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# Adaptive Livelihoods in Andean Pastoralism: Community-Based Institutions, Peatland Management, and Migration in Sajama National Park, Bolivia

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This article examines livelihood practices among Indigenous Aymara pastoral communities in Sajama National Park (SNP) on the Bolivian Altiplano. Pastoralist livelihoods within SNP are based on the management

of Andean camelids—llamas (*Lama glama*) and alpacas (*Vicugna pacos*)—and the high-elevation peatlands, known locally as *bofedales*, that provide essential pasture. Aymara pastoralists employ a variety of practices to manage *bofedales*, including the use of fences to control herd movements and demarcate grazing parcels, known as *sayañas*. Temporary labor migration, within Bolivia or internationally, represents another important livelihood

strategy. Fencing facilitates temporary migration by allowing pastoralists to leave their herds unattended and seek wage work. Community-based institutions that govern land tenure and communal obligations incentivize pastoralists to return to their communities. Migration and fences positively impact pastoralists' quality of life, but carry potentially negative consequences for *bofedal* quality in the form of overgrazing and *bofedal* degradation. Community-based institutions, fences, and temporary migration together contribute to adaptive livelihoods among pastoralists in SNP.

**Keywords:** Bolivia; pastoralism; rural livelihoods; community-based institutions; migration; Andean peatlands; *bofedales*.

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## Introduction

This article examines livelihood strategies among Indigenous Aymara pastoralists in Sajama National Park (SNP) on the Bolivian Altiplano (high plain). Andean peoples have raised alpacas (*Vicugna pacos*) and llamas (*Lama glama*) for millennia (Capriles Flores 2011; Capriles 2014; Grant and Lane 2018; Young et al 2023). Aymara pastoralists have long been integrated into extensive interecological trade networks, exchanging leather, hides, dried llama meat (*charque*), dried potatoes (*chuño*), quinoa, salt, and other Altiplano goods for maize from the temperate valleys, coca leaf from the tropics, and other trade goods (Flores-Ochoa 1979; Lehmann 1982; Murra 2002). By the mid-20th century, regional and international road networks connected the Altiplano to coastal and interior lowlands, reducing the need for llama caravans (Cottyn 2014). Road connections have also provided opportunities for pastoralists to leave their communities to seek wage work. Some outmigration is permanent, but a substantial portion is temporary, with migrants returning to their communities periodically to tend their herds and pasture, participate in community events, and fulfill communal obligations.

Today, pastoralists employ a range of livelihood practices, some of which may appear at odds with sustainable pasture management. These include widespread temporary migration

and the use of fences to demarcate family-based grazing parcels. While these practices improve pastoralists' quality of life, they may also have negative long-term ecological consequences for the peat-forming wetlands, known locally as *bofedales*, that provide valuable pasture for native camelids (Villaruel et al 2014; Dangles et al 2017; Yager et al 2021). *Bofedal* management and other livelihood practices are shaped by institutional contexts, including land tenure arrangements, market structures, park rules, and state policy frameworks. Of these, community-based institutions governing land tenure and rotating leadership responsibilities (known as *cargo*) are of particular importance in incentivizing migrants to return to their home communities. In light of these dynamics, this article examines the ways that community-based institutions influence temporary migration as an adaptive livelihood strategy.

Temporary migration is a common contributor to individual and household income (Smyth 2017; Mack et al 2023). Migration typically involves both “push” and “pull” factors, in which migrants are “pushed” to leave their communities by factors such as environmental stress, debt, loss of assets, or other financial necessity. At the same time, migrants are “pulled” to their destinations by economic or educational opportunities not available in their home communities (Turin and Valdivia 2011). While it is unsurprising that rural residents leave home in search of

opportunities elsewhere, less well understood is why some migrants return to and remain in their home communities. Off-farm income creates opportunities for livelihood diversification, allowing residents to stay in their communities (Zoomers 2012; Caulfield et al 2021). Put another way, “mobility [is] an instrumental resource to achieve the aim of staying put” (Mata-Codesal 2018: 7).

Livelihood practices are conditioned by an array of institutions, which may include land tenure arrangements, water rights, market structure, or relations with development actors and state agencies (Bebbington 1999; Scoones 2009; Zoomers 2012). Attention to institutional context is therefore essential for understanding livelihoods (Damonte et al 2019; Postigo 2021). Livelihood practices often involve trade-offs between economic and environmental interests, or between the fulfillment of immediate needs and investment in long-range goals, and thus provide a valuable entry point for understanding how, why, and to what extent people adapt (or not) to biophysical and socioeconomic change (Nyantakyi-Frimpong and Benzer-Kerr 2015). This article argues that pastoralist livelihoods are conditioned by community-based land tenure requirements, fencing, and migration. Temporary labor migration may be considered an adaptive livelihood strategy insofar as it is a practice that pastoralists elect to engage in, in response to adverse economic and environmental conditions, as a way to supplement household income (cf Young et al 2023). As Capriles Flores (2011: 11) notes, pastoralism is adaptive by definition, as pastoralists move their animals in response to localized environmental conditions in order to exploit an array of ecological niches. As I argue here, migration may also be thought of as a form of livelihood adaptation, undertaken in response to economic or ecological stress.

## Research context: pastoralist livelihoods in Sajama National Park

### Socioterritorial organization

The crucial elements for livestock raising, in the Andes and elsewhere, are access to pasture, water, and markets. Pastoralist livelihoods in SNP are based on raising native camelids, alpacas and llamas, which together account for over 80% of total household income among communities in SNP (Agua Sustentable 2013). While other livestock are commonly raised elsewhere in the Andes (Young et al 2023), within SNP and surrounding communities, pastoralism is based almost exclusively on camelids. Alpacas are raised for their fiber and meat, whereas llamas, formerly valued as pack animals (Dransart 2002), are now raised primarily for meat and hides. With multiple shearings, alpaca fiber can bring income several times over the life of the animal. By contrast, llamas typically produce income only when sold for slaughter. Herders sell meat, fiber, and hides at market in the municipal capital, Curahuara de Carangas, or to marketing intermediaries (*compradores*) who periodically visit communities (Claros et al 2018; see also Arzamendia et al 2021).

Land tenure arrangements vary between communities, but in all SNP communities pastures are divided into family-based parcels called *sayañas*, often demarcated by fences

(Villaroel et al 2014; Yager et al 2019). Most *sayañas* include *bofedales* in valley bottoms, in addition to *pajonal* grasslands, *thola* shrublands, and *Polylepis* woodlands upslope (Figure 1). Families and their *sayañas* belong to *ayllus*, a form of socioterritorial organization comprising extended kinship networks. *Ayllus* have roots in pre-Hispanic Andean societies and were once common throughout the central Andes (Platt 1982; Allen 1988). Having survived multiple efforts to abolish them in the late 19th and mid-20th centuries (Cottyn 2014), *ayllus* have experienced a resurgence in recent decades (Choque and Mamani 2001; Weismantel 2006). In their current form, the *ayllus* of SNP are relatively recent, having been revived following the passage of the 1996 Agrarian Reform Law (MMAyA 2014). These *ayllus* are coterminous with communities, and *ayllu* names and community names are used interchangeably. The term “community,” in this sense, refers to legally recognized administrative units that together make up a *municipio* (similar to a county in the United States or Great Britain). For simplicity, this paper uses community names rather than the longer *ayllu* names.

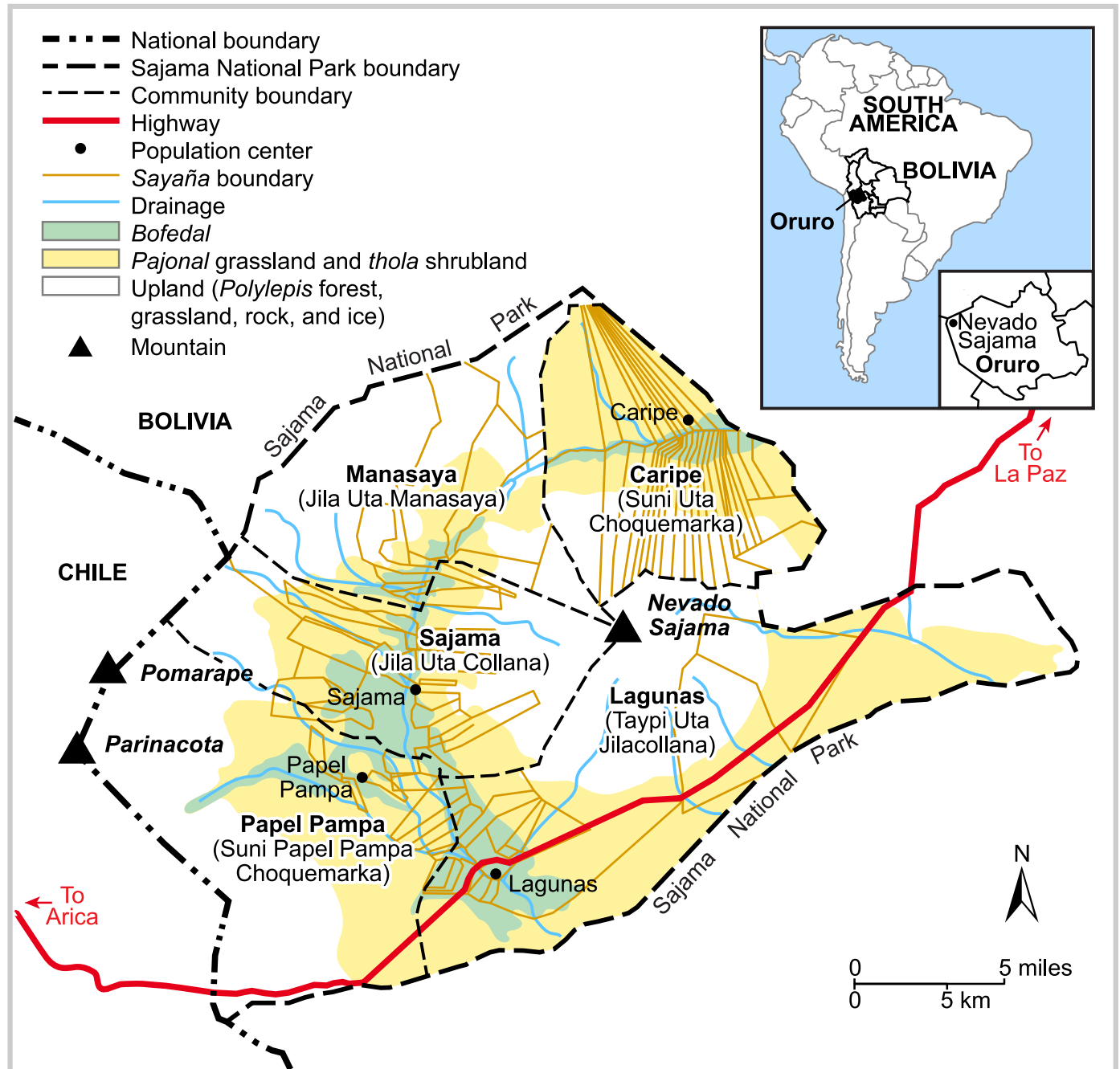
Elected leaders (*awatiris*) of each of the 5 communities within SNP serve on a comanagement committee along with park leadership (Hoffman 2007). While the park superintendent and assistant director are from other regions of Bolivia, the park guards (*guardaparques*) are typically hired from SNP communities and maintain households and *sayañas* within the park. Residents of communities within SNP are subject to certain restrictions on land use practices. For instance, hunting is strictly prohibited within the park boundaries, a recurring point of contention as pastoralists complain of livestock lost to predation by pumas (*Puma concolor*) and Andean foxes (*Lycalopex culpaeus*). The park also restricts the location and size of buildings that can be constructed within the park. Not all restrictions are enforced, however. While the use of fences to demarcate *sayañas* is technically prohibited by park policy, this restriction is not enforced, and pastoralists have engaged in widespread fence construction since the early 2010s (see below).

### Bofedal management

*Bofedales* provide crucial forage for alpacas and to a lesser degree llamas, and so are central to pastoral livelihoods on the Altiplano. *Bofedales* are azonal peat-forming wetlands located at elevations between 3650 and 5200 masl, which form concentrated mosaics of cushion plants, dominated by members of the Juncaceae family (Squeo et al 2006; Domic et al 2019; Yager et al 2021). Whereas llamas can graze on the tough grasses of the Andean steppe known as *puna*, alpacas need the more palatable and nutritious forage provided by *bofedales* (Struelens et al 2017; Yager et al 2021). *Bofedales* require well-watered locations fed by springs, streams, and glacial runoff and are vulnerable to desiccation. This risk has been enhanced by climate change, which has led to increased warming and drying, as maximum temperatures have risen throughout the Altiplano (Valdivia et al 2010, 2013; see also Dangles et al 2017).

Pastoralists commonly use fences to demarcate *sayañas*, a sign of the individualization of *bofedal* management. The use of fences is a relatively recent phenomenon, dating to

**FIGURE 1** Map of Sajama National Park and communities (*ayllu* names in parentheses), showing *sayaña* boundaries and grazing zones. (Map by Joe Stoll, Syracuse University Department of Geography and the Environment)



the early 2000s in most communities, although a few families in Caripe began delimiting their *sayañas* with stone barriers as early as 1977 (Yager et al 2017; Bedregal 2019). Wire fences were first promoted in the region in the 1990s by the Integrated Association of Camelid Livestock Raisers of the Andes (Asociación Integral de Ganaderos en Camélidos de los Andes Altos) in conjunction with the state-run Indigenous Fund (Fondo Indígena; Bedregal 2019; Buttolph and Coppock 2001). According to Bedregal (personal communication, 20 February 2024), the Indigenous Fund intended that fences should be used for constructing corrals and enclosures

only. Nevertheless, herders chose to fence their *sayañas*, contrary to project objectives and the stated (but unenforced) policy of the national park. Fences are now widespread in SNP.

Fences prevent animals from “trespassing” onto their neighbors’ pastures. This has helped resolve boundary disputes between neighboring *sayañeros*—a major point of contention for community residents throughout the park. Fences also help resolve labor shortages created by outmigration. In addition, children have historically played a major role in livestock management. Indeed, in his classic study of alpaca pastoralists in the Peruvian Altiplano,

Flores-Ochoa (1979) reports that children carried out most day-to-day responsibilities associated with herding. In Bolivia, improved access to primary and secondary schools, combined with compulsory education (mandated in 1995), means that children are no longer available to watch animals on a daily basis (Bedregal 2019). Responsibility for herding now falls entirely to adults, who have competing interests and commitments. Fences permit herders to leave their animals to graze unsupervised while they pursue other activities, knowing that the herd will not stray beyond the bounds of the *sayaña*.

### Migration

Temporary or permanent outmigration for wage labor has steadily increased in recent decades and is now widespread among residents of SNP. In the early 1990s, the paving of the Patacamaya-Tambo Quemado highway (which connects La Paz with Arica, Chile) substantially improved communication between the communities of SNP and employment opportunities in Chile and elsewhere in Bolivia (Ribera and Liberman 2006). Both men and women migrate, but more frequent male migration has led to a feminization of herding practices similar to that reported for southern Peru (Caine 2021) and northern Argentina (Arzamendia et al 2021).

Wage labor outside SNP represents a minority of household income. A household survey conducted in SNP by the Ministry of Environment and Water (MMAyA 2014) found that 80% of respondents reported household income from nonpastoral activities, but Agua Sustentable (2013) found that nonlivestock-related activities accounted for just 16.5% of household income in SNP communities. Thus, while temporary migration is widespread among SNP households, livestock raising remains the most important source of income.

Community-based institutions play a major role in incentivizing and facilitating temporary migration. As members of *ayllu*, community residents are required to fulfill rotating leadership positions (known as *cargo*). They are also required to maintain herds and actively manage their pasture. Community members who do not fulfill these requirements can be stripped of their *sayaña* rights by the *ayllu* assembly. Thus, communal obligations provide a powerful incentive for pastoralists to remain in or return to their communities, even if they spend significant time away (Turin and Valdivia 2011; Caulfield et al 2021). In this way, pastoralists pursue migration as a livelihood strategy, even as they remain rooted in their communities (Zoomers 2012; Mata-Codesal 2018). The following sections present the study sites, methods, and results from field research.

### Study sites

Fieldwork was conducted in the 5 communities within SNP (study site coordinates: 18°06'53"S, 68°53'10"W). SNP was established in 1939 as Bolivia's first national park and in 2003 was designated a UNESCO World Heritage site. The park is centered on Bolivia's highest peak, Nevado Sajama (6542 m), and the surrounding *puna* ecosystem. This includes *Polylepis* woodlands, *thola* shrublands, *pajonal* grasslands, extensive *bofedales*, and numerous species of threatened flora and fauna. SNP lacks a buffer zone and clearly defined

boundaries, but Hoffman (2007) reports the park's size to be approximately 100,000 ha. Five communities are located within SNP: Caripe, Lagunas, Manasaya, Papel Pampa, and Sajama. They are located between 4150 and 4400 masl elevation, above the upper limit of agricultural production. Grazing lands constitute 83% of SNP's total area with the remaining 17% consisting of lands above 4800 m elevation that are not suitable for grazing (Ribera and Liberman 2006). Elected community leaders (*awatiris*) serve on SNP's management committee (Comité de Gestión) along with park leadership and municipal officials, and are involved in management and planning decisions (Hoffman 2007). Chronic underfunding and understaffing, together with comanagement arrangements, mean that park policies can be implemented only with the approval and support of community leaders. As a result, herding practices and community organizations within SNP are markedly similar to those outside park boundaries.

Following Bolivia's 1953 agrarian reform, there was a gradual process away from collective management of pasturelands and toward individualized, family-based management (Villarroel et al 2014; Struelens et al 2017). As Ribera and Liberman (2006: 48) note, since the mid-20th century, the ancient *jaccha sayañas* (large, communal grazing lands) have been steadily subdivided into smaller family-based parcels demarcated with fences, and grazed by numerous small herds. As a result, herds and pastures within SNP are largely managed by individual families, under the auspices of communal (*ayllu*) rules for land tenure.

### Methods

Four months of field research was completed in 3 phases: February–March 2023, July–August 2023, and February–March 2024. Field research consisted of open-ended interviews, household surveys, focus group workshops, participation in community meetings, and direct observation of herding practices. A small ( $n = 32$ ) household survey was conducted in communities within SNP (Table 1). The survey is not statistically representative, but was designed to detect trends in livelihood practice, attitudes toward SNP, and perceptions of environmental change. Survey results were used to formulate interview questions. Open-ended interviews were conducted with community members ( $n = 41$ ); community leaders ( $n = 7$ ); SNP personnel ( $n = 3$ ); government officials in the national capital, La Paz ( $n = 3$ ) and the municipal capital, Curahuara de Carangas ( $n = 2$ ); and researchers and development practitioners based in La Paz ( $n = 10$ ). Interviews lasted between 20 minutes and 1 hour and were designed to elicit qualitative information on herding practices, perceptions of environmental change, market conditions, park policies, and the relationship between SNP and local residents. Focus group discussions were conducted in the communities of Sajama and Caripe, with the aim of gathering information on local history and herding practices. Direct observation of herding practices was carried out in the communities of Sajama and Caripe. Community residents are ethnically Aymara and speak both Aymara and Spanish (INE 2005; Hoffman 2007). All field research was conducted in Spanish.

TABLE 1 Community information, Sajama National Park.

| Community name | Ayllu name                   | Size (ha) <sup>a)</sup> | Population <sup>b)</sup> | No. of <i>sayañas</i> <sup>c)</sup> | No. of household surveys |
|----------------|------------------------------|-------------------------|--------------------------|-------------------------------------|--------------------------|
| Caripe         | Suni Uta Choquemarka         | 15,312                  | 171                      | 34                                  | 11                       |
| Lagunas        | Taypi Uta Jilacollana        | 31,995                  | 517                      | 52                                  | 5                        |
| Manasaya       | Jila Uta Manasaya            | 16,869                  | 83                       | 10                                  | 6                        |
| Papel Pampa    | Suni Papel Pampa Choquemarka | 22,113                  | 133                      | 30                                  | 2                        |
| Sajama         | Jila Uta Collana             | 16,053                  | 542                      | 53                                  | 8                        |

<sup>a)</sup> Villarroel (2014).

<sup>b)</sup> MMAyA (2013).

<sup>c)</sup> Yager (2017).

## Results

### Community institutions and *bofedal* management

Alpacas and llamas are typically pastured upslope (in the *pojonal* grasslands or *thola* shrublands) in the morning, and moved downslope to the *bofedal* in the afternoon. Herders reported that this practice helps prevent overgrazing *bofedales*. Animals are typically moved to corrals at night to protect them from predators and extreme cold. Herd movement varied greatly between households. Some pastoralists expressed pride in their active herd management, whereas others left their herds unattended on most days. Herders who migrated long distances frequently paid neighbors to tend their herds while they are away. One woman interviewed reported exchanging labor (*ayni*) with a neighbor in which they each cared for the other's animals while they were away from the community.

*Sayaña* lands are controlled by communities and households have usufruct rights only. To retain grazing rights, pastoralists are required to maintain animals on their *sayañas* and carry out communal and *cargo* obligations according to customary practices (*usos y costumbres*). As the *awatiri* (elected indigenous authority) of the community of Papelpampa noted, “We are not owners [of the *sayañas*], we are possessors. And to be a possessor, you have to fulfill the *cargos*, the *usos y costumbres*” (interview, 27 February 2024). *Cargo* responsibilities include a series of leadership roles that residents might be expected to complete over the course of their lives, culminating in *awatiri* for men, or, for women, *mama t'alla* (wife or in some cases mother of the *awatiri*). Residents may spend much of their time away from their community and return occasionally to fulfill their *cargo* responsibilities. As recounted by the *awatiri* of Lagunas, who had recently returned from an extended stay in Chile:

*It was my turn to be awatiri [me ha llegado el cargo] and I arrived at my sayaña so I could assume the cargo. I came here to live just to carry out the cargo [as awatiri]. Just to carry it out . . . Now, if you don't carry out the cargo, the customary practices [usos y costumbres] the community can take away your sayaña and give it to someone else.*

(interview, 27 February 2024)

In a pattern common throughout the region, the newly elected *awatiri* was obliged to return to the community and

fulfill his communal obligations or risk losing his rights as a *sayañero*. In this way, *cargo* obligations incentivize return.

### Migration

Nonpastoral wage labor constitutes an important source of cash income between periodic sales of fiber and live animals. In the household survey, 14 of 20 of men (70%) and 7 of 12 women (58%) surveyed had migrated out of the community. Of the destinations for temporary migration, Chile was by far the most popular, with 19 of 32 respondents (59%) saying that they or a family member had sought work there at least once, most frequently in the coastal city of Arica or the nearby Azapa valley. Other destinations (with 5 or fewer respondents each) were Argentina, La Paz, the Yungas (subtropical valleys in La Paz department), Cochabamba, Brazil, and Europe. All but 2 households surveyed (30 of 32) had at least 1 family member who had migrated temporarily or permanently in search of economic opportunities.

Fences are widespread in SNP. All 32 households surveyed (100%) reported using fences to demarcate at least part of their *sayañas*. Most fences in SNP are constructed of simple barbed wire and wooden post construction, often strung with plastic and cloth to make them more visible to animals and people alike. Many herders aspired to replace barbed wire with chain-link fencing, which is sturdier and more resistant to damage. Unlike barbed wire, chain-link can be extended to ground level, excluding pumas and foxes. Hunting is strictly prohibited within SNP, and herders frequently complain of predation. Fences also inhibit the movement of vicuñas (*Vicugna vicugna*), wild camelids related to alpacas. According to the SNP superintendent (interview, 7 March 2024), the park's vicuña population has decreased by about 70% in the past 13 years, from roughly 5000 in 2010 (according to a park census at the time) to an estimated 1525 in 2023 (the year of the most recent census), a decline he attributed to the vicuñas' inhibited mobility within the park.

Most migration takes place in April–July and December–January, when pastoral activities and community responsibilities are relatively slow. Men tend to find work in commercial agriculture, construction, or transportation, while women most commonly find work in agriculture or retail, or as domestic servants. As one man from the community of Manasaya told me:

*Life here in the countryside provides the daily bread [pan de cada día] and maybe something for the children and nothing more. But when you leave you can get much more. More than anything when you travel abroad you find more opportunities because the Bolivian, the Andean man, is characterized as a hard worker [se caracteriza como trabajador].*

*(interview, 28 February 2024)*

In a pattern common in rural areas the world over, migration takes multiple forms. Young people leave their communities to pursue secondary and, in some cases, higher education. Some return but many do not. Adults often leave communities for weeks or months at a time and return for festivals, activities such as canal maintenance, or to fulfill *cargo* responsibilities within the community.

It is easy to understand why people leave their communities in search of work. Perhaps the more interesting question is, why do they return? Although Bolivians can find good-paying jobs in Chile, they enjoy little sense of security of the sort afforded by their access to land and social networks in Bolivia. Many return to the security and familiarity of their home communities. As a woman from Lagunas told me:

*More than anything people from here migrate [to Chile] because there are no secure jobs and it's very hard to maintain a family on this side [of the border] . . . But there [in Chile] if you don't work you don't have anything to eat. For this reason, people sometimes decide to save their money and take their things and get some land and settle here in Bolivia, because in Bolivia it's more flexible economically.*

*(interview, 27 February 2024)*

## Discussion

Among pastoralists within SNP, community-based institutions that govern land tenure ensure the ecological basis necessary for raising llamas and alpacas. The rotating leadership (*cargo*) system, which is a requirement of *sayaña* rights, provides a strong incentive for community members to maintain their herd and manage their pasture. Temporary migration, which is sometimes interpreted as a sign of livelihood crisis or maladaptation to environmental change (Castles 2002; Hoffman 2007; IOM 2010), should be seen instead as central to rural livelihoods (Zoomers 2012). In a context in which rural livelihoods are seldom only rural and nearly always involve some form of off-farm income (Bebbington 2000), temporary migration represents an important livelihood strategy (Caulfield et al 2021). Analysis of pastoralist livelihoods in SNP suggests that temporary migration may be interpreted as a longstanding adaptive strategy with roots in precolonial interecological trade networks (Lehmann 1982; Mayer 2002; Murra 2002). In its contemporary form, migration allows pastoralists to earn income, invest in homes and herds, and, importantly, maintain membership and *sayaña* rights in the community, while pursuing what Zoomers (2012: 108) calls “multi-local livelihoods.”

As these examples suggest, livelihood strategies often involve tradeoffs and compromises. There is evidence that fences can lead to overgrazing, as untended animals can concentrate in the most desirable pasture (Yager et al 2019). Additionally, Yager et al (2021) argue that migration leads to

the erosion of traditional knowledge, which in turn results in poor *bofedal* management. This observation was supported the *awatiri* of Lagunas, who explained that knowledge of irrigation practices is declining because older generations, who used to irrigate, no longer actively manage their *bofedales*. Meanwhile, younger generations migrate temporarily or permanently: “The people who are older [*mayorcitos*] no longer work and neglect their *bofedales*. They no longer irrigate and their children have migrated for work” (interview, 27 February 2024). In these cases, it is possible that a loss of irrigation knowledge leads to declines in *bofedal* quality.

Nevertheless, while *bofedales* are indispensable for pastoralism, they are not necessarily indispensable for rural livelihoods per se. This is evident in the region surrounding the communities of Suches and Ulla Ulla, northeast of Lake Titicaca, where some Aymara communities are abandoning pastoral livelihoods in favor of mining, in some cases even destroying *bofedales* in order to extract alluvial gold. This is not (yet) the case in SNP. But for at least some pastoralists, the social and territorial basis of the *ayllu* may be more important than sustainable *bofedal* management, at least in the short term.

## Conclusion

This study examined livelihood practices among Indigenous Aymara pastoralist communities in SNP, Bolivia. Pastoralist livelihoods in SNP are based on Andean camelids and the resources necessary to raise them, primarily water and *bofedales* (Villarroel et al 2014; Yager et al 2019, 2021). Pastoralists employ a diversity of livelihood strategies, including wage work in their home communities, elsewhere in Bolivia, in Chile, or another country. Community members frequently engage in temporary migration, sometimes covering long distances on a regular basis, while returning to their home communities to tend animals, fulfill *cargo* responsibilities, and participate in festivals, meetings, or other community events. Some older residents return to the familiarity of their communities to live out their remaining years. In contrast to studies that emphasize migration as indicative of a failure to adapt to environmental or economic change (eg Castles 2002; Hoffman 2007; IOM 2010), this study demonstrates that migration among Andean pastoralists can actually reinforce community relations. As Zoomers (2012) argues, the desire to stay in the community is enabled by the ability to leave.

Community-based institutions, in the form of land tenure arrangements and *cargo* responsibilities, incentivize migrants to return to their communities. Fencing demarcates *sayañas* and allows pastoralists to leave animals unattended while they pursue wage labor or other activities. Although many pastoralists recognize the possibility that fencing can lead to overgrazing and pasture degradation, the benefits of fencing are widely seen to outweigh these risks. In this way, community-based institutions, fencing, and temporary migration all contribute to adaptive livelihoods within SNP.

The limits of this study must be recognized. Because the study was conducted among communities within a national park, it cannot be taken as representative of pastoralist livelihoods in the Altiplano region as a whole. Similarly, the

small sample size of the household survey—intended to provide information that would shape interview questions—is not statistically representative. Additional research is needed to determine the ecological response of *bofedales* to periodic migration, as well as the relationship between migration and the intergenerational transfer of traditional herding and ecological knowledge. However, as this study makes clear, migration—enabled by fencing and incentivized by community-based institutions—contributes to adaptive livelihoods among pastoralist households in SNP.

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