R8362 VINCOSER

Validation and communication of a community-led mechanism for livelihood improvement of remote marginalised communities in Bolivia

A collaborative project with staff from PROMETA (Tarija), the School of Geography of the University of Leeds and the University of Greenwich, Natural Resources Institute.

TRENDS IN LIVELIHOOD CHANGES IN ASSOCIATION WITH RECENT TECHNICAL ACTIONS[1]

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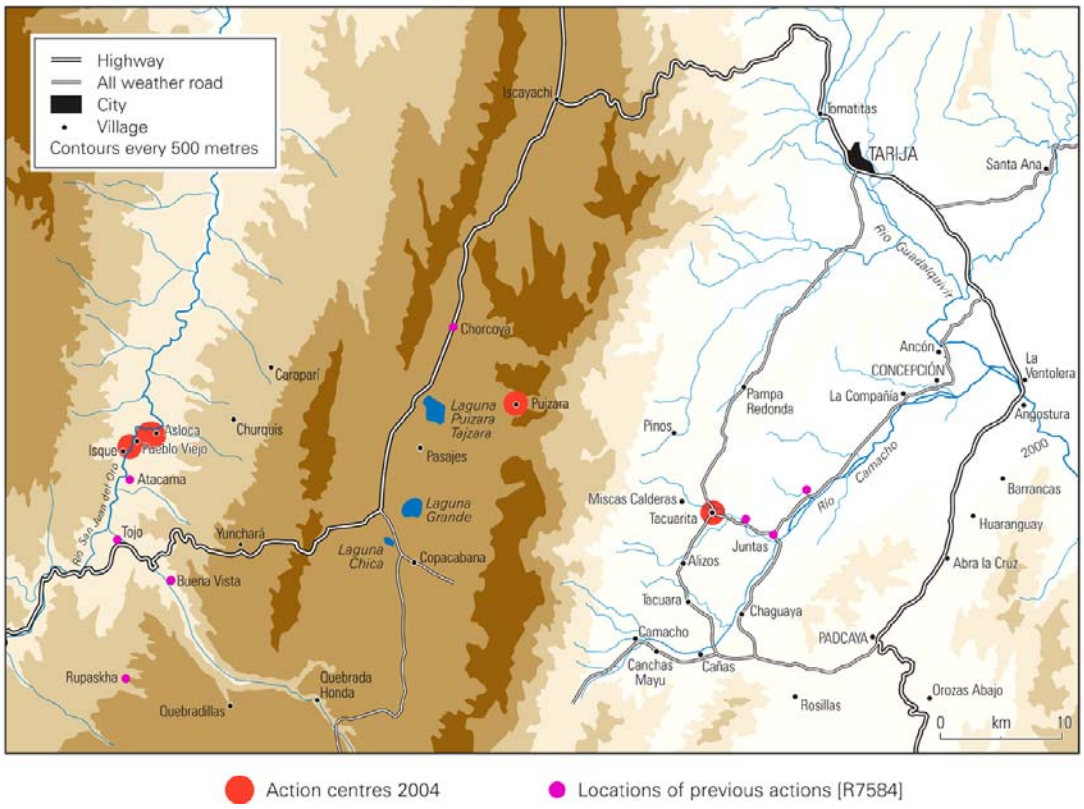
Introduction

During 2004, the work of local professionals [LPs] was concentrated in three communities adjacent to areas where earlier work in association with R7584 had taken place (see Map 1). In one of the communities, Tacuarita, contact had already been made and work started in 2001-2002 but in the other two areas – Pueblo Viejo and Pujzara – no previous visits had been made.



Map 1

This paper reports on work undertaken between March 2004 and March 2005, a period of 12 months. During this time, the mechanism of community-led articulation of needs, especially related to natural resource use, was applied by and guided the actions of local professionals in their collaboration with communities. The characteristics of the communities are described and the structure of livelihood strategies of households in different socio-economic strata. The aim of this report is to present preliminary findings on the trends in livelihood changes that can be detected that are associated with the current

actions of the LPs and their possible impact of households of different socio-economic status[2].

This paper is based on reporting by LPs on the stages of their work with communities and on 32 semi-structured interviews conducted individually by the LPs with about ten households in each community conducted during the week of 8 November 2004. The interviews focussed on the household's livelihood strategy, the principal threats to their livelihoods, their responses to the work of the LPs with them, their hopes for the future and their views on who /how the poorest in the community can best be helped (See Appendices 1 and 2). Important information used to complement the interview data was derived from the community workshops during which members of the community developed their vision of the direction in which they wished their community to progress in the future.

Tacuarita, Pujzara and Pueblo Viejo

Tacuarita (1900 m) and Pueblo Viejo (2550 m.) are located in the temperate valleys that border the eastern Andes while Pujzara (3700 m) is located on the part of the Altiplano – the high plateaux that characterise the Central Andes – that lies in Tarija department (Map 1). Tacuarita is crossed by an all-weather highway which enables access to the city of Tarija 1-2 hours away by the lorries which offer a daily service except when rains make the rivers impassable. Pueblo Viejo is located far from Tarija on the western boundary of the department. It is located on an all-weather road running north-south along the valley of the Río San Juan del Oro. This road links to the north with the main highway between Tarija and Potosí and the northern parts of Bolivia (2-3 hours away by infrequent vehicles), and to the south (about 9 kms.) with the major highway enabling regular access to Tarija (3-4 hours by bus or lorry) or to Villazón (1-2 hours by bus) on the frontier with Argentina. Pujzara is within sight of the main highway between Tarija and Villazón (5 kms), traversed by infrequent lorries and several daily buses and about 2 hours travel from Tarija (see Map 1).

[2] The team of local professionals comprised Raimundo Montaño (horticulturalist), Patricia Ruíz (veterinarian) and María Isabel Cano (support person).

Tacuarita lies in the valley bottom drained by the Río Alizos and tributaries and the surrounding land comprises river terraces, some of which have clayey soils, frequently eroded and covered with vegetation dominated by grasses and the spiny churqui (*Acacia caven*) which provides shade, fuel wood, and fence material and whose seeds (*cholonca*) and leaves are eaten by goats. The rivers flowing from the cordillera provide water for irrigation year-round but irrigation systems tend to be rudimentary and are subject to regular destruction by seasonal floods. The water from Alizos' irrigation system which reaches Campo Carreras, bordering Tacuarita, has some surplus water which is used by households with land nearby. Cattle are taken to graze outside the community both on high pastures on nearby hills and as high as 3000 metres on the mountain sides during the dry season. Those with more than about 15-25 head of cattle also may take them during the dry season to graze several days walk away on the slopes of the parallel ranges of hills bordering the Chaco[3]. Grazing for cattle, sheep and goats is available both in fenced areas close to dwellings and on surrounding hillsides where communal tenure allows access to all.

In Tacuarita, the principal needs expressed in the community's vision of its future, identified by people during workshops were related to how existing projects (CARE and VINCOSER) could help them and priority was given to improved fruit trees, livestock health, forage crops, better quality maize seed, bee-keeping, quality laying hens and the planting of windbreaks. The principal hazards limiting agricultural production mentioned at community meetings and during interviews were seasonal drought, hail and frost as well as rain storms accompanied by high winds that can destroy growing maize.

[3] See Jamie Fairbairn, David Preston, Narel Paniagua, Glenn Maas, with Martha Guevara and Stephan Beck, 2000, ***Grazing and environmental change on the Tarija altiplano***, INCO-DC Project Working Paper 00/04, Marianela Subieta Frias, 1996, ***Efectos del pastoreo y ramoneo sobre la vegetación de una área de la cuenca baja del río Camacho***, Tesis de Grado, Licenciado en Biología, Facultad de Ciencias Puras y Naturales, Carrera de Biología, Universidad Mayor de San Andrés, and C Vacaflores et al. , 2003, ***Trashumancia ganadera en Tarija***, La Paz: Fundación PIEB.

Pujzara lies on the slopes of the high plateau and its extensive communal grazing land ranges in height between 3600 and 4000 metres. Rainfall is low (less than 350 mm) and crop-growing is only possible on the lower hill-slopes where frost risk is least and where some soil moisture (from springs or small-scale irrigation) allows crop growth. Drainage is towards the saline lakes that lie in the centre of the shallow valley that comprises this part of the altiplano. Some areas of *bofedales* (humid spring sites) exist where year-round grazing is possible. Some grazing areas are walled or fenced but most grazing is on communal land within which households have informal priority grazing areas. Cattle are frequently taken over the mountain crest to the east to areas moistened by clouds where adequate grazing is available year-round.

The community's vision of its future is strongly influenced by the ever-present donor agencies, mainly NGOs, but at a personal and household level their vision of the future includes wanting more money invested in projects from which they personally may benefit: collective community wellbeing has a generally lower priority. One informant commented that the community was not united and individualism is rife. Many people identified very clearly their priority for getting rid of their dependence on NGOs and 'projects' in general and learning enough about how to overcome everyday problems, such as disease and other threats to crops and livestock. The principal natural hazards are droughts, which affect sheep and dramatically increase lamb mortality, and frosts affecting potatoes and broad beans.

The area with which the team worked in **Pueblo Viejo** includes the nearby small community of Asloca and also Izque on the opposite side of the Río San del Oro valley in the department of Potosí. Considerable movement of people takes place between the three communities, to attend school [in Tojo], and exchange labour but each community has its own organizational structure. The land available for making a living is morphologically similar. The floor of the valley of the San Juan river has water for irrigation available from the main river and also from some side valleys only one of which has water available all year round. The river water is sometimes highly contaminated by mining waste from mines upstream, around Tupiza, in particular following the first

rains of the wet season. Hillsides to the east are covered with scrub and columnar cacti (*cardones*) that offer grazing particularly for goats – that eat foliage and seed pods – as well as sheep. Most grazing areas away from the main valley floor are communally owned.

The people of the three localities included in Pueblo Viejo agreed that their vision of the future included better services – in particular a school and a medical centre access to drinking water – as well as better access roads to be able to cross rivers at all times. Strong priority was also given to strengthening community organization, creating a women's group (Centro de Madres) as well as a strong peasant union (*sindicato*). High priority was also given to a better understanding of plant and animal diseases, ways of processing their fruit (grapes, peaches and quinces) and of improving their production of pigs for the lively frontier market at Villazón.

Community workshops and meetings also identified two other important factors that limit the maintenance of a satisfactory quality of life in the three areas:

- Extreme climatic hazards leading to regular loss of harvests and/or livestock
- Access to sufficient cultivable land to support a household. In some areas, land belonging to absent families is unused.

Some respondents also remarked on the low levels of community cohesion expressed in variably levels of co-operation, difficulty in communicating needs to inter-community organizations. This may also be a function of the regular absence of people for long periods while working in Tarija, Santa Cruz or, most commonly, Argentina.

Social stratification and livelihood strategies

In all the areas in which work was conducted marked differences existed in the livelihood strategies of households that occupy distinct social strata. Stratification, using community criteria, is generally associated with the number of animals owned and access to land resources. Although in all communities extensive areas of communal land occur to which all have equal

access, cultivable land, in particular with water for irrigation, is of crucial importance. Those with no land, either because they still live with their parents or for other reasons may have access to other people's land which they work as sharecroppers. Criteria used in the communities for ascribing socio-economic category are summarised in the table below (Table 1).

Table 1 *Livelihood and socio-economic status*

Locality & social-economic stratum		Livestock	Land	Livelihood strategy
Tacuarita	High	+25 cattle 20-50 sheep/goats	+0.5 ha. with water	Agriculture & livestock equally Children in Argentina
	Middle	20-30 cattle ≤50 sheep/goats	-0.5 ha. with water	Agriculture and livestock; working locally
	Low	≤20 cattle ≤30 sheep/goats	No land with water	Agriculture, working for wages, locally or away
Pujzara	High	+ 100 sheep + 5 llamas +5 cattle	With irrigation	Livestock, agriculture, weaving Work for wages. Sell animal dung
	Middle	50-100 sheep 0-7 llamas 2-5 cattle	Cult. Land but little water	Livestock, weaving, crops & working away
	Low	≤40 sheep	Maybe no cult. Land with water	Livestock, weaving, Agriculture, work away
Pueblo Viejo	High	+ 20 pigs 25-40 sheep & goats, 2-5 cows	1.2 ha. with water	Pigs, fruit, grapes, vegetables, making wine, maybe with a shop
	Middle	5-20 pigs some cattle 15-40 sheep & goats	0.2-2.5 ha. with water	Pigs, maize & fruit, grapes animals, vegetables, alfalfa, making wine & singani.
	Low	0-7 pigs, 0-55 sheep, 0-2 cows	None owned to cultivate. Sometimes 0.1-0.8 ha. rented	Pigs, maize & fruit, vegetables, working locally

Table 2 *Principal components of livelihood strategies*

(mentions per household)

Pujzara	Livestock		Fruit		Maize & other crops		Weaving etc	Waged work		
	Consumption.	Sale/exchange	Cons.	sale	Cons.	sale		here	Tarija	away
High N=2	2				3	1			1	1
Middle N=4	2	2			4	2	4	1	3	
Low	5	1			2	2	5	1	3	

N=5										

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Pueblo Viejo	Livestock		Fruit		Maize & other crops		Weaving wine, shop	Waged work		
	consumption	Sale/exchange	Cons.	sale	Cons.	sale		here	Tarija	away
High N=2	1	3		3	5		3			
Middle N=4	2		4	1	5	2	3			
Low N=5	5		2	1	5	3		5		

Tacuarita	Livestock		Fruit		Maize & other crops		Weaving etc	Waged work		
	Cons	Sale/exch	cons	sale	cons	sale		here	Tarija	away
High N=3	3	4			5					
Middle N=1	2	1			3					
Low N=6	3	3			9	1	1	2		

For all social strata in all localities both agriculture and livestock are of prime importance for livelihoods. Many people said that it was impossible to say which was more important because it varied from one season to another and between drought and normal years. Differences between the strategies of each stratum lay not in whether or not households engaged in livestock rearing and/or agriculture but the number of livestock and the area of land available. For many households, particularly Pujzara, working for wages, whether in Argentina, or in the city of Tarija or just within the community, was an important source of cash income to buy necessities of life and to buy clothing, tools and medication. Working elsewhere for cash was mainly practised by people in the medium and lower strata but was more common among the poorer households. In respect of non-agricultural work, weaving was important for people in the middle and lower social strata in Pujzara.

It is the total stock of capitals available to each household and the security of access to them that is most important with regard to livelihood security. Thus a young household that farms a relative's land may experience comparative security and, if they have their own animals plus an assured personal network for the sale or exchange of goods, they are not necessarily less advantaged than a household with a similar area of land of their own. This is particularly true of households where one son or daughter (or grandson/grand-daughter) has stayed to care for their old folk but with the expectation that they will subsequently inherit much of their land and livestock.

It is necessary to recognise that socio-economic stratification relates to the position of a household in the normal biological cycle from youth to old age. For instance, many young people have a period of relative poverty when the have no land of their own, young children unable to be part of the household labour force and parents still able to work and needing all their land. Analysing the ages of heads of household interviewed in November in the three communities, the mean ages varied between 62 for the upper stratum and 39 for the lower stratum (Table 3).

Table 3 *Mean age of heads of household in case study communities*

Stratum	Yrs.
High	62
Middle	47
Low	39

The following are important components of livelihood strategies:

- Rearing livestock involves keeping small animals (sheep and goats), that are robust and that can survive on poor-quality grazing. They are sold to raise small amounts of capital and for domestic consumption whenever the need arises. They require supervision on a daily basis but this can be done by children. Households in all socio-economic categories have some small animals. Better-off households have more small animals and, in Tacuarita and Pujzara, more cattle. Cattle are worth more both in capital value and as a source of status, and they

can also be taken to distant pastures and left untended for periods of several weeks. Pigs are kept by some households in all categories. They need regular feeding but grow rapidly and can be sold when cash is needed. Most households in Pueblo Viejo keep pigs in corrals; this allows better health care and enables monitoring of diet. Such pigs are sold for cash and rarely consumed locally: they are kept by most households irrespective of their socio-economic level.

- Many crops are grown for domestic consumption, in particular maize, potatoes and broad beans (*habas*), but also for sale or exchange when the need arises. A range of vegetables – lettuce, tomatoes, herbs etc. – is grown, as well as alfalfa (in the Río San Juan valley) which is used as a feed crop but also sold under contract for seed. Fruit trees and grape vines (both grown on trellises and climbing up *molle* trees) are present in Tacuarita and Pueblo Viejo. They can only grow well with some irrigation and thus occur only on part of the cultivated area in each locality. Peaches are sold when fresh but they are also dried and used during the year for making drinks. In Tacuarita there are no grape vines and the few fruit trees are old and poorly cared for and produce little. In Pueblo Viejo fruit have long been important and many households have quinces, peaches and a number of grape vines. Grapes are sold to wholesalers who in turn sell to the major wineries in Tarija. They are used to make wine and *singani* (brandy) and are also dried for local consumption..
- Households in all socio-economic strata, but especially the middle and lower strata, sell their labour, whether it uses a particular skill (for plumbing or bricklaying) or an existing resource such as a team of oxen for ploughing. Within communities this is usually paid for in cash but also in exchange for similar work at a later time (*tornavuelta*). Both men and women go to work elsewhere, to Tarija, Bermejo, Santa Cruz or Argentina during the slack season to earn money to support the household. Absence during this period is also important because it reduces the level of food consumption at home during periods sometimes marked by extreme food scarcity. This was not mentioned by informants but should logically be a factor. Young people may be

particularly eager to work away to experience a freer social environment away from parental supervision[4]. They often spend a substantial part of their earnings and cannot be relied upon to return with substantial savings as many informants reported. Only two interviewees cited children's migrant earnings as a critical component of livelihoods. Earnings of an adult senior household member are a basic source of capital for survival, as reported by four households. Such earnings are most commonly but not exclusively important to poorer households. Better-off households are less likely to sell their labour elsewhere but are more likely to have children employed, often in white-collar jobs in cities in Bolivia or Argentina, although such children contribute little to the household economy and, during education or training, are also sometimes a drain on it.

- Selling value-added produce, such as bread, pastries or meals is a common female occupation, particularly among the poorer households but solely where a highway or pilgrimage route (as in Tacuarita) leads many people to pass by. Some of the poorest households are among those who prepare drinks and pastries to sell at their community meetings. Shops are part of the livelihood of those with available financial capital.
- Weaving is important in Pujzara and engaged in particularly by men and women in the middle and lower socio-economic strata. It is a source of cash income and was originally organised by a Tarija NGO but is now largely independent. Weavings are also sold at the Argentine border in Villazón.

[4] This is discussed at length, based on data from Juntas in S Punch, 1996, Rural emigration as a livelihood strategy for young people in southern Bolivia. Escape or necessity? University of Leeds, *Farmer strategies and production systems in fragile environments in mountainous areas of Latin America Project*, Working Paper 96/02. A revised version of this paper was published in Spanish in S Punch, 2001, La emigración como estrategia para jóvenes: escape o expulsión?, in S Beck, N Paniagua and D Preston (eds.), Historia, ambiente y sociedad en Tarija, Bolivia, [La Paz: Instituto de Ecología], 123-144. See also, based on research in an area north of the Camacho valley in Tarija, A Hinojosa, L Pérez and G Cortes, 2000, Idas y venidas. Campesinos Tarijeños en el norte argentino, La Paz: PIEB.

4. Natural hazards threatening household and individual security

The uptake of technical actions developed during previous NRSP research in this region was seriously hampered by climatic events that occur periodically and jeopardise production. Although such events occur frequently they are impossible to avoid and household strategies need resilience to withstand them.

Hail destroys both tree and field crops and is localised, rarely affecting a whole community. Households with land in widely separated localities may be better able to withstand their effects but only those with more than average land resources are likely to be in this situation. Frost is an important hazard for potatoes and broad [fava] beans and it is less localised in its occurrence than hail. Frosts are widespread and some degree of resistance to frost can be achieved by planting crop varieties that are more resistant to frost or whose cycle of growth is shorter, thereby minimising the likelihood of being affected.

Drought is the most widespread climatic hazard and often but not always occurs in association with climatic cycles related to the global circulation variations – known as the El Niño – Southern Oscillation (ENSO) effect – although it is less marked on the margins of the Andes[5]. Droughts affect the early sowing of potatoes and maize and livestock, in particular sheep one of whose lambing period coincides with the normal beginning of the wet season. Transhumant cattle (usually belonging to households with more than average numbers of animals) avoid the worst effects of drought by grazing the upper hillsides on their return from the eastern hills before returning to the lower slopes once rains have enabled pasture re-growth. Alternative sources of fodder, through silage making, storing fodder or fenced pasture land, are not common.

[5] Preston, D., 2000, The Southern Oscillation and rainfall in SW Tarija, *Technical Report* R7584 [available in Spanish as La Oscilación del Sur y la pluviosidad en el sudoeste de Tarija, in S Beck, N Paniagua and D Preston (eds.), **Historia, ambiente y sociedad en Tarija, Bolivia** (La Paz: Instituto de Ecología) pp 41-46]

Although such hazards are frequently experienced in conjunction with new practices being tested, the failure of a harvest as a result of a specific climatic event is discouraging to farmers. Those households most vulnerable to these hazards are those with limited livelihood strategies, growing few crops in few places and without any or many animals. However those with no land can move elsewhere with little hindrance. If investment of extra time in better care for fruit trees, potatoes or beans is lost as a result of a frost, hailstorm or exceptional drought, it is understandable that some farmers, especially those whose labour and cash resources are limited, feel discouraged from trying the new potato variety or careful disease control in peach trees once more.

5. Technical actions

Technical actions in which LPs engaged were an outcome of consultations with each community through meetings and workshops as outlined in an earlier Working Paper[6]. The purpose of these was to identify actions that responded to the community's view of how it should attempt to change in order to match its vision of the future with reality and to make use of the capabilities of the local professionals in particular to address natural resource issues. Although there were similarities in the actions undertaken in each community, there were also important differences that reflected community priorities and the ecological situation of each community. It must be recognised that, while a community workshop may develop a genuine vision of what is sought, actions may also be influenced by the known expertise of the local professionals helping the development of the community action plan.

A second issue is the extent to which actions can respond to the situations of people in very different socio-economic categories. In all communities livestock were widely kept and internal and external parasites were universally associated with commonly mentioned diseases. Thus, while the treatment might be modified to respond to the economic circumstances of the household (for instance by proposing different frequencies of treatment) this category of veterinary action was universally appropriate. The only exception was that

[6] de la Fuente, T. 2004, A mechanism linking the demand for and supply of farming information and services, *VINCOSER Working Paper 04/01*

some people with large numbers of livestock were already aware of the importance of de-worming and some practised it regularly. Project staff engaged in work with locality groups of farmers and learning to identify problems and how to tackle them was as important as actually treating livestock. A range of actions were usually developed in order that some of them might be appropriate to the resources of each participating household.

Table 4 *Principal actions started by LPs*

Locality	Livestock	Crops
Tacuarita	Disease diagnosis & methods of treatment De-worming Formation of working groups with medicine chest	Fruit tree care, grafting Vegetable growing & care Improve maize, potatoes Trees for windbreaks
Pujzara	Disease diagnosis & methods of treatment De-worming Formation of working groups with medicine chest	Quality seed potatoes Forage crops experiment, barley, alfalfa, quinoa, tarwi, cañahua
Pueblo Viejo	Disease diagnosis & methods of treatment De-worming Formation of working groups with medicine chest	Nurseries for fruit trees and vines Fruit tree care, grafting

It is important to note that responses relating to field crops were very speculative since the wet season/growing season had not started at the time of field interviews in November.

A review of records of interviews with community members suggested that the benefits of their experience of working with the LPs might be categorised in the following ways:

- Acquiring knowledge that would enable them to understand a particular situation – diagnosing a disease, recognising a pest affecting a specific crop, knowing which diseases/pests occurred at particular times of the year or in association with what sort of weather; knowing how to administer an injection, spray trees or plants, where and how to prune fruit trees, to graft a fruit tree shoot etc.
- Knowing what sort of treatment to use, the most suitable chemical or other intervention, how to acquire and store it and what applicator to use. This knowledge only has value when associated with an appropriate input that has to be acquired.

- Understanding the broader environmental context of actions and the need for collective action and other associated work, such as the need to de-worm domestic animals and people as well as livestock, the need to control fruit tree pests collectively to avoid the actions of some being in vain when others take no such action and pests multiply.

Technical actions addressing crucial components of the livelihoods were associated with the use of livestock and the cultivation of crops, both annual and perennial (principally grape vines or fruit trees). Actions relating to livestock comprised the identification and treatment of the most important diseases (intestinal parasites and a range of other diseases), tuition on methods of applying medication – principally injecting animals, especially for de-worming - and discussing ways of improving animal health through changes in methods of retaining animals in corrals or pens and pasture management. In Tacuarita this concerned cattle and, to a lesser extent, goats and sheep. In Chorcoya actions focussed principally but not solely on sheep and Pueblo Viejo had cattle, sheep and goats in small numbers but pig rearing was a particularly important source of income for a number of households and veterinary actions laid emphasis on the conditions for optimal health.

Agricultural actions included the experimental cultivation of feed crops for livestock both in the valleys and on the altiplano as well as experiments with the cultivation of crop varieties that were better able to minimise risk of frost. Plant nurseries were established in Tacuarita and are being established in Pueblo Viejo to develop small trees to be grown from either seed or cuttings for fruit production (grape vines or peaches in particular), for protection from strong winds or flooding. The principles of disease identification and treatment for fruit trees and crops were taught at workshops and illustrated leaflets embodying that information were produced and distributed.

In each community collective decisions were made about the formation of working groups through which appropriate actions would be carried out. In most cases these groups were formed by locality and each group nominated a leader who would – in the case of the veterinary medicine store – manage

group resources, organise collective action where necessary and inform members absent from any workshops or meetings of useful information needed to pursue the various actions. As part of the veterinary work a store of medicines was given to each working group and members paid for the use of medicines in order to accumulate cash to replace the stock. This appeared to be working correctly.

6. Evaluation of technical actions

Technical actions and the development of each community's view of what it sought for its future were reported regularly by field staff. Their reports identified households participating and their basic socio-demographic characteristics. From the start households were assigned to a socio-economic stratum using locally recognised criteria. This also facilitated monitoring that households of all strata were involved in the workshops and actions.

During November 2004 visits were made to the three communities by the local professionals – Raimundo Montaño, Patricia Ruíz and María Isabel Cano – and David Preston. A sample of about ten households in each community were visited and interviewed in order to record their view of the work so far and to attempt to obtain their frank assessment of it. A total of 32 semi-structured interviews were conducted according to an agreed schedule.

Results

- There was a positive assessment of the benefits of information transfer by LPs and a sound learning experience has been achieved by most participants that can benefit people of all social strata whatever their access to resources. Those in the lowest stratum in all three communities ranked highly the learning experience in the work with LPs. Several individuals from poorer households in each community mentioned being able to or having carried out technical veterinary actions for others for payment or non-pecuniary benefit. Typical

comments on the learning were 'so great to learn'[7] , or we liked 'the way we were taught'[8]

- A tangential outcome of the strategy for helping communities to identify their collective priorities was appreciation of the benefit of the meetings to enable community members to debate matters of common interest. One commented that "the games help us feel together, this is a very 'un-together' community, we need these sorts of things[9]".
- The strong appreciation of livestock actions and their visible results by households in each stratum in each of the communities reflected the importance of livestock in household strategies and the immediacy and visibility of results of actions. Several people interviewed mentioned their animals looking better after treatment.
- There was general confidence in likely positive outcomes of actions relating to trials on vegetables and new varieties of common crops; relatively high expectation of the results of improved fruit tree care and the establishment of nurseries through which tree quality may be improved.

An analysis of the nature of responses of households according to their socio-economic position showed interesting differences between strata (Table 5). Actions directed at livestock were most strongly valued by the better-off, who had largest numbers of animals. However the methods of learning – involving workshops, detailed explanations, sometimes laboratory analysis of diseased livestock and distribution of explanatory sheets – were strongly valued by all three strata.

Table 5 *Action content most frequently mentioned*
(Score in %)

Stratum	Veterinary actions	Methods of learning	Agricultural actions	N=
A	50	30	20	10
B	35	27	38	26
C	34	29	37	41

Percentage of the mentions of each category of action in response to a request for comments on which collective actions farmers liked most.

[7] 'Es tan lindo aprender'
[8] 'la forma como nos enseñan'
[9] 'los juegos nos unen más, es una comunidad muy separada necesitamos de esto'

7. Trends in changes in livelihoods

After twelve months' work during which good relations have been established by the LPs in all communities, positive outcomes for most actions have been noted by many of the people interviewed. These observations and expectations can be conflated to identify trends whose importance to livelihoods will vary according to the livelihood strategy of each household. The most obvious change is the improvement of the condition of livestock after de-worming and other treatment. Since livestock are an important physical capital resource, such an improvement will strengthen livelihoods.

Tendencies for livelihood changes

Some generalisations are possible on the expected directions of change by each socio-economic stratum in the communities with which LPs have worked on the basis of the November interview data and subsequent reports[10] Rainfall during December in the Tarija valleys and the Altiplano has been average and drought stress has diminished since the period of field work on which this report is partly based. Communities in the Río San Juan del Oro are still very short of water. The probability of normal plant and animal growth during the 12 month period is thus increased except in the Río San Juan valley..

Further trends will be observed according to the socio-economic stratum to which each household may be assigned. The best-off households have diversified livelihood strategies that enable them to benefit from the complete range of activities promoted in association with all community productive activities. They have most livestock for which de-worming and other veterinary care is well justified and they all were confident of value of continuing to apply their new knowledge.

Middle-range households anticipated benefits from a wide range of activities and foresaw benefits from improving fruit production (especially Pueblo Viejo) and more effective disease control for livestock for both domestic

[10] Montaño, R and Ruíz, P, 2004, Pujzara: Informe agrícola-veterinario, etapa de acción, Informe Técnico, and Ruíz, P., 2005, Informe veterinario mes de enero, Informe Técnico

consumption and sale (all three communities). In Pueblo Viejo, for example, households mentioned looking forward to improving production (and by implication health) of pigs, grape vines and tree fruit.

The poorer households could foresee improvements in both their production and earning capacity through use of new techniques of disease control and experimentation with forage crops, new fruit tree propagation and, in several cases, vegetable production for their own consumption and possibly for sale. It was noticeable that this category of households mentioned their appreciation of what they had learned and of the group work as well as the possibility of working for others, applying the new knowledge, as part of their view of the future.

The range of new practices ensures that activities carried out by women and men are equally benefited although in communities such as Pueblo Viejo, where women have an important role in the community, they will derive particular benefit. Although the better-off households may benefit disproportionately from improved management practices because of their access to a wider range of capitals and thus be more able to overcome climate hazards, poorer households should derive important benefits from lower livestock mortality and the opportunity to work for those with more livestock and cultivated land and a shortage of labour. Various middle and poor households mentioned the importance of having a surplus to trade at local fairs which retain an important role in the region.

All households interviewed, without exception, agreed that the work had focused on what were important priorities for all households. Immediate positive outcomes had been noted with respect of de-worming livestock which will obviously have a positive future impact on livelihoods of all households with livestock. Responses to a question about the likelihood of actions being continued in the longer term were all positive with regard to veterinary work and the need for a continuous programme of disease diagnosis and treatment, in particular de-worming, was recognised. Some, however, were

realistic in their recognition that not all would continue with the actions but they believed than many would.

8. Conclusions

After such a short period of work, starting just before winter, at a time when no harvest has occurred that has been influenced by technical actions, the detection of trends in livelihood change is inevitably tentative. The generally positive experiences with initial veterinary actions among all households results in a generally positive view of the future outcomes of the work of local professionals.

An important finding of this research is the importance attached to the quality of the learning process. That this was remarked on by people from households in all strata further underlines its importance. The acquisition of knowledge that relates to several aspects of livelihoods adds to the stock of human capital and is a resource that can be used at any time and in various ways – to improve the quality of ones own physical resources and, for those whose physical resources are limited, to earn money by using such knowledge for the benefit of others.

The experience of using the community-led mechanism to elicit deep-seated community needs enabled LPs to consider what conscious and unconscious changes in the mechanism were introduced and their relative success. The importance of the ability to listen to local people, of respecting their opinions and developing a close personal relationship has enabled the acquisition of deeper insights into ways of strengthening livelihoods.

Conclusions

After such a short period of work, starting just before winter, at a time when no harvest has occurred that has been influenced by technical actions, the detection of trends in livelihood change is inevitably tentative. The generally positive experiences with initial veterinary actions among all households results in a generally positive view of the future outcomes of the work of local professionals.

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Appendices

Appendix 1

Guía de entrevistas – 8 de noviembre

Queremos hablar un rato sobe lo que se han hecho hasta ahora en la comunidad con nosotros y como se espera que le puede ayudar

.

[Basic data on household interviewed were pasted from community database]

1. Que son las cosas nuevas que se ha hecho (o que piensa hacer) después de los talleres comunales aquí?

Qué acción o técnica nueva?	Por qué está importante para Uds.? Van experimentar con esto?
1.	
2.	
3.	

2. Para el sustento de la familia qué cosa tiene más importancia? Apunta en orden de importancia: 1,2 3 etc.

Ganadería	
Agricultura	
Artesanía	
Lo que ganan de salir trabajar en Argentina	
Jornales	
[otro]	

3. En los últimos años que mas le ha perjudicado su vida (como sequías, riadas, precios bajos en el mercado, falta de mano de obra?

4. Cuentan Uds. con otras formas de ingresos para vivir (*Como dinero de los hijos trabando en otro lugar?, trabajo de algún oficio)*

5. Le ha gustado que hayamos venido aquí para trabajar con Uds.? Qué más ha gustado de este trabajo, los talleres, trabajos prácticos?

6. Cómo van Uds. continuar practicando lo que han aprendido?

7. Qué hubiéramos podido hacer mejor para apoyarles?

8. Ha trabajado HEDECOM en asuntos que eran **realmente** importantes para la comunidad?

9. Cuenta ahora la comunidad con mejor capacidad para resolver sus problemas agropecuarios?

10. Hemos siempre querido aportar algo para los que tienen menos recursos. Cree Ud que hemos lograd algo con esta gente?

11. Estos más pobres de la comunidad, quien les debe apoyar…la comunidad misma u otra fuente de apoyo?

12. Espere Ud si no llueve bien esto año confronta esta situación mejor con los conocimientos adquiridos?

13. Tiene algún otro comentario sobre nuestro trabajo aquí?

Appendix 2

PUJZARA

Apellido	*estrato*	*Ovejas*	*problemas*	*Prioridad prod.*	*Pueden continuar ?*	*Que cosa major?*
Pedro Díaz 41 Esposa 25 2 niños 14 años	c	20	sequia	Ganaderia, tejidos, albañil. Papas para cambiar por maíz en las ferias.	Creo que sí	Vacunas, siembra de la papas en grupo
Galian-díaz 27 Mercedes Hayte 25 2 niños 2-3 años	c	107 5 llamas 2 vac.	sequía	Ovejas, papas, artesanía	Lo hacemos	Nos estan enseñando, los juegos nos unen! Sembrábamos forrajes
Sabina Galean 27 Su padre 51, hermana y 5 niños 4-16 años	c	24	sequía	Animales, agric., tejidos. Empleada en Tarija	Yo voy a continuar	Es tan lindo aprender. Inyecciones, papas ovejas
Rogelio Delgado 24 Esposa 23 2 niños 1-4	c	22	Falta de agua, heladas	Ovejas, tejidos,, siembra, verduras, trabajo en S Andres, jornaleando en la comunidad[11]	Seguiré practicando	Las campañas de desparatización, poner abono antes de la siembra
Cres. Delgado 60 Esp.49 Lucia Delgado y 4 otros 18-26 años	c	54 1.5 ha.	Helada del año pasado, sequías	Agric. (papa, haba etc), corderos, tejidos	Lo aprendido es muy importante, vamos a continuar	Vacunar ovejas. Trabajo en grupo, visitas casa a casa
Juliana Galean 29 Esp. 29 2 niños 1-5	b	60 2 llamas 6 vacas	La sequía nos ha matado	Ovejas, siembras, papa, haba, tejidos	Tengo que ensañarle a mi esposo	Como nos enseñan. Inyecciones, papas, cultivan en terrazas, avenas, cebada, alfa.
Eduardo Galean 39 Esp.42, 7 niños 1-17	b	50 10 llamas	Heladas, sequía	Ovejas, artesanía, albañil, siembras[12]	Hay que seguir practicando	Aprendemos otras cosas
Barbarita Galean, vive con su papa [49] y tres hermanos y 1 nieto	b	141 7 llamas	Mortandad de las ovejas, sequía, heladas	Agricultura, carne, abono, telares, queso, haba. Vende abono, jornalea en Tarija	Voy a continuar vacunando	Reuniones. Las campañas – no ha muerto ninguna.
Rosa Colque 37 Esp.30 4 ninos 3-14	b	100 3 llamas 2 vac.	Heladas, falta de pastos	Ganadería[13], tejidos, siembras para comer, jornaleando, albañil	Tenemos que criar el botiquín; voy a seguir curando	Curar las ovejas, todos se ayudaban. Hacer cerramientos
Rafael Colque 51 Esp.49 2 nino 6-7	a	100	Helada, sequía	Ovejas, agricultura, ajo, habas, jornaleando en Tarija (Bella Vista)[14]	Seguiremos desparasitando	La campaña es lo que más me gustó.
Cipriano Galean 74 Esp.73 2 hijos 24-28	a	200 2 llamas	Mortandad de los animales, helada, sequía	La hacienda, cultivos, papa, cebolla, ajo. hijo emigra y manda dinero	Sigo desparasitando	Curando los animales.

PUEBLO VIEJO

Natividad Cardoso 46 1 hijo estudia Tarija. 2 en	c	7 chanchos 0.13 ha.	Turbiones, riadas	Chanchos, maicito, habas, tomate, cebolla. Vende verduras.	Lo que hemos aprendido seguiremos practicando	La forma como nos enseñan. Los juegitos. Poner plantitas de carral, curar plantitas,

[11] Su papa vende en Tarija
[12] vende en Villazón
[13] vende ovejas en la comunidad para sus gastos
[14] Vende en la Manka Fiesta sobre la frontera

escuela Madre sola						inyectar animales
Cason Diaz 44 Candelaria 35, 6 hijos, 4 Yunchará, 2 aqui	c	26 ovinos, 2 vac. 0.13 ha. mediero.	La riada	Los animales mas seguro, luego, tomate, cebolla, haba, membrillo, uva[15]. Jornalea aqui	Tenemos que seguir practicando	La forma como nos enseñan. Desparatizar, pde de la uva, multiplicación.
Cenobio Saldaña 54 Esp. 7 hijos, 2 en Arg. Asloca	c	55 ovinos/ chivos, 3 porcinos, 2 vacunos. arrendero	Las riadas	Sembramos, con eso nos mantenemos practicando. Jornaleando aquí	Voy a seguir	De todo, siempre es bueno saber. Curar frutales, multiplicar plantitas. Lo que aprendemos nos ayuda mucho.
Dionisio Bejarano [Isque]	c	0.8 ha. uva	riadas	Chanchos, uva, otros cultivos, tomates. Jornaleando	Estoy practicando con mi Ganado, jornaleando en la cura de los animales	He aprendido mucho. Inyectar, mejorar mis chanchitos
Mauro Farfán, 49 con hermana 46 lado Potosí	c	2 ollas viñedo, 1/8 con riego, arrendado	Heladas, granizo	Los cultivos, jornaleando. Maíz para vender Villazón. Jornalea aquí.	Seguirá practicando y puede ayudar a otra comunidad	Veterinaria. Para ayudar a los vecinos
Humberto Farfán 43 Esp. 44. 7 hijos, 3 estud. Arg. Sta Rosa	b	15 Ovejas, 2 vacas. ½ olla chanchos	riadas	Chanchitos, maíz, alfalfa	Voy inyectar mis chanchos y tener mis propias uvas	¿tratar los animales, podar la vid, hacer nuevas plantitas.
Elsa Tejerina 24 Su madre 58, 5 hijos 3-16	b	20 ovinos,10 porcinos, 2 vacunos. 2.4 ha.	Riadas, heladas	Verduras, chanchitos[16], fruta seca y maíz para cambiar con papas. Alfa. Tienda.[17]	Hablaba de colaborar auydando a otras comunidades	Trabajar en grupo, parte veterinaria, curar las uvas. Curar los chanchos
Lidia Alemán 62. Sola, 4 hijos Arg. Asloca	b	0 ganado – 0.8 ha. vive sola y viaja a Arg. A visitar hijos	Acequia secando, granizo, riada	Vivimos mas de las huertas Sola y sin animales. Lleva maíz a sus hijos en Arg.[18]	Hay que seguir para no olvidarse	Como poner plantas de uva, pera, membrillo, uva. Como curar las plantas..
Asunta Lara (50) Vive con su hermana (25).Hermanos Salta	b	18 ovinos, 11 porcinos, 25 cabras, 1.4 con riego, mas 0.1 frutales	Riada, heladas, falta de camino	Animales, la uva para vender y cambiar, hace vino y Singani para su uso tanto como otros productos	Organizar tener medicamentos,	Lo que una aprende nadie le quita. Trabajo en grupo, capacitación. No sabíamos nada, aprender curar animales y viñedos.
Ruperto Farfan 61 Esp. 3 hijos estud. Tarija	a	25 ovejas, 25 cerdos, 2 vacas, 1.2 ha. con riego	Chaparrones torrenciales, riadas, heladas	Agric: cebolla, maíz, la vid, chanchos (para vender). Ovejas para su consumo. Vino para vender, tienda	Pienso hacer vacunaciones pero nos falta práctica	La capacitación muy abierta y participativa. Las cartillas,
Manuel Apaza esposa	a	30 ovinos, 30 cerdos[19], 5 vacas	Precios bajos, las riadas, turbiones	Animales, vendo 40 chanchos, agric: igual – cebolla, papa, uva, alfa, linaza. Tiene tienda	Pienso comprar mas animales, de razas, en las plantas vamos a practicar	Saber poner remedio (en vacas). De todo me ha ayudado.

TACUARITA

Gabriela Cata Esp. 28	c	27 vacas, 19 ovejas,	Tengo poco	Maiz, papas, hortalizas, ¿	No voy a olvidar nunca, estoy	Reconocer enfermedades,

[15] vende en Villazón
[16] Muchísimos datos económicos adicionales
[17] Vende verdures Villazón
[18] Ellos traen cosas aquí de vez en cuando
[19] Compró terreno con dinero de la venta de chanchitos

Vive con sus padres 2 niños pequeños y otros en Tarija y Arg.		2 ha con riego (? de sus padres)		ganado, su marido trabaja en Arg. Unos 5 meses	curando los animales de mis padres y curo sus papales y maizales	inyectar. Preparar almácigos, injertar, sembrar durazneros y luego injertar.
Miriam Valdez esp. 28	c	Sin tierras, ni animales. Siembra en parcelas prestada	Como no tengo tierra no me afecta	Jornaleando. Siembra pedacitos prestados. Debe $100 de una enfermedad	Sigo con lo que he aprendido	Curar animales, sembrar hortalizas.
Nora Valdez Esp. 47 2 hijos, uno en Arg.	c	2 vacas, 3 chanchos	granizadas	La agricultura y la ganadería es l que más importa. Hago comida para la fiesta de Chaguaya, hago empanadas	Trabajando en tierras de otras y el ganado de mi papa lo practicamos diariamente	Nos han enseñado bien. Cultivar las plantas, injertar, curar los animales. He aprendido mucho.
Esilda Valdez, 20? vive entre 3 mujeres Madre soltera, con 3 sobrinos herfanos	C?	2 bueyes, 150 ovejas y chivos, 1/2ha riego	Cuando llueve el viento afecta al maíz; granizo, la helada	Agric y ganadería; son 3 mujeres solas. Vende cuando hay necesidad. Muy al margen?	Vamos a continuar mejorando frutales animales. Queremos hacer un huerto con durazneros	Las visitas a las casas.
Adela Caucota 24 Esp. En Arg. Madre, 3 niños 1-8. Hermano estud. Tarija ellos envían cosas	C?	20 bovinos, 50 ovinos,20 caprinos; ¾ riego	Falta de pasto, granizada	La migración, 5 meses. Vive con sus papas, mayores. Los cultivos, papa, cebolla, vender bueyes	Voy a seguir curando los animales	La capacitación. Inyectar animales. Interesa mucho los durazneros.
Andres Tarifa y esp. 38 Vive con sus padres 5 niños 7-17	c	30 bovinos, 90 ovejas y chivos, ½ con riego	Sequía, granizada, heladas	Agric.: papa, maíz, cebolla, maní, las vacas, chivos. Jornaleando, albañil.	Queremos seguir practicando mas a inyectar,	El botiquín, los injertos. Siembra de frutales, desparatizar el ganado.
Salome Martinez 54 y esp. Niño en Arg. No mandan nada	b	28 vacas, 21 ovejas, 23 chivos ½ ha riego	Precios, granizo, lluvia con viento	Los cultivos y la hacienda	Lo que he aprendido no puedo dejarlo	Todo hemos gustado, visitas a casas en especial.
Nélida Vega 45 Esp.54 5 niños 6-18, 2 en Arg.	a	50 bovinos, 20 ovejas; 3 ha.	La sequía	Animales y siembras. Ganado mas para dinero	Si podemos…	Curar animales y cultivos Su manera de trabajar ha sido diferente, muy bueno
Emilio Valdéz, Betsabe Vega 73 y nieto	a	25 vacas, 130 ovejas; ½ ha riego	Sequías han sido tremendos, también heladas	Animales y cultivos iguales. Hijos y nietos en Arg.	Su grupo va seguir, pero tiene sus dudas en otros	Ha aprendido mucho, sobre todo el control de enfermedades al ganado.
Irma Cardosa 66 Esp. 8 niños, 7 en Arg.	a	50 bovinos, 40 ovinos, 12 cerdos. 3.5 ha de riego	Granizada, heladas, riadas	Papa, maíz, trigo, soya; leche, ovejas para carne. Hijo Lindolfo trae cosas de Arg.	Mejorar con injertos, remedios aquí para el ganado	Hija aprendiendo a injertando, remedios para los animales

Appendix 3

Actions mentioned in interviews by social stratum*

All	Vet practices, De-worming	Vet diagnosis	Animal care	Method of learning	Understanding	Fruit	Propagation	Diseases	Vegetables
A	2	2	1	2	1		1	1	
B	8		1	7		1	3	4	2
C	12	1	1	10	2	2	6	2	5
Total	22	3	3	19	3	3	10	7	7

Pujzara

	Vet practices, De-worming	Vet diagnosis	Animal care	Method of learning	Understanding	Fruit	Propagation	Diseases	Vegetables
A	2								
B	3			3					2
C	4			4					4
Total	9			7					6

Tacuarita

	Vet practices, De-worming	Vet diagnosis	Animal care	Method of learning	Understanding	Fruit	Propagation	Diseases	Vegetables
A		2	1	1			1	1	
B	1		1	1			1		
C	4	1	1	2	1	1	2		1
Total	5	3	3	4	1	1	4	1	1

Pueblo Viejo

	Vet practices, De-worming	Vet diagnosis	Animal care	Method of learning	Understanding	Fruit	Propagation	Diseases	Vegetables
A				1					
B	4			3		1	2	4	
C	4			4	1	1	4	2	
Total	8			8	1	2	6	6	

*Number of mentions of each category of action in response to a request for comments on what farmers had most liked of the collective actions that were developed.