hectare [of grapes]. [...] That is what we invested lots of money in. And this little half hectare offered enough to let our children study. And then we continued to put in more little by little. Sometimes just a couple of plants at a time. And so we put in more and more until we filled the whole field.

Initially they planted multiple crops, but over time they specialized their production and

began to purchase all of their food. She explained:

We don't plant anything [else] – corn, nothing. There isn't land. Everything is grapes. There isn't land to plant. [...] Potato, it has been two years that we haven't planted any. We planted a little to eat, but now we don't. We buy it. [...] Before, of course, we didn't buy potatoes. We grew them. And corn too, we grew. And now we buy everything, from the corn. We don't plant anything. [...] At first we started planting tomatoes 'in halves', in the alleys of the vineyard but not now. Just grapes. [...] You can put potatoes, tomatoes, onions in the alleys of the vineyard, but we had to take those things out of the vineyard. Now my son doesn't want to produce 'in halves'. [...] They say to take them out of the vineyard will finish sooner. That it debilitates them, so now they don't plant anything. Nothing, nothing.

As their production grew they were encouraged by agronomists to specialise and her children, who now run their vineyards, chose to concentrate their primary production activities exclusively on commercial viticulture and to pursue intensification through economies of scale. While it is too early to draw conclusions, our dataset indicates that land concentration can result in the reduction of agrobiodiversity within the farm system. In our case, this transition is reinforced by agricultural development policies and technical directives for viticulture production that favour large land holdings that also reduce landscape elements such as pasture lands further diminishing the viability of smallholder agriculture.

3.6 Discussion

Within a wider context of modernist agricultural policy, economic globalisation, and persistent widespread rural poverty, questions endure regarding how to balance multiple objectives related to rural income enhancement, ecological sustainability, and agrobiodiversity. Different trajectories of agricultural intensification have been proposed: one based on the segregation of land use function and the specialisation and simplification of production units and regions through monoculture-based commodity production and another based on the integration of land uses through multi-functional, multi-species production (Vandermeer et al., 1998; Zimmerer, 2010). Although increasing rhetorical attention is being paid to this second trajectory within a discourse of sustainable intensification and support for family farming in Bolivia (e.g. MMAyA, Cooperación Suiza, and Programa Nacional de Biocultura 2015; Gobierno Autónomo

Departamental de Tarija 2012) and elsewhere (FAO, 2015), implementing this new policy direction is often at odds with decades of rural development focused on single-commodity production (also see Zimmerer 2015 for broader discussion of tensions and contradictions surrounding Bolivian development policy and practice).

In the Central Valley of Tarija and elsewhere in Bolivia and South America, grapes have been grown for centuries as part of complex campesino production portfolios (Altieri & Farrell, 1984; Contreras Villaseñor & Elías Pastor, 2012; Preston & Clewer, 1993). Following decades of agricultural modernisation policy, some campesino producers in the Central Valley have created production systems that prioritize commercial viticulture but do so alongside a diversity of other crops that also contribute to the household economy. The contributions of other crops and livestock to grape producing households are direct, through household consumption, as well as indirect through their sale on the market.

The rationale for maintaining agrobiodiverse production strategies are not articulated by producers in terms of wider political discourses of peasant resistance to capitalist encroachment, food sovereignty or agroecology, but rather in terms of their needs, desires, histories and realities of everyday life. Producers recognize the potential of commercial viticulture to provide income, but are also aware of the numerous limitations and risks. They utilize agrobiodiversity as a strategy to balance these limitations with the benefits of participation in the sector. Multi-species production was reported to lower production costs, diversify and spread income sources and also reduce dependence on externally purchased foodstuffs by maintaining production of vegetables, fruit and animal products for household consumption, potentially reducing vulnerability to fluctuations in cash income. Many households also diversified their household economies to include non-farm or off-farm activities that sometimes supported and sometimes were supported by agricultural production generally and grape production specifically. The case of tourism services, in which vineyard and agricultural landscapes play a role, and artisanal wine production are examples of these agricultural and non-agricultural synergies.

These findings parallel other work elaborating the idea of new ruralities in which the agency of producers in creating, adapting and innovating agroecosystems in response

to shifting opportunities, constraints and multiple objectives is recognised (Isakson, 2009; Perreault, 2005; Smale, 2006; Vandermeer et al., 1998; van der Ploeg, 2008; van der Ploeg & Long, 1994; Zimmerer, 2013). In his work in Cochabamba, Bolivia, Zimmerer (2013) found co-occurrence of agricultural intensification (commercial peach production) and agrobiodiversity (maize landraces) and that this was linked to the limitations of the commercial sector as well as the importance of agrobiodiversity for food and livelihoods. Perreault (2005) and Isakson (2009) in their respective work on *chacra* and *milpa* cultivation practices highlight the multiple values, including the performance of cultural identity (Perreault, 2005), linked with the retention of agrobiodiversity-rich, traditional production practices alongside processes of market integration. A cross cutting theme in these and other studies (Zimmerer, 2014) is that rural households, including those maintaining agrobiodiversity, are operating within conditions of a new rurality, in which migration and involvement in non-agricultural sectors, such as tourism, play important roles in processes of change. These conditions are also important for many of the campesino grape-producing households and are part of the context in which campesino production strategies and multifunctional use of agrobiodiversity reflect household decisions.

The retention and nurturing of agrobiodiversity by campesino grape producers, however, was not discussed in any of the policy documents, training manuals, program websites or development reports examined (e.g. Bruno Antelo et al. 2012; Comité de Competitividad, n.d.; FAUTAPO 2010a; FAUTAPO 2010b; FAUTAPO n.d.; Idepro n.d.; Ministerio de Desarrollo Sostenible 2004; Paniagua Requena 2003). This suggests that it is a dimension of the viticulture economy that is under-recognized by development agencies in spite of its importance to campesino grape producers themselves. Nevertheless, it seems compatible with the goals of environmental stewardship, including minimising erosion, reducing water contamination and maintaining and supporting agrobiodiversity, set out in the best practices guide for viticulturists produced by FAUTAPO and IDEPRO (2011, p. 40). It is also consistent with national policies to promote ecological and cultural diversity alongside small-scale production systems and campesino economies (Ministerio de Medio Ambiente y Agua et al., 2015; Plurinational Legislative Assembly, 2012).

Understanding the contributions of non-grape crops and livestock, and the rationale for their management, are important first steps in linking Bolivia's new rural development policy orientation to grounded action attuned to the ecological and socio-economic circumstances of campesino grape producers. To do so may involve a shift in mindset on the part of development agencies to look beyond single attributes of agricultural production systems, such as economic costs and returns, to acknowledge and account for multiple attributes of agroecosystems (Tomich et al., 2011; Vandermeer et al., 1998). This is important for generating more complete evaluations of the trade-offs and benefits of different production models, including associated implications for agrobiodiversity, being promoted or degraded by development programs (Smale, 2006). To create policies that are supportive of complex agroecosystems, identifying challenges for campesino producers in maintaining agrobiodiversity and working with producers and campesino unions on strategies to reduce those challenges should be high priorities.

One important example relates to the loss of pasture lands through processes of land concentration and conversion to vineyards. This has resulted in many study communities reducing or eliminating their herds, a transition also occurring elsewhere in the Central Valley (Section 5; Key informant 04; C-4; Turner, field notes 26/06/2013 and 29/09/2013). Vacaflores (2013) documents the work of campesino households and unions to maintain transhumance practices in the Central Valley. In spite of some successes, campesino and indigenous livestock management practices are frequently dismissed by state agencies "as part of the natural landscape instead of a significant economic activity" (p. 3) and continue to be under-represented in state land use data and public policy. Animal husbandry, however, is a central livelihood activity for many households and communities in the Central Valley (Vacaflores, 2013). Furthermore, delinking livestock from cropping systems decreases nutrient cycling, which must then be compensated for through agrochemical use (Tomich et al., 2011) or purchased manure produced elsewhere (Section 4.1). Working with campesino producers to maintain animal husbandry practices within mixed farming systems may both support traditional economic practices and help re-establish, maintain and strengthen green fertiliser use in crop production. With respect to viticulture, this may be a fruitful way to enhance ecological functioning while decreasing production costs and exposure to agrochemicals.

Institutional support to investigate possible ecological implications of intercropping in the vineyard system, including better understanding the competition dynamics of different crop combinations, is an example of an area of future research that may help campesino producers adapt cropping patterns for optimal production outcomes in both the short and long term (Vandermeer et al. 1998; Jackson, Pascual, and Hodgkin 2007). The innovation and creativity of campesino producers in maintaining agrobiodiversity by adapting traditional agricultural practices to include modernized, commercial viticulture also suggests that there may be willingness to adopt more extensive, and perhaps more refined, agroecological cultivation methods that reduce the need for external inputs, particularly chemical pesticides and fertilizers, that were commonly used and also identified as cost and health concerns (V-3; Primary producer 04; Turner, field notes 08/04/2013 and 19/08/2013).

Increasing agrobiodiversity in vineyard ecosystems might also benefit larger holdings. Although controversies persist over the relative costs and benefits, cover cropping in vineyards in Europe is becoming more common because of the positive outcomes for grape production and the environment, including higher infiltration rates, decreased runoff and reduced soil erosion, herbicide use and risk of disease through lower vegetative development (Celette, Findeling, & Gary, 2009; Gaudin, Celette, & Gary, 2010; Mercenaro, Nieddu, Pulina, & Porqueddu, 2014; Ripoche, Celette, Cinna, & Gary, 2010). Intercropping vineyards with white clover and alfalfa has also been found to reduce mildew in Chinese vineyards under some weather conditions (Boudreau, 2013), a common problem in the Central Valley.

The agrobiodiversity-based trajectory currently being utilized by some smallholders provide an alternative approach to agricultural intensification and rural development in the Central Valley. However, it will require a policy context that recognizes, validates and supports multifunctional campesino agriculture and viticulture practices. Such policy support is needed to offset the pressures of ‘get big or get out’ transition trajectories that favour land concentration and monoculture-based intensification (Section 5). Multi-functional smallholder farming systems that include a mixture of agrobiodiversity, commercial viticulture and wage labour can meet the multiple livelihood dimensions of smallholders and provide alternative trajectories to

those that lead to urban migration or the transition of smallholders to rural labour. This trajectory will be more viable if it is not just given recognition in policy texts but supported by the investment portfolios of government, international development agencies and civil society organizations.

3.7 Conclusions

In this paper we document how and why the single commodity system of grape production has been and continues to be both modernized and combined with species-level agrobiodiversity. Our results indicate that there are a number of economic, ecological and sociocultural factors shaping campesino production strategies and encouraging the conservation of agrobiodiversity within their farming system. Through an empirical analysis of agrobiodiversity found within a contemporary farming system of southern Bolivia we reveal the tension between farmer choices for, and regional processes of, agricultural intensification.

Questions surrounding livelihoods and ways of life in rural areas are increasingly gaining focus and visibility within Bolivian national political discourse and policy (Ministerio de Medio Ambiente y Agua et al., 2015; Plurinational Legislative Assembly, 2012, 2013). For decades viticulture, based on intensification through external input-based monoculture production, has held a central position on the regional development agenda and the introduction of commercial grape production has been widely recognized to benefit small-holders, industry and the region. As one community leader and former grape producer (02) in Valle de la Concepción, reflected:

With grape cultivation people's lives changed a lot. [...] Having a comfortable house was quite unusual. But with grape cultivation, the situation started to improve, as did the lives of the inhabitants of this municipality.

However, what has been less widely acknowledged by development agencies and policy makers is that rather than transitioning their complete farming system to modern viticulture practice, campesino producers have incorporated it as a component of diverse agroecosystems. This alternative trajectory of intensification based on multi-species and multi-purpose production being employed by campesino producers offers an alternative vision for the Central Valley. The potential of this alternative trajectory, however, is put at risk by its invisibility and is considered inconsequential as a regional viticulture

development strategy by development agencies and decision-makers. Smallholders suffer from a lack of investment into research on enhanced ecological production methods, including optimal crop combinations, and from a lack of policy and programs that would support the continuation and reintroduction of mixed crop and livestock production. Additionally, our findings suggest that as landholding size increases agrobiodiversity decreases and incrementally reduces the viability of smallholder farming systems in the Central Valley.

The challenge going forward will be to find ways to support smallholder farming systems including their use of commercial grape and secondary grape products as part of their agroecosystem. This would include understanding farmers' perceptions regarding the limitations and risks of transitioning from a diverse agroecosystem to one dependent upon the commercial grape sector. This case offers insights into how campesino producers themselves are navigating these challenges by employing agrobiodiversity. It also highlights some of the inconsistencies between national development discourses and rural development practice. Acknowledging, accounting for and listening to the voices and experiences of campesino producers is an essential first step in realizing the aspirations of both Bolivian policy discourse and campesino producers themselves.

Preface to Chapters 4 and 5: Examining biocultural sustainability through two territorial development projects

Chapters 4 and 5 were produced as companion pieces, sharing a framework of analysis developed around the concept of biocultural sustainability as a planning and evaluation tool in development processes, such as Biocultural Design (Davidson-Hunt et al., 2012), seeking to mobilize biocultural heritage and materials as resources to meet locally-identified needs and objectives. This biocultural sustainability lens is used to examine two very different strategies for utilising biocultural resources in local development. These strategies are conceptualized as distinct territorial projects (Hinojosa et al., 2015), each working to further a vision for the future of the Central Valley food system. Examining two processes – one seeking to enact a gourmet imaginary and the other seeking to enhance the visibility of campesino food heritage – provides insight into how ideas of territory can be contested and what some of the local issues can be.

These pieces draw attention to how territorial projects form and bring together groups of actors with different ideas about the value, purpose and potential of local biocultural resources. They highlight the importance of how and by whom biocultural valorisation processes unfold and what the disparate ripple effects of such processes can be on different sectors of the population and the environment. While both strategies use discursive tools to craft ideas of ‘quality’, ‘specialty’ and ‘authenticity’ around certain biocultural materials, the outcomes are markedly different with respect to target audience and how regimes of access to benefits of valorisation are created.

By virtue of examining these two strategies independently in each article, a critical question they raise concerns the extent to which these strategies are compatible or not. Can they continue to co-exist indefinitely? Or, are the effects of one so deleterious on the other that, ultimately, over time they will prove to be incompatible? A related element that is important to acknowledge, but the representation of which is limited in the chapters, is the degree to which there is overlap between the strategies. These questions will be returned to in Chapter 6.

Chapters 4 and 5 build on the insights into the history of the Central Valley food system developed in Chapter 2, emphasizing how historical material processes of change inform the present. While Chapter 3 focuses on systems of production and household-level decision-making, Chapters 4 and 5 adopt a more regional-level approach and examine how multiple intersecting development processes, including those related to grape production, manufacturing and tourism, are shaping economic activities surrounding the food system. These chapters also shift the focus from primary production, investigated in Chapters 2 and 3, to secondary and tertiary production, including that related with tourism services.

A revised version of the manuscript comprising Chapter 4, “Wine, cheese and building a gourmet territory: Examining biocultural resource-based development strategies in the Central Valley of Tarija, Bolivia” is accepted for publication in the *Canadian Journal of Development Studies*. It is co-authored with Dr. Iain Davidson-Hunt and Dr. Ian Hudson. A version of the Chapter 5 manuscript has been published in *Agriculture*:

Turner, Katherine L., Davidson-Hunt, Iain J., Desmarais, Annette A., Ian Hudson. (2016). Creole hens and *ranga-ranga*: Campesino foodways and biocultural resource-based development in the Central Valley of Tarija, Bolivia. *Agriculture*, Special Issue “Distributed, Interconnected and Democratic Agri-Food Economies: New Directions in Research”, 6 (41): 1-33. DOI:10.3390/agriculture6030041.



Figure 24. Attendees at *Tarija Aromas y Sabores' Noche Gourmet* (Gourmet Night) held annually as part of the TAS festival. The table displays cured hams, cheeses and other focal products of the gourmet strategy.



Figure 25. Marquiri community members finalizing their display at the *Feria de Maíz y sus Derivados*, hosted in the community of Jurina, San Lorenzo. The sacks contain varieties of corn and other crops and the table is spread with *chicha de maíz*, corn flour breads and other baked goods, *mote* and many other corn-based dishes.

Chapter 4: Wine, cheese and building a gourmet territory: Examining biocultural resource-based development strategies in the Central Valley of Tarija, Bolivia

Abstract

Promotion of products based on local biological and cultural diversity is sometimes seen as a sustainable development pathway. Questions persist, however, with respect to the outcomes for local populations and environments, including how such outcomes can be appraised. We examine a case of gourmet product development from ecological, economic and sociocultural perspectives. Based on interviews, participant observation and document review, we find that preferential support for gourmet products risks fostering a closed-loop of elite production and consumption, in which those with the greatest economic and cultural capital are best positioned to shape and benefit from new biocultural heritage-based product markets, often to the exclusion of other producers and ‘non-gourmet’ products.

Key Words: Biocultural resources; Biocultural design; Gourmet markets; Sustainable rural development; Rural territorial development.

4.1 Introduction

Interest in food and gastronomy is burgeoning around the world as calls for sustainable agriculture and local production intersect with growing demand for products simultaneously associated with novelty, heritage, the exotic and that which is inextricably bound to place (or an ideal of place). Within this macro context of entwined food localism and globalism, biocultural diversity, reflected in food products and dishes, is being identified and mobilised as a valuable resource in local, regional and sometimes national development projects (Papadopoulos & Fonte, 2010; Vandecastelaere, Arfini, Belletti, & Marescotti, 2009; Van de Kop, Sautier, & Gerz, 2007).

Correspondingly, in Bolivia, food, gastronomy and biocultural heritage have become an important locus of state, multi-lateral and NGO (non-governmental organisation) development activities across the country, including in the Central Valley of the Tarija Department. While food heritage promotion is seen as a promising pathway to sustainable rural development, many questions persist regarding how agriculture and gastronomic heritage are put to work in development and the ultimate outcomes for local

peoples and environments. Such questions are particularly pertinent in contexts such as the Central Valley where entrenched social and economic inequalities inform processes of self-representation and the mobilisation of biocultural heritage.

We examine the role of foods as biocultural heritage resources in rural development through the case of gourmet product development in Tarija's Central Valley. The gourmet strategy focuses predominantly on constructing and positioning local biocultural resources to bring a competitive advantage for the territory in the national (and ideally international) economy. The program has promoted six product chains selected for their market potential and prestige relationships with European heritage. Regional identity branding, marketing support and tourism development are central tools of the strategy. We develop a biocultural sustainability framework to structure our analysis around interdependent ecological, economic and sociocultural insights into the use of biocultural resources that this case offers. Such insights are intended to support the work of Biocultural Design (Davidson-Hunt et al., 2012), Rural Territorial Development (Berdegué et al., 2015; Ranaboldo & Schejtman, 2009; Schejtman & Berdegué, 2004), and other approaches seeking to engage critically with biocultural resource use as a way of supporting locally defined development processes. We conclude that the preferential support for gourmet products risks fostering a closed-loop of elite production and consumption, in which those individuals and communities with the greatest economic and cultural capital are best positioned to shape and benefit from new niche markets for biocultural heritage-based products, often to the exclusion of other producers and 'non-gourmet' products.

4.2 Biocultural resources in local economic development

Human sociocultural diversity, biological diversity and the complex, co-constructing relationships between them have long been a subject of study and thought (Davidson-Hunt and Berkes 2003). In the 1990s the term *biocultural* (Table 15) came into use to express these relationships and has since become widely used in scholarly and development practice circles (Davidson-Hunt et al., 2012). Although early biocultural diversity work focused on documentation, appraisal methods, and raising awareness about diversity loss (Maffi, 2007, p. 270), alternate framings focus on the processual

nature of culture, development and human-environment relations. Central to such approaches are the rights and abilities of local and Indigenous people to shape processes of adaptation (e.g. Davidson-Hunt et al. 2012; Cocks 2010; Pimbert 2007; Swiderska 2006). They also draw attention to the creative potential of biocultural heritage as resources to meet sustainable development objectives (c.f. Maffi and Woodley 2010; IIED, n.d.).

Table 15. Key definitions.

Key Terms	Definitions
Biocultural Diversity	A metric of biological and cultural diversity and used as a proxy for biological and cultural diversity linkages (Maffi & Woodley, 2010).
(Collective) Biocultural Heritage	Knowledge, innovations and practices of indigenous and local peoples collectively held, shaped within social-ecological systems and inextricably linked with traditional resources, territory, local economies, biological diversity at different scales, spiritual values and customary laws (Swiderska, 2006, p. 3).
Biocultural Materials	Materials produced, transformed, or given meaning in relation to biocultural heritage (adapted from Ingold, 2012).
Biocultural Resources	Tangible and intangible elements of biocultural heritage recognised as potential assets in achieving particular goals or objectives.
Biocultural Products	Products, including origin-based products (Vandecandelaere et al., 2009, p. xix), traditional foods, medicines, services and territorial identity, deriving from biocultural heritage (Davidson-Hunt et al., 2012; Dutfield, 2011).

Biocultural resources have become a focus of Bolivian government and civil society efforts to construct alternative development trajectories that sustainably manage biodiversity and respect peasant and indigenous cultures (Plurinational State of Bolivia 2015; MMAyA, Cooperacion Suiza, and Programa Nacional de Biocultura 2015). A national food movement, MIGA (*Movimiento de Integración Gastronómico Boliviano*), formed in the early 2010s, and numerous regional projects also aim to mobilise Bolivia's regional food heritage as a platform for tourism, economic and social development (MIGA, n.d.). In Tarija's Central Valley the promotion of regional specialties and the creation of corresponding niche markets are part of a rural territorial development strategy begun in the early 2000s.

The rural territorial development approach, which grew from European and Japanese regional identity-based product promotion experiences, has become an influential rural development paradigm in the Global North and South (Papadopoulos &

Fonte, 2010; Ranaboldo & Schejtman, 2009; Vandecandelaere et al., 2009). Schejtman and Berdegué (2004, p. 26) define rural territorial development as “...a process of simultaneous productive transformation and institutional change with the aim of reducing poverty and inequality in rural territories,” in which biocultural and other endogenous territorial characteristics are positioned as strategic assets. To become assets, biocultural products must often undergo a process of (re-)valorisation through which their regime of value (Appadurai, 1986) is rearticulated to enhance associations with desirability, pride and prestige (Papadopoulos & Fonte, 2010; Porrás, n.d.; Ray, 1998).

Biocultural products can support sustainable rural development in three primary domains (Vandecandelaere et al., 2009). Ecologically, wild and cultivated biodiversity can benefit from increased demand for their unique characteristics (Vandecandelaere et al. 2009, 20; also see, Slow Food Foundation, 2016; Petrini, 2005). Biocultural characteristics, aided by territorial brands, certifications and other soft property rights tools, can create a competitive advantage for products in markets otherwise dominated by globalised, ‘placeless’ commodities (Dutfield, 2011; Fonte & Ranaboldo, 2007). Resulting niche markets can support a decent income for producers and, if effectively promoted, create tourism and other spin-offs (Fonte & Ranaboldo, 2007). By providing livelihood opportunities, sociocultural benefits can also result, including “preservation of natural and cultural heritage, traditions, know-how and lifestyles in marginal areas” and broader food diversity for consumers (Vandecandelaere et al., 2009, pp. 22–23).

In spite of these potentialities, territorial projects reflected in biocultural valorisation, market creation and other aspects of biocultural resource mobilisation involve complex social-ecological systems etched with the legacies of past territorial projects (Berdegué et al., 2015; Hinojosa et al., 2015). Within territorial projects, “imaginaries, discourses, and practices” are evoked by coalitions of actors attempting to position one development strategy and vision for the future as prevalent over others (Hinojosa et al. 2015, 106; also see, Brighenti 2010; González 2015; Coombe and Weiss 2015). Critically, these dynamics also shape access – defined as the ability to access benefits (Ribot & Peluso, 2003) – to newly articulated biocultural resources. Which aspects of biocultural heritage are valorised and transformed, and by whom, using what tools, in order to appeal to what audiences, shape current relationships with biocultural

heritage while setting the conditions against which future relationships are sustained, reconstructed or severed. We propose biocultural sustainability as a lens through which to examine these processes and as a complementary evaluative and planning tool in biocultural design proposed by Davidson-Hunt et al. (2012).

By biocultural sustainability we refer to the potential for continuity of biocultural practices and resource use, including through processes of adaptation and innovation by resource users, and whether ecological, economic and sociocultural conditions are created in which sustaining biocultural relationships are desirable, feasible and viable (Brown & Katz, 2009). This framework directs attention to how power relations, distribution of benefits and regimes of value and access are structured intentionally (and unintentionally) by biocultural heritage mobilisation in development processes. How such strategies are conceived and actualised shape the context of individual and collective decision-making regarding which aspects of biocultural heritage should be sustained, innovated or abandoned (Davidson-Hunt et al., 2012). In keeping with sustainability approaches, we use interconnected ecological, economic and sociocultural themes to structure our analysis. The objective is not to critique the choices made by local actors. Rather it is to provide an entry point to analyse how biocultural resource mobilisation may shape the range of future choices surrounding biocultural heritage use, and to critically reflect upon how to engage in biocultural valorisation in ways that support biocultural sustainability and ensure that poorer producers and consumers are included within the distribution of benefits arising from the use of biocultural materials.

4.3 Study area and research methods

The sub-Andean Central Valley (1,650-2,200 metres above sea level) has approximately 250,000 inhabitants living in three main municipalities/sub-provincial districts: San Lorenzo, Cercado and Uriondo (FAUTAPO & OMIN, 2012c, p. 10). Central Valley inhabitants are primarily Spanish speakers of mixed Indigenous and Spanish descent. With the exception of the City of Tarija's growing service sector, the Central Valley is predominantly an agriculture-based economy. Building agricultural competitiveness and stimulating agro-industrial development, including in viticulture and alcohol, have been a focus of development interventions since the 1970s (Turner and Davidson-Hunt 2016).

During the 2000s and 2010s, a gourmet product development strategy was launched to further the rural development agenda by using regional biocultural characteristics as a market penetration tool.

We draw on data gathered over twelve months in 2012 and 2013 to examine the gourmet strategy through a biocultural sustainability lens. Semi-structured interviews (n=131) were conducted with primary and secondary food producers, consumers, and other key informants, including government officials, NGO staff, tourism agents, and restaurant and specialty food shop owners. Participants were purposively selected based on their current or past involvement with the production, sale and household use of biocultural products or involvement with related local development programs. Interview data were complemented by participant observation,⁵³ review of publically available institutional documents and surveys with venders at four public markets and three production fairs. All data were collected in Spanish. The names of research participants have been withheld to protect their privacy and anonymity, with interview codes and numbers assigned to participants (Table 16).

Table 16. Interview category codes.

Interview category description	Code
Agricultural development	AD
Non-governmental organization	NGO
Tourism	T
Local government	LG
Gourmet strategy	GS
Retail	R
Restaurant owner	RO
Commercial wine producer	CWP
Tarija Aromas y Sabores producer	TASP
Local history	LH
Cangrejo harvester and vender	CHV
Baker	B
Artisanal wine producer	AWP

⁵³ Including at *Tarija Aromas and Flavours* events, the launch of MIGA (2012, La Paz), and MIGA’s “TAMBO” symposiums (2012 and 2013, La Paz).

Table 17. Product chains included in the gourmet strategy.

Product chain	Description	History	Primary actors involved in the gourmet strategy ²	Number of beneficiaries (2007) (FAUTAPO & OMIN, 2012c, p. 19)	Number of beneficiaries (2012)	Number of businesses /associations (TAS, n.d.)	Number of businesses /associations (Olarte Q., 2012b)
Grapes, wine and singani¹	Table and alcohol grapes, wine and singani	Viticulture and grape alcohol production began in the mid-1500s. In the 1970s and 1980s viticulture expanded and large winemakers were established	10 industrial wine makers, several medium-sized wine and singani producers	5	66	1 Association (Industrial winemakers)	3 Associations (Industrial and medium winemakers and a community grape producers association)
Goat cheese	Fresh goat cheese products	Part of the Central Valley diet since the 1500s	Two small factories	3	100	2 private businesses	2 private businesses
Honey	Ecological honey	Commercial honey production began in the 1980s as part of NGO-led development programs in newly created ecological reserves	Producer cooperatives	1	54	2 associations	4 associations
Ham	Cured ham products	A tradition among immigrant families of German, Italian and Spanish descent	Half a dozen small businesses	1	18	6 private businesses	7 private businesses
Fruit and vegetables	Non-traditional, high value fruit (i.e. blueberries, blackberries, and raspberries) and vegetables (i.e. asparagus, Brussels)	Introduced in the 1990s and 2000s through rural development programs	Originally a producer cooperative (AFRUTAR), which is no longer operational. ³ Now a blueberry	1	20	2 associations (including AFRUTAR); 1 private business	9 private businesses; 1 association (including AFRUTAR)

	sprouts)		producer association and several independent producers			
Tourism	Tourism activities, including gastronomy and wine tours	Wine route established in 2009	Tourism service providers, Tarija Cheifs' association, restaurants and specialty shops	1	86	Specialty shops: 2 private stores; 1 cooperative Restaurants: 5 private businesses Rural Tourism: 1 association of hotels; 2 tourism organisations

¹ A liquor distilled from *Moscatel de Alejandría* grapes.

² Based on representation on the TAS website, product catalogues and regular participation in TAS sponsored events.

³ Turner, field notes 20/09/2012; AD_1 and 2; NGO_1.

4.4 Biocultural valorisation through gourmet product development

In the mid-2000s, a coalition of private and public actors came together to design and implement a rural territorial development strategy aimed at building competitiveness, improving product quality and enhancing market opportunities for micro, small, medium and large businesses involved in six gourmet product chains (Table 17: FAUTAPO & OMIN, 2012a, 2012b). Product chain development is concentrated in two allied programs – one focused on grape, wine and singani (G/W/S: Comité de Competitividad 2009; FAUTAPO n.d.), and the other on agri-food products, including goat cheese, cured ham, honey, and selected produce (FAUTAPO & OMIN, 2012b; Olarte Q., 2012b) – and built into regional development plans (Prefectura 2006; Antelo 2007).⁵⁴

Together these programs represent over ten million USD of investment to transform the Central Valley's territorial dynamics through enhanced territorial competitiveness achieved by positioning select products as gourmet items of high status and desirability (FAUTAPO & OMIN, 2012a).⁵⁵ The focus is on creating:

...an enclave of Mediterranean products...[and] positioning them together in the market [...] with the aim of generating market access for MIPyMEs [Micro, small and medium enterprises] of hams, cheeses, honey, and fruit and vegetable products of high value ('Tarija, Aromas y Sabores: Una marca territorial que posiona a Tarija en el mercado nacional', 2013, p. 7).⁵⁶

The ideal of Tarija as a "Mediterranean enclave" in Bolivia is reflected in the emphasis on Mediterranean products, including wines and wine pairings (Olarte Q., 2012a, p. 1). Two multi-product brands are key in the territorial marketing strategy (FAUTAPO and OMIN 2012a, 2012b, 2012c). *Wine and Singanis of Bolivia, an experience of altitude*

⁵⁴ The Agri-food Chain Initiative began in 2008 with primary funding by the Inter-American Development Bank (IDB), through their Multilateral Investment Fund, and executed by Fundación FAUTAPO in collaboration with municipal and department governments, tourism and producer organisations ('Tarija, Aromas y Sabores: Una marca territorial que posiona a Tarija en el mercado nacional', 2013). The G/W/S Cluster, begun in 2005, builds on decades of sectorial investment and involves a complex set of actors, including FAUTAPO, the Government of the Netherlands, the National Viticulture Centre, banks, credit agencies and producer associations (TAS, n.d.; Comité de Competitividad 2009).

⁵⁵ The IDB has invested 2.7 million USD cumulatively in four projects (IDB 2016; SISTME / Mesopartner 2013), in addition to over 9 million USD invested in the G/W/S Cluster by international development agencies and the Bolivian government (Comité de Competitividad 2009; SISTME / Mesopartner 2013, 70).

⁵⁶ All Spanish texts, including interviews and documents, were translated by the authors.

was developed for industrial wine makers to consolidate their marketing around the high altitude *terroir* of Central Valley wines (Comité de Competitividad 2009, 32; FAUTAPO 2010a, 3; Olarte 2012a, 5).⁵⁷ The second brand promotes Tarija's star products nationally under the label *Tarija Aromas and Flavours* (TAS, for the acronym in Spanish).

Gastronomy and tourism concentrated around a High Altitude Wines and Singanis tourism route are other vital components of the strategy (Ugarte 2010; FAUTAPO and OMIN 2012a; 2012b).

The gourmet orientation is a strategic decision to appeal to upper-middle and upper class consumers in order to maximise economic returns (FAUTAPO and OMIN 2012c). Local, national and international training courses for producers were organised to improved production standards, while product presentation was enhanced through marketing assistance, including the use of the TAS logo, packaging materials, website, recipe books and product catalogues. Linkages were also forged with local and national specialty shops to distribute TAS products (FAUTAPO and OMIN 2012b, 2012c; R_1 and 2) and producers are encouraged to participate in local, national and international promotional events, including TAS's annual Gourmet Night and Festival, MIGA's TAMBO fair and symposium in La Paz, and Slow Food's Terra Madre exposition in Italy in 2012 (Uribe 2013; GS_1).

4.5 Considerations for biocultural sustainability

Below we draw on empirical data to reflect upon the biocultural sustainability of the gourmet strategy (Table 18). Given the strategy's relatively incipient nature and complexity, the results are neither definitive nor exhaustive; however, they suggest that the preference given gourmet production may create conditions in which the majority of benefits are concentrated within an elite sector of the population.

⁵⁷ Central Valley vineyards are some of the highest in the world. The altitude concentrates flavours, aromas, and antioxidant properties.

Table 18. Summary of biocultural sustainability findings.

Sustainability Dimension	Considerations	Observations
Environment	Landscape change and agrobiodiversity	Extension and conversion of agricultural lands to commodity production, limiting traditional agricultural activities Local agrobiodiversity not incorporated within product valorisation profiles
	Sustainable harvesting	Risk of stimulating ecologically unsustainable demand
Economic	Economic injections	Wine and tourism sectors support economic growth
	Economic benefit distribution	Strong linkages between secondary and primary sectors
		Gourmet products inaccessible to local consumers Informal producers unable to participate (e.g.in tourism routes) or access benefits
Sociocultural	Gourmet discourse construction	European (and globalised) taste and product norm focus creating preferential benefit-access conditions for those with cosmopolitan cultural capital

4.5.1 Environmental considerations: Is biodiversity supported?

Creating biocultural product markets may support their continued production and use; however, promotion may have unintended consequences on other aspects of the food system, local ecosystems and biodiversity. Some of these considerations are examined below.

4.5.1.1 Landscape change and agrobiodiversity

Significant environmental and landscape change has taken place in the Central Valley in recent decades associated with agricultural expansion and urban growth. In parts of Cercado and Uriondo large tracts of vineyards have replaced dry forest ecosystems, reflecting the precedence given viticulture in regional development plans.⁵⁸ As a result, campesino agricultural systems have been impacted by the reduced availability and access to common pasture areas key for traditional livestock production (Turner and Davidson-Hunt 2016).

At the species level, little interest in valorising local animal breeds and crop landraces is evident. In the case of wine, investment has focused on introducing new, commercial grape varieties, while local varieties are classified as rustic with little commercial potential (FAUTAPO, 2010a). With the notable exception of *Moscatel de*

⁵⁸ Viticulture has grown from 450 ha in the 1970s to approximately 3,500 ha in 2015 (Turner and Davidson-Hunt 2016); double this area is targeted for development in the coming decades (Prefectura 2006).

Alejandro (accounting for 42% of total viticulture), traditional grape varieties and cultivation methods make up only a small fraction of production (FAUTAPO, 2010a) and are not part of gourmet valorisation efforts (Turner, field notes 20/09/2013; R_1; GS_4). Similarly, although mentioned in some promotional materials as part of product histories (Olarte 2012), no goat cheese or cured ham producers featured on the TAS website or interviewed utilize associations with local animal breeds as part of their marketing (TAS, n.d.; c.f. GS_1; TASP_1 and 2).⁵⁹ Horticultural products are explicitly distanced from local agrobiodiversity as high-value, non-traditional produce (FAUTAPO & OMIN, 2012c, p. 14)2).

4.5.1.2 Sustainable harvesting, management institutions, and demand

Markets for biodiversity may encourage production and use. However, demand may outpace sustainable harvest. The *cangrejo* – a species of freshwater crab (*Aegla septentrionalis*) – is an illustrative example. Launched to national fame by a popular film (Agazzi, 2005), the crab is a Central Valley specialty in high demand. Little is known about the ecology of the species except that it has limited distribution (Bond-Buckup et al. 2008) and many believe it is experiencing population declines related to overharvesting and habitat loss,⁶⁰ evidenced by price increases and decreased availability (LG_1 and 2; LH_1 and 2; CHV_1; RO_4). The crabs feature in TAS, including as the main promotional image for the 2013 TAS Fair at which they were also sold (Turner, field notes 07/09/2013; CHV_1). Similarly, demand for traditional, wood oven produced baked goods, also sometimes linked with TAS, is causing concern about deforestation to meet fuel requirements (LG_1; LH_3; T_2; Turner, field notes 24/04/2013).

Our intention in highlighting these challenges is not to vilify producers or their supporters. Rather, we suggest that the ecological context of production must be considered and steps taken to pace growing demand with institutional and technological adaptations, such as aquaculture or improving oven efficiency (B_1), to support ecological sustainability.

⁵⁹ One ham producer stands as the exception.

⁶⁰ Cangrejo habitat [i.e. *acequias* (irrigation canals)] has been destroyed through irrigation network modernisation for grape and dairy production.

4.5.2 Economic considerations: Are a range of people economically better off?

Rural territorial development seeks growth with redistribution, recognising that economic injections into depressed areas are necessary, while realizing that focusing only on growth worsens inequalities by improving the conditions of those best positioned to capture benefits while worsening or having a neutral effect on poorer sectors of society (Ranaboldo & Schejtman, 2009; Schejtman & Berdegué, 2004). Below, we examine economic injections stimulated by the gourmet strategy and the circulation and concentration of these benefits.

4.5.2.1 Economic injections: Regional and household perspectives

Current, reliable data on the Central Valley economy is limited; however, evidence suggests that the gourmet strategy is likely increasing the flow of capital into the region through extra-territorial market enhancement, investments (including development funds) and tourism. In so doing, it has stimulated economic opportunities for some affiliated producers. G/W/S production is estimated to be growing annually by 7% (Viceministerio de Comercio 2014) and approximately 75% of the 72 wineries and distilleries surveyed by FAUTAPO were established during the preceding 15 years (FAUTAPO, 2010a, p. 28). The wine and singani sub-sector had a gross income just below 30 million USD in 2008, based on the reported incomes from 49 Central Valley wineries and distilleries (FAUTAPO, 2010a, p. 107). This accounted for approximately 3% of the real gross domestic product for the Tarija Department (INE, 2011, p. 12).⁶¹

While that income is likely concentrated in the eight wineries and distilleries that account for nearly all of Central Valley wine and singani production based on volume, and own approximately one fifth of vineyards (CBI 2014, 10), it is a significant contribution to the overall economy (Antelo, 2007; FAUTAPO, 2010a). Although data are not available on gross income distribution within industrial producer supply chains, it is estimated that 5,000 people, including small-holder viticulturists – accounting for approximately 80% of total viticulture (Oliva, 2015) – are directly employed in the sector, with another 11,000 indirectly employed (FAUTAPO, 2010a, p. 4). This accounts for approximately 6.7% of the economically active population in the Department (INE

⁶¹ Based on 2009 GDP estimates.

2012a, 48) and 13% in the Central Valley (INE 2012b). Three thousand families have also benefited from viticulture investment funding and skills training programmes (FAUTAPO n.d.). Interviews with smallholder viticulturalists suggest that grape production is an important complement to household incomes alongside other economic activities (Turner and Davidson-Hunt, 2016), and persistent undersupply in the alcohol industry inputs suggests continued income generating opportunities (FAUTAPO, 2010b).

The wine route is also a driver of tourism growth and a pivot point for service sector business development (FAUTAPO & OMIN, 2012c). Tourism was estimated to bring in over 4.5 million USD to the department in 2008 (Uribe et al., 2012, p. 6) and wine route visitation increased from 900 to 30,000 visitors between 2006 and 2012 (Sanchez Ramos, 2015). Key informants also report increases in tourism activity and the establishment of new businesses and local tourism associations (FAUTAPO & OMIN, 2012b, p. 19; T_1 and 2; LH_3; GS_5). One study surveying eight TAS affiliated businesses found an average ten-fold increase in tourism income during the preceding ten years (Uribe et al., 2012, p. 8). These figures suggest the benefits for local businesses that tourism promotion may accrue, particularly for those businesses closely networked with the strategy.

4.5.2.2 Supply-chain linkages and market access

Forward and backward linkages within supply chains and among sectors, including tourism, fulfil a critical function in terms of benefit distribution from new capital (Loxley & Lamb, 2007). In addition to smallholder viticulturalist and winemaker linkages, there is evidence for strong linkages among TAS producers, local markets and non-affiliated producers.

To identify market linkages, interviews were conducted with TAS affiliated restaurants and producers. With the exception of some specialty products, most restaurants source the majority of their fresh ingredients from public markets and feature other TAS products on their menus, particularly commercial wines (e.g. RO_1-3). Surveys and interviews with secondary producers also found they source from local markets, abattoirs or primary producers (e.g. TASP_1-3).⁶²

⁶² Goat cheese production, however, is done exclusively in-house.

TAS restaurant and secondary producer sourcing patterns, however, were similar to those of non-affiliated restaurants (n=18), food vendors (n=22) and secondary producers (n=44). It is also important to note that there is no large supermarket or distributor in the Central Valley, and local market surveys found over 80% of surveyed products were produced within the Department. This suggests the linkage patterns reflect the relatively closed nature of the local foodshed and limited sourcing options (See Appendix G). Produce and other goods are often easiest to find, cheapest, or only available at the public market (RO_1).

While the gourmet strategy is likely not responsible for creating these linkage patterns, increased demand for goods produced with locally-sourced ingredients likely strengthens local agricultural markets and a degree of local solidarity seems to exist among affiliated producers. However, should the Central Valley food supply system change through increased imports or the arrival of a supermarket chain then the current linkages may be at risk of unravelling unless targeted strategies are developed to encourage local sourcing.

With respect to access to gourmet products for local consumers, cheaper commercial wines are widely available and some produce was found during market surveys. More expensive wines and other TAS products, however, are only available at specialty shops and high-end restaurants in the City of Tarija and on the wine route. During interviews with specialty shop and affiliated restaurant owners it was generally acknowledged that their clientele were either tourists or from the local upper class (RO_1 and 2; R_1 and 2).

4.5.2.3 Formalisation, inclusion and access to business development support

Formalisation requirements entwined with gourmet discourses (discussed below) have created institutional barriers concentrating benefits within a local elite. Although the direct beneficiary group has grown (Table 17), businesses most firmly established at the outset of the project have typically become the core TAS producer group regularly appearing in promotional materials and events. Formalization requirements have

reinforced this pattern as many artisanal producers,⁶³ including of wine, cheese and baked goods, work at a cottage-industry scale using non-industrial kitchens and manufacturing spaces and are often not registered as formal, tax-paying businesses with health and hygiene certifications. As a result of their informality, some producers report being denied participation in promotional events and being excluded from development project funding to refurbish their establishments for tourism (e.g. B_2; AWP_1).

A self-reinforcing demand and supply pattern in which the best known businesses and communities on the wine route draw consistent patronage from tourism companies is also justified by discourses of reliability and quality linked with formalisation. Although, the wine route formally includes sites in Cercado, Uriondo and San Lorenzo, in practice it is highly concentrated around a small cluster of businesses in Cercado and Uriondo. A gourmet strategy key informant (5) explained:

In San Lorenzo there are a ton of winemakers, but they don't have their sanitation registration. And so the tourist agencies can't offer those visits.

For many artisanal producers in San Lorenzo and other communities, their products are a supplementary livelihood activity, which increases the challenge of participation in and coordination for organised tourism. Schedules and commitments are variable and there is not sufficient clientele to shift their production to a full-time activity (e.g. B_2; RO_5). Similarly, although Valle de la Concepción in Uriondo is on the route, most tours are restricted to visiting the same one or two best-known businesses, and these can receive several dozen to hundreds of visitors daily (Turner, field notes 21/09/2012; T_2).

Several Valle de la Concepción businesses (and a few in nearby communities) have organised to get tourism service certifications (T_1). While this has enabled them to enter the tourism economy, many still face challenges competing with established, popular businesses. One restaurant owner and artisanal wine producer located beside one of the high traffic destinations reflected that, while they have seen increases in tourism over the last five years, it is difficult to gain clientele:

⁶³ Used here synonymously with traditional producer of secondary products, an artisanal producer is “a skilled person who creates objects of aesthetic and/or functional value, mainly by manual labour, using traditional craft techniques and/or materials” (Baldacchino & Cutajar, 2011, p. 21).

[There is] much more [tourism] because, we have [that other business] just up here. [...] Sometimes people want to go there but she doesn't have time, so they come visit a little [here] and they leave (RO_6).

During the grape harvest and festival season, tourism flourishes and other businesses are more likely to get spill-over clientele. However, as one key informant (LH_3) expressed, a general sentiment is that, "...everyone does free and very profitable (*millonaria*) publicity for the wine route, *millonaria* because everyone says that in Tarija the wine route is a tourism circuit that has two or three winemakers and nothing more."

The illustrations above suggest that a tension in supporting livelihood opportunities through biocultural valorisation rests at the interface of formal and informal entrepreneurship, recognising that artisanal producers can fall outside of the aid profile and quality standards of the executing NGOs (GS_1, 2 and 5). While health and food safety are important concerns, they can also become justifications for excluding products and producers who could potentially benefit most from support. The construction of discourses of quality also shapes which types of products are seen as acceptable and desirable within the strategy networks and which are not. This reflects an intrinsic overlap between how power is manifested in the creation of discourses and how economic benefits are distributed.

4.5.3 Sociocultural considerations: Are relationships with biocultural heritage validated and enabled?

When biocultural heritage and materials are mobilised as economic development assets, tensions and conflicts can arise as individuals, businesses, communities or networks position themselves to benefit from collectively generated and held commons (González 2015; Coombe and Weiss 2015; Billiard 2006, 2010). In considering biocultural sustainability, it is critical to examine the politics shaping the construction of biocultural resources and regimes of access. Below we examine how discourses around gourmet products shape current and future access to benefits, including economic benefits, from biocultural heritage.

4.5.3.1 Constructing "gourmet" through discourses of authenticity and quality

A sociocultural lens directs attention to the material outcomes of politics of distinction associated with creating a class of products (and producers) recognised for their "quality"

and “specialness” as required within a gourmet discourse. As presented on the TAS website (n.d.), TAS is:

... the synthesis of a new gastronomy proposal that explores, discovers the new and integrates it with the best of what already exists, recovering in perfect harmony the best of our land and traditions.

In spite of references to valorising local food culture evident in this and other gourmet strategy materials (e.g. Olarte 2012a; FAUTAPO and OMIN 2012b), the aim is not necessarily about reproducing the past. Often it is about creating distance from it. Wine and cheese, for example, are products with newly crafted gourmet forms that are markedly different from their traditional counterparts (Figure 26a and b).

By virtue of having non-gourmet local counterparts, it is necessary, not only to compete with similar products from outside the territory, but also to create differentiation between the traditional (*lo típico*) and the gourmet (*lo gourmet*) within it. To encourage consumption and preference for commercial wines, it is sometimes asserted by industry players that artisanal wines are neither “real wines” nor products with gourmet potential (GS_2 and 4; R_1). Some documents classify them with illegal, clandestine and contraband products posing risks to the sector and public health (c.f. Antelo 2007, 93).

The transformation of goat cheese into a gourmet product tells a similar story (GS_1), and high value, non-traditional products were brought into the strategy because of their exoticism and market value. Where traditional products and production methods have been engaged with, it has often been with the aim to sanitise and reform them through capacity building programmes teaching production methods and standards more compatible with the gourmet vision. This reveals tensions within the biocultural valorisation discourse over representation, quality, and what defines innovation, tradition and development.



Figure 26. a) Wine served during an industrial winery tour (Santa Ana area, Cercado). b) Wine served at an artisanal wine fair (Sella Cercado, Cercado).

Furthermore, the core TAS producer group are typically educated, upper-middle and upper class professionals with experience abroad, living, travelling or being immigrants to Bolivia. Consequently, most have international cultural capital to bring to processes of product innovation, often drawing on recipes, processing techniques, and

biocultural materials, including crops and livestock, from outside Tarija (TAS, n.d.; GS_1; AD_1; TASP_3; Turner, field notes 01/04/2013). This contributes to the production of a territorial imaginary compatible with international (largely European) ideas of gourmet and specialty. In doing so less ‘desirable’ or prestigious aspects of Tarija’s history and society, including those associated with indigenous and campesino identity, become downplayed (if not written out entirely). In many respects these politics recreate longstanding tensions within Tarija about identity, heritage and distinction, and also inform how networks of beneficiaries are created (Hinojosa et al., 2015; Lizárraga Aranibar & Vacaflores Rivero, 2007).

4.6 Discussion

Biocultural diversity and heritage offer rich, dynamic resources that some local and Indigenous communities and rural regions are choosing to draw upon as they craft development pathways reflecting their needs and objectives (c.f. Davidson-Hunt and Berkes 2010; Davidson-Hunt and Turner 2012; IIED n.d.; Maffi and Woodley 2010). While biocultural diversity proponents may welcome the growing interest in biocultural valorisation within mainstream development circles, when examined through a biocultural sustainability lens the findings suggest that a cautious and critical stance is essential, particularly when creating products for gourmet markets within contexts of high social and economic inequality.

A central challenge seems to be the ease with which an elite bias (unintended or otherwise) can be built into a project and perpetuated through it, a concern also articulated in the rural territorial development literature (Berdegué et al., 2015; de Janvry & Sadoulet, 2007). As Wolf (1999) also notes, power groups tend to use their influence to build and enact ideologies – in this case a standard of “gourmet” – that perpetuate their positions of power within a social system. The tendencies within growth-oriented economic development approaches to reinforce existing power relations and socioeconomic inequalities by concentrating new wealth in elite sectors and geographic areas is also noted in the Community Economic Development literature (c.f. Loxley and Lamb 2007).

Elite tendencies may also be reinforced by project funding cycles. Once competitive, export-oriented products are identified as the objective of project support, there is incentive for project executers to work with already comparatively established and competitive businesses or cooperatives, since by doing so the project is closer to achieving its goals. Affiliated entrepreneurs also tend to be well-positioned, as holders of expert knowledge and capital, to advocate for their own inclusion and take on leadership roles within a valorisation process that positions them to steer the project in ways that support their objectives and territorial imaginary. Actors need not be acting maliciously for such dynamics to emerge.

Entrepreneurs involved in the gourmet strategy see themselves as local leaders working to support job creation and regional pride alongside their own self-interest. Also, by donating their time and the existing reputation of their products, they are reciprocally supporting and benefiting from the strategy. Having rural or campesino roots, some may justifiably feel the right to evoke their heritage in the making and marketing of their products. The concern identified here does not arrive from these evocations *per se*. Rather it relates with how, when combined with existing inequalities, use of biocultural heritage in a gourmet imaginary becomes entwined with processes of innovation and discourses that establish elite products as the gold standard for quality and authenticity to the exclusion of traditional products and producers seen as “non-gourmet”.

As capital is concentrated within “gourmet” production systems and associated production zones expand (as has happened with viticulture), producers of “non-gourmet” products may face pressure to specialise and simplify their production. These pressures can serve to reproduce and manifest in practice the simplified image of a territory’s biocultural heritage originally created for marketing purposes. Furthermore, the construction of products as objects of elite desire, as a means to increase their economic value, places such products outside the reach of most Central Valley consumers. Consequently, the majority of citizens tend to be excluded both as producers and as consumers from gourmet product-oriented biocultural valorisation strategy benefits.

Market-oriented valorisation strategies have also been critiqued elsewhere for embodying a neoliberal ideal of competition in which regions succeed by carving out a niche in the global economy through “...marketized relationships that position cultural

heritage as a resource” (Coombe & Weiss, 2015, p. 43). For biocultural heritage to become a successful commodity, it must be packaged and rearticulated as something desirable to the outside (Coombe & Weiss, 2015; González, 2015). Doing so often involves a re-construction of local heritage within an internationally accepted standard of taste, quality and flavour. Similar patterns surrounding the gentrification of local foods and their re-articulations as internationally-oriented commodities are documented elsewhere (Billiard 2006, 2010; Leitch, Counihan, and Van Esterik, 2013; Wilk, 2013; González, 2015). Billiard (2006, 2010), for example, describes how Maltese food culture has been reconstituted through a local business and cultural elite directed food movement to take advantage of international fascination with Mediterranean food heritage. Like Tarija, a commercial wine industry based on foreign varietals and production methods has emerged in recent years, while traditional wines are excluded from promotional events. In seeking to create a national identity post-independence, the Maltese elite have succeeded in creating differentiation from “their ‘other within’”, which is to say the lower classes of Maltese society, “whilst failing to distinguish themselves from the ‘other without’, their past colonial rulers” (Billiard, 2006, p. 124).

Creating a national cuisine – a process with strong parallels with territorial identity building – is a political project reflecting discourses and imaginaries of what it is desirable to be, rather than complex social realities (Billiard, 2010). Wilk’s (2013) work on Belizean food documents similar processes of identity construction, including how the interests and life experiences of different classes have shaped and differentiated these constructions over time. González (2015) also shows how tourism and economic development in Maragatería, Spain, have depended on the appropriation and reinvention of common heritage values to create an idealized past. This supports the interests of some local actors while writing out the history and identity of others, much as Wolf (1982) documents at a global scale.

The biocultural sustainability framework, when applied to post-project analysis, draws attention to some of the intended and unintended processes set in motion through biocultural valorisation, including how action taken with reference to one dimension of sustainability, such as market development, can have ripple effects in other dimensions. We suggest that the biocultural sustainability lens also has utility in the design phase of

products and projects, providing a tool for communities and development agencies to consider if and how multidimensional relationships with biocultural heritage can and should be evaluated, innovated and transformed, and what desired outcomes of such processes may be. This frame of analysis complements work by Davidson-Hunt et al. (2012) on biocultural design and may provide an evaluation and planning tool in the design of biocultural-based products.

Davidson-Hunt et al. propose eleven guiding coordinates that communities and development actors, such as those involved in rural territorial development strategies, may find useful in orienting processes of innovation surrounding biocultural resources towards locally-defined and led sustainable rural development objectives. We offer five coordinates (Table 19) that rearticulate and refine Davidson-Hunt et al.'s set in relation to this case and the insights on regional branding and gourmet product development that it offers. As Davidson-Hunt et al. suggest, considering these coordinates at different phases of planning and executing a project may help build a critical approach to biocultural resource use in gourmet product development. Broadly, these coordinates relate to acknowledging and responding to the complexity of the biocultural systems involved, the importance of recognising ecological and social contexts and the centrality of taking inclusion seriously. The ecological impacts of changing resource use practices, how forward and backward economic linkages are created, who participates and how benefits are distributed across them are critical issues to consider, as are participation and inclusion in decision-making surrounding how and under what conditions aspects of biocultural heritage can and should be used in development initiatives.

Table 19. Considerations for biocultural resource use in local development, based on this study.

Biocultural design coordinates	
1	Does product selection consider production contexts, including sociocultural, economic and ecological conditions?
2	What are proactive ways to support existing ecological, economic and sociocultural relationships that support the continuity of biocultural heritage?
3	What might unintended ecological, economic and sociocultural consequences of valorisation be for a selected product and other food system components?
4	If poverty reduction and biocultural resource use continuity are objectives, then how do biocultural valorisation efforts include campesino producers and their products?
5	What are the ethical dimensions of valorisation discourse construction and how might risks of elite capture and dominance be reduced?

4.7 Conclusions

Using biocultural heritage as a strategic resource in development is a difficult path that must be navigated with care if biocultural sustainability and social justice are to be furthered. It demands critical reflection on how processes of biocultural resource mobilisation unfold, who is benefiting from them, where ecological, economic and sociocultural trade-offs are taking place and on-going commitment to reforming and adapting strategies as necessary (Davidson-Hunt et al., 2012). How effective, inclusive biocultural valorisation strategies are identified and developed will vary depending on particular contexts, goals and objectives. However, the Central Valley experience is valuable in considering how to approach biocultural heritage development and how to create conditions for sustainability and equity. For Biocultural Design, rural territorial development and other approaches seeking to use biocultural resources, acknowledging complexity, building an understanding of the social-ecological context and including a diversity of voices and actors are all critical to supporting biocultural sustainability and minimizing unintended harm. A biocultural sustainability framework offers an effective approach to examine these processes and to better evaluate the interconnected ecological, economic and sociocultural implications of biocultural valorisation strategies.

Chapter 5: Creole hens and *ranga-ranga*: Campesino foodways and biocultural resource-based development in the Central Valley of Tarija, Bolivia

Abstract

Biocultural heritage-based products, including regional specialty foods, are increasingly part of sustainable rural development strategies. While export-oriented biocultural products are often the most visible, we examine the role of campesino gastronomic heritage in the Central Valley of Tarija, Bolivia, as a case study of a local market-centered biocultural resource-based development strategy reflected in an alternative agri-food network. We develop a biocultural sustainability framework to examine this network from ecological, economic and sociocultural perspectives. Data are drawn from interviews (n=77), surveys (n=89) and participant observation, with primary and secondary producers of traditional and new products, as well as restaurant owners, market vendors and local consumers. We find that campesino biocultural heritage, including products such as creole hen and dishes like *ranga-ranga*, and the alternative agri-food network surrounding it represent an influential territorial project that underpins many household economies, particularly for women. We conclude that the relatively small investments by local governments to promote campesino gastronomic heritage are having positive ripple effects on small-scale producer livelihoods and on biocultural sustainability. We suggest that further support to increase market access and reduce other barriers to participation in alternative food networks will likely increase the options and benefits available to small-scale producers mobilising campesino gastronomic heritage within the local economy.

Key words: Biocultural resources; Biocultural design; Alternative food networks; Sustainable rural development; Local food systems; Bolivia

5.1 Introduction

It is 2pm in the City of Tarija's Central Market and Doña Gloria has just sold the last serving of *ranga-ranga* – a hot and sometimes spicy dish of stewed tripe, potatoes, and yellow chili peppers (Figure 27). Doña Gloria is known widely for her *ranga* and has catered her food at events in La Paz and Cochabamba. This dish has been a key to Doña Gloria's livelihood for fifty years, sustaining her children and herself as a single parent after her husband left. In the Central Valley of the Tarija Department of southern Bolivia, even as the territory is entwined in global markets and transnational cultural patterns, traditional foods like *ranga* and the agricultural products used to make them continue to play a vital role in the local food culture and economy.



Figure 27. *Ranga-ranga* served with a homemade *refresco de cebada* (barley drink) and *ají* (a sauce of blended chilies, tomatoes and onions).

This special issue of *Agriculture*, entitled "Distributed, Interconnected and Democratic Agri-Food Economies: New Directions in Research," seeks to develop a multidisciplinary discussion on how local and regional agri-food systems are being reconstructed and reconfigured in response to the social, ecological and economic crisis posed by conventional agri-food systems. We contribute to this discussion by developing a biocultural sustainability framework to document and analyse a local market-oriented alternative agri-food network surrounding foods and food products associated with local campesino gastronomic heritage – like the local dishes made by Doña Gloria and many others in the Central Valley.

We find that the alternative agri-food network surrounding campesino gastronomic heritage contributes to sustainable rural and urban livelihoods in Tarija's Central Valley and that women are key actors and beneficiaries of this sector of the economy. Through our examination of the interconnected ecological, economic and sociocultural dimensions of the alternative agri-food network, we conclude that even the relatively small investments made by local governments to promote campesino gastronomic heritage are creating conditions favouring biocultural sustainability, which includes generating economic opportunities, validating and enabling local food culture and using local agrobiodiversity. Our analysis shows that further investments to reduce market access barriers may increase the benefits and options available to small-scale producers. In bringing together the biocultural and alternative agri-food network literatures, we identify ways in which alternative agri-food networks can be part of territorial projects to enhance biocultural heritage and, reciprocally, what biocultural heritage can offer to create and sustain alternative agri-food networks. Our analysis aims to support the work of biocultural design (Davidson-Hunt et al., 2012), alternative agri-food networks and other rural development approaches, such as rural territorial development (Anbrosio-Albalá & Bastiaensen, 2010; Berdegué et al., 2015; Ranaboldo & Schejtman, 2009), seeking to use biocultural resources to further locally-defined development objectives associated with local food system sustainability.

5.2 Alternative food networks and biocultural sustainability

Alternative food networks, or “alternative systems of food provisioning” (Watts, Ilbery, & Maye, 2005, p. 22), are broadly defined as heterogeneous spaces within the food economy differentiated from other food networks by certain claims and characteristics. The primary claim is to an intentional alterity, or otherness, compared with placeless and faceless conventional food networks, often linked with ‘re-localisation’ or ‘re-territorialisation’ through greater embeddedness and food ‘quality’ (Bowen & De Master, 2011; Goodman & Goodman, 2009; Renting et al., 2003; Tregear, 2011; Wiskerke, 2009). Embeddedness expresses the greater spatial, economic and social proximity created through short food supply chains (Renting et al., 2003). Food ‘quality’ is a highly differentiated concept that refers to the salience of both socially constructed and material

properties of products within alternative agri-food networks, in contrast to the prominence of price within conventional food networks (Goodman & Goodman, 2009). It is also often linked with postproductivism and more transparent, ethical and sustainable practices of production, exchange and consumption (Renting et al., 2003; Watts et al., 2005).

Alternative agri-food networks are diverse in their political orientation (e.g. their prioritisation of ‘just value’ for products or ‘just values’ embodied in their production and exchange: Goodman & Goodman, 2009, p. 8), emphasis on competition within local or global markets, focus on product specialisation or diversity, and relative prominence of artisanal or ecological characteristics (Renting et al., 2003; Watts et al., 2005). In Europe, alternative agri-food networks are also linked with development programs to stimulate endogenous development in lagging regions (OECD, 2006; Papadopoulos & Fonte, 2010; Ray, 1998; Schejtman & Berdegué, 2004). This rural territorial development approach has been exported through aid programs to other regions of the world, including in Latin America (Fonte & Ranaboldo, 2007; Merlay & Enjalbert, 2013; Ramírez-Miranda, 2014; Ranaboldo & Schejtman, 2009).

Much of the critical scholarship on alternative agri-food networks has concentrated on European and North American experiences, with processes underway in other regions examined primarily as they relate to the production of ‘quality’ products, such as organic, Fair Trade, or out of season or exotic produce, for consumption in the Global North (c.f. Goodman & Goodman, 2009; Watts et al., 2005). Much less work has focused on endogenous processes of alternative agri-food network creation, particularly for local markets, taking place in the Global South.

Yet, major and distinctive processes of alternative agri-food network creation and re-territorialisation are occurring in local food systems of Latin America and elsewhere (Argumedo, 2008, 2013; Brandt, 2014; Graddy, 2013; c.f. Marti & Pimbert, 2006; Mathez-Stiefel, Malca, & Rist, 2011). A key contribution of some of these cases is the incorporation of biocultural perspectives. *Biocultural* describes the dynamic, interdependent complex of relationships linking human populations, ecosystems, non-human species and their environments. First proposed in the 1990s, it has been widely used within development policy and practice circles, including in Bolivia (Ministerio de

Medio Ambiente y Agua et al., 2015; Porras, n.d.). The interdisciplinary field of biocultural diversity finds its theoretical roots in the fields of linguistic anthropology, ethnobiology, ethnoecology and conservation biology (Maffi, 2005) and has subsequently been extended through collaboration between Indigenous peoples and research groups, such as International Institute for Environment and Development (IIED), to the broader concept of biocultural heritage, which draws more explicit attention to the processual nature of culture, development and human environment relations (IIED, n.d.; Swiderska, 2006).

Biocultural perspectives focus on biocultural diversity and heritage and their role in shaping the interconnected wellbeing of societies and ecosystems (Maffi, 2007; Swiderska, 2006) as well as their potential as resources in pursuing a plurality of locally-defined development objectives (Cocks, 2010; Davidson-Hunt et al., 2012; ETC Foundation & Compas, 2007; IIED, n.d.; Porras, n.d.). These may range from promoting traditional language learning, to agrobiodiversity conservation, to enhancing livelihood opportunities and stemming youth outmigration through market creation – or pertain to projects simultaneously addressing multiple social, economic and ecological objectives (Graddy, 2013; IIED, n.d.; Maffi & Woodley, 2010; Mathez-Stiefel et al., 2011).

Biocultural relationships are manifest in all components of food systems, including in processes of production, transformation, exchange and consumption, and in the ecological, cultural and economic networks that bind them together (Barthel et al., 2013; Johns & Sthapit, 2004; Pimbert, 2007, 2010). While local foods have been the basis of traditional economies over the course of human history, economies and foodways have undergone rapid changes in recent decades as a result of globalisation and global environmental change (Clapp, 2012; Kuhnlein et al., 2013; Lang & Heasman, 2004; Wittman et al., 2010). These forces, entangled with the spread of global capitalism and legacies of colonialism, demonstrate a powerful capacity to undermine local productive autonomy and dramatically alter patterns of production and consumption, including local and intergenerational food tastes and preferences, toward products drawn from global markets and reflecting global norms and corporate interest. As such, edible biocultural heritage, including wild and cultivated local species, landraces and breeds, as well as the dishes and products made from them, have sometimes become a locus of

valorisation efforts and a basis for creating or rebuilding alternative agri-food networks as a component of territorial projects to re-embed or maintain the embeddedness of local food systems.

Repositioning biocultural heritage as a resource within this context is inherently a political process, reflecting tensions over self-representation, local identity and access to resources. It often necessitates engaging in (re)valorisation efforts to enhance the symbolic and economic values surrounding biocultural heritage-based products. Valorisation describes the process of intentionally altering the existing regime of values (Appadurai, 1986), or meaning (Mintz, 1996), associated with specific biocultural materials, such as local breeds, landraces, cooking technologies or dishes, in order to enhance their position within society by increasing associations with prestige, pride and desirability (Porrás, n.d.; Ranaboldo, 2013; Ray, 1998).

Advocates of identity- or biocultural heritage-based products argue that valorisation can generate multiple ecological, economic and sociocultural benefits for resource holders and their territories, including supporting the retention of biodiversity at different scales, better incomes for small-scale producers (including greater recognition of aspects of production often undertaken by women), maintenance of cultural practices, and sustaining or enhancing access to culturally important foods and dishes (Giovannucci, Josling, Kerr, O'Connor, & Yeung, 2009; Papadopoulos & Fonte, 2010; 'Slow Food Foundation, n.d.; Vandecandelaere et al., 2009; Van de Kop et al., 2007). Through enhancing the viability of rural territories through biocultural heritage promotion, demand for other goods and services in the territory can also be enhanced (Fonte & Ranaboldo, 2007). However, as Bowen and De Master (2011, p. 81) argue, "a key question is how we can protect and preserve traditional products and rural livelihoods without distorting or destroying them, particularly considering the pervasive global reach of the current industrial food system."

The potential benefits of biocultural valorisation suggest ecological, economic and sociocultural parameters through which to reflect upon the outcomes of promoting local foods and cuisines for the people and environments involved. Better understanding how such processes unfold, as well as their strengths and weaknesses, may contribute to the formation of alternative development trajectories that meet objectives of sustaining

biocultural heritage and foodways alongside flourishing rural economies. We propose biocultural sustainability as a framework to evaluate and monitor the ecological, economic and sociocultural outcomes of biocultural heritage valorisation processes related to alternative agri-food networks.

How relationships with biocultural heritage and resources are constructed, transformed, innovated and adapted through territorial projects may reflect very different visions of what desirable relationships with local and extra-local resources within the food system are. Differing constructions of regimes of access and benefit may have dramatically different outcomes for current and future biocultural relationships (Coombe & Weiss, 2015; González, 2015; Hinojosa et al., 2015; Ribot & Peluso, 2003). The trajectory set in motion may create conditions in which those relationships flourish or, alternatively, create contexts in which they are damaged or severed, recognizing that change in one dimension of a relationship, such as monetary value of a product, may have secondary impacts (intended or otherwise) on other aspects of the system. Building on Brighenti's (2010) analysis of processes of territorial ordering, which aspects of biocultural heritage are focused on within biocultural valorisation strategies, who the intended audience may be, what tools are used, and with what objectives, are some of the factors that may dramatically shape the outcomes for individuals, communities, territories, biodiversity and ecosystems.

We frame these ecological, economic and sociocultural considerations in terms of biocultural sustainability that captures the potential for the continuity of biocultural relationships into the future, set in motion by the mobilization of biocultural resources in local economic development activities. We present this framework (also elaborated in Chapter 4) as an analytical lens to examine the unfolding of biocultural valorisation processes, and as a tool with which to consider multidimensional impacts of such strategies during the design phase of biocultural valorisation efforts (Davidson-Hunt et al., 2012).

5.3 Study area and research methods

The Central Valley of Tarija, Bolivia, roughly comprising the municipalities/sub-provincial jurisdictions of San Lorenzo, Cercado and Uriondo, sits at approximately 1,650 to 2,200 meters above sea level. It is home to two hundred and fifty thousand people commonly known as *Chapacos*, most of whom are Spanish speakers of mixed Indigenous and Spanish descent (INE, 2012a; Vacaflores, 2013a). In spite of increased rural to urban migration in recent years, and high levels of international migration, many people in the Valley retain strong rural roots. Approximately 19% of the working age population here work in agriculture, with those numbers increasing dramatically to 48% in San Lorenzo and 74% in Uriondo (INE, 2012b).

Agricultural modernisation, particularly specialisation in viticulture and dairy production, linked with agri-food manufacturing, has been a major focus of development programs dating back to the 1970s and 1980s (CODETAR, 1979; Prefectura, 2006). During the 2000s and 2010s, public and private investment has concentrated on promoting gourmet products – wines and wine pairings – through regional identity branding as the basis for a territorial development strategy (Olarte Q., 2012b; also see, Chapter 4). While this approach is largely export-oriented and aimed toward upper-middle and upper class consumers, another valorisation process based on campesino foods and dishes for local consumption is also being taking place.

To document and analyse an alternative agri-food network surrounding campesino gastronomic heritage in the Central Valley, we draw on data gathered during twelve months of ethnographic fieldwork on the relationships between the local food system, biocultural heritage and the local economy (August – November 2012 and March – November 2013). Semi-structured interviews were conducted with primary, secondary and service sector producers, as well as consumers, intermediaries (e.g. market vendors and other retail owners), NGO and government officials in seven San Lorenzo and Uriondo communities as well as the City of Tarija. Participants were purposely selected based on their current or past involvement in the production, sale or household use of traditional products or involvement with development programs linked with biocultural resources. Interview data were complemented by participant observation, including with secondary producers and small restaurant owners, regularly visiting and eating at local markets and

product promotion fairs⁶⁴ and participating in a municipally sponsored cooking class for local women, work with key informants and review of publically available documents. Surveys were also conducted with vendors and visitors at three product promotion fairs⁶⁵ as well as with market vendors. The numbers of research participants involved in primary, secondary and other food services and their gender are recorded in Table 20. All data were gathered in Spanish and research participants have been given pseudonyms or codes to protect their privacy and anonymity (Table 21).

Table 20. Gender distribution of research participants involved in the production and sale of campesino products according to interview categories.

Type of Interview and Surveys	Total Sample	Number of Women	Number of Men
Primary production Interviews	n=41 (6 joint interviews, total of 47)	16 (+ 4)	25 (+ 2)
SUBTOTAL	n=41 (47)	39% (42.5%)	61% (57.4%)
Secondary Food Production Interviews ¹	n=17 (3 joint interviews, total participants 21)	12 (+ 4)	5
Restaurant owners Interviews ²	n=19 (1 joint interview, total of 20 participants)	16 (+ 1)	3
Market venders Surveys ³	n=43 (2 joint interviews, total of 45 participants)	37 (+ 2)	6
Production fair participants Surveys ⁴	n=36 (3 joint interviews, total of 42 participants)	24 (+ 6)	12
Production fair food venders Surveys	n=10 (1 joint interview, total 12)	8 (+2)	2
SUBTOTALS	n=125 (total participants 140)	97 (+ 15)	28
	Percentage of sample	77.6% (80%)	22.4% (20%)
TOTALS	n=166 (total participants 187)	113 (+ 19)	53 (+ 2)
	Percentage of sample	68% (70.5%)	32% (29.4%)

¹ Including producers of *vino patero*, traditional baking, cheese, *humintas*.

² Three were high-end restaurants (two of the male participants were from these restaurants).

³ Including venders of prepared meals, snacks, baked goods, cheeses, dry goods and produce at the four surveyed Central Valley Markets.

⁴ Six interviews with participants at the *Feria de Maíz* (Corn fair) were also conducted, but communities participated as groups of up to a dozen or more men and women representing numerous families. These interviews are not included in this tally.

⁶⁴ Eight fairs were attended as part of this research, in addition to three at which surveys were conducted.

⁶⁵ *X feria de maíz y sus derivados* (10th Maize and maize product fair: August 4, 2013, Marquiri, San Lorenzo), *Feria de alojas y rosquetes* (Alojas and rosquetes fair: San Lorenzo, San Lorenzo) and *II Festival de Tarija Aromas y Sabores* (2nd Tarija Aromas and Flavours Festival: September 6 to 8, 2013, Tarija, Cercado).

Table 21. Interview category descriptions and associated codes.

Description	Code
Agricultural development key informant	ADKI
Baker	B
Campesino market vendor	CMV
Crab harvester and vender	CHV
Dairy producer	DP
Fair vendor	FV
Local government key informant	LGKI
Local history key informant	LHKI
Primary producer	PP
Restaurant owner	RO
Tourism Key Informant	TKI
Wine producer	WP
Wine sector key informant	WSKI

5.4 Campesino gastronomic heritage-based alternative food network

Patrimonio gastronómico campesino (campesino gastronomic heritage) of the Central Valley, as explained by Vacaflores and Lizárraga (2012, p. 4): “...implies a rich and ancient knowledge of campesino families that is conserved, reproduced and innovated constantly as part of *vida comunitaria* (community life)...” This includes knowledge of the specific properties of each product and combinations of products reflecting regional ecological characteristics and local culture that allow their nutritional and savourable qualities to be enjoyed through approaches to cultivation, harvesting, preservation, cooking and eating and through the materials and technologies used in these processes. They emphasise the link between campesino gastronomic heritage and community life and production, in which the logic of production is based around the relative control of campesino communities over production processes, including the allocation of land, labour, biodiversity and technologies, and in which the primary objective is the social and cultural reproduction of the territory (p. 5).

Campesino primary production takes place within a cultural landscape created through long-standing human-environment relationships. Historically it has relied on transhumance, extensive pastoralism and the cultivation of diverse agricultural plots located at multiple elevations and in different ecological zones (Chapter 2; Macklin et al., 2001; Vacaflores, 2013). Campesino forms of production, transformation, and consumption constitute a unique aesthetic characterising campesino gastronomic heritage that is manifested in a broad array of traditional cultivars and foods that are eaten and

transformed into classic dishes (Table 22). These products connect people to the *campo* (countryside) and long-standing campesino foodways that have become the basis of an alternative agri-food network entwined in ecological, economic and sociocultural dimensions of *Chapaco* life in the Central Valley.

The alternative agri-food network surrounding campesino gastronomic heritage and the valorisation processes helping position campesino gastronomic heritage as a resource in the local economy are not unified under a specific, formalised development program. Rather they reflect a constellation of ideas, spaces and practices surrounding local food heritage that are emergent and salient in the daily lives, annual calendar and foodscape of Central Valley rural and city dwellers. Representations of edible biocultural heritage in public spaces take many forms, the most obvious of which is the availability and promotion of foods and dishes in restaurants, food stalls and markets. Edible biocultural heritage, however, is also represented and figuratively consumed publicly through sculpture, promotional materials for events, and in local folklore, songs, poetry, literature and a discourse of distinction to identify locally recognized regional specialities (Box 1: Cardozo Gutiérrez, 2013; Figueroa Guerrero, 2010; Gobierno Autónomo Municipal de San Lorenzo, 2013). The main plaza of the Town of San Lorenzo, for example, is populated with sculptures representing campesino products from the area (Figure 28).

Box 1. Finding an angel's wings and halos: The origin of *rosquetes* and *empanadas blanqueadas*

Some say that the tradition of *rosquetes* and *empanadas blanqueadas* comes from Spain and before that from the Arabs. But, have you heard the real story? One day angels came down to Earth and they wanted to walk among the people, so they took off their wings and their halos and hid them in a cave in the hills. There, they were found by a boy. The wings and halos were so delicious that he ate them! He also brought some to show to his mother. She tried them too and soon they were all gone. The angels came back to the cave only to find their wings and halos had vanished. The mother and son were so amazed by the deliciousness of the angels' heavenly dress that the mother continued trying to make things as perfect and delicious. The closest she ever came was to make *rosquetes* to resemble the halos and *empanadas blanqueadas* to resemble the wings. (Story told by Mauricio, September 2013)

Table 22. Examples of products associated with the gastronomic heritage project.

Primary products		Secondary products		Dishes	
Name	Description	Name	Description	Name	Description
Maize	<i>Zea mays</i> subsp. <i>mays</i> . Numerous varieties are produced in the Central Valley for food and feed. Some are eaten as <i>chocolo</i> (fresh/sweet corn), while many others are ground for flour.	Queso criollo and queso de cabra criolla (“Creole” Cheese)	<i>Queso criollo</i> made from goat, creole cow or Holstein’s milk. Creole goat and cow’s milk has a richer flavour.	Ranga (or “ranga ranga”)	Stewed tripe, cooked with yellow chilies and potatoes, with small amounts of sliced tomatoes and onions served on top. Normally served with rice.
Peanuts	Endemic to the Chaco ecosystem of South America, peanuts are a pre-European Andean crop widely consumed in the Central Valley, being boiled, roasted, and served as ingredients in soups (i.e. <i>sopa de maní</i>) and beverages (i.e. <i>aloja de maní</i>).	Chicha	A fermented, mildly alcoholic beverage made from corn (<i>chicha de maíz</i>) or grapes (<i>chicha de uva</i>).	Saice	Ground meat, stewed with red chilies, peas and potatoes. Normally served with rice and a lettuce, tomato and onion salad.
Potatoes	<i>Solanum tuberosum</i> . Numerous varieties are produced.	Aloja	A lightly fermented, non-alcoholic beverage made from peanuts (<i>aloja de maní</i>) or barley (<i>aloja de cebada</i>).	Sopa de maní (Peanut soup)	Puréed raw peanuts blended with vegetable broth to which chicken gizzards (or other pieces of chicken) and pasta are added. Garnished with parsley and small pieces of fried potato.
Ajípa	<i>Pachyrhizus tuberosus</i> . A tuber edible raw and known to be good for digestion. It is halved and carved out, sometimes into the shape of a flower, to serve as a cup for <i>vino patero</i> during Corpus Christi.	Mote and patasca	Mote and patasca are different preparations of boiled corn kernels. For mote the kernel is boiled whole, while the skin is removed to make patasca.	Sopa de la gallina criolla (Creole hen soup)	Soup of chicken broth, vegetables, potatoes and chicken. (Often made together with <i>picante</i> by using the water used to boil the chicken and the smaller pieces of meat for the soup)
Yacón	<i>Smallanthus sonchifolius</i> . A sweet tuber edible when raw and with edible leaves that are dried for tea.	Vino patero (Artisanal wine)	Artisanal wine, traditionally fermented and aged in large clay vessels for about nine months. Some producers now use plastic barrels in lieu of clay vessels. Red and white wines in sweet or	Picante de la gallina criolla	Boiled pieces of creole chicken stewed in ground red chilies, potatoes and peas. Often served with rice. (Creole chicken is commonly substituted for a factory-produced chicken).

			dry styles are common.		
Squashes	<i>Cucurbita</i> spp. Several varieties are cultivated.	Singani casero (Homemade Singani)	<i>Singani casero</i> is distilled from young wine to produce a clear spirit. Although singani is sometimes made exclusively with <i>Moscatel de Alejandría</i> grapes, other types of singani are also produced [e.g. ‘singani de la uva negra’ (singani from the black grape)]	Chancho al horno and chanho a la olla	Pork stewed with chilies and green onions and cooked in the oven or on the stove. Often served with mote.
Grapes	The earliest grape (<i>Vitis vinifera</i>) varieties, including <i>Moscatel de Alejandría</i> , <i>Misión</i> , <i>negra criolla</i> and <i>mollar</i> , were brought to the Central Valley by the Spanish in the 1500 and 1600s (Milla Tapia et al., 2007). These varieties continue to be produced in campesino communities, while commercial varieties have become the norm in other areas of the Central Valley.	Rosquetes blanqueadas	Large, un-sweetened ring-shaped cookies made with dough that includes singani or other spirits and covered with a sweetened meringue.	Chancho, chiva, or carnero “a la cruz” (pig, goat and sheep on the cross)	Whole animal spread over frame (or ‘cross’) and slow roasted next to a fire, while being based with beer, salt and other seasonings. Served with mote.
Gallina criolla (“Creole” hen)	<i>Gallina criolla</i> refers to hens raised in the countryside, outside and on a natural diet, with no growth hormones, antibiotics or other interventions. Often eaten at several months or years of age.	Empanadas blanqueadas	A circle of pastry folded into a half circle and filled with a jam made from stewed lacayote (<i>Cucurbita ficifolia</i>) and iced on top with sweetened meringue.	Chancao	A soup of hen or chicken made with potatoes and yellow chilies. A serving includes a piece of meat (often leg) on the bone. Often spicy.
Huevos criollos (“Creole” eggs)	Creole eggs are produced from creole hens and often vary in size and colour, including white, brown, speckled and blue eggs.	Tamales	Meat from the head of a pig, cooked with onions and garlic, (and sometimes raisins), wrapped in corn dough, packaged in cornhusks and boiled.	Arvejada	Dish of thinly sliced fried potatoes, peas, eggs, cheese and onion. Served with rice and a small salad.
“Creole” hogs	Creole hogs are widely produced in the countryside at a small-	Humintas	Corn dough flavoured with anise (<i>Pimpinella anisum</i>),	Guiso Chapaco	A thick stew of rice, potatoes, chick and peas cooked with onion

	scale.		wrapped and cooked in cornhusks. There are several styles of humintas that vary in shape, ingredients (e.g. sweet, fresh corn or corn flour, with or without cheese) and cooking methods (e.g. fried or grilled, boiled or baked).		and chilies (<i>ají colorado</i>).
Cangrajos (Fresh water crabs)	<i>Aegla septentrionalis</i> : found in streams and irrigation channels. Fried in oil and eaten whole, often served with mote.	Pan casero or bollos (Artisanal or homemade bread)	Thin (c. 3 cm high), circular loaves of bread baked in a wood fire, doom-shaped clay oven.	Chanfaina	Pig organs and blood stewed with cubed potatoes, onion and chilies.
Peaches, custard apples, cactus fruits, quince and other fruits	Peaches, custard apples, cactus fruits among others are a seasonal, high value crops.	Peaches dried whole and made into fruit leather (Pelón, pelón de cuaresmillos)	Mature peaches and early peaches (<i>cuaresmillos</i>) are dried whole as <i>pelon</i> . Peaches are also cut into thin strips that are dried and sometimes rolled into sculptures of people, animals or furniture.		
Ajís (Chili peppers)	Many varieties of chili peppers (<i>Capsicum</i>) are locally produced, including <i>aji 'putita'</i> (or <i>mala palabra</i>), <i>ulupica</i> , <i>cobincho</i> , <i>locoto</i> , <i>amarillo</i> , <i>colorado</i> , and many more.	Fruit jams and preserves	Peaches, seven year melon (<i>lacayote</i>), plums, quince and many other fruits are processed into jams, jellies and other preserves, including grapes pickled in singani.		



Figure 28. Sculptures of local specialty products in the Central Plaza of the Town of San Lorenzo. The statues depict: (a) tamales; (b) a traditional singani still; (c) a basket of rosquetes; and, (d) a traditional clay bread oven with clay pots stored underneath. Other sculptures include large clay and aluminium pots with *humintas*, a brightly decorated basket filled with sweetbread, corn, squash, grapes and other treats for the *compadres* and *comadres* celebrations (celebrated as part of Carnival: Vacaflores, 2013), and large jugs of fresh milk alongside clay vessels of *chicha* or *aloja* being served with a halved gourd.

Some local governments have helped create a supportive environment for the campesino food economy in various ways. At the department level, a program called *Progreso Solidario* (Solidarity Progress: ProSol), directing hydro-carbon royalties towards campesino production through funding allocations for primary production projects to campesino unions, is unique in the country (Vacaflores, 2012a). Public markets, maintained with support from local governments, are vital nodes of exchange between campesino products, their products and Central Valley consumers. The largest and most prominent of these is the *Mercado Campesino* (Campesino Market) in the City of Tarija (Azuga H., 2013), which houses 1,300 permanent and 800 occasional vendors. Local governments across the Central Valley also sponsor cooking and baking classes for local women in which some traditional recipes are taught. Additionally, numerous *ferias*

productivas (production fairs) organized by campesino unions, local governments and producer associations are held throughout the Central Valley each year. The Provincial sub-section government of San Lorenzo, for example, supported 27 production fairs in 2012 (Gobernación de Departamento de Tarija, Sección San Lorenzo, 2012) and the same number in 2013, in addition to 7 *Festividades Propias del Lugar* (Local festivities) (Gobernación de Departamento de Tarija, Sección San Lorenzo, 2013).

Each fair is organized around a central theme reflecting local products or ideas that the organizers wish to showcase. Examples include: varieties and derivatives of maize (*Zea mays*), amaranth (*Amaranthus caudatus*), ajipa (*Pachyrhizus tuberosus*), or “Education and environmental agriculture”, as well as more recently introduced products, such as commercial dairy, that are important in the contemporary livelihoods of many rural families. The size of events can vary from several hundred to several thousand participants and some can last a week. There are also weekend events that are held in more isolated communities, drawing dozens to hundreds of vendors and attendees. These fairs bring together local people, visitors, exhibition stalls and vendors related to the focal product or theme, as well as mainly female vendors of other campesino foods and dishes (Figure 29).

Local festivities, including religious festivals and other celebrations throughout the year, also feature a variety of actors and offer a public arena for exchange, celebration and consumption of regional specialty foods.⁶⁶ The weeklong Festival of Santa Anita – dedicated to children preparing, selling and eating miniature portions of traditional dishes – is a particularly important event in urban areas with respect to the reproduction of culinary heritage. Other festivals with strong food related components include the celebration of *Todo los Santos* (All Saints, November 1st), during which a table is set in the home and filled with dishes for the ancestors (Figure 30). These often include foods remembered as loved ones’ favourites and dishes, such as *chicha*, that require significant time to prepare and are no longer made frequently.

⁶⁶ For a full discussion of religious celebrations and other cultural events celebrated in the Central Valley see Vacaflores (2013b).



Figure 29. Female vendors selling campesino gastronomic heritage-based products: (a) Women selling roquetes during the Festival of San Lorenzo (San Lorenzo, SL, 08/11/2013); (b) Women selling yacón during the Festival of San Lorenzo (San Lorenzo, SL, 08/11/2013); and, (c) Women selling prepared foods at the *feria de vino paterno y singanis casero* (Sella Cercado, Cercado, 07/23/2013).



Figure 30. Table in the Community of Tarija Cancha Sud laden for *Todo los Santos* with *chicha*, soups, fruit, and other foods appreciated by the family's ancestors and deceased loved ones. Sweetbreads shaped as ladders are also offered to help the spirits visiting that night to ascend again to heaven.

In addition to the food-related economy associated with the celebrations and events discussed above, many people, particularly women (like Doña Gloria, mentioned in the Introduction), also make their living in whole or in part by regularly producing and selling traditional specialty foods. Production often takes place at a cottage industry scale with the help of other family members, and artisanal products are sold from a small retail platform attached to the home or at the local market. In the Town of San Lorenzo (population 2,500: Gobierno Municipal 2008, 132), 55 retail platforms, including *tiendas* (small shops), restaurants and homes, advertising the sale of local specialty dishes and/or

products were identified.⁶⁷ The local market also has between 40 and 55 permanent and occasional vendors selling local products (depending on day and time), over half of whom sell dishes or products that could be classified as local specialties (Table 22). Additionally, the road between San Lorenzo and the City of Tarija is populated with restaurants and food vendors (Table 23). Market vendors, restaurant owners and other producers and retailers in the City of Tarija, Valle de la Concepción and other areas also depend on the sale of edible biocultural heritage and regional specialty foods.

Table 23. Different types of vendors selling traditional products long the road between San Lorenzo and Tarija.¹

Community	Number of shops (<i>tiendas</i>)	Number of kiosks (<i>casitas</i>)	Number of roadside food vendors	Number of restaurants or eateries
Tomatitas	15 (4 advertising the sale of meat and/or chicken, 6 bread, and 2 vino patero)	8	12 (1 advertising the sale of cakes and other baked goods)	22 (4 advertising the sale of vino patero)
Rancho Sud	2	0	0	11 (1 advertising the sale of vino patero)
Rancho Norte	5 (1 advertising the sale of chicha and 1 of bread)	1	2	3

¹ Data were gathered on Sunday, October 13, 2013, between 11:30 AM and 12:30 PM and include open (or obviously marked/signed) businesses.

Fairs and festivals also help reinforce and/or establish associations between products and particular places within the Central Valley. Tomatitas on the outskirts of Tarija, for example, has become synonymous with *comidas típicas* (traditional dishes), especially fresh water crabs, small fish and *humintas* (Balza, 2013). Other examples include: Lajas, La Victoria and Erquiz (San Lorenzo) known for artisanal bread; San Lorenzo (San Lorenzo) known for baked goods, such as *rosquetes* and *empandas blanqueadas*; Sella Mendez (San Lorenzo) and Sella Cercado (Cercado) recognized for *vino patero* (artisanal wine production); and, the areas of Santa Ana (Cercado), Valle de la Concepción and surrounding communities (Uriondo) increasingly renown for commercial grape and wine production.

⁶⁷ These are in addition to 39 other retail platforms in San Lorenzo, including other shops, butchers and self-advertised “fast food” restaurants, also selling foods, but without artisanal products or traditional dishes being advertised.

5.5 Considerations for biocultural sustainability

When biocultural diversity and heritage are mobilised as resources within territorial projects, such as the campesino gastronomic heritage alternative agri-food network in the Central Valley, relationships with the practices, materials and meanings constituting those resources are subject to reinterpretation, renegotiation and sometimes reconstruction (Billiard, 2006, 2010; Bowen & De Master, 2011; González, 2015). The concern brought forward through biocultural perspectives relates with how such processes of change in biocultural relations may affect the potential for continuity of biocultural diversity and heritage into the future. Are processes being set in motion that may establish trajectories with potential to sustain, strengthen or sever those relationships? We employ the biocultural sustainability framework as an analytical tool to evaluate and monitor the outcomes of biocultural resource mobilisation through interdependent ecological, economic and sociocultural perspectives. A summary of the insights from this case are presented in Table 24.

Table 24. Summary of sustainability dimensions and remarks associated with the gourmet and campesino projects.

Sustainability Dimension	Consideration	Observations
Environmental	Local wild and cultivated biodiversity	Supporting continued production of agrobiodiversity through seed sharing and celebrating local cultivars and associated secondary products <hr/> Less focus on uncultivated edible biodiversity
	Sustainable harvesting, management institutions and product demand	Commercialisation and promotion of potentially unsustainable products (e.g. fresh water crabs)
Economic	Regional economic patterns	Fairs, holidays and other events circulate economic capital within the Central Valley, providing economic injections to households and host communities
	Contributions to households and distribution of benefits	Intermittent income source and challenges of scaling-up, economic returns and market access.
Sociocultural	Discourses of authenticity, quality and access to biocultural materials	Challenges of formalization and conflicting discourses of health and food safety. Also challenges of access to biocultural materials needed for production.
	Enhancing appreciation and taste for campesino products and dishes	Creating spaces for cultural reproduction and adaptation, including the incorporation of traditional foods, recipes and cooking technologies into formalized restaurant contexts.

5.5.1 Environmental considerations: Is biodiversity supported?

A promise and risk of promoting consumption of local biological diversity relates to changing the abundance and health of species, breeds and landraces. While encouraging the use and consumption of a given food may precipitate it to be planted, harvested and cared for and thereby support *in situ* conservation of diversity that may otherwise be lost, overexploitation can have detrimental impacts on target and non-target species and/or ecosystems, particularly if management institutions are not in place.

Research participants and government officials express concern about declines and loss of landraces of crops, such as maize and potatoes (LHKI/B_1; LGKI_2; Turner, field notes 08/04/2013). Other research also documents that the cultivation of grains, such as quinoa, amaranth and wheat, is no longer practiced in some communities in the valley floor (Chapter 2). Production fairs offer a social mechanism to enhance the symbolic values surrounding agrobiodiversity and also provide networks through which seeds are traded and production knowledge is circulated and innovated. In the coming years, it will be important to see if this concern is reflected in the production profiles of campesino farmers as the celebration of foods and dishes that are no longer commonly available may also spark renewed interest in those products and stimulate local demand and perhaps production.

At maize and maize product fair in Jurina, twenty-four varieties of maize, each with specific uses, were documented, as were dozens of corn-based dishes and other local foods (Figure 31). This is in contrast to the seven varieties reported in production profiles of the twenty-seven maize-producing households in the San Lorenzo area. This suggests the role that fairs can play in making visible and possibly increasing interest in regional agrobiodiversity among producers and consumers. Doña Irene, for example, who remembers eating amaranth as a child, described an amaranth-themed fair that took place a few months prior to our interview. She recalled many different ways to use and prepare the grain: “Amaranth is like oats. It is toasted to make a drink... they made cakes, pastries, they made everything...” Following the event, amaranth became a topic of discussion during Doña Irene’s municipal government sponsored cooking class. The women in the course began asking the teacher to show them how to prepare a dessert made with amaranth that some had seen at a fair the class participated in (Turner, field

notes 25/08/2013). While this evidence is anecdotal, it suggests that these events enhance the interest and prestige associated with campesino gastronomic heritage. In the future, particularly, if local consumer demand for these products increases, it may serve to encourage the reincorporation of now uncommon products within campesino production systems and the local diet.



Figure 31. Dishes made with corn presented by La Calama community during the corn fair (Jurina, SL, 09/04/2013).

It is also important to note that edible wild biodiversity, particularly plant foods, such as *taco* (*Prosopis julifloras*) and *tusca* (*Acacia aroma*: both trees often cleared to make room for agricultural fields: PP_1-3; LHKI_2), is less evident at these events. However, over-exploitation of wild species is another issue that has emerged in the discourse surrounding the promotion of local foods. Declines in *cangrejo* (fresh water crab, *Aegla septentrionalis*) populations, which live in *asequias* (earth aqueducts) and natural waterways, is linked with habitat loss due to irrigation network modernisation projects coinciding with increased demand for the species as a Central Valley speciality. Crabs (Figure 32) have long been eaten at a small scale (LHKI_3-4; LGKI_1). Food vendors, many of whom are concentrated in Tomatitas, often specialise in a menu of crabs, *doraditos* (*Acestrohamphus bolivianus*), *misquichos* (*Trichomycterus* sp.) and other small fish (e.g. “mojarrita” and “llausa”). Tomatitas became a popular destination for locals and national tourists to eat crabs and other Tarijeñan dishes after the crab

achieved national fame by featuring in a popular Bolivian film, *Sena/Quina, la inmortalidad del cangrejo* (Agazzi, 2005; RO_3; CHV_1).



Figure 32. Fresh water crabs (*Aegla septentrionalis*) fried and served with small, fried fish and *mote*.

A small dish of crab with *mote* (boiled corn) sells for around 2.16 USD, making it a very profitable product (CHV_1-2; LHKI_4).⁶⁸ In spite of the demand, local harvesters explain there are no common property or government institutions regulating the harvest and they fear overharvesting is putting pressure on the species, reflected in increased difficulty finding crabs to harvest and also in rising prices. As Doña Maria (LHKI_4) reflected, “My grandmother used to say, ‘Go and leave the little ones! Only take the big ones!’ By contrast now they take everything; everyone does business.” Within the scientific literature, little is known about the species, except that it has limited distribution and was first described by science in 1994 (Crandall, 2007). This suggests

⁶⁸ All prices and other monetary data we refer to have been converted from Bolivian bolivianos to American dollars at the average exchange rate in 2013 of 6.95 BOB to 1 USD. A kilo of crab sells approximately for 17.25 USD at the public market (CHV_1). The price per kilo can range from 11.50 USD to 28.75 USD depending on the season (RO_3; LGKI_3; CHV_2). In the past the price was 1.44 USD/kg (CHV_1).

that in the absence of harvesting institutions or other sustainable harvesting systems, such as aquaculture production, the promotion and valorisation of the species may be leading to population declines. Similar concerns about habitat loss and over harvesting extend to the other small fish that are part of the industry (LHKI_4; LGKI_1 and 3; El Diario, 2009).⁶⁹

Another example draws attention to the potential importance of adapting technologies in anticipation of changes in demand. Artisanal bread-makers in Lajas and other communities rely exclusively on wood drawn from the Central Valley to fuel their clay bread ovens. Although interviewed bread makers were not concerned about over harvesting (B_2-3), other key informants believe the industry contribute to deforestation (TKI_1; LHKI/WP_5; LGKI_3). Within a context where roughly 28,000 people in the department rely on wood fuel for cooking (INE 2012a, 205–206) and where landscape clearing for agriculture and other purposes is ongoing, the contribution of the artisanal bread and other food industries relying on wood fuel is likely a contributing rather than primary driver of deforestation. However, as the industry continues to grow, this draws attention to the importance of anticipating the potential impacts of changes in demand on the resource-base. The examples above both point to the need for better information regarding environmental impacts and suggest that changes to harvesting and production practices and technologies, such as aquaculture, increasing fuel efficiency or changing fuel sources, may be necessary to minimise environmental damage.

5.5.2 Economic considerations: Are a range of people economically better off?

Fairs, holidays and other events described in Section 4 circulate economic capital within the Central Valley, providing economic injections to households and host communities. Surveys conducted at two campesino product fairs – one an urban event (“rosquetes fair”, San Lorenzo, San Lorenzo) and the other a rural event (“maize and maize products fair”, Jurina, San Lorenzo) – showed that most economic beneficiaries (both invited participants and the majority of other food vendors) came from the host community or from the nearby area. The majority of visitors, however, came from elsewhere in the Tarija Department (mostly from the City of Tarija), other parts of Bolivia or

⁶⁹ These sell for 5.75-10.07 USD/kg, depending on species and season (CHV_1).

internationally (Table 25). This suggests that these events may help circulate and redistribute wealth within the Central Valley by creating flows from urban to rural areas, while visitors from outside the region also represent economic injections into the Central Valley and host communities. Furthermore, the economic injections for vendor and participant households are significant.

Table 25. Origin of participants, vendors and visitors at production fairs.

	Place of Origin			
	Host community	Neighbouring communities (>10 km away)	Other parts of the Tarija Department	National or international
Participants (n=16)	7	9	0	0
Other food vendors (n=11)	2	8	1	0
Visitors (n=32)	1	9	17	5

Those selling foodstuffs at the fairs reported potential average net incomes of 139.52 USD to 141.50 USD based on estimates of direct costs of production, prices per unit and volume of production provided by 18 participants and other food vendors.⁷⁰ At the rosquetes fair, all the products brought to sell were sold by mid-afternoon (LHKI/WP_5; Turner, field notes 17/07/2013), suggesting that the calculations above based on total potential sales are not unrealistic, particularly for large and busy events. When data was collected in 2013, this accounted for close to a national monthly minimum wage of 143.90 USD (Trading Economics, 2015).⁷¹ Within this context, the economic contribution would remain significant even if net incomes were half the reported potential average.

Four of eleven vendors regularly travelled to fairs throughout the Central Valley and revenue from these events accounted for more than half of their household income.

⁷⁰ Participants are those invited to participate through the sale or exhibition of their products related to the theme of the event. Vendors are those selling other foodstuff not related to event theme.

Indirect costs of production, including labour, infrastructure and transportation costs, were excluded. As some products varied in price depending on the number of units sold, high and low estimates of net income were calculated as needed.

The highest calculated net income was 230.22 USD, while two producers reported breaking even or losses of 4.32 USD or more. Two vendors (FV_1-2) who participated in fair regularly and for 10 and 20 years respectively independently calculated their average take home earnings per fair at around 28.78 USD. Another reported 71.94 USD.

⁷¹ Monthly minimum wage in Bolivia was increased to 238.27 USD in 2015 (El País, 2015).

Three others reported income from fairs accounting for 30 to 49% of household income. All vendors explained that a primary motivation for participating was economic benefit, alongside other sociocultural benefits (Section 5.3). Twenty of the thirty-two groups of visitors surveyed (62.5 %) reported spending or planning to spend more than 14.39 USD, of whom eleven (34 %) reported spending or planning to spend over 28.78 USD. Counts conducted at the events found 470 people in attendance at the rosquetes fair and 200 at the corn fair. This suggests that the events provide enabling environments for economic injections into the host community and surrounding area by drawing visitors from the city and other areas to visit and spend money in the host community, which they otherwise might not have occasion to do.

Similarly, clusters of production of campesino products and dishes (e.g. restaurants serving *comidas típicas* in Tomatitas) draw urban dwellers and tourists throughout the year, particularly on weekends, and well-known celebrations, create a similar, although more seasonal demand. During the month-long Festival of San Lorenzo many celebrations centre around traditional food and drink, including a “foods of yesteryear” fair (*comida del antaño*). During the evenings of the Saint’s Day celebration weekend, the square around the San Lorenzo cathedral and market is full of stands selling artisanal wines, *Diana* and *cañelito* (hot toddies made with singani). During the days of the celebration, food stalls fill the town centre spilling over into the streets for several blocks (Table 26). Dozens of houses are also temporarily transformed into restaurants and bars serving traditional food and drink (Turner, field notes 12/08/2013). Vendors of other artisanal products, including clay cooking pots, also travel to San Lorenzo to sell their wares during this time.

Table 26. 2013 Festival de San Lorenzo food vendors.

Vendor type	Description	Number of vendors ¹		
		Day 1	Day 1	Total
Hot foods	Prepared food stands selling pork dishes, <i>picante</i> , <i>ranga</i> , soups, tamales, fried bread, and snacks.	51	93	144
Baked goods	Principally <i>rosquetes</i> , with smaller quantities of <i>empanadas blanqueadas</i> and other baked goods.	45	77	122
Beverages	Mostly <i>refescos</i> , with some fresh juices and blended fruit drinks.	17	21	38
Tubers	Yacón	9	10	19
Total		122	201	323

¹ Counts were conducted between 11:30 AM and 12:00 PM both days. Total is the sum of vendors recorded on Saturday and Sunday, thus vendors selling on both days are repeated.

Most restaurants, vendors and secondary producers source their ingredients from the local market, and in the case of specialty items, such as *gallina criolla* (creole hen) directly from campesino producers (Table 27: also see Appendix G). Many women from rural areas who occasionally or regularly make food to sell at events or from their homes, use their own potatoes, meat and vegetables, or when not available source from their neighbours. Those in cities and towns tend to buy from the local markets. Market surveys found that the majority of products at the public markets, with the exception of dry goods, such as rice and pasta, are produced within the Central Valley. This suggests strong backward and forward linkages among small restaurants, food vendors and secondary producers to primary producers through direct sourcing or the local and regional market places.

Table 27. Sourcing patterns of restaurants, market vendors and secondary producers.

Source ¹	Restaurants (n=22)		Market Vendors (n=29)		Secondary producers (n=52)	
	Occurrence		Occurrence		Occurrence	
	#	%	#	%	#	%
Regional Market (Mercado Campesino)	20	91	22	76	25	48
Sub-regional markets	5	23	8	28	2	4
Distributor, dealer or trader	7	32	5	17	7	13
Supermarket, butchers or other stores	2	9	1	3	2	4
Production fairs	1	5	0	0	0	0
Direct from producers	18	82	15	52	16	31
In-house production	4	18	11	19	14	27

¹ Producers may have multiple sourcing strategies.

It is important to note, however, that not all fairs are well attended, particularly in more isolated communities. Other concerns about lack of organisation, public drunkenness and a shifting emphasis away from arenas of exchange to commercial activity, entertainment and tourism were also reported (n=13 of production fair survey respondents; also, LHKI/WP_5; LGKI_1; Vacaflores & Lizárraga, 2012). Low attendance relates to the difficulty in travelling to some communities and to limited promotion, such as posters not being distributed until a day or two prior to the event.

Also, because multiple events are staged with support from different government agencies (e.g. the municipal vs. sub-provincial governments), events are sometimes held over the same weekend and so come into competition with one another.

As the data above suggest, the production and sale of campesino products has a major presence in the study communities, reflecting the importance of these products to the livelihoods of many households. The strategies surrounding the sales of food vary. Some small restaurant owners and food vendors prepare meals most days (n=13 of restaurants; n=3 of fair vendors), while others regularly open only on weekends or Sundays (n=6 of restaurants). In some cases, women from outlying communities travel to the local markets to sell their dishes on Sundays, holidays and special events, or when they need extra cash income (Turner, field notes 21/04/2013, 30/05/2013 and 22/09/2013). Similarly, secondary producers interviewed range from producing daily (n=3), to weekly or bi-weekly (n=4), or occasionally (n=10).⁷² Some women prepared dishes or specialty products, such as chicha, only a few times a year to sell at particular events (e.g. CMV_1-2; RO_4, until a year prior). Whether regular or occasional activities and income sources, specialty products occupy an important and visible place in the local economy and in the livelihood profiles of many households, particularly of women.

While detailed data is not available on the distribution of income within households, from the sample of interviewed restaurant owners and secondary producers, 75% of businesses are run by women and 33% are part of female-headed households (Table 28). Fourteen per cent of businesses are joint ventures involving one or more male and female family members. In the case of one restaurant opened on weekends, Doña Julia (RP_11) is the primary cook, however, her husband is the server and also helps with the kitchen. For them, the decision to open their house as a restaurant came about when Julia decided to begin an undergraduate degree and her husband's income was not enough to cover their increased costs. Similarly for Doña Flora (RO_5), the income from her restaurant helps stabilise her household income, which also comes from her husband's work in agriculture and from their store, which she also manages. Doña

⁷² Eight of these, however, have a retail platform where their products are regularly available for sale. Wine and singani producers for example are only able to produce during a few months of the year when fresh grapes are available.

Lucia's (B_4) husband's income is also unstable and her catering and bakery business helps stabilize and add to the household income. Importantly, she emphasized, it also offers her some independence in a sometimes abusive relationship. For Doña Josefina (RO_6), as their family grew, her husband's income from driving a taxi was not enough to cover their household costs. She found she was regularly cooking for a dozen family members and so she decided to cook enough to sell during the week from their home. While it started as a supplement to her husband's income, she now makes more from the restaurant than he does. For rural households with primarily agricultural livelihoods, selling food is an important, if sometimes occasional, source of cash income (e.g. LHKI/B_1, FV_2-3).

Table 28. Gender of business proprietors and gender of household heads.

Research Participants	Business proprietorship				Household			
	Female	Male	Joint	Not disclosed	Female	Male	Joint	Not disclosed
Secondary Producers (n=17)	12	3	2	0	7	0	10	0
Restaurants (n=19)	15	1	3	0	5	0	9	5
Total #	27	4	5	0	12	0	19	5
Total %	75	11	14	0	33	0	53	14

For other households, selling food became a primary survival strategy and primary income source. Doña Rosaria (RO_3) explained that she began selling food when her husband became ill and was no longer able to work. Her business allowed her children to study and their family to survive. Other women (e.g. RO/WP_7; RO_1-2, 8 and 9; B_5), like Doña Gloria selling *ranga* in the Central Market, became the sole providers for themselves and their children after their husbands left. Doña Fernanda (RO/WP_7) explained that when she began her restaurant and winemaking business, "I had children who were still studying and I didn't have collaboration from my husband. He became involved with another couple and I was left on my own. And after that I started with the restaurant to help myself out and to help my family."

In the case of artisanal alcohol production, nineteen sites in San Lorenzo and Tarija Cancha Sud advertised the sale of *vino patero* (artisanal wine), *singani*, *chicha de uva* (grape chicha) or other artisanal alcohol and the income from selling this production was identified as an important, although not exclusive income source for the seven

interviewed producers. All producers sold their products primarily from their home or shop. One producer (LHKI/WP_5) has a dedicated wine retail and tasting room and another (WP_1) regularly opens a small restaurant in their home during holidays. *Vino patero* generally sells for 2.16 USD/L and *singani* retails for 3.60 USD/L. The two largest producers reported average net incomes from wine and *singani* production of 11,510-14,390 USD a year, based on a production of roughly 5,000L of *vino patero* a year and 500L of *singani*. The three smaller producers, producing less than 1000L a year, reported between 1,151-2,014 USD of gross income. One producer making 1,500L of *singani* reported 5,036 USD of gross income. All producers reported selling all of their production before the beginning of the next year's production season.

Producers of other regional specialty products also emphasize their economic importance. One *rosquete* producer, Doña Alejandra (B_6), makes a batch of 300 *rosquetes* two to three times a week with the help of her husband and hired assistants. Each *rosquete* is sold for 0.40 USD. She calculates her direct costs of production at approximately 36.00 USD, generating a net income of around 180.00 USD a week. Her *rosquetes* are sold from her home and through vendors in Tarija and San Lorenzo. The income complements what she and her husband earn through their work at the local school and as a mechanic.

For campesino producers, goat and cow's milk cheese is also an important contribution to household economies. Goat cheese producers in the community of Marquiri explain that they can sell their cheese for 4.32 USD/kg directly to consumers or resellers who visit their community. In the markets in Tarija or San Lorenzo it can be sold for between 5.76 – 7.20 USD/kg (compared to cow's milk cheese normally bought from producers for 2.88 USD/kg and resold for 4.32 USD/kg: Turner, field notes, 28/07/2013 and 10/30/2013). However, these earnings are highly seasonal. Similarly, cheese made from creole cow's milk also has higher prices and is difficult to find. Two women in Tarija's Central Market make it and sell it in small quantities as a snack food. They explain that while creole cows produce less milk, they produce richer and better tasting milk than commercial dairy breeds like Holsteins. Many San Lorenzo area households have become involved in commercial dairy production over the last two decades, with the majority of milk sold to one of two commercial dairy processors.

However, cheese-making offers an important safety net in their livelihood strategies, acting as a fall back for when they are unable to bring their perishable fresh milk to the market (DP_1-8).

The discourse of speciality surrounding campesino products (Section 5.3) provides a market and often price premiums for producers. *Gallina criolla* (creole hen), which is raised over several months or years without the use of hormones and antibiotics and is allowed to forage and develop muscles by leading an active life outside, is sought after as a specialty product in contrast to widely available factory farmed chicken (referred to as *pollo*). Creole hens have also retained a high market value (approximately 10 USD, compared to 3.60-4.30 USD for a chicken: DP_9; Turner, field notes 31/07/2013). Food vendors commented that supply of creole hen is a persistent problem. The shortages and prices have also led to problems of counter-fitting through the substitution of retired commercial laying hens for creole hen (RO_1-2). Although, the high market value of creole hen translates into higher prices for soups and other creole hen based dishes, one restaurant owner, Don Manuel (RO_10) explained that his clients are willing to pay the price premium because of the higher quality and flavour:

[T]here are people who ask me, “*Señor*, I want you to make me a *sopa de gallina criolla* (creole hen soup) – everything creole. I’m ordering a *picante de gallina criolla* (picante of creole hen) and it isn’t important to me what it costs.” That is what people tell me, so with great pleasure I find the hen. If I make it the best I can, people don’t mind if I ask 2.16 USD for a plate of soup. People pay me for it without complaint because I make a good soup.

This suggests that the cultural value placed on campesino products can create high value markets within the local economy.

Many small producers, however, face challenges related with scaling-up, economic returns and market access. Limited infrastructure and poor market access can reduce product price and quality before they reach the market or limit their sale all together. For example, even though fresh goat milk is valued and discussed as a healthy and desirable food, it is not available at the markets in Tarija, San Lorenzo or Valle de la Concepción because of low production volumes and difficulty bringing it to market. Similarly, a goat cheese factory owner making commercial cheese for the national market explained he only uses milk from his own herd because there are no cold storage chains to facilitate accessing milk from producers in nearby communities (DP_10). Producers

also explain that they sometimes sell their cheeses at lower prices to middle men who come to their communities to buy cheese to resell at the public markets because of travel times involved in bringing their product to market. As a result, they receive a smaller share of the final sale value of their goods.

5.5.3 Sociocultural considerations: Are relationships with biocultural heritage validated and enabled?

In considering the sociocultural implications of alternative agri-food networks surrounding biocultural heritage, a critical area of reflection is if and how relationships with biocultural heritage are being validated and enabled. A defining characteristic of the campesino gastronomic heritage alternative agri-food network is that it is largely emergent in daily life and practice of rural and urban dwellers. While local governments, campesino unions and producer associations currently play an important role in planning, coordinating, sponsoring and publicizing production fairs and other events, the production and sale of campesino specialty foods at festivals, markets and fairs predate these forums. For many, the production of campesino specialties is an intergenerational activity, in which recipes and preparation methods are learned from parents or grandparents, many of whom also made a living selling specialised traditional products, such as *chicha*, bread or prepared meals (RP_11; DP_7; LHKI_4; RO_1-2). As the business partner and husband of a producer of fruit preserves explained, “It’s a way of making a living through my wife’s family tradition that was taught to her by her grandparents” (FV_4).

The production of regional specialty products is often connected with feelings of pride, family tradition and identity, thus extending the value of products beyond their financial contribution to household economies. Doña Alejandra, discussed above, works in a little front room of her house on a hundred-year-old table also used by her mother and grandmother to make *rosquetes*. She has been making *rosquetes* for the last 40 years, since she was ten years old. Her sister also makes *rosquetes* and other traditional baked goods.

Similarly, promoting traditional products, supporting community and fostering tourism were discussed by participants at production fairs as important reasons for their participation. Participants in the corn fair also pointed to the benefits of sharing

production techniques and varieties of corn among participating communities. Visitors at these events – who came to see the exhibition stands, have a meal or snack, and access traditional products – discussed similar benefits.

The presence of *ranga-ranga*, *gallina criolla*, *rosquetes* and other foods and dishes at special events, in the public markets and as featured products in shops and restaurants helps create a cultural context in which those items are valued, sought after and in which their production at a cottage industry scale remains a viable and beneficial component of some household economies (Section 5.2). By creating forums to celebrate and reinforce the biocultural diversity and heritage of the territory, the symbolic value placed on the knowledge (i.e. how to produce and prepare different foods), practice (i.e. the act of producing and preparing such foods) and materials (i.e. the crops, products and dishes themselves, as well as the land and other components of production) underpinning them are strengthened. Sites of public eating and enjoyment are an interface between the private and public spaces of consumption and provide forums in which the local food culture is produced and adapted over time. The making public of campesino culture is supported by a local discourse valorizing and identifying campesino products as local specialties. This discourse of ‘specialness’ is linked with nostalgia for the *campo* (countryside) and rural ways of life and the naturalness, superior flavour, cooking process and quality of campesino products.

The promotion and circulation of these products is highly dependent on word of mouth, social networks and local knowledge to identify producers, products, and vendors and make discriminating choices among available options. There is a range of words and signals with widely understood meanings that help people locate and identify campesino products. Coloured flags are placed outside of homes and businesses to indicate that a product is available: a white flag for bread, a red flag for grape chicha, and a half red, half white flag for *rosquetes*.

The language of tradition and heritage is also evoked by producers on business signs outside their homes or retail platforms advertising *repostería típica* (traditional baking) or *comida típica* (traditional food). One sign for a bakery reflective of this

discourse reads, “Nostalgia and tradition with the flower of the *pago*.”⁷³ Words used on menus and in everyday language, such as *criollo/a* (creole), are also used to describe dishes and/or ingredients and distinguish them from possible substitute products that might be used in preparing the same recipes. Creole hen is an example of a product reflecting many aspects of this discourse (Section 5.2). The adjective *criolla* for hen and other products, like cheeses, and others such as *patero*⁷⁴ to indicate artisanal wine and *casero* (homemade) for breads and singani, are ‘quality’ markers and central tools of communication and markers of distinction associated with campesino foods.

While where ingredients come from and how they are produced are important characteristics and markers of distinction, so is the cooking process. Wood fuel, clay ovens and clay cooking pots are key technologies shaping flavor and cooking processes. Clay pots boil slowly and retain heat for a long time allowing dishes to stew and slow cook, while the wood smoke adds flavor and also shapes the cooking process. These cooking methods are in contrast to the gas stoves, ovens and aluminum pots now commonly used in Central Valley households, particularly in urban areas. Thus, when visitors from urban areas look for campesino dishes they are seeking meals prepared using traditional methods and ingredients that are no longer common in the daily life of many households. Some restaurants catering to middle and upper classes, have built kitchens to accommodate the use of these technologies (e.g. RP_10 and RO_12). Other restaurants, such as “*Ollita del Baro*” (Little Clay Pot), evoke these cooking methods in their names or imagery on their signs.

This type of *sui generis* marketing is important because a shared language of “distinction”, to borrow Bourdieu’s (1984) term, helps producers of biocultural heritage-based foods to create product recognition that is transposable in multiple contexts helping create continuity of demand. Discourse articulating and supporting the value of campesino products is essential to the continued production and consumption of these products, particularly when considering the wider sociocultural context in which other discourses, such as agricultural modernisation, are at play that tend to devalue local food

⁷³ *Pago* refers to a plot of land conjuring the image of the land giving or providing payment or harvest, as well as the place that a person is born and has deep roots.

⁷⁴ *Patero* is derived from the Spanish noun *patas*, meaning legs or feet, and in this usage refers to the process of crushing grapes with the feet.

culture and re-craft it within extra-local standards of quality and desirability (Billiard, 2006, 2010; Bowen & De Master, 2011; González, 2015).

Certainly some local actors, such as the NGO, JAINA, are working to visibilise and position campesino gastronomic heritage and the alternative agri-food network surrounding it as a coherent political project capable of transforming public policy away from export-oriented production and toward support for *producción comunitaria* (community production), decolonization and food sovereignty objectives (Vacaflores, 2012b, n.d.; Vacaflores & Lizárraga, 2012). However, they note that the alternative agri-food networks surrounding campesino gastronomic heritage remain a sub-altern project that is often under-recognized, under-supported and undervalued by the state and development actors. Notwithstanding, the explicit political nature of some production fairs is clear, such as the *VI feria de intercambio de comidas tradicionales y semillas criollas* (6th Fair for the exchange of traditional foods and creole seeds),⁷⁵ which had the slogan “We decide that what we eat and what we produce is food sovereignty”, or the *V feria producimos y consumimos lo nuestro* (5th Producing and eating what is ours fair).⁷⁶ These are contrasted, however, with other events also organized by campesino unions with government support and/or NGO support that showcase local advances toward modernist production ideals of increasing commercial production through incorporation of new genes and technologies. For example, fairs related to the milk industry showcase high production breeds, particularly Holsteins, introduced in recent decades, and include competitions for most milk produced by a single cow. This suggests the heterogeneity among actors and visions, even when certain values, such as improving rural livelihoods, are held in common. Consequently, many aspects of the campesino gastronomic heritage alternative agri-food network and valorisation processes supporting it remain within the realm of cultural practice. Ways of life and foodways reflected in this territorial project are still fighting for legitimation in a context in which modernist ideas of development have long dominated and continue to hold a central place in rural development planning and investment.

⁷⁵ Held October 28, 2012, in Potreritos, organized by the Sub Central Campesina de San Diego, Comunidad Campesina de Potreritos.

⁷⁶ Held April 27 and 28, 2013, in Tomatas Grande, San Lorenzo.

5.6 Discussion

Tracing some of the multiple threads of the alternative agri-food network surrounding campesino gastronomic heritage reveals a complex web of interactions linking primary and secondary producers, rural and urban consumers, cultural identity and local biodiversity, and ideas of the past and visions for the future. This set of ideas, processes, and networks, particularly short-supply chains, surrounding campesino quality foods are creating mechanisms by which embedded relationships with the local food system and the biocultural relationships entwined with it are being sustained. This case seems to support the conclusion reached by Vorley, Del Pozo-Vergnes and Barnett (2012, p. 31) that “[s]mall, traditional farms can compete on their strengths by appealing to demands for native crop and animal varieties, local cuisine, terroir, artisanal quality and diversity.” In the case of the Central Valley, the benefits and appeal for local biocultural-heritage-based products extend beyond the realm of primary production to include an array of secondary and tertiary activities that are vital to many households and of particular importance for women who are the principal producers and vendors of many campesino foods.

The campesino territorial project, however, faces several challenges. Some of these, such as the ecological issues and concerns surrounding production fairs, have been described above. Another concerns the degree to which campesino gastronomic heritage alternative agri-food network as a rural development strategy may build on cultural practice to consolidate into a clear, political project with transformative capacity in the face of concurrent territorial projects seeking to reorder the Central Valley food system towards national and international market integration. One manifestation of these trends is a process of dietary transition in which a globalised food culture is becoming an important reference point for shaping food tastes and preferences linked with the rise of successive global food regimes (Bernstein, 2015; McMichael, 2009), particularly among urban dwellers and youth (Chapter 1). Another manifestation is in old and newly recast discourses of modernist agricultural development, in which external markets and extra-local consumers are identified as the locus of economic opportunity (FAUTAPO & OMIN, 2012b). Most recently, this vision for the territory has been articulated through a

gourmet development strategy focused on increasing the production and export of selected Tarija products (Chapter 4).⁷⁷

Within this wider context, which echoes trends towards globalisation of food being experienced around the world, the campesino territorial project and the role the biocultural heritage plays within it are deeply political; both underscoring the importance of food systems and the practices surrounding them as sites of resistance. Given the power of elite interests to shape local development agendas and the powerful capacity of capitalist globalisation to transform food systems, it is important to reflect upon the factors that have favoured the alternative agri-food networks around campesino gastronomic heritage to emerge and remain prominent and that might favour the consolidation of a campesino territorial project in the Central Valley.

While cultural traditions, initiative and creativity of individual producers, the choices made by consumers and other factors are undeniably critical, one enabling factor that must also be recognized is the role of government. Research on alternative food systems and local and rural economic development, point to the important role that governments play in creating environments that either support or hinder certain types of economic organization (Feenstra, 2002; Markowitz, 2010; Pimbert, 2010; Kay, 2006). In spite of the contradictions reflected in government support for the gourmet strategy and other modernisation processes, Central Valley governments are also helping create an enabling environment for alternative agri-food network surrounding campesino gastronomic heritage, both by what they are doing and also by virtue of what they are not doing.

The relatively minimal investments from local governments in production fairs, festivals and events are having significant ripple effects on the livelihoods of many households as well as the continuity of biocultural heritage in the region. Support for the maintenance of public market places is another example, as are the growing number of cooking classes sponsored by municipalities for local women. Such spaces of exchange and encounter have also been documented elsewhere as vital to local food movements

⁷⁷ The selected products are a triad of grapes, wine and singani, along with cured ham, honey, goat cheese and high-value fruits and vegetables. Of these the grape, wine and singani chain has had the greatest impact on campesino production because of the scale and growth of vineyards in the Central Valley beginning in the 1970s and 1980s (Chapter 2).

and economies in the North and South (Hinrichs, 2010; Marti & Pimbert, 2006; Trauger, Sachs, Barbercheck, Brasier, & Kiernan, 2010; Vorley et al., 2012). Although this paper has concentrated mainly on secondary production and exchange of campesino products, support for primary production activities of campesino communities taking place through ProSol (Section 4) is another policy innovation that is enhancing the capacity and autonomy of campesino communities (Vacaflores, 2012a).

These and other supportive actions by governments are important, but perhaps of equal or greater importance is what they are *not* doing, either by choice or as a result of their limited resources and enforcement capacity. A key factor supporting the production and circulation of campesino primary and secondary products relates with the relatively closed nature of the food system (Section 5.2), including the absence of a national or international supermarket chain. A contribution from the government in this regard is that they have not actively pursued or succeeded in recruiting that kind of foreign direct investment, which has been shown to dramatically alter food systems elsewhere in Latin America (Baker, 2009; Coleman, 2003; Reardon & Berdegúe, 2002).

Another important area of limited intervention relates with the informal economy. Historically within development policy and practice the informal economy and role of non-farm economic activities, particularly of women, have been seen as unimportant, complementary and residual of the past that are expected to “wither away as a country develops” (Kay, 2006; Lanjouw & Lanjouw, 2001, p. 1; Vorley, 2013). Particularly since the beginning of the 21st century, Vorley (2013) notes, the informal sector has been recast from unimportant to a “public bad” that is undercutting the development of a tax-paying, private sector essential to the neoliberal development agenda. In spite of the valuable contributions that the informal sector – or popular economy as it is known in Bolivia – play in supporting food security and providing livelihood opportunities, governments are increasingly attempting to regulate it, often with negative impacts on food safety, poor producers and consumers (Vorley, 2013).

Research participants report problems related to operating in the informal economy. Key examples include being denied participation in some fairs and festivals (WP_2), being excluded from NGO and government programs helping businesses renovate their establishments for tourism (B_6), and being denounced by a neighbour and

fined for “illegal” (unregistered) alcohol production (PP_4). Artisanal wines and singani have also sometimes been classified with contraband and illegal products as risks to the economy and food safety (Antelo, 2007, p. 93) and are sometimes disparaged by industrial producers and development agencies (ADKI_1; ADKI/WSKI_1-2). As these examples suggest, informal producers are vulnerable to discrimination and persecution, and much more could be done to support them; however, the state could also be adopting a much stricter regulatory approach involving the active persecution of the informal economy surrounding many campesino products. The relative tolerance towards the production and sale of goods produced outside government regulatory control allows many households, and particularly women, livelihood opportunities that otherwise might not be feasible, and in so doing also allows consumers access to valued products and dishes.

For many, making traditional products or preparing traditional dishes is a complement to other livelihood activities and as such their enterprises are often part-time, low capital and informal. Many fear reducing their small returns if they were to become registered tax-paying businesses. Similarly receiving health and hygiene certifications are often complicated and difficult to acquire and so not prioritized or possible for small-scale and occasional vendors. Furthermore, it is often seen favourably by producers to be able to opt-in and opt-out of production in a very flexible and adaptive manner. This suggests that if the state came to strictly enforce formalisation, many small-scale enterprises would be closed down or, as Vorley (2013) documents elsewhere, be pushed further underground.

While these actions and inactions on the part of the state have helped create an enabling environment for alternative agri-food networks based on campesino gastronomic heritage, much more could be done to actively support campesino producers and the circulation of their products. Vorley (2013) suggests several institutional innovations to work with the informal sector to reduce the downsides of informality, while capitalising on the contributions to local food systems and economies. A critical issue includes creating standards and certifications that are reasonable and “risk-based”. The principle should not be regulation for regulation’s sake, but rather identifying if and where significant risks to health, safety or the environment are present and working with

producers to address them. This should not mean demonising traditional production practices or assuming non-industrial processes are unhygienic. It suggests that extreme care should be taken in developing and implementing regulations affecting the informal economy, and by extension alternative agri-food networks associated with campesino gastronomic heritage. The principle of working with, rather than against, the informal sector is a policy that could be explicitly and actively pursued in the Central Valley within a framework of supporting biocultural sustainability. Building on the networks already created through cooking classes and other programs, it might also be possible to incorporate not only food preparation skills, but also basic food safety and accounting skills that might help women entrepreneurs generate greater benefits from the demand for campesino gastronomic heritage while improving public health.

Lack of basic infrastructure, such as electricity and decent road access to facilitate cold storage chains, is another barrier facing producers, particularly in rural areas. These limitations can have disproportionate impacts on women. In their work on rural non-farm economies, Berdegué and Escobar (2001, p. 407) recommend, “Education, labor training, the improvement of roads and transport systems that allow women to easily travel between their homes and places of work, the creation of day-care centers, revise labor and social security policies and their adequate financing,” as key for enabling women to access and benefit from off-farm economic opportunities. Governments could actively address existing infrastructure deficits as key development priorities that will improve the material wellbeing of rural dwellers and also their access to better markets for their products.

Other examples of concrete steps local governments could take to support campesino gastronomic heritage alternative agri-food network are many. These may include greater support for campesino agricultural production practice through investment in agroecology-based agricultural extensions services and producing local maps of towns, such as San Lorenzo, with points of sale of traditional products. Similarly collective production and packaging facilities could also support the quality and presentation of local products without placing undue burden on individual producers who might not benefit enough to ever make such an investment feasible at the enterprise scale. For example, a small glass bottling machine in towns (e.g. Valle de la Concepción and

San Lorenzo) where tourists or visitors from the city could transfer their purchases of artisanal wines or singanis from reused plastic bottles into glass bottles (perhaps with a label from the town along with the name of the producer) might improve the competitiveness of campesino wines in relation to their commercial competition. Increasing the promotion around fairs and other events, particularly in more isolated communities, including by ensuring that transportation is available and promptly producing and distributing promotional materials, might help support producers in those communities and enhance the potential benefits from hosting such events.

In linking this case to the broader discussions surrounding the role of biocultural heritage in local development processes and what insights might be drawn from this case, we turn to the work of Davidson-Hunt et al. (2012) on Biocultural Design. Davidson-Hunt et al. (2012, p. 10) suggest a number of “guiding coordinates” that may aid communities and groups of actors as they navigate the challenging process of purposefully mobilizing biocultural resources to meet locally identified needs and interests through biocultural design.⁷⁸ The idea of guiding coordinates builds on the concept of ethical coordinates proposed by Gibson-Graham and Roelvink (2009) and elaborated on by Bargh (2012), in their work on alternative, postcapitalist economies. Coordinates resonate with the metaphor of alternative economic development as processes of wayfinding (Davidson-Hunt et al., 2012), in which constellations of coordinates may come together to “shape decisions, moral judgments and subsequent effects for peoples and the environment” (Bargh, 2012, p. 281). The orientation emphasizes the range of the possibilities and not predetermined possible outcomes. In Table 29, we offer 5 coordinates that refine and re-articulate Davidson-Hunt et al.’s set in relation to the insights into biocultural resource valorisation and support for local food systems that this case offers. We have focused these observations largely on the role of the state in enabling or hindering economic and social organisation around the promotion of local edible biocultural heritage.

⁷⁸ Biocultural design coordinates are also re-examined in Chapter 4 in relation to the gourmet product development strategy in the Central Valley and biocultural sustainability

Table 29. Considerations for biocultural resource use in local development.

Biocultural design coordinates	
1	In developing policy to support alternative agri-food networks, have existing factors enabling desired forms of economic organisation (e.g. absence of a supermarket) been identified and steps taken to support their continuation?
2	Recognizing the linkages between the formal and informal economy and rural and urban areas, what can be done to support occasional producers and venders?
3	In order to enhance program effectiveness, have mechanisms for collaboration and information sharing between levels of government been identified and implemented, especially where there is jurisdictional overlap?
4	In order to create policies and regulations that support sustainable biocultural heritage use, have information gaps, such as ecological or human health risks, been identified and filled?
5	Basic infrastructure, including transportation and electricity, are vital to market linkages favouring rural producers. What key infrastructure developments can enhance rural producers' market access?

In the literature on alternative agri-food network, it is noted by some authors that a weakness of existing scholarship is a persistent tendency to make normative claims about the relationships between scale and outcomes. There are two sides to this coin. The first, most commonly cited in the alternative agri-food network literature (Harris, 2009; Tregear, 2011; Watts et al., 2005), is what Purcell and Brown (2005) and Born and Purcell (2006) term the 'local trap', by which they refer to the pervasive issue in many disciplines, including food systems (also see Hinrichs, 2003), to equate 'local' *a priori* to 'good', 'ethical' and 'alternative' without empirical grounding or critical reflection. The other is the tendency linked with productivist, export-oriented rural development policy to assume 'local' to be synonymous with 'unviable', 'residual' and 'redundant' (see Kay, 2006; Lanjouw & Lanjouw, 2001; Vorley, 2013). Empirical study, including of economic outcomes, and critical analysis is necessary in order to avoid making assumptions about the viability or lack thereof of different types of alternative agri-food networks (Watts et al., 2005).

A biocultural sustainability framework provides a lens to examine, evaluate and reflect upon processes of biocultural valorisation, alternative agri-food network formation and what their strengths and weaknesses are for the people and environments involved. A key contribution of this framework is recognising the interconnectivity among production, exchange and consumption aspects of the food system and the environmental, economic and sociocultural contexts in which those processes unfold. This helps draw attention to how intended and unintended consequences of different approaches to biocultural valorisation can lead to conditions that strengthen, sustain or sever relationships with biocultural heritage. This framework may provide an analytical tool to

avoid *a priori* assumptions about organisation forms and outcomes of alternative agri-food networks and other biocultural heritage valorisation strategies.

The biocultural sustainability framework also offers a way to look at what alternative agri-food networks can offer in sustaining biocultural heritage and reciprocally what biocultural heritage can offer for creating and sustaining alternative agri-food networks. Approaching alternative agri-food network through a biocultural framing offers several contributions towards filling gaps identified in the existing literature. One of these is the need to better understand social and cultural perspectives on alternative agri-food network, including how consumers and producers construct values and meanings and recognizing markets as cultural phenomena (Hughes, 2005; Renting et al., 2003). Here the campesino gastronomic heritage alternative agri-food network is found to be a socially constructed market for campesino foods, supported by formal institutions and structures, but largely manifesting in the realm of cultural practice and based around informal institutions and discourses of quality reflecting values of local heritage. Biocultural perspectives also explicitly place human-environment relationships a central ordering principle for understanding food systems. While concepts such as ‘origin-based products’ (Vandecandelaere et al., 2009; Van de Kop et al., 2007) and *terroir* (Watts et al., 2005) have many parallels, biocultural extends the understanding from the social, cultural and environmental characteristics embodied in a product, to how products are embedded in complex biocultural systems. In doing so, a biocultural lens helps direct attention to a wide range of values surrounding foods.

In their work linking biocultural diversity of fermented foods and markets, Millar, Beyuo and Agana (2015, p. 45) found that these circulated in largely invisible markets but were associated with a range of income generating and sociocultural benefits, including the spiritual values of foods as ‘foods of the dead’, ‘foods of the gods’, ‘foods for cleaning’, and ‘foods to get rid of the ‘evil one’’ (p. 45), leading to a richer understanding of market formation and value. Etkin (2009, p. 206) also argues that a biocultural perspective is essential to an integrated approach to understanding food because it:

...reflects that the tangible characteristics and physiologic effects of all aspects of foods and beverages (production/consumption, transformation, circulation and

consumption) undergird and are influenced by their cultural construction and social transactions.

Similarly, Hadley and Wutich (2009) argue that biocultural heritage is so vital to individual experience that recognising the role of culture in determining what is edible, in what amounts and under what conditions, alters the meaning and measure of concepts such as food and water security.

Watts, Ilbery and Maye (Watts et al., 2005) also critique some alternative agri-food networks, particularly those organised around formalised labeling and certification schemes, for their tendency to overlook low value-added foods, concentrating on global, high-value favourites, such as wine, cheese and meats. Primary products, foods with low durability or limited-extra-market appeal they note, however, are prominent within many local food systems. Biocultural perspectives can help draw attention to these and other elements of local edible biocultural heritage that might be undervalued and have low visibility in formal markets, including wild foods and those circulating in networks of informal exchange, by offering an alternative lens to understand the value and quality attributes of these foods and by doing so help identify and better understand the forms of organisation surrounding them.

Lastly, it has also been noted that scholarship on alternative agri-food networks would benefit from bringing together food and agro-food studies (Watts et al., 2005). Biocultural concepts offer ways to approach bridging those gaps, particularly the underlying concern of linking processes of production with those surrounding exchange and consumption, because they are well attuned to looking at complex, interconnected systems in which culture and environment are ‘intrinsically linked’ (ISE, 1988). This kind of systems thinking is also critical in the analysis of campesino livelihoods and agrobiodiversity.

Many of the “remarkable features and services of peasant agriculture” have been well documented (Altieri & Toledo, 2011, p. 591); however, the lens of primary production is not sufficient to understand the potential of campesino agriculture or other small-holder production systems and associated agrobiodiversity and resource management practices. It is also necessary to look at the wider food system context, including the existence or not of markets. In thinking about the viability of these systems it is also necessary to consider that campesino households do not only depend on the

surplus sale of raw ingredients, but also on the sale of food products that can have increased value because of their origins and quality characteristics.

Better understanding the complex historical, ecological, economic and sociocultural contexts of alternative agri-food networks around campesino gastronomic heritage underscores that the campesino gastronomic heritage strategy is not so much about processes of ‘re-localisation’ or ‘re-territorialisation’ (often cited with the alternative agri-food network literature as a defining feature of alternative agri-food network: Goodman & Goodman, 2009; Wiskerke, 2009), so much as about adapting and sustaining long-standing territorial relationships in the face of on-going processes of globalisation and environmental change underway in the Central Valley Territory. Similarly, although this case documents the importance of pluri-activity, non-farm and off-farm activities, caution should also be taken in equating these activities with a “new” rurality (Kay, 2006; Reardon, Berdegúe, & Escobar, 2001). The history of specialty food production in the Central Valley suggests that the rural non-farm economy surrounding campesino gastronomic heritage is not so much part of a new rurality as part of a rurality that has often been under-recognised and undervalued by the state and other development agents as a contributor to rural livelihoods and local identity. This is especially the case when considering the significance that the campesino gastronomic heritage alternative agri-food network has for women. In the Central Valley, campesino gastronomic heritage is gaining visibility and recognition through multiple networks of production, exchange and consumption constituting an alternative agri-food network. The campesino gastronomic heritage alternative agri-food network faces many challenges as well as presenting many opportunities as an alternative trajectory for the Central Valley Territory.

5.7 Conclusions

The use of biocultural resources in development is a complex proposition reflecting multiple ideas of what the local economy and food system are, what they may be and who the beneficiaries are. The production, transformation and exchange of local foods and food products, while a vital part of the Tarija Central Valley economy, is not always sufficiently recognized within development planning and programs that tend to focus on promoting economic growth through export-oriented commodity production. The

campesino gastronomic heritage alternative agri-food network, emergent in daily life, practices and foodscapes of households and communities across the Central Valley, reflects an alternate vision and range of options for the local economy and identity of the territory that is particularly important in the livelihoods of women.

Within this alternative agri-food network, local biological diversity holds a central (though not exclusive) place within production systems and the use of that biodiversity in favoured recipes by food vendors and producers is supported by a locally generated and understood discourse of value surrounding campesino production, production practices and ways of eating. The importance of fairs and festivals in creating public spaces of campesino cultural celebration and performance and as areas of exchange and access to biocultural materials reflect some of the support from local governments that campesino foodways have received. These relatively small investments from local governments to promote campesino gastronomic heritage are having positive ripple effects that underscore the importance and potential of campesino gastronomic heritage as resources in rural development strategies based on alternative agri-food networks. However, further support for small producers to address market access and other barriers may increase the benefits and options available to them. This includes investing in supportive infrastructure, such as roads, as well as insuring that government regulations affecting the production, exchange and consumption of campesino products protect the biophysical environment and create an enabling (and not penalising) context for small producers.

Far from being relics of production systems and biocultural relationships that are doomed to disappear through acculturation and economic modernisation, creole hens and *ranga-ranga* and other local products and dishes remain vibrant and integral parts of campesino foodways and are being mobilized as resources within the local economy. The forms of sociocultural and economic organisation surrounding them and other aspects of campesino gastronomic heritage suggest an alternative development trajectory with great potential to support small-scale producers and the continuity of local biocultural heritage into the future.

Chapter 6: Conclusions

6.1 Introduction

This research examines the role of edible biocultural heritage in the food system and local economy of the Central Valley of the Tarija Department of Bolivia, and how the use of that heritage – reflected in agrobiodiversity, production practices, local recipes, tastes and food preferences – shapes the lives and livelihood opportunities available to Central Valley residents. Biocultural heritage, however, is constantly evolving to incorporate new elements, while sustaining or leaving aside others (Asociacion ANDES & The Potato Park, 2015; Dutfield, 2014). Recognizing biocultural heritage as part of territorial identity necessitates acknowledging that multiple heritages co-exist within the same time and space.

These reflect the histories, including class histories, resource access opportunities and constraints, as well as territorial imaginaries of different groups of actors comprising that territory. Whose heritage (or aspects of heritage) are carried forward and given precedence within development processes and whose is rendered less viable and visible have significant impacts on the form and function of food systems, the representations of local identity they manifest and the livelihood possibilities they entail. Better understanding the complexity of such issues is critical because the mobilization, or use, of local biocultural heritage in rural development has become an increasingly prevalent tool being looked to by development agencies in the creation of sustainable rural development pathways.⁷⁹ Sometimes this is posited as a win-win scenario for rural territories in which biocultural heritage can be used as an instrument to address past ills of development, including environmental degradation and erosion of biodiversity, the

⁷⁹ Examples of these programs and their funders are identified in Chapter 4. Another example is funding from the Canadian agency, the International Development Research Centre (IDRC), for RIMISP's (*Centro Latinoamericano para el Desarrollo Rural/Latin American Rural Development Centre*) *Desarrollo Territorial Rural con Identidad Cultural* projects (Rural Territorial Development with Cultural Identity), which included work in the Central Valley and elsewhere in the Tarija Department (c.f. Merlay & Enjalbert, 2013; Uribe, 2012; Uribe et al., 2012).

failure of many regions to compete in national and international economies and processes of acculturation that have accompanied globalization.

What emerges through the analysis of the Central Valley case is a more complex narrative. While edible biocultural heritage has played and continues to play a key role in sustaining the local economy, it is also an arena of contestation and struggle. Different heritages of the Central Valley are being mobilized within multiple domains and for multiple purposes, ranging from everyday survival to helping position Central Valley products in the national and international market. How relationships with biocultural heritage are constructed now, however, also influence how regimes of access to biocultural heritage and resources will be organized into the future.

This is evident in cases, such as the development of the viticulture sector discussed in Chapter 3, in which incorporation of new biological materials and production methods has been prioritized over historically dominant production practices. This has worked to shift the *landscapes of possibility* (Bebbington, 2008) away from some crops and livestock associated with local biocultural heritage, as discussed in Chapter 2. Strong parallels and sharp contrasts are evident in the processes of biocultural valorisation as documented in Chapters 4 and 5. Independently and together they suggest that how valorisation unfolds, including who decides which aspects of biocultural heritage should be included within such processes and which should not, can alter the ecological, economic and sociocultural impacts of these processes, including who is best positioned to benefit from them and in what ways.

In this chapter I examine the empirical findings of this dissertation related to the use of biocultural heritage in development processes in the Central Valley, and then outline some of the theoretical and practical contributions of this work. I end by identifying examples of directions for future research and providing some concluding thoughts on the research project.

6.2 Empirical findings

The purpose of this dissertation is to understand how rural development processes have shaped the food system of the Central Valley, and to determine the significance of these processes of change and continuity in biocultural heritage use for those engaged in the

localized food-based economy as producers, intermediaries and consumers. This purpose was considered through three research objectives that structured data collection. The data and findings related to these objectives were examined through the four previous chapters (2 to 5) each focused on a key question that drew on and sometimes brought together themes associated with my research objectives. The following paragraphs integrate findings from the chapters as they are associated with each objective.

Objective 1 was to document the history (c. 1950 to the present) of the study area through the lens of the food system. In relation to this objective, I found that multiple territorial projects have shaped the food system of the Central Valley during this period. One such project that continues to inform current processes of territorial ordering was championed by the state development corporation, CODETAR. It focused on creating sub-regional specialisation in commodity production, specifically of dairy (concentrated in San Lorenzo and Padcaya) and viticulture (in Cercado and Uriondo). Public and private investment in infrastructure, such as dairy processing plants and the irrigation projects associated with the San Jacinto Reservoir, altered production possibilities in the Central Valley and led many to shift their production strategies towards commodity production (Chapter 2, also see Appendix D). While production incentives and enhanced market opportunities have encouraged the expansion of commercial viticulture and dairy, as examined through the case of grape production (Chapter 3), the limitations surrounding the sector, including production risks and seasonality, have led some small-holders to incorporate commercial grapes, but as part of diverse agricultural systems. While these systems have maintained relatively high biodiversity, the production of some crops and livestock has declined or disappeared from production portfolios of participant households in the valley floor as a result of landscape change, competition with imported food products, changes in food taste and preference and other interconnected factors (Chapter 2).

The contemporary food system, including its components and dynamics (Objective 2), is an outcome of the history of production and exchange in the Central Valley and how consumers have responded to the shifting landscape of what is available, what is logistically and economically possible and what is seen as desirable to produce and eat. Primary production remains a mainstay of the Central Valley economy, with

commercial production being concentrated in the valley floor, and household-oriented production dominating in more isolated parts of the valley. Many small-holders (such as those discussed in Chapter 3) have adopted a mixture of commercial and subsistence production. In spite of increased imports of wheat and processed foods (such as pastas, discussed in Chapter 2), the majority of fresh food traded in the Central Valley is produced there, suggesting the relatively closed nature of the local food system (Appendix G). Public markets also remain key nodes of exchange. These are important sites of trade for fresh products, but also significant for the sale of prepared foods.

Secondary production of prepared foods, beverages and dishes is also an important component of local livelihoods. As documented in Chapter 5, many people, particularly women, make all or part of their living based on the production and sale of foods and beverages recognized locally as specialty products because of their associations with campesino gastronomic heritage. Promotion and valorisation of campesino gastronomic heritage-related foods and the local biodiversity used to make them is evident in many public spaces, including markets, traditional festivals and production fairs that have become common features of the Central Valley cultural calendar. Together these networks of production, exchange and consumption constitute an alternative food network based on campesino gastronomic heritage.

The findings surrounding the third research objective – to identify the characteristics and forms of rural development connected with the use of edible biocultural heritage and their meanings for communities and households in the Central Valley – are concentrated in Chapters 4 and 5. Chapter 5 documents the practices and nodes of exchange surrounding campesino products in order to identify this constellation of biocultural valorisation activities as an alternative food network and the basis of a territorial project with potential to support biocultural sustainability in the Central Valley. This territorial project, however, is co-occurring with another, more institutionalised process of biocultural valorisation attempting to position selected products as items of gourmet status within the national and international economy (Chapter 4). While the campesino territorial project promotes elements of biocultural heritage that have survived processes of agricultural modernisation and globalisation, the gourmet project tends to build on the legacy of sub-regional specialisation in commodity production, particularly

in viticulture, and focuses on elements of local biocultural heritage identified to be of strategic value in regional branding with the aim of creating demand for selected, high value products in extra-local market places.

The overlapping – sometimes intersecting – processes of biocultural territory creation are employing similar tools of valorisation and are both working to craft regimes of value (Appadurai, 1986) that build associations between edible biocultural heritage and ideas of prestige, quality and pride in local identity and so position edible biocultural heritage as resources in local development. When abstracted to theoretical processes, the territory building strategies share many features. However, the distinct market orientations and networks of actors involved underscore the importance of examining whose territorial imaginary is being amplified and materialized through valorisation processes. This includes identifying who controls the creation of discourses and narratives surrounding valorisation (and consequently de-valorisation), associated institutions and their relative power to influence the environing conditions (or outside meanings: Mintz, 1996) that render some foodways more viable and valid than others. The resulting development pathways shape how, and by whom, benefits from biocultural heritage are constructed and accessed into the future.

6.3 Theoretical contributions

The specific theoretical contributions of each chapter are elaborated in Chapters 2 to 5. Collectively the findings contribute a body of empirical data on the Central Valley food system and how biocultural heritage is entwined in ways of life and livelihoods of local people. By examining household experiences of regional transition from rain-fed agricultural production to more specialised agricultural commodity production, Chapter 2 provides an analysis of rural transition that underscores the contingent nature of such processes. The chapter identifies a number of factors, such as changing regimes of land access, social requirements of ‘modernising lifestyles’ and market integration, and environmental change, that have shaped the use of agrobiodiversity within campesino production systems of the Central Valley. The research sheds light on how, over time, local responses to *double exposure* to globalisation and environmental change (Leichenko & O’Brien, 2008; O’Brien & Leichenko, 2000) can configure *landscapes of possibility*

(Bebbington, 2008) in ways that expand livelihood options in some domains, such as market-oriented production, while limiting options in other areas, such as pastoralism.

Agricultural modernization has transformed primary production in the Central Valley; however, this is shown here to be an uneven process. The transformation reflects an interplay of structures manifesting historical material legacies of past territorial projects and the agency of actors in responding to the opportunities and constraints made possible by the on-going patterning and re-patterning of material flows over time and space. Landscapes of possibility are created through one's own and others' actions, playing out within the context of material transformations of the environment wrought by development policies and by less planned or directed processes of global and environmental change. Landscape changes resulting from household production decisions come to affect the range of choices available to neighbours. Individual agency, however, also plays a central role in how transitions unfold, including through the choices made by producers to conserve and promote, or abandon aspects of biocultural heritage.

Chapter 3 also examines the role of agrobiodiversity in campesino production systems, in this case through the lens of campesino viticulture. The chapter examines some of the factors encouraging smallholder viticulturalists to incorporate commercial grape production within agrobiodiverse production systems in which crops serve a mixture of market and household consumption purposes. Campesino experiences and responses to the possibilities and limitations surrounding engagement in the viticulture sector contribute to discussions around new rurality and the role of multi-functional, multi-species agricultural production in sustaining rural economies and food systems (Kay, 2006; Vandermeer et al., 1998; Zimmerer, 2010). By documenting agrobiodiversity within viticultural households, which is largely unrecognized by local development agencies promoting grape production, the chapter highlights gaps between national-level policy supporting small-holder, agrobiodiversity-based intensification (Plurinational Legislative Assembly 2012; MMAyM, Cooperacion Suiza, and Programa Nacional de Biocultura 2015) and practice of local development agencies prioritizing single commodity production.

Chapters 4 and 5 contribute to on-going discussion within the literature on the use of local biocultural heritage in sustainable development (Cocks, 2010; Coombe & Weiss, 2015; Davidson-Hunt et al., 2012; Pimbert, 2007). While Chapter 4 highlights how the

requirements associated with extra-territorial market penetration can reinforce existing inequalities and create dynamics favouring the reconstruction of biocultural heritage in favour of globalised standards, Chapter 5 documents an emergent, local market-oriented valorisation process surrounding the circulation of campesino gastronomic heritage-based products within an alternative food network.

A contribution of these chapters is the development of a biocultural sustainability framework as an evaluative and potential planning tool to examine key environmental, economic and sociocultural issues related to biocultural valorisation. We suggest this framework may have utility for biocultural design, which we have been developing at the Natural Resources Institute, University of Manitoba (Davidson-Hunt et al., 2012), rural territorial development (Ferrini, 2012; Fonte & Ranaboldo, 2007; Porras, n.d.) and other approaches seeking to mobilise local biocultural diversity and heritage as a means of supporting people in designing their own biocultural territories and planning how their biocultural heritage fits into their desired future development pathways.

The case of the export-oriented gourmet product promotion strategy (Chapter 4) contributes to discussions on the use of heritage resources in territorial projects (Billiard, 2006, 2010; Bowen & De Master, 2011; Coombe & Weiss, 2015; González, 2015) by documenting how, in a context of high social and economic inequality, the gourmet orientation risks fostering a closed-loop of elite production and consumption, excluding those of lower economic or social status. This case adds to the growing body of inquiry examining the application of rural territorial development policies in the context of Latin America, highlighting some of the potential opportunities and pitfalls (Berdegué et al., 2015; Fonte & Ranaboldo, 2007; Ramírez-Miranda, 2014; Ranaboldo & Schejtman, 2009).

Chapter 5 contributes a case study of local-market focused alternative food network creation in the Global South, a phenomenon not as well documented in the literature as European and North American alternative food networks or export-oriented alternative food networks in the Global South (c.f. Goodman & Goodman, 2009; Watts et al., 2005). This chapter concentrates the discussion on the role of the state in creating an enabling environment for the campesino territorial project, as reflected in the alternative food network surrounding campesino gastronomic heritage, including in relation to the informal economy (Vorley, 2013; Vorley et al., 2012). This is important in considering the factors

that enable economic organisation at different scales, including those supporting alternative and localised food systems.

By linking biocultural perspectives with the alternative food network literature this chapter also contributes to developing an interdisciplinary discussion between these bodies of work. We suggest that our Biocultural Sustainability Framework serves as a tool to address a persistent tendency in the study of alternative economies, including alternative food networks, to make normative claims about causal relationships between scale and outcome, a problem termed the ‘local trap’ (Born & Purcell, 2006; Purcell & Brown, 2005). We find that biocultural perspectives also contribute to addressing other gaps identified by scholars in the alternative food network literature (c.f. Hughes, 2005; Renting et al., 2003; Watts et al., 2005). This includes proposing a multidimensional approach for understanding how values and meanings associated with food situate markets as sociocultural phenomena. It also underscores the attention biocultural perspectives provoke for recognizing aspects of local edible biocultural heritage that may have a low-profile in markets but are nonetheless important to local foodways.

Together Chapters 4 and 5 also demonstrate how the production of discourses shaping the meanings attached to particular products and production processes are key factors informing change and continuity in biocultural heritage. Discourses surrounding ideas of authenticity and quality are tools used by dominant and sub-altern territorial projects. This helps bring together ideas from territorial development and territorialology (Berdegué et al., 2015; Brighenti, 2010; Hinojosa et al., 2015; Painter, 2010) with biocultural heritage and diversity (Cocks 2010; Davidson-Hunt et al. 2012; IIED, n.d.; Maffi and Woodley 2010) to better understand some of the potentials and risks for biocultural sustainability involved in generating intentional change in the regime of values (Appadurai, 1986) surrounding biocultural resources. Changes in regimes of values can alter regimes of access (Ribot & Peluso, 2003), and can become key tools in territorial projects to establish development trajectories. Such trajectories can dramatically affect resource flows and access in ways that can strengthen biocultural relationships into the future or could work to weaken or sever them.

While food systems are recognized as complex, multidimensional and dynamic (Lang & Heasman, 2004; Pimbert, 2010), many of these complexities, including the

contributions of local biodiversity (IUCN, 2012), are not yet well-understood or accounted for in food-related policy or rural development initiatives. Yet, building such understandings is critical if we are to meet global food demands within the concurrent threats of undeniable ecological limits and human-induced climate change. Small-holder farming systems are vital to addressing these global challenges and to meeting the livelihood needs of millions of producers around the world (FAO, 2015). A food systems perspective underscores that production cannot be considered in isolation, but must be seen as one part of a complex system involving production, exchange and consumption over time.

How each of these components and their interrelationships are configured is fundamental to functioning rural and urban economies and to the potential of different production strategies into the future. In the case of Tarija, the issue is not about rebuilding ecologically sustainable farming or reconstructing a small-holder dominant system (although some recuperation might be needed). Rather it is about developing policy in which *sustaining* and *adapting* the existing campesino system to better meet the needs and interests of producers, intermediaries and consumers in the Central Valley is rendered desirable and viable for the actors involved. How to do this is an on-going challenge in Tarija, but also has broader relevance and applicability in other parts of Bolivia and elsewhere.

A theoretical aim of this work is to situate food systems as biocultural processes and to shed light on how rural development interventions can have ripple effects across such systems. This is done through developing a theoretical framework and research approach attuned to how structural power, discourse, or processes of ideation (Wolf, 1999), and collective and individual agency shape values surrounding edible biocultural heritage, and how those values manifest in material processes affecting the production and reproduction of that heritage. This includes an examination of how flows of biocultural resources are created, stabilised and transformed as part of territory making (Brighenti, 2010; Painter, 2006, 2010). Tracing the flows and relationships surrounding edible biocultural heritage as schematised within a theory of localised food systems constituted by processes of production, transformation, exchange, and consumption, finds

edible biocultural heritage to be a key territorial attribute and resource in processes of territory making (Figure 33).

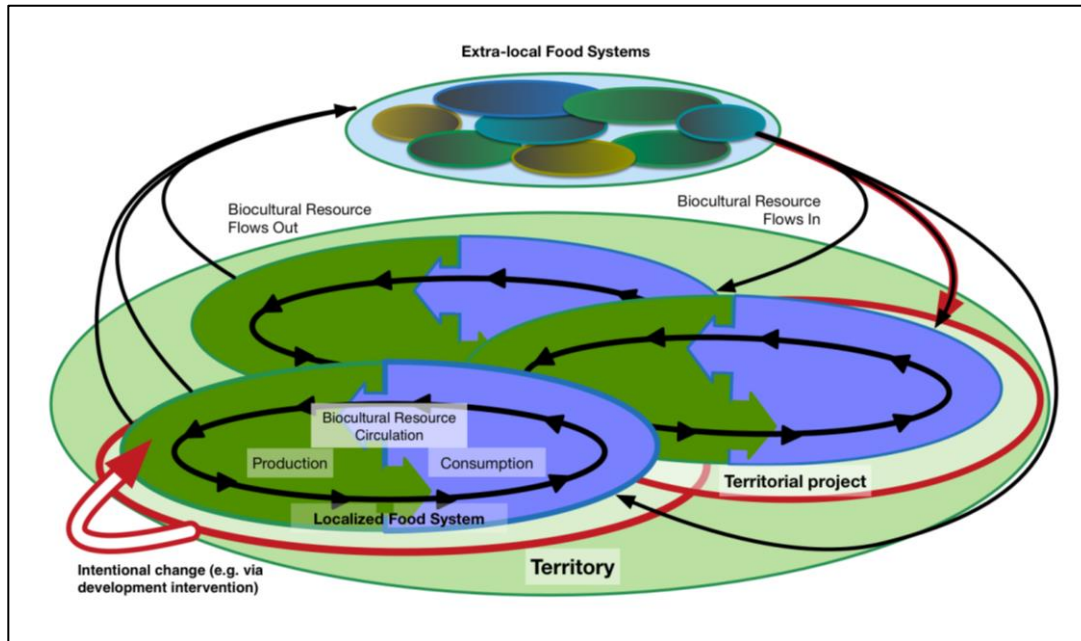


Figure 33. Overlapping localised food systems situated within territorial dynamics, including territorial projects, and linked through biocultural resource flows with extra-local food systems.

Figure 33 adapts and expands the original conceptualisation of localised food systems presented in Chapter 1 (Figure 1) to better account for overlapping territorial projects (shown in red in the diagram), mobilising edible biocultural heritage as tools of boundary drawing and territorialisation. These projects create multiple localised food systems (or sub-systems) within the same geographic space. Through this lens, however, localised food systems echo many features of territory as contested, layered, heterogeneous phenomena (Ambrosio-Abalá & Bastiaensen, 2010; Brighenti, 2010; Painter, 2006, 2010). Consequently, these multiple localised food systems may be coordinated to greater or lesser degrees, including through the intertwining of elements of production, transformation, exchange and consumption within practices and networks of actors and other elements of the foodscape. Thus, territorial projects and their associated food systems are not naturally bounded entities. Rather, as Wolf (1982) reminds us, the delineations between them reflect degrees of affinity and density of interaction, not absolute categories.

How power is wielded by different actors – including in creating discourses and influencing structural contexts – shapes which territorial projects and associated food

systems are given precedence within development policies and programs, and consequently how regimes of benefit and access to biocultural heritage are built and sustained through them. An aspect of these dynamics is captured in Figure 33 by the red and black arrow linking local and extra-local food systems. Localised food systems are connected with extra-local food systems through flows of biocultural resources linked with processes of territorial ordering taking place at other scales or other geographic locations.

These flows can simultaneously be seen as assets that local territorial projects can mobilise in pursuing their territorial visions and also as structures that can influence processes of territory making. For example, cheap imports of flour from Argentina (Chapter 2) can be seen as an asset for some territorial projects attempting to establish a localised food system integrated with global markets, in which cheap, imported foodstuffs form the basis of consumption, and local production is freed from the need to produce for local markets and can be focused on specialised, export-oriented commodities. At the same time, these imports are a manifestation of economic structures, such as lower trade barriers or trade agreements requiring reduced subsidies for agricultural production, that can reduce the viability of small-holder agricultural systems and undermine territorial projects associated with a small-holder, local consumption oriented vision for the territory and food system.

These connections and influences suggest that, by overlapping in time and space, the relations among concurrent territorial projects and their associated food systems are not necessarily benign. One territorial project altering access to resources needed for primary production, or changing the regulatory framework affecting transformation and exchange, can have ripple effects on other territorial projects, creating enviroing conditions in which patterns of production, exchange and norms of consumption are sustained or rendered nonviable. The power of contemporary territorial projects is also informed by pre-existing social structures (Hinojosa et al., 2015; Scott, 1999). As well, the material legacy of past development projects affects where and in what ways future projects are implemented. Where infrastructure investments have occurred reflects and has enabled the encodement of certain territorial projects onto the landscape and that material legacy continues to inform flows of development funding. Initial investments in

viticulture development, for example, including large-scale infrastructure development (touched on in Chapters 2 and 3), have tended to concentrate capital in the hands of large wine producers who have continued to benefit from new articulations of development policy supporting the wine sector (e.g. the gourmet strategy discussed in Chapter 4).

Structural power, however, is not monolithic. Individuals and groups also exercise power to create and enact alternative territorial projects with salience for household livelihoods and across the various dimensions of the localised food system. Multiple, overlapping and sometimes competing, territorial projects are themes evident in Chapters 2 to 5. Further research (see Section 6.5) is necessary to better account for, and understand, the compatibilities and incompatibilities of territorial projects, such as the gourmet and campesino strategies (Chapters 4 and 5), as expressed over time.

In keeping with the framework of analysis described above, this research also developed and employed a food system methodology, which includes a close examination of the social, ecological and economic contexts shaping food systems. This methodology provided insights into processes of rural development that would have been outside the scope of research focused on a single sector or group of beneficiaries. Overlooking the multiple roles that different actors can play within the food system, including their roles as consumers, is cited as a gap in existing food systems scholarship (Edelman et al., 2014; Tregear, 2011).

This research shows that a food systems methodology offers a deeper picture of how the economy surrounding food and biocultural heritage is woven throughout the social fabric of households, communities and individual life histories and how it can be mobilized within territorial projects. The attention to individuals as actors active in multiple, interconnected areas brought forward stories surrounding the role of biocultural heritage in livelihoods and ways of life that otherwise would likely not have been recognized. The relevance of such an approach is reflected in the concrete examples below of insights garnered through this lens of analysis. In Chapter 2, the systems approach directed attention to the relationships between landscape transformations toward commodity production and the implications for other production strategies. By considering the food system and household economies more broadly, it also highlighted the role of agrobiodiversity associated with viticulture and why producers were pursuing

those strategies (Chapter 3). This approach also directed attention to the broader food context in which (re)valorisation of specific products was taking place (Chapters 4 and 5).

In a subtle way, by virtue of the methodology of approaching people active in specific parts of the food system, but also actors across the system, the research was consistently drawn to the margins of established networks and practices that would often be overlooked within a narrower framework of analysis. As a result, stories were able to emerge such as those of women who make food to sell at fairs or festivals once or twice a year, even though their primary income is agricultural production, or of food venders, such as the cheese vender in the Central Market who also produces her own milk and distinguishes her cheese as *queso de la vaca criolla* (creole cow's milk cheese). It was through these and similar narratives and discussions of the household diet of primary producers, and the primary and secondary production activities of people with other livelihoods, that many of the layers and nuances of the relationships surrounding edible biocultural heritage were brought forth, including highlighting the importance of local discourses of specialty discussed in Chapter 5.

The new rurality literature has worked to document and build awareness that rural economies should not be assumed to be synonymous with primary production and that most primary producers do not depend exclusively on that domain of economic activity (Kay, 2006, 2008; OECD, 2006; Reardon et al., 2001). A food systems perspective highlights linkages (and gaps) within the rural economy associated with the flows of food within the localized food system and the broader environing conditions that are necessary for campesino productions systems to remain viable.

In the case of this research, tracing such flows draws attention to the importance of the informal economy, including in the production and exchange of secondary food products, and the vital role of edible biocultural heritage in providing economic opportunities for households and individuals, especially women. It also draws attention to the distinct but deeply connected linkages between rural, urban and peri-urban areas. This complexity of livelihood strategies reinforces the need highlighted in the literature to adopt more comprehensive, integrated and multi-sectorial approaches to regional development planning.

6.4 Practical contributions

Identifying ways to support campesino economies and forms of economic organisation surrounding food systems is particularly pertinent in Bolivia, where the state has committed to pursuing alternative development pathways based on concepts, such as *buena vivir* (living well), biocultural diversity and food sovereignty, which have been enshrined in the 2009 constitution (Plurinational State of Bolivia, 2015), and subsequent legislation and programs supporting campesino production and economies (Ministerio de Medio Ambiente y Agua et al., 2015; Plurinational Legislative Assembly, 2012, 2013). How these objectives are to be moved from theory and policy to transformative development practice, however, remains less clear and many gaps persist (see Chapter 3).⁸⁰ This research aimed to contribute to the political project of Bolivian groups such as JAINA in their work to bring to ground alternative development models built through collaboration with campesino unions, indigenous peoples, and *pueblos originarios* (original peoples). Part of my research is to make visible alternative forms of social and economic organisation as valid and viable development pathways.

The biocultural sustainability framework used to analyse the gourmet and campesino territorial projects (Chapters 4 and 5) helps identify some of the strengths and weaknesses of these two approaches to biocultural heritage valorisation and what they might contribute to regional and national development planning surrounding campesino economies and edible biocultural heritage. The insights from each case study have also been summarised and used to refine the biocultural design coordinates proposed by Davidson-Hunt et al. (2012) as a tool for navigating the use of biocultural resources to meet local needs and objectives through biocultural design. These insights may be of use to local actors as they continue to shape rural development processes in the Central Valley, and may also provide points of consideration and reflection for others interested in mobilizing biocultural heritage for economic development purposes.

Of particular relevance is the recognition that biocultural materials do not exist independent of their sociocultural and ecological contexts. Any biocultural product

⁸⁰ The limitations and contradictions of the state's willingness and ability to achieve these objectives are examined elsewhere (c.f. Fabricant & Gustafson, 2011; McKay, Nehring, & Walsh-Dilley, 2014; Zimmerer, 2015).

functions in relation to a myriad of other products within a localized food system; thus, transforming the values surrounding one thing will have impacts, intended and otherwise, on other aspects of the system. This complexity demands careful reflection on what such outcomes might be and who stands to benefit from them. These insights may be particularly relevant at the territorial level where meaningful participation and representation in development planning, particularly by a diverse segment of the population, is difficult to achieve and where the choices made by a few can have significant effects on residents across the territory.

Furthermore, while the gourmet project is widely recognized, identified and identifiable within development plans and among state and non-state development actors, the alternative food network surrounding campesino gastronomic heritage is less visible. An important contribution of this research to the work of JAINA and other groups interested in mobilising support for campesino economies and local foodways is the empirical documentation of this network (Chapter 5) and the processes (such as enclosure and Climate Change discussed in Chapter 2), that are rendering elements of campesino production systems less viable within the regional landscape. By highlighting some of the ways by which biocultural heritage is also being incorporated within other territorial projects, such as the gourmet strategy, and the challenges for biocultural sustainability these signify, this work also contributes to deconstructing representations of biocultural heritage marketing as a panacea for biocultural conservation.

By documenting these processes of valorisation surrounding biocultural heritage and biocultural resource construction, this research supports the ability of JAINA and other groups to define what campesino gastronomic heritage is, to detail the complex human-environment relationships it entails, to identify how it is given value in different contexts and to recognize how those processes of valorisation are associated with multiple ecological, economic and sociocultural costs and benefits. Naming and deconstructing these processes are vital steps for campesino communities and their allies to position their territorial imaginary as a viable development pathway for the Central Valley. To do this requires both decentralizing territorial development to allow campesino and other groups to define their own biocultural territories, and also scaling-

up these visions to regional or territorial-levels in order to control, or at least have influence within, institutions that play key enabling roles in territorial creation.

There are different dimensions of territory that might be involved in such processes of negotiation. One of these is control over land and other productive assets commonly linked with indigenous territories and other demarcated geographic areas under management of specified groups. Another is territory as networks constituting specific forms of economic organisation and patterns of production, exchange and resource flows. Both dimensions of territory are vital. Without control over land and other productive assets, the production of biocultural heritage products is restricted, while conversely, the ability to benefit from land and other territorial assets is limited if resource holders do not have control over the (potential) creation and administration of markets associated with their biocultural resources.

Specific ideas to better support producers depending on local biocultural heritage have been included in each chapter. These include addressing gaps between rural development policy supporting campesino producers and development practice in which the contributions of traditional agricultural practices remain under-recognized and under-supported. Some of the gaps in current knowledge related with these suggestions are outlined in the following section.

6.5 Directions for future research

While the nets cast by this project were wide, many areas for future research remain. Areas of future work include drawing on data gathered during this research to examine in more depth processes of dietary transformation touched on in this dissertation. A journal article in preparation on this topic is entitled, “Food and negotiated meanings: Dietary change in the Central Valley of Tarija, Bolivia.” Similarly, further analysis on the role of dairy production and dairy sector development along the San Lorenzo transect, may offer important insights into the introduction of commodity production, rural transitions and farmer creativity in rural livelihoods. A journal article examining these themes is in preparation and entitled, “Territorial development through small-scale commodity production: The introduction of commercial dairy to the Central Valley of Tarija, Bolivia.” Lastly, a critical area of further inquiry and analysis surrounds the interactions

between the gourmet and campesino territorial strategies discussed in Chapters 4 and 5. Central questions are: (1) whether or not, or to what degree, the strategies are compatible in the long term; and (2) what might be done to create a territorial development strategy for the Central Valley that does a better job of addressing issues of power and social justice in the mobilization of edible biocultural heritage as a tool for economic development. This includes addressing thorny questions surrounding how to understand and balance the needs of producers, with those of processors and secondary producers, and in turn with those of consumers, all of whom may have competing claims to and different needs, interests and ideas surrounding the value of edible biocultural heritage and the desired future place of the biocultural relationships that heritage entails. These critical issues are not yet sufficiently addressed in the biocultural territory or territorial development literatures.

Continued research on the territorial development processes underway in the Central Valley and in other areas of the Tarija department is also needed to better understand their longer-term outcomes, relationships and ecological, economic and sociocultural impacts. More can also be done to better understand how territorial development processes at different scales are interconnected. Of particular relevance are issues of participation, especially at the territorial scale and when collectively held biocultural heritage is the focus of development activities. Davidson-Hunt et al. (2012) propose design teams to lead biocultural design processes at the community level. While part of the role of such teams is to engage in consultation with stakeholders, scaling-up such processes to a territorial level seems challenging as the group of stakeholders grows. The rural territorial development literature identifies the need for coalitions of public and private actors to engage in territorial development (Schejtman & Berdegué, 2004); however, the experience of the Central Valley illustrates the challenge of achieving meaningful participation (Chapters 4 and 5).

A focus has been on establishing producer associations as representative and lobbying bodies. Currently dozens of producer associations exist alongside Campesino Unions representing rural constituents, but meaningful participation of these associations and unions in the gourmet project is not evident in this research. Furthermore, these interest groups do not necessarily capture all of those with a stake in how territorial

development or the valorisation of local edible biocultural heritage should unfold. As the case of the gourmet strategy suggests (Chapter 4), institutions involving more powerful actors may be able to mobilise significant resources and, within a relatively short time, enhance markets for some local products. A trade-off, however, has been the exclusion of other local actors. Conversely, meaningfully consulting with and gaining participation from hundreds of small-scale producers is likely not feasible within the mandate of any development program.

The campesino gastronomic heritage alternative food network reflects self-organisation and endogenous processes of valorisation that have been aided by the creation of some forums, enabling cultural practice by government institutions, including campesino unions. However, the limited coordination inhibits the ability of the alternative food network to consolidate into a coherent territorial project with potential to influence regional planning and development investment in ways that would create enabling conditions and mobilise resources to support that vision. Without some process of consultation and engagement, the nature of that associated vision remains unclear. Consequently, many questions persist as to how to organize effective participation in development planning in ways that do not reinforce existing inequalities.

Several specific gaps in current knowledge surrounding different areas of the Central Valley food system were identified in Chapters 2 to 5. Examples of these include the need for research on:

- Optimal planting combinations in polyculture viticultural systems, and contributions of agroecological techniques to improve total yields and ecological and economic outcomes for viticulturalists.
- The distribution and ecology of freshwater crabs (*Aegla septentrionalis*) and commonly eaten wild fish species (e.g. *Acestrohamphus bolivianus* and *Trichomycterus* sp.) in order to create more effective management institutions for these species.
- Cooking and micro-industry development impacts on deforestation in order to better understand the presence and scale of the problem and create more effective management institutions surrounding wood harvest for fuel and other purposes.

- Research on the food safety of traditional production practices and materials for products such as artisanal wines, *singanis* and cheeses, to help identify risk-based regulatory approaches to support artisanal producers and their products, helping to avoid assumptions about whether or not such products pose risks to human health.

Future research in these areas would help support producer livelihoods and environmental sustainability in the Central Valley and elsewhere.

6.6 Concluding thoughts

An on-going societal and academic debate surrounds the value of biocultural diversity and heritage and what the role of biocultural heritage should be for societies in the future. Mintz (1996) has noted that food and dietary habits are paradoxically incredibly durable yet also open to rapid change in response to individual and social contexts. This reminds us that change is constant, and underscores the importance of how such processes unfold and who is empowered by different types of change.

Development policies play a key role in shaping environing conditions against which persistence and change in localised food systems are negotiated. Such policies have tended to work in ways that further development trajectories linked with agricultural modernization and looking outward for resources and opportunity, including food imports and scientific varieties of crops and breeds of livestock. Many producers in the Central Valley have responded to new economic opportunities by adopting new crops and production processes that have become dominant in some areas of the territory. Edible biocultural heritage, however, remains a central ordering principle shaping many components of the localised food system. Alongside the incorporation of new crops, imported food, new tastes and food preferences, demand for campesino foods and food products remains strong and encourages networks of production and exchange surrounding them.

Looking at the food system provides a powerful entry point to examine how processes of change and continuity unfold and how the associated opportunities and costs are distributed among different actors. As the case of Tarija's Central Valley shows, which trade offs are acceptable and desirable depends greatly on positionality and

circumstance. While some actors are positioned to shape regional processes of change more than others, all are affected by how such processes unfold.

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Appendix A: Sample interview guides

Notes on use of guide: Typical interviews lasted approximately 30 minutes and commonly ranged from 15 minutes to one hour. In the majority of cases all sections of the guide were not used. In stead sections of the guide were selected (e.g. production) and provided the main talking points for the interview. If other themes were mentioned (e.g. wine making) then questions from the corresponding section of the guide were included. Most interviews were primarily themed around primary production, household consumption, or secondary production/small businesses. The following sample guide is an English translation of the master guide used for interviews in the Uriondo Transect. Questions from San Lorenzo guides have been added where necessary (e.g. related to dairy production) to provide a comprehensive set of interview questions used in both transect zones. Interviews with key informants, such as government officials, NGO staff, producer association leaders and other community leaders, were prepared specifically for each interview and would draw on questions related to the work of the program, group or organisation in question, their role in territorial development, and their visions for the territory in the future.

Guide for interviews in Uriondo

October and November 2013

Basic information

- Name:
- Age (approximate):

Residence and work history

- Where were you born?
- Have you lived elsewhere?
- Household/family composition:
 - Who lives with you?
 - Do you have children? What do they do? Do they live with you? (If not, where do they live?)

- What is the main income for your family?
- What is your primary occupation currently?
- Have you had other occupations in the past?
- Are you part of any cooperative, association or union? If so, which one(s)?
 - What is your role? What are the responsibilities and benefits for your participation/membership?

Production and family consumption

Part 1: Primary production

A: Land

- How much land do you have?
 - Where is it (how far from the house/community/ecological zone/etc.)?
 - How much of your land is irrigated and how much is rainfed?
 - What do you use your different land areas (e.g. irrigated/non-irrigated) for?
- Do you have access to other lands that you use (e.g. common lands, rented land, land in the highlands)? Do you have agreements with other landowners?
 - What kinds of lands are those? Where are they located? What are they used for?
- How many people work with you?

B: Crops

- How much of your land is in production?
- What do you grow? [e.g. grapes, corn, other grains, potatoes, other tubers, fruit trees, vegetables, etc.: list all and ask about each item]
 - Which products do you sell? Which are for household/family consumption? Which do you grow for animal feed?
 - When and under what circumstances do you sell/eat/etc. different crops?
- What technologies do you use in cultivation? (tractor/oxen/etc.)
 - How do you access them? (own them/rent them/other)

Dynamics of each crop:

- How long have you produced _____ for?

- How much of your land do you use to produce _____?
 - Which varieties do you grow?
 - How many kg. do you produce/harvest each year?
 - Where do you produce it?
 - In which season?
 - Do you use any inputs? (chemical fertilisers/animal manures)?
- How do you use/preserve the harvest?
 - If it is to sell, where do you sell it and to whom?
 - How many kg do you sell and at what price?
 - Do you use _____ to make any secondary products? (wine/singani/chicha – GO TO OTHER GUIDE AFTER – preserves, refresco, etc.)
 - It is for the house or to sell?
 - If it is to sell, where do you sell it and at what price?
- History and future of the crop:
 - In comparison to past years, do you produce more or less now? Why?
 - Have there been changes in how you produce_____? (e.g. in the technology that you use?) How so and why?
 - Do you produce the same varieties as in the past? Why/why not?
 - Which varieties do you produce now?
 - Do you plan to continue producing_____? Why/why not?
 - **For grapes:** Right now you have _____ hectares of grape production. What were you producing on that land before?

C: Animals

- What animals/livestock do you have? [Ask about each animal: e.g. cows, sheep, goats, chickens, ducks, turkeys, donkeys, oxen]
 - How many do you have?
 - What breeds do you have?
 - What do you use these animals for?
 - How do you use them? (e.g. for fresh meat/dried meat/cheese/eggs/artisanal products/etc.)

- Are they for household consumption, to sell, or for work? (e.g. in the case of donkeys or oxen)
 - If they are to sell,
 - When and under what conditions do you sell/eat/etc.?
 - Where do you sell and to whom? How many kg/units do you sell a day/month/year and for what price?
- Do you receive any kind of support for these animals? (e.g. government programs for veterinary services, artificial insemination services, etc.)
- How do you care for these animals? (e.g. are they pastured, corralled, stabled, etc.)
 - What do you feed them? Where does their feed come from?
- How long/how many years have you had this kind of livestock for?
 - In the past, did you have more or less of them? Why?
 - Have you changed breeds? Why? (e.g. from creole/local breeds to “improved”/imported ones or visa versa)

Cattle (Dairy) (Used primarily in the San Lorenzo Transect)

- How many head of dairy cattle do you have? (size of herd)
 - How many are of productive age and how many are in production now?
- Production average (now and during peak production)
 - How much of what you produce is for family consumption?
 - How do you use it? (to drink fresh/make cheese/other)
 - How much of the production is for the market?
 - Who do you sell to? What price do you receive per litre?
 - Do you ever make and/or sell cheese? Why/why not?
- Have you received any kind of support from the government or an NGO for your cattle? (vaccinations, veterinary services, insemination? (e.g. SEDAG, ProSol, other?))
- How do you maintain/feed your dairy cattle?
 - What kinds of feed do you use? [corn, alfalfa, oats, “alimento balanceado” (concentrated feed)]

- With respect to maize, do you use dried corn stocks or silage?
- Do you make the silage yourself? Do you have a tractor?
 - If you don't have a tractor, where do you rent one or how do you access one?
- Do you pasture your dairy cattle or do you keep them stabled/corralled/tethered? Why?
- Do you produce their feed? What do you give them and in what amounts?
- Do you buy any of their feed? Which? And in what quantity?
- What do you do with the calves? (males and females) What do you feed those (e.g. females) you keep?
- What kinds of dairy cattle do you have in your herd?
- Are you pleased/satisfied with these breeds? Would you like to change or improve them?
- How many dairy cattle could you/your household maintain without problem?
- How many years have you had dairy cattle for?
 - Why did you start to have this kind of cattle?

Before dairy production

- Did you have other cattle before?
 - What kinds of cattle did you have before? (e.g. creole/"brutas"/other breeds)
 - How did you maintain them? (pasture them/corral/other)
 - Have you benefited from changing from creole cattle to dairy cattle?
 - Did you receive support for your non-dairy livestock before? (From whom? What kind of support?)
 - Why did you decide to begin dairy production? [e.g. changes in land access, irrigation, production support (PIL/municipality/provincial government/other)]
- (May be repetition with part B)**
- What other animals did you have before starting dairy production? How many did you have (size of herd)? What did you do with them when you started working with dairy cattle?

D: History and future of primary production

- Have you participated in any capacity building courses/skills training? (e.g. to produce grapes/horticultural products/milk/etc. Or to make secondary products from them.)
- What is the most important crop for you/your household now? Why? How long has it been the most important? Which were in the past?
- When you were little did you parents or grandparents grow crops or varieties of crops (e.g. grapes/maize/potatoes/fruit/grains) that you don't have now? Which were they? Why don't you have them now?
- Is there someone in your family who will take over your land/agricultural plots in the future?
- Have you ever experimented with other crops (e.g. grapes/asparagus/berries/etc.)?
 - What was your experience with those crops? (e.g. Was it part of a program?)
- Is there any product (crop/animal) that you would like to cultivate/raise, but that you don't because of a lack of time/resources/labour/etc.? Why would you like to have it?
- Are you planning to continue producing _____ (e.g. grapes/most important crop/product)? Are you planning to continue producing other animals/crops as well? Why/why not?

Part 2: Household consumption

A: Household consumption and preferences

- Have there been changes in your family's diet after the changes in your production (talked about before)? How so? (e.g. improved income to buy food/less space to grow crops for household use/etc.)
- Who is the main cook in your household?
- What kind of foods and beverages do you eat during a normal day?
 - How many meals do you cook/eat over the course of a day?
 - What is the first meal of the day? The second? The next? Do you eat any kind of snacks between meals?
 - Where, when and with whom do you normally eat?

- Do people in the family (e.g. children) eat outside of the home? (e.g. do they eat meals provided by their school? At the market? etc.)
- When and how often do you eat outside of the house?
- What do you make/cook/prepare to eat/drink for a special occasion? (e.g. a birthday, Christmas, Easter, or other festivals)
- What are you/your family's favourite foods/dishes/drinks to eat/drink?
- Does the family diet change according to the seasons? (e.g. dry/wet season; summer/winter)
- Is there any seasonal food that you especially like or that is special in the family diet? (e.g. a fruit or holiday meal/dish/ingredient)

B: Flows of resources, uses and technologies

- Where do the foods you eat come from?
- What does your family cultivate/produce? (meat, milk, eggs, tubers, grains or cereals, vegetables, fruit, spices, etc.)
- Do you use any wild/uncultivated plants, fruit or animals? (e.g. harvesting/hunting/etc.)
 - What are they? How do you use them? When in the year?
- What are the things you generally buy? (meat, milk, eggs, tubers, grains or cereals, vegetables, fruit, spices, etc.)
 - Where do you usually do your shopping/buy food?
 - Do you spend a lot of money on food each month? How much more or less?
 - More or less how much/what percentage of your household's food do you buy?
- During last year did you ever not have enough money to buy food or not grow enough for you and your family to eat?
- Is there any food that you would like to grow/produce, but that you can't? Why? (e.g. lack of time/labour/space/weather event like frost/hail/water shortage)
- Do you make or produce any food to sell? (e.g. cheese, bread, eggs, preserves, jams, pickles, vinegar, wine, chicha, etc.)
 - Why do you make/sell these products?
 - Where and to whom do you sell them?

- When do you make/sell them? How much do you make?

Kitchen technology:

- Can we talk a little about your kitchen?
 - Where do you cook? (inside/outside/more than one place?)
- What kind of stove do you use? (gas, electric, wood)
- How long have you had it for?
 - If it is gas, what did you use to cook with before? Why did you change to gas? Is the gas from a line or do you buy a tank?
 - If a line, how long have you had a gas line fore?
 - How often do you change the tank?
 - If you have a wood stove or oven, where do you buy/get the wood? How much does it cost?
- Do you have a wood oven? What do you use it for?
- Do you have a refrigerator? How long have you had it for?
- Do you have water and sink in the kitchen?
 - How do you boil water or what do you do for hot water?
- Have new technologies change the way you cook?

C: History

- What food did you eat frequently when you were young/a child/growing up?
- Have there been changes in ways of eating or tastes/preferences in comparison between now and the past? How so? Why? (with reference to other parts of the interview, e.g. the introduction of viticulture, etc.)
 - Are there foods that are common or everyday that weren't common before or that were only eaten on special occasions?
 - Are there foods that used to be everyday/regular parts of the diet that aren't eaten or eaten very often now? If you still eat them, when do you?
- Do you ever cook/eat recipes from your mother or grandmother? Can you tell me about them? When and why do you make them?

- What kinds of foods do your children and/or grandchildren (or parents/grandparents) like to eat? Are they the same/similar as what you like? Which are similar and which are different? Why do you think there is a difference (if there is one)?
- Is there something you used to do/eat in the past that you miss? (foods, activities related with them)
- Is there anything that you don't miss? (e.g. Anything you are happy not to eat anymore? Why?)

D: Development programs

- Have you ever participated in a baking or cooking class?
 - Or received any kind of education/instruction on nutrition or diet? (e.g. at a clinic/health facility/school)
 - Or been part of any program to improve your kitchen or access to kitchen technologies (stove/fridge/electricity/water/other sanitary services)? (e.g. a program from the government or an NGO)
 - If yes, what motivated you to participate in the program? Did you find the program helpful/useful? What did you learn?
- Have you ever participated in any fair or festival (e.g. as part of an exposition table or selling something)? If yes, which one(s)? When/how often? And what did you do?

Secondary production (other than wine/singani/chicha)

Part 1: Basic information

- Does your business have a name? What is it? And how did you decide on that name?

Part 2: Business: Can you tell me a little about your business?

- What products do you make/sell?
- How many people work with/for you? (now and at the outset)
- How does your business work?
 - What is your work schedule? Or when do you make your products? (day/week/year)
 - Where do you make them?
- How do you sell your products?
 - Where do you sell them? Do you sell to a re-seller or directly to consumers? Etc.

- Who are your main clients? (e.g. students, workers, office workers, tourists, etc.)
- How do they know about your business? Do you do any kind of promotion?
- How many units do you sell in a typical day or week? How much do you sell each unit for?
- Is there a time of the year in which you sell more or less? Why? (e.g. fairs/parties/festivals/etc.)
- Is it a good business for you? What does it contribute more or less to your household income?

Part 3: Cooking and life history

- When did you start to produce/make these products?
 - How long have you had your business/been making these products for?
 - If you were making them before for the family to eat, why did you decide to sell them/start the business?
- How did you learn how to make this product?
 - Did you have any experience in the kitchen or with food services before?
 - Do you sell at fairs, festivals or other events?
 - Did you have any formal education/learning or participate in any capacitation course that helped you learn how to make the product or start your business?
- Do you ever prepare anything different/special to sell? (e.g. for a festival, etc.)
- How/why did you decide to sell this product/these products?
- Which are your most popular products/dishes? And why do you think they are so popular?
- Is there any dish in particular (a favourite of yours or your family) that is particularly special for you? Can you tell me about it? Why is it special?

Part 4: Local networks

- Where do you find/buy your inputs?
 - Do you grow/produce any of the ingredients that you use? Why/why not?
 - Do you buy anything from local producers/campesino producers? What do you buy?

- Do you sell any other locally made/homemade products or other products from the region?
 - What are they? (e.g. *chicha*, *rosquetes*, *cañazo*, *empanadas*, etc.)
 - Why/why not?
- What do you buy from Tarija? Where in Tarija?
- Is there any ingredient that is hard to find or that you would like to be able to get more of?
- Is there anything that you would like to be able to buy from local campesino producers, but that you can't?
- Do you have any relationships with other businesses or other local producers? (e.g. selling any other local products? E.g. *vino patero*)

Part 5: Territorial development and the future

- Is there a good demand for your products? Is it greater/the same/less than in the past?
- What would help your business the most right now? (e.g. more promotion/improved infrastructure/etc.)
- Do you know of any initiative (e.g. fairs/festival/other) that is promoting gastronomy, local foods, etc. from the area? For example in relation to tourism?
 - What do you think about them? (e.g. the wine route)
 - Do you have any direct relationship/association with them? For example, have you ever been to a meeting or a capacitation course sponsored by an NGO or the government?

Wine, singani and chicha

Part 1: Basic information

- Does your business have a name? What is it and how/why did you decide to give it that name?
- How long have you had this business for?
- How many people work with/for you?

Part 2: Production

- What kind of wine/singani/chicha do you sell? (make a list of all)

- Are you or someone in your household the producers?
- If yes:
 - Why do you produce these types of wine/singani/chicha?
 - Who in the family makes wine/singani/chicha?
 - How many years has someone in your family been making wine/singani/chicha?
How far back does the family tradition go?
 - How did you learn to make wine/singani/chicha?
 - Did you have any formal education or participate in any capacity building course?
- If not:
 - Who do you buy it from?
 - Did you ever make it in the past? Why did you stop? (Go to part 3)
- Do you grow the grapes yourself/yourselves?
- If so:
 - Where? How much do you produce? How much of your production is to make wine/singani/chicha?
- If not:
 - Did you grow them in the past?
 - Where do you buy the grapes? Do you buy from the same producer each year?
 - When did you stop growing your grapes and start buying them?
 - Why did you stop growing your own grapes?
- How many boxes of grapes did you buy or produce last season?
- How many litres of wine/singani/chicha did you make this year?
- Do you own the equipment to make wine/singani/chicha or do you borrow or rent it?
(e.g. How do you access the still to make singani?)
- What season/month of the year do you normally make your wine/singani/chicha?

Part 3: Market and local economy

- Where do you sell your products? (e.g. your own shop or *tienda*/restaurants/other shops/etc.)
- Have you ever participated in any production fair? (e.g. the Festival of Art and Wine, etc.)

- Do you sell everything you produce?
- Do you sell everything you produce from your home? If not, where else do you sell?
- How much do you sell your wine/singani/chicha for? (make a list of all prices)
- What is the amount/unit size you sell the most of? (e.g. half litre, full litre, etc.)
- Who are your main clients? [e.g. people from the community/tourists (from where?)]
 - How do they know about your business/product? Do you do any kind of promotion?
- Is there a time of year during which you sell more? (e.g. Art and Wine Festival, parties, festivals, holidays)
- Do you have a label for your products? Why/why not?
 - If not, would you like to have one? Do you see any benefits of having a label? (What does it let you do? E.g. sales/participation in fairs, events, etc.)
- Do you sell any other homemade products or products from the region?
 - Which ones? (e.g. *chicha*, *rosquetes*, *cañazo*, *empanadas*, etc.)
 - Why/why not?
- Do you find that selling wine/singani is a good/profitable business?
- What would help your business the most right now? (e.g. better promotion/infrastructure/etc.)
- Are you planning to continue producing wine/singani in the future? Why/why not?
- Have you ever heard about or been part of any kind of activity organized by the government or an NGO to promote wine/singani in the Tarija Department? (e.g. fair or the wine route)
- If yes:
 - What do you think about those activities? Have you seen any benefits from them? (e.g. increases in sales/more clients)
 - What do you think about the wine route? Is there more demand for your products? Are there more tourist now than in the past?

Restaurants and food sales

Part 1: Restaurant

- How long have you had your restaurant for?

- How many people work with/for you?
- When are you open?
 - What is your work schedule/business hours?
 - Why do you have this schedule? (e.g. weekdays vs. weekends)
- Who are your primary clients? (e.g. students, works, office workers, tourists, etc.)
 - How do they know about your business? Do you do any kind of promotion?
- How many dish/plates/servings do you sell more or less on a typical day? How much does a plate sell for?

Or for more informal vendors

- How long have you been selling food for?
- How many people work with you?
- Where and when you do sell? (e.g. do you have a fixed/regular/permanent location? Do you sell at fairs/festivals? Which ones? How often? Etc.)
- Who are you main clients? (e.g. students, works, office workers, tourists, etc.)
 - How do they know about your business? Do you do any kind of promotion?
- How many dish/plates/servings do you sell more or less on a typical day? How much does a plate sell for?

Part 2: Cooking and life history

- Why did you start your restaurant?
- Tell me about learning to cook, how did you learn?
 - Did you have any kind of formal training or participate in any kind of capacitation course?
- Did you have any experience in the kitchen or food services before?
 - Do/did you ever sell food at fairs/festivals/other events?
- What kind of dishes do you sell? (*platos típicos*/fast food/international/other)
- How did you decide on/create your menu?
 - Do you sell any traditional dishes? Why did you decide to cook/sell those dishes?
 - What do you think of as a traditional dish?
- What are your most popular dishes? Why do you think they are so popular?

- Is there any dish (e.g. a favourite dish of yours or your family's) that is particularly special for you? Can you tell me about it? Why is it special?

Part 3: Local networks

- Where do you find/buy/get your ingredients?
 - Do you grow any of the ingredients you use? Why/why not?
 - Do you buy anything from local/campesino producers?
 - Do you sell any other products that are homemade or from the region?
 - Which? (e.g. *chicha*, *rosquetes*, *cañazo*, *empanadas*, etc.)
 - Why/why not?
 - What do you buy in Tarija? (Where in Tarija?)
- Is there any ingredient that is difficult to get or that you would like to be able to get more of?
- Is there anything you would like to be able to buy from local producers, but that you aren't able to?
- Do you have any other relationships with local/campesino producers? (e.g. selling local products? E.g. wine)

Part 4: Territorial development and the future

- Have you heard about or participated in any initiative to promote traditional products or traditional dishes? For example, connected with tourism, a capacitation course, or fairs?
 - What do you think about the initiative(s)?
 - Do you have (or know someone who has) any connection/relationships with one of these initiatives? (e.g. participated in a course or fair)
- What do you think about the restaurants in _____(local community/area)? Has their number increased in recent years? Why/how so?
- Do you know about any initiative to promote local gastronomy/traditional foods/dishes/etc.?
 - What do you think about them?

- Do you have any direct connection/relationship with them? For example, have you participated in any meeting/course/program put on by the government or an NGO?
- What do you think about the future of tourism in Uriondo related with traditional foods and gastronomic heritage?
 - What would you like that future to be?
 - What do you think future will be of the dishes, ingredients and tastes (gustos – food preferences) in Uriondo? For example, with the introduction of “international” foods, like pasta/noodles, pizza, and hamburgers.
 - Or, for example, your own (in-house) production of chickens/hens, vegetables, etc.
 - Or, with the modernisation of production, do you think the norms around eating will change? For example, we’ve heard conversations about the differences between creole chickens/hens and factory farmed chicken. What do you think about those kinds of changes?
- What would help your business most?

Tiendas (shops) and other businesses

Part 1: Basic information

- Does your business have a name? What is it and how did you decide to give it that name?

Part 2: Business: Can we talk a little about your business?

- How long have you had your shop?
- How many people work with you now/at the beginning?
- How does your business operate?
 - What is your schedule?/What hours are you open?
 - What do you sell? Do you ever prepare anything else special to sell (e.g. for festivals, events, etc.)?
- Who are your main clients? (e.g. students, workers, office workers, tourists, etc.)
 - How do they know about your business? Do you do any kind of promotion?

- Is it a good business for you? More or less how much does it contribute to the household income?
- Are there periods during the year in which you sell more or less? Why? (e.g. fairs/*fiestas*/festivals)

Part 3: History of the business

- How did you start your shop?
- Did you have any kind of experience with this kind of business before?
- Why did you decide to sell these kinds of products? (e.g. dry goods instead of vegetables)
- Which products do you sell the most of? Do you do any kind of promotion? Why do you think they are so popular?

Part 4: Local context

- Where do you get/buy the products that you sell?
 - Do you make/produce any of them yourself? (e.g. bread/wine/etc.)
 - What do you buy from local producers/campesinos?
 - Do you sell any other homemade products or products from the region?
 - Which ones? (e.g. *chicha*, *rosquetes*, *cañazo*, *empanadas*, etc.)
 - Why? Why not?
- What do you buy in Tarija? Where in Tarija?
- Is there any product that is difficult to find or that you would like to buy more of? (e.g. milk/yogurt/cheese/fruit/vegetables) Why is it hard to find?
- Is there anything you would like to buy from local campesino producers, but that you are unable to?
- Do you have any relationships with other business or local producers? (e.g. selling local products like *vino patero*)

Part 5: Territorial development and the future

- Is there a good demand for your products? Is it better/worse/the same as in the past?
- What would help your business most? (promotion/infrastructure/etc.)

- Do you know of any initiative (e.g. fairs/festival/other) that promote the gastronomy or traditional foods from the area? (e.g. through tourism)
- What do you think about them? (e.g. the wine route)
- Do you have any direct relationship with them? For example, have you participated in any meeting or capacitation course put on by an NGO or government?

San Lorenzo baking class

- Why did you decide to participate in this baking class?
- What do you hope to come away from it with?
- Have you participated in any similar courses or activities before?
 - What were they? Can you tell me about it? (what was it/when/etc.)
- Would you like to participate in another in the future? Why/why not?
- What do you think is the importance of these kinds of opportunities for women in San Lorenzo and other communities?
- What do you think is the future of traditional foods in San Lorenzo?

Territorial development

- Can you describe this territory?/Can you tell me a little about this territory? (San Lorenzo/Uriondo/Valle Central)
 - Now, 20 years ago, 40 years ago
- How has tourism developed/grown here? What is the tourism offer now?
 - What do you think is the vision for the future of tourism in the Central Valley and San Lorenzo/Uriondo?
- What do you think about the territorial development activities that have been undertaken so far? (e.g. wine route/*Tarija Aromas y Sabores*/production fairs, e.g. *Arte y Vivo*)
 - Do they provide benefits for the territory? How so?
- What are the most important territorial assets (advantages or special things, e.g. aspects of the culture/history/heritage)? Why?

- Do you think there are potential assets that so far haven't been adequately valorised?
- What are they and why?
- What do you think are the main limitations for territorial development/tourism development/production/etc.?
- What are the relationships between this town/region and the rest of the Central Valley?

History of the territory

- What was it like here when you were a child?
- What are the most important products from this area? What were they 30 years ago? 10 years ago? When you were a child?

Personal history

- What was it like here when you were a child?
- What did your parents do?
 - What did they grow? Did they have animals? How much land did they have?
 - Did they make anything like *vino patero*, cheese or other things like that for the family or to sell? (e.g. baking, *charque*, *chicha*, etc.)
 - Do you remember much about those activities? (How did they make them? What they contributed to the family income/livelihood?)
- What were your responsibilities to help them/your family? (e.g. with the animals/during the harvest/in the kitchen/etc.)
- What were the foods you ate most often during a normal day?
 - What did you eat at the beginning of the day/mid-day/at night?
 - If you were hungry between meals, did you have snacks?
 - Did you ever harvest/hunt fruit/plants/animals/fish?
 - What would you eat on a special occasion? (e.g. a birthday or for Easter/Christmas/etc.)
- Where did most of the foods you ate in your household come from?
 - What did your family produce? And how much? Including, fruit trees, herbs, other domesticated or wild plants and animals.

- What food products did your family buy? Where they expensive? Where did you buy them?
- And in the kitchen, who was the main cook?
 - Did you help much in the kitchen?
 - With what kind of activities?
 - When did you learn how to cook? How old were you when you started to cook by yourself?
- How has life changed since your childhood and adolescence? For example, since you married?
 - Who is in charge of the kitchen?
 - What kind of food do you mostly eat?
 - Where do most of the foods you eat come from now?
 - Do you produce any foods?
(meat/chicken/eggs/fruit/vegetables/potatoes/corn) Why/why not?
 - What are the things your family buys? Where do you do your shopping?
 - Are there things like *vino patero*, cheese or other things for the family or to sell?
(e.g. baking, *charque*, etc.)
- And now that you have children, how do you see their lives now compared to yours when you were a child?
 - Do they know how to cook or work in the *campo*? Why/why not?
 - What kinds of foods do they like to eat?
 - Do they help in the kitchen/in the garden/with the animals/the farm? Are they learning similar things that your and your siblings did at their age?

Regional history

- Are there changes you see between ways of eating and tastes now compared with life in the past?
- For example, are there food that are regularly eaten, common or everyday now that weren't common before or were only for special occasions? Or the opposite, are there things that before were regularly eaten, common or everyday foods that now are only eaten for special occasion or aren't common now?

- What were the cultivars and animals that were common in the community when you were a child?
 - How were livestock maintained? (pastured/corrals/stables/etc.)
 - How much land did people have on average in the past?
 - What were the technologies that were used for cultivation and transportation? (e.g. oxen, donkeys, etc.) When did that change and why?
- After speaking with older people from around here, it seems like there have been some key moments in the history of the community that have change life here a lot. For example, the construction of the road to Tarija, when electricity came, the construction of markets, the start of grape production...
 - Do you remember any of these events or other important ones in the history of the community?
 - Can you tell me a little about your experience of them?
 - How did life in the community change after the road came in?
 - How did life in the community change when grape production grew into a regional economic sector?
 - When did electricity arrive here? Or other changes in technology?
 - In the kitchen: gas, fridge, etc.
 - On the farm: the tractor, new varieties of plants and animals, etc.

Sample key informant/institution questions: SENASAG/SEDAG ⁸¹

- What is the mission/vision of SENASAG/SEDAG?
- What kind of livestock is the most important here? (Central Valley municipal/Central Valley/Tarija Department)
- What is the importance of dairy production here in the Central Valley? What are the most important zones of production? How long have they been?
 - Production/consumption

⁸¹ SENASAG (*Servicio Nacional de Sanidad Agropecuaria e Inocuidad Alimentaria*: National Agricultural Sanitation and Food Safety Service: <http://www.senasag.gob.bo>) and SEDAG (*Servicio Departamental Agropecuario*: Department Agricultural Services: <http://www.tarija.gob.bo>) are state agencies responsible for food health and safety and agricultural extension services.

- What type of Holsteins are here mostly? American or European?
- Introduction of Jersey to the mix: Is it related to the higher content of fat and lower costs of maintenance due to sturdiness and smaller size?
 - What is the benefit of introducing Jerseys?
 - Are the two types/grades of milk mixed together? Will they continue to be?
(Implications for cheese making)
- Support and aid programs
 - What programs do they have for small livestock and non-cow livestock.
- What is your goal of the program (vision for the future of the region) and what have been your challenges (obstacles) to achieving that.
- When dairy production began to be promoted in San Lorenzo?
 - Why was it decided to focus on the raw product?
 - Why were Holsteins brought in instead of Jerseys, for example, when there was a tradition of cheese production in the area and Holsteins are not well suited for cheese?
 - Why are Jerseys being brought into the mix now? What is the advantage?
- There is a history of goat production in the area. Is there any support being offered for goat milk producers?
 - Any thought of building a goat milk industry? (high value product)

Appendix B: Sample market data related instruments

Please note that the instrument has been modified from the original format by removing space between lines allocated for writing and shortening tables in order to minimize document length.

Market overview report

Part A: Full survey of biological resources of the market

Market: _____ Date: _____ Hour: _____ Name of data collector(s): _____

Instructions

Do a pass through the market to do a preliminary characterisation [area and zones of the market, general ideas of the types of stalls – specialised areas for products (e.g. stalls dedicated to fruit, vegetables, cheese, etc.)].

Do a new pass through, zone-by-zone, to document the diversity of biological products found in each type of stall. Start with the most diverse stall and use the others to see if there are other products. Note if a product is not common or if it has other important characteristics. Select a few examples of stalls for instrument 6. These examples can be used as the basis for the lists of products in each category.

Characterisation of the market

Approximate area of the market _____

Approximate number of shops/stalls with biological products: _____

Map the basic zones of the market:

Types of specialised stalls:

1) _____

2) _____

3) _____

4) _____

Type of specialised stall: # _____

Approximate number of stalls in this category: _____

List of products:

No.	Name/type of product	Notes
1		
2		
3		
4		

Part B: Surveys with market vendors

Personal details:

Name: _____ Age (approx.): _____ Gender: M / F

Survey number: _____

Where do you live now? Where were you born?

Type of stall:

- A) Type of products sold
- B) Formal or informal
- C) Frequency selling here: _____ per week/month/year

Do you work here full- or part-time?

- If part-time, where else do you work?
- Do you sell in other locations as well?

How long have you sold here? How did you start?

Where and how do you source the products you sell? (place of purchase or other)

Where do your products come from? (list or show on map and record)

- Are these products available year round? Do you buy from different places over the course of the year?

Do you know the producers?

How do you make decisions about where you source the products you sell?

What do you think are the main characteristics/qualities your clients look for in your products?

- Price/quality/origin/method of production?

Do all the exchanges involve money (monetary transaction)? Do you ever barter or use another type of transaction?

Would you mind/be available to speak with us again in a few months?

List of products for sale:

No.	Name/ type of product	Origen (and producer)	Price (B/Kg.)	Season	Notes
1					
2					
3					
4					
5					

Part C: Survey with consumers at the markets

Market: _____ Date: _____ Hour: _____ Data collector(s): _____

Survey # _____

Origin of consumer/respondent:

Which community do you come from? (ID location on map and size of the community)

Name of community: _____

Zone (Municipality/provincial sub-section): _____

Size of community: _____

Distance between community and market:

A) How long does it take for you to travel here? _____

B) Form of transport (all that apply):

Car _____ TRUFI _____ Taxi _____ foot _____ Other _____

C) Distance in kilometres:

Between 1km _____ 2-5km _____ 5-10km _____ 10-15km _____ 15-25km _____ more than 25km _____

How often do you shop or eat here? How many times a month?

_____ times per day/week/month/year

Which other market(s) do you use?

(Mark 1, 2, 3, etc. in order of importance)

Mercado Campesino (Tarija)_____ Mercado Central (Tarija)_____

Other market in Tarija_____ Sub-regional market_____ (Which?_____)

Other_____

Which market do you use most often and which do you buy the most at?

_____market _____times per day/week/month/year

What kinds of goods do you regularly buy here?

(Mark 1, 2, 3, etc. in order of importance)

Always buy:

Meat_____ Chicken_____ Vegetables_____ Fruit_____ Dry goods_____

Bread and baked goods_____ Cheese and milk _____ Other_____

Sometimes buy:

Meat_____ Chicken_____ Vegetables_____ Fruit_____ Dry goods_____

Bread and baked goods_____ Cheese and milk _____ Other_____

Never buy:

Meat_____ Chicken_____ Vegetables_____ Fruit_____ Dry goods_____

Bread and baked goods_____ Cheese and milk _____ Other_____

Do you produce anything in your home/garden/agricultural plot?

Yes _____ No _____

If yes, what?_____

Monthly market scan instrument (for fresh produce)

A checklist based on the lists compiled through the market overview (e.g. lists of products sold by market vendors) was used to record available products identified during market scans. A sample checklist for fruit is included below. The products names are in Spanish and English translations have been added where applicable. Other categories in the checklists included vegetables and other fresh produce, tubers, meats and fish, and eggs and dairy. Long-form scans also included: herbs, spices, condiments, and other home-made products; grains, nuts and dried fruit; bread and baked goods; artisanal beverages; prepared dishes; snack foods; and, dry and canned goods. A complete list of products identified through market scans is provided in Appendix G.

Available products (Sample of instrument)

Market: _____ Date: _____ Hour: _____ Data collector(s): _____

Fresh fruit			
Product		Available (✓)	Notes
Category (Spanish followed by English common name)	Sub-category		
Arándanos (blueberries)			
Banana	Cavendish (grandes/large)		
	Guineo (pequeñas/small)		
Carambola (star fruit)			
Caña de azúcar (sugar cane)			
Chirimolla (custard apple)			
Coco (coconut)			
Durazno (peach)	Blanco		
	Amarillo		
Frutilla (strawberries)			
Limones (lemons)	Amarillo (yellow)		
	Verde (lime)		
	Sutil		
	Suci		
Mandarinas (Mandarin oranges)	Otras/other (Incor - plantation)		
	Criollas (creole)		
Manzanas (apples)	Criollas (creole)		
	Otras/other (importadas - imported)		
Maracuyá (passion fruit)			
Moras (blackberries)			
Naranjas (oranges)			
Papaya			
Peras (pears)	Criollas (creole)		
	Otras/Other (importadas - importanted)		
Piña (pineapple)			
Plátano (plantain)			
Pomelos (grapefruit)	Blancos (white)		
	Rosados (red)		
Kiwi			
Mandarinas (tangerines)			
Uvas de mesa (grapes)	Roja /rosada (red)		
	Negra (purple)		
	Blanca/verde (white/green)		

Appendix C: Sample fair survey instruments

Please note that the instrument has been modified from the original format by removing space between lines allocated for writing and shortening tables in order to minimize document length.

Instrument 1: Survey with food vendors at product promotion fairs

Name: _____

Age (approximate): _____ Survey #: **FPc1** _____

1) Which community do you live in?

2) What are the dishes or type of food you have for sale today?

(make a list and take photos, if given permission)

Dish	Number of units for sale	Price per unit	Cost of preparation (approximate)	Notes (Which is the most popular? Why? Special ingredients, etc.)

3) Why do you sell these specific dishes/foods/beverages?

4) Where do you buy the ingredients to make them? (Which ingredients do you produce?

Which do you buy locally? Which are from the Mercado Campesino? Etc.)

5, A) Do you sell food in other locations? Where? [e.g. do you have a restaurant or market stall? Do you sell at other fairs? (see question 6)]

5, B) What is the main source income for your family (main economic activity)?

6, A) Have you participated in other fairs? Yes/No

If yes:

- Which other fairs? Approximately how many in total? How many years have you been participating for?
- Why do you participate? (e.g. income, promotion, other?)

6, B) If the fairs are a primary incomes source, what is the approximate contribution of the fairs to household income? (%)

7, A) What do you think about the fairs? Can you describe some of the benefits of these types of events? What are some of the benefits you personally receive? Are there any drawbacks?

7, B) Do you think you will continue to participate in these types of events? Yes/No. Why/why not?

Instrument 2: Survey with production promotion fair participants (e.g. stands exhibiting or selling the focal product or related products)

Name: _____

Age (approximate): _____ Survey number #: **FPe1** _____

(Take a photo of the exhibition table)

1, A) What community do you live in?

1, B) Who organized this exhibition table? Is it part of any organization or producer association? Other?

2) What products do you have here? Are they to display or to sell? (Make a list that includes prices where applicable and take photos of each the products)

Product	Display (mark with X)	Sale (Number of units)	Sale price per unit	Production costs (approximate)	Notes

3) Do you produce other products as well? Or do you have them all here?

- If some aren't here, what are they?

4) What are the product that you sell the most of/which are the most popular? Why?

5, A) Did you produce these products? (or participate in their production?)

5, B) Where do the ingredients come from? (Which ingredients do you production? Which do you buy locally? Which are from the Mercado Campesino? Etc.)

6, A) Do you sell food in other locations? Where? [e.g. do you have a restaurant or market stall? Do you sell at other fairs? (see question 7)]

6, B) What is the main source of income for your family (main economic activity)?

7, A) Have you participated in other fairs? Yes/No

If yes:

- Which other fairs? Approximately how many in total? How many years have you been participating for?
- Why do you participate? (e.g. income, promotion, other?)

6, B) If the fairs are a primary incomes source, what is the approximate contribution of the fairs to your household income? (%)

8, A) What do you think about the fairs? Can you describe some of the benefits of these types of events? What are some of the benefits you personally receive? Are there any drawbacks?

8, B) Do you think you will continue to participate in these types of events? Yes/No. Why/why not?

Instrument 3: Survey for production fair visitors

Survey #: **FPv1**_____

1, A) Where do you come from?

- B) How many people are in your group? (Note if a family, etc.) # in the group:___
- C) What is your profession or main livelihood activity?/What do you do for a living?
- 2) How many hours are you going to spend (or think you are going to spend) here today?
- 3) What are the most interesting activities/things to do at this event? Why?
(e.g. see the exhibition tables, shopping, eat, drink, go to the presentations/ceremonies, play games, other?)
- 4) Can we talk a little more about shopping?
- A) What kinds of products are you planning to buy? Why those? (e.g. their quality, price, availability, etc.) How many are you going to buy?
- B) Are you buying them for yourself, as gifts or on behalf of someone else?
- C) Are you going to buy other things today as well? (e.g. food, drinks, etc.)
- D) Approximately how much have you or do you think you will spend here today? (5-10Bs; 10-30Bs; 30-50Bs; 50-70B; 70-100Bs; 100-150Bs; 150Bs or more)?
- 5, A) What do you think about the fair?
- B) Have you been to other similar events before? Which ones?
- C) Can you describe some of the benefits of these types of events? What are some of the benefits you personally receive? Are there any drawbacks?
- D) Do you have any other comments you would like to share about your experience here today?

Appendix D: Agricultural production history of the Central Valley

Agricultural production has been the basis of the Central Valley economy for millennia. Humans are believed to have first settled around the Central Valley over 11,000 years ago, with agriculture and animal husbandry beginning 5000-8000 years ago and concentrating settlements in the areas most favourable to agriculture (Macklin et al., 2001, p. 1). The first Spanish expedition arrived in the Central Valley in 1539 and identified it as a promising area for livestock production and, consequently, as desirable for Spanish settlement and colonization (Prefectura, 2006, p. 35). The first record of European livestock being introduced to the Central Valley is cattle brought in the late 1550s. Other European crops were also introduced during this period, including grapes. Tarija was identified by the Spanish as an apt area for viticulture as early as the 1570s (Contreras Villaseñor & Elías Pastor, 2012) and by 1606 the first documented vines had been planted (FAUTAPO, 2010a). Both creole cattle and grape varieties still found in the Central Valley originated from the Andalucía region of Spain (Milla Tapia et al., 2007). The colonial memory of Andalucía still resonates strongly in the Central Valley, with the rivers sharing the name Guadalquivir in both places and Tarija being known as the “Andalucía of Bolivia” (Figure 34).

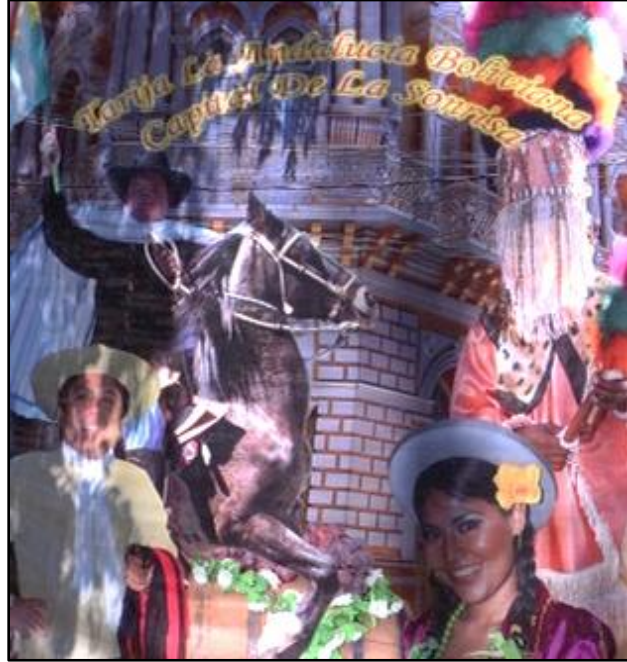


Figure 34. The slogan, "Tarija the Andalucía of Bolivia, capital of the smile", displayed during a fair themed around chanchito a la cruz ("pork on the cross", a type of roasted pork) held on April 15, 2013, in Tarija.

With support from the Catholic Church, and edicts to evangelise, live peaceably with the Indigenous Peoples and build economic centers around agriculture, Spanish settlement actively began in 1574 with the establishment of Villa de San Bernardo de la Frontera, which is now the City of Tarija (Prefectura, 2006). Settlements, mostly undertaken as missions by religious orders and through land grants to settlers, were established throughout the Central Valley and the rest of what is now the Department of Tarija throughout the 1600 and 1700s (Calzavarini, 2004; Prefectura, 2006). The land grants, including the 117 made by Franciscans between 1626 and 1785 for *tierras* (lands: 29), *chacras* (small farms: 34), *fincas* (farms: 2) *haciendas* (large properties: 6), *estancias* (ranches: 14) and *viñas* (vineyards: 32), helped establish the Spanish colonial order and associated agricultural project (Calzavarini, 2004, pp. 101–104). The Chicha, Tomatas and Churumata Indigenous Peoples of the Central Valley were killed, displaced and assimilated when Spanish settlement interests began to outweigh ideals of “peaceful cohabitation” (Prefectura, 2006). Macklin et al. (2001) also note that European livestock quickly displaced domesticated camelids following Spanish settlement.

During this time, “...the region was converted into a centre of food production, both by supplying cattle to the south and to the northern mining region” as well as

agricultural products to Potosí and other colonial centres (Prefectura, 2006, pp. 35–36). During the early 1800s, a new wave of settlement was undertaken in the highland and Chaco areas. By the 19th century, much of the land surrounding the City of Tarija was divided into large estates and European settlement, agriculture and livestock had dramatically changed the landscape, vegetation and economy (Preston et al., 1997, p. 6). Tarija was established as a department in 1831, and the end of the 19th century was a period of economic growth based on the continued sale of agricultural products to the mining regions, which boomed as a consequence of territorial conflicts, including the *Guerra del Pacifico* (War of the Pacific: 1879-1883) in which Bolivia allied with Peru against Chile.

The pattern of latifundio – large land holdings – persisted until the National Revolution of 1952 and the subsequent *Ley de la Reforma Agraria* (Agricultural Reform Law) in 1953. Through the revolution rural lands were claimed by the state. Although the agrarian reforms were unevenly implemented (Kay & Urioste, 2007; Urioste, 2010), this period is widely recognized as one of pivotal transformation in rural areas, in which the agrarian structure characterised by large landholdings held by a few was broken, “giving way to another structure in which lands passed to the control of campesinos” (Prefectura, 2006), with an average grant of 9.3 hectares allotted per household (CODETAR, 1974, p. 104). Prior to the revolution, the national agricultural census conducted in 1950 offers a window into rural life in Tarija (for full census results see MACA et al., 2009). That census found 61,338 people dependant on agriculture, 40,552 of whom lived in the Central Valley (Provinces of Mendez, Cercado and Avilez).⁸²

At that time, 25,867 ha of land in the department were under cultivation, by independent landowners (12, 227 ha), owners with labourers or settlers (576 ha), tenant farmers (11,375 ha), sharecroppers (1,032 ha), and communities (275 ha: MACA et al., 2009, p. 87). An additional 449,376 ha were recorded as natural pasture (p. 90). Within the Central Valley area there were approximately 14,930 ha under cultivation, of which approximately half (7,415 ha) were worked by independent owners, with tenant farmers (6,301 ha) and sharecroppers (933 ha) making up the next largest groups.

⁸² Central Valley totals are calculated based on the figures provided from the provinces of Aviles, Cercado and Mendez, as no municipal level data is available.

According to the agricultural census the most commonly produced crop in the Central Valley was corn in the forms of both maize and *choclo* (sweet corn: Table 30). This was followed by wheat and potatoes. Together these three categories account for 63% of the area under cultivation. Barley, peaches and peas were the next most important crops based on area under cultivation (17% of total).

Table 30. Agricultural production in the Central Valley based on data in the 1950 Bolivian Agricultural Census.

Produced on ≥1000 ha		Produced on 999 – 100 ha		Produced on 99 – 50 ha		Produced on 49 – 20 ha		Produced on 19 – 1 ha	
Crop	Area (ha)	Crop	Area (ha)	Crop	Area (ha)	Crop	Area (ha)	Crop	Area (ha)
Corn	6501	Barley	337	Grape	98	Papaliza	49	Figs	15
Wheat	1533	Peach	299	Alfalfa	81	Peanuts	48	Garbanzo beans	15
Potato	1413	Peas	242	Sugar cane	65	Fava beans	45	Quinoa	14
		Oca	140	Onion	61	Sweet potato	39	Cabbage	14
						Beans	30	Squash	12
						Tabaco	21	Apple	8
						Lemons	28	Yuca	6
								Carrot	5
								Tomato	4
								Lettuce	4
								Oats	4
								Orange	4
						Walnuts	3		
						Lima	2		

Livestock also played an important role in the Central Valley economy in 1950 (Table 31). The Central Valley housed approximately one third (30%) of all cattle in the department, with the rest concentrated in the Gran Chaco, and three quarters (76%) of all sheep and 63% of all goats, of which over half were concentrated in Mendez. The census also gathered data on dairy, eggs, and sheep cheese and wool production. 6494 respondents had sheep and 47% (2953) of them sold wool and 9% (600) produced cheese. Although, 43% of all sheep in the Central Valley were found in Avilez, Mendez was home to 66% of sheep cheese producers (396), who produced 62,354 kg of cheese, which is 81% of all sheep cheese recorded. By contrast 62% of dairy cattle, 67% of poultry (hens, ducks, turkeys) and 44% of pigs were located in Cercado.

Table 31. Livestock in the Central Valley and the Tarija Department based on data from the 1950 and 1984 Bolivian Agricultural Censuses.

Type of livestock	1950, Central Valley	1984, Central Valley
Bovines	52,665	53,978
Registered dairy cattle	22,438	0
Sheep	242,756	158,196
Pigs	18,826	26,190
Goats	111,693	101,460
Llamas	218	323
Alpacas	103	7
Horses	8380	3,281
Mules and donkeys	23747	16,644
Hens	71,074	137,930
Ducks	3,517	2,966
Turkeys	2,053	2,091
Beehives¹	62	221

¹ Number of respondents with beehives.

Following the 1952 Revolution and 1953 Agrarian Reform that brought about the destabilisation of the semi-feudal hacienda economy across the country, regional and national economies underwent a period of instability during which campesino production was largely focused on self-provisioning (CODETAR, 1991). During the 1960s and 1970s, the national agricultural sector began to grow and greater emphasis was placed on commodity production, including of potatoes and sugar cane (particularly during the 1960s) and agro-industrial crops, including soya and oilseed, and on the incorporation of Green Revolution technologies, particularly agrochemicals. Little investment in infrastructure, however, limited market integration in most of the country. During this period, the agricultural sector was characterised by low productivity, underemployment of factors of production, particularly labour, and low levels of income (CODETAR, 1991, p. 5).

The next comprehensive window into agricultural production in the Central Valley is through the 1984 Agricultural Census (Tables 31 and 32: for full census results see República de Bolivia, 1990). By 1984, the area under cultivation in Tarija had tripled to 68,618 ha. Only 201,434 ha were identified as natural pasture, which is less than half the area identified in the 1950 census. The population in the department was 261,989, of whom 148,298 (57%) lived in rural areas (República de Bolivia, 1989, pp. 18–19). In 1984, 80% of all lands in the department were held by individuals, while the rest were

held by associations (10%), campesino communities (5%), the state (1%), producer cooperatives (1%) and others.

There are also notable differences in patterns of agricultural production in comparison to 1950. Corn, wheat and potatoes remained the most produced crops; however, their share of the total area fell from 63% in 1950 to 26%. In 1984, many more crops were also being produced at larger scales. One that has a marked increase in area under production is grapes, which grew from 98 ha to 1029 ha (the expansion of this sector is examined in more detail in Chapter 3). Commercial crops, such as peanuts and market vegetables, like peas, onions, carrots, garlic and tomatoes, also increased significantly (e.g. a six-fold increase in onion production). The production of alfalfa and oats, both important animal feeds, also increased. By contrast, the production of other crops, such as oca, and to a lesser extent squash and quinoa, fell during the period between the national censuses.

Table 32. Agricultural production in the Central Valley based on the 1984 Bolivian Agricultural Census.

Produced on ≥1000 ha		Produced on 999 – 100 ha		Produced on 99 – 50 ha		Produced on 49 – 20 ha		Produced on 19 – 1 ha	
Crop	Area (ha)	Crop	Area (ha)	Crop	Area (ha)	Crop	Area (ha)	Crop	Area (ha)
Corn	9465	Peas	995	Tomato	92	Papaliza	46	Apple	16
Potato	4683	Peanut	568	Oca	74	Garbanzo beans	41	Lettuce	14
Wheat	3614	Fava beans	486	Oats	73	Beans	39	Chili peppers	5
Grape	1029	Unspecified vegetables	412			Sweet potato	35	Quinoa	5
		Onion	400					Strawberry	4
		Barley	384					Cabbage	3
		Unspecified fruit	336					Squash	3
		Alfalfa	289					Rice	3
		Peach	205					Mandarin orange	3
		Carrot	142					Plum	2
		Garlic	137					Cheery	1
		Sugar cane	100					Lima	1

During the period between 1950 and 1984, exploitation of oil and gas deposits in the Chaco region of Tarija fuelled much of the economic growth in the department, particularly since the 1970s. Outside of the Chaco, however, agriculture remained a central activity. The *Comité Departamental de Desarrollo de Tarija* (Tarija Department Development Committee), which subsequently became the *Corporación Regional de*

Desarrollo de Tarija (CODETAR: Regional Development Corporation of Tarija), was established in April 1971 (Arze Cuadros, 2002, p. 307) with the mission of promoting economic and social development in the department, stimulating agricultural production remained a central priority (Prefectura, 2006). During the late 1970s and 1980s, in accordance with the “*polos de desarrollo*” (development pole) strategy being pursued through state development corporations (CORDES) across the country, projects in Tarija were developed to promote sub-regional specialisation in economically profitable products (Avilés Irahola, 2005, p. 60). As Plaza and colleagues explain (2003, p. 42):

...following a developmentalist vision, the Corporación Regional de Desarrollo de Tarija (Codetar) conceived and implemented an industrialisation strategy for the region based on centers of development in those zones with particular agroindustrial potential.

Within this strategy, the department was subdivided into planning zones. Zone 1 corresponds to the provinces of Mendez, Cercado and Aviles as well as the northern corner of the province of Arce, and overlays the geographic area of the Central Valley, as well as the highland areas. The 40,500 ha of potentially arable land in the Central Valley represent approximately 26% of the total potential arable land in the Department. The lands in the Central Valley are identified by the state as best suited for the production of “vegetables and fruit, grape vines, milk and forage” (Prefectura, 2006, p. 172). Since the 1970s, regional development has focused on linking agricultural production with industrial development, particularly prioritizing the production of commercial agricultural products (CODETAR, 1974, 1979, 1991).

CODETAR (1979, p. 273) identified potato, corn, alfalfa, barley, grapes, wheat, and temperate fruits and vegetables as the focus of primary production. Manufacturing, although limited, was centred on the production of alcoholic and soft drinks, animal feed (*alimentos balanceados*) and milk, along with some wood and construction materials. As described in Chapter 2, the central precepts of the development strategy for the region were to increase agricultural production through expanding the area under cultivation and the introduction of green revolution technologies, in order to supply agro-industries and increase the competitive advantage of primary and secondary goods with industrial or extra-regional export potential (CODETAR, 1979, p. 327). Consequently, a specific set of crops and livestock were selected for technical and financial support in the department. These were: soya, peanuts, cotton, grapes, pomo and stone fruits, meat cattle, hogs, wood,

(hard) yellow corn, soft corn, wheat, sugar cane, forage, dairy cattle and poultry (CODETAR, 1979, p. 329). In the Central Valley (Zone 1), emphasis was placed on grapes and dairy because of their potential for linkages with budding agro-industries. These sectors were supported through multi-party initiatives. The planning for the *Proyecto múltiple “San Jacinto”* (San Jacinto Multi-project) was also initiated during this time to help facilitate the extension of the agricultural area through increased irrigation.

The efforts of CODETAR, however, could not prevent the global economic downturn and debt crisis of the 1980s. Although the Chaco received many migrant workers from elsewhere in Bolivia over this time, many Tarijeños left Bolivia to find work in Argentina (Prefectura, 2006). Neoliberal economic policies launched through the state’s *La Nueva Política Económica* (New Economic Policy) in 1985 sought to reorient and “transform the national economy to favour the incorporation of the Bolivian economy into the global economy” (CODETAR, 1991, p. 1) and also put emphasis on private business as the driver of economic development. Subsequent development programs are elaborated on in Chapters 2, 3 and 4.

Appendix E: Contemporary primary production patterns in study communities

Agricultural production is the backbone of the rural economy and food system in Tarija and plays a central role in the livelihoods of many households. This research examines the contemporary primary production dimension of the food system by documenting the production profiles of 48 households from seven communities located along two transects. This following sections provide: A) descriptions of the transects; B) descriptive data on the 48 households and their livelihood strategies; and C) an typology of four production strategies characterising these households.

A: Transect descriptions

The following provides basic descriptions of the San Lorenzo and Uriondo Transects. Associated maps, figures, tables and a description of the transect methodology are found in Chapter 1, Section 1.4.

San Lorenzo Transect: Basic description

30 households active in agriculture were involved in the San Lorenzo Transect. These households were distributed along a road running from the centre of the Town of San Lorenzo, through the communities of Tarija Cancha Sud and La Calama up to the community of Marquiri, 11.3 kms to the west of San Lorenzo. The area surrounding each community comprises a transect zone that serves as a unit of analysis in comparing production patterns within and between the transects.

The Town of San Lorenzo is a community of approximately 2500 people (Gobierno Municipal de la Primera Sección Provincia Méndez - San Lorenzo, 2008b, p. 132). As the capital of the Municipality of San Lorenzo and the first sub-section of Mendez Province, many of the amenities and basic services, including health and education, for the region are located in San Lorenzo, as are the local government offices. There is also a small market located in the centre of town and several small restaurants operating out of homes. Many people are employed in government and service sectors; however, agriculture remains an important component of many livelihoods. In recent years, more emphasis has also been placed on attracting tourism to the area particularly

around the historical architecture, artisanal products, including artisanal wines, baked goods and clothing, and cultural festivals. The San Lorenzo celebrations of Easter (March/April) and those of the patron saint of San Lorenzo (August) are particularly renown and attract large crowds of people as well as vendors from the City of Tarija, surrounding communities and many from further afield (See Chapter 5, also Balza, 2013; Gobernación de Departamento de Tarija, Sección San Lorenzo, 2013; Gobierno Autónomo Municipal de San Lorenzo, 2013; Vacaflores, 2013b).

Most houses, businesses and offices of San Lorenzo back onto farmland and border one of a few narrow streets running through town on the road between Tarija and communities further to the north or branching from San Lorenzo up a sub-valley of the *Rio Calama* to the communities of Tarija Cancha Sud, La Calama and finally Marquiri. Along the road, Oscar Alfaro, that runs parallel to the *Rio Calama*, many of the houses are walled compounds with rooms facing onto open courtyards and often with agricultural fields behind. The courtyards are frequently shaded by grapevines planted in pots or beds around the edges of the yard and often also house a few fruit trees. Many of these houses, made of mud brick and white plaster, have a small cowshed attached to the side or back of the dwelling. A *centro de acopio* (collection centre) for milk is just two blocks up the road from the main town square. On the outskirts of town are also several chicken barns. Many houses have signs hanging from the wall or door to indicate that *vino patero*, *rosquettes*, fresh bread, eggs or other goods can be found there. Many houses also have small *tiendas* (small shops) selling a selection of soft drinks and dry goods.

The houses of Tarija Cancha Sud (population 619: Gobierno Municipal de la Primera Sección Provincia Méndez - San Lorenzo, 2008b, p. 132), with their many *tiendas*, blend with those of the San Lorenzo eventually becoming more interspersed with agricultural fields and occasionally a small patch of churchi (*Vachellia caven*) and other small trees and bushes. Mid-way through Tarija Cancha Sud is a small school, *centro de acopio* for milk and a shrine to the local patron saint. A little further the road crosses the *Ruta Nacional 1*, which was inaugurated in 2013, and links the Central Valley and the Tarija Department with Potosi and the rest of Bolivia (Márquez, 2016). Many of the fields are filled with corn and alfalfa and climbing vines of *lacayote* (*Cucurbita ficifolia*)

wind around the occasional fig tree near family compounds. There are also many small corrals of stone often housing a local breed of small, blacked haired pigs, called *roco*.

When Oscar Alfaro crosses a small creek, we enter the community of La Calama. Approximately 743 people live in this community, which is also the capital of the Calama Canton (Gobierno Municipal de la Primera Sección Provincia Méndez - San Lorenzo, 2008b, p. 132). Most of the houses are clustered along the road and become denser around the town centre, which has a soccer field and school. Near the soccer field is the collection point for milk delivery. There are also several *tiendas* many of which advertise that, in addition to dry goods, they sell meats and sometimes cheese. At the edge of the town centre the paved road turns to dirt and forks, one side running towards to the Community of Jurina and the other continuing up the narrowing valley to the Community of Marquiri. Both Jurina and Marquiri are featured in Municipal tourism promotion because of their waterfalls, which are becoming increasingly popular attractions for bathers during the hot months of the year ('Las cascadas de Marquiri aguardan a los visitantes: Es el segundo circuito que promocionará Tarija', 2013).

The houses of Marquiri, which together are home to 150 inhabitants, are situated in small clusters usually belonging to members of the same family (Gobierno Municipal de la Primera Sección Provincia Méndez - San Lorenzo, 2008b, p. 132). There is a small, but constant, elevation gain coming up the road from San Lorenzo, and as the valley narrows past La Calama the humidity increases and larger trees are visible along the road and field edges. The small plots of agricultural land are often bordered with *molle* trees (*Schinus molle*), many of which are draped in climbing grape vines, and low stonewalls. At the end of the road, where the last group of houses is situated, the surrounding hills are terraced to accommodate agricultural production. There are also many small agricultural plots located in surrounding hillsides. The houses are very small and most have a stone corral nearby to house their goats and sheep and others a little more distant for pigs and cattle.

Uriondo Transect: Basic description

The Uriondo transect involved 18 households active in agriculture and one corporate bodega. This 7.25 km-long transect follows the road leading west out of the Town of Valley de la Concepción, through La Compañía, San Nicolas and Saladillo. A large

vineyard, belonging to Bodega Valle de la Concepción is also located in La Compañía zone; however it is not included in the household figures.

The town of Valle de la Concepción (also identified as Uriondo on some maps) is the capital of the Municipality of Uriondo and the first sub-section of the Province of Aviles. The town is home to approximately 1,722 residents (INE - Central, 2012) and over the last decade has become an important centre of wine tourism, with many restaurants, a few hostels and several small and medium-sized wine makers located in the town. Most tourism services operate seasonally from November to April. *La Casa Vieja* (“The Old House”) is one of the most famous of these and is included on many wine tours to the area, which also visit large bodegas in the Province of Cercado (most in the area of Santa Ana) and a shop, called *Las Duelas*, featuring wines and other products from local artisans in the community of Calamuchita. Concepción also hosts several festivals during the year, which attract large numbers of tourists (Contreras Villaseñor & Elías Pastor, 2012).

Many of the houses in Concepción consist of the rooms facing an inter-courtyard, which are often planted with shade providing grapes and a few fruit trees. The majority of these houses touch the road and back onto agricultural land. These small plots are usually ringed with trees and commonly hold vineyards. As the sub-regional hub, many government offices and public services are located in Concepción. There is also a small market and many *tiendas* selling meat, fresh produce and dry goods. Towards the edge of town on the *Ruta 45* are also several small bread makers. The recently paved, two-lane *Ruta 45* continues through Concepción to skirt the west side of the valley eventually arriving at the Bolivia-Argentina boarder.

At the edge of Concepción dense houses quickly give way to small plots of agricultural land. Some of these plots have fruits, some vegetables, and others vineyards, but the majority have some combination of the three, with some small shrubs and trees interspacing them and edging the road. The community of La Compañía is concentrated up on the narrow hillside. Many of the 639 residents (INE - Central, 2012) have homes on the hillside, but maintain plots in the flatter and irrigated valley bottom. Fruit trees are often planted on the steeper areas, while small vineyards, potatoes, onions or other crops are given the flat lands. Up on the hillside the natural vegetation of churqui and other dry

forest plants takes over. At the edge of La Compañía is the bodega and vineyard of *Bodega de la Concepción*. Just beyond it at the edge of the community of San Nicolas (population 107: INE - Central, 2012) several dozen were recently sold and bulldozed to clear the land for vineyards (Chapter 3).

Transitioning from San Nicolas to Saladillo the road runs between a long cliff face and the wide stone riverbed of the *Rio Nuevo Guadalquivir*. Saladillo is the last community along *Ruta 45* that was included in this transect. It has approximately 463 residents (INE - Central, 2012), living in homes mostly clustered along the road, with agricultural plots dispersed between small rows and patches of dry forest. Small vineyards, potatoes and other crops occupy most of the available land. There is also one tourism facility with restaurant and picnic area, called *La Heredad de Jacob*, located in Saladillo.

B: Transect household land holding size, ownership and access

Figure 35 summarizes the amount of land used by households in the different transect zones. Grazing lands held in common are not included in this chart, unless participants identified the land as part of their holdings when they were asked how many hectares of land they owned, rented or accessed through sharecropping or other arrangements. As summarized in Figure 36, the majority of households (77%, 37/48 households) are small holders with less than 3 hectares of land. Only 8% (4/48) households reported more than 10 hectares of land, with 20 ha, 15 ha, 10 ha and 30 ha respectively. Bodega de la Concepción is also a large landowner with 120 ha of vineyards.

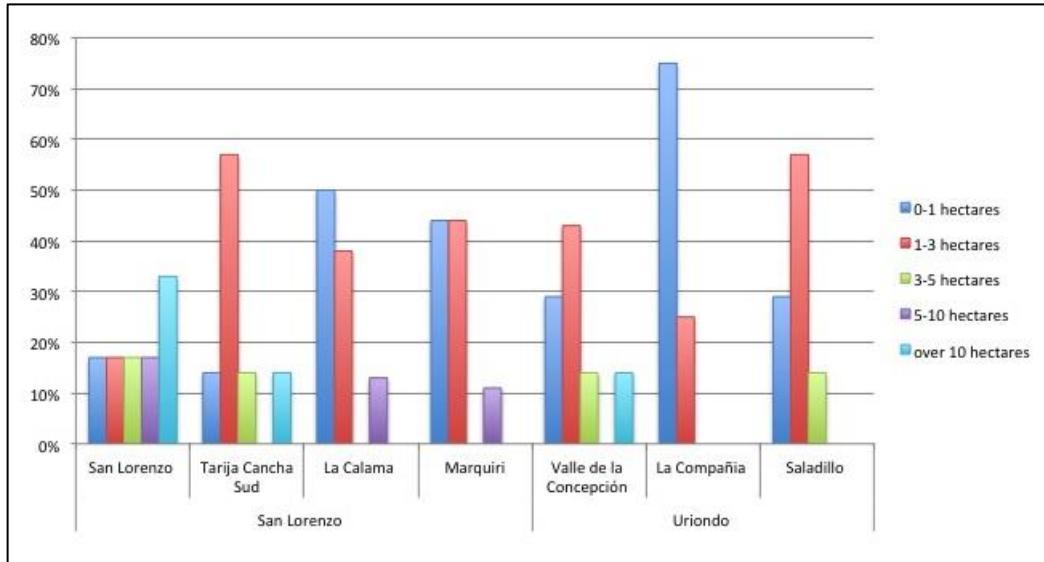


Figure 35. Size of land used by households by transect zone (per cent of households in each zone).

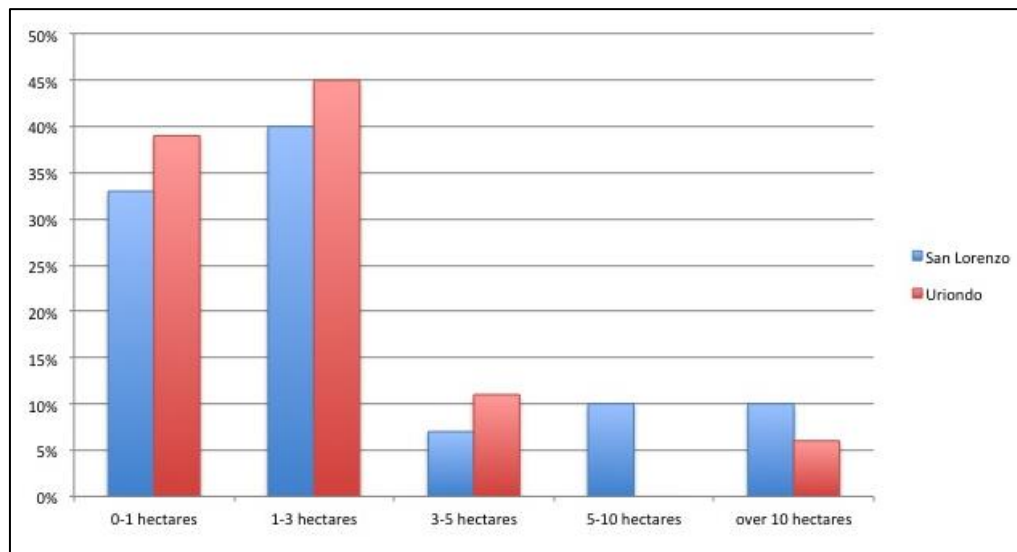


Figure 36. Size of landholdings by percentage of households per transect.

In total participants used approximately 190 hectares (133 ha belonging to households in the San Lorenzo Transect and 57 ha belonging to households involved in the Uriondo Transect), in addition to the 120 ha belonging to Bodega de la Concepción. The majority of lands registered in Figure 36 are owned by the respective households. Only three households rented lands (one household in San Lorenzo, two households in La Calama, totalling 10.5 hectares) and five households accessed land through sharecropping (one household in each of the communities of La Calama, Marquiri, Valle de la Concepción, La Compañía, and Saladillo). Of these one shared their land and two only

occasionally accessed land this way. In the most common share cropping arrangement, called “*medias*”, two parties agree to share the crop produced on one party’s land through the other party’s labour.

Eleven households (eight in Marquiri, one in La Compañía, and two in Saladillo) also discuss using common lands for pasturing goats, sheep or creole cattle. Two additional households also reported relaying on pasturing, but are able to do so on their own lands. Although it was not discussed directly, other households also likely engage in limited pasturing of goats, sheep and creole cattle.

Primary production patterns along the transects

Primary production activities varied by household and community; however, patterns of sub-regional specialization are evident as are differences related with distance from urban centres.

Primary production activities and livelihoods

Three categories of primary production were engaged in by participants: dairy, vineyards (27%, 12/13 of those located along the Uriondo Transect), and other agricultural activities (50%, fourteen households in each transect, comprising 47% of households in San Lorenzo and 78% of households in Uriondo), such as livestock production or cultivating fresh produce. Thirty-five per cent of the total participant group were engaged in dairy production. These seventeen households were all located in the zones 1-3 of the San Lorenzo transect. Grape production was engaged in by 27% of households, of whom 12/13 were located along the Uriondo Transect. Fifty per cent of households were involved in other agricultural activities. The percentage of households (56%) was slightly higher in Uriondo than in San Lorenzo (37%, with nine out of fourteen of those households concentrated in Marquiri). The majority of dairy producers are also engaged in the production of animal feeds, such as alfalfa, corn, oats and barley; however, these producers did not discuss this domain of production as a separate component of their livelihood portfolios. Instead, it was seen as synergistic with dairy production.

Although all participants identified primary production as the principal component of their livelihoods, 44% (21/48, 37% of households in San Lorenzo and 56% of those in Uriondo) were also engaged in a range of activities on- and off-farm,

including secondary production, food services, retail or other occupations such as teacher, office worker, construction worker or transportation. Participants were not limited to one primary activity but could free list any activities contributing to the household. Figures 38 and 39 indicate the percentage of households in each zone and each transect, involved in each category of livelihood activity.

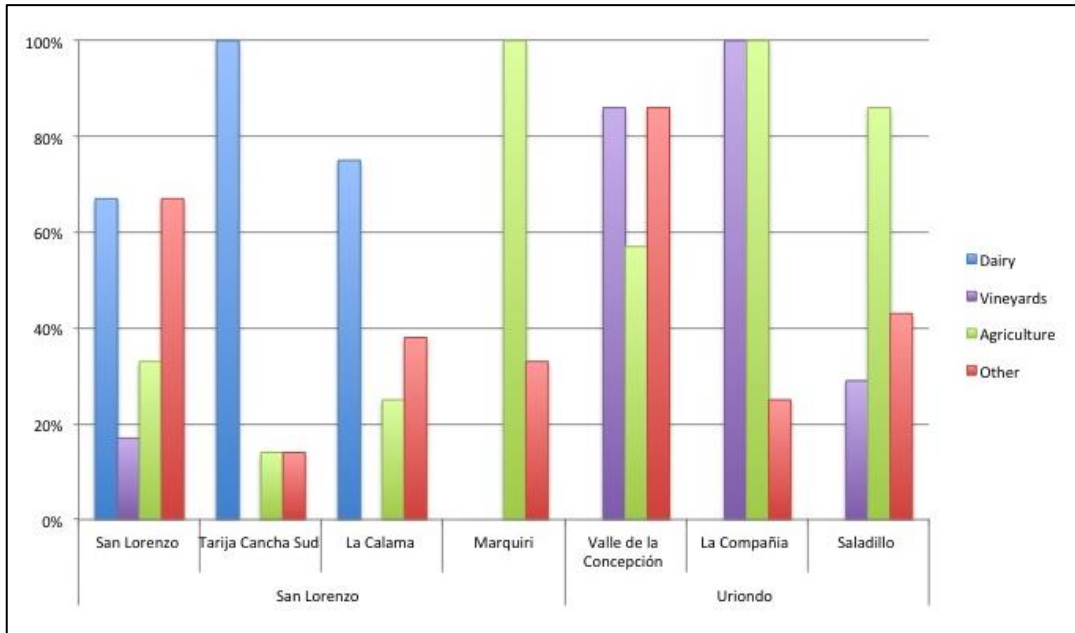


Figure 37. Percentage of households in each transect zone involved in dairy, vineyard, agriculture or other livelihood activities.

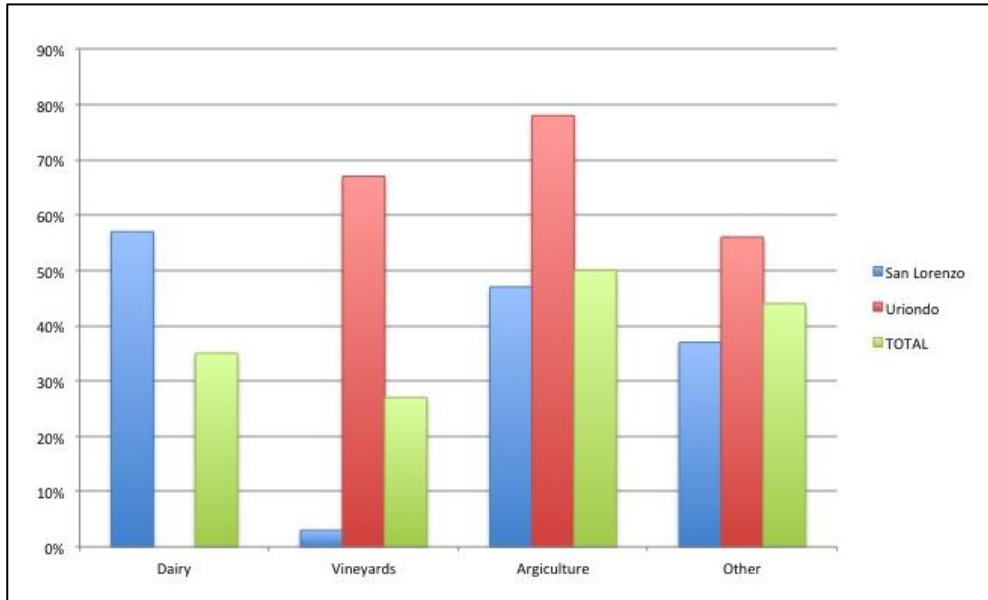


Figure 38. Percentage of households involved in dairy, vineyard, agriculture or other livelihood activities summarized by transect and total participants.

Fifty-four per cent of households were involved in more than one livelihood activity (Figure 39). Of the three primary production activities, vineyards were the most commonly undertaken in conjunction with other activities. While ten dairy producers (21% of total households) and eleven agricultural producers (23% of total households) concentrated on a single activity, only one grape producer focused exclusively on grape production.

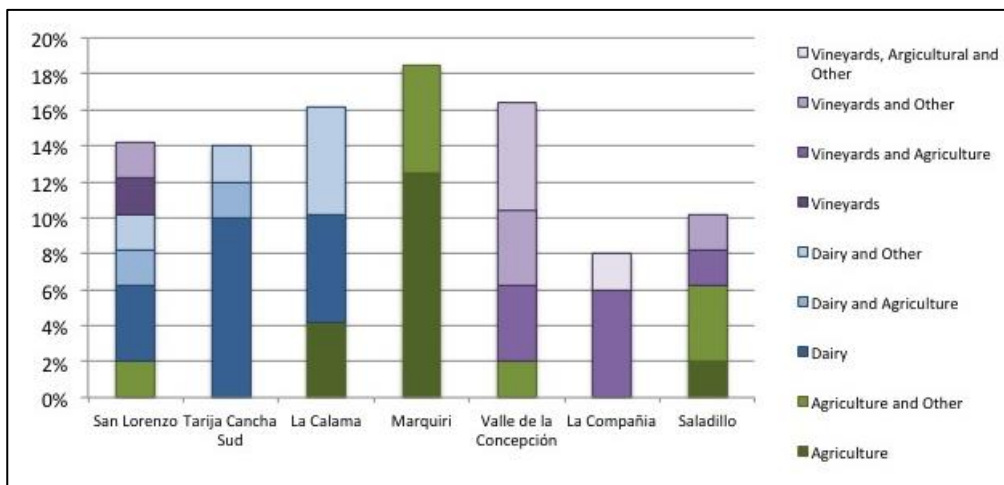


Figure 39. Households involved in multiple primary production and other livelihood activities.

Crop and livestock diversity and use in primary production

The crops and livestock produced in each zone and their relative frequency of production based on a scale of 1 to 4, with 4 being the most commonly produced and 1 the least, are presented in Appendix F. Over 48 types of plants and animals were reported as part of the production profiles of participating households. However, only corn, potatoes, peaches, onions, chickens and pigs were reported in all 7 transect zones. Other crops and livestock common to the majority of the zones (6/7) were peas, fava beans (*Vicia faba*), figs and sheep, and to lesser degree (5/7 zones) grapes, dairy cows, walnuts, leafy greens and other vegetables. Nineteen plant and animal species were only reported by one to two households. These include, other forage (i.e. vicia), peanuts, asparagus, hot peppers (*ají*), ajipa, papalisa, oca, carrots, cabbage, beets, achochas, strawberries, passion fruit, pomegranate, loquat, avocado, prickly pear cactus, grapefruit and turkey.

Certain products tend towards greater degrees of market-orientation – notably those that have been the focus of market development, such as dairy and grapes – than others that more commonly tend toward household consumption. The series of graphs presented in Appendix F describe the usage of crops and livestock within each transect zone and transect by transferring research participants descriptions of the uses of their crops and livestock to a Likert scale from 0 to 5. 0 represents crops or animals not produced by the household. 1 represents the highest degree of marketness (crop or animals are produced exclusively for sale on the market) and 5 represents the highest degree of embeddedness of primary production in which crops or animals are produced exclusively for household consumption or for transformation within the household. 2 represents situations in which the majority of production was sold, however, some surplus, lower quality or small amount of the production was retained for household use. Situations in which production was divided more or less equally between the market and household or in which production was as likely to be sold as it was to be used at home depending on volume of production and opportunity in a given year were given 3. Finally, 4 describes situations in which the majority of production was for the household; however, some surplus is sold or a small amount of production is sold when special opportunities present themselves or the household experiences the need for cash.

In spite of some commonalities between the transects, when occurrence and use of crops are examined, distinct primary production patterns are apparent between and within each transect.

San Lorenzo Transect

A Bray-Curtis Similarity Cluster Analysis groups zones 1-3 in San Lorenzo as the most similar of all of the seven zones comprising the two transects. Dairy production is a defining characteristic of primary production within the first three zones of the San Lorenzo Transect. Fifty-seven per cent of all households are involved in dairy production, including 67% of households in the San Lorenzo Zone, 100% in Tarija Cancha Sud and 75% in La Calama. The widespread production of animal feeds, of which corn (produced by 90% of total households), oats and alfalfa (produced by 53% and 60% respectively) were the most common, is also related with the prevalence of dairy cows as the majority of households with dairy cows also produce all or part of their feed.

Chickens and pigs were produced by 73% and 63% of all households. Three of these households operate chicken (2 households) and hen (1 household) barns at an industrial scale for meat and eggs for the market. The remaining pigs and poultry were produced at a small scale, largely for household consumption.

Along with corn, which is a dual-purpose feed and food crop, potatoes and peas were the most commonly produced crops for human consumption. Many households also grew some combination of fruit (e.g. peaches, figs, apples, plums, or walnuts) and vegetables (e.g. onions, fava beans, or leafy greens); however, most were growing very small quantities almost exclusively for household consumption. Only a few families reported occasionally selling some of their fruit and vegetable production. One producer in La Calama grew strawberries as a commercial crop.⁸³ One household in San Lorenzo also produced 0.25 ha of grapes. The other grape producers limited their production to a few plants, most commonly used as ornamentation and shade in their inner courtyard.

⁸³ It is notable that although a cooperative (*La Asociación de Fruticultores de Tarija: AFRUTAR*) producing and marketing high value berries and vegetables, particularly raspberries and asparagus, was active in the area from the late 1990s through to the late 2000s no evidence of current raspberry or other high value produce production, with the exception of strawberries, was identified along the transect.

The fourth zone of the San Lorenzo Transect, Marquiri, shows a distinctive pattern of production associated with distinct norms of land use. Most notably there is no dairy industry in this zone. Only one household reported owning dairy cows (3 adults and 2 calves); however, they were described and observed to be very sickly and their milk was not brought to market. The absence of dairy cows also accounts for the lower production of animal feed. By contrast 78% of households report having goats, 67% creole cattle, and 33% sheep, all of which are commonly pastured in the surrounding hillsides. Also a higher number of households report selling fruit, vegetables and tuber crops. The diversity of tubers grown in this zone is also greater and includes four species (yacon, ajipa, papalisa and oca) not reported in any other transect zone in San Lorenzo or Uriondo. Corn and potatoes remained the most widely produced crops (produced by 100% of households); however, as with fruit and vegetables, a larger number of households reported selling a higher percentage of their crop more frequently.

Uriondo Transect

Fruit and vegetable crops that emerge as important along the San Lorenzo Transect are reported as even more so in Uriondo households. Grape production is the clearest example and, in contrast to dairy production in 3 of 4 zones in San Lorenzo, is a defining characteristic of production in Uriondo. Seventy-eight per cent of households produced grapes, of which the majority were for market and the remainder of production was for transformation within the household, most often with sale of the resulting wine or *singani* as the final outcome. Six of 7 households in Concepción and 4 of 4 households in La Compañía had vineyards, compared with only 4 of 7 households in Saladillo. The corporate vineyard belonging to Bodega de la Concepción is also located in the second zone of this transect. Peach production is also reported by 67% of households, with over half of those selling all or the majority of their production. As in San Lorenzo, the most common reason cited for not selling peach crops was the low productivity of peaches related with climatic conditions. Other fruit and vegetable crops were also commonly produced for a mixture of market and household purposes.

Households in Uriondo also reported less livestock. Only two households (one in Valle de la Concepción and one in Saladillo) reported having dairy cows, although neither produced primarily for the market. Pigs (3/3 zones), creole cattle, sheep, and

chickens were reported in 2 of 3 zones. The highest diversity of livestock and vegetables is found in Zone 3 (Saladillo). Corn and potatoes were reported in all 3 zones for a mix of market and household purposes; however, more of the production was reported to be sold than in San Lorenzo. Other tubers and animal feeds were not commonly produced.

C: Primary production system typologies

Similarities and differences among the households suggest that four distinct production strategies are pursued and that households using these distinct strategies are geographically concentrated in different transect zones giving rise to clear regional production patterns. The following groups these strategies into four production system typologies of production found in the study communities: System 1) the commercial dairy-based system, primarily pursued in San Lorenzo, Tarija Cancha Sud and La Calama; System 2) the vineyard with other agricultural production-based system, as seen in Valle de la Concepción, La Compañía and, to a lesser extent, in Saladillo; System 3) the agriculture with animal husbandry system, as seen in Marquiri; and, System 4) agriculture without, or with limited, animal husbandry, as seen in a small number of households in each transect.

These are not perfect categories. While the dairy and vineyard systems have the clearest delineations, there is more grey area surrounding how to classify the remaining systems. Furthermore, these classifications are based on snapshots in time. Many of the households in their past, sometimes including their not too distant past, would have fit within another production typology. Households M-3 and M-6, here discussed as System 4, a few years ago would have been System 2 and culturally are still part of that system. While S-5 is in the process of shifting from System 3 to System 2, with new commercial grape vines in their first year of establishment. Similarly other households currently using other production strategies and classified as System 3 or 4, also produced commercial grapes in the past (e.g. SL-1, V-6).

System 1: The commercial dairy-based system

The commercial dairy-based system, represented in San Lorenzo, Tarija Cancha Sud and La Calama, centres on the commercial production of fresh milk. The household economies of 17 households participating in this research are based on this system of

production. The central feature of this system is the Holstein dairy cow, often with feed produced on farm. Other primary production activities, such as the production of potatoes or other crops or animals for household consumption, are secondary and generally occurring at a small scale. An overview of household assets, including landholding and herd size, is provided in Table 33.

Table 33. Summary of dairy production household assets.

#	Household Number	Community	Land holdings	Amount of irrigated land (approx.)	Number of cows
1	SL-1	San Lorenzo	20 ha	Unknown	100
2	SL-3	San Lorenzo	15 ha	> 50%	Not disclosed
3	SL-4	San Lorenzo	8 ha (rented)	50%	15
4	SL-5	San Lorenzo	3.5 ha	100%	17 (including young)
5	TCS-1	Tarija Cancha Sud	1 ha	50%	5
6	TCS-2	Tarija Cancha Sud	1.5 ha	> 50%	25
7	TCS-3	Tarija Cancha Sud	30 ha	> 50%	8 (6 productive)
8	TCS-4	Tarija Cancha Sud	2.5 ha	100%	6 adults (+ young)
9	TCS-5	Tarija Cancha Sud	3 ha	50%	25 (14 adults)
10	TCS-6	Tarija Cancha Sud	2.5 ha	Unknown	6 (2 calves)
11	TCS-7	Tarija Cancha Sud	Unknown	Unknown	3 (plus young ones)
12	LC-3	La Calama	1 ha	100%	2 (plus 2 young)
13	LC-4	La Calama	2 ha + 1 ha (rented)	100%	5 (2 productive)
14	LC-6	La Calama	5.5 ha + 1 (medias)	100%	10 (5 productive, 3 young)
15	LC-7	La Calama	0.25 ha	Known	3 (2 adults)
16	LC-8	La Calama	2 ha	< 50%	4
17	LC-9	La Calama	1.5 ha + 1.5 ha (rented)	100%	7 (2 productive)

History of dairy production

Holstein cows were first brought to the Central Valley in the late 1970s as part of a development program led by a coalition of public agencies, international organizations, and PIL-Tarija (*Programa de Industrias Lácteas*), which was established in 1976 (Tapia & Pimentel, 1978). From an initial group of a few families organized around *centros de acopio* (collection centres) in select communities, including Tarija Cancha Sud and

nearby Rancho, there are now more than 900 dairy producers in Tarija and several hundred in fourteen communities in San Lorenzo Municipality (Vásquez Mamani & Gallardo Aparicio, 2012, p. 157). Long the San Lorenzo transect the expansion of the dairy industry is evidenced by the recent incorporation and rapid growth of dairy production in La Calama.

Production profiles

Twenty-nine categories of plants and animals were reported by dairy production-based households (Table 34). Within this group of dairy production-based households, 100% (17/17 household) had dairy cattle. All households reported producing animal feed. The most common of which was corn, produced by 100% of households (17/17), followed by alfalfa produced by 94% of households (16/17). Oats were produced by 71% of households (12/17) and barley by 18% (3/17). Other fodders, specifically vicia – a legume, were only reported by 1 household (SL-3); although, another household (SL-1) reported an interest in experimenting with sorghum. The average number of animal feed species produced per household was 2.9. The majority of households (59%, 10/17) produced 3 types of fodder, while 29% (5/17) were growing two. Only two households were producing 4 and 5 types of fodder respectively.

All households also produced some other crop or animal for household consumption. Seventeen species of plants and 6 species of small livestock were reported. The average household produced 9.6 species, including dairy cattle and their feed. Although some households report occasionally selling these other products, and one household owns a commercial chicken barn wholly oriented toward the market, the average market vs. non-market orientation score for these products was 4.9, showing an almost exclusive orientation towards household use.

Table 34. Household production and use profiles of crops and livestock.

#	Crop/ Livestock	Occurrence		Average use score ¹	Usage
		# of HHs	%		
1	Dairy cows	17/17	100%	1.35	Milk sold, only small amounts for household consumption and transformation (most commonly when milk cannot be delivered)
2	Corn	17/17	100%	5	Animal feed, some for household consumption
3	Alfalfa	16/17	94%	5	Animal feed
4	Pigs	13/17	76%	4.7	Household consumption, occasionally sold if need or opportunity arises
5	Potatoes	12/17	71%	4.75	Household consumption, occasionally sold if need or opportunity arises or there is a production surplus
6	Oats	12/17	71%	5	Animal feed
7	Chickens/ hens	11/17	65%	4.3	Household consumption, occasionally sold if need or opportunity arises (10/11 producing households). 1 household has commercial chicken barns.
8	Peas	10/17	59%	5	Household consumption
9	Peaches	7/17	41%	4.6	Household consumption, animal feed (pigs), and sold when possible (sufficient harvest). Noted as unreliable, poor production.
10	Onions	6/17	35%	4.5	Household consumption, occasionally sold if need or opportunity arises or there is a production surplus
11	Sheep	6/17	35%	5	Household consumption
12	Ducks/ geese	5/17	29%	5	Household consumption
13	Grapes	4/17	24%	5	Household consumption, decoration and transformation
14	Apples	3/17	18%	5	Household consumption
15	Barley	3/17	18%	5	Animal feed
16	Fava beans	3/17	18%	5	Household consumption
17	Other vegetables	3/17	18%	4.7	Household consumption, occasionally sold if need or opportunity arises or there is a production surplus
18	Figs	2/17	12%	5	Household consumption
19	Leafy greens	2/17	12%	4.5	Household consumption, occasionally sold if need or opportunity arises or there is a production surplus
20	Beans	2/17	12%	5	Household consumption
21	Walnuts	2/17	12%	5	Household consumption
22	Plums	1/17	6%	5	Household consumption
23	Squash and <i>lacayote</i>	1/17	6%	5	Household consumption
24	Peanuts	1/17	6%	5	Household consumption
25	Other forage	1/17	6%	5	Animal feed
26	Loquat	1/17	6%	5	Household consumption
27	Avocado	1/17	6%	5	Household consumption
28	Turkeys	1/17	6%	5	Household consumption
29	Goats	1/17	6%	5	Household consumption

¹Calculated based on usage by producing households.

There was variation among households with respect to non-dairy related production. Among all households, pigs (13/17), potatoes (12/17), chickens or hens (11/17) and peas (10/17) were the most commonly produced. These were followed by peaches (7/17), onions (6/17), sheep (6/17) and ducks (5/17). Four or fewer households produced the remaining species. When these plants and animals are functionally grouped into vegetables, fruits, starches (i.e. potatoes and excluding corn, which in this system was overwhelmingly described as primarily a feed rather than food crop and so is grouped with feed), poultry and small livestock (pigs and small ruminants) categories (Figure 40), 10 households were producing 4-5 of these categories, 4 were producing 2-3 and 3 were only producing one (two pigs and one chickens). Although the average number of species produced in each category is just over one in most cases (Table 35) the average total of non-dairy related species produced per household is 5.8. Three households report only producing one other product, while 10 households produced between 3 and 6 products. The remaining 4 households produced 8, 10, 12 and 18 products respectively.

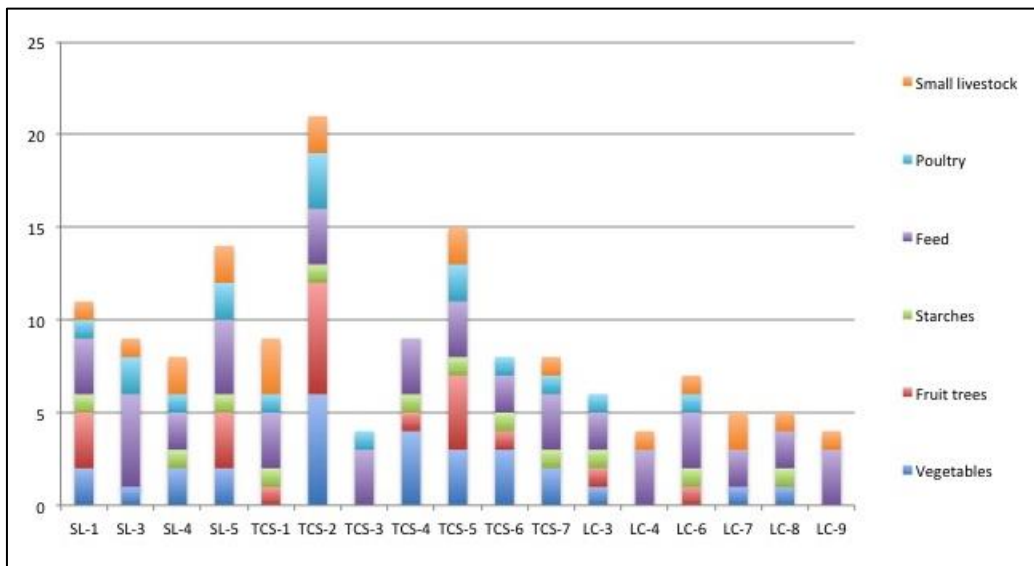


Figure 40. Involvement of dairy households in non-dairy related production activities by category waited by number of species produced by each household.

Table 35. Primary production profiles and product uses grouped by product category.

Functional Category	# of species/sub-categories	Occurrence (Number of households)	Average number of species ¹	Average market/non-market score ²	Most commonly produced species
Vegetables	8	12/17	1.6	4.8	Peas (10/17) Onions (6/17)
Fruits	8	9/17	1.2	4.95	Peaches (7/17)
Starches	1	12/17	0.7	4.75	Potatoes (12/17)
Feed	5	17/17	2.9	5	Corn (17/17) Alfalfa (16/17) Oats (12/17)
Poultry	3	12/17	1	4.8	Chickens/hens (11/17)
Small livestock	3	13/17	1.2	4.9	Pigs (13/17) Sheep (6/17)

¹ Average number of species per category produced by the household following this production strategy.

² Average market/non-market orientation score based on the average score per product (table X) divided by the number of products per category.

An illustrative example of this production system is a household in Tarija Cancha Sud (TCS-6), which, in addition to milk from their 6 dairy cows and cattle feed (in this case corn and alfalfa), produces potatoes, as well as a row each of peas, beans and onions and has a few apples trees along with a small flock of chickens. While the vegetables, fruit and chickens remain within the household, except on rare occasions when a surplus of onions might be sold, milk is a commercial product sold daily and produced using feed inputs produced on-farm, as well as other in-puts bought off-farm. Occasional transformation of fresh milk into cheese for consumption and sale is also engaged in during times when it is not possible to bring fresh milk to market (see Chapter 5). The characteristics of this system are schematised in Figure 41.

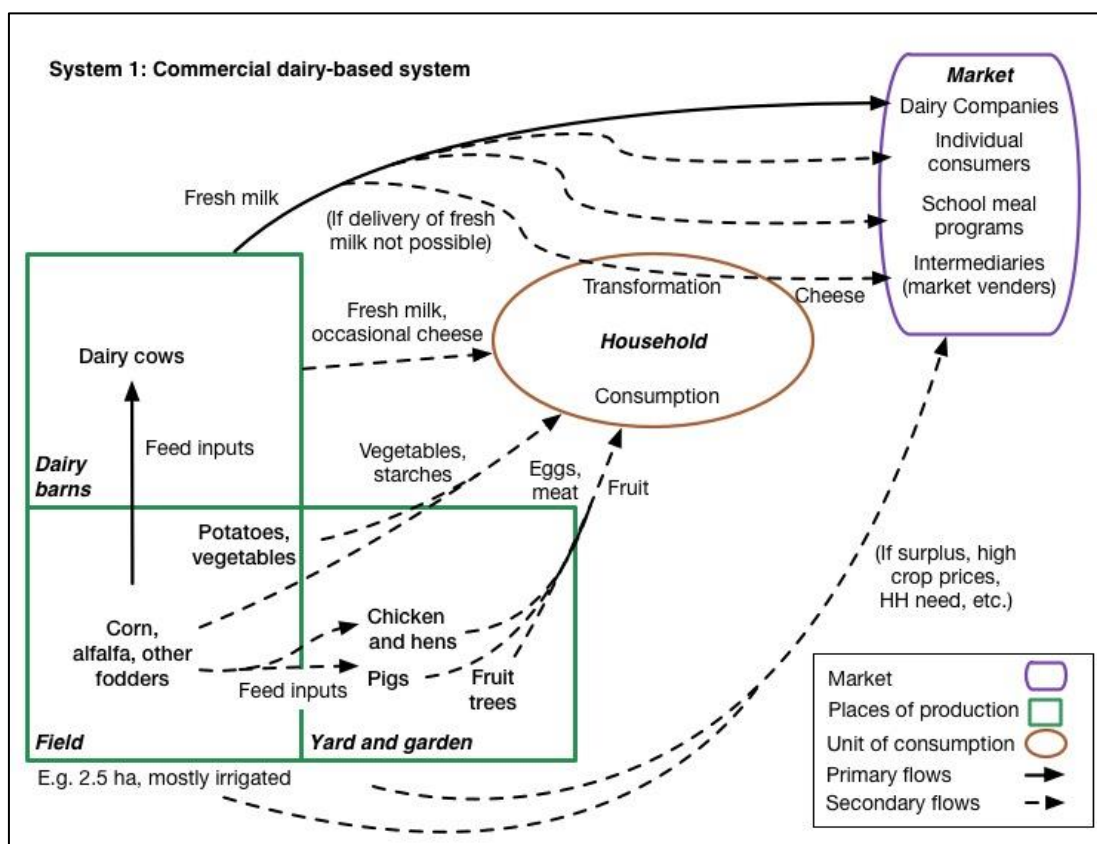


Figure 41. Common features of a dairy production-based household. The green squares show the main sites of primary production and the livestock and crops associated with them. The flows of those products are shown with arrows leading to the market through different channels of commercialisation and to the household, which is a unit of consumption and also of transformation.

System 2: Vineyard with other agricultural production-based system

This system is characteristic of 13 primary production households predominantly located along the Uriondo Transect in the communities of Valle de la Concepción, La Compañía and Salladillo. One household (SL-20) is located in San Lorenzo and two others in the community of Canasmoro are also included in the analysis of viticulture households provided in Chapter 3. (Refer to Chapter 3 for detailed tables, figures and analysis of viticulture household production profiles.)

These households are distinguished from other grape producing households (e.g. SL-1, SL-8, TCS-2 and TCS-4 who grow grapes in their patios or field edges for decoration, shade and household consumption), by their production of grapes for direct commercial purposes or for transformation with a commercial outcome. This market orientation also corresponds to a larger scale of production. Rather than a few plants,

most commonly planted in a patio, the viticulture households have dozens to 100s of plants planted in fields and trained on trellis systems.

System 3: Agriculture with animal husbandry system

The agricultural with animal husbandry system is a mixed commercial and subsistence production system, in which a diversity of plants and animals are produced for both household and exchange purposes, depending on need and opportunity. A summary of household assets of this group of households are presented in Table 36. The two outliers in this category of primary production are SL-8, which has a commercial chicken barn, and S-5 which has creole cattle, pigs and chickens. The remaining 7 households are located in Marquiri. In addition to engaging in irrigated and rain-fed agriculture, they actively manage herds of goats, sheep and creole cattle through pastoral grazing strategies. As described in Chapter 2, this production system has long history in the Central Valley.

Table 36. Summary of agriculture with animal husbandry household assets.

#	Household Number	Community	Land holdings	Amount of irrigated land (approx.)	Use of pasture or common land
1	SL-8	San Lorenzo	0.5	50%	No
2	M-1	Marquiri	1	Unknown	Yes
3	M-2	Marquiri	2	Unknown	Yes
4	M-4	Marquiri	3	100%	Yes (limited)
5	M-5	Marquiri	0.25 + occasionally <i>medias</i>	< 50%	Yes
6	M-7	Marquiri	0.5 (unclear)	0%	Yes
7	M-8	Marquiri	3	50%	Yes
8	M-9	Marquiri	2	Unknown	Yes
9	S-5	Saladillo	2 ¹	100%	Yes

¹ Land holdings now belong to children.

Production profiles

Thirty-two varieties of plants and animals were reported by the 9 households characteristic of the agriculture with animal husbandry system. Corn and chickens were produced by all households (9/9). Eight of 9 households also produced goats and potatoes, while pigs are produced by 7/9 households, creole cattle and peas were produced by 6 of 9 households and half of households (5/9) also produced leafy greens and peaches. A summary of use profiles of crops and livestock is provided in Table 37.

Table 37. Household production and use profiles of crops and livestock.

#	Crop/ Livestock	Occurrence		Average use score ¹	Usage
		# of HHs	%		
1	Corn	9	100%	4.1	Household consumption, animal feed and occasional sale
2	Chickens/ hens	9	100%	4	Household consumption and occasional sale when need or opportunity arises
3	Potatoes	8	89%	2.9	Sale and household consumption
4	Goats	8	89%	4.1	Household consumption, transformation and occasional sale of meat or cheese when need or opportunity arises
5	Pigs	7	78%	4.1	Household consumption and occasional sale when need or opportunity arises
6	Creole cattle	6	67%	4.2	Household consumption and occasional sale of animals when need or opportunity arises
7	Peas	6	67%	4	Household consumption and occasional sale
8	Leafy greens	5	56%	4.6	Household consumption and occasional sale when need or opportunity arises
9	Peaches	5	56%	4.2	Household consumption and occasional sale when need or opportunity arises
10	Sheep	4	44%	4.5	Household consumption and occasional sale of animal or meat when need or opportunity arises
11	Oats	3	33%	5	Animal feed
12	Yacon	3	33%	3.3	Household consumption and occasional sale
13	Walnuts	3	33%	3.3	Household consumption and occasional sale
14	Alfalfa	3	33%	5	Animal feed
15	Chili peppers (<i>aji</i>)	2	22%	4	Household consumption and occasional sale
16	Onions	2	22%	4	Household consumption and occasional sale
17	Grapes	2	22%	5	Household consumption, ornamentation/shade, and intention of future sale (1 hh with market-oriented grapes in first year of establishment)
18	Oca	1	11%	4	Household consumption and occasional sale
19	Peanuts	1	11%	3	Household consumption and sale
20	Fava beans	1	11%	4	Household consumption and occasional sale
21	Beans	1	11%	4	Household consumption and occasional sale
22	Squash and <i>lacayote</i>	1	11%	5	Household consumption
23	Ajipa	1	11%	3	Household consumption and sale
24	Papalisa	1	11%	4	Household consumption and occasional sale
25	Beets	1	11%	3	Household consumption and sale
26	Alchucha	1	11%	3	Household consumption and sale
27	Other vegetables	1	11%	5	Household consumption
28	Figs	1	11%	5	Household consumption
29	Quince	1	11%	5	Household consumption
30	Pomegranate	1	11%	5	Household consumption
31	Ducks/ geese	1	11%	5	Household consumption
32	Dairy cows	1	11%	5	Household consumption

¹Calculated based on usage by producing households.

When species are grouped into functional categories (vegetables, fruits, starches [i.e. corn and tubers], poultry, small livestock, and large livestock), most households are involved in the production of each of these categories (Figure 42 and Table 38). On average, households produced 2.4 vegetable species, 1.4 fruit species, 2.6 species of starches, 1.1 species of poultry, 2.1 species of small livestock, 0.8 of large livestock (cattle) and 0.7 species of feed, excluding corn, which can be dual purpose.

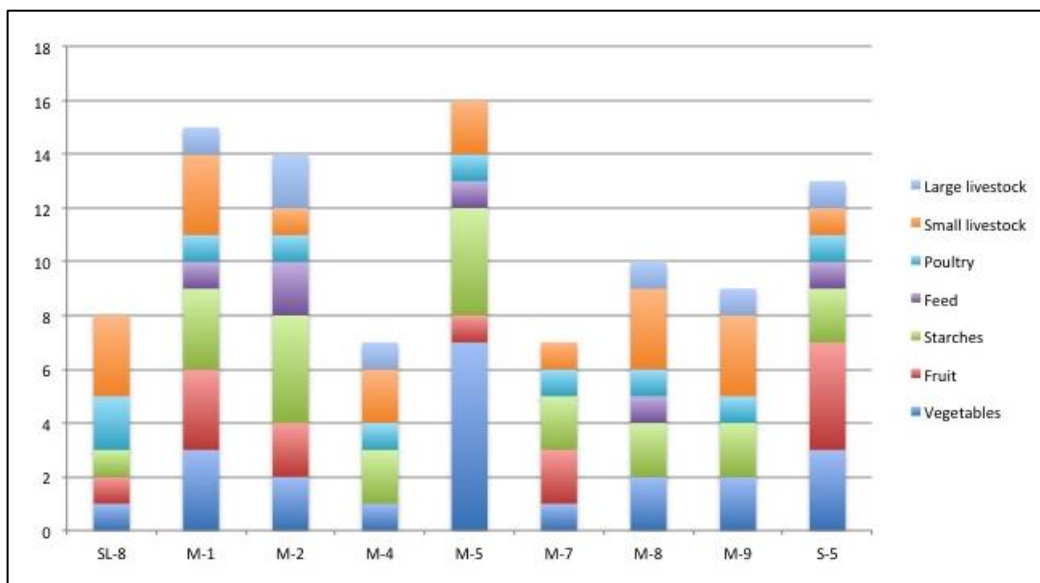


Figure 42. Production activities by category waited by number of species produced by each household.

Table 38. Primary production profiles and product uses grouped by product category.

Functional Category	# of species/sub-categories	Occurrence (Number of households)	Average number of species ¹	Average market/non-market score ²	Most commonly produced species
Vegetables	11	9/9	2.4	3.9	Peas (6/9) Leafy greens (5/9)
Fruits	6	5/9	1.4	3.6	Peaches (5/9) Walnuts (3/9)
Starches	6	9/9	2.6	3.6	Corn (9/9) Potatoes (8/9)
Feed	2	5/9	0.7	5	Oats (3/9), Alfalfa (3/9)
Poultry	2	9/9	1.1	4.5	Chickens/hens (9/9)
Small livestock	3	9/9	2.1	4.2	Goats (8/9), Pigs (7/9)
Large livestock	2	6/9	0.8	4.6	Creole cattle (6/9)

¹ Average number of species per category produced by the household following this production strategy.

² Average market/non-market orientation score based on the average score per product (table X) divided by the number of products per category.

The average market vs. non-market orientation score of plants and animals produced by the household was 4. The product with the highest market orientation is potatoes (2.9), indicating that more than half of the production is intended for the market. Ajipa, beets, achochas and peanuts (each with a score of 3), followed by yacon and walnuts (with scores of 3.3), were other products often sold. Many other plants and animals, or other associated products such as meat or cheese, were sold occasionally, with the majority remaining for household consumption. These include: aba (4), beans (4), fava beans (4), onions (4), papalisa (4), oca (4), chili peppers (4), peas (4), chickens (4), corn (4.1), goats (4.1), pigs (4.1), creole cattle (4.2), peaches (4.2), sheep (4.5), leafy greens (4.6). The remaining products were exclusively used within the household. Figure 43 illustrates the key features of this production system.

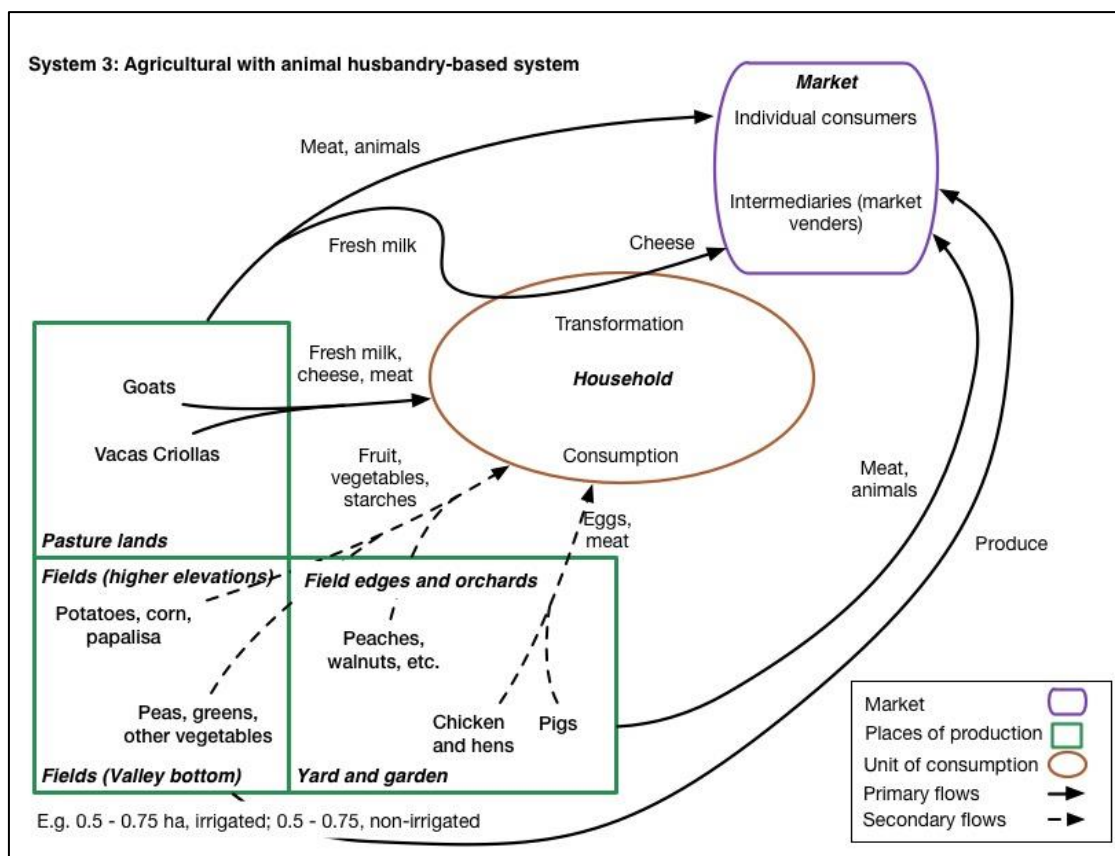


Figure 43. Common features of a household with an agriculture with animal husbandry profile. The green squares show the main sites of primary production and the livestock and crops associated with them. The

flows of those products are shown with arrows leading to the market through different channels of commercialisation and to the household, which is a unit of consumption and also of transformation.

System 4: Agriculture without, or with limited, animal husbandry

Agriculture without, or with very limited animal husbandry, is a production strategy encountered in multiple transect zones and the household circumstances and reasons for this strategy vary significantly. A summary of assets of this group of households is presented in Table 39. Within this category there are three distinct types of production activity occurring. The first are households opting for high levels of specialization. The clearest example of this is LC-1 who exclusively produces strawberries for the market. This is not unlike grape producing household V-3, which exclusively produces grapes for the market. The second group of households are specializing in vegetable and fruit production because of limited space and/or time for livestock (e.g. V-6). Household S-3 straddles both the first and second group as this household is opting for specialization in organic vegetable production. Finally, the third group of households is in production decline because of age and labour difficulties (e.g. LC-2, M-3, M-6, S-1). In the past, these households were engaged in more extensive agricultural and animal husbandry activities.

Table 39. Summary of agriculture without, or with limited, animal husbandry household assets.

#	Household Number	Community	Land holdings	Amount of irrigated land (approx.)	Other land use notes
1	LC-1	La Calama	1 ha	100%	
2	LC-2	La Calama	0.5 ha	>50%	Also has some land in the hills
3	M-3	Marquiri	5-10 ha	>50% (only 0.5 ha)	Now divided among his children
4	M-6	Marquiri	0.5 ha	Not disclosed	
5	V-6	Valle de la Concepción	0.5 ha	100%	
6	S-1	Saladillo	Not disclosed	Not disclosed	
7	S-3	Saladillo	1.75 ha	100%	
8	S-4	Saladillo	2 ha	100%	
9	S-6	Saladillo	1.5 ha	100%	Land now worked by her children

Production profiles

Over all, this group of households have the lowest diversity in their production portfolios, with only 24 species reported among the nine households (Table 40). No crop or animal was produced by all households in this group. The species with the highest occurrence

scores were peaches (5 of 9 households) and chickens (5/9). These were followed by corn, potatoes and peas (each produced by 4/9).

Table 40. Household production and use profiles of crops and livestock.

#	Crop /Livestock	Occurrence		Average use score ¹	Usage
		# of HHs	%		
1	Peaches	5/9	56%	4.4	Household consumption and occasional sale when opportunity arises
2	Chickens/hens	5/9	56%	4.6	Household consumption and occasional sale when need or opportunity arise
3	Corn	4/9	44%	4.25	Household consumption and occasional sale when need or opportunity arise
4	Potatoes	4/9	44%	2.75	Sale and household consumption
5	Peas	4/9	44%	4	Household consumption and occasional sale
6	Onions	3/9	33%	3.3	Household consumption and sale
7	Fava beans	2/9	22%	3.5	Household consumption and sale
8	Squash and <i>lacayote</i>	2/9	22%	4	Household consumption and occasional sale
9	Tomatoes	2/9	22%	2.5	Sale and household consumption
10	Figs	2/9	22%	5	Household consumption
11	Apples	2/9	22%	3.5	Household consumption and occasional sale
12	Creole cattle	2/9	22%	4.5	Household consumption and occasional sale
13	Barley	1/9	11%	5	Animal feed
14	Oats	1/9	11%	5	Animal feed
15	Asparagus	1/9	11%	2	Sale and transformation (use in restaurant)
16	Beans	1/9	11%	5	Household consumption
17	Oca	1/9	11%	4	
18	Leafy greens	1/9	11%	3	Sale and household consumption
19	Grapes	1/9	11%	5	Household consumption
20	Plums	1/9	11%	5	Household consumption
21	Strawberries	1/9	11%	1	Sale
22	Pears	1/9	11%	5	Household consumption
23	Walnuts	1/9	11%	2	Sale and occasional household consumption
24	Grapefruit	1/9	11%	5	Household consumption

¹ Calculated based on market/non-market orientation score of by producing households.

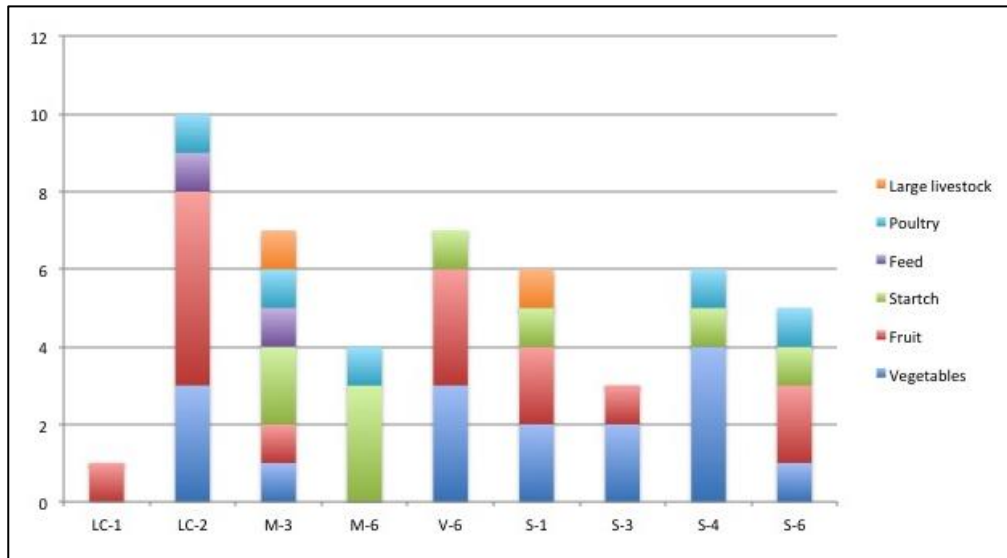


Figure 44. Production activities by category waited by number of species produced by each household.

When plants and animals were grouped into functional categories (vegetables, fruit, starches, feed, poultry and large animals), again no category was engaged in by all households (Figure 44 and Table 41). Fruit and vegetables had the highest occurrence (produced by 7/9 households). No households reported producing small livestock (e.g. pigs, sheep or goats). The overall average market orientation score was 3.9. Figure 45 illustrates the key features of this production system.

Table 41. Primary production profiles and product uses grouped by product category.

Functional Category	# of species/sub-categories	Occurrence (Number of households)	Average number of species ¹	Average market/non-market score ²	Most commonly produced species
Vegetables	8	7/9	1.8	3.4	Peas (4/9) Onions (3/9)
Fruits	9	7/9	1.7	4	Peaches (5/9)
Starches	3	6/9	1	3.7	Corn (4/9), Potatoes (4/9)
Feed	2	2/9	0.2	5	Barley (1/9), Oats (1/9)
Poultry	1	5/9	0.6	4.6	Chickens/hens (5/9)
Large livestock	1	2/9	0.2	4.5	Creole cattle (2/9)

¹ Average number of species per category produced by the household following this production strategy.

² Average market/non-market orientation score based on the average score per product (table X) divided by the number of products per category.

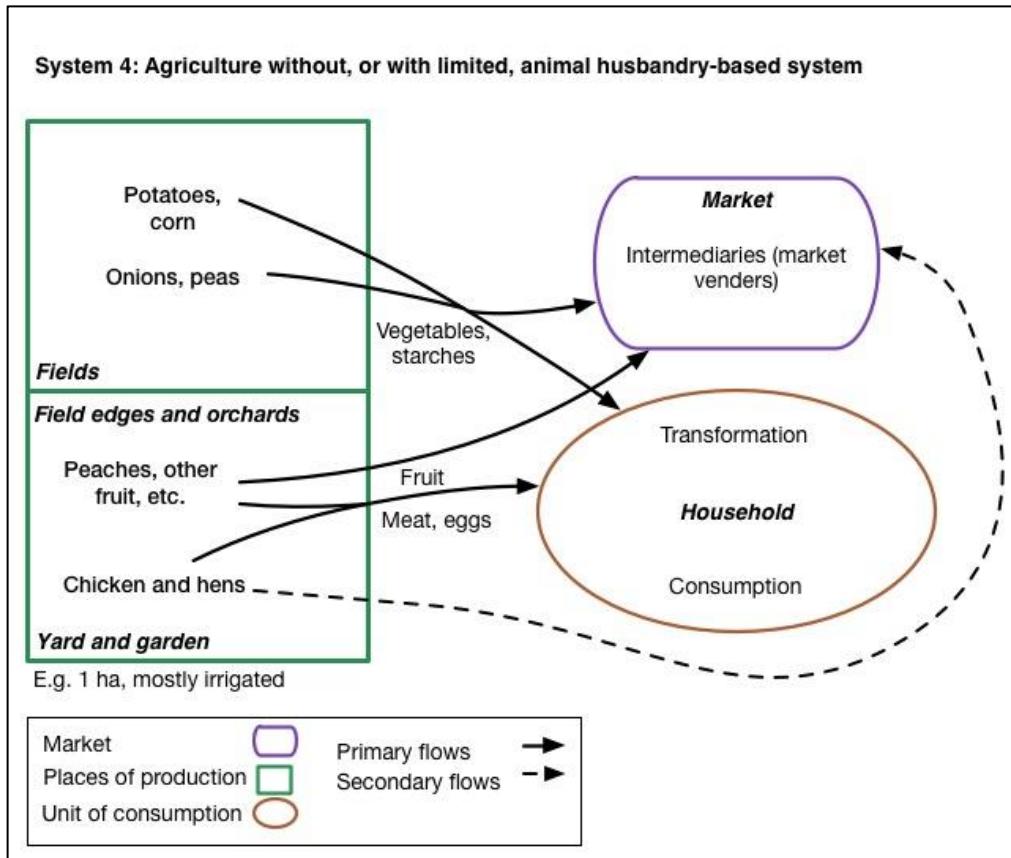


Figure 45. Common features of a household with an agriculture without, or with limited, animal husbandry profile. The green squares show the main sites of primary production and the livestock and crops associated with them. The flows of those products are shown with arrows leading to the market through different channels of commercialisation and to the household, which is a unit of consumption and also of transformation.

Appendix F: Primary production profiles of study communities

Section A of this Appendix provides a complete list of the crops and livestock reported by primary production households in each transect zone based on interviews with primary production households (Table 42). As the number of primary production households in each zone varies, species are given a relative occurrence score. The relative occurrence scores are used to produce Table 43, which ranks reported species according to their prevalence in each zone. Next, the market and non-market orientation scores of each species, grouped by functional category (e.g. fruit or tubers), are analysed according to transect zones and transects, as presented in a series of figures in Section B.

A: Relative occurrence of crops and livestock among study communities

Table 42. Relative occurrence of crop and livestock species in transect zones.

Transect	Zone	Crop List			Livestock List		
		Crop Type (number of species)	Species (Occurrence in participating households)	Relative occurrence score ¹	Livestock type (number of species)	Species (Occurrence in participating households)	Relative occurrence score ¹
San Lorenzo	Zone 1 (San Lorenzo)	Grains (4)	Corn (5/6)	4 (.83)	Small livestock (5)	Chickens/ hens (5/6)	4 (.83)
			Barley (2/6)	2 (.33)		Ducks/ geese (3/6)	2 (.5)
			Other forage [e.g. vicia (vetch), sorghum, etc.] (1/6)	1 (.17)		Goats (1/6)	1 (1.7)
			Oats (3/6)	2 (.5)		Sheep (3/6)	2 (.5)
						Pigs (5/6)	4 (.83)
			Other (1)	Alfalfa (4/6)		3 (.67)	Large livestock (1)

	Tubers (1)	Potatoes (3/6)	2 (.5)	Working animals (3)	Oxen (1/6)	1 (.17)	
	Vegetables (5)	Peas (4/6)	3 (.67)		Horses (1/6)	1 (.17)	
		Fava beans (1/6)	1 (.17)	Donkeys (1/6)	1 (.17)		
		Onions (2/6)	2 (.33)				
		Leafy greens (lettuce, Swiss chard, parsley, etc.) (1/6)	1 (.17)				
		Squash and <i>lacayote</i> (1/6)	1 (.17)				
	Tree fruits and nuts (6)	Pomegranates (1/6)	1 (.17)				
		Peaches (2/6)	2 (.33)				
		Plums (1/6)	1 (.17)				
		Apples (1/6)	1 (.17)				
		Pears (1/6)	1 (.17)				
	Other fruits (2)	Loquat (1/6)	1 (.17)				
		Passion fruit (1/6)	1 (.17)				
Zone 2 (Tarija Cancha Sud)	Grains (3)	Grapes (4/6)	3 (.67)				
		Corn (7/7)	4 (1.)	Small livestock (5)	Chickens/ hens (5/7)	3 (.71)	
		Barley (1/7)	1 (.14)		Turkeys (1/7)	1 (.14)	
	Oats (5/7)	3 (7.1)	Ducks/ geese (3/7)		2 (.43)		
					Goats (1/7)	1 (.14)	
					Sheep (3/7)	2 (.43)	
					Pigs (4/7)	3 (.57)	
		Other (2)	Alfalfa (7/7)	4 (1.)	Large livestock (1)	Dairy cows (7/7)	4 (1.)
			Peanuts (1/7)	1 (.14)			
		Tubers (1)	Potatoes (6/7)	4 (.86)	Working animals (3)	Oxen (2/7)	2 (.29)
				Horses (1/7)		1 (.14)	
					Donkeys (2/7)	2 (.29)	
	Vegetables (7)	Peas (4/7)	3 (.57)				
		Fava beans (2/7)	2 (.29)				
		Beans (2/7)	2 (.29)				
		Squash and <i>lacayote</i> (1/7)	1 (.14)				
		Onions (4/7)	3 (.57)				

		Leafy greens (lettuce, Swiss chard, parsley, etc.) (1/7)	1 (.14)			
		Other vegetables (broccoli, celery, etc.) (1/7)	1 (.14)			
	Tree fruits and nuts (5)	Peaches (3/7)	2 (.43)			
		Figs (2/7)	2 (.29)			
		Apples (3/7)	2 (.43)			
		Avocado (1/7)	1 (.14)			
		Nuts (2/7)	2 (.29)			
	Other fruits (1)	Grapes (2/7)	2 (.29)			
Zone 3 (La Calama)	Grains (3)	Corn (6/8)	3 (.75)	Small livestock (3)	Chickens/ hens (3/8)	2 (.38)
		Barley (1/8)	1 (.13)		Sheep (1/8)	1 (.13)
		Oats (4/8)	2 (.5)		Pigs (5/8)	3 (.63)
	Other (1)	Alfalfa (5/8)	3 (.63)	Large livestock (1)	Dairy cows (6/8)	3 (.75)
	Tubers (1)	Potatoes (3/8)	2 (.36)	Working animals (2)	Oxen (1/8)	1 (.13)
					Donkeys (1/8)	1 (.13)
	Vegetables (4)	Peas (3/8)	2 (.36)			
		Fava beans (1/8)	1 (.13)			
		Onions (1/8)	1 (.13)			
		Other vegetables (broccoli, celery, etc.) (1/8)	1 (.13)			
Tree fruits and nuts (5)	Peaches (3/8)	2 (.38)				
	Figs (1/8)	1 (.13)				
	Plums (1/8)	1 (.13)				
	Apples (1/8)	1 (.13)				
	Grapefruit (1/8)	1 (.13)				
Other fruits (1)	Strawberries (1/8)	1 (.13)				
Zone 4 (Marquiri)	Grains (2)	Corn (9/9)	4 (1.)	Small livestock (4)	Chickens/ hens (9/9)	4 (1.)
		Oats (4/9)	2 (.44)		Goats (7/9)	4 (.78)

					Sheep (3/9)	2 (.33)	
					Pigs (5/9)	3 (.56)	
	Other (1)	Alfalfa (2/9)	1 (.22)	Large livestock (2)	Dairy cows (1/9)	1 (.11)	
					Creole cattle (6/9)	3 (.67)	
	Tubers (5)	Potatoes (9/9)	4 (1.)	Working animals (2)	Oxen (4/9)	2 (.44)	
		Yacon (3/9)	2 (.33)		Donkeys (1/9)	1 (.11)	
		Ajipa (1/9)	1 (.11)				
		Papalisa (1/9)	1 (.11)				
		Oca (2/9)	1 (.22)				
	Vegetables (10)	Peas (6/9)	3 (.67)				
		Fava beans (1/9)	1 (.11)				
		Beans (1/9)	1 (.11)				
		Squash and <i>lacayote</i> (1/9)	1 (.11)				
		Peppers (<i>aji</i>) (1/9)	1 (.11)				
		Onions (1/9)	1 (.11)				
		Leafy greens (lettuce, Swiss chard, parsley, etc.) (4/9)	2 (.44)				
		Beets (1/9)	1 (.11)				
		Achochas (1/9)	1 (.11)				
		Other vegetables (broccoli, celery, etc.) (1/9)	1 (.11)				
	Tree fruits and nuts (4)	Peaches (4/9)	2 (.44)				
		Figs (1/9)	1 (.11)				
		Pears (1/9)	1 (.11)				
		Nuts (3/9)	2 (.33)				
Uriondo	Zone 1 (Valle de la Concepción)	Grains (2)	Corn (3/7)	2 (.43)	Small livestock (3)	Chickens/ hens (1/7)	1 (.14)
			Oats (1/7)	1 (.14)		Sheep (1/7)	1 (.14)
						Pigs (1/7)	1 (.14)
		Other (1)	Alfalfa (1/7)	1 (.14)	Large livestock (1)	Dairy cows (1/7)	1 (.14)
		Tubers (1)	Potatoes (5/7)	3 (.71)			
		Vegetables (7)	Asparagus (1/7)	1 (.14)			

		Peas (2/7)	2 (.29)			
		Fava beans (1/7)	1 (.14)			
		Onions (2/7)	2 (.29)			
		Tomatoes (2/7)	2 (.29)			
		Carrots (1/7)	1 (.14)			
		Beets (1/7)	1 (.14)			
	Tree fruits and nuts (6)	Peaches (3/7)	2 (.43)			
		Figs (2/7)	2 (.29)			
		Apples (2/7)	2 (.29)			
		Pears (1/7)	1 (.14)			
		Quince (1/7)	1 (.14)			
		Nuts (2/7)	2 (.29)			
	Other fruits (2)	Grapes (6/7)	4 (.86)			
		Cactus fruits (tunas) (1/7)	1 (.14)			
Zone 2 (La Compañía)	Grains (1)	Corn (3/4)	3 (.75)	Small livestock (1)	Pigs (1/4)	1 (.25)
	Tubers (1)	Potatoes (4/4)	4 (1.)	Large livestock (1)	Creole cattle (1/4)	1 (.25)
	Vegetables (4)	Onions (2/4)	2 (.5)			
		Leafy greens (lettuce, Swiss chard, parsley, etc.) (2/4)	2 (.5)			
		Tomatoes (1/4)	1 (.25)			
		Other vegetables (broccoli, celery, etc.) (1/4)	1 (.25)			
	Tree fruits and nuts (4)	Peaches (4/4)	4 (1.)			
		Figs (1/4)	1 (.25)			
		Plums (1/4)	1 (.25)			
		Nuts (2/4)	2 (.5)			
	Other fruits (1)	Grapes (4/4)	4 (1.)			
Zone 3 (Saladillo)	Grains (1)	Corn (5/7)	3 (.71)	Small livestock (5)	Chickens/ hens (4/7)	3 (.57)
					Ducks/ geese (1/7)	1 (.14)
					Goats (1/7)	1 (.14)

				Sheep (2/7)	2 (.29)
				Pigs (2/7)	2 (.29)
Other (2)	Peanuts (2/7)	2 (.29)	Large livestock (2)	Dairy cows (1/7)	1 (.14)
	Alfalfa (1/7)	1 (.14)		Creole cattle (2/7)	2 (.29)
Tubers (1)	Potatoes (4/7)	3 (.57)	Working animals (1)	Oxen (2/7)	2 (.29)
Vegetables (10)	Peas (5/7)	3 (.71)			
	Fava beans (2/7)	2 (.29)			
	Beans (3/7)	2 (.43)			
	Squash and <i>lacayote</i> (2/7)	2 (.29)			
	Peppers (<i>aji</i>) (1/7)	1 (.14)			
	Onions (1/7)	1 (.14)			
	Leafy greens (lettuce, Swiss chard, parsley, etc.) (2/7)	2 (.29)			
	Tomatoes (2/7)	2 (.29)			
	Cabbage (1/7)	1 (.14)			
Other vegetables (broccoli, celery, etc.) (1/7)	1 (.14)				
Tree fruits and nuts (5)	Peaches (5/7)	3 (.71)			
	Figs (2/7)	2 (.29)			
	Quince (2/7)	2 (.29)			
	Pomegranates (1/7)	1 (.14)			
	Nuts (1/7)	1 (.14)			
Other fruits (1)	Grapes (4/7)	3 (.57)			

¹Score based on instances of occurrence divided by the number of households in each zone ($\leq 25 = 1$, $26 < 50 = 2$, $51 < 75 = 3$, $76 < 100 = 4$).

Table 43. Comparison of crop and livestock relative occurrence across transect zones.

Transect	Transect zone	Level of occurrence (4 highest, 1 lowest)			
		4	3	2	1
San Lorenzo	Zone 1 (San Lorenzo)	Corn	Alfalfa	Barley	Other forage [e.g. vicia, sorghum, etc.]
		Chickens/ hens	Peas	Oats	Fava beans
		Pigs	Grapes	Potatoes	Leafy greens (lettuce, Swiss
			Dairy cows	Onions	

			Peaches Ducks/ geese Sheep	chard, parsley, etc.) Squash and <i>lacayote</i> Pomegranates Plums Apples Pears Loquat Passion fruit Goats Oxen Horses Donkeys
Zone 2 (Tarija Cancha Sud)	Corn Alfalfa Potatoes Dairy cows	Oats Peas Onions Chickens/ hens Pigs	Fava beans Beans Peaches Figs Apples Nuts Grapes Ducks/ geese Sheep Oxen Donkeys	Barley Peanuts Squash and <i>lacayote</i> Leafy greens (lettuce, Swiss chard, parsley, etc.) Other vegetables (broccoli, celery, etc.) Avocado Turkeys Goats Horses
Zone 3 (La Calama)		Corn Alfalfa Pigs Dairy cows	Oats Potatoes Peas Peaches Chickens/ hens	Barley Fava beans Onions Other vegetables (broccoli, celery, etc.) Figs Plums Apples Grapefruit Strawberries Sheep Oxen Donkeys
Zone 4	Corn	Peas	Oats	Alfalfa

	(Marquiri)	Potatoes Chickens/ hens Goats	Pigs Creole cattle	Yacon Leafy greens (lettuce, Swiss chard, parsley, etc.) Peaches Nuts Sheep Oxen	Ajipa Papalisa Oca Fava beans Beans Squash and <i>lacayote</i> Peppers (<i>ají</i>) Onions Beets Achochas Other vegetables (broccoli, celery, etc.) Figs Pears Dairy cows Donkeys
Uriondo	Zone 1 (Valle de la Concepción)	Grapes	Potatoes	Corn Peas Onions Tomatoes Peaches Figs Apples Nuts	Oats Alfalfa Asparagus Fava beans Carrots Beets Pears Quince Cactus fruits (<i>tunas</i>) Chickens/ hens Sheep Pigs Dairy cows
	Zone 2 (La Compañía)	Potatoes Peaches Grapes	Corn	Onions Leafy greens (lettuce, Swiss chard, parsley, etc.) Nuts	Tomatoes Other vegetables (broccoli, celery, etc.) Figs Plums Pigs Creole cattle
	Zone 3		Corn	Peanuts	Alfalfa

(Saladillo)	Potatoes	Fava beans	Peppers (<i>aji</i>)
	Peas	Beans	Onions
	Peaches	Squash and <i>lacayote</i>	Cabbage
	Grapes	Leafy greens (lettuce,	Other vegetables (broccoli,
	Chickens/ hens	Swiss chard, parsley,	celery, etc.)
		etc.)	Pomegranates
		Tomatoes	Nuts
		Figs	Ducks/ geese
		Quince	Goats
		Sheep	Dairy cows
	Pigs		
	Creole cattle		
	Oxen		

B: Market and non-market orientation of primary products

The following legend applied to all figures below.



Market and household usage of grains and animal feed

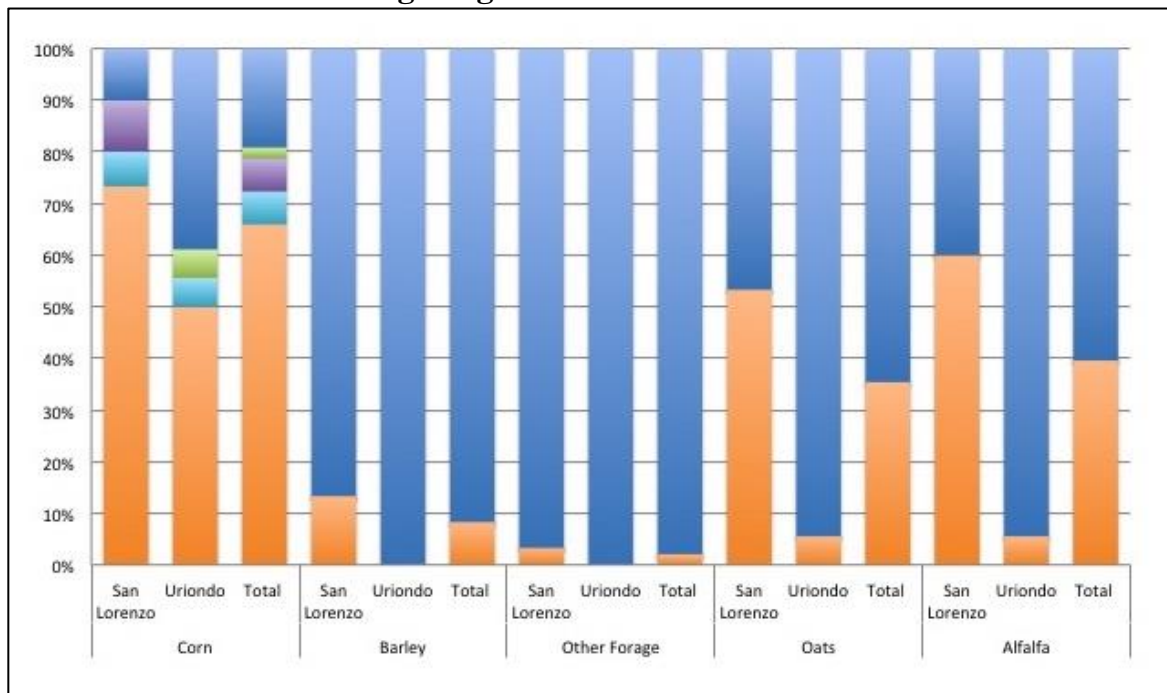


Figure 46. Summary of grain and animal feed usage per transect.

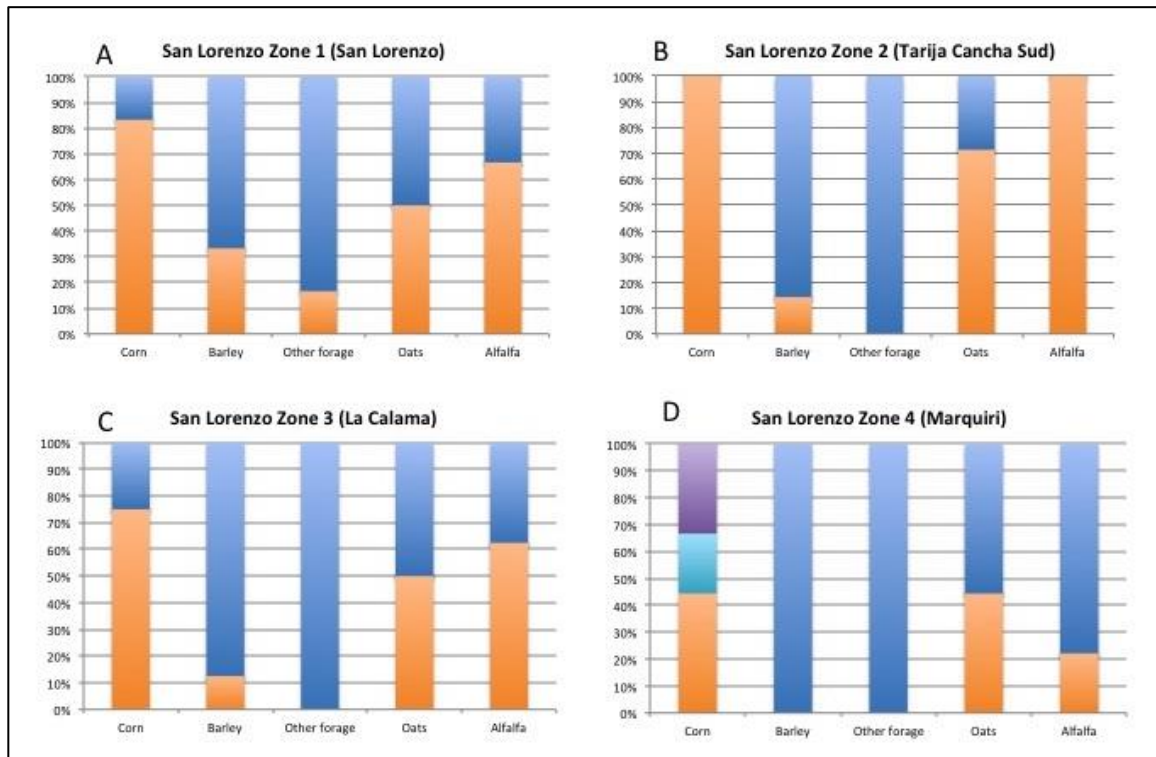


Figure 47. a – d. Summary of grain and animal feed usage by San Lorenzo transect zones.

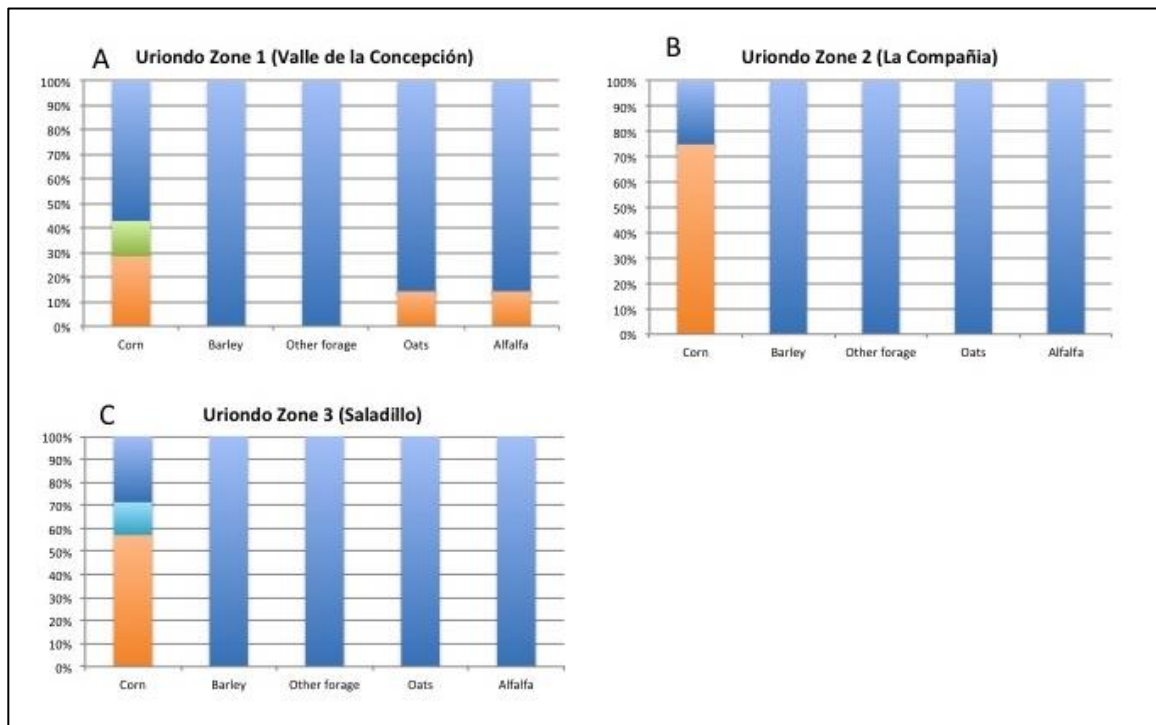


Figure 48. a – c. Summary of grain and animal feed usage by Uriondo transect zones.

Market and household usage of tubers

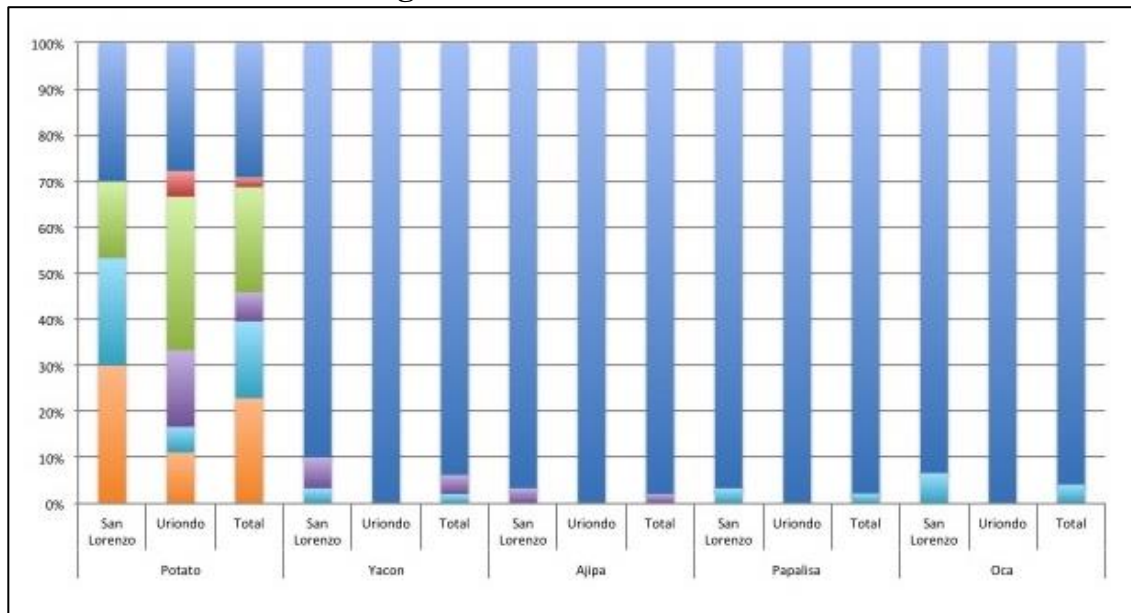


Figure 49. Summary of tuber market and household usage by transect.

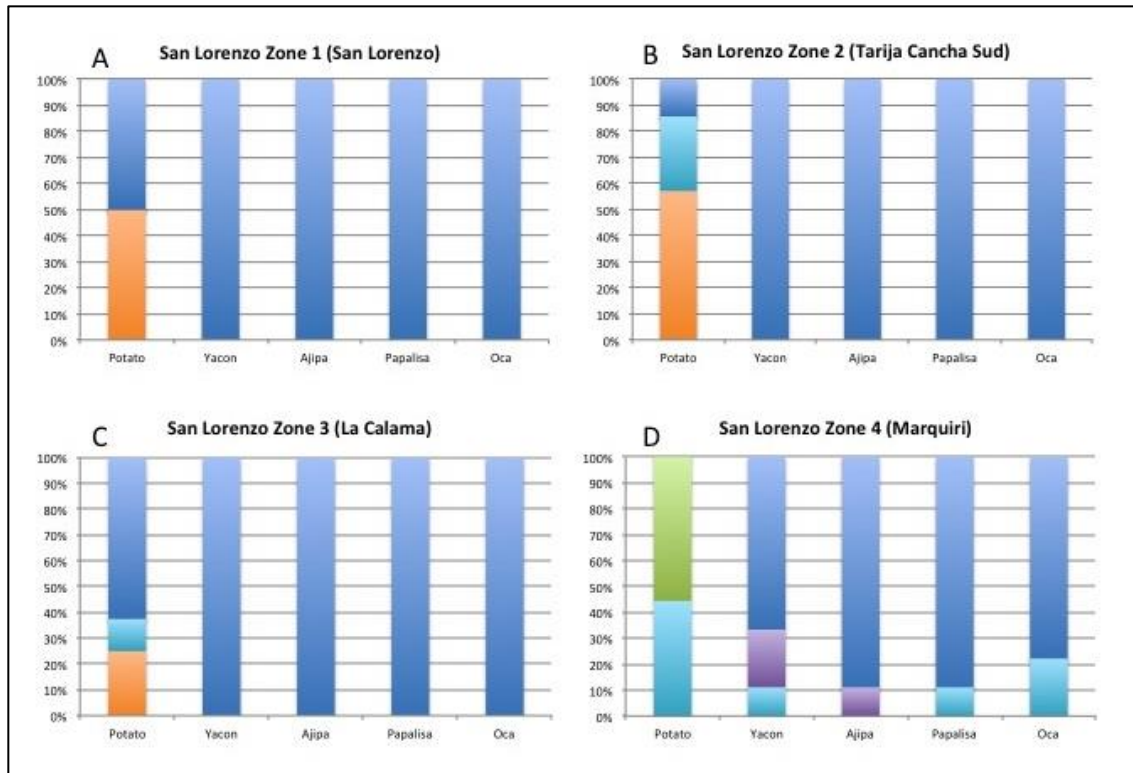


Figure 50 a – d. Summary of tuber usage by San Lorenzo transect zones.

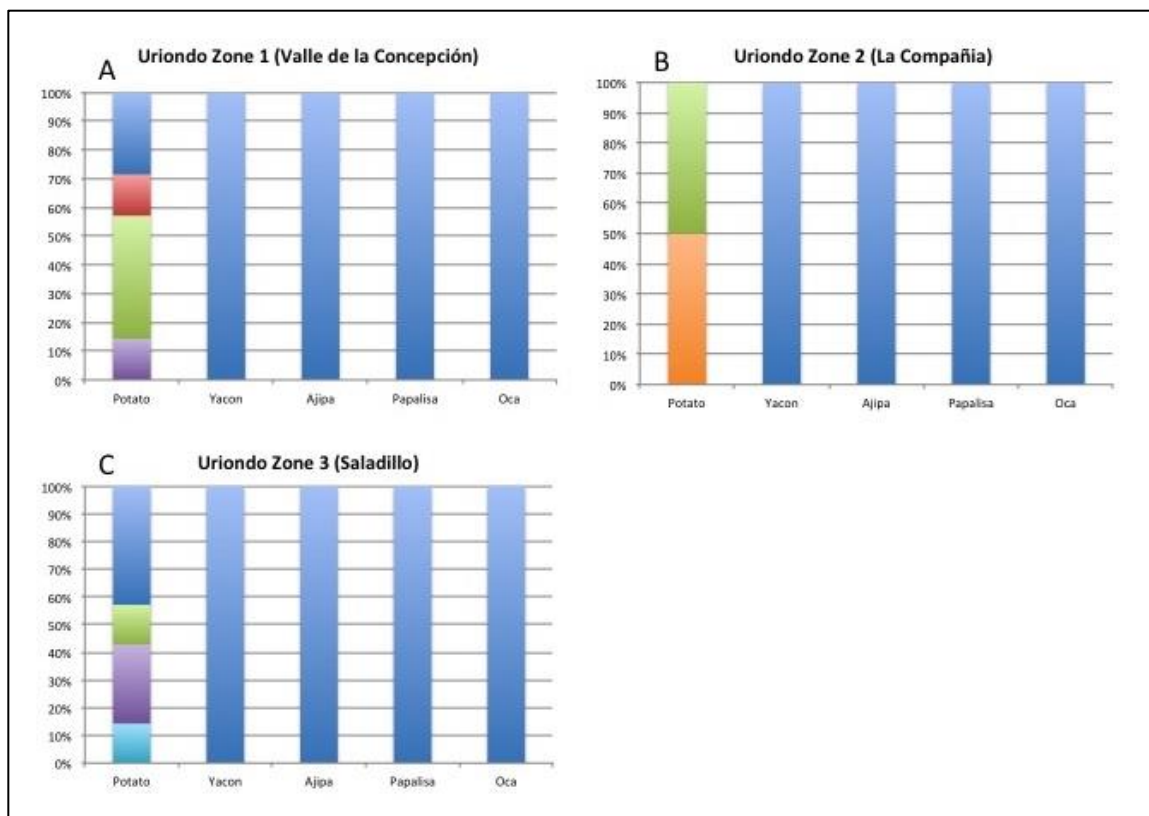
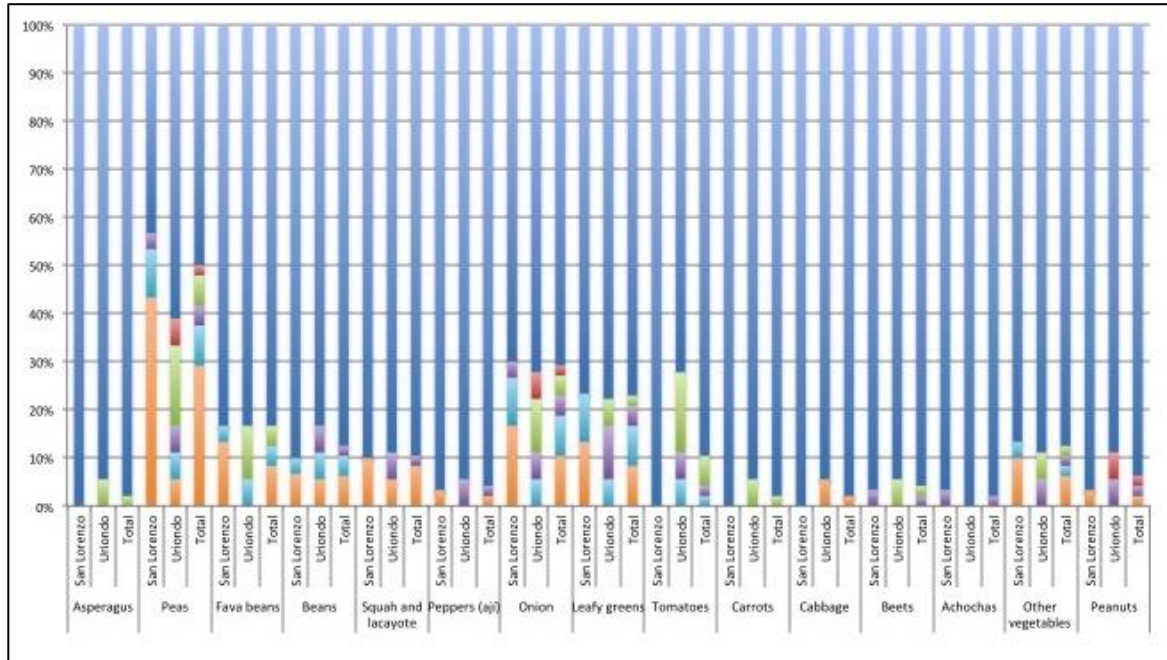


Figure 51 a – c. Summary of tuber usage by Uriondo transect zones.

Market and household usage of vegetables



Note: “Leafy greens” includes lettuce, Swiss chard, parsley, etc. and “Other vegetables” includes celery, broccoli, etc.

Figure 52. Summary of vegetable market and household usage by transect.

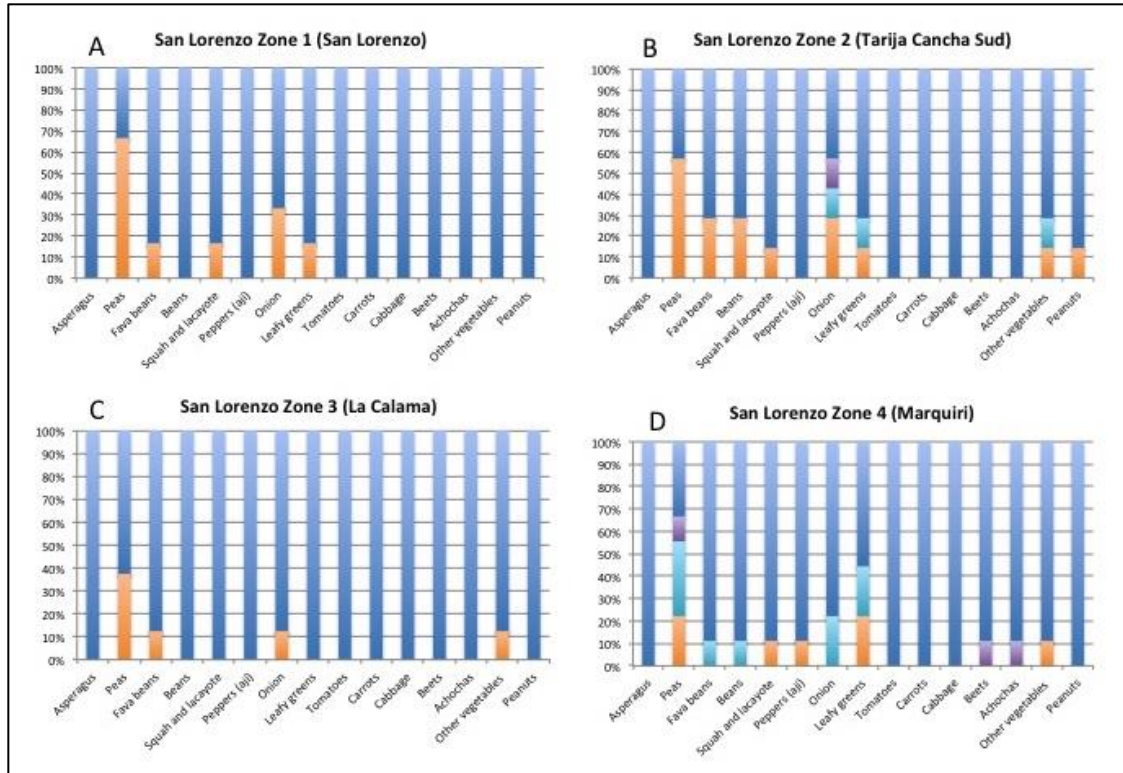


Figure 53 a – d. Summary of vegetable usage by San Lorenzo transect zones.

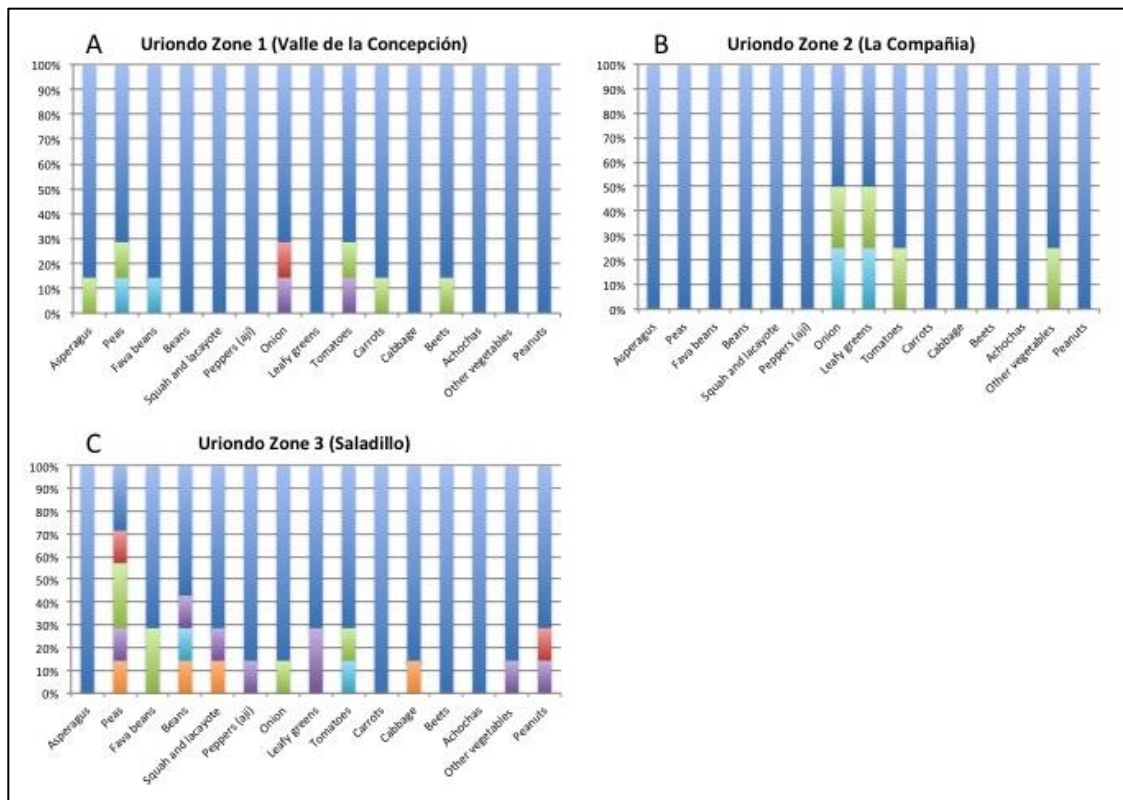


Figure 54 a – c. Summary of vegetable usage by Uriondo transect zones.

Market and household usage of fruits

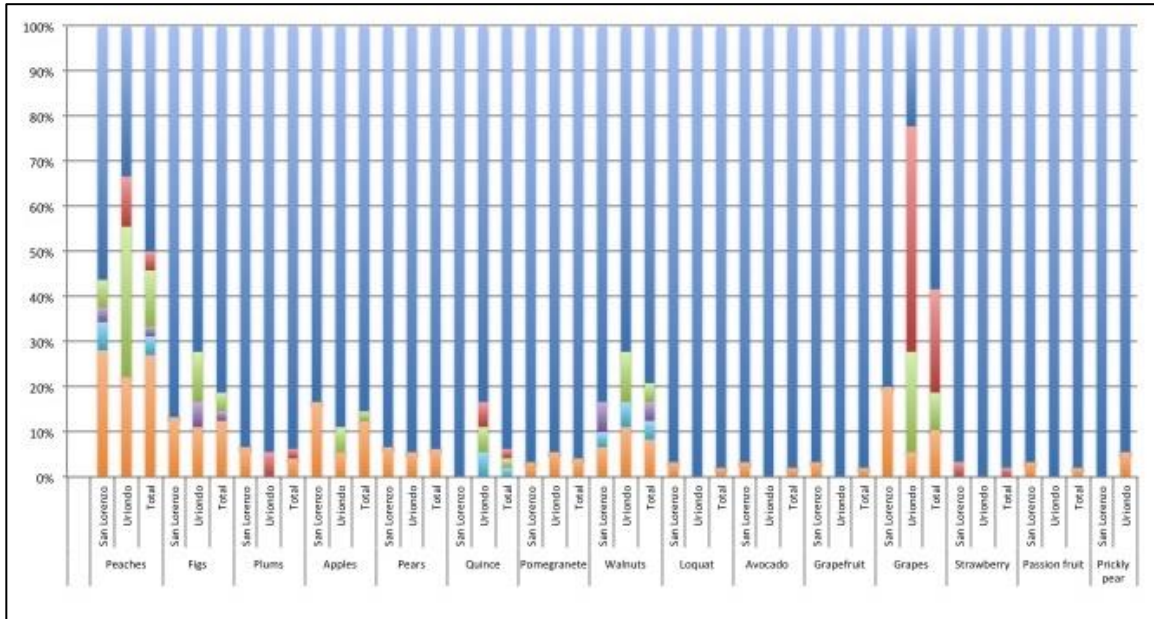


Figure 55. Summary of fruit market and household usage by transect.

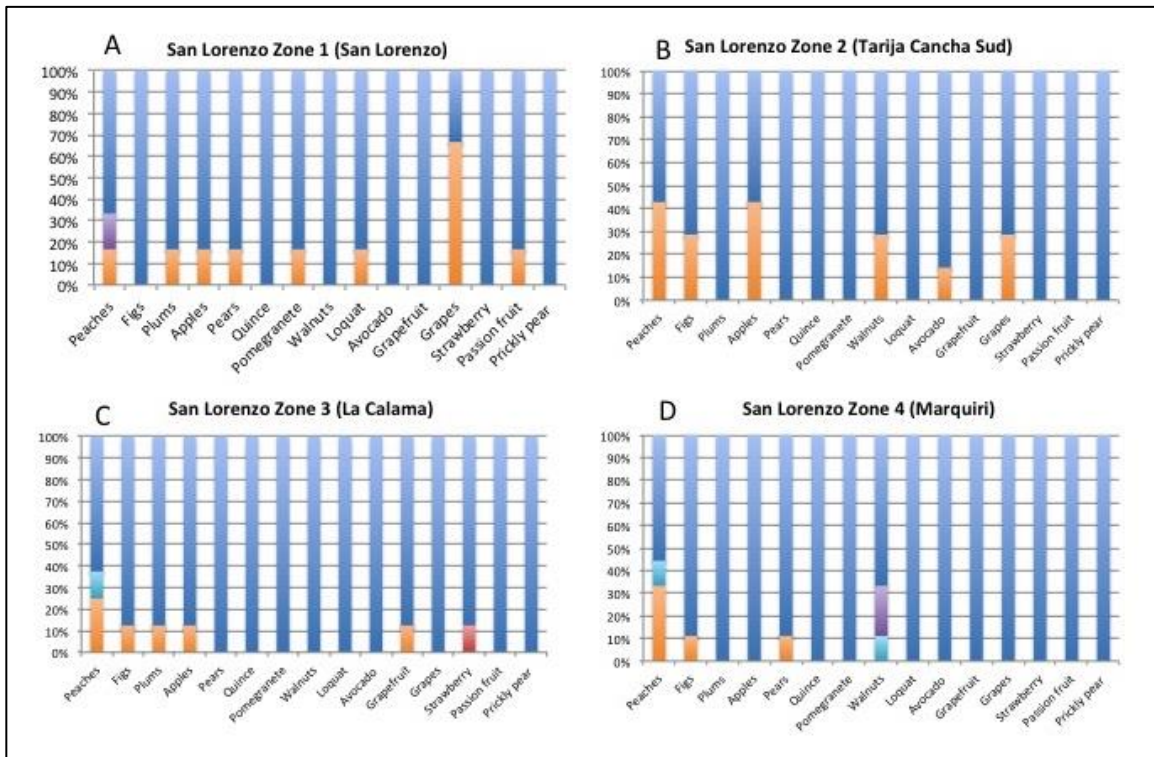


Figure 56 a – d. Summary of fruit usage by San Lorenzo transect zones.

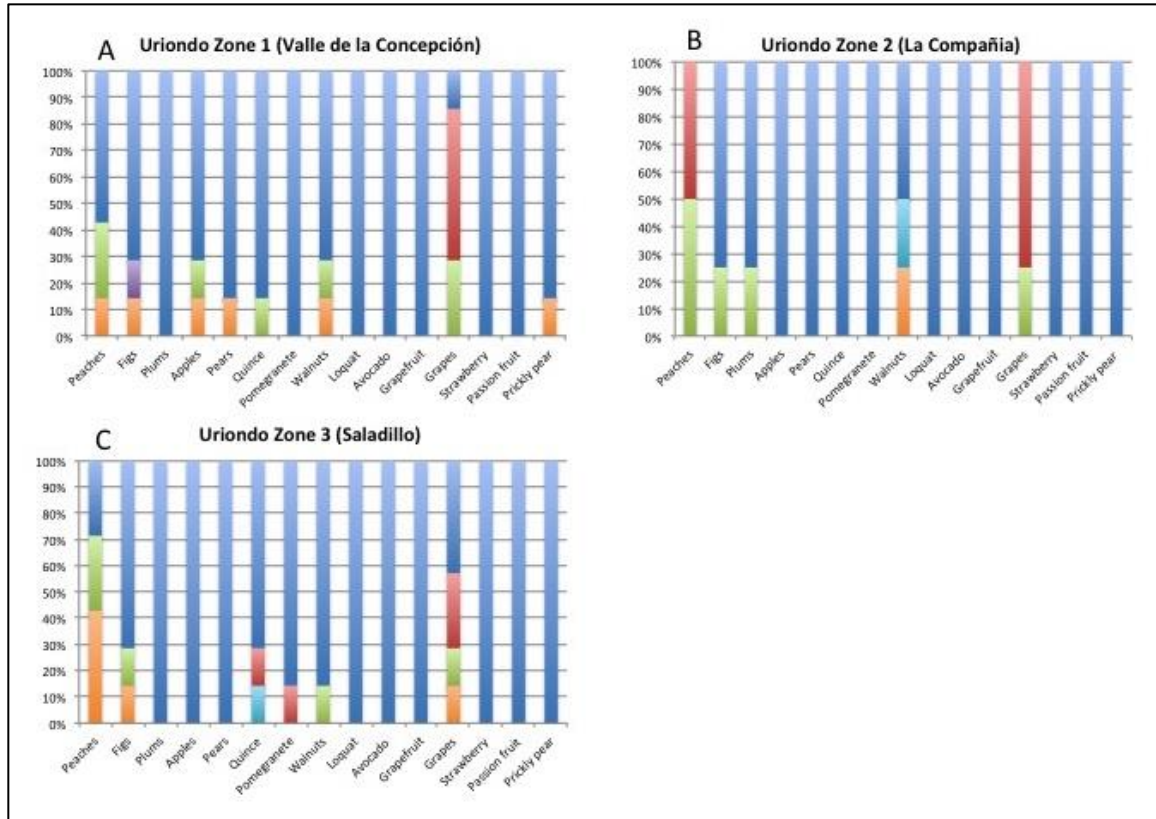


Figure 57 a – c. Summary of fruit usage by Uriondo transect zones.

Market and household usage of livestock

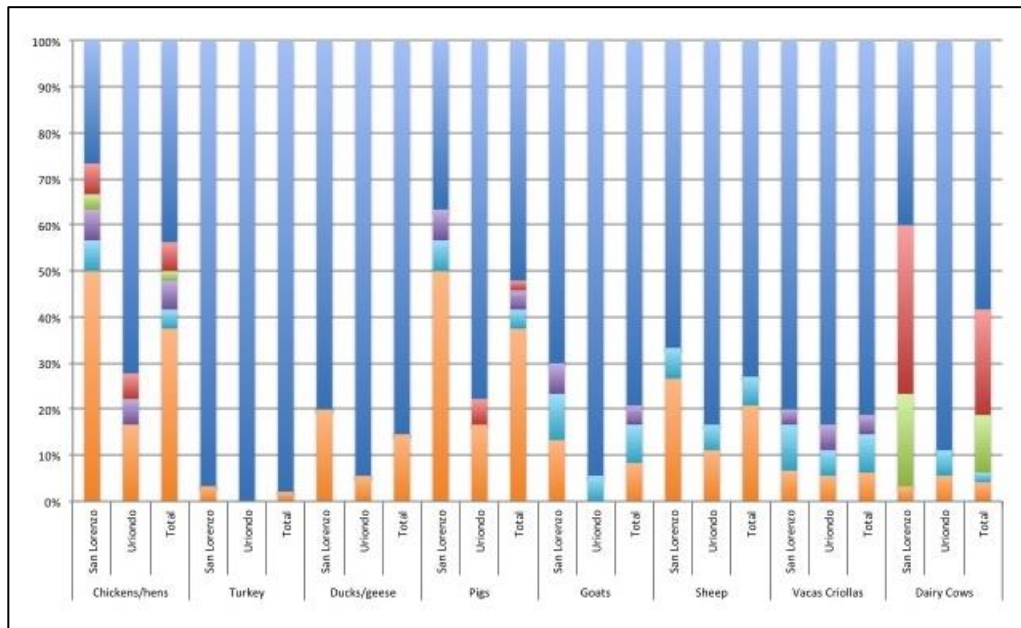


Figure 58. Summary of livestock market and household usage by transect.

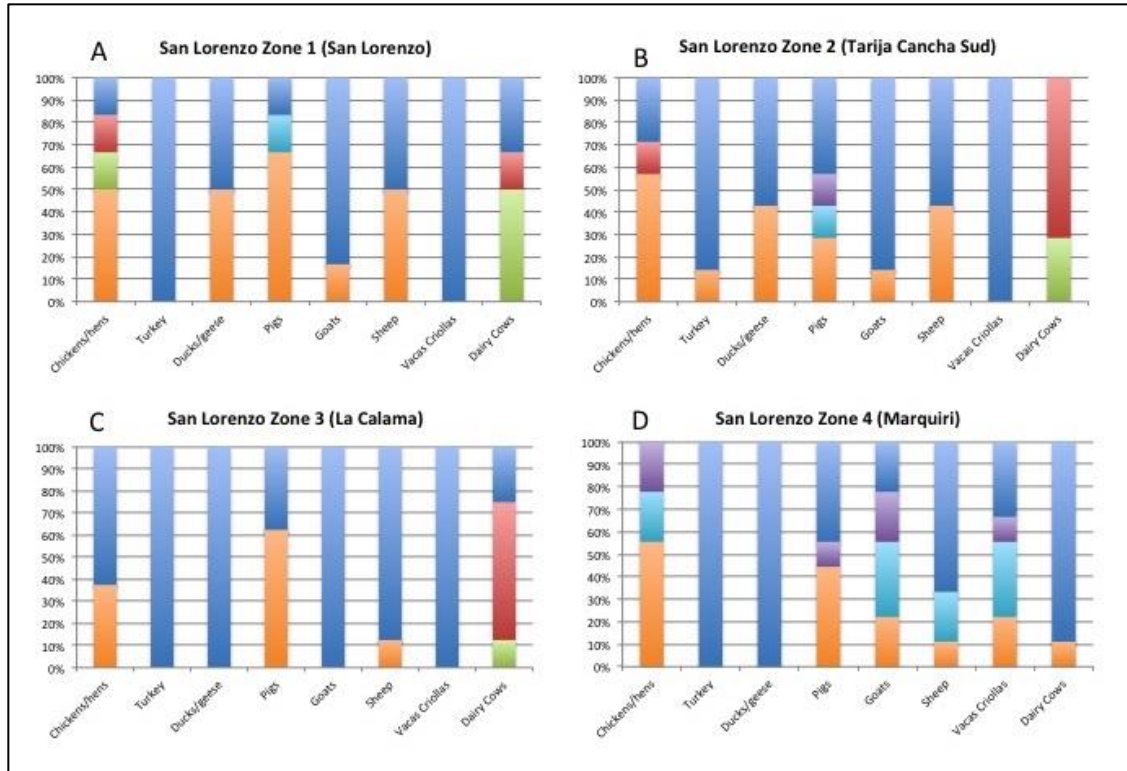


Figure 59 a – d. Summary of livestock usage by San Lorenzo transect zones.

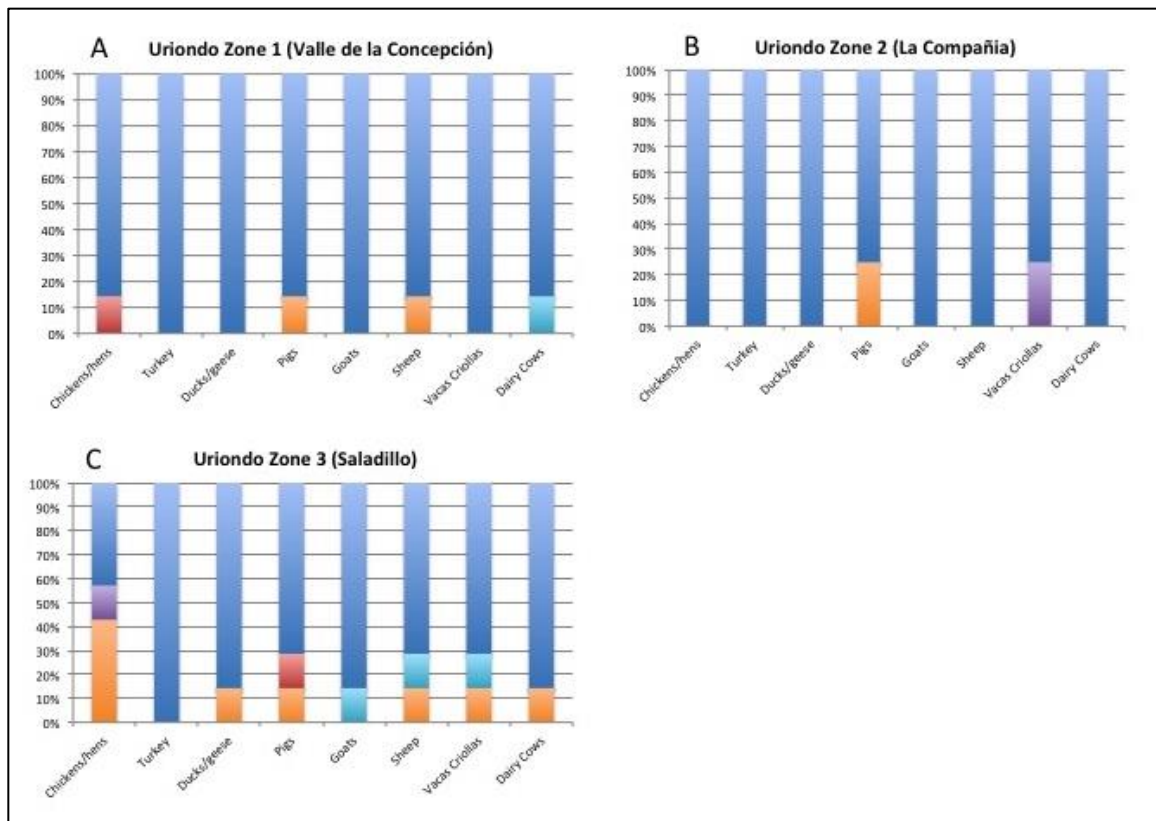


Figure 60 a – c. Summary of livestock usage by Uriondo transect zones.

Appendix G: Market product availability and distribution

Data on the availability and circulation of products in the Central Valley food system were collected through interviews and surveys with market vendors, restaurant owners and other intermediaries as well as through a series of market scans (See Chapter 1, Section 1.4 and Appendix B). Section A of this appendix details a complete list of products identified at markets in Tarija, San Lorenzo and Valle de la Concepción during market scans and surveys. The list is followed by an analysis of the availability, origin and distribution of products in the Central Valley (Sections B and C).

A: Products identified through market scans

Tables 44 to 46 contain lists of all products identified at the four surveyed Central Valley Markets. English common names, local names and scientific names of products are provided where possible. Additionally, many product descriptions (e.g. of prepared dishes and secondary products) are provided in Chapter 5.

Table 44. Fresh produce identified during market scans.

#	Category	Subcategory	
	Common name (English, if available)	Local name	Scientific name
VEGETABLES			
1	Swiss chard	Acelgas	<i>Beta vulgaris</i> subsp. <i>cicla</i>
2	Caigua	Achocha	<i>Cyclanthera pedata</i>
3	Chili peppers	Ají	<i>Capsicum annuum</i>
			Ají amarillo
			Ají camba
			Ají campanito (o manzana)
			Ají cobincho
			Ají cruceño
			Ají escabeche
			Ají ulupica
			Ají pintado
			Ají "putita" ("mala palabra")
			Ají vinagre o ají escabeche
Anaheim			
Jalepeños			
Locoto			
4	Garlic	Ajo	<i>Allium sativum</i>

5	Artichoke	Alcachofas	<i>Cynara scolymus</i>	
6	Celery	Apio	<i>Apium graveolens dulce</i>	
7	Peas	Arvejas	<i>Pisum sativum</i>	
8	Egg plant	Berenjena	<i>Solanum melongena</i>	
9	Cabbage	Repollo	<i>Brassica oleracea</i>	Green Purple
10	Broccoli	Brócoli	<i>Brassica oleracea</i>	
11	Brussels sprouts	Coles de bruselas	<i>Brassica oleracea</i>	
12	Borage	Borraja	<i>Borago officinalis</i>	
13	Cauliflower	Coliflor	<i>Brassica oleracea</i>	
14	Scallion, spring onions	Cebolla	<i>Allium cepa</i>	
15	Onion	Cebolleta	<i>Allium cepa</i>	Red White
16	Coriander, cilantro	Cilantro	<i>Coriandrum sativum</i>	
17	Peruvian corn, Cuzco corn	Choclo	<i>Zea mays</i> subsp. <i>mays</i>	
18	Spinach	Espinacas	<i>Spinacia oleracea</i>	
19	Asparagus	Espárragos	<i>Asparagus officinalis</i>	
20	Faba beans, broad beans	Habas	<i>Vicia faba</i>	
21	Seven year melon	Lacayote	<i>Cucurbita ficifolia</i>	
22	Lettuce	Lechuga	<i>Lactuca sativa</i>	Green leaf Red leaf Escarole Iceburge
23	Mallow	Malva	<i>Malva sylvestris</i>	
24	Chamomile	Manzanilla	<i>Matricaria chamomilla</i>	
25	Mint	Menta	<i>Mentha spicata</i>	
26	Turnip	Nabo	<i>Brassica rapa</i> subsp. <i>rapa</i>	
27	Oregano	Orégano	<i>Origanum vulgare</i>	
28	Avocado	Palta	<i>Persea americana</i>	
29	Cucumber	Pepino	<i>Cucumis sativus</i>	
30	Parsley	Perejil	<i>Petroselinum crispum</i>	
31	Bell peppers	Morrón	<i>Capsicum annuum</i>	
32	Common bean	Poroto (poroto verde)	<i>Phaseolus vulgaris</i>	
33	Radish	Rábano	<i>Raphanus sativus</i>	
34	Beets	Remolacha	<i>Beta vulgaris</i>	
35	Tomatoes	Tomates	<i>Solanum lycopersicum</i>	Standard Plum or roma Cherry or cocktail
36	Green bean, sting bean	Vainitas, Habichuela	<i>Phaseolus vulgaris</i>	
37	Mint (type of)	Yerbabuena	<i>Mentha</i> sp.	
38	Carrot	Zanahorias	<i>Daucus carota</i> subsp. <i>sativus</i>	
39	Squash	Zapallo	<i>Cucurbita</i>	Calabaza Truncito "Zapallo"

FRUIT				Other
1	Apricot	Albaricoque	<i>Prunus armeniaca</i>	
2	Blueberry	Arándanos	<i>Vaccinium corymbosum</i>	
3	Banana	Banana	<i>Musa acuminata</i>	Cavendish (grandes) Guineo (pequeñas)
4	Sugarcane	Caña de azúcar	<i>Saccharum officinarum</i>	
5	Starfruit, Carambola	Carambola	<i>Averrhoa carambola</i>	
6	Custard apple, cherimoya	Chirimoya	<i>Annona cherimola</i>	
7	Plum	Ciruelo	<i>Prunus domestica</i>	Blanco Rojo
8	Cocanut	Coco	<i>Cocos nucifera</i>	
9	Peaches	Durazno	<i>Prunus persica</i>	Blanco (white) Amarillo (yellow)
10	Strawberries	Frutilla	<i>Fragaria × ananassa</i>	
11	Pomegranate	Granada	<i>Punica granatum</i>	
12	Fig	Higo	<i>Ficus carica</i>	
13	Sweet lime	Lima	<i>Citrus limetta</i>	
14	Lime/Lemon	Limón	<i>Citrus × limon</i>	Amarillo (lemon) Verde (lime)
			<i>Citrus × aurantifolia</i>	Limón sutil Suci
15	Mandarin	Mandarina	<i>Citrus reticulata</i>	Creole Japanese Other (Produced by the Incor corporation in Southern Tarija)
16	Mango	Mango	<i>Mangifera (Mangifera indica)</i>	
17	Apples	Manzanas	<i>Malus domestica</i>	Creole Other (Imported, e.g. Granny Smith, Gala, etc.)
18	Muskmelon	Melón	<i>Cucumis melo</i>	
19	Passion fruit	Maracuyá	<i>Passiflora edulis</i>	
20	Black berries	Moras (Zarzamora)	<i>Rubus fruticosus</i>	
21	(Sweet) Orange	Naranjas	<i>Citrus × sinensis</i>	
22	Noni, great morinda, Indian mulberry	Nonis	<i>Morinda citrifolia</i>	
23	Papaya	Papaya	<i>Carica papaya</i>	
24	Pacay, ice-cream bean	Pacay	<i>Inga feuilleei</i>	
25	Pear	Pera	<i>Pyrus communis</i>	Creole Other (Imported, Williams pear or Bartlett pear)
26	Pineapple	Piña	<i>Ananas comosus</i>	
27	Plantain	Plátano	<i>Musa × paradisiaca</i>	
28	Grapefruit	Pomelo	<i>Citrus × paradisi</i>	White

				Ruby
29	Kumquat	Quinoto	<i>Citrus japonica</i>	
30	Watermelon	Sandía	<i>Citrullus lanatus</i> var. <i>lanatus</i>	
31	Tangerine	Tangerina	<i>Citrus × tangerina</i>	
32	Prickly pear cactus fruit	Tuna	<i>Opuntia</i> spp.	
33	Grape	Uvas de mesa	<i>Vitis vinifera</i>	Red Purple Green (Most commonly Moscatel de Alejandria)
34	Kiwifruit	Kiwi	<i>Actinidia deliciosa</i>	
TUBERS AND ROOTS				
1	Ajipa	Ajipa	<i>Pachyrhizus tuberosus</i>	
2	Sweet potato	Camote batata	<i>Ipomoea batatas</i>	Blanco Amarillo
3	Cassava, manioc	Mandioca, yuca, cassava	<i>Manihot esculenta</i>	
4	Oca	Oca	<i>Oxalis tuberosa</i>	
5	Potatoe	Papa	<i>Solanum tuberosum</i>	Runa cron Colorada (cardenal/rosada) Ojosa Marcela Negra Jendalme Collareja Revolucionaria Alpa Other (Usually imported from Argentina)
6	Ullucu	Papa lica	<i>Ullucus tuberosus</i>	
7	Yacón	Yacón	<i>Smallanthus sonchifolius</i>	

Table 45. Meat and dairy products identified during market scans.

#	Category	Subcategory
	Common name (English, if available)	Local names
MEAT AND FISH		
1	Beef	Carne de vaca (res)
2	Chicken	Carne de pollo
		Creole Farm
3	Pork	Chancho
4	Goat	Chiva
5	Mutton	Cordero
6	Llama	Llama
7	Fish	Pescado
		Villamontes Bermejo Farmed fish Other
EGGS AND DAIRY PRODUCTS		
1	Hen eggs	Huevos de gallina
		Farm Creole

2	Duck eggs	Huevos de patos	
3	Quale eggs	Huevos de codorniz	
4	Cow's milk	Leche	Fresh Pasteurized
5	Butter	Mantequilla	Casero (homemade) Industrial
6	Cheese	Queso	Creole Chaqueño Caizeño Charagueño De leche de cabra (goat's milk) Other
7	Yogurt	Yogur	Casero (homemade) Industrial

Table 46. Extended list of other food products identified during market scans (see descriptions in Chapter 5).

#	Category	Subcategory
	Common name (English, if available)	Local names
DRIED HERBS, CONDIMENTS AND OTHER <i>PRODUCTS CASEROS</i>, Including rehydrated (ready to use) goods		
1	Yellow chili, ground	Ají Amarillo (molido)
2	Red chili, ground	Ají Colorado (molido)
3	Milk caramel candies	Caramelos de dulce de leche
4	Charque (dried meat)	Charque De llama Other
5	Sausage	Chorizo
6	Chuño, rehydrated	Chuño (rehidrato)
7	Milk caramel (<i>dulce de leche</i>), homemade	Dulce de leche casero
8	Horsetail, dried	Equiseto/ cola de caballo, seco
9	Garbanzo, chickpeas, rehydrated	Garbanzos (rehidratos)
10	Fruit syrup	Jarabe
11	Coca leaves	Hojas de coca
12	Quince jelly	Jelea de membrillo
13	Bay leaves	Laurel
14	Peanuts, ground	Maní molido
15	Mote corn, rehydrated	Mote (rehidrato)
16	Honey	Miel de abeja
17	Jams and preserves	Mermeladas o dulces caseros de papaya (Papaya) de membrillo (quince) de durazno (peach) de naranja (orange) de cuaresmillos (small peaches) de frambuesas (raspberry) de frutilla (strawberry) de uva (grape) de kiwi (kiwi) de piña (pineapple)

			de lacayote (Seven year melon)
18	Pickles and other conserves	Otras conservas ("escabeche")	Ajo (garlic)
			Ají (ground chili peppers)
			Locoto (Locoto chili peppers)
			Ulupica (Ulupica chili peppers)
			Cobincho (cobincho chili peppers)
			Verduras mixtos (mixed vegetables)
			Cebolla (onion)
19	Grapes in singani	Uvas en singani	
20	Grapes in juice	Uvas en jugo/uvas al jugo	
21	Grape vinegar	Vinagre de uvas	
GRAINS, NUTS AND DRIED FRUITS			
1	Garlic, dried	Ají seco	
2	Peas, dried	Arvejas secos	
3	Oats	Avena	
4	Barley	Cebada	
		Cascajo de café (toasted barley coffee)	
5	Chuño	Chuño	
6	Peach, dried	Durazno seco	Pelón
			Pelón de cuaresmillo
			Durazno seco/despepitado
			Duranzo "leather"
7	Garbanzo, chickpeas, dried	Garbanzo seco	
8	Beans, dried	Frijol seco	
9	Lentils, dried	Lenteja	
10	Flax seed	Linaza	Whole
			Ground
11	Maize, corn	Maíz	Whole dried kernels
			Harina de maíz
			Chanca de maíz
			Tostado de maíz
			Maiz pelado
			Maiz garrapata
12	Peanuts	Maní	Raw, whole ("crudo", en grano)
			Toasted, whole ("tostado", en grano)
13	Quince, dried	Membrillo seco/cacha de membrillo	
14	Walnuts	Nueces	
15	Brazil nuts	Nueces de Brasil	
16	Macadamia nuts	Nueces macadamia	
17	Figs, dried	Pasas de higo/higos secos	
18	Prunes (dried plums)	Pasas de ciruela	
19	Wheat	Trigo	Harina (flour)
			en grano (whole)
20	Raisins (dried grapes)	Uvas pasas/pasas de uva	
21	Quinoa	Quinoa	en grano (whole)
BREADS AND BAKED GOODS			

1		Alfajores	
2	Crackers	Cauquitas (saladas)	
3	Croissants	Cuernitos y otras formas	
4	Empanadas with meringue	Empanadas blanqueadas	
5	Onion empanadas	Empanadas de cebolla	
6	Seven year melon empanadas	Empanadas de lacayote (de azúcar)	
7	Cheese empanadas	Empanadas de queso	
8	Sugar cookies	Galletas de azúcar/galletas dulces (de formas)	Different shapes
9	Orange cookies	Galletas de naranja	
10	Hojarascas	Hojarascas	
11	Breads	Panes	Caspa Bollo de trigo Bollo de maíz Pan de maíz Loaves of bread (“pan de la ciudad”) Buns Pan con queso
12	Cake, corn	Pasteles de choclo	
13	Rolls, Cheese	Rollos de queso	
14	Roscas de azúcar	Roscas de azúcar	
15	Rosquetes	Rosquetes	
16	Rosquitos	Rosquitos	
17	Sweet bread	Tortas (de comadres)/ pan dulce	
18	Special cakes	Tortas especiales	
19	Cakes	Queques	Simples Decorados
20	Humintas	Humintas	
21	Meringue	Suspiros	
CASERA DRINKS			
1	Anchi	Anchi	
2	Barley aloja	Aloja de cebada	
3	Peanut aloja	Aloja de maní	
4	Lightly fermented peanut aloja	Aloja de maní maduro	
5	Purple apí	Apí morado	
6	Grape chicha	Chicha de uva	
7	Fruit salad	Ensalada de frutas	
8	Sugarcane juice	Jugo de caña de azucar	
9	Fruit juices and blended drinks	Jugos de frutas/liquidos	
10	Tigers' milk	Leche de tigre	
11	Dried peach drink	Refresco de pelón	
12	Pineapple drink	Refresco de piña	
13	Strawberry drink	Refresco de frutilla	
14	Flaxseed drink	Refresco de linaza	
15	Soya drink	Refresco de soya	
16	Tamarind drink	Refresco de tamarino	
17	Singani (artisanal)	Singani patero	

18	Tojori	Tojori
19	Artisanal wine	Vino patero
20	Freshly squeezed juices	Zumos Orange, grapefruit, mandarin, etc.
PREPARED FOODS		
1	Chilled hoof with wheat	Ají de pata con trigo
2	Meatballs	Albóndigas
3	Arvejada	Arvejada
4	Barbequed pork	Asado de chanco
5	Vegetable patties	Bocadillo de verduras
6	Spice chicken stew	Chancao
7	Blood and potato stew	Chanfaina
8	Fire roasted pork	Chancho a la cruz
9	Oven roasted pork	Chancho al horno
10	Papaliza stew	Guiso de papaliza
11	Cabbage stew	Guiso de repollo
12	Lentil stew	Guiso de lenteja
13	Rice stew	Guiso chapaco/ guiso de arroz
14	Noodle stew	Guiso de fideo
15	Corn stew	Guiso de pataska/ guiso de caritas
16	Tongue	Majadito (lagua)
17		Milanesa de carne
18		Milanesa de pollo
19	Pataska	Pataskas
20	Creole hen picante	Picante de gallina (criolla)
21	Hoof picante	Picante de pata
22	Chicken picante	Picante de pollo
23	Roasted chicken	Pollo al horno
24	Ranga Ranga	Ranga ranga
25	Saice	Saice
26	Rice soup	Sopa de arroz
27	Pork soup	Sopa de chanco
28	Peanut soup	Sopa de maní
29	Vegetable soup	Sopa de verduras
SNACK FOODS (“Comidas de Paso”, meriendas, etc.)		
1	Sweet potato, roasted	Camote tostado
2	Corn pancakes	Chirriadas
3	Fried skewers of organ meat	Anticuchos (fried skewers)
4	Boiled corn on the cob	Choclo
5		Kupis
6	Fried empanadas	Empanadas fritas
7	Flan	Flan
8	Ice cream	Helado
9	Gelatin	Gelatina
10	Cheese empanada	Pastel de queso (empanada de queso)
11	Pizza	Pizza
12	Stuffed potatoes	Rellenos de papa
13		Salteñas
14		Salchipapa
15	Sandwiches and hamburgers	Sandwiches y hamburgesas

16		Tamales	
17	Fried bread	Sopaipillas	
BULK, CANNED AND PACKAGED GOODS			
1	Olives	Aceitunas	Green Black
2	Oil	Aciete	Vegetable/cooking oils Olive
3	Rice	Arroz	White Brown
4	Tuna fish, canned	Atun en lata	
5	Sugar, white	Azúcar blanco	
6	Baking soda	Bicarbonato de sodio	
7	Coffee	Café	Instantáneo (instant) Molido (ground)
8	Beer	Cerveza	
9	Raw sugar	Chancaca	
10	Peaches, canned	Durazno en lata	
11	Crackers	Galletas saladas o crackers aborrotadas	
12	Cookies	Galletas dulces	
13	Pop, soft drins	Gaseosas	
14	Candies	Golosinas o bombones aborrotados	
15	Wine	Vino	
16	Lemon juice	Jugo de limónn	
17	Black tea	Té negro	
18	Yerba mate	Yerba mate	
19	Milk, powdered	Leche en polvo	
20	Milk, canned	Leche en lata	
21	Herbal teas	Mates	
22	Bread crumbs	Pan molido	
23	Flan, powdered	Flan en polvo (mixta)	
24	Cake mix	Queque en polvo (mixta)	
25	Salt	Sal	
26	Mackerel, canned (in tomato sauce)	Macarela en lata (en salsa de tomate)	
27	Ham, canned	Jamón en lata	
28	Tomato sauce	Salsa de tomate	
29	Margarine	Margarina	
30	Pineapple, canned	Piña en lata	
31	Pasta	Fideos	Number of different forms
32	Corn starch	Fécula de maiz	
33	Baking powder	Polvo para hornear	
34	Yeast, baking	Levadura	
35	Jams	Mermelada	
36	Packaged spices and flavour enhancers	Especias empacadas y mejoradores de sabor	
37	Packaged condiments (ketchup, mustard, mayonnaise)	Condimentos empacados (salsa de tomate, mostaza, mayonesa)	
38	Hot dogs	Salchichas	
39	Oatmeal, instant	Avena instantánea	
40	Powdered fruit drinks	Bebidas de frutas en polvo	

41	Vinegar	Vinagre
42	Soy sauce	Salsa de soya
43	Semolina	Sémola
44	Instant soup	Sopas instantáneas

B: Product Availability and Diversity in Central Valley Markets

Eight sets of product availability scans were conducted in four markets in the Central Valley from June-December 2013,⁸⁴ with an additional scan conducted in March 2014. Thus, a product might register on market scans to a maximum of 32 times, which would indicate it was available at all markets during each scan. Ninety-three categories of vegetables (38), fruit (33), tubers (7), meat and fish (7), and dairy products (7) were recorded. Twenty-four of these (i.e. potatoes, fish) also had subcategories (i.e. varieties of potatoes or fish) that were recorded when possible. Subcategories are not included in the summary occurrence counts (i.e. an occurrence score of 1 is given for “potato” even if more than one variety is recorded). Selected subcategories are examined in separate analyses.

The Campesino and Central Markets are located in the City of Tarija. The San Lorenzo Market is in the Town of San Lorenzo and the Uriondo Market is located in the Town of Valle de la Concepción. The market in Uriondo is so small that nearby *tiendas* in Uriondo were incorporated to provide a more accurate representation of the products available to residents in Valle de la Concepción. The Campesino Market is the largest and most diverse of the four markets. This is followed by the Central Market. The San Lorenzo Market is notably smaller than the markets in Tarija; however, much larger than the Uriondo Market. Basic descriptive information on the markets is provided in Table 47. The 30 products with the highest occurrence scores are presented in Table 48.

The Campesino Market (Figure 61d) offered the highest diversity of products in all categories. It was followed by the Central Market (Figure 61c), and next by San Lorenzo (Figure 61a) and finally Uriondo (Figure 61b). The comparative availability of products among the markets is presented in Figure 62.

⁸⁴ Vegetables, tubers and meat and fish data were not collected for the Central Market in the month of June because sections of the market were closed for cleaning when the scan was preformed.

Table 47. Market descriptions including location and size.

Market	Location	General description	Approx. total of stalls	Types of stalls (approx. #)
San Lorenzo	Town of San Lorenzo	Small, single story building (approx. 850m ²), with uncovered central courtyard, off the central plaza.	40-45	<ul style="list-style-type: none"> • Mixed fruit and vegetables (7) • Snack foods (2 AM, and 6-10 PM) • Prepared meals (breakfast and lunch: 8) • Red meats (4) • Chicken (along with cheese and eggs: 4) • Mixed stands (dry goods and fresh produce: 6) • Artisanal beverages (2-5) • Breads and baked goods (5 weekdays, more weekends) • Other (e.g. mote and anchi: 1)
Uriondo	Town of Valle de la Concepción	Small, single story building, with uncovered central courtyard (approx. 600m ²), several blocks from the central plaza.	10 (plus, 5-10 <i>tiendas</i>)	<ul style="list-style-type: none"> • Mixed stands (dry goods and fresh produce: 3) • Prepared meals (breakfast and lunch: 5) • Red meats (1) <p>(5-10 <i>tiendas</i> were also included in the product scans for Uriondo. These <i>tiendas</i> sell fresh produces as well as meat, dairy products and dry goods.)</p>
Central	City Centre of Tarija	Three-storey building covering half a block (approx. 3,250m ²) in the centre of Tarija. Stall immediately outside the market building and <i>tiendas</i> on the outside wall of the market are included.	255	<ul style="list-style-type: none"> • Fruit (often with cheese, eggs and homemade products, like jams and preserves: 25) • Vegetables (30) • Dairy products (i.e., cheese and eggs: 6) • Red meats (18) • Chicken (10) • Snack foods (15) • Prepared meals <ul style="list-style-type: none"> ○ Breakfast (15) ○ Lunch (56) • Dry goods and non-perishables (22) • Non-perishables and refrigerated foods (i.e. yogurt, milk and cold meats: 10) • Artisanal beverages and blended drinks (12) • Breads and baked goods (27) • Semi-cooked foods (rehydrated vegetables, ground chilis, etc.: 8)

Campesino	Northern edge of the City of Tarija	Series of single, two and three storey building complexes, covered and uncovered courtyards and plazas covering approximately 5 hectares (approx. 50,000m ²).	500+, with up to 800 occasional vendors annually	<ul style="list-style-type: none"> • Fish • Dry goods <ul style="list-style-type: none"> ○ Dried fruits and herbs • Fruit • Vegetables • Cheese • Dairy products (i.e., cheese and eggs) • Red meats • Chicken • Snack foods • Prepared meals <ul style="list-style-type: none"> ○ Breakfast ○ Lunch • Dry goods and non-perishables • Non-perishables and refrigerated foods (i.e. yogurt, milk and cold meats) • Artisanal beverages and blended drinks • Breads and baked goods • Semi-cooked foods (rehydrated vegetables, ground chilis, etc.)
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Table 48. List of most commonly occurring products in the Central Valley markets.

#	Product	Occurrence Score (out of possible 32)
1	Chicken eggs	32
2	Lemons/Limes	32
3	Potatoes	31
4	Milk	31
5	Beef	31
6	Tomatoes	31
7	Carrots	31
8	Lettuce	31
9	Onions	31
10	Chili peppers	31
11	Swiss Card	30
12	Peas	30
13	Scallions, spring onion	30
14	Parsley	30
15	Bell peppers	30
16	Beets	30
17	Squash	30
18	Apples	30
19	Chicken	30
20	Cheese	30
21	Yogurt	29
22	Pears	29
23	Banana	29
24	Camomile	29
25	Celery	28
26	Cabbage	28
27	Fava beans	28
28	Oranges	28
29	Papalica	27
30	Butter	27

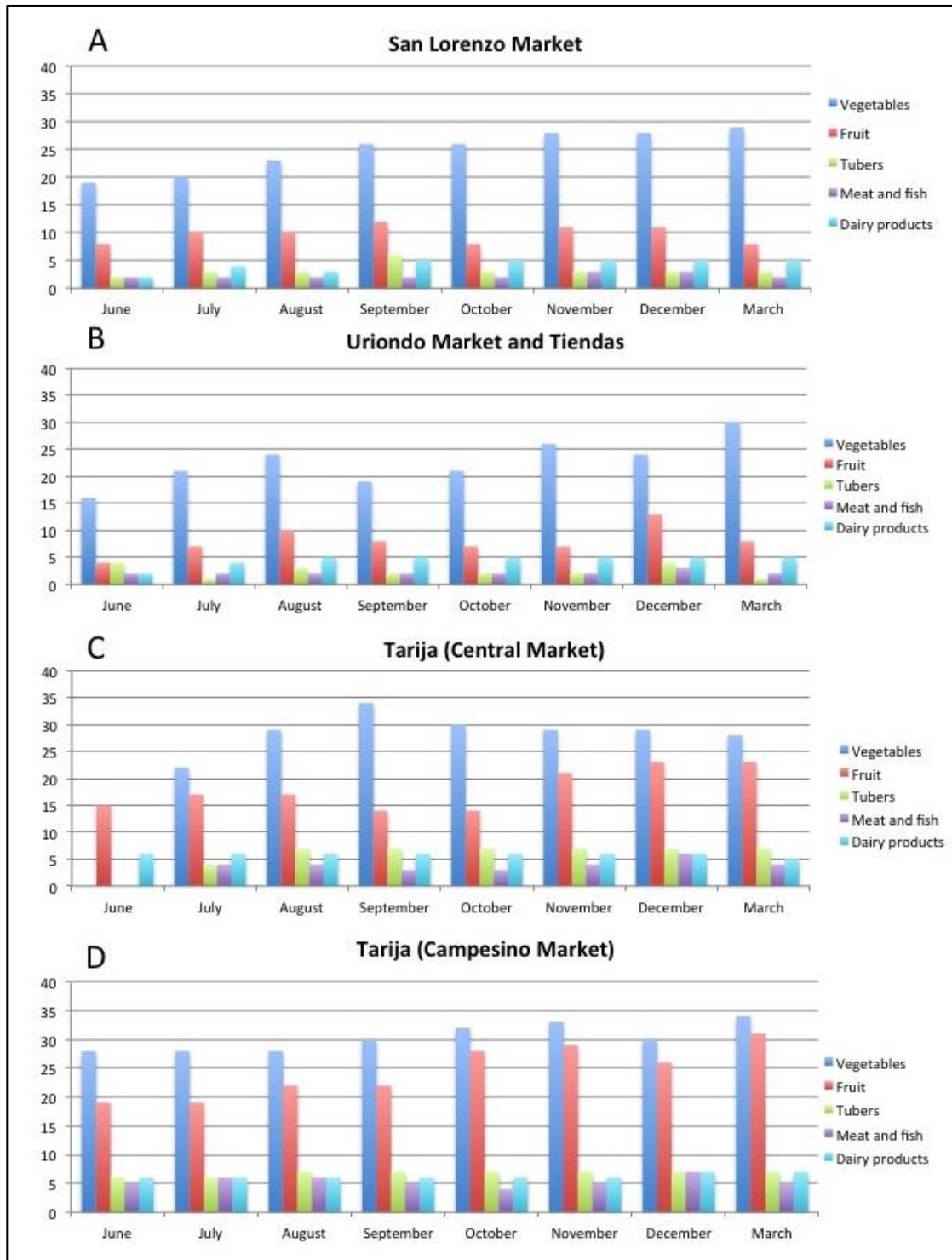


Figure 61 a – d. Products available in Central Valley Markets by month.

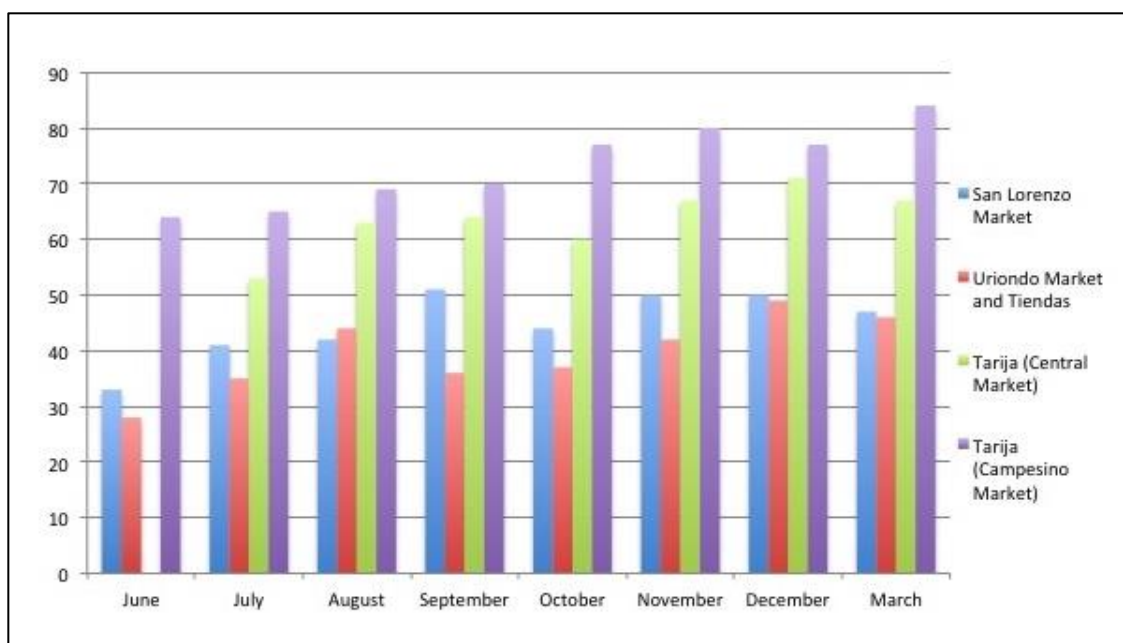


Figure 62. Comparative product availability among markets based on the total number of products registered in each market each month.

Behind the course product categories shown in Figures 61 and 62 is a subtler picture of product diversity and availability. Examining diversity within product categories (i.e. species) also illustrates the differences between the four markets. Chili peppers (*ají*), potatoes and fish are examples of products with many sub-types or varieties. Many other species (e.g. apples, pears, lettuce, tomatoes, lemons, squashes, grapes) also showed diversity in varieties, although to a lesser extent. Other products, such as grapefruit and peaches, had only two variations.

Similar patterns are also present in dairy and meat products. For example, there were several different types of cheese available. Milk, eggs and other dairy products, like apples, might be distinguished by origins (i.e. industrial vs. cottage industry).

Products with high diversity

Cheese, potatoes and chili peppers are examples of products with high diversity. Data on the occurrence of different varieties within these product categories are presented below.

Cheeses

Six categories of cheeses were used in the market scans: creole (*criollo*), Chaqueño, Caizeño, Charagueño, goat's milk cheese, and others, such as "queso fundido" (Market Scan, September, Campesino). All of these are fresh cheeses. The "other" category

includes balls of fresh pressed cheese curds and quecillo. The presence of these other cheeses was concentrated in a few stalls in the Campesino Market and two women with baskets of cheese in the Central Market. Criollo, Chaqueño, Caizeño, and Charagueño are primarily distinguished by their location of production [Chaqueño (meaning from the Chaco) and Caizeño (meaning from the town of Caiza) cheeses are from the Chaco region of the Tarija Department, and charagueño from Charagua (Santa Cruz)] and differences in texture and taste related with moisture content and saltiness. *Queso criollo* (creole cheese) is the common name used to refer to fresh, pressed cheese commonly made in the Central Valley (and other areas). The production of *queso criollo* is a cottage industry, with the cheese being made in small batches.

The most common types of cheese in all of the markets were criollo and chaqueño (Figure 63). These cheeses were available at the majority of markets in the majority of scans. Caizeño, charaguaño and other cheeses were available most months in the Central and Campesino Markets (Figure 64). Goat cheese was seen only once (in the Campesino Market), however its absence in other scans is likely related to the time of the surveys, which did not coincide well with the predominant season for goat cheese production.

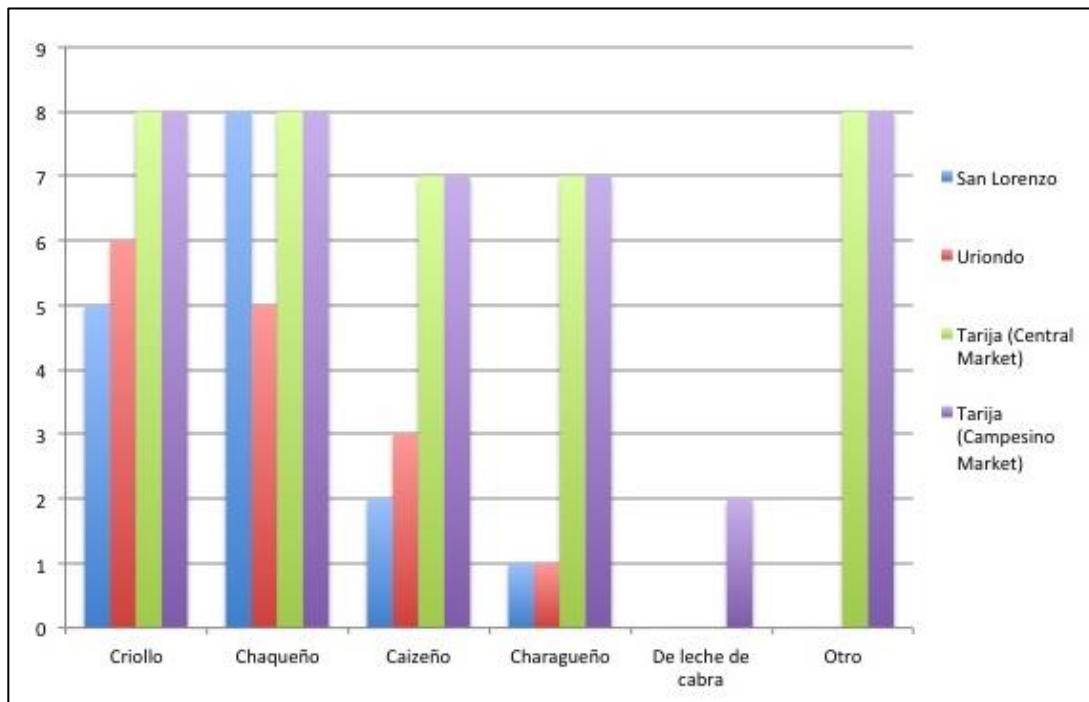


Figure 63. Frequency of cheese type occurrence.

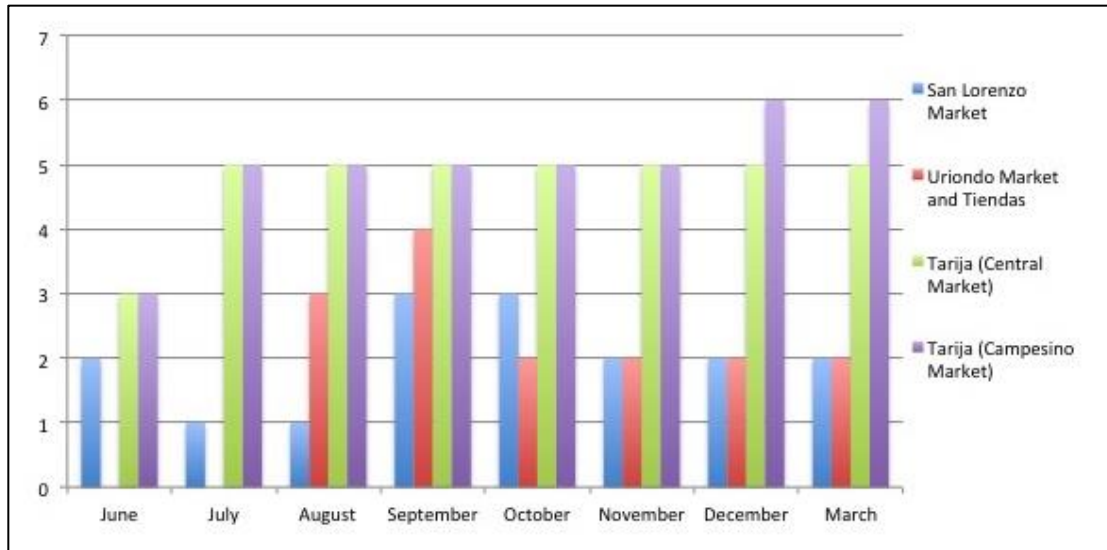


Figure 64. Number of cheese types occurring each month in each market.

Potatoes

Ten categories of potatoes were included in the market scans: runa cron, colorada (also called cardenal or rosada), ojosa, marcela, negra, jendalme, collareja, revolucionaria, alpa and 'other'. The 'other' category usually captured potatoes imported from Argentina or Peru. The most commonly available potato variety was colorada, followed by runacron (Figure 65). The campesino market consistently had the greatest diversity of potatoes available (Figure 66).

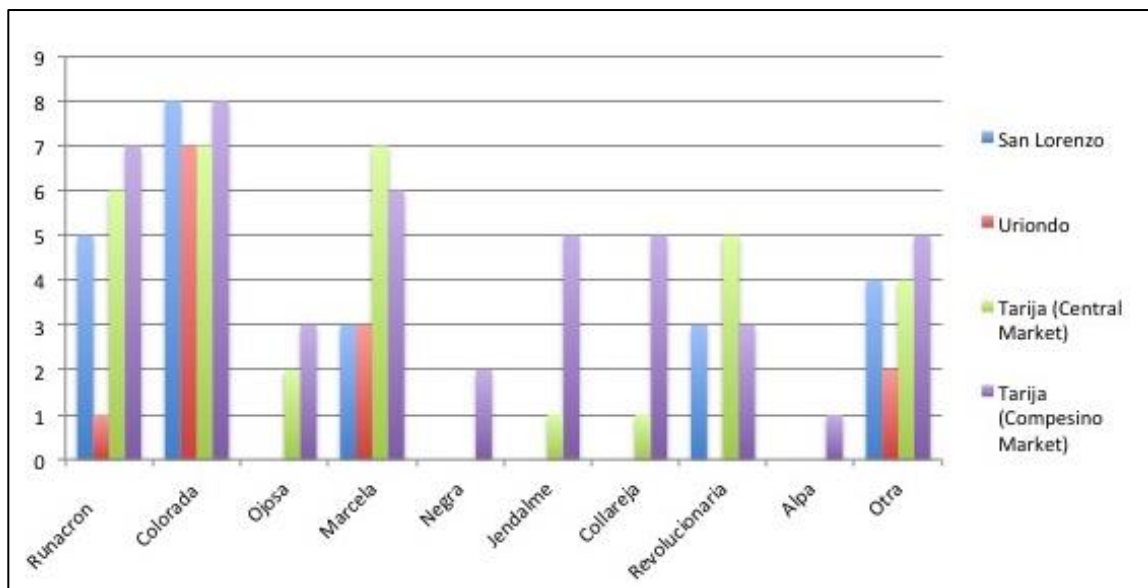


Figure 65. Frequency of potato variety occurrence.

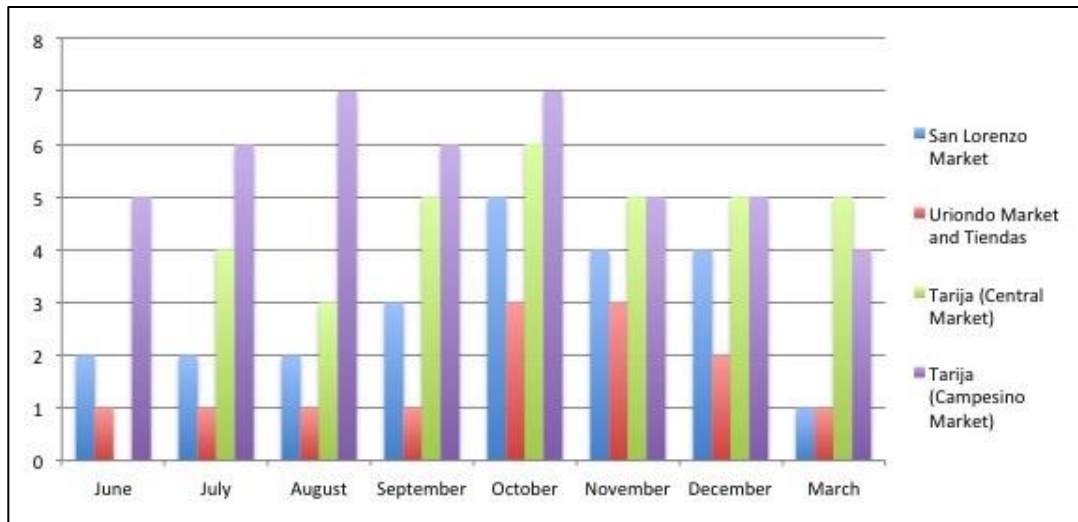


Figure 66. Number of potato varieties occurring per month.

Chili peppers (*Ají*)

The highest diversity of chili peppers was found at the Campesino Market (Figure 67). This is followed by the Central Market, next by San Lorenzo and finally by Uriondo. Thirteen varieties of chili peppers were recorded among the markets. Of these *ají cambia* and *locoto* were the most common, nearly always recorded in all markets each month (Figure 68). Five other varieties were recorded in more than three monthly sets of market scans: *ají pintada* and *ají vinagre* (San Lorenzo, Central Market and Campesino Market), *ulupica* (Central Market and Campesino Market) and *cobincho* and *mala palabra* (Campesino Market).

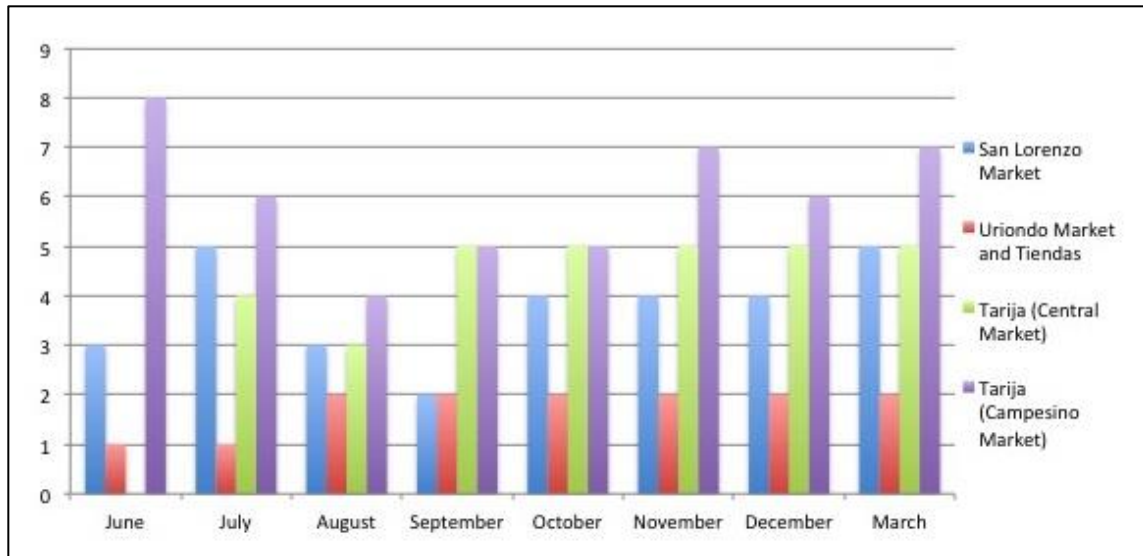


Figure 67. Number of chili pepper (*aji*) varieties occurring per month.

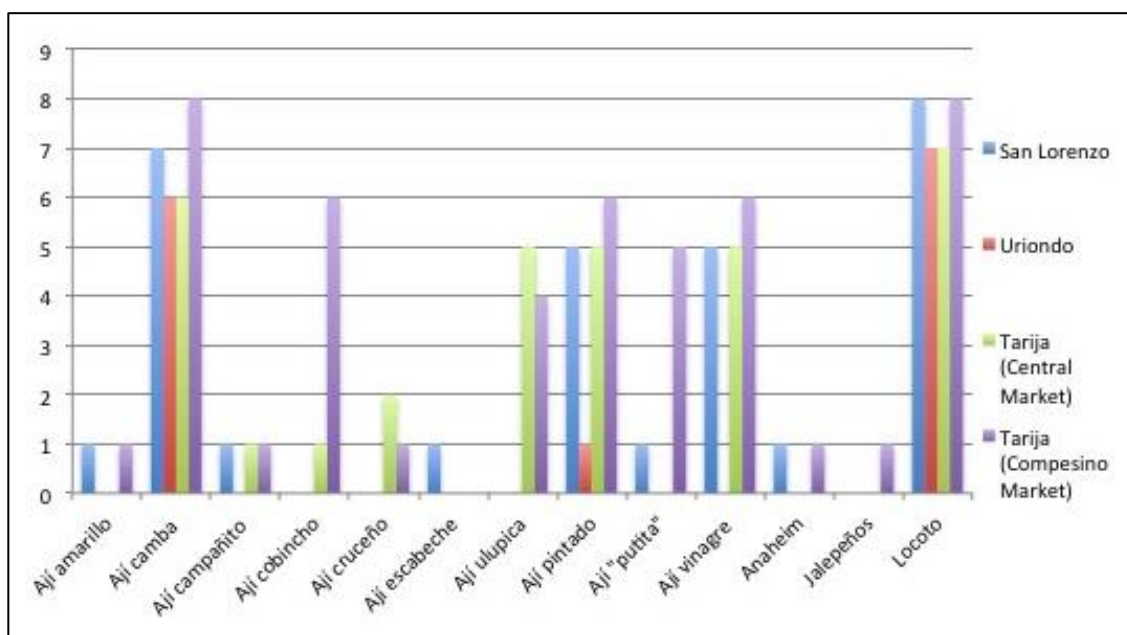


Figure 68. Frequency of chili pepper occurrence by variety.

Availability of other product varieties

Multiple varieties of a fruit or vegetable were also more likely to be found at the Campesino and Central markets. Sweet potatoes, grapes, grapefruit, lemons, peaches, plums, bananas, squash, tomatoes, lettuce, onions and cabbage were products with 2 to 4 varieties each (e.g. green cabbage and purple cabbage; green, red and purple grapes) that

were recorded as subcategories when possible. These were generally recorded as salient categories (differences readably visible within a species group or product category).

For example, green, red, and purple grape varieties were easily distinguishable and were recorded, but there were many more types of green, red and purple grapes, that were not commonly recorded because the differences were difficult to distinguish. Some examples are presented in Table 49. For example, while green grapes were the only variety occurring in San Lorenzo (3 occurrences) and Uriondo (1 occurrence), green grapes were recorded 5 times at the Central Market and 6 times at the Campesino Market, while red grapes and purple grapes were also recorded 4 to 5 times at both the Central and Campesino Markets. In the market price and origin survey conducted in March 2014, the green grapes were identified as Moscatel de Alejandria, “*blanca moscatel*” (present in San Lorenzo, Uriondo and the Central and Campesino Markets), while 6 other varieties of grapes (*blanca tarrantel*, *negra cereza*, *negra favorita*, *negra rideri*, *blanca italiana*, and *rosada* red globe) were identified in the Campesino Market. Similarly, peaches occurred more frequently overall at the Central and Campesino Markets (5 and 4 respectively out of 8 scans, compared with twice in San Lorenzo and once in Uriondo) and these markets were also most likely to have both white and yellow peach varieties.

Table 49. Distribution of varieties of selected products at Central Valley Markets.

Category	Variety	Occurrence (out of possible 8)			
		San Lorenzo	Uriondo	Central	Campesino
Grapes	Green	3	1	5	6
	Red	0	0	5	4
	Purple	0	0	4	5
Peaches	White	0	1	5	4
	Yellow	2	1	5	4
Banana	Cavendish	7	7	7	7
	“Guineo”	3	2	6	7
Lemons	Yellow	8	7	7	7
	Limes	5	5	6	6
	“Sutil”	0	1	6	6
	“Suci”	0	0	0	2

A greater diversity of meats was also available at the Campesino market, followed by the Central market, compared with the San Lorenzo and Uriondo markets. For example, of the 32 scans conducted in the 4 markets over 8 months, pork was recorded in 18 of these scans: 7 times in each of the Campesino and Central markets, and 2 times each in San Lorenzo and Uriondo. Mutton was recorded 12 times, with 7 of these in the

Campesino market and 5 in the Central market. Goat and llama were each recorded, only once, in the Campesino Market. One permanent stall selling llama meat brought to the City of Tarija from the Reserva Sama (in the highland region of the Department), is located in the Campesino Market. However, at the time of my research, it was only open a few days a week. Similar to the diversity of meat products, quail and duck eggs were available at both Campesino and Central markets. The 17 recorded occurrences were divided evenly between these two markets, and duck eggs were only recorded twice, both times at the Campesino Market.

In the market surveys, fish was recorded only in the Campesino Market. Fish from Vilamontes and Bermejo were the most common (6/8 months and 7/8 months respectively). Farmed fish and fish imported from Argentina were both recorded once. Although it did not register in the surveys, the Campesino Market is also known as the location to buy and sell *misquinchos* and *cangrejos* (see Chapters 4 and 5). Fish was also occasionally seen for sale at the market in San Lorenzo; however, this was a sporadic occurrence that did not coincide with the days of the market scans or surveys.

Industrial and small-scale products

The Campesino and Central markets were more likely to have products produced locally and at a small-scale than the others. Although industrially produced eggs, chicken, mandarin oranges and yogurt, industrially pasteurized milk and imported pears and apples were widely available (Figure 69), their local equivalents were far more common at the Campesino market, seconded by the Central (Figure 70). Creole eggs and raw milk were exceptions, as these were also often available at the San Lorenzo and Uriondo markets, although often in smaller quantities. For example, raw milk was available in San Lorenzo because one market vendor would bring milk produced by her dairy cows to sell at her stall in the market. By contrast, there were multiple vendors of raw milk at the Campesino and Central markets.

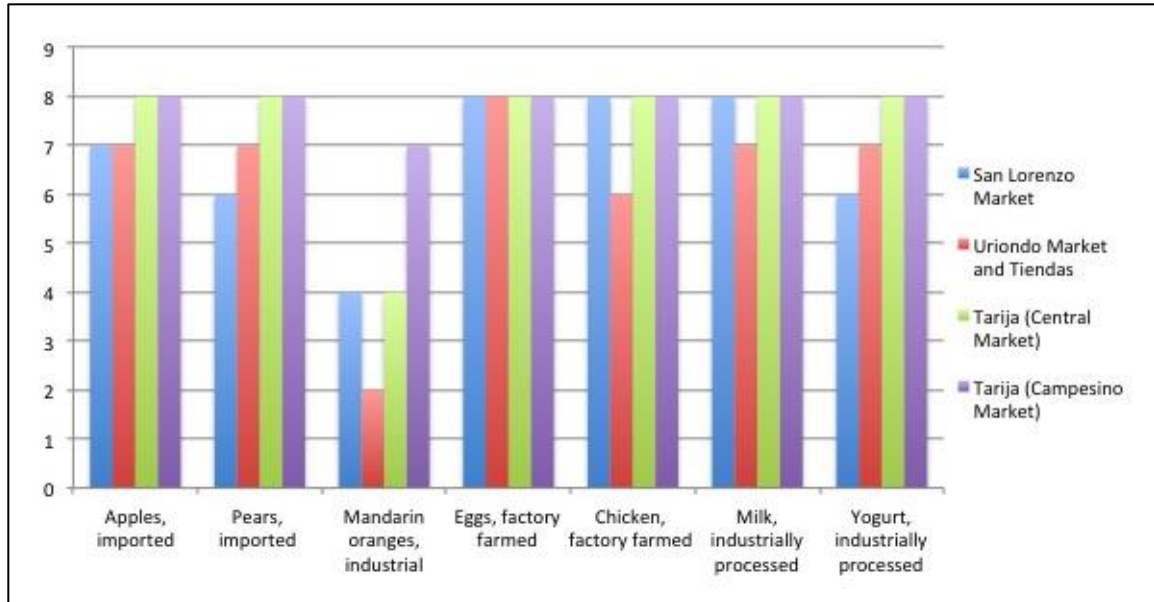


Figure 69. Occurrence of industrial and imported products with campesino or small-scale production equivalents.

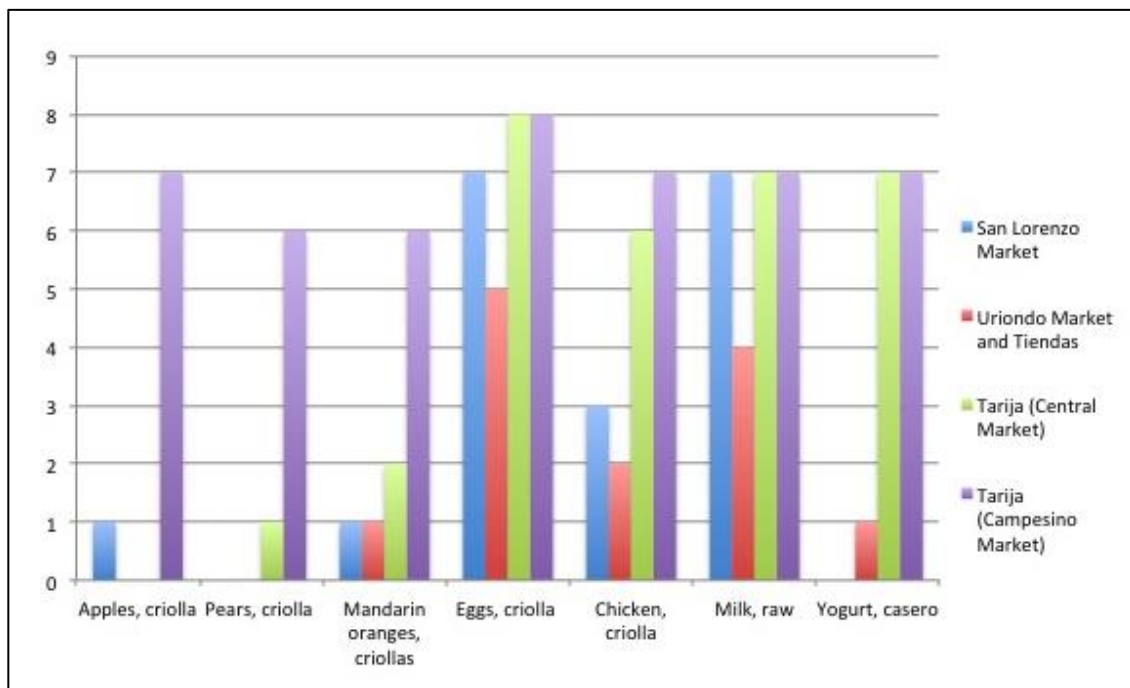


Figure 70. Occurrence of campesino or small-scale products with industrially produced equivalents.

Occurrence of “specialty” fruit and vegetables”

Included in the category of *hortofrutícola de especialidad* (speciality horticultural products) are berries (raspberries, strawberries, blackberries and blueberries) and non-traditional vegetables (“*hortalizas no tradicionales*”: asparagus, artichokes, Brussels

sprouts, and others) (FAUTAPO & OMIN, 2012c, p. 14). These examples of specialty produce were recorded infrequently in the market scans. Raspberries were not recorded in any scan, Brussels sprouts were recorded only once and the other products were available only in the Central and Campesino markets (Table 50). Of the specialty produce, strawberries were the most commonly recorded, seen at the Central and Campesino markets in nearly every scan.

Similarly, eggplant, iceberg lettuce and cherry tomatoes, which are other examples of non-traditional vegetables, were nearly exclusively available in the Campesino Market (eggplant, 8 times; iceberg lettuce twice; cherry tomatoes twice) and Central Market (eggplant 3 times; iceberg lettuce once; cherry tomatoes 4 times) during the recorded period (eggplant was recorded once at the San Lorenzo Market).

Seasonality may be an important factor in the overall low occurrence of these products; however, the data suggests that specialty products are more likely to appear in the Campesino and Central markets.

Table 50. Occurrence of speciality horticultural products identified during market scans.

Specialty Produce	Occurrence (out of possible 8)			
	San Lorenzo	Uriondo	Central	Campesino
Raspberries	0	0	0	0
Strawberries	0	0	8	7
Blackberries	0	0	2	3
Blueberries	0	0	1	1
Asparagus	0	0	0	3
Artichokes	0	0	0	4
Brussels sprouts	0	0	0	1

Occurrence of other products

In addition to the short-form scans conducted between June and December 2013, and in March 2014, the occurrence of “herbs, condiments and other *products caseros* (homemade products)” (21 categories, 3 with subcategories), “grains, nuts and dried fruits” (21 categories, 5 with subcategories), “breads and baked goods” (21 categories, 2 with subcategories), “*casera* drinks” (homemade drinks: 19 categories), prepared foods (28), snack foods (16), and “bulk, canned and packaged goods” (47) were also surveyed (Figure 71). Because of the complexity of these categories and the lower impact of seasonality, this more extensive survey was conducted only twice per market (between the periods of June and August 2013). The occurrence data presented below is likely an

underestimate of availability, particularly of bulk, canned and packaged goods in the Central and Campesino markets, because of their size and complexity. Each market is accorded a single occurrence point for a product if it appeared in either scan conducted in the market (if it was recorded twice it still receives only a single occurrence point).

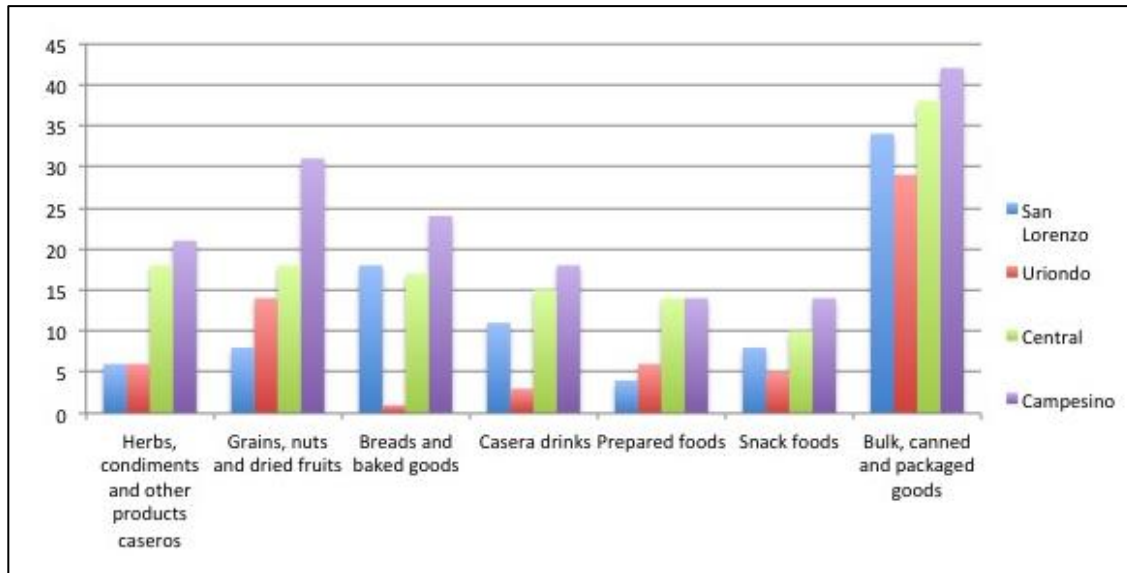


Figure 71. Occurrence of prepared and non-perishable goods identified during long-form scans and surveys.

The occurrence of prepared foods suggests not what is always available, but the diversity of selection available in each market on a given day. While in Uriondo and San Lorenzo 5 choices of dishes might be available, that choice is significantly larger (approximately 14) in the other two markets. Snack foods, however, tend to be more fixed, as these are often items produced by a particular vendor specializing in that product (e.g. *empandas* or *tamales*).

The Campesino and Central markets scored highest in all categories. San Lorenzo, however, also scored higher than Uriondo. In the category of bread and baked goods the diversity in San Lorenzo was as high as in the Campesino and Central markets. This reflects the importance of baked goods as a regional specialty of San Lorenzo (Chapter 5). Similarly, the *alojas* and *refrescos* that comprise the homemade drinks categories are also specialties of the area.

Although both San Lorenzo and Uriondo show high complements of non-perishable dried, canned and packaged goods, apart from non-alcoholic beverages and baked goods in the case of San Lorenzo, “casero” products were almost completely absent. These “casero” products include caramel candies (*ceramelos de dulce de leche*),

homemade dulce de leche (*dulce de leche casero*), fruit syrup (*harabe*), *jelea de membrillo*, jams and jellies (*mermeladas y dulces caseros*, 11 flavour recorded), other conserves (*escabeches*, 7 types recorded), grapes in singani or juice (*uvas en singani or jugo*), grape vinegar, singani, artisanal vino (*vino patero*), dried peach products (4 types recorded), dried quince, and grape chicha (*chicha de uva*). Slightly more of such products occurred in the Central Market compared with the Campesino when varieties of jams, jellies and other conserves are examined. While 16 of 17 recorded varieties occurred at the Central Market, only 9 out of 17 were recorded at the Campesino.

C: Exchange and food flows in and out of the Central Valley of Tarija

There are five main sources of foods circulating and consumed within the Central Valley. These include: 1) foods produced in the Central Valley; 2) foods produced elsewhere in the Tarija Department; 3) foods coming from elsewhere in Bolivia; 4) foods coming from Argentina by both legal and illegal channels; and, 4) foods coming from other parts of the world. These foods circulate within multiple domains, including within the household, as items of consumption, production and transformation as well as through other domains of transformation and networks of exchange, such as markets, *tiendas*, specialty stores, restaurants and vendors' permanent and casual stalls that enable products to move from one geographic location to others (Figure 72).

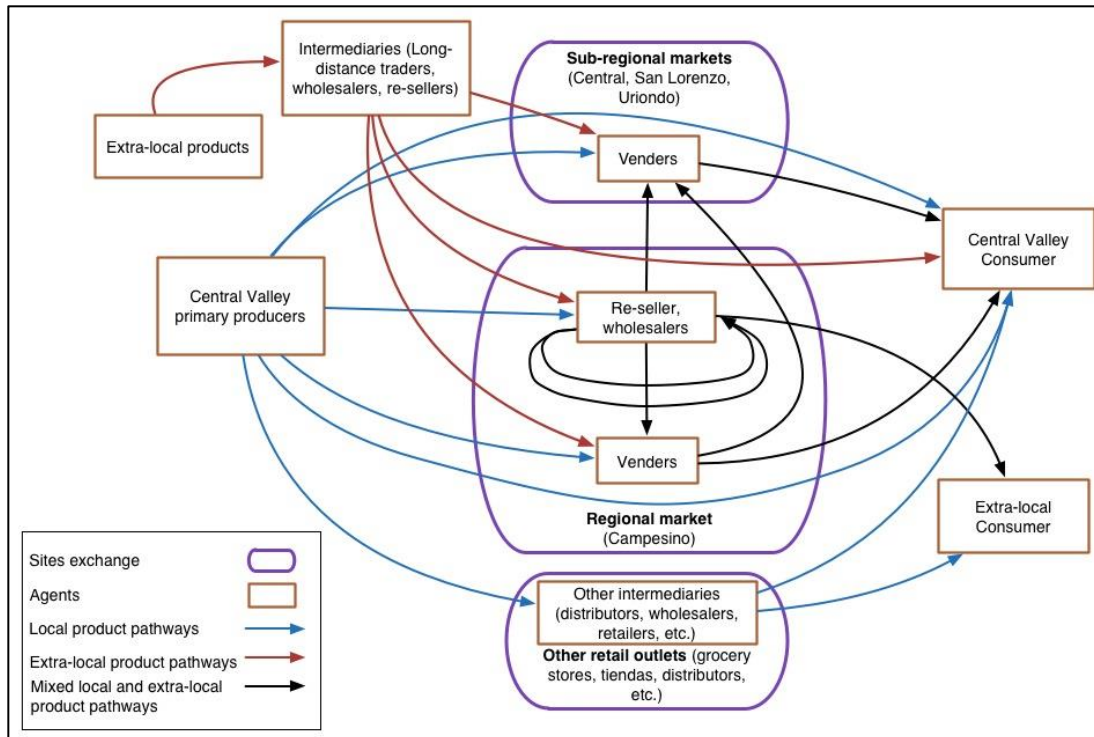


Figure 72. Key sites of production and exchange and the flows of products among them.

Flows of primary products

In March 2014, data were collected from the regional market of Mercado Campesino and from three sub-regional markets (Central Market, San Lorenzo Market and Uriondo Market) focusing on 17 products and their sub-varieties. This data was augmented by data gathered through interviews with market vendors in each of the four markets examined in this research. A total of 294 data points were gathered on the geographic origins of production of a variety of primary and secondary products, including fruits (53 out of 294), vegetables (58), starches (47) meats (12), fish (7), cheeses and dairy products (68), eggs (23), some dry goods, such as rice and pasta (13), breads (3), and preserved fruit (10). Of these, 238 originated within the Tarija Department, while 29 came from other departments in Bolivia [primarily Chuquisaca (7), Cochabamba (6), and Santa Cruz (6)] and 27 from other countries (Tables 51 and 52).

Of the products originating in Tarija, approximately 189 (64%) were produced in the Central Valley (Municipalities of Uriondo, San Lorenzo, Cercado and Padcaya), with another 9% coming from the adjacent municipalities of El Puente, Yunchará, Bermejo and Entre Ríos. Products from the Gran Chaco account for another 7%. This suggests a high level of inter-connectivity within the Central Valley and extended Central Valley

territory. The origins of surveyed products are summarised in Figure 73 and the distribution of product origins by category are summarised in Figure 74.

Table 51. Summary of surveyed products by geographic area of production.

Geographic area	Region	Municipality or other political jurisdiction	Number of products
Tarija	Central Valley	Central Valley Generally	17
		Uriondo (Concepción)	62
		Cercado	39
		San Lorenzo	60
		Padcaya	11
	Extended Central Valley Territory	Yunchará	1
		El Puente	15
		Bermejo	10
		Entre Ríos	4
	Elsewhere in Tarija	Gran Chaco Province	19
National	Chuquisaca Department		7
	Cochabamba Department		6
	Santa Cruz Department		6
	Elsewhere in Bolivia		10
International	Argentina		26
	Peru		1

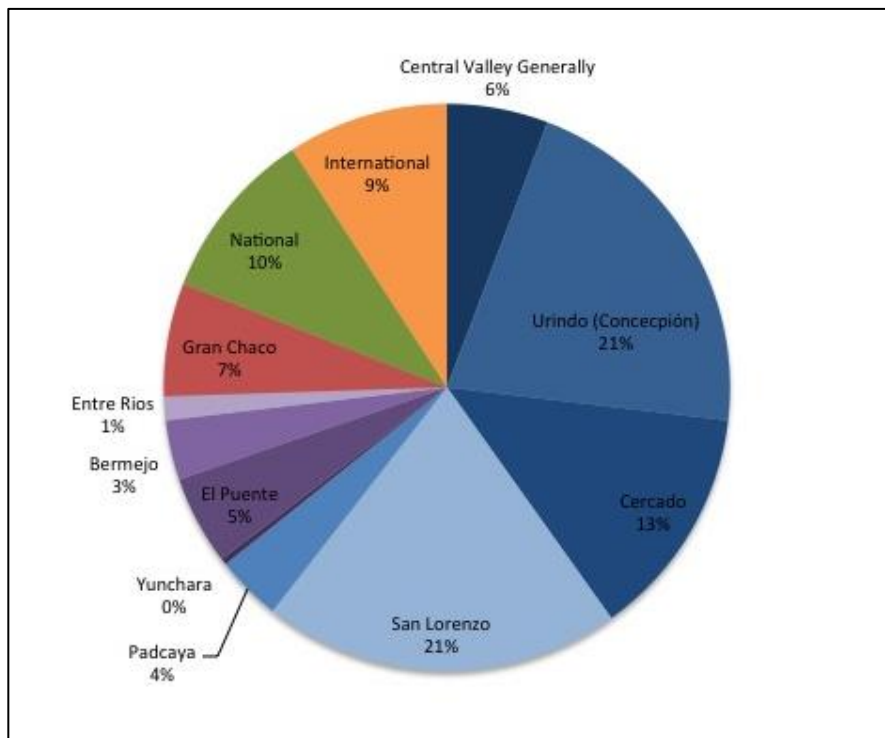


Figure 73. Origins of products entering Central Valley Markets based on market surveys and scans.

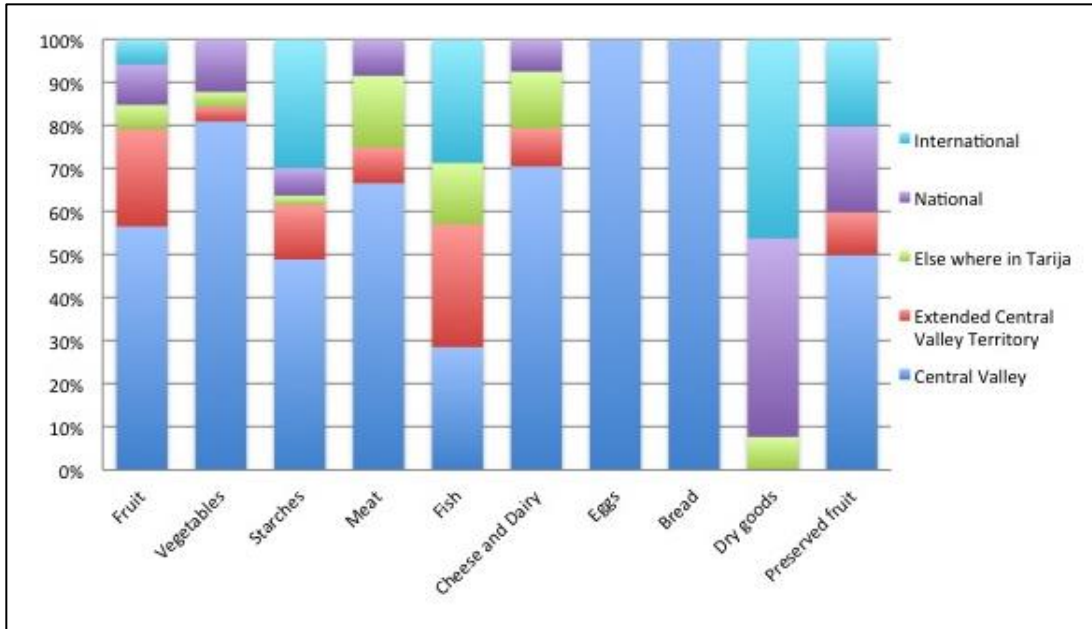


Figure 74. Distribution of Central Valley Market product origins by category.

Table 52. Origin of surveyed products by product category.

Category	Central Valley					Central Valley Sub-total	Extended Central Valley Territory					Extended CV Sub-Total	Else where in Tarija Gran Chaco Province	National	International	Total (out of 293)	% of total sample
	General	Uriondo	Cercado	San Lorenzo	Padcaya		Yunchará	El Puente	Bermejo	Entre Ríos							
Fruit	0	21	5	4	0	30	0	2	9	1	12	3	5	3	53	18%	
Vegetables	0	20	10	17	0	47	0	2	0	0	2	2	7	0	58	20%	
Starches	0	5	5	13	0	23	0	5	0	1	6	1	3	14	47	16%	
Meat	0	1	0	7	0	8	0	1	0	0	1	2	1	0	12	4%	
Fish	1	0	1	0	0	2	1	0	1	0	2	1	0	2	7	2%	
Cheese and Dairy	16	6	6	12	8	48	0	4	0	2	6	9	5	0	68	23%	
Eggs	0	9	7	4	3	23	0	0	0	0	0	0	0	0	23	8%	
Bread	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3	1%	
Dry goods	0	0	0	0	0	0	0	0	0	0	0	1	6	6	13	4%	
Preserved fruit	0	0	5	0	0	5	0	1	0	0	1	0	2	2	10	3%	
Total (out of 293)	17	62	39	60	11	189	1	15	10	4	30	18	29	27			
% of total sample	6%	21%	13%	20%	4%	65%	0%	5%	3%	1%	10%	7%	10%	9%			

Table 53. Main products by category from main contributing municipalities of the Central Valley.

Product category	Uriondo (Concepción)		Cercado		San Lorenzo	
	% municipal total	Products (% of municipal total) ¹	% municipal total	Products (% of municipal total) ¹	% municipal total	Products (% of municipal total) ¹
Fruit	33%	Grapes (19%), peaches (6%), strawberries (3%), also prickly pear cactus fruit, figs, and lemons	13%	Blueberries (5%), also grapes, melon, and oranges	7%	Strawberries (3%), mandarin oranges, and prickly pear cactus fruit
Vegetables	32%	Tomatoes (8%), peas (3%), green onions (3%), onions (3%) also egg plant, asparagus, leafy greens, chili peppers, carrots, cabbage, bell peppers and beets	26%	Leafy greens (11%), peas (11%), and others	28%	Leafy greens (18%), peas (3%), asparagus (3%), also green onions and achocha
Starches	8%	Potatoes (7%), and sweet potatoes	13%	Potatoes (8%), corn (choclo, 5%)	22%	Potatoes (5%), corn (choclo, 15%), papalisa
Meat	2%	Beef	0%	None	13%	Chicken (farmed, 10%), pork (3%)
Fish	0%	None	3%	Small fish and crabs (misquinchos, cangrejos, etc.)	0%	None
Cheese and Dairy	10%	Creole cheese (8%), goats' milk cheese	15%	Creole cheese (13%), creole milk (3%)	20%	Creole cheese (8%), goats' milk cheese (8%), fresh milk
Eggs	15%	Eggs (factory farmed, 14%), creole eggs	18%	Egg (factory farmed, 11%), creole eggs (8%)	7%	Eggs (factory farmed, 5%), creole eggs
Bread	0%	None	0%	None	5%	Bread and other baked goods (5%)
Dry goods and non-perishables	0%	None	0%	None	0%	None
Preserved fruit	0%	None	13%	Jams and jellies (13%)	0%	None

¹ Percentage given if over 2% of total.

From within the Central Valley and extended territory, the majority of products came from the municipalities of Uriondo (Concepción), Cercado and San Lorenzo (Table 53). Seventeen products were also identified as originating from the Central Valley, but were not identified as coming from a specific part of the Central

Valley. Of these 15 were dairy (13 milk and 2 yogurt) coming from Prolac and Pil-Tarija, two of the largest dairy processing companies operating in the Central Valley. The remaining products were a creole cheese, small fish and crabs.

From Padcaya and the municipalities comprising the extended Central Valley territory, the range of products identified in the market tended to be concentrated in a few select types (Table 54).

Table 54. Main product entering Central Valley Markets from other Tarija municipalities.

Municipality	Main products entering Central Valley markets	
Padcaya	Dairy	Creole cheese
	Eggs	Creole eggs
Yunchará	Fish	Smelt
El Puente	Fruit	Peaches and nuts
	Vegetables	Peas and fava beans
	Starch	Potatoes
	Dairy	Creole cheese and goats' milk cheese
	Preserved fruit	Dried quince
Bermejo	Fruit	Citrus fruits (oranges, etc.)
	Fish	River fish
Entre Ríos	Dairy	Creole cheese
	Starch	Potatoes
	Fruit	Oranges

Cheese was the main product entering the Central Valley markets from the Gran Chaco. Fruit (e.g. avocado and oranges), vegetables (e.g. bell peppers and tomatoes), starches (e.g. corn), meat (pork and beef), as well as river fish were other products from the region. Fruits (e.g. oranges, pineapple and papaya), as well as vegetables (e.g. chili peppers, onions), starches (e.g. potatoes and papalisas), cheeses, milk and meat were products drawn from other departments. Argentina accounted for all but one of the international products. Potatoes and dry goods and other non-perishables, including dried fruit, were the main products from Argentina.

The only category of food exclusively originating from outside the Central Valley was dry goods. Salt was the only dry good sourced from the Tarija Department, as were corn meal and corn flour. All other dry goods, including rice and noodles, and other non-perishables (with the exception of dried fruits) came from the Department of Santa Cruz or Argentina.

Flows of products within the Central Valley: Forward and backward linkages

Data was collected from secondary producers, restaurant owners and other vendors on their ingredient sourcing practices and norms.

Restaurant, food vendor and secondary producer sourcing patterns

Data were collected on 22 restaurants. Of these 5 were located in the City of Tarija, 5 were in San Lorenzo, 7 were in Tomatitas (a small town on the outskirts of the City of Tarija on the road to San Lorenzo), 4 were in Valle de la Concepción, and 1 was in Saladillo. Of these, 18 classified their menus as traditional foods, with 4 identifying a specialization in fresh water fish and crustaceans. The remaining 4 restaurants served a mixture of international and traditional dishes.

A summary of sourcing strategies is provided in the Table 55. Twenty of these 22 restaurants reported sourcing ingredients from the Mercado Campesino in Tarija. In contrast, only 5 reported using a regional market (e.g. San Lorenzo Market, Uriondo Market or the Central Market). Eighteen, however, reported sourcing directly from producers, without intermediaries or the use of formalised sites of exchange, such as markets. Seven reported using distributors or traders for specific products, including buying pork directly from the abattoir. Two others reported using grocery stores, butchers and other independent, formalised sites of exchange. One respondent reported purchasing *vino patero* at a fair. Four also reported producing or harvesting some of their ingredients.

Twenty-one restaurants reported employing more than one sourcing strategy. The sole restaurant that employed only one strategy sourced everything from the Mercado Campesino. An overwhelming proportion of materials overall were drawn from the Mercado Campesino. Sourcing from local producers, while often reported, tended to be limited to a few selected products per business (e.g. hens) and to times of the year when there was a harvest and the product was readily available (e.g. potatoes). Restaurant owners commented that they would buy a product from a local producer “during their season” or when they were available and otherwise they would buy that product from the Mercado Campesino. Similarly, the majority of restaurant owners who reported buying from their closest sub-regional market often purchased only a few select products there – those that were needed fresh, such as meat or bread – or used the local market as a backup in case they forgot something, and did the majority of their shopping at the

Mercado Campesino. They would go there once a week, for example, to buy most of what they would need and then supplemented their supplies from the local market as necessary. Similar patterns are evident among other prepared food vendors and secondary producers (see Tables 56 and 57). Secondary producers generally relied on a smaller set of specific, raw ingredients in their production process compared with restaurants or food vendors, who may be producing a large variety of dishes requiring particular ingredients.

Table 55. Restaurant sourcing strategies.

Sourcing strategy	Occurrence		Products	Comments
	# (out of 22)*	%		
Regional Market (Mercado Campesino)	20	91%	Dry goods and oils, vegetables, fruit, beef, pork, chicken and hen, fish and crustaceans, and specialty items (including blueberries, raspberries and strawberries)	Most frequently described as “everything”, and preferred for lower prices and simplicity of being able to buy everything at the one time.
Sub-regional markets (Central, San Lorenzo, Uriondo or other)	5	23%	Beef, pork, chicken, fish and vegetables	Often things used daily and reported to have a minimal price difference at sub-regional compared to regional market
Distributor, dealer or trader	7	32%	Beer, wine, soft drinks, dry goods, fresh and aged meat, and specialty items (e.g. ice cream making supplies)	Many of these are either heavy items that are difficult to transport (e.g. beverages), or are speciality items (e.g. whole pigs or ice cream making supplies)
Supermarket, butchers or other stores	2	9%	Aged meat, vegetables	Specialty items, or used as secondary purchasing option
Product fairs	1	5%	<i>Vino patero</i>	Occasional
Direct from producers	18	82%	Vegetables (e.g. potatoes, peas, fava beans, corn, onions), hen, pork, fish and crustaceans (e.g. cangrejos, misquinchos, etc.), milk, artisanal beverages (e.g. <i>vino patero</i> , <i>chicha de uva</i>), industrially produced wine and singani, also specialty items (e.g. goat cheese and cured hams).	Frequently used crops (e.g. potatoes), naturally raised meats (e.g. <i>gallina criolla</i>), harvested products (e.g. cangrejos), artisanal products (e.g. <i>vino patero</i>) or specialty products (e.g. goat cheese and cured ham from formalized small producers linked with Tarija Aromas y Sabores)
In-house production	4	18%	Pigs, chickens, vegetables, including potatoes, and fish (e.g. <i>cangrejos</i> and <i>misquinchos</i>).	Often linked with production for household consumption and/or products with high market value (e.g. <i>gallina criollo</i> and <i>cangrejos</i>)

¹ Figures include only restaurants that self-reported to employ a given sourcing strategy.

Table 56. Food vendor sourcing strategies

Sourcing strategy	Occurrence		Products	Comments
	# (out of 29) ¹	%		
Regional Market (Mercado Campesino)	22	76%	Meat (e.g. organ meats, beef, pork), fish, including cangrejos and misquinchos, potatoes, vegetables (e.g. onions, chili peppers, tomatoes), grains and flours (e.g. corn, wheat, barley), dried fruit (e.g. pelón), oil, sugar, lard and other non-perishable items.	Most frequently described as “most things”.
Sub-regional markets (Central, San Lorenzo, Uriondo or other)	8	28%	Meat, cheese, potatoes, dry goods (rice, flour, etc.)	Described as the source of “some things”.
Distributor, dealer or trader	5	17%	Llama and aged meats, corn flour	Most distributors were abattoirs or meat suppliers. One was a local flourmill.
Supermarket, butchers or other stores	1	3%	Specialty items	
Direct from producers	15	52%	Hens and other creole meats (e.g. pork, goat), potatoes, vegetables (e.g. peas, onions), milk, and fish (e.g. cangrejos and misquinchos)	Often a specific item or small group of items used by a vendor in preparing their products.
In-house production	11	19%	Hens and other creole meats (e.g. pork), milk, corn (or corn flour), potatoes, peaches, and specialty products (e.g. chicha de uva).	Often a specific item or small group of items used by a vendor in preparing their products.

¹ Figures include only restaurants that self-reported to employ a given sourcing strategy.

Table 57. Secondary producer sourcing strategies.

Sourcing strategy	Occurrence		Products	Comments
	# (out of 52) ¹	%		
Regional Market (Mercado Campesino)	25	48%	Dry goods (e.g. flour, sugar) and grains (e.g. barley, wheat, dried corn, flax), oils, lard, vegetables (e.g. choclo, peanuts), fruit (e.g. peaches), eggs, milk, including creole cow and goat, cheese, eggs, meat (e.g. pork), spices and specialty items.	Described by several of the producers as the source of “most” of their ingredients.
Sub-regional markets (Central, San Lorenzo, Uriondo or other)	2	4%	Eggs, dry goods (e.g. flour, sugar), cañazo	
Distributor, dealer or trader	7	13%	Dry goods (flour, salt, sugar, yeast), lard, chocado, meat (pork and llama)	3 of these are bread producers operating in a localized node of production (Lajas) where a delivery system has emerged to cater to the producers.
Supermarket, butchers or other stores	2	4%	Dry goods (baking powder, corn starch, flour) and cañazo	Both purchased from local tiendas because of ease of access to these sources.
Direct from producers	16	31%	Eggs (industrial and “creole”), fruit (e.g. peaches, <i>lacayote</i> , etc.), milk, corn and corn derivatives, wood for fuel and specialty products (e.g. cured ham, honey, artisanal vinegar)	Often a specific item or small group of items.
In-house production	14	27%	Milk, including conventional, “de vaca criolla”, and goat milk, fruit (particularly peaches), and corn or corn flour	Often a specific item or small group of items.

¹ Figures include only secondary producers that self-reported to employ a given sourcing strategy.

Appendix H: Preliminary territorial profiles

The territorial profiles presented in Table 58 of the main areas considered as study sites were compiled during Phase I of my fieldwork (August to November, 2012).

Table 58. Territorial and sub-territorial profiles of Central Valley and neighbouring Tarija territories.

Territory	Nested Territory	Main Town(s)	Closest Urban Centre (kms/travel time)	Main Economic Activities	Outcomes	Other notes (population, distinguishing features, etc.)	Rural development using Edible Biocultural Heritage ¹	Related associations and networks	Field site advantages ²	Field site disadvantages
Valle Central	San Lorenzo	San Lorenzo	Tarija (~15 kms/30-40 mins.)	Small-holder dairy production; small-holder agriculture; artisanal wine production; tourism	Most of the agricultural and dairy production is sold in Tarija. There is a central processing plant for the milk. Much of the agricultural production is associated with the dairy production (fodder and feed for cattle). Most of the artisanal wine is consumed within the household or sold to an intermediary (sold under a bulk 'vino patero' lable at about 15B/\$2 a liter)	Many small communities along the roads leading to and from San Lorenzo. San L. has approximately 4000 people. Most agricultural production is taking place on holdings ranging from 0.5 to 4 hectares. The western part of this area touches the Sama Reserve.	San Lorenzo is developing a tourism industry based on artisanal wine and singani production (part of the Tarija Ruta del Vino). There are several small shops, some offering wine tasting, in San Lorenzo. There is also goat cheese production and berry product cooperative (no longer active).	Ruta del Vino (linking artisanal producers and artisanal wine retailers with tourism providers); Afrutar Cooperativa: La Asociacion de Fruticultores de Tarija (now inactive network of berry and asparagus producers, including a secondary production facility); Some non-wine producers are also linked with Tarija Aromas y Sabores.	Meets criteria: 1, 2, 3, 4, 6 Logistically, there is electricity and is close to Tarija.	Criterion 5 is less certain. The question of how to bound the field site is an issue. It is a relatively large, amorphous area.

Lago San Janinto	Tolamos a y San Andres	Tarija (~10kms/20-30 mins.)	Small-holder agriculture; tourism; migration	This area produces potatoes, maize, and vegetables mostly for the Tarija market. Most the production is very labour intensive (using ox ploughs). The “lake”, which is really a reservoir, was completed about 10 years ago. There is a small tourism industry, mostly based on small restaurants selling fish (stocked, introduced species) from the lake to people from Tarija. Many people from this area migrate to Argentina.	This area borders the Sama reserve. The population is quite dispersed, or in small centers. This area seemed quite poor compared to San Lorenzo and Uriondo. Most of the larger houses were built with money gained through migration. Interesting to note that the reservoir was created in part to provide irrigation for the more industrial wine growing areas (e.g. Santa Ana)			Meets criteria: 1, 2, 3, and 6 Logistically, it is close to Tarija.	I did not see any specific initiatives related to edible biocultural heritage (criteria 4). The bounding the areas is again not clear (criteria 5).
Santa Ana		Tarija (~10kms/20-30 mins.)	Medium and large-scale commercial wine production; tourism	Most of the wine is intended for the national market and competes with higher quality imports from Argentina and Chile.	There has been rapid land development here in the last 10 years, marked by significant conversion of scrub forest to grape production. Irrigation water comes from San Janinto. Land prices are now very high.	Some of the wineries and distilleries are part of the Ruta del Vino. These wine tours cater to a higher-end cliental compared to San Lorenzo and Uriondo.	Ruta del Vino (linking bodegas with tourism providers). Many of the tourism providers also serve cured ham, cheese and other local products as part of the wine tasting.	Meets criteria: 1, 4, and 6	With respect to criteria 2 and 3, although, the wine is also sold in Tarija, the majority of production is intended for the national market. There are a few communities in this area, but mostly it is an industrial agricultural zone.

	Uriondo/ Valle de la Concepci ón	Uriondo	Tarija (~25kms/4 5 mins.)	Grape cultivation; artisanal wine production; tourism; agriculture	Grape production at small and medium scales is a major economic activity. Both grapes for fresh consumption and for wine production are produced. Most of the bodegas are small or medium. There is also some other agricultural production taking place (limited livestock and staple crop production).	There are a number of small and medium-sized communities. Most of the tourism activity is taking place in Uriondo. Most of the holdings are small. There are many similarities with the San Lorenzo area. The main distinction is the increased importance of grape production in the economy and the presents of medium-scale artisanal wine producers.	This area has been involved in wine tourism for about a decade longer than San Lorenzo. There are number of well- organized bodega/vineyards (restaurants/small museums/etc.). This area is also part of the Ruta del Vino. There is also limited production of other niche-market goods.	Ruta del Vino (linking artisanal producers and artisanal wine retailers with tourism providers); Las Duelas: Enoturismo Interactivo (a group of primarily wine producers that sell their products through a producer- owned store).	Meets criteria: 1, 2 (?), 3, 4, 6	More of the agricultural production (e.g. wine) was oriented for niche markets compared to San Lorenzo (criterion 2). Similar to San Lorenzo, the area is large and the population is not easily bounded geographically (criterion 5).
Entre Rios	Itika Guasu Guarani	Timboy	Entre Rios (3 hours); Timboy (1- 1.5 hours); Tarija (6-7 hours)	Fishing (Local, Entre Rios); agriculture; handicrafts; migration	Fishing in the river is the main economic activity. This fish is a large part of the local diet, and is supplemented by maize cultivation and small animal production for domestic consumption. Fish is also sold in Timboy and other communities, including Entre Rios. Many people migrate to nearby urban centers and to Argentina.	This small Guarani community of 6 households is located within a large, dry forest area. There are several other small communities close by. There is no electricity and very poor road access. There is some hunting and wild plant use. A large portion of the diet is produced locally.	There have been a few examples of tourists visiting the community. Their activities included eating local foods.	The community has been involved in some activities by RIMSIP to promote Entre Rio's territorial identity	Meets criteria: 1, 2 (fishing), 5	All bought food comes from Timboy or other urban areas (Entre Rios: criterion 3). There is no significant economic development activity taking place (criterion 4). The population speak Guarani and there is limited fluency in Spanish. Communication was quite

									difficult (criterion 6).
									Logistically: Very isolated and no electricity.
Salinas	Salinas	Entre Rios (1.5 hours); Tarija (4-5 hours)	Animal husbandry, including livestock and bee keeping; agriculture (Local, Entre Rios); limited tourism; migration (Logging was important, prior to the establishment of the reserve)	There is lots of cattle and sheep ranching and most homesteads also have small agricultural plots (including fruit trees, sugar cane, and other crops). Maize is also grown for domestic and livestock consumption. Most of the honey is consumed locally or sold in Entre Rios or Tarija. There are two hostels in the community, which received limited visitation. Many people also migrate to urban centers or to Argentina.	This community of about 600 people is located within the Tariquia Reserve. It is divided into four zones, each with a residents' association/ council. Only one of these zones has electricity. The main form of transportation within the community is by horseback. The ranchers also practice transhumance and bring their herds to an area about a day's travel to the south in the reserve. The reserve allows for domestic use of timber and non-timber forest products from the reserve.	There is has work over the last 20 year (particularly last 10) to develop local honey production as a higher value product. This has included the development of secondary products. A 'sala de miel' (honey exhibition room) is currently being built with support from FAUTAPA. There has not been significant effort to link tourism with local edible biocultural heritage, which includes honey, jams, several different kinds of alcohol, in addition to locally produced staple crops and meats.	Tarija Aromas y Sabores and FAUTAPA have been involved in promoting Tariquia honey. There is also an association of 15 active honey producers (approximately a 1/6 of the population are involved in honey production).	Meets criteria: 1, 2, 4, 5, 6 I did not see exchange of locally and non-locally produced foods taking place. However, it is reasonable to assume that some exchange of local products is present. There are a few small shops selling dry foods from individuals' homes. Most of the bought food comes from Entre Rios.	The only significant economic development related to edible biocultural heritage is related to honey (criterion 4). Logistically, the community is relatedly isolated and lacks basic services, including electricity in most of the community.

Zona Alta	Yunchar á	Yunchar á	Tarija (~100km/ 3 kms)	Animal husbandry (sheep and llamas); small- holder agriculture (potatoes); limited tourism.	Sheep and llamas are used for both fiber and meat. The sheep have a lower value currently than llamas; however, they were introduced in the 1960/70s and come to replace llamas during that time because of their higher economic status. The reintroduction of llamas was enabled (at least in part) because of the national and international revalorization of llamas and camelids. There are two important cooperatives (one for llama meat and the other for wool products), both of which sell in Tarija.	Yunchará is the largest town (a few hundred households). There are several smaller towns, or clusters of homesteads, scared throughout the area. Most families seem to have both small agricultural plots and livestock. Most of the community is Spanish- speaking.	The main initiative related to edible biocultural heritage (e.g. the llama meat co-op) has been developed by Prometa. They sell the meat in the mercado campesino en Tarija and to local schools (via the municipality). The co-op has a slaughterhouse and processing facility in the Yunchará area. They also have the capacity to produce charqui, which has a higher value per kilo than fresh meat.	Prometa is a key NGO actor in the area and has helped develop the llama meat and wool co- ops. They have also trained local tourist guides. JAINA has also been involved in one of the valleys in the area and has produced some materials related to culinary heritage. The tourism opportunities that Prometa has worked to develop (the Inca trail, bird watching, etc.) are well promoted in Tarija by a number of different tourism agencies.	Meets criteria: 1, 2, 3, 4, 5, 6 The main example of exchange of local products in the school lunch program. There are also likely a few small shops in Yunchará.	The only significant economic development activity related to edible biocultural heritage is llama meat (criterion 4). Bounding the participant group may be difficult (criterion 5). Logistically, this area is relatively isolated and lacks basic services. Finding medium-term housing is also likely to be a challenge.
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¹ Food production is important in all of these areas. Here I refer to specifically to initiatives to add value to local food production, or create a multi-functional rural landscape.

² See Chapter 1, Section 1.4 for case selection criteria.