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Article

Creole Hens and Ranga-Ranga: Campesino Foodways and Biocultural Resource-Based Development in the Central Valley of Tarija, Bolivia

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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 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.

Keywords: biocultural resources; biocultural design; alternative food networks; sustainable rural development; local food systems; Bolivia

1. Introduction

It is 2:00 p.m. 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 chilli peppers (Figure 1). 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.

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Figure 1. *Ranga-ranga* served with a homemade *refresco de cebada* (barley drink) and *ají* (a sauce of blended chillies, 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 of 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 (AFN) surrounding foods and food products associated with local campesino gastronomic heritage (CGH), like the local dishes made by Doña Gloria and many others in the Central Valley.

We find that the AFN surrounding CGH 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 AFN, we conclude that even the relatively small investments to promote CGH made by local governments 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 AFN literature, we identify ways in which AFNs can be part of territorial projects to enhance biocultural heritage and, reciprocally, what biocultural heritage can offer to create and sustain AFNs. Our analysis aims to support the work of biocultural design [1], AFNs and other rural development approaches, such as rural territorial development [2–4], seeking to use biocultural resources to further locally-defined development objectives associated with local food system sustainability.

2. Alternative Food Networks and Biocultural Sustainability

Alternative food networks, or "alternative systems of food provisioning" [5], 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' [6–10]. Embeddedness expresses the greater spatial, economic and social proximity created through short food supply chains [9]. Food 'quality' is a highly differentiated concept that refers to the salience of both socially constructed and material properties of products within AFNs, in contrast to the prominence of price within conventional food networks [7]. It is also often linked with postproductivism and more transparent, ethical and sustainable practices of production, exchange and consumption [5,9].

AFNs are diverse in their political orientation (e.g., their prioritisation of 'just value' for products or 'just values' embodied in their production and exchange; [7]), emphasis on competition within local or global markets, focus on product specialisation or diversity, and relative prominence of artisanal or ecological characteristics [5,9]. In Europe, AFNs are also linked with development programs to stimulate endogenous development in lagging regions [11–14]. This rural territorial development approach has been exported through aid programs to other regions of the world, including in Latin America [4,15–17].

Much of the critical scholarship on AFNs 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, cf. [5,7]. Much less work has focused on endogenous processes of AFN creation, particularly for local markets, taking place in the Global South.

Yet, major and distinctive processes of AFN creation and re-territorialisation are occurring in local food systems of Latin America and elsewhere, cf. [18,19–23]. 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 [24,25]. The interdisciplinary field of biocultural diversity finds its theoretical roots in the fields of linguistic anthropology, ethnobiology, ethnoecology and conservation biology [26] and has subsequently been extended through collaboration between Indigenous peoples and research groups, such as the 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 [27,28].

Biocultural perspectives draw attention to biocultural diversity and heritage and their role in shaping the interconnected wellbeing of societies and ecosystems [28,29] as well as their potential as resources in pursuing a plurality of locally-defined development objectives [1,25,27,30,31]. 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 [22,23,27,32].

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 [33–36]. 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 [37–40]. 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 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 species, landraces and breeds, as well as the dishes and products made from them, have sometimes become a particular locus of valorisation efforts and a basis for creating or

rebuilding AFNs 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 [41], or meaning [42], 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 [13,25,43].

Advocates of identity- or biocultural heritage-based products argue that valorisation can generate multiple ecological, economic and sociocultural benefits for resource holders and their territory, 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, the maintenance of cultural practices, and sustaining or enhancing access to culturally important foods and dishes [11,44–47]. Through enhancing the viability of rural territories through biocultural heritage promotion, demand for other goods and services in the territory can also be enhanced [15]. Such arguments recognise and support "new rurality" conditions within development policy, acknowledging the important contributions that non-farm and off-farm incomes, including those related with rural tourism and the production of value-added products, make to many rural territories for a review of new rurality see Reference [48]. However, as Bowen and De Master [8] (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 biocultural valorisation for the people and environments involved. These parameters are consistent with the broader sustainable development and sustainability principles that both AFN and biocultural concepts echo [49]. Better understanding how such valorisation 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 with AFNs.

The incorporation of biocultural perspectives contributes to filling gaps in current AFN analysis. It has also been noted that scholarship on AFNs would benefit from bringing together food and agro-food studies [5]. 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' [50]. 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 [51] (p. 591) as have the biocultural strategies for in situ conservation [22,36]; however, the lens of primary production, as new rurality perspectives suggest, is not sufficient to understand the potential of campesino agriculture or other small-holder production systems and associated agrobiodiversity and resource management practices. Acknowledging the wider food system context, including the existence or not of markets, is vital. 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. Examining alternative food networks through the lens of biocultural sustainability attuned to human-environment relationships manifesting in multiple dimensions of food systems offers a systematic approach to examine the use of edible biocultural heritage as local development resources.

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 [52–55]. The trajectory set in motion may create conditions in which those relationships flourish or 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 [56] 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 Reference [57]) 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 [1].

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 1650 to 2200 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 [58,59]. In spite of increased rural to urban migration in recent years, and high levels of international migration, many people in the Central Valley retain strong rural roots. Approximately nineteen percent of the working age population here work in agriculture, with those numbers increasing dramatically to forty-eight percent in San Lorenzo and seventy-four percent in Uriondo [60].

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 [61,62]. 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 [57,63]. 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 been taking place (A key actor in the gourmet valorisation strategy is a program called *Tarija Aromas y Sabores* (Tarija Aromas and Flavours, primarily funded by the Inter-American Development Bank), which is also the name of a territorial brand used within the strategy to promote selected product chains with high-value market potential: Grapes, wines and *singanis*, goat cheese, cured hams, honey, and non-traditional fruits and vegetables. More recently, gastronomy and tourism have also been incorporated into the strategy and has led to greater interactions between the gourmet strategy and the AFN focused on here. For example, while most of the restaurants involved in the gourmet strategy cater to high-end markets, *Tarija Aromas y Sabores* has also hosted an annual festival since 2012 in which some less-formal food venders participate. A full discussion of the gourmet strategy and the differentiation between gourmet products and their traditional equivalencies is provided in Reference [57]).

To document and analyse an AFN surrounding CGH 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 fairs (Eight fairs were attended as part of this research, in addition to three at which surveys were conducted) 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 fairs (*X feria de maíz y sus derivados* (5th Maize and maize product fair: 4 August 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: 6–8 September 2013, Tarija, Cercado)), 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 1. All data were gathered in Spanish and research participants have been given pseudonyms or codes to protect their privacy and anonymity (Table 2).

Table 1. 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.

Table 2. 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

4. Campesino Gastronomic Heritage-Based Alternative Food Network

Patrimonio gastronomico campesino (campesino gastronomic heritage) of the Central Valley, as explained by Vacaflores and Lizárraga [64] (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 CGH 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 [65–67]. Campesino forms of production, transformation, and consumption constitute a unique aesthetic characterising CGH that is manifested in a broad array of traditional cultivars and foods that are eaten and transformed into classic dishes (Table 3). These products connect people to the *campo* (countryside) and long-standing campesino foodways that have become the basis of an AFN entwined in ecological, economic and sociocultural dimensions of *Chapaco* life in the Central Valley.

Unlike the gourmet product valorisation process also taking place in the Central Valley, which is being undertaken by a group of public and private actors largely coordinated by NGOs with funding from the Inter-American Development Bank, the Swiss Agency for Development and Cooperation, among other donors [69,70], the AFN surrounding CGH and the valorisation processes helping position CGH as a resource in the local economy are not unified under a specific, formalised development program. Although related with the activities of local governments, campesino unions, local tourism associations, producer associations and some supportive local NGOs, valorisation of CGH transcends any specific event or celebration. Rather it reflects 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) [71–73]. The main plaza of the Town of San Lorenzo, for example, is populated with sculptures representing campesino products from the area (Figure 2).

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Table 3. Examples of products associated with the gastronomic heritage project.

Primary Products		Secondary Products		Dishes	
Name	**Description**	**Name**	**Description**	**Name**	**Description**
Maize	*Zea mays* subsp. *mays*. Numerous varieties are produced in the Central Valley for food and feed. Some are eaten as *chocolo* (fresh/sweet corn), while many others are ground for flour.	*Queso criollo* and *queso de cabra criolla* ("Creole" Cheese)	*Queso criollo* 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., *sopa de maní*) and beverages (i.e., *aloja de maní*).	*Chicha*	A fermented, mildly alcoholic beverage made from corn (*chicha de maíz*) or grapes (*chicha de uva*).	*Saice*	Ground meat, stewed with red chilies, peas and potatoes. Normally served with rice and a lettuce, tomato and onion salad.
Potatoes	*Solanum tuberosum.* Numerous varieties are produced.	*Aloja*	A lightly fermented, non-alcoholic beverage made from peanuts (*aloja de maní*) or barley (*aloja de cebada*).	*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	*Pachyrhizus tuberosus.* 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 *vino patero* 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 *picante* by using the water used to boil the chicken and the smaller pieces of meat for the soup)
Yacón	*Smallanthus sonchifolius*. 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 dry styles are common.	*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).
Squashes	*Cucurbita* spp. Several varieties are cultivated.	*Singani casero* (Homemade Singani)	*Singani casero* is distilled from young wine to produce a clear spirit. Although singani is sometimes made exclusively with *Moscatel de Alejandría* 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 (*Vitis vinifera*) varieties, including *Moscatel de Alejandría*, *Misión*, *negra criolla* and *mollar*, were brought to the Central Valley by the Spanish in the 1500	*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	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.

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	and 1600s [68]. These varieties continue to be produced in campesino communities, while commercial varieties have become the norm in other areas of the Central Valley.			sheep on the cross)	
Gallina criolla ("Creole" hen)	*Gallina criolla* 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 strewed lacayote *(Cucurbita ficifolia)* 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. Serviced with rice and a small salad.
"Creole" hogs	Creole hogs are widely produced in the countryside at a small-scale.	*Humintas*	Corn dough flavoured with anise (*Pimpinella anisum)*, 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).	*Guiso Chapaco*	A thick stew of rice, potatoes, chick and peas cooked with onion and chilies (*ají colorado)*.
C*angrajos* (Fresh water crabs)	*Aegla septentrionalis*: 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 (*cuaresmillos*) are dried whole as *pelon*. 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 (*Capsicum*) are locally produced, including *ají putita'* (or *mala palabra*), *ulupica*, *cobincho*, *locoto*, *amarillo*, *colorado*, and many more.	Fruit jams and preserves	Peaches, seven year melon (*lacayote*), plums, quince and many other fruits are processed into jams, jellies and other preserves, including grapes pickled in singani.		

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Box 1. Finding angels' 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).

Figure 2. 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 rosqetes; 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* celecbrations (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 [75]. Public markets, maintained with support from local governments, are vital nodes of exchange between campesino producers, their products and Central Valley consumers. The largest and most prominent of these is the *Mercado Campesino* (Campesino Market) in the City of Tarija [76], which houses 1300 permanent and 800 occasional vendors. Local governments across the Central Valley also sponsor

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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 [77] and the same number in 2013, in addition to seven *Festividades Propias del Lugar* (Local festivities) [78].

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 3).

Figure 3. Female vendors selling CGH-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).

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

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regional specialty foods (For a full discussion of religious celebrations and other cultural events celebrated in the Central Valley, see Vacaflores [74]). 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, 1 November), during which a table is set in the home and filled with dishes for the ancestors (Figure 4). 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.

Figure 4. 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 2500) [79] (p. 132), 55 retail platforms, including *tiendas* (small shops), restaurants and homes, advertising the sale of local specialty dishes and/or products were identified (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). 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 3). Additionally, the

road between San Lorenzo and the City of Tarija is populated with restaurants and food vendors (Table 4). 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 4. Different types of venders selling traditional products long the road between San Lorenzo and Tarija [1].

Community	Number of *Tiendas* (Shops)	Number of *Casitas* (Kiosks)	Number of Roadside Food Venders	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, 13 October 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 *comídas típicas* (traditional dishes), especially fresh water crabs, small fish and *humintas* [80]. 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.

5. Considerations for Biocultural Sustainability

When biocultural diversity and heritage are mobilised as resources within territorial projects, such as the CGH AFN in the Central Valley, relationships with the practices, materials and meanings constituting those resources are subject to reinterpretation, renegotiation and sometimes reconstruction [8,53,81,82]. 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.

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; 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 [67]. 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

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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 a 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 5). This is in contrast to the seven varieties reported in production profiles of the twenty-seven maize-producing households interviewed 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 (field notes, 08/25/2013). While this evidence is anecdotal, it suggests that these events enhance the interest and prestige associated with CGH. 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 5. 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 aromo*: 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 6) 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* ([83] RO_3; CHV_1).

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Figure 6. 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) (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)). 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 [84]. This suggests 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; [85]) (these sell for 5.75–10.07 USD/kg, depending on species and season (CHV_1)).

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 contributes 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.

5.2. 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 internationally (Table 5). 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 5. Origin of participants, venders 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 venders (*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 (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). At the rosquetes fair, all the products brought to sell were sold by mid-afternoon (LHKI/WP_5; field notes, 07/17/2013), suggesting that the calculations above based on total potential sales are not unrealistic, particularly for large and busy events. When data were collected in 2013, this accounted for close to a national monthly minimum wage of 143.90 USD ([86]) (Monthly minimum wage in Bolivia was increased to 238.27 USD in 2015 [87]). 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. Three others reported income from fairs accounting for 30 to 49 percent 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 6). Dozens of houses are also temporarily transformed into restaurants and bars serving traditional food and drink (field notes, 08/12/2013). Vendors of other artisanal products, including clay cooking pots, also travel to San Lorenzo to sell their wares during this time.

Table 6. 2013 Festival de San Lorenzo food venders.

Type of Food Vender	Description	Number of Venders Recorded [1]	
		Saturday, August 10	Sunday, August 11
Prepared dishes and snacks	Mainly prepared food stands selling pork dishes, *picante*, *ranga*, and soups. Others sold tamales, fried bread, and other snacks, including *churiadas* and gelatine.	51	93
Baked goods	Most principally sold *rosquetes*, with smaller quantities of *empanadas blanqueadas* and other baked goods.	45	77
Beverages	Most sold *refescos*. A few had fresh squeezed juices and blended fruit drinks.	17	21
Tubers	Yacón	9	10

[1] Counts were conducted between 11:30 AM and 12:00 PM both days.

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 7). 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 7. Sourcing patterns of restaurants, market venders and secondary producers.

Source [1]	Restaurants (n = 22)		Market Venders (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; [64]). 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. Additionally, 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 (field notes 04/21/2013, 05/30/2013, 09/22/2013). Similarly, secondary producers interviewed range from producing daily (n = 3), to weekly or bi-weekly (n = 4), or occasionally (n = 10) (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

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produce during a few months of the year when fresh grapes are available). 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 percent of businesses are run by women and 33 percent are part of female-headed households (Table 8). Fourteen percent 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 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 is 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 8. 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 5000 L of *vino patero* a year and 500 L of *singani*. The three smaller producers, producing less than 1000 L a year, reported between 1151–2014 USD of gross income. One

producer making 1500 L of *singani* reported 5036 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: field notes, 07/28/2013 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 then 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 processers. 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; field notes, 07/31/2013). 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.

5.3. Sociocultural Considerations: Are Relationships with Biocultural Heritage Validated and Enabled?

In considering the sociocultural implications of AFNs 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 CGH AFN 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 specialities 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*." (*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). 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* (*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) 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 are the methods of preparation. Wood fuel, clay ovens and clay cooking pots are key technologies shaping taste 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 genius* marketing is important because a shared language of "distinction", to borrow Bourdieu's [88] 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 culture and re-craft it within extra-local standards of quality and desirability [8,53,81,82].

Certainly some local actors, such as the NGO, JAINA, are working to visibilise and position CGH and the AFN 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 [64,89,90]. However, they note that the AFNs surrounding CGH remain a sub-altern project that is often under-recognized, under-supported and undervalued by the state and development actors. Not withstanding, 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), (Held 28 October 2012, in Potreros, organized by the Sub Central Campesina de San Diego, Communidad Campesina de Potreros), 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) (Held 27–28 April 2013, in Tomatas Grande, San Lorenzo).

These are contrasted, however, with other events also organized by campesino unions with government support and/or NGO support, which 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 CGH AFN 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.

6. Discussion

Tracing some of the multiple threads of the AFN surrounding CGH 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 [91] 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 CGH AFN 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, particularly among urban dwellers and youth. 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 [92]. 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 [57] (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 [67]).

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 AFNs around CGH 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 AFN surrounding CGH, 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 and economies in the North and South [18,91,93,94]. 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 [75].

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 [95–97].

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" [98–100]. Particularly since the beginning of the 21st century, Vorley [99] notes, the informal sector has been re-caste 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 [101] 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 AFNs based on CGH in the Central Valley, 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 AFNs associated with CGH. 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 extend these programs from their focus on food preparation skills to incorporate basic food safety and accounting skills that might help women entrepreneurs generate greater benefits from the demand for CGH 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 CGH AFN are many. These may include greater support for campesino agricultural production practices 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. [1] suggest a number of "guiding coordinates", framed as orienting questions, 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 (Biocultural design coordinates are also re-examined by Turner, Davidson-Hunt and Hudson (submitted) in relation to the gourmet product development strategy in the Central Valley and biocultural sustainability). The idea of guiding coordinates builds on the concept of ethical coordinates proposed by Gibson-Graham and Roelvink [102] and elaborated on by Bargh [103], in their work on alternative, postcapitalist economies. Coordinates resonate with the metaphor of alternative economic development as processes of wayfinding [1], in which constellations of coordinates may come together to "shape decisions, moral judgments and subsequent effects for peoples and the environment" [103] (p. 281). Rather than predetermining possible outcomes, the idea of guiding coordinates emphasizes the range of possibilities available to local actors as they navigate development processes. In Table 9, we offer five 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.

Table 9. Considerations for biocultural resource use in local development.

Biocultural Design Coordinates
1. In developing policy to support AFNs, 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?

The biocultural sustainability framework was developed within the specific context of the Central Valley; however, the framework may have broader application including in the analysis of other AFN cases. A biocultural sustainability framework provides a lens to examine, evaluate and reflect upon processes of biocultural valorisation, AFN formation and what their strengths and weaknesses are for the people and environments involved. The attunement to human-environment relationships overtime and attention to multiple dimensions of the food system are integral features of this framework that differentiate it from value-chain, actor-network, and other approaches sometimes used to examine agri-food networks and AFNs that tend to concentrate on selected components and dimensions of a food system. As such, approaching AFNs through a biocultural framework offers several contributions towards filling gaps identified in the existing literature.

It is noted by some authors that a weakness of existing AFN 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 AFN literature [5,10,104], is what Purcell and Brown [105] and Born and Purcell [106] term the 'local trap', by which they refer to the pervasive issue in many disciplines, including food systems also see [107], 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 [98–100]. 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 AFNs [5].

A key contribution of the biocultural sustainability 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 AFNs and other biocultural heritage valorisation strategies.

The need to better understand social and cultural perspectives on AFN, including how consumers and producers construct values and meanings and recognizing markets as cultural phenomena has also been noted in the AFN literature [9,108]. Here, the CGH AFN 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 as a central ordering principle for understanding food systems. While concepts such as 'origin-based products' [44,45] and *terroir* [5] 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 [109] 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 [110] (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) both undergird and are influenced by their cultural construction and social transactions.

Similarly, Hadley and Wutich [111] 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 [5] also critique some AFNs, 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 identify the value and quality attributes of these foods and by doing so help identify and better understand the forms of organisation surrounding them.

In the case of the Central Valley, recognising the complex historical, ecological, economic and sociocultural contexts of AFNs around CGH underscores that the CGH strategy is not so much about processes of 're-localisation' or 're-territorialisation' (often cited with the AFN literature as a defining feature of AFN: [6,7]), so much as about adapting and sustaining long-standing territorial relationships in the face of on-going processes of globalisation, modernisation and sociocultural change. Similarly, the history of specialty food production in the Central Valley suggests that the rural non-farm economy surrounding CGH is not so much part of a 'new rurality' [98,112] 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 CGH AFN has for women. In the Central Valley, CGH is gaining visibility and recognition through multiple networks of production, exchange and consumption constituting an AFN. The CGH AFN faces many challenges as well as presenting many opportunities as an alternative trajectory for the Central Valley Territory.

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 CGH AFN, 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 AFN, 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 CGH are having positive ripple effects that underscore the importance and potential of CGH as resources in rural development strategies based on AFNs. 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, *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 CGH suggest an alternative development trajectory with great potential to support small-scale producers and the continuity of local biocultural heritage into the future.

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Abbreviations

The following abbreviations are used in this manuscript:

AFN	Alternative food networks
CGH	Campesino gastronomic heritage

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