

# Community management of vicuña in the Bolivian Altiplano

Procedural Paper by  
Nadine Renaudeau d'Arc

Supervised by  
Kate Brown and Edward Allison

31<sup>st</sup> May 2002

School of Development Studies  
University of East Anglia, Norwich UK

## Contents

<b>Introduction .....</b>	<b>3</b>
<b>Section 1. Conceptual background .....</b>	<b>4</b>
1.1 Perspectives on conservation .....	5
1.2 Resource management institutions.....	12
1.3 The research approach .....	14
<b>Section 2. Research context .....</b>	<b>16</b>
2.1 Historical background.....	17
2.2 Vicuña management scenarios.....	19
2.3 The Bolivian Altiplano.....	21
<b>Section 3. Research questions.....</b>	<b>24</b>
<b>Section 4. Methodology .....</b>	<b>28</b>
4.1 Research methods .....	28
4.2 Preliminary observations.....	30
4.3 Future research plan .....	35
<b>Section 5. References.....</b>	<b>36</b>

## List of Figures

Figure 1 Distribution of vicuña <i>Vicugna vicugna</i> in the Andean region.....	3
Figure 2 Vicuña management units in the Bolivian Altiplano.....	23

## List of Tables

Table 1 Management scenarios set up for shearing vicuña per country.....	20
Table 2 Conflicts of interest between the DGB agency and communities.....	34

## Introduction

The vicuña *Vicugna vicugna* is a wild South American Camelid (infra-order Tylopoda, family Camelidae; (Franklin 1982). Its distribution ranges from latitudes South 9°30' to 29°00' and it is found only above the 3,500 metres in altitude on the Peruvian, Bolivian, Chilean and Argentinean treeless grassland steppes called Puna and Altiplano (Figure 1). The majority of the vicuña's natural range overlaps with Quechua and Aymara speaking people, 90% living in poverty (World Bank 1996).

**Figure 1. Distribution of vicuña *Vicugna vicugna* in the Andean region.**



Vicuña fibre is almost as fine as silk (Koford 1957) and highly valued in the luxury textile industry (approximately 300U\$S/kg in the international market). The species has been sacred for Andean culture before the European conquest; then hunted to nearly its extinction by the mid 20<sup>th</sup> century. A global programme of conservation, articulated through different levels of governance, successfully helped to recover the species and it is now classified by the

World Conservation Union (IUCN) under 'lower risk: conservation dependent' in the 1996 Red List of Threatened Animals. The progressive relaxation of policy by the Convention on International Trade on Endangered Species of Plants and Animals (CITES) policy from strict protection (Appendix I) to sustainable use (Appendix II) is allowing limited shearing of live vicuñas and trade of its fibre in those populations that have increased in numbers. Different management systems have been set up for shearing live vicuñas and a recent study (Lichtenstein, Oribe et al. 2000) highlighted the lack of consideration on matching the detailed characteristics of the management system to the characteristics of vicuña, resource users, and their context.

Within this context the EU-funded project MACS "Sustainable economic utilisation of wild South American camelids: Strategies for improving rural productivity in pastoral communities in Latin America" brings together a multidisciplinary group to establish basic knowledge to evaluate the practical feasibility of the different systems producing fibre from live vicuña and, identify policies to encourage appropriate management approaches.

This research therefore sets out to study the community management system that is being developed for vicuña management in Bolivia. The central research question is:

*Is community management of vicuña in the wild a viable and appropriate means of combining conservation with development on the Bolivian Altiplano?*

## **Section 1. Conceptual background**

The move towards community management of vicuña in Bolivia is consistent with a large body of literature on community wildlife conservation through sustainable use. The idea of community management is itself based on common property resources theories, with the

community being the institutional vehicle to realise devolved resource management (subsection 1.1).

However, this approach to conservation relies heavily on new orthodoxies about the definition and nature of community-level cooperation, the necessity for participatory or partnership approaches, and the importance of informal and civil society institutions at both local and global scales in natural resource governance (subsection 1.2).

This research will use vicuña management as a case study to build improved understanding of the strengths and limitations of conservation through sustainable use. As most contemporary utilitarian conservation efforts in developing countries stress community involvement and local livelihood benefits as key elements of conservation strategy, community-level institutional arrangements for resource management and benefits sharing will be a focus for the research (subsection 1.3).

## **1.1 Perspectives on conservation**

The perspectives on conservation concern and debate have changed throughout history in response to different understandings of the meaning of conservation (Adams and Hulme 2001) and have mainly been influenced by two strong movements that emerged in the past century: preservationism and utilitarianism.

Preservationists focus on the intrinsic values of nature where people are seen as a threat to biological diversity. This movement emerged during the early 20<sup>th</sup> century, with the establishment of a wildlife refuge system in USA (e.g. Yellowstone National Park) and, in the colonial period (1900-1960s), the Game Reserves and Parks in Africa (e.g. Serengeti National Park in Tanzania). Strictly defined borders with the exclusion of local people was the

conservation strategy applied in these areas but this didn't stop the us-versus-them rush to harvest where rules were broken and law enforcement impracticable and costly.

In the late twentieth century, in response to these limitations and when motives were decidedly more political and utilitarian than strictly preservationist, the focus of conservation changed towards “the saving of natural resources for later consumption” as defined by (Passmore 1974). Ideas centred on the use of living resources in a relatively sustainable and predictable way. This perspective was influenced by the perception of an ecosystem in equilibrium with a “fixed carrying capacity” and “maximum-sustained yields” (Gordon 1954) or related targets. This literature stressed the importance of unitary ownership as a solution to (Hardin 1968) tragedy of the commons, where mutually agreed upon coercion leading to effective rules are not internally based but are instead achieved either through privatisation or state (usually government) control.

A knowledge of natural history and demography of the resource was considered to be the only requirement to identify policies for sustainable exploitation. Consequently, little research was carried out on resource-user communities: their social structure and existing or potential production and resource management mechanisms.

Both preservationist and utilitarian perspectives to conservation have not provided local people with the incentives to stop external threats to the biodiversity and from 1930s until late 1970s, many species became seriously depleted due to commercial poaching and logging. The international community recognized this fact and, from the 1970s, international legislation, CITES being the most important, was seen as the only solution in an attempt to save wildlife and biodiversity resources held in common.

In the 1980s perceptions of an ecological crisis by a severe depletion of wildlife and famine influenced the re-thinking of the viability of conservation and development. New

thinking makes linkages between conservation and livelihoods and is a reflection of four significant shifts in understanding: First is a new ecological paradigm (Behnke, Scoones et al. 1993; Scoones 1995) views the ecosystem as probabilistic and multi-causal, rather than deterministic, and acknowledges the role of human intervention in shaping biodiversity. Second, it is increasingly recognised that social and economic factors determine the goals of management and the nature of management actions (Talbot 1996). Third is the rise in prominence of the concept of sustainable development (IUCN 1980) that tries to link conservation and development goals by assuring the long term supply of valuable resources to people, thereby enabling species and populations depleted by overuse to recover, and conserving not only the species concerned but the associated ecosystems. Fourth is the renewed interest, in the 1980s, in bringing markets to bear in shaping the structure of incentives for conservation.

Based on these linkages and a general assumption that communities that are interested in conservation can be identified (IIED 1994; Songorwa 1999; Mazzucchelli and Ortiz von Halle 2000), conservation through sustainable use and community management are combined under the new label 'community management' or 'community-based management'. Communities represented the new locus of action where it was assumed that local participation in decisions and benefits could reduce hostility towards conservation efforts. In policy and practice, community based conservation (CBC) programmes were seen as the means towards sustainable use of wildlife and wild land by rural people, under communal tenure. The emphasis has been on the incorporation of floral and faunal resources into the livelihood and development strategies of the community. Local resource users are encouraged to own land and resources either *de jure* or *de facto*, with the State perhaps retaining some control of last resort. CBC programmes emphasise economic incentives, with the assumption being that rural people will not sustainably manage wildlife unless these are perceived to yield greater return than other forms of resource use.

Devolution of authority and responsibility to communities are also emphasised, the assumption being that this creates an incentive framework favouring sustainable utilisation. Finally, the emphasis is placed on development of communal institutions and structures in a manner that allows communities to effectively control use, distribute benefits to their membership and efficiently exploit opportunities in the natural resources market.

(Salafsky and Wollenberg 2000) have built a conceptual framework to assess the linkage between livelihoods and conservation based on the hypothesis that “an increase in the degree of linkage should lead to an increase in conservation success”. However, the recent literature is beginning to question whether this new orthodoxy of people-oriented conservation approaches are effectively succeeding in meeting this trade-off between conservation and livelihood (Brechin, Wilshusen et al. 2002; Wilshusen, Brechin et al. 2002).

Community management presupposes that communities exist and are interested in conservation. The debate around the definition of community has been raised by sociologists (Wirth 1938; Parsons and Shils 1962) and anthropologists (Lerner 1962; Redfield 1974) long before this conservation perspective emerged and is still an important and hotly debated issue (Anderson 1991; Murombedzi 1991; Agrawal and Gibson 1999).

In the context of community wildlife management, the community has often implied the unit of social organisation, where individuals can speak and decide for themselves (Kiss 1990). Within a community, individuals may give up some of their individuality to behave as a single entity to accomplish common goals. In this case, culture implies commonality, providing a basis for collective action within that group (Berkes and Folke 1994).

IIED (1994) define at least three different ways of considering a community, based on spatial, socio-cultural and economic terms. It is important to bear in mind, however, that what may appear to be a community on the ground (i.e. in spatial, social and cultural terms)



may in fact be deeply divided in relation to individuals', institutions' and households' interests in, and control over, different kinds of wildlife. In some cases, the spatial dimension or ecological boundaries of the resource system may not match the socio-cultural or economic boundaries of the resource users (e.g. rural villages). Boundaries are generally porous, are open to individual interpretation and contestation, and are changeable (Mandondo 2000; Mandondo in press). The geographical literature on concepts and definitions of boundaries (McKean 1996; Geisler, Warne et al. 1997) is particularly relevant here.

Within the context of getting the communities interested in conservation, social and economic incentives are used to encourage community members to participate in the conservation programmes (Milner-Gulland and Mace 1998). Participatory approaches forms part of a fundamental shift in development thinking (Chambers 1983; Oakley 1991; Chambers 1993) that is now embraced in conservation approaches and widely accepted in the international arena such as UNESCO, FAO and IUCN and in various conferences and workshops (Council 1986; National Research Council 1986; McCay and Acheson 1987).

There are claims that participation constitutes a new paradigm of development (Chambers 1997). There is also a more recent critique of 'the tyranny of participation' (Cooke and Kothari 2001) that asks if participation is intrinsically a 'good thing' (especially for the participants), if the focus on 'getting the techniques right' is the principal way of ensuring the success of such approaches. These debates leave some conservationists wondering if considerations of local or community-level power and politics on the whole should be avoided as divisive and obstructive.

Although incentives encourage participation in community conservation (IIED 1994; Little 1994) it does not always imply cooperation in collective action (Olson 1965; Cleaver 2000) and in the vast majority of African cases indicates that the traditional economic benefits generated by community approaches are not at a scale that would adequately compensate

local residents for the aggregate direct costs and opportunity costs caused by conservation (Hulme and Murphree 2001). The evidence here is that if promises to create benefits (economic and intrinsic) and reduce costs for people who live on or adjacent to wild lands and wildlife (Heinen 1995) do not meet local short term expectations, programmes are likely to fail (Songorwa 1999).

Despite the ongoing critiques of community-level management, it remains apparent that established institutions such as formal governmental arrangements for managing natural resources do not adequately promote solutions to the problems of conservation with development. Nor are there consensus views in how to reconcile local participation in setting conservation policies with global conservation agendas. While community conservation indicates a gradual shift of authority (and management and benefits) to local residents, they remain part of a regional, national and international framework in which a variety of organisations and institutions play a role (Hulme and Murphree 2001). This is the special case in the management of common resources defined as resources with a global interest where the legal framework for management is articulated at different levels of governance (e.g. the Endangered Species Act of 1973 and the CITES treaty of 1973 or “big laws” in fisheries; (Allison 2001). Experiences in Zimbabwe show how local governance structures for wildlife management in communal areas tend to be ineffectual. Economic incentives are considered important in community management as the mechanisms which shape individual and collective action. However, field results indicate that local people often see CAMPFIRE as a government programme, rather than a community-based programme ((Campbell, Mandondo et al. 2001).

Another approach is one that seeks to elucidate the causal relationships between motivations, behaviour and management of a particular resource need finding out which and where the incentives or motivation for cooperation are (Lawry 1990; Ostrom 1992; Wade 1994). (Cleaver 2000) sees motivation and actions as critically related to social structure,

historical circumstance and the exercise of individual agency. (Long 2000) highlights the numerous communal activities that occur through daily interactions and socially embedded arrangements that may be overlooked by focusing on the “highly visible” institutional arrangements. Investigation of individual motivations and behaviour, as well as institutional architecture, will help to understand the dynamics of conflicts, consensus-building and decision-making within communities (Cleaver 2001). (Bennet 1976; Gadgil 1987) have also proposed that solutions may be found in a close examination of local social organisations and practices based on the assumption that “where community natural-resource management systems have remained viable and where there are significant elements of their structures still in use there is potential for improvement of resource management”. Traditional community-based natural resource management systems that continue to function effectively have been documented by (Berkes and Folke 1995) in several mountain and arid environments and by (Bebbington 1998) in the Bolivian Altiplano.

In some cases, local management with no external economic incentive can work, but only under conditions in which relatively small groups of individuals have exclusively access to a resource, and have a stake in sustainable harvest or protection (Heinen 1995). Resources involved in common-property systems may be communal property or those which, although not legally owned by the community, are managed in accordance with community-based norms and rules (Berkes 1989). Many case studies on common property regimes with management that follows community-level resource using rules and community level interests reveal a number of conditions that promote - livelihood security (Ostrom 1986) and collective action (Cleaver 2000) or impede functional community management systems such as - contextual factors (Campbell, Mandondo et al. 2001) and, most significantly, the penetration of capital and the arrival of external markets into formerly subsistence or barter economies (Western and Wright 1993).

## 1.2 Resource management institutions

Community management arrangements or community management institutions are a “set of rules actually used by a set of individuals (the community) to organise repetitive activities (resource management) that produce outcomes affecting those individuals and potentially affecting others” (Ostrom 1992). These studies are based on common property resource theories, a broad body of literature studying local institutions for the management of common pool resources, or commons (Wollenberg 1998). Property is defined by (Bromley 1992) as the rights and obligations of individuals or groups to use the resource base. Common property or common pool resources are defined by (Berkes 1989) as a class of resources for which exclusion is difficult and joint use involves subtractability. The two basic management problems in commons are how to control access to the resource, and how to institute rules among users to solve the potential divergence between individual and collective rationality respectively (Berkes and Folke 1998).

Common-property theory has shown why institutions and property rights are important considerations for resource management (Berkes 1989; Feeny, Berkes et al. 1990). It used to be popularly believed that users of common property resources were always trapped in an inexorable ‘tragedy of the commons’ (Hardin 1968) where the pursuit of an individually rational economic maximisation strategy brings ‘ruin to all’. However, many resources used by rural communities are not used by a group of non-interacting individuals, as Hardin’s model supposed, but are instead used under communal property rights arrangements derived through co-operative behaviour among the resource users. There is a broad body of case studies showing that rules exist regarding access and joint use of many commons (McCay and Acheson 1987; Berkes, 1989; Bromley, 1992). This literature emerged from a bibliography, collated since 1985, (<http://www.indiana.edu/~iascp/Iforms/searchcpr.html>) that aimed to further understand the conditions under which institutions for the management of common

property exist. In 1990 the International Association for the Study of Common Property resources (IASCP) was officially established with the attempt to bridge different scholars from the natural and social sciences and discuss a framework for analysing the question of the commons. These discussions have led to the development of an analytical framework for the analysis of the commons, and a set of “design principles” that are associated with successful common property management regimes (e.g. (National Research Council 1986; Ostrom 1990; Bromley 1992; Oakerson 1992).

The interesting finding of the common property literature is the rich diversity of common property institutions and property rights arrangements, especially in the older, historically rooted resource management systems and the use of common property regimes to align property boundaries with ecological ones (McKean 1996).

It has been increasingly recognised, however, that the analysis of institutions also needs to include questions of jurisdiction and the respective roles of local groups and government agencies. Even those indigenous groups with well-functioning local management systems are dependent on the authority structure that supports them (Berkes and Folke 1998). (Edwards and Steins 1999) highlight that research should extend beyond the geographical boundaries of a particular resource system to include the contextual factors that supports them. They suggest one should start by analysing local contextual factors and then trace them back through to a more global level.

A key concern is when and where there is a need to use common property institutions today. There is a renewed interest both in the lessons to be learned from successful common property regimes of the past and present (Netting 1981; Berkes 1992; McKean 1992; Thomson 1992) and in the possibility of reviving community ownership or management as a practical remedy where appropriate (Bebbington 1998; Hesse and Trench 2000; McKean

2000). “The Drama of the Commons” (National Research Council 2002) brings together an interesting bibliography to contribute to this knowledge.

There are prospects for scaling up/down in the dimensions of space and time in the efforts to understand the roles that institutions play in causing and confronting environmental change what (Young 2000) defines as “questions relating to the matters of fit, interplay and, scale”.

Finally, there is a general agreement that conservation policy and practice has changed significantly in the past two decades or so and people-oriented approaches have been widely accepted and adopted (Brown 2002). However, there is a growing debate supported by the idea that the scale and complexity of environmental problems is far greater today than anything traditional communities ever had to deal with. Within this context, the new debate now is whether communities actually can resolve resource conflicts and slow environmental degradation better than a centralised authority (Wells, Brandon et al. 1992). ‘Community conservation’ and ‘common property regimes’ for managing common-pool resources are not simply a question of recognizing the rights of local communities and landowners to use resource, but also recognizing the sense of responsibility to wider society, including what has been termed ‘the global commons’ (Bromley and Cernea 1988; Barrett 1990; Barrett 1994; Keohane and Ostrom 1995; Young 1997).

### **1.3 The research approach**

Vicuña are a common pool wildlife resource where several types of users compete for benefits of the resource system and where there are several different types of use taking place under different institutional arrangements. Understanding the dynamics of conflicts between

these types of use around a common resource is necessary for future consensus-building and decision-making within communities.

This research will contribute to this wider field of study by attempting to focus on some key areas for further investigation: the concept of communities; the linkages between conservation of camelids and Andean livelihoods; the concept of participation and collective action; the change of power relationships across space and time and the concept of success in institutional management.

The concept of community will be explored by paying special attention to defining what community is in the Bolivian Altiplano and to identifying the units of self-organisation for collaborative behaviour. There is strong evidence for traditional management of domestic South American camelids based on collaborative management and appropriate ecologically sound methods that can provide interesting cases to explore linkages between local and state-mandated institutions for management of local resources.

This study will use the term actor and acknowledge the importance of the interactions between agency, power and structure bearing in mind that individuals can belong to more than one group (e.g. community) and may interact at different levels of governance (local, national). Through this approach, this study will identify the recursive relationship between the individual and institutions forming the social structure.

Common property theory (Netting 1981; Redford and Padoch 1992; Peters 1994; Lane 1998) points out that an important first step in multiple-use analysis is to distinguish the resource system and characteristics of the resource to be used from the property rights and the resource users. The great challenge is then to match them all and see in which context they are most suitable for management. Attempts to deal with these issues are contemplated by a number of authors (Ostrom 1990; Wade 1994; Baland and Platteau 1996; Edwards and Steins

1999; Edwards and Steins 1999). It is assumed that this type of research will contribute to building up a theory of what counts in “successful” resource management institutions (Agrawal 2001). A “successful” institution may be defined as a social arrangement for managing resources that lasts over time, constrains users to safeguard the resource and produces fair outcomes (Ostrom 1990; McKean 2000).

Although it is important to consider the linkages throughout the entire integrated ecological, social, economic system, this research aims to contribute to this knowledge mainly by analysing in depth the social system around the community management of vicuña in the wild on communal lands and if possible, other related resource (e.g. llama and alpaca).

## **Section 2. Research context**

The Puna and Altiplano region is a high and arid environment with harsh living conditions: very low atmospheric pressure, low annual rainfall, high daily temperature range, and low primary productivity (Cabrera 1976). Andean societies have adapted and survived together with South American camelids for more than 10,000 years. Nowadays, it is a region inhabited by scattered Quechua and Aymara speaking people with a subsistence production based on pastoralism.

The geographical and regional background is outlined in this section to understand the characteristics of the users, the characteristics of the vicuña and the context in which they interact. Subsection 2.1 presents *Vicugna vicugna* conservation in historical perspective; subsection 2.2 provides an overview of the policy context and vicuña management scenarios and subsection 2.3 highlights relevant issues in the contemporary Bolivian Altiplano.



## 2.1 Historical background

South American Camelids were domesticated 7,000 years ago to obtain the Alpaca *Vicugna pacos* and Llama *Lama glama* from breeding selection of wild species vicuña *Vicugna vicugna* and guanaco *Lama guanicoe* (Kadwell, Fernández et al. 2001). They are ecologically adapted to arid zones and considered "low impact grazers" (Baied and Wheeler 1993) with soft pads instead of hoofs that do not harm the fragile arid soils and open rooted and continuously growing incisors allowing them to cut the vegetation instead of pulling it out by the roots.

Camelid pastoralism is a type of high-altitude pastoralism where rainfall (in some cases less than 100 mm annual precipitation) represents the main limitation (Browman 1990). Reduced partial pressure, a lengthy dry season, irregular precipitation, low temperatures with frequent frosts and freezes, rugged topography, and poorly developed soils result in a variety of stresses and risks where keeping the ecologically best adapted livestock such as llama and alpaca is considered a major strategy for dealing with these problems (Sumar 1988; Browman 1990).

Before the European conquest, a herd of llamas and alpacas was one of the basic sources of subsistence together with the utilisation of *Vicugna vicugna* based on an ancient traditional technique known as chaku (Wheeler 1984). Chakus were developed by pre-Inca societies and then adopted and improved as a viable technique by the Inca Empire. Animals were surrounded from the wild each four years, sheared, a few sacrificed in rituals and the rest released again into the wild. This required a high social organisation for collective labour. The fibre had a sacred value and only used to weave special cloths for the Inca authorities (Hurtado de Mendoza 1987)..

The European conquest dismissed the value of llama and alpaca which were progressively displaced to higher areas by introduced livestock (sheep, goats and cattle) less adapted to the fragile characteristics of the environment (PEURV undated). Vicuña fibre was highly prized and the species was persecuted and hunted nearly to extinction to obtain the entire pelt. By the mid-20<sup>th</sup> century, a few as ten thousand vicuñas remained of a population estimated at two million when the Spanish arrived (Barker 1980). With the establishment and creation of the CITES treaty in the 1970s, a global programme of conservation for the species. The successful population recovery has more recently begun to shift the emphasis away from conservation towards the sustainable use of this species (Wheeler and Hoces 1997).

The ban on the use of vicuña was controlled by the CITES international agreement and reinforced by the regional Vicuña treaty (Tratado para la Conservación de la vicuña). After thirty years of strict conservation through the coalition of international, national and local efforts, the species recovered in numbers. The Vicuña agreement and the IUCN guidelines for sustainable use of wild species supported community management in their policies where tenure conditions favour this type of management (Mazzucchelli and Ortiz von Halle 2000) and in 1987, Peru was the pioneer to shift from preservation to sustainable use based on the ancient chaku technique of those local populations of vicuña that recovered in numbers (Wheeler and Hoces 1997). In 1995 the whole population was included under the Appendix II of CITES and the progressive granting of use and usufruct of vicuña by the state to Quechua and Aymara speaking communities became the landmark in successful community conservation. Financial benefits obtained by the communities from sales of live shorn fibre far exceed those from hides sold on the black market, providing a powerful incentive to protect the species. This helped them solve their most urgent problems, which the government is not in a position to address (Wheeler and Hoces 1997).

## 2.2 Vicuña management scenarios

There is a strong trend for interfering with natural populations by using fences and enclosures and recent studies (Lichtenstein, Oribe et al. 1999; Lichtenstein, Oribe et al. 2000; Kadwell, Fernández et al. 2001) indicate that incompatible with the initial criteria of IUCN sustainable use which states that a balance must be found between the space allowed for a rare wild species and the immediate socio-economic needs of local Quechua and Aymara speaking people that have protected the species for more than 30 years. CITES policy treats the international trade in wildlife as the most important threat to the continued existence of wild species. It offers a prescription of trade bans and restrictions for endangered species but does not control the management of its populations (Hutton and Dickson 2000).

At one extreme falls the management in captivity initiated by the National Institute for Farming Technology (INTA) in Argentina. At the other extreme lies the Community-based management of vicuñas in the wild such as in Bolivia which is the sole country to declare that all its vicuñas remain as wild populations. Peru and Chile's policies stand in the middle with a strong trend towards shifting from community-based management of vicuñas in the wild towards semi-captivity (Table 1).

This seems to create conflicting interest. As users in Peru are enclosing vicuñas, there are fewer animals on the Bolivian side of the border for the community wild capture and shearing. This can lead to efforts to fence in vicuñas before someone else does. This is a typical dilemma of a common-property resource such as the vicuña where controlling the access is costly and its trans boundary and fugitive characteristics makes it difficult to set up use-boundaries. Wildlife moving across community whose territory it is in. In this process, more wealthy groups often capture ownership of the more valuable resources, creating group

differences between households within communities and a breakdown in the linkages between community members upon which communal management systems depend.

**Table 1 Management scenarios set up per country for shearing vicuña**

<b>Management scenarios<sup>1234</sup></b>	<b>Argentina<sup>1</sup></b>	<b>Bolivia<sup>2</sup></b>	<b>Chile<sup>3</sup></b>	<b>Peru<sup>4</sup></b>
<b>Management in the wild:</b> temporary surround technique in communal land based on traditional chaku. The process of capture, shearing and release again into the wild need collective participation and organisation of people.	Not officially reported	Interested communities in Lipez, Apolobamba and Mauri Desaguadero units are given use rights and custodianship over the vicuña. The capture and shearing is controlled and assisted by the Government Agency DGB (General Biodiversity Bureau).	Interested families in Lagunillas and Surire units are given the within the Lauca National Park. The management programme is controlled and assisted by the Government Agency CONAF (National Forest Corporation).	Interested communities are given the use rights over the vicuñas in their land. The capture and shearing is assisted by the CONACS (National Council for South American camelids).
<b>Management in semi-captivity:</b> fencing of extensive plots (1000 ha) on communal land. Process of capture and shearing as above.	Not officially reported	Not officially reported	Interested group of households in Ankara and Central Citani units. The management programme is controlled and assisted by CONAF	Interested communities have access to the programme controlled and assisted by CONACS
<b>Management in captivity:</b> small captive farming units to keep the vicuñas enclosed. Local people provide the animals and labour to the service.	Private investors and selected households can have access to the programme monitored by the National Institute for Farming Technology (INTA) in Abrapampa Jujuy province.	Not officially reported	Not officially reported	Not officially reported

Sources: <sup>1</sup> <sup>4</sup>(Lichtenstein, Oribe et al. 2000) <sup>2</sup> (Ripa de Marconi 2000) <sup>3</sup> (Castellaro 2000)

### 2.3 The Bolivian Altiplano

From the earliest times, most of Bolivia's inhabitants have lived on the Altiplano, at an average height of 4,000 metres. Most of its population is Aymara and Quechua speaking descendants. The centre of Aymara society were the ayllus, groups based on kinship which owned and worked the land collectively. The Quechua speaking Incas conquered the Aymara kingdoms and incorporated them into their powerful Empire. Anthropologists working in the region have been mainly concerned about the history of the Andean region (Murra 1967) and the politics of ethnic stratification and the so-called 'Indian question' (Harris 2000). The European conquest of the Inca State, is a constant point of reference. On the one hand, there are studies of religion, magic, shamanism and so forth, often looking at contemporary indigenous populations in the light of early colonial sources (Stewart 1946). On the other hand, there are studies of peasant communities with special emphasis on camelid-based pastoralism (Browman 1990).

(Bebbington 1998) analyses the role of local institutions in establishing environmentally-sustainable development in the Bolivian Andes. He draws attention on his idea of "islands of sustainability" (Bebbington 1997) supported by links between social capital and natural resource management where social capital is found within local organisations, institutions and networks. This idea of maintaining social capital through local institutions has also been described by (Ostrom 1992) as crafting institutions for better natural resource management and widely supported by research in the camelid Andean pastoralism literature (Orlove 1982; Browman 1990; Browman 1994; Nielsen 1996) showing the strength and resilience of traditional elements in making use of native domestic camelids successful in a harsh environment.

There is a general consensus that Andean peasants constitute a distinctive field of study (Harris 2000). Within the Bolivian context, the decentralization process of government action to municipal levels has generated major changes in political structures. Bolivia also has a pioneering legislation for social participation, the National Grassroots Participation Law (Ley de Participación Popular), enacted in 1994. It involves local populations in the planning and management of a broad range of social, production and infrastructure projects through administrative decentralization, providing the necessary legal framework to recognise participation by local institutions within municipal city limits (Mazzucchelli and Ortiz von Halle 2000). Bolivia stands between two models for land policy: the discussion about land reform favouring the creation of collective landholdings (Deere and León 1999) and the neo-liberal model favouring individual over collective land rights (Thiesenhusen 1995).

The National Programme for sustainable use of vicuña in Bolivia started in 1997 with the implementation in three conservation units: Apolobamba, Mauri-Desaguadero and Lipez-Chichas where CITES permitted the capture and shearing of vicuña populations by local communities (Figure 2). The sustainable use programme started in 1998 with a zero quota from CITES that restricts commercialisation of vicuña fibre until Bolivia demonstrates that it has the ability, the legal framework and organizational skills necessary to carry out the sustainable shearing programme. Bolivia has been building up this capacity and they are lobbying for a relaxation in international policy, the case for which will be presented in next CITES meeting held in Santiago de Chile next November 2002 (Orosco Mita 2002)personal communication).

The programme promotes the involvement of local communities to manage wild vicuñas. Communities that are interested are given the “custodianship” and “use right” of the vicuña that share grazing land with their livestock (mainly llamas and sheep). National policies promote sustainable use by local communities and, with vicuñas in the wild.

**Figure 2 Vicuña management units in the Bolivian Altiplano**



The government agency DGB (General Biodiversity Bureau) provides technical assistance, training and certification of the fibre. The fibre produced is stocked from local to national level into the Bolivian National Vicuña Society in order to collectively accumulate 200 kilograms (depending on the climate of the vicuña habitat within Bolivia, fleece weights vary on average between 150-250 grams) for future commercialisation (Ripa de Marconi 2000).

Within a regional context towards privatisation and individualisation of land rights and the intensive use of vicuña, the Bolivian Altiplano stands out as an interesting empirical

scenario to study the viability of community-based institutions for management of vicuña and other natural resources.

### **Section 3. Research questions**

This research is situated within the context of what has become the prevailing paradigm in conservation in developing countries: community-based conservation.

Vicuña in the Bolivian Altiplano provides a case study that in some ways typifies contemporary conservation: the attempt to align an international conservation agreement, to which a sovereign state is a signatory, with the social and economic concerns of the citizens of that state.

What makes vicuña a particularly pertinent case for analysis is that conservation efforts under the old preservationist paradigm have been successful in halting a decline to near-extinction, and rebuilding populations. The questions this thesis will address centre on whether past preservationist conservation can now be substituted by utilitarian conservation. The rationale for utilitarian approaches is that as well as achieving international conservation objectives by maintaining biologically viable populations, it can contribute sufficient benefits to remove the cost of conservation from either local communities (as benefits foregone and direct costs incurred) or nation-states (in the form of enforcement and management costs, and macro-economic benefits foregone).

The key research question in this context becomes: Is it viable to conserve vicuña through sustainable use by communities?



Viability in this context refers to the biological, economic and institutional constraints and opportunities presented by this shift in conservation approach and devolution of management responsibility.

The shift to a utilitarian approach introduces potential threats to the success of vicuña conservation, in terms of conserving the biodiversity and genetic potential of this wild species. These threats might include direct harm to populations through mortality or reduced reproductive success brought about by the capture and shearing programme, and genetic homogenisation (e.g. of separate sub-species or races) under domestication in other Andean countries.

These biological impacts of sustainable use of vicuña populations will be evaluated, largely in collaboration with other members of the MACS team and the economic impacts of a shift from preservation to sustainable use will be investigated through an analysis of the benefits of vicuña shearing programmes. The main research area of the thesis, however, is in the analysis of institutions for management.

In order to address the institutional viability of a move towards conservation through community-level sustainable use, the first part of the research will focus on identifying the key actors involved in the vicuña system at international, national, sub-national and local level and, assessing their respective interests. The role and objectives of those individuals or groups included but not limited to the vicuña management system will be investigated. Some individuals or groups may be indirectly involved, or uninvolved (no specific role within the system). The research will also look at the interests that may support or not decisions to join the vicuña management programme. At local level during the capture and shearing event, special attention will be given to the initial and current expectations before and after the capture. These expectations may include perceived costs and benefits. These questions can provide an insight into factors (other than existing economic ones) that provide incentive or

motivation for participation. These might include (the opportunity for a social event, trust of a future economic benefit, “curiosity” based on a cultural traditional knowledge or pride derived from protecting and managing a cultural landscape and valuable resource. Conversely, a lack of interest, or loss of prior interest, may be due to unrealised expectations, associated costs or perceived lack of benefits from the programme.

Tracing linkages between actors and institutions will provide the opportunity of identifying tensions between motives for economic integration (international trade of vicuña fibre at a national level with implications at local level) and motives for political decentralisation and devolution of power (resource use ruled by international policies). It will finally help tracing conflicts and trade-offs. Conflicts seen as situations of competition and potential disagreement between two or more stakeholder groups over the use of vicuña. Trade-off seen as the process of balancing conflicting objectives. Conflicts and trade-off may be perceived within and across the different scales of governance. The first question can thus be stated simply as:

**Question 1:** Who are the stakeholders in vicuña management and what are their interests and agenda?

A second part of the research is to provide a good understanding of the local-level institutional arrangements for managing native camelids in the Bolivian Altiplano. Institutions are defined as “a set of rules actually used by a set of individuals to organise repetitive activities that produce outcomes affecting those individuals and potentially affecting others” (Ostrom 1992). The emphasis is on institutions that deal with communities, property rights and common property resources where property is defined as the rights and obligations of individuals or groups to use either vicuña, llama and/or alpaca. Native camelids are defined as common property resources for which exclusion is difficult and joint use involves subtractability (Berkes 1989; Feeny, Berkes et al. 1990). Anthropological and social research

(Sumar 1988; Browman 1990) shows how culture and social structure shapes Andean camelids pastoralism which becomes the institutional resource bank with the capacity to support other institutional arrangements to reduce the social overhead costs of co-operation in resource management. In this research, the analysis of vicuña and domestic camelids institutions in comparative focus to assess the similarities and differences in the emergence, adaptation, evolution, process in decision making, lessons learned, conflict management. It will provide the opportunity of exploring how local people organise themselves for production and through this introduce the understanding of the dimensions of communities within the unities of production.

The research will provide information on the role (or value) of vicuña for livelihoods (in both absolute terms and compared to domestic camelids); on local knowledge resource about native local resource available (ecology and management) and acquired knowledge (information about policies, management or other issues). The institutional research will build on the stakeholder identification by further investigating what motivates people to participate in group or collective action and what facilitates or impedes individual and collective action. The research may also provide information on the channels through which power runs in this society and what is the role played by the state in this regard. These organisations can be at community or household level and provide information on how this society ‘hangs together’. The second question will thus be:

**Question 2:** What institutions exist for managing native camelids (vicuña, llama and/or alpaca) and how do they work?

The findings to date from many individual case studies of successful and failed common-property regimes can be initially synthesized into a set of broad policy recommendations related to the conditions that are associated with successful common-property regimes (Ostrom 1990; McKean 1992; Ostrom, Gardner et al. 1994; Wade 1994;

Baland and Platteau 1996). A third part of the research is to try to understand the different dimensions of the term “successful institution”. The third question will therefore be:

**Question 3:** What are the different perceptions of the term “success” in an integrated conservation and development programme?

## **Section 4. Methodology**

The research approach combines both qualitative and quantitative primary and secondary data. Secondary data collection includes unpublished and published documentary material together with background research. Primary data collection will be conducted through fieldwork in Bolivia (subsection 4.1). Preliminary fieldwork observations (subsection 4.2) will guide future research plan (subsection 4.3).

### **4.1 Research methods**

Primary data will combine both qualitative and quantitative field methods. Both analyses are used for gaining an understanding of the system by means of identifying the perceptions and actions of key actors (individuals or organisations). A cross scale and comparative approach will provide the opportunity of linking the different factors across space (different study sites) and time (change in policies). Comparative methods will be used to explore the different dimensions in which people are organised as individuals, communities and institutions in three different geographical and historical settings for vicuña management: Lipez-Chichas, Area de Manejo Integrado Apolobamba and Mauri-Desaguadero.

The institutional arrangements for managing vicuña have different levels of governance affecting a number of different stakeholders at local, regional, national and international levels with different agendas and sets of interests. A stakeholder analysis will

then identify different individuals and groups directly or indirectly involved in the system. An actor oriented approach (Long 1992) will provide the opportunity to trace individuals that can belong to more than one group, identify their interests and agenda, assess their actions and interactions, identify potential conflicts of interests and trade-offs that could be expected to threaten the viability of (or support to) community management of vicuña. Based on (Grimble 1998) conflicts are situations of competition and potential disagreement between two or more stakeholder groups over the use of one or more scarce resource; trade-off is the process of balancing conflicting objectives within a single stakeholder group. Likelihood and intensity of both tend to increase when, with development and population growth the resource becomes scarcer and more highly valued. This analysis will highlight power relationships at the different levels of governance (local, regional, national and international).

An institutional analysis will then provide the methodological framework based on (Ostrom 1990; Oakerson 1992) to identify and analyse the dynamics between agency visualised as the action and interaction of the different actors and, structure or context of their action which in this particular case study is focused on micro-macro institutional arrangement set up in Bolivia for management of vicuña and domestic camelids.

In depth interviews will provide the opportunity of identifying local perceptions on institutional effectiveness in terms of delivering management objectives in the form of conservation and livelihood benefits. These will be addressed at different levels of governance and at local level to different generations, gender and roles within the communities. This analysis will highlight the systems boundaries of decision-making and perception.

Secondary data will be used to understand the legislation, government policy papers, donor reports and academic literature. Triangulation of methods with secondary data can help to clarify the causal links of the different variables. Community-based management of vicuña

in the wild can be compared to Peru where this system of management is also taking place. The institutional arrangement for management of domestic camelids share commonalities with other countries (e.g. Llamas in Argentina; Alpacas in Peru).

#### **4.2 Preliminary observations**

The Lipez-Chichas Unit was visited between 17-28 November 2001 to assist the two-days process of capture and shearing of vicuña in three communities: San Antonio de Lipez, Relave and Guadalupe. Two communities on the Argentine border were also visited (Cusi Cusi and Rinconada).

Observations of peoples' attitudes, collated through participant observation and informal interviews, were recorded before, during and after the two-days event. Informal discussion with members from other communities managing vicuñas (San Pablo de Lipez and Santa Isabel) and from other vicuña protected areas where vicuña management is not carried out represented yet more interesting sources of information.

Secondary data were obtained from the Global Biodiversity Bureau (DGB, Ripa de Marconi 2000) and an attempt was made to identify the different levels of organisation of the Vicuña Management Programme. Background information of the institutional arrangement structure for Lipez Chichas Unit was provided through formal interviews with government agents in DGB. In 1997 the "Programa Quinoa Potosi" (PROQUIPO-GTZ) provided funds to acquire the posts and fish nets necessary for construction of the capture enclosure. These materials were distributed amongst five communities: San Pablo de Lipez, San Antonio de Lipez, Guadalupe, Relave and Santa Isabel selected because of the high density number of vicuñas, the interest in managing the species and access to the area. 170 to 200 posts were given to each community. Each post was 3 meters weight and 10cm wide. The cost was

12,000 U\$S (1post = 5Bs = 1U\$S, Argentina). The 1700 meters fish net (=14 rolls of 30 meters each) is rotated amongst communities.

Shearing of vicuña is carried out once a year and three members from La Paz Governmental Agency (DGB) come along to control the whole process and certify the fibre shorn from live animals. Wildlife wardens from all the communities have to assist and participate in all stages of the vicuña management process carried out by five communities. It is part of their job that otherwise have to be justified for absentee.

Although the Lipez-Chichas Unit is divided into 14 Vicuña Management Community Areas, there is only five that received the authorisation to manage vicuñas: Relave, San Antonio de Lipez, San Pablo de Lipez and Guadalupe.

Vicuñas are protected within each Community Area and monitoring and control is carried out by: eight wildlife wardens, qualified members of the community employed by the DGB and community guards selected by the community working *ad-honorem* on a yearly basis. Wildlife wardens have to participate in the capture and shearing events of the five communities. Those wildlife wardens most interested and stimulated are offered to do a interregional capacity building course in La Paz with possibilities of participating in the captures and shearing of vicuña in other Management Units (e.g. Candido Nina, wildlife warden from San Antonio de Esmoruco was been selected for assisting the capture and shearing events in Apolobamba Unit).

Each community seems to be organised under a number of authorities: “corregidor”, wildlife warden, “curaca”, ministry agent, school delegate, “OTB”. Most of these posts are rotated annually and *ad-honorem* chosen by the community members. The communities that are interested in the management of vicuña have the right to claim for guidance to the

allocated local authority (San Pablo de Lipez, Mojinete and San Antonio de Lipez) in charge of facilitating the equipment, logistics and training for the capture and shearing of vicuña.

Local perceptions from members from other villages not officially involved in the Vicuña National Programme were perceived during the capture and shearing held in San Antonio de Lipez. All wildlife wardens from all communities with the potential to use vicuñas were forced to assist the event. The wildlife warden from San Antonio de Esmoruco was very interested in the management of vicuña as well as the village authorities.

When the question about why doesn't the community becomes involved in the Programme? Two answers were given: "not interested" (e.g. Kollpani, Pueblo Viejo) or "there is no enough logistic support such as posts and fish nets and transport for installing the capture enclosure" (e.g. San Antonio de Esmoruco). Further investigation is needed to look at the real conditions to access the programme.

A long discussion with Ing. Hugo Lamas who coordinates a Programme for llama cooperatives in the Argentinean Altiplano provided valuable information on what promotes and what impedes cooperation in llama management, as an important institution for management of common grazing land. In this case he draws up on a ten years experience of development of llama cooperative in the Rio San Juan Basin.

The institutional arrangement was inspired from CECOALP (Central Cooperativa Alpaqueras Puno limitadas) in Peru where many cooperatives for alpaca management converge in a central institution named CECOALP. The legal framework was adapted from ISQANI (Asociacion de Criaderos de llamas del Norte de La Paz) in Bolivia.



This initiative was presented to the communities through three community meetings. In the first meeting the community highlights problems, potentials and desires based in a set of questions. In the second meeting it is presented what other people are doing in other places within the Altiplano region (Peru, Bolivia). If the community was interested to learn more about it, a member from the Peruvian cooperative was invited to demonstrate the different steps followed by the cooperative to stock the fibre. The third and final meeting is for the community to decide if it accepts or not to introduce the new idea.

This initiative started in the community of Cusi Cusi but is now widespread to include other interested communities throughout the Argentine Altiplano. They all converge in the Cooperative Rio Grande de San Juan Basin. Ing Lamas highlights that communities in the extreme North west of Argentina have more affinity and commonalities with communities across the Bolivian border than to the rest of the Argentine Altiplano. This process of unification is based on traditional and historical social networks that already exist amongst these communities. The parallel in the development process of these trans-boundary communities are related to the productive aspect of the region, especially to pastoralism of llamas. The analysis of the long term pilot experience of cooperative management of llamas within and across countries provides the opportunity to identify what promotes and what impedes cooperative-management of llamas. He highlights the potential of this in supporting rural development initiatives. He believes that institutions, appropriately scaled to the management of llamas, could strengthen the basis for cooperation in the management of vicuña. He hopes that the Argentine communities will soon have access to the management of vicuña and that will be supported by the Bolivian experience that is taking place in the Lipez-Chichas Management Unit.

The different tensions between the conflict of interests of the DGB governmental agency and local communities members regarding the objectives of the vicuña management were highlighted.

This was considered an important issue for the DGB because there is a high cost for the governmental agency to come to Sud Lipez area (long driving distance from La Paz and highly remote and isolated highlands) to find out that the communities have not respected their recommendations (Table 2).

**Table 2 Conflicts of interest between the DGB agency and communities**

<b>Vicuña Management</b>	<b>DGB</b>	<b>Communities</b>
<b>Site identification for position of the enclosure</b>	They have visited the area in August 2001 to choose the site based on higher vicuña density and design of the enclosure based on topographic features (near a vega)	Different sites Same site
<b>Design of the enclosure</b>		Different design Same design
<b>Division of labour for the capture</b>	Suggest use of banderoles	Didn't use banderoles
<b>Shearing process</b>	Suggest not to shear animals after 2-3pm because of cold and not shearing offspring	Wanted to shear all animals caught including offspring of less than 2 years
		Use of paper scissors and cuts made to the animals. Then scar sewed and disinfected.
<b>Division of labour</b>	Shearing tasks should be divided	All members want to try shearing the animal
<b>General objective</b>	Capture as many animals as possible to be able to shear and accumulate enough fibre that will positively contribute to the overall national stock (200kg) required to start the commercial trade of its fibre.	They are not concerned about the numbers captured. They are highly satisfied with one animal captured at least that will provide them the opportunity of experiencing the shearing. All community members want to experience the event.

Field observations in Lipez-Chichas unit reveal that there are conflicts of interest between the government agency and community expectations regarding the management of vicuña. Members from the DGB agency highlighted this experience as a characteristic of this management unit because of the far distance from La Paz and recommended to visit the two other units of management closer to La Paz to observe differences in human behaviour.

### **4.3 Future research plan**

Preliminary observations reveal that management activities (census, preparation of the capture site, capture and shearing event, birth season) around vicuña seem to be divided throughout the year. The capture and shearing event is only possible twice a year between October and December and between May and June. It does not occur during the vicuña birth season between February and March (Vilá 1992) and under the harsh weather conditions during the winter season between July and September (Bonacic 1996). During that period activities of census and logistics preparation for capture seems to occurs. The capture and shearing is always assisted and controlled by government agency DGB. Visits to Apolobamba and Mauri-Desaguadero units, both located nearer La Paz will provide valuable information to cross-check with preliminary observations in Lipez-Chichas unit. Human behaviour may change not only amongst units of management but also across the year calendar with different objectives and agendas before, during and after the capture and shearing event. It will also be important to spend some time in La Paz and local authority department to collect information about key stakeholders and secondary data.

A tentative fieldwork plan will take place from end of June 2002 to end of March 2003. During this time, coordination of activities with other members of MACS will be necessary in order to meet outputs deadline in next MACS coordination meeting that will take place in Peru next November 2002. This will also provide opportunity of gathering relevant secondary data.. If necessary, there will be a possibility of returning to the field between September and December 2003 to coincide with the 3<sup>rd</sup> MACS meeting taking place in November 2003.

## Section 5. References

### References

- Adams, W. and D. Hulme (2001). Conservation and Community. Changing narratives, policies and practices in African conservation. African Wildlife and Livelihoods. D. Hulme and M. Murphree. Oxford, James Currey Ltd. **chapter 2**: 336.
- Agrawal, A. (2001). "Common property institutions and sustainable governance of resources." World Development **29**(10): 1649-1672.
- Agrawal, A. and C. C. Gibson (1999). "Enchantment and disenchantment: the role of community in natural resource conservation." World Development **27**(4): 626-649.
- Allison, E. H. (2001). "Big laws, small catches: global ocean governance and the fisheries crisis." Journal of International Development **13**: 933-950.
- Anderson, B. R. (1991). Imagined Communities: reflections on the origin and spread of nationalism. London, Verso.
- Baied, C. A. and J. C. Wheeler (1993). "Evolution of high Andean puna ecosystems: environment, climate, and culture change over the last 12,000 years in the Central Andes." Mountain Research and Development **13**(2): 145-156.
- Baland, J. and J. Platteau (1996). Halting Degradation of Natural Resources: is There a role for rural communities? Oxford, Clarendon Press.
- Barker, M. L. (1980). "National parks, conservation, and agrarian reform in Peru." Geographical Review **70**: 1-18.
- Barrett, C. B. (1990). "The problem of global environmental protection." Oxford Review of Economic Policy **6**: 68-79.
- Barrett, C. B. (1994). "Self-enforcing international environmental agreements." Oxford Review of Economic Policy **46**: 878-894.
- Bebbington, A. (1997). "Social capital and rural intensification: local organisations and islands of sustainability in the rural Andes." The Geographical Journal **163**(2): 189-197.
- Bebbington, A. (1998). "Sustaining the Andes? Social capital and policies for rural regeneration in Bolivia." Mountain Research and Development **18**(2): 173-181.
- Behnke, R. H., I. Scoones, et al. (1993). Range ecology at disequilibrium: new models of natural variability andn pastoral adaptation in Africa savannas. London, ODI.
- Bennet, J. W. (1976). The ecological transition: cultural anthropology and human adaptation. Oxford, Pergamon.
- Berkes, F., Ed. (1989). Common property resources: ecology and community-based sustainable development. London, Belhaven Press.
- Berkes, F. (1989). Cooperation from the perspective of human ecology. Common property resources: ecology and community-based sustainable development. F. Berkes. London, Belhaven Press: 70-88.
- Berkes, F. (1992). Success and failure in marine coastal fisheries of Turkey. Making the commons work: theory, practice and policy. D. W. Bromley. San Francisco, ICS Press.

- Berkes, F. and C. Folke (1994). Investing in cultural capital for sustainable use of natural capital. Investing in natural capital: the ecological economics approach to sustainability. A. Jansson, M. Hammer, C. Folke and R. Costanza. Washington DC, Island Press: 504.
- Berkes, F. and C. Folke (1995). A framework for the study of indigenous knowledge: linking social and ecological systems.
- Berkes, F. and C. Folke (1998). Linking social and ecological systems for resilience and sustainability. Linking social and ecological systems: Management practices and social mechanisms for building resilience. F. Berkes and C. Folke. Cambridge, Cambridge University Press: 1-25.
- Berkes, F. and C. Folke (1998). Linking social and ecological systems: Management practices and social mechanisms for building resilience. Cambridge, Cambridge University Press.
- Bonacic, C. (1996). Sustainable use of vicuña (Vicugna vicugna, Molina 1782) in Chile. Reading UK, University of Reading.
- Brechin, S. R., P. R. Wilshusen, et al. (2002). "Beyond the square wheel: toward a more comprehensive understanding of biodiversity conservation as social and political process." Society and Natural Resources **15**: 41-64.
- Bromley, D. W. (1992). Making the commons work: theory, practice and policy. San Francisco, CA, Institute of Contemporary Studies Press.
- Bromley, D. W. and M. M. Cernea (1988). "The management of common property natural resources and some conceptual and operational fallacies." World Bank Discussion Paper(57).
- Browman, D. L. (1990). High Altitude Camelid Pastoralism of the Andes. The World of Pastoralism: herding systems in comparative perspective. J. G. Galaty and D. Johnson. New York, Guildford Press: 807.
- Browman, D. L. (1994). "Información y Manejo de riesgo de los fleteros de llamas en los Andes Centro-Sur." Zoarqueología de Camélidos(1): 23-42.
- Brown, K. (2002). "Innovations for conservation and development." The Geographical Journal **168**(1): 6-17.
- Cabrera, A. (1976). Regiones Fitogeograficas Argentinas. Buenos Aires, Editorial ACME.
- Campbell, B., A. Mandondo, et al. (2001). "Challenges to proponents of common property resource systems: despairing voices from the forests of Zimbabwe." World Development **29**(4): 589-600.
- Castellaro, G. (2000). Estudio de capacidad de carga de pastizales destinados al manejo en cautiverio de la vicuña. Arica Parinacota, Corporacion Nacional de Desarrollo Indigena: 35.
- Chambers, R. (1983). Rural development: putting the last first. London, Longman.
- Chambers, R. (1993). Challenging the professions: frontiers for rural development. London, Intermediate Technology Publications.
- Chambers, R. (1997). Whose reality counts? Putting the first last. London, Intermediate Technology Publications.
- Cleaver, F. (2000). "Collective Action and the institutions that shape the management of common property resources." Development and Change **31**(2).
- Cleaver, F. (2001). Institutions, agency and the limitations of participatory approach to development. Participation: The new Tyranny? B. Cooke and U. Kothari. London, Zed Books. **Chap. 3**.

- Cooke, B. and U. Kothari (2001). Participation: the new tyranny? London, Zed Books.
- Council, N. R. (1986). Proceedings of the Conference on Common Property Resource Management, Cambridge, UK, National Academy Press.
- Deere, C. and M. León (1999). Land reform under neo-liberalism: the impact of the women's and indigenous movements. Land in Latin America: new context, new claims, new concepts, Amsterdam.
- Edwards, V. M. and N. A. Steins (1999). "A framework for analysing contextual factors in common pool resource research." Journal of Environmental Policy and Planning **1**: 205-221.
- Edwards, V. M. and N. A. Steins (1999). "Special issue introduction: the importance of context in common pool resource research." Journal of Environmental Policy and Planning **1**: 195-204.
- Feeny, D., F. Berkes, et al. (1990). "The tragedy of the commons: twenty-two years later." Human Ecology **6**: 1018-1024.
- Franklin, W. M. (1982). Biology, ecology and relationships to man of the South American Camelids. Mammalian Biology in South America. M. A. Marer and H. H. Genoways. Pittsburg, University of Pittsburg. **6**: 457-489.
- Gadgil, M. (1987). "Diversity: cultural and ecological." Trends in Ecology and Evolution **2**: 369-373.
- Geisler, C., R. Warne, et al. (1997). "The wandering commons: a conservation conundrum in the Dominican Republic." Agriculture and Human values **14**: 325-335.
- Gordon, H. S. (1954). "The economic theory of a common property resource: the fishery." Journal of Political Economy **62**: 124-142.
- Grimble, R. (1998). "Socio-economic methodologies. Best Practice guidelines." Natural Resources Institute: 9.
- Hardin, G. (1968). "The Tragedy of the Commons." Science **162**: 1243-1248.
- Harris, O. (2000). To make the earth bear fruit: ethnographic essays on fertility, work and gender in highland Bolivia. London, Institute of Latin American Studies.
- Heinen, J. T. (1995). "Applications of human behavioural ecology to sustainable wildlife conservation and use programmes in developing nations." Oryx **29**(3): 178-185.
- Hesse, C. and P. Trench (2000). "Who's Managing the Commons? Inclusive management for a sustainable future." IIED Securing the commons(01): 39.
- Hulme, D. and M. Murphree, Eds. (2001). African wildlife and livelihoods: the promise and performance of community conservation. Oxford, James Currey Ltd.
- Hurtado de Mendoza, L. (1987). Notas arqueológicas y etnohistóricas acerca de la vicuña en el antiguo Perú. Técnicas para el Manejo de la vicuña. H. Torres. Gland, IUCN: 13-23.
- Hutton, J. and B. Dickson (2000). Endangered species, threatened convention. The past, the present and future of CITES. London, Earthscan.
- IIED (1994). Whose Eden? An overview of community approaches to wildlife management. London, International Institute for Environment and Development.
- IUCN (1980). World Conservation Strategy. Gland Switzerland, International Union for the Conservation of Nature and Natural Resources.

- Kadwell, M., M. Fernández, et al. (2001). Genetic analysis reveals the wild ancestors of the llama and alpaca. Proceedings of the Royal Society London B, London.
- Keohane, R. O. and E. Ostrom (1995). Local commons and global interdependence: heterogeneity and cooperation in two domains. London, Sage Publications.
- Kiss, A. (1990). "Living with wildlife:wildlife resource management with local participation in Africa." World Bank Technical Paper(130).
- Koford, C. (1957). "The vicuna and the Puna." Ecological Monographs **27**: 152-219.
- Lane, C. (1998). Custodians of the commons: pastoral land tenure in east and west Africa. London, Earthscan.
- Lawry, S. W. (1990). "Tenure Policy toward common property natural resources in sub-saharan Africa." Natural Resources Journal **30**: 403-422.
- Lerner, D. (1962). The passing of traditional society: modernising the middle east. Glencoe, The free press.
- Lichtenstein, G., F. Oribe, et al. (1999). Evaluating Eden: Community wildlife management in South America. Community management of vicuña in Peru. London, International Institute for Environment and Development: 105.
- Lichtenstein, G., F. Oribe, et al. (2000). Community management of vicuñas in Peru. Proceedings of the 2nd International Wildlife Management Congress, Godollo Hungary.
- Little, P. D. (1994). The link between local participation and improved conservation. Natural connections: perspectives in community-based conservation. D. Western and M. Wright. Washington, Island Press: 347-372.
- Long, N. (1992). From Paradigm lost to paradigm regained? The Case of an actor oriented sociology of development. Battlefields of knowledge: the interlocking of theory and practice in social research and development. N. Long and A. Long. London, Routledge: 16-43.
- Long, N. (2000). Exploring local/global transformations: a view from anthropology. Development and Modernities. N. Long and A. Arce. London, Routledge.
- Mandondo, A. (2000). Management and ecology of indigenous woodlands in Nyamaropa communal lands, Nyanga district, Zimbabwe. Departement of Biological Sciences, University of Zimbabwe.
- Mandondo, A. (in press). "The concept of territoriality: local natural resources management and its implications on livelihoods in Nyamoropa communal land, Zimbabwe." Agriculture and Human values.
- Mazzucchelli, S. and B. Ortiz von Halle (2000). "Community wildlife management in South America: a regional review." IIED Evaluating Eden Series Discussion Paper(8): 145.
- McCay, B. J. and J. M. Acheson (1987). The Question of the Commons. Tucson, University of Arizona.
- McKean, M. A. (1992). "Success on the commons: a comparative examination of institutions for common property management." Journal of Theoretical Politics **4**(3): 247-282.
- McKean, M. A. (1996). Common property regimes, a solution to problems of scale and linkage. Rights to Nature: ecological, economic, cultural, and political principles of institutions for the environment. S. Hanna, C. Folke and K.-G. Maler. Washington DC, Island Press: 223-243.
- McKean, M. A. (2000). Common property: what is it, what is it good for, and what makes it work? People and forests: communities, institutions and governance. C. C. Gibson, M. A. McKean and E. Ostrom. London, The MIT Press: 274.

- Milner-Gulland, E. J. and R. Mace (1998). Conservation of biological resources. Oxford, Blackwell Science Ltd.
- Murombedzi, J. (1991). "Decentralising common property resources management: a case study of the Nyaminyami District Council of Zimbabwe's wildlife management programme." IIED Dryland Network Programme Issues Paper(30).
- Murra, J. V. (1967). On inca political structure. Comparative political systems. R. Cohen and J. Middleton. New York, Natural History Press.
- National Research Council (1986). Proceedings of the Conference on Common Property Resource Management, Cambridge, UK, National Academy Press.
- National Research Council, Ed. (2002). The Drama of the Commons. Committee on the Human Dimensions of Global Change. Washington DC, National Academy Press.
- Netting, R. M. (1981). Balancing on an Alp. Cambridge, Cambridge University Press.
- Nielsen, A. E. (1996). "Competencia territorial y riqueza pastoril en una comunidad del sur de los Andes Centrales (Dpto. Potosi, Bolivia)." Zoarqueología de Camélidos(2): 53-74.
- Oakerson, R. J. (1992). Analysing the commons: a framework. Making the commons work: theory, practice, and policy. D. W. Bromley. San Francisco, Institute for Contemporary Studies.
- Oakley, P. (1991). Projects with people. Cambridge, Blackwells.
- Olson, M. (1965). The logic of collective action. Cambridge, Harvard University Press.
- Orlove, B. S. (1982). Native andean pastoralists: traditional adaptations and recent changes. Contemporary Nomadic and pastoral peoples: Africa and Latin America. S. i. T. W. S. P. 17. Williamsburg.
- Orosco Mita, A., Ing. (2002). CITES meeting in Santiago November 2002.
- Ostrom, E. (1986). Issues of definition and theory: some conclusions and hypotheses. Proceedings of the conference on common property resource management, Washington DC, National Academic Press.
- Ostrom, E. (1990). Governing the commons: the evolution of institutions for collective action. Cambridge, Cambridge University press.
- Ostrom, E. (1992). Crafting institutions for self-governing irrigation systems. San Francisco, Institute for Contemporary Studies Press.
- Ostrom, E., R. Gardner, et al. (1994). Rules, games and common-pool resources. Ann Arbor, University of Michigan Press.
- Parsons, T. and E. Shils (1962). Toward a general theory of action. New York, Harper.
- Passmore, J. (1974). Man's responsibility for nature. London, Duckworth.
- Peters, P. (1994). Dividing the commons: politics, policy and culture in Botswana. Charlottesville, University Press of Virginia.
- PEURV (undated). Plan Nacional para la utilización racional de la vicuña. Lima, Proyecto especial para la utilización racional de la vicuña Ministerio de Agricultura y Alimentación: 182.
- Redfield, R. (1974). "The folk society." American journal of sociology **52**: 293-308.
- Redford, K. H. and Padoch (1992). Conservation of Neotropical Forests: working from traditional resource use. New York, Columbia University press.
- Ripa de Marconi (2000). Situación de la vicuña en Bolivia, TRAFFIC South America: 27.



- Salafsky, N. and E. Wollenberg (2000). "Linking livelihoods and conservation: A conceptual framework and scale for assessing the integration of human needs and biodiversity." World Development **28**(8): 359-378.
- Scoones, I. (1995). Living with uncertainty: new directions in pastoral development in Africa. London, Intermediate Technology.
- Songorwa, A. N. (1999). "Community-based wildlife management (CWM) in Tanzania: are the communities interested?" World Development **27**(12): 2061-2079.
- Stewart, J. (1946). Handbook of South American Indians. The Andean civilisations. Washington, Bulletin of the Bureau of American Ethnology. **2**.
- Sumar, J. (1988). "Present and potential role of South American camelids in the high Andes." Outlook on Agriculture **17**(1): 23-29.
- Talbot, L. M. (1996). "Appendix I. Living-resources conservation: an international overview." Ecological Applications **6**(2): 355-362.
- Thiesenhusen, W. C. (1995). Broken promises: agrarian reform and the Latin American campesino. Boulder, Westview Press.
- Thomson, J. T. (1992). A framework for analysing institutional incentives in community forestry. Rome, FAO.
- Vilá, B. L. (1992). "Mother-offspring relationship in the vicuña, *Vicugna vicugna* (Mammalia: Camelidae)." Ethology **92**: 293-300.
- Wade, R. H. (1994). Village Republics: economic conditions for collective action in South India. San Francisco, ICS Press.
- Wells, M., K. Brandon, et al. (1992). People and Parks: linking protected areas with local communities. Washington DC, World Bank.
- Western, D. and R. M. Wright (1993). The Background to community-based conservation. Natural connections: perspectives in community-based conservation. D. Western and R. M. Wright. Washington DC, Island Press: 1-12.
- Wheeler, J. C. (1984). On the origin and early development of camelid pastoralism in the Andes. Animals and archeology: early herders and their flocks. J. Clutton-Brock and C. Grigson, Oxford BAR International Series 3. **202**: 395-410.
- Wheeler, J. C. and R. D. Hoces (1997). "Community participation, sustainable use, and vicuña conservation in Peru." Mountain Research and Development **17**(3): 283-287.
- Wilshusen, P. R., S. R. Brechin, et al. (2002). "Reinventing a square wheel: critique of a resurgent "protection paradigm" in International biodiversity conservation." Society and Natural Resources **15**: 15-17.
- Wirth, L. (1938). "Urbanism as a way of life." American journal of sociology **44**: 1-24.
- Wollenberg, E. (1998). "A conceptual framework and typology for explaining the outcomes of local forest management." Journal of World Forest Resource Management **9**: 1-35.
- World Bank (1996). Bolivia: poverty, equity and income: selected policies for expanding earning opportunities for the poor. Washington DC, World Bank.
- Young, O. R. (1997). Global governance: drawing insights from the environmental experience. Cambridge, MIT Press.
- Young, O. R. (2000). The Institutional dimensions of environmental change: fit, interplay, and scale. London, The MIT Press.

