

VOLUME 11 • NUMBERS 1 & 2 • 2010 • **SPECIAL**
KNOWLEDGE - CONSERVATION - SUSTAINABILITY

Biodiversity

JOURNAL OF LIFE ON EARTH



Vetiver Grass
Chrysopogon zizanioides

**BIODIVERSITY &
POVERTY ALLEVIATION**

Journal OBJECTIVE

To contribute to the
understanding, protection
and restoration of
the diversity of living things



EDITOR'S CORNER

A Special Edition and a Special Announcement

In October 18 - 29, 2010, nations will gather in Nagoya, Japan, for the Tenth Meeting of the Conference of the Parties to the Convention on Biological Diversity. In advance of this important event, I am pleased to present this special edition of *Biodiversity* on the theme of Biodiversity and Poverty Alleviation. It is a particularly opportune time to expound on this subject as global attention turns to the crisis of biodiversity loss. The keynote paper authored by Dr. Ahmed Djohglaf, Executive Secretary of the Convention on Biological Diversity, provides a powerful introduction to our theme and I share his hope that this edition will "help lift the veil on the enormous potential of biodiversity in the long march towards the worldwide alleviation of poverty."



This special edition contains a diverse collection of articles and case studies illustrating how biodiversity and poverty are inextricably linked. These papers, from around the world, provide valuable insights into the sometimes complex, and sometimes simple, relationship between biodiversity and poverty alleviation. I hope you find them to be stimulating reading.

But there are more than just authored papers in this special edition. It includes abstracts from an international symposium sponsored by International Institute for Environment and Development, UNEP-WCMC and the African Wildlife Foundation, held in April, 2010. The paper by Roe *et al.* provides critical "lessons learned" from this symposium. The summaries of the Equator Initiatives 2010 prize winners are also included, highlighting the Equator Initiative's celebration of local initiatives to reduce poverty through the conservation and sustainable use of biological resources. The abstracts and summaries presented here will direct readers to resources and information beyond these printed pages.

It is no small challenge in publishing an edition dealing with such a broad topic. Fortunately, a Special Board of Editors, whose names are listed on this page, provided guidance at every step of the process. It was a pleasure working with this distinguished group and I thank them for all their contributions.

Finally, this special edition provides an opportunity for a very special announcement. On behalf of the Board of Editors, Stephen Aitken, Managing Editor, and myself, I am pleased to welcome Dr. Thomas Lovejoy as a new patron for *Biodiversity*. Dr. Lovejoy is well known for his long-time work in the Amazon of Brazil and substantial contributions to the science of conservation biology. He has forged a remarkable career at the interface of science and public policy; building the WWF-US, serving at the Smithsonian Institution and founding the public television series, NATURE. His past appointments have included Chief Biodiversity Advisor with the World Bank and President of the Heinz Center for Science, Economics and the Environment. In 2008, Dr. Lovejoy became Biodiversity Chair at the Heinz Center and, in 2010, he was appointed University Professor at George Mason University. Dr. Lovejoy currently chairs the Scientific and Technical Advisory Panel to the Global Environment Facility and continues half time at the Heinz Center.

I note that Dr. Lovejoy was the first to use the word "biodiversity" in 1980. This only adds to our great delight in his new role as patron to *Biodiversity*.

Glenn M. Lewis

Glenn M. Lewis
Editor-in-Chief
glennis.lewis@tc-biodiversity.org

CONTENTS

This special issue on Biodiversity & Poverty Alleviation is dedicated to the Tenth Conference of Parties to the Convention on Biological Diversity in Nagoya, Japan 2010.

ARTICLES

- Conservation agreements as a tool to generate direct incentives for biodiversity conservation** by *E. Niessen et al.* 5
- Whither biodiversity in development? The integration of biodiversity in international and national poverty reduction policy** by *Dilys Roe* 7
- Value-added secondary processing for conserving biodiversity and alleviating poverty: examples from the equator** by *Oliver Hughes et al.* 9
- Current challenges for addressing poverty alleviation via vicuña management in Andean countries** by *Gabriela Lichtenstein* 19
- Mainstreaming biodiversity and gender in impact assessment for human well-being** by *Asha Rajvanshi* 25
- Integrating biological conservation into management: Community adaptive learning in the wetlands of Bangladesh** by *Paul Thompson et al.* 31
- Poverty, governance and conservation in the Gran Chaco of South America** by *Janis B. Alcorn et al.* 39
- HIV/AIDS and forests in Sub-Saharan Africa: exploring the links between morbidity, mortality, and dependence on biodiversity** by *J.A. Timko et al.* 45
- Prospects for Mainstreaming Ecosystem Goods and Services in International Policies** by *Marcel Kok et al.* 49
- Ecosystem services, financing, and the regional economy: a case study from Tatra National Park, Poland** by *Michael Getzner* 55
- Eco-development in Orissa's protected areas: a participatory approach to conserving forest biodiversity and alleviating poverty piloted in Satkosia Tiger Reserve** by *Michael J.B. Green et al.* 62
- The Chepang and forest conservation in the Central Mid-hills of Nepal** by *Arun Rijal* 71
- The role of SCUBA diver user fees as a source of sustainable funding for coral reef marine protected areas** by *Elizabeth Terk & Nancy Knowlton* 78
- Management of highland wetlands in central Kenya: the importance of community education, awareness and eco-tourism in biodiversity conservation** by *Jane M. Macharia et al.* 85

FORUM

- Social feasibility and biodiversity conservation: how prioritizing the linkage can also establish the conditions for poverty alleviation** by *Michael Brown* 91

IN EVERY ISSUE

EDITOR'S CORNER

- A Special Edition and a Special Announcement** i
Glennis Lewis

SPECIES BY SPECIES

BLOSSOMING TREASURES OF BIODIVERSITY

- 31. Vetiver Grass – poverty alleviation by habitat restoration**
Ernest Small 99

SYMPOSIUM

- Linking biodiversity conservation and poverty reduction: what, where and how? Summary and conclusions from an international symposium held at the Zoological Society of London, 28th-29th April 2010** by *Dilys Roe et al.* 107
- Symposium Presentation Abstracts** 110
- Research Project Summaries** 118

EQUATOR PRIZE

- 2010 Winner Summaries** 125

Biodiversity

ISSN 1488-8386

2010

Volume 11
Number 1&2

Editor-in-Chief

GLENNIS LEWIS, Ph.D., LL.B., LL.M.
glennis.lewis@tc-biodiversity.org

Patrons

MAURICE STRONG

Former Secretary-General, 1992 UN Conference on Environment & Development & Biological Diversity Convention, Brazil

THOMAS LOVEJOY, Ph.D.

Professor, George Mason University
Biodiversity Chair, the Heinz Center for Science, Economics and the Environment
Chair the Scientific Technical Advisory Panel,
Global Environment Facility

Associate Editors

HEMANT K. BADOLA, D.Phil. Botany, India

PAUL CATLING, Ph.D. Botany, Canada

JOHN HERITY, Biodiversity, IUCN Canada

JOHN LAMBERT, Ph.D. Medicinal Plants, World Bank

TED MOSQUIN, Ph.D. Botany, Canada

BALAKRISHNA PISUPATI, Ph.D. Molecular Biology, United Nations University (UNU)

SETIJATI D. SASTRAPRAJDA, Ph.D. Botany, Indonesia

Managing Editor

STEPHEN AITKEN

aitken@tc-biodiversity.org

Book Review Editor

K.G. ANDREW HAMILTON, Ph.D.

Editorial Submissions

Managing Editor

c/o Tropical Conservancy (see address below)

aitken@tc-biodiversity.org

Biodiversity Publication Committee

PETER HALL, Chair

Subscriptions

T.D. TRINH

trinhtd@tc-biodiversity.org

Desktop Design

T.D. TRINH

Queries

P.T. DANG, Ph.D. - President

dangpt@tc-biodiversity.org

Mailing Address:

Tropical Conservancy

94 Four Seasons Drive

Ottawa, Ontario, Canada K2E 7S1

Tel: 1-613-224-9518 or 1-613-325-9518

URL: www.tc-biodiversity.org

Publication Date: 1 September 2010



The International
Development
Research Centre
(Canada)



The Ontario
Trillium
Foundation

Biodiversity

is indexed by
Biosis, Cambridge
Scientific Abstracts,
Environment Abstracts,
and Zoological Record.

Front Cover: Vetiver Grass, *Chrysopogon zizanioides*, has been used successfully in habitat restoration to alleviate poverty (See article page 99). Illustration by P.T. Dang

Inside Front Cover Art: The Diversity of Life by Roelof Idema

Current challenges for addressing poverty alleviation via vicuña management in Andean countries

Gabriela Lichtenstein

Abstract. Vicuña (*Vicugna vicugna*) are South American camelids, the commercial use of which has untapped poverty alleviation potential. Vicuña fibre is produced by extremely low income communities that inhabit the harsh environment of the high Andes in Argentina, Chile, Peru and Bolivia. At the other end of the world, affluent consumers are willing to pay high prices for apparel made of vicuña fibre. Vicuña management projects follow the logic of community-based wildlife management. The rationale for vicuña conservation through sustainable use is that commercial utilization of fibre obtained from live-shorn individuals will generate sufficient economic benefits to outweigh the costs of conservation, and contribute to community development and poverty alleviation. However, while conservation efforts have been extremely successful with vicuñas having recovered from the brink of extinction, the socio-economic achievements have thus far proved modest. Most such benefits are being captured by traders and international textile companies, rather than by local communities. In addition, the high market value of vicuña fibre has attracted a number of groups interested in its production. This threatens the conservation of this wild species, the exclusive rights of Andean communities and could undermine the spirit of the Vicuña Convention. This paper explores multiple-objective projects that address vicuña conservation and poverty alleviation and analyses the challenges that limit a more equitable distribution of benefits among stakeholders.

Key words. Vicuñas, Vicuña Convention, low income communities, community development.

Chair, South American Camelid Specialist Group (IUCN SSC GECS)
Instituto Nacional de Antropología y Pensamiento Latinoamericano (INAPL)/
CONICET
lichtenstein.g@gmail.com

INTRODUCTION

In recent years we have witnessed several attempts to link poverty alleviation and biodiversity conservation objectives (Hulme and Murphee 2001). Yet, just as the development community is urging conservation organizations to address poverty issues as well, the conservation community itself is increasingly concerned about the neglect of biodiversity within many development agencies (Roe and Elliot 2005). Conservation and development projects are usually led by different sets of stakeholders with different outlooks and priorities. Given that both conservation and poverty alleviation are intensely political activities (Adams 2010), projects need to be understood within a political and economic framework. Furthermore, the management of wildlife species as a resource is complicated by multiple scales of interest (local, regional, to global with differing perspectives at each scale, where species can be viewed either as pests or commodities depending on abundance, perspective and economic value (McAllister *et al.* 2009).

This paper explores multiple-objective projects that address vicuña (*Vicugna vicugna*) conservation and poverty alleviation in Argentina, Chile, Peru and Bolivia. Analysis of the vicuña enterprise provides an enlightening case study of the political economy of wildlife management as well as a success story in conservation terms that is still facing challenges with regards to its poverty alleviation goals.

The vicuña recovered from a population of only 10,000 to about 421,500 individuals during the period 1965-2010. This recovery was achieved through an effective policy framework, which mirrored the development of international conservation regimes, shifting from strict protection, to conservation, through sustainable use involving local people.

Vicuña sustainable use provides the following unique opportunities for poverty alleviation:

- Vicuñas along with guanacos are the only wild species that can be captured, sheared and released on a commercial basis, thereby providing a novel example of non-consumptive wildlife use;
- Andean countries are the only producers of the world's finest animal fibre;
- The product to be commercialized has a high market value;
- Vicuña management could create an alternative source of income to local people in areas with very few economic alternatives;

- Given that climate variability presents one of the current threats to sustainable farming in the Andes (Perez *et al.* 2010), vicuña use could play a vital role as a risk management strategy in terms of economic diversification;
- Sustainable use of vicuña fibre can further contribute to the recovery of vicuña populations and habitat conservation;
- Taking into account the multidimensional nature of poverty (OECD 2001), vicuña use could provide not only economic benefits, but also benefits related to health, political, socio-cultural and protective community goals.

The high economic value of vicuña fibre has proven to be an opportunity for conservation of the species but it is also a main threat. In recent years vicuña fibre has turned into an international commodity that has attracted a diverse range of economic and political interests including the attention of investors and traders with desire for an exclusive business with high economic returns; members of Parliament who have been interested in turning vicuñas into domestic livestock; politicians that have wanted to hybridize vicuñas with alpacas; and veterinarians that have promoted captive breeding. These different ways of appropriating vicuñas are threatening the conservation of this wild species, the exclusive rights of Andean communities and the spirit of the Vicuña Convention.

BACKGROUND

Vicuñas and guanacos are among the few native large herbivores that inhabit South America and are the most abundant free-ranging ungulates to inhabit the continent's deserts and high plateau scrublands and grasslands (Franklin 1983). Vicuñas live above 3,700 m in the *Puna* and *Altiplano*, high Andean ecoregions in Argentina, Bolivia, Chile, Ecuador and Peru. The area is characterized by very harsh conditions such as low annual rainfall, extreme temperatures, long dry seasons, irregular precipitation, rugged topography and poor soils (Wheeler and Laker 2009).

The *Altiplano* is a marginal agricultural region with declining land productivity due to soil erosion and land fragmented into small and un-economic parcel sizes (Perez *et al.* 2010). Most rural Andean communities face high levels of persistent poverty and inequality which is expressed in high indices of infant mortality and malnutrition, low literacy rates, limited amenities and lack of basic services such as access to water, sanitation and electricity, limited government assistance as well as remoteness from markets and steady emigration (Foncodes 2006). In the Bolivian Altiplano, 72.6 % of the families live below the poverty line (PNUD 2008). Moreover, climate variability presents a very real, current threat to local livelihoods in the Andes (Perez *et al.* 2010). Trends and



Figures 1-3. 1, Male vicuña group in a high altitude wetland (bofedal) in Ulla Ulla, Apolombamba, Bolivia. (© Antonio Orosco); 2, Vicuña roundup in Sajama National Park, Bolivia. (© Daniel Maydana); 3, Vicuñas captured by Hinchoollo community, waiting to be shorn in Apolobamba, Bolivia. (© Antonio Orosco)

forecasts suggest significant changes in Andean climate by the end of the 21st century which will likely lead to severe impacts on socio-economic activity, Andean ecosystems and maintenance of their biodiversity (Urrutia and Vuille 2009).

Vicuñas have developed extraordinary adaptations to cope with in the extreme conditions of the Altiplano. The vicuña's protection from wide temperature fluctuations has resulted in the rarest, finest, most valuable and highly priced natural fibre in the world, with insulating properties that have been recognized for millennia by local inhabitants (Wheeler and Laker 2009). Vicuña fiber competes in the market with fine fibres such as cashmere or mohair that cost USD 75 and USD 28 per kilo respectively (IBCE 2009).

Before the European Conquest, vicuña fibre was sacred and only sheared for making special garments used exclusively by the Inca. Vicuñas were captured, sheared and released again into the wild every 3 to 5 years using a technique known as *chaku*, which required the organisation and participation of hundreds of people. The rules and regulations under the *chaku* prevented overexploitation by controlling access to and use of the species (Laker *et al.* 2006).

Since the XVth Century, this highly prized species became an open-access resource that was exploited and hunted to the brink of extinction. By 1960, it was estimated that the vicuña population had dropped from its pre-colonial population of 2 million to an estimated 10,000 individuals. International, regional and national conservation efforts were successful in halting further population decline. Strict conservation regulations, through the Vicuña Convention, and inclusion in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1975, helped to rebuild populations to approximately 421,500 individuals by 2010. The global conservation programme was so successful that it resulted in a progressive shift in international policy from strict preservation (Appendix I of CITES) to sustainable use (Appendix II of CITES), allowing trade in fibre obtained from live-shorn target populations. In 1979, Argentina, Bolivia, Chile, Peru and Ecuador signed the Convention for the Conservation and Management of the Vicuña (The Vicuña Convention). Andean people that had been bearing the burden of vicuña conservation were named as the main beneficiaries of future vicuña use in Article I of the Vicuña Convention, and in the signatory states' subsequent submissions to CITES meetings.

The current population estimate of 421,500 individuals (Table 1) may be imprecise since data from different countries were obtained during different years and using different methodologies. All vicuñas in Peru and Bolivia are in CITES Appendix II, whereas all populations from Ecuador are still in Appendix I, as well as some populations from Chile and Argentina. This means that fibre exports are only allowed from the whole vicuña population of Peru and Bolivia and certain populations from Chile and Argentina.

Vicuña use programmes

Vicuña management programmes that were developed in the Andes follow the logic of community-based wildlife management (CWM) (Western and Wright 1994; Hulme and Murphree 2001). These are a variation on what are collectively referred to as community natural resource management (CNRM) initiatives, a form of natural resource management that has emerged as a strategy linking conservation and community development through local participation and sustainable use. Two general

outcomes are expected from CWM: 1) the maintenance of wildlife habitats and preservation of the species and 2) improved social and economic well-being of local communities (Songorwa 1999). Emphasis on power, participation and property rights of frequently marginalized peoples represents a prominent objective, as well as giving increased attention to traditional values and ecological knowledge (Kellert *et al.* 2000).

The rationale behind the vicuña use projects is similar to the “linked incentives” model of Salafsky and Wollenberg (2000) whereby allowing commercial utilization of fibre obtained from live-shorn vicuñas would encourage local participation and the development of positive local attitudes towards vicuña conservation. In turn, this should result in a decrease in poaching (or a decrease in logistic support to poachers), the replacement of domestic livestock (e.g. sheep and cows) with vicuñas, an increase in tolerance for vicuñas on community lands, and greater support for conservation measures.

This rationale is based on the assumption that commercial use of vicuña fibre is a viable economic option that can contribute sufficient benefits to lower the cost of conservation for local communities. Vicuña conservation is perceived as a cost by local people, who must allow vicuña to graze on their properties (“eating the best pastures”) and mix with their livestock (“catching and transmitting diseases to domestic animals and bathing in drinking points”) (Stollen *et al.* 2009). The hope is that rather than continuing an antagonistic attitude towards vicuña, rural residents would assist government efforts in monitoring and protecting the species.

The five vicuña countries have adopted different models for vicuña management to reflect country-specific social organization systems, idiosyncrasies and livelihoods, as well as national and local laws pertaining to resource and land tenure. The first management systems, developed in Peru and Bolivia, consisted of vicuña management under common property regimes by *Aymara* and *Quechua*-speaking communities. They used a capture and release system evolved from the Inca *chaku* tradition, whereby large numbers of community members holding colourful flags chase vicuñas into a funnel from where vicuñas are taken to be shorn. Modern *chakus* incorporate animal welfare considerations and the use of more modern technology (such as motorcycles in Chile) to support the vicuña roundup.

Subsequently, in the 1990’s, there was a trend in Peru, Argentina and Chile towards managing vicuñas in captivity using a management entity that varied between single producers, families or communities. At present, captive and wild management coexist in Argentina, Chile and Peru (Table 1). Bolivia is the only country that remains committed to managing vicuñas in the wild under common property regimes. Whereas wild management has the potential to create economic incentives for the conservation of vicuña and its habitat, the link between captive management and conservation is less obvious (Lichtenstein 2006). Furthermore, maintaining populations in enclosures has a potentially negative impact on vicuña populations by disrupting the natural organization of the animals, inhibiting genetic flow between populations, increasing the likelihood of inbreeding, genetic drift, artificial selection, and transmission of diseases (Vilá 2002).

Although vicuña poaching decreased significantly with the implementation of trade regulations and management systems, it still has an important impact on all Andean countries and is a prime concern for policy makers (Proceedings of the Vicuña



Figures 4-5. 4, Ms. Julia Cruz from Papelpampa community, (Sajama National Park, Bolivia) shearing a vicuña manually within the framework of the sustainable vicuña use project. (© Daniel Maydana); 5, Local authorities from Apolobamba, Bolivia, during the distribution of benefits derived from selling vicuña fibre. (© Antonio Orosco)

Table 1. Vicuña populations, fibre production, management systems and beneficiaries

Country	Vicuña population	National fibre production 2008 (kg)	Management system	Beneficiaries
Argentina	72,700	271	Captive/wild	National Institute (INTA), 15 ranch owners, one community, one "non-Andean" private company
Chile	17,000	160	Captive/wild	45 Aymara families
Bolivia	112,249	924	Wild	77 indigenous communities representing more than 3,000 families
Peru	219,665	6034	Captive/wild	267 indigenous communities and 77 persons or businesses on whose land vicuña live

Source: Country reports to the XIV Technical Meeting of the Vicuña Convention (2010).

Convention, 2007). Most of the fibre poached is not for internal use but to be smuggled outside Andean countries.

In **Argentina**, the main producer is a public organization rather than local farmers: the National Institute of Agriculture and Cattle Technology (INTA), based in Abrapampa, Jujuy. This organization has 1,200 vicuñas in large corrals and a captive breeding programme that used to provide herds of 12-36 vicuñas and technical assistance to 15 local producers who run small breeding ranches (Lichtenstein 2010). Since 2004, INTA's support to breeding ranches has diminished as the programme was found to be ineffective (DFS 2008).

All the fibre production from INTA is sold through a bidding process that has always been won by the same company. This company provided financial assistance to producers for building the corrals in exchange for fibre. Owners of breeding ranches were always paid less than INTA and producers from other countries (Lichtenstein 2010) as a result of this contract. Social enterprises for selling vicuña were never successfully developed in Argentina and, as a result, each producer negotiates with the trading company on its own. Given the small volume produced per breeding ranch, the distance to markets, and that a percentage of the production should go to the trading company in order to pay back debts, it is very difficult for individual producers to attract other clients.

In **Chile**, fibre is produced mostly in corrals by Andean *Aymara* families. Some of these people had already left small Andean towns to move to nearby cities where they found more economic alternatives and better education for their children. The large support to vicuña management programmes provided by the Chilean Government is, in part, an attempt to reverse this urban migration.

Production units in Chile started exporting fibre through the *Sociedad de Hecho Surire*, with support from several national organizations for marketing, resources, generation of added-value status, and organization of biddings (e.g. FIA, ProChile). In 2007, the productive units formed a cooperative (*Cooperandino Chile*) which exports vicuña and alpaca fibre as well as developing alternative sources of income (ecotourism, crafts, etc.). The business plan (created by a State agency) includes active support from the public sector, universities and financial institutions. Although the trading company that won all the biddings in recent years is the same as the one that buys fibre from Argentina and Bolivia, market prices have always been higher in Chile than other countries because of State intervention and support that producers receive in terms of commercialization, marketing strategies and promotion of exports (Table 2).

Vicuña management in **Bolivia** was based on pre-existing communities, however new institutions for resource management have been created (Renaudeau d' Arc 2005), as well as strategic partnerships between the government and communities. Fibre commercialization is managed by

the National Association for Commercialization (ACOFIV-B) that has assembled 9 Regional Associations for Vicuña Management (ARMV) from all over the country. The Regional Associations represent 77 managing communities (CMV). Fibre production and commercialization is supported by national (e.g. SERNAP, DGB) and regional agencies (e.g. Prefecturas), NGOs and international cooperation agencies (e.g. GTZ, AECI).

Peru is by far the country with the largest vicuña population and highest volume of fibre production (Table 1). The country pioneered vicuña conservation and sustainable use and was the first to provide exclusive usufruct rights (the right of temporary possession and use) over the vicuña to Andean communities. Peru also had a special department (CONACS) for South American Camelids. At present, vicuña management in Peru is divided between the General Direction of Forestry and Wild Animals-DGFFS of the Ministry of Agriculture, the National Service of Protected Natural Areas - SERNANP of the Ministry of the Environment and regional governments which now house local "CONACS" (the remnants of what was CONACS). Since 2000 the exclusive usufruct rights were removed from Andean communities by law (DL No 653, Sahley *et al.* 2004) and were extended to persons and business.

Until 1995, vicuñas in Peru were managed exclusively in the wild, but in 1996 a captive management programme was introduced by CONACS. This programme consisted of installing corrals on communal land from which domestic livestock could be withdrawn. The corrals were supposed to enclose from between 250 to 1,000 vicuñas, but in practice they normally contained 0-600 animals. Communities with large numbers of vicuñas were able to continue managing free-ranging vicuñas whereas communities with small number of vicuñas were encouraged to participate in captive management and had less freedom to opt-out given that they relied heavily on technical assistance from CONACS. Captive management proved not only to be a high investment with little economic return (Lichtenstein *et al.* 2002), but in some cases it also led to conflicts between communities over land and resource ownership as corrals impeded the free movement of animals between neighbouring communities (Brewin 2007).

Until 2004 there was one channel for commercialization in Peru, through the National Vicuña Society (SNV). The SNV was made up of campesino community management committees that in turn formed regional associations. The SNV acted as the representative negotiating entity when selling fibre that had been collected via the regional associations. In addition to negotiating with exporting companies, the SNV secured verification that the fibre was from live-shorn vicuñas (instead of poached ones). Since 2004 the SNV has disintegrated. At present communities can negotiate individually with middlemen or textile companies. The range of prices obtained in 2007 (Table 2) is an indicator of the various negotiating capacity of communities.

Fibre market

The total vicuña fibre production of Andean countries is approximately 7,400 kg per year (Proceedings of the XIV Technical Meeting of the Vicuña Convention, Table 1) and is increasing (especially since Bolivia started exporting fibre). Although Andean countries are the only world producers of the most expensive animal fibre, the market gives buyers control of prices rather than producers.

There is no formal market for vicuña fibre and, unlike merino wool or cashmere, there are no reference prices. In the past 10 years, prices paid for raw fibre have ranged from US\$250 to US\$940 (Lichtenstein 2010; Table 2). The highest prices were not obtained by local communities negotiating by themselves, but rather by government agencies (e.g. INTA in Argentina after 2004) or local co-operatives strongly supported by government (e.g. Chile). Prices vary greatly among and within countries (Table 2). The lack of information about prices paid to other producers, communities or countries is a disadvantage when negotiating, as is distance

to international markets and the fact that local people are unaware of the demands imposed by the market. As a result, many communities find themselves in a poor negotiating position.

Most of the fibre from Peru and Bolivia is sold to the International Vicuña Consortium (IVC), a holding company led by the Italian firm Loro Piana. A small proportion of the fibre is sold to British, Peruvian and Japanese companies (CONACS 2007). The fibre from Chile and Argentina is sold to the same trader company (Pelama Chubut) that also bought all the production from Bolivia in 2008. The number of textile companies operating in the vicuña market remains minimal, creating very few options for communities to obtain new clients and better deals.

The vicuña fibre market is an oligopsony with a few large buyers and a large number of sellers (the converse of an oligopoly, a market dominated by a few large suppliers). This market places the control of the terms of trade and most of the profits with the buyer, the oligopsonist (Ribot and Pelusso 2003). A common theoretical implication is that the price of the good is pushed down, which seems to be the case with vicuña fibre. INTA finally dropped the price of vicuña fibre in 2010 to USD \$700 after two years of having no bidders (Table 2).

Vicuña fibre prices have historically been related to factors such as: market demand; the bargaining power of the actors involved; actors' cash flow issues; volume of fibre stocked; number of channels for commercialization and the degree of corruption during biddings (Lichtenstein *et al.* 2002; Sahley *et al.* 2004; Brewin 2007). The volume produced is also very important, as communities or producers that manage few animals end up with no option but to sell the fibre to middlemen for relatively low prices.

Fibre processing

In broad terms, there are two types of vicuña goods: handicrafts or industrialized products. Locally, it is possible to buy hand-made *ponchos*, scarves and blankets produced by local artisans, mainly from illegal fibre (i.e. fibre that comes from poached animals). Traditional processing is done with legal fibre by only two cooperatives in Argentina. However, as most of the handicrafts sold in the region come from illegal fibre and tracing illegal fibre is very costly and inefficient, handicraft production is just not encouraged by government officials.

A commodity chain can be viewed as a series of transactions, beginning from the transfer of the raw product to the first stage processor, and ending with the sale of the finished product to the final consumer (Choraria 2007). Although more data on the intermediate stages of fibre processing are needed (e.g. cloth, washed fibre), data available shows a concentration of income in the later stages of the value chain (Table 3) so that the producer's share of the total value is very small.

The value of vicuña fibre increases with the level of processing. At the lower end is raw fibre, obtained after shearing the animals, which has no added value. At the other extreme is the production of industrial textiles. Raw fibre accounts for the highest volume of vicuña exports by Andean countries (Table 3). In Peru, two textile companies are also producing industrial textile products, but this only represents 14% of Peruvian vicuña exports (CONACS 2007). Most of the value-adding activities are concentrated in Italy by one company that buys more than 70% of vicuña fibre from Peru.

The revenues obtained from the transformation of raw material in Italy are very high. Assuming the market prices paid to communities in Peru or Bolivia in 2007 (i.e. USD \$380/kg), the cost in raw material for a vicuña scarf made from 250 gms of vicuña fibre that is sold for USD \$1,975 is, at most, USD \$95. According to these figures, producers get less than 4.8% of the price paid for the final product.

Economic and non-economic impacts on local communities

The impact of the commercialization of vicuña fibre on the economic development of the Andean communities who are responsible for its

management has proved to be very limited across the whole region (Stollen *et al.* 2009; Brewin 2007). In the case of Peru and Argentina, earnings from the production of fibre from captive vicuñas did not cover the costs of purchasing vicuña corrals. As a result, many communities and producers found themselves in debt to the government (Peru) or to a private company (in Argentina, producers with 24 vicuñas need 6 to 12 years to pay back the debt for the fencing material) and were unable to use the income from fibre for the benefit of the community. Furthermore, captive management involves additional opportunity costs in terms of labour and land. Management of wild vicuñas is preferable to captive management as it has the potential to incentivize species and habitat conservation, and has proved to be more economically viable.

According to Berkes (2010), benefits and incentives seem too narrowly conceived if we focus only on economic benefits. The OECD Development Assistance Committee (DAC) recognizes five key dimensions of poverty: economic, human, political, socio-culture and protective (OECD 2001). Using DAC's definition of poverty, vicuña management can address other dimensions of poverty. Vicuña management can provide non-monetary benefits such as strengthening local communities, revitalizing old traditions, creating relationships among communities, recuperating local knowledge, developing a framework for local participation, solidifying land claims, providing incentives to avoid migration to cities, alternative sources of income to communities that are usually forgotten by nation states, visibility for local and central governments as well as, opportunities for seeking credit, schools, health service, better roads, infrastructure and support for economic activities (Lichtenstein 2010).

DISCUSSION

The high international commercial value and world demand for vicuña products could potentially have a significant economic impact and act as a means for promoting poverty alleviation in the Andean region. However, as in many other conservation and development projects, economic benefits for local communities have proved elusive (Adams *et al.* 2004). Although goods made from vicuña fibre are sold at exorbitant prices on the international market, local people still fail to obtain significant economic benefits from the legal use of vicuñas.

The link between vicuña use and poverty alleviation is still facing the following challenges:

- Moving from "trade as usual" (with low commodity prices and high manufactured good prices) to trade schemes that increase the producer's share of total retail value;

Table 2. Evolution of vicuña fibre prices 2006-2009

	INTA Argentina (US\$/kg)	Bolivia (US\$/kg)	Chile (US\$/kg)	Peru (US\$/kg)
2006	896,50	380	670	365
2007	922,30	560	770	250-507
2008	no bidders	no buyers	650	350-415
2009	no bidders	430	430	350-415
Buyers	PC	PC/IVC	PC	IVC + various companies
Fibre commerce	INTA sells through public auction, ranch owners negotiate individually	ACOFIV (national indigenous association) sells whole lots through direct invitation	Cooperandino sells whole lots through direct invitation	Communities negotiate individually with middlemen or textile companies

Source: Proceedings of the XIV Technical Meeting of the Vicuña Convention 2010.

Table 3. Stages and countries involved in industrial fibre processing.

	Raw fibre	Pre-de-haired fibre	Dehaired	Yarns	Cloth	Clothes
Argentina	X	X	X			
Chile	X	X				
Bolivia	X	x				
Peru	X	X	X	x	x	x
Italy			X	X	X	X
Price range (2009)	\$350-430 per kg	\$430 per kg	\$650 per kg (producers) \$1342 per kg (middlemen)	\$250/ounce \$8,928/kg	?	Scarf: \$1418–\$9900, cardigan \$3560; overcoat: \$ 11,865, suit US\$35,460 ¹ -103,000 ²

Source: Country reports to the XIV Technical Meeting of the Vicuña Convention (Arica, April 2010). Prices are expressed in USD. ¹ Loro Piana shop New Bond Street, London, 2008, ² <http://valuesuit.com/news/the-most-expensive-suit-in-the-world-a-889.html>. The size of X indicates the relative volume produced.

- Developing initiatives that maximize benefits to local communities and minimize biological impacts to the species and habitat;
- Developing policies that tackle market failures, improve market access and ensure that markets work for local communities (instead of the communities working for the market);
- Developing a joint commercial strategy among Andean countries;
- Strengthening producer associations and creation of social enterprises;
- Capacity building for commercial engagement;
- Improving information exchange (e.g. prices, potential buyers) between countries and among producers;
- Generating added value at national and regional levels;
- Developing a market for handicrafts using legal fibre;
- Securing tenure over land and usufruct rights over vicuñas;
- Translating Article I of the Vicuña Convention into national laws and further developing the legal framework in order to deter textile companies and investors from buying land in areas with high vicuña density and becoming involved in vicuña fibre production;
- Detering new projects that seek to maximize production while threatening the conservation of this wild species, the exclusive rights of Andean communities and the spirit of the Vicuña Convention (i.e. pacovicuñas, captive management);
- Empowering local communities and improving political capabilities;
- Creating networks of partners with NGOs, universities, research centres, and donors;
- Controlling poaching and illegal fibre trade;
- Extending international coordination to control illegal fibre commerce and;
- Involving national and social actors that are willing to devise, operationalize and implement pro-poor policies.

In summary, in order for vicuña use to provide an opportunity for conservation and poverty alleviation, programmes should address the uneven distribution of benefits among stakeholders and devote more efforts towards the conservation of the species.

ACKNOWLEDGMENTS

I thank Dena Cator (IUCN) and two anonymous referees for providing helpful advice on the manuscript. Thanks to Fikret Berkes, my colleagues from the South American Camelid Specialist Group (IUCN SSC GECS), specially Nadine Renaudeau d'Arc and Pablo Carmanchahi for helpful discussion and Antonio Orosco and Daniel Maydana for their wonderful photos. Funding was provided by CONICET.

REFERENCES

- Adams, B. 2010. Biodiversity and poverty: a political perspective. Unpublished paper presented at the symposium: *Linking biodiversity conservation and poverty reduction: what, why and how?* London 28th and 29th April.
- Adams, W. M., R. Aveling, D. Brockington, B. Dickson, J. Elliot, J. Hutton, D. Roe, B. Vira, and W. Wolmer, 2004. Biodiversity conservation and the eradication of poverty. *Science* 306:1146–1149.
- Berkes, F. 2010. Community-based approaches for linking conservation with livelihood approaches. Unpublished paper presented at the symposium: *Linking biodiversity conservation and poverty reduction: what, why and how?* London 28th and 29th April.
- Brewin, L. 2007. *The Vicuña Industry in Peru: Has the vicuña lived up to its reputation as the gold of the Andes?* MSc. Globalisation and Latin American Development, Institute for the Study of the Americas.
- Choraria, J. 2007. Commodity value chains compression - coffee, cocoa and sugar. In: Grynberg, R and S. Newton (Eds). *Commodity prices and development*. Oxford University Press, New York. 136-159.
- CONACS, 2007. Informe a la XXIV Reunión Ordinaria del Convenio de la Vicuña. <http://www.camelidosgecs.com.ar>. Accessed June 2010.
- DFS (Dirección de Fauna Silvestre), 2008. Informe a la XXVII Reunión Ordinaria del Convenio de la Vicuña. Secretaría de Ambiente y Desarrollo Sustentable de la Nación Argentina.
- Foncodes, 2006. Focalización geográfica, Nuevo mapa de pobreza FONCODES 2006. <http://www.foncodes.gob.pe/mapapobreza/> (accessed June 20, 2010).
- Franklin, W.L. 1983. Contrasting socioecologies of South American wild camelids: the vicuña and the guanaco. Pp. 573-629 In J.F. Eisenberg and D.G. Kleiman, (Eds.) *Advances in the study of mammalian behavior*. Spec. Publ. Am. Soc. of Mammals. No. 7, Lawrence, KS.
- Hulme, D., and M. Murphree, (Eds.) 2001. *African Wildlife and Livelihoods: the Promise and Performance of Community conservation*. Oxford: James Currey Ltd. IBCE, 2009. Perfil de Mercado vicuña. “Evolucion del biocomercio en Bolivia: situacion actual y perspectivas”
- Kellert, S.R., I. Mehta, S.A. Ebbin, and L.L. Lichtenfeld, 2000. Community natural resource management: promise, rhetoric and reality. *Society and Natural Resources* 13:705–715.
- Laker, J., J. Baldo, Y. Arzamendia, and H.D. Yacobaccio, 2006. La vicuña en los Andes. In: *Investigación, conservación y manejo de vicuñas*, B. Vilá (Ed.), 37–50. Buenos Aires: Proyecto MACS, Universidad Nacional de Luján.
- Lichtenstein, G., F. Oribe, M. Grieg-Gran, and S. Mazzucchelli, 2002. Manejo comunitario de vicuñas en Perú. Estudio de caso del manejo comunitario de vida silvestre. *Poverty, Inequality and Environmental Series* No 2. London: IIED, Earthscan.
- Lichtenstein, G. 2006. Manejo de vicuñas en cautiverio: El modelo del CEA INTA Abrampampa. In *Investigación, conservación y manejo de vicuñas*, ed. B. Vilá, 133–146. Luján: Proyecto MACS, Universidad Nacional de Luján.
- Lichtenstein, G. 2010. Vicuña conservation and poverty alleviation? Andean communities and international fibre markets. *International Journal of the Commons*. Vol 4 (1): 100-121.
- McAllister, R.R.J., D. McNeill, I.J. Gordon, 2009. Legalizing markets and the consequences for poaching of wildlife species: The vicuña as a case study. *Journal of Environmental Management* 90: 120-130.
- OECD, 2001. The DAC guidelines: Poverty reduction. OECD, Paris.
- Perez, C., C. Nicklin, O. Dangles, S. Vanek, S. Sherwood, S. Halloy, K. Garret, G. Forbes, 2010. Climate change in the high Andes: Implications and adaptation strategies for small-scale farmers. *The International Journal of Environmental, Cultural, Economic and Social Sustainability* 6: 71-88.
- PNUD, 2008. “La Otra Frontera: Usos alternativos de los recursos naturales”, Informe sobre Desarrollo Humano, PNUD, La Paz, Bolivia.
- Proceedings of the Vicuña Convention, 2007. <http://www.camelidosgecs.com.ar>. (accessed June 2010).
- Proceedings of the XIV Technical Meeting of the Vicuña Convention, 2010. Unpublished country reports.
- Renaudeau d'Arc, N. 2005. *Community-based Conservation and Vicuña Management in the Bolivian Highlands*. PhD thesis, School of Development Studies, University of East Anglia.
- Ribot, J.C., and N.L. Pelusso. 2003. A theory of access. *Rural sociology* 68(2):153–181.
- Roe, D and J. Elliot, 2005. Poverty-conservation linkages: a conceptual framework. Poverty and Conservation Learning Group.
- Sahley, C., J. Torres, and J. Sanchez, 2004. Neoliberalism meets pre-Columbian tradition: Campesino communities and vicuña management in Andean Peru. *Culture and Agriculture* 26(1&2):9–17.
- 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):1421–1438.
- Sonogorwa, A.N. 1999. Community based wildlife management (CWM) in Tanzania, are the communities interested? *World Development* 27(12):2061–2079.
- Stollen, K.A., G. Lichtenstein, and N. Renaudeau d'Arc. 2009. Local participation in vicuña management. In: *The vicuña: the theory and practice of community based Wildlife management*, I. Gordon (Ed.), pp 81–96. New York: Springer.
- Urrutia, R. and M. Vuille, 2009. Climate change projections for the tropical Andes using a regional climate model: Temperature and precipitation simulations for the end of the 21st century. *Journal of Geophysical Research* 114: 1-15.
- Vilá, B. L. 2002. La silvicultura de las vicuñas, una característica esencial para su conservación y manejo. *Ecología Austral* 12(1):79–82.
- Western, D., and R.M. Wright. 1994. *Natural Connections: Perspectives in Community-Based Conservation*. Washington, DC: Island Press.
- Wheeler, J. and J. Laker. 2009. The vicuña in the Andean Altiplano. In: *The vicuña: the theory and practice of community based wildlife management*, I. Gordon (Ed.), 63–79. New York: Springer.

CLIMATE CHANGE

Special Issue
published in Biodiversity 9(3+4)2008
to purchase a copy
write: special@tc-biodiversity.org



published by
Tropical Conservancy
A charity working to
sustain and preserve
life on Earth

Biodiversity
ISSN 1488-8386
indexed by
Biosis, Cambridge
Scientific Abstracts,
Environment Abstracts,
Scopus &
Zoological Record

PARTNERSHIPS



YOU CAN HELP

- by
- becoming a *Biodiversity* Patron with a contribution of CA\$ 1,000.00 or greater, or
 - subscribing to *Biodiversity*, or
 - making a donation

Please send contributions to:
Tropical Conservancy
Charity's Business No. 89518 7763 RR0001
94 Four Seasons Drive
Ottawa, Ontario, Canada K2E 7S1

All contributions (Canada & USA) are tax deductible.

SUBSCRIBE TO Biodiversity

Biodiversity, a quarterly journal, focuses on biological issues essential to sustaining and preserving life on Earth.

Biodiversity is distributed worldwide to a broad readership of scientists, researchers, educators, students, policy makers and informed citizens. It includes:

- Articles by specialists from around the world;
- Regular features: • *Blossoming Treasures of Biodiversity* and *Animal Treasury* by world-renowned botanists and zoologists - an in-depth look at selected species and their value to food, agriculture, medicine, aesthetics, ecosystems, and aspects contributing to the welfare of humanity; • *Biodiversity News*: current news of discoveries, conservation, protection, and sustainable development of biodiversity; • *Book Reviews*; and • *Forum*: space for readers and specialists to express their opinions and views.

Biodiversity's format: 52 (8"x11") pages of acid free, recycled 25 lb off white paper; text and graphics printed using vegetable oil ink.

"Most people do not know what biodiversity means, let alone why it is important. The source of all that humanity needs and uses is biodiversity. This journal is desperately needed to inform and guide us toward ecological balance." DAVID SUZUKI

SUBSCRIPTION

Individuals: US\$ 30.00 /1 year (4 issues)
Institutions: US\$ 60.00 /1 year (4 issues)

PLUS POSTAGE: ♦ From USA: Add US\$ 6.00 postage ♦ From other countries: Add US\$ 10.00 postage ♦ From CANADA: Please pay dollar amounts given above in CA\$ (e.g. Individuals: CA\$ 30.00; Institutions: CA\$ 60.00).

BACK ISSUES: Individuals: US\$ 9.00/single issue; US\$ 30.00/volume (4 issues). Institutions: US\$ 18.00/single issue; US\$ 60.00/volume (4 issues). Plus postage: Canada-USA: US\$ 1.50/single issue; US\$ 6.00/volume. Other countries: US\$ 2.50/single issue; US\$ 10.00 /volume (4 issues).

- NEW SUBSCRIPTION GIFT SUBSCRIPTION RENEWAL
- Cheque in Canadian or US funds enclosed
- Money Order /or Bank Draft in US funds enclosed
* Please make cheque payable to Tropical Conservancy.
- Bill me later

Subscribe online

➔ at <http://www.tc-biodiversity.org/subscription.php>

Biodiversity
is published quarterly by
TROPICAL CONSERVANCY
94 Four Seasons Drive
Ottawa, Ontario, Canada K2E 7S1
Email: admin@tc-biodiversity.org

To Contribute Articles
Contact:
STEPHEN AITKEN, Managing Editor
94 Four Seasons Drive
Ottawa, Ontario, Canada K2E 7S1
Email: aitken@tc-biodiversity.org

Website: <http://www.tc-biodiversity.org>

Printed in Canada at VN Printing, Ottawa,
on paper with post-consumer recycled content and with vegetable oil

Published by
Tropical Conservancy
94 Four Seasons Drive, Ottawa, Ontario, Canada K2E 7S1

BIODIVERSITY

Volume 11, Numbers 1 & 2, 2010



Vicuña roundup in Sajama National Park, Bolivia. © Daniel Maydana (see article page 19).



**TROPICAL
CONSERVANCY**

Working to Conserve World
Biodiversity & Environment

ISSN 1488-8386



2-3

Individual \$20.00
Institution \$30.00