



COMPARATIVE ANALYSIS OF LIVELIHOOD STRATEGIES ACROSS AYMARA COMMUNITIES OF THE PERUVIAN AND BOLIVIAN ALTIPLANO

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Introduction

The Altiplano region is classified by its geographic characteristics of a plateau within mountains at an elevated altitude. The importance of the Altiplano is found in a culture at the center of the domestication and transformation of important resources in agriculture such as the potato, quinoa, and South American camelids, as well as a place of development in technology for adaptation to climate change. However, it faces adverse climate conditions and little developed markets. Thus, the Altiplano is the scene of the SANREM Project "Adaptation to Climate Change and Markets of Vulnerable Agricultural Ecosystems of the Altiplano".

The goal of this project is to increase the resilience of Altiplano households to deal with climate and markets changes, in systems of income generation and food security of local actors. In order to do that, using sustainable livelihood approach, the project promotes a shared understanding of the ecosystem, the development of livelihood strategies and the management of natural resources based on the perceptions of change and risk of Altiplano households.

To accomplish this, the project consisted in three stages. The first stage involved the exchange of information and data collection through questionnaires, participatory workshops, interviews and participant observation of livelihood strategies, local knowledge and practices. The second stage was the analysis of information, and the third is the devolution and incorporation of information into the livelihood practices of local actors.

The following presentation identifies and compares the current livelihood strategies of eleven Aymara communities in the Altiplano of Peru and Bolivia with respect to the social, economic, political, and environmental conditions, for a better understanding of the Altiplano region, for present and future research and development considerations.

Objectives

1. Identify common points and differences among the strategies, assets or capitals, and practices found in the different sites involved in the project.
2. Compare livelihood strategies across the eleven communities in Bolivia and Peru.

Materials and Methods

- During the first stage of the project, 2006 – 2007, databases were compiled with information collected using two types of questionnaires.
- One questionnaire with the objective to collect information about their livelihood strategies consisted of sections about demographics, crop production, livestock production, product commercialization, biodiversity, food consumption and perception of risk. The other questionnaire was focused on understanding how decisions are made as part of a livelihood strategy, particularly as they are based in relationships between local knowledge and practice. This questionnaire consisted of sections about demographics, knowledge and practices regarding livestock/soils/pastures management, climate, markets, organizations and food security.
- First questionnaire was administered in 330 households of 9 Aymara communities of Bolivia and the second was administered in 115 households of 2 Aymara communities of Peru.

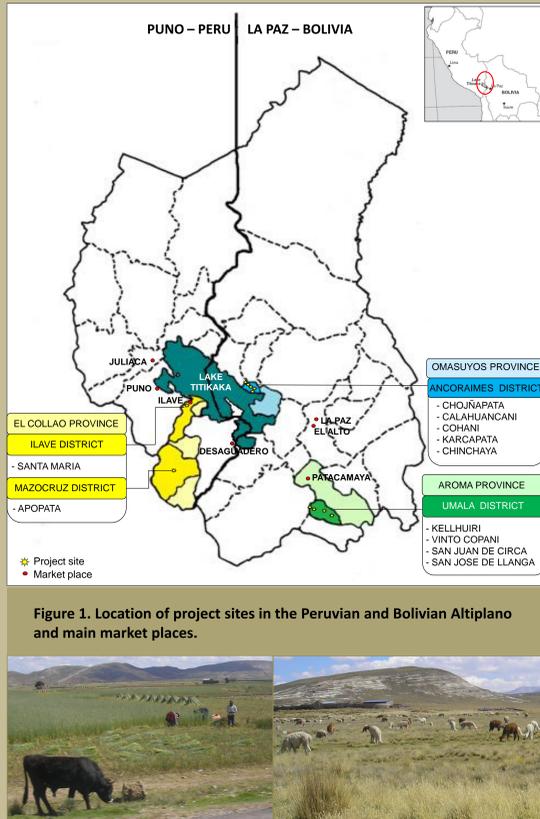


Table 1. Summary of Livelihood strategies per community

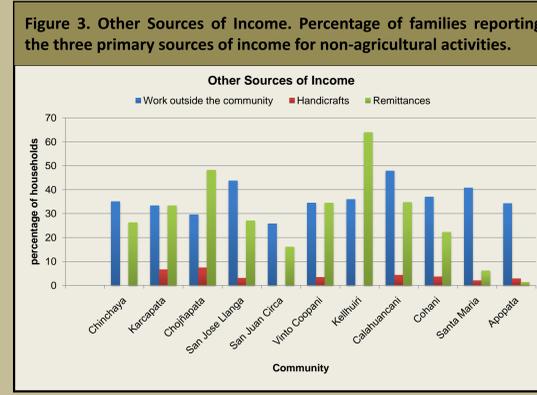
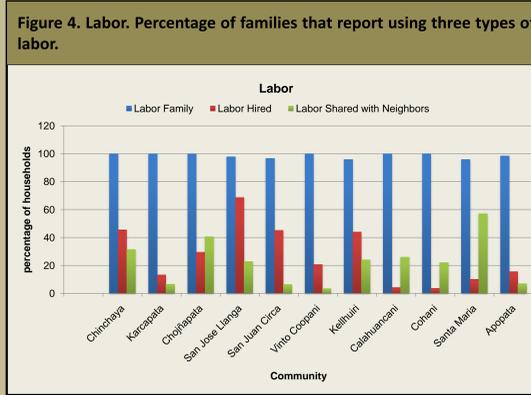
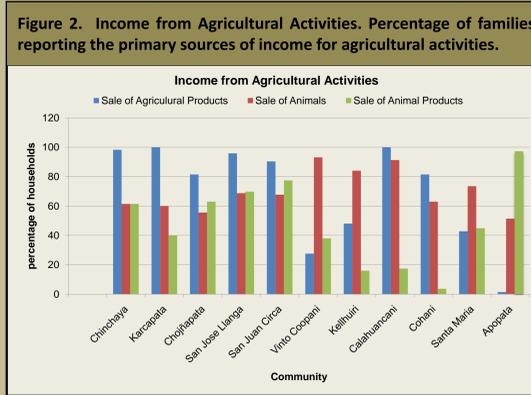
Community	Country	Municipality	Altitude	N	Land (hectares)		Livelihood (% households)			Livestock (% households)					Crop (% households)										Forages (% households)					
					mean	mode	Livestock	Crop	Off farm work	Cattle	Sheep	Alpaca	Pig	Chicken	Potato	Quinoa	Fava bean	Oca	Mashua	Arveja	Wheat	Onion	Ulluco	Kañiwa	Turnip	Alfalfa	Barley	Oat		
Santa Maria	PE	Ilave	3845	48	7.8	2.0	95.8	97.9	41.7	81.2	89.6	6.2	33.3	56.2	97.9	85.4	41.7	18.8	6.2	-	-	-	-	-	-	-	-	97.9	95.8	45.8
Apopata	PE	Mazocruz	4450	67	17.3	10.0	100	-	34.3	35.8	94.0	100	3.0	23.9	-	-	-	-	-	-	-	-	-	-	-	-	-	4.5	19.4	3.0
Chojñapata	BO	Ancoraimes	4200	27	1.0	0.5	100	100	29.6	88.9	88.9	70.4	29.6	25.9	100	11.1	7.4	100	7.4	7.4	-	3.7	29.6	7.4	3.7	-	29.6	66.7		
Calahuancani	BO	Ancoraimes	3890	23	1.1	0.5	100	100	47.8	82.6	95.7	65.2	52.2	-	100	39.1	13.0	78.3	4.3	52.2	-	4.3	30.4	4.3	-	-	91.3	26.1		
Cohani	BO	Ancoraimes	3860	27	0.8	0.5	96.3	100	37.0	66.7	85.2	18.5	44.4	18.5	100	3.7	25.9	77.8	-	96.3	-	-	-	-	-	-	92.6	-		
Karcapata	BO	Ancoraimes	3850	15	3.0	0.5	93.3	100	33.3	66.7	93.3	6.7	60.0	26.7	100	-	13.3	80.0	-	100	-	-	26.7	-	-	100	26.7			
Chinchaya	BO	Ancoraimes	3800	57	2.7	1.0	100	100	35.1	96.5	89.5	1.8	82.5	21.1	100	47.4	91.2	26.3	-	75.4	14.0	86.0	-	-	-	-	3.5	89.5	49.1	
Kellhuiri	BO	Umala	4070	25	8.2	2.0	92.0	100	36.0	92.0	84.0	20.0	4.0	4.0	100	24.0	20.0	-	4.0	-	12.0	-	-	-	-	8.0	96.0	16.0		
Vinto Coopani	BO	Umala	4012	29	5.7	3.0	100	100	34.5	96.6	96.6	-	6.9	13.8	100	34.5	6.9	3.4	6.9	-	6.9	-	3.4	-	-	13.8	93.1	-		
San Juan Circa	BO	Umala	3805	31	13.0	7.0	93.5	100	25.8	90.3	77.4	-	-	-	96.8	71.0	-	-	-	-	6.5	3.2	-	-	-	-	96.8	-		
San Jose Llanga	BO	Umala	3770	96	9.3	6.0	96.9	100	43.8	93.8	81.2	-	2.1	6.2	100	49.0	11.5	-	-	-	-	9.4	-	-	-	10.4	91.7	4.2		

Findings

- Table 1 shows a summary of the livelihood strategies identified for each community according to the percentage of respondents. As we observe, raising livestock is one of the main livelihood strategies in the Altiplano, practiced by more than 92% of households of the 11 communities. Cropping is of equal importance as livestock, however because of geographic conditions not all of them have access to agricultural land, like in the case of Apopata, located at the highest altitude. Cropping apparently is more practiced by Bolivian households because all declared to have crops. Off farm work is another important livelihood strategy with 37% of average of households that go for off farm work for the 11 communities.
- To deal with adverse ecosystems like the Altiplano, adaptation and diversification of strategies has become a key factor for survival. Most of the Altiplano households raise different types of animals and a variety of types of

plants according their geographic conditions and the market opportunities, as well as their consumption preferences. Thus, cattle and sheep are the main animal species used across communities, and alpaca is more common in high altitude communities. Cattle, sheep, and alpacas are raised for market purposes, while pigs and chickens are grown for consumption. San Jose de Llanga and San Juan de Circa present the highest numbers of cattle per family, 5.9 and 6.8 respectively. Chojñapata, Kellhuiri, and Apopata present the highest numbers of sheep per family, 38, 41, and 35.9 respectively. Apopata and Chojñapata present the highest average number of animals per family, 27.9 and 69.1 respectively.

- Potato is the most important crop across project sites for market and consumption, followed by quinoa (i.e. Santa Maria and San Juan de Circa) and for fava beans (i.e. Chinchaya). Other local crops (i.e. oca, mashua, ulluco or papalisa, and kaniwa) are preferred mostly for household consumption, contrary to onion (ie Chinchaya) that is exclusively for market. Within the forages, barley seems to be the most commonly used across sites.



- We can also see in Table 1 the different levels of access to natural capital. As we look at the size of land holdings of households. There are communities that report average land holdings of less than one hectare while others have an average greater than ten hectares. However, because land distribution differs among and within communities, we can observe that the mode of land differ significantly from the average.
- In Figure 2 we observe how main sources of income in the Altiplano vary across sites. Thus, we observe that the sale of agricultural products are specially important for Chinchaya, Karcapata, Chojñapata, San Jose de Llanga, San Juan de Circa, Calahuancani and Cohani. The sales of animals is specially important for Vinto Coopani, Kellhuiri and Santa Maria. And the sale of animal products are specially important for Apopata. Figure 3 shows other sources of income that are important to households in these communities. Work outside the community is important for all communities, especially in Calahuancani and San Jose de Llanga, while remittances are more important for Chojñapata and Kellhuiri. The sale of handicrafts is also a source of income for some households in several of the communities.
- In Figure 4, we can see the most common types of labor accessed by households the Altiplano. Familial labor is the most common source of labor across communities. However, more than 40% of households in San Jose de Llanga, Chinchaya, San Juan de Circa and Kellhuiri also hire labor. Households also share labor through the cultural practices of Ayni (with neighbors), Minka (as a community) and Aynokas (as a group of households, a practice more common in Santa Maria and Chojñapata).
- Shared labor is not the only indicator of social capital in the Altiplano. Households in all eleven communities have communication networks with neighbors and family members within and outside the community that they use to acquire information about climate and markets.
- Households and communities demonstrate high human capital through their use of local knowledge in maintaining potato varieties. Similarly, they continue practicing ancient technology like the transformation of potato into chuño and tunta through an elaborate freeze drying process and processing sheep and alpaca meat into chalonga and charki, respectively.
- Across the 11 communities, it appears that male household members tend to have greater access to education and higher reported Spanish language ability than female household members.

Conclusions

- The livelihood strategies of Aymara households in the Altiplano have been described as a involving various combinations of agricultural and non-agricultural activities. Depending upon geographic conditions and accessibility of certain assets, households incorporate livestock, cropping, and handicraft activities in mixed systems of on-farm agricultural production, which is also supplemented with other sources of income such as off-farm work and remittances.
- For rural households in the Peruvian and Bolivian Altiplano, it is important to differentiate that livestock is raised mainly for market sales (income generation) and most crops are cultivated primarily for consumption (food security). Therefore, households located at higher altitudes that are more dependent on livestock also need to rely on markets for food security, making them particularly vulnerable in the region.
- Family members are the most important source of labor in the Altiplano and is complemented by shared or hired labor.

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