

HOOFS ON THE ROOF

Pastoral livelihoods on the Qinghai-Tibetan plateau
The case of Chengduo county, Yushu prefecture

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Executive Summary

This report has served ASIA 2028 project to get a thorough understanding of its area of intervention – Chengduo county, Yushu Tibetan Autonomous Prefecture - in order to properly tailor project activities as well as to assess option for future interventions. The report depicts the three major areas of concern when dealing with pastoral livelihoods, namely the natural resource system, the resource users system and the larger geo-political system. The specific and different interactions among these three systems in fact define to a great extent pastoral livelihood strategies, vulnerability levels and capacities to adapt to changes and respond to shocks (Pratt et al, 1997).

Poverty, environmental degradation and exposure to climatic risks are major factors challenging pastoral communities throughout the world. Inadequate development policies, ineffective institutional setting and unfair market relationships have often compounded already critical socio-economic conditions and increased the pressure on rich-but-fragile rangelands. These processes undermine pastoral livelihoods and trigger vicious circle to local sustainable development, as pastoralists are critically dependant on the conditions of their resource base. The case of the Tibetan plateau provides with this respect a specific and interesting case. While the relevance and the impact of GoC policies on the plateau are here assessed, the need for a socio-cultural change is also highlighted, for Tibetan communities to improve their capacity to set the agenda for their sustainable development. Through integrated interventions in the animal husbandry and educational sectors, ASIA challenges ongoing trends in the area and tries to compliment institutional effort to build these capacities for a fairer integration into the wider societal frame.

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In spite of the crucial assistance of these colleagues, the author takes full responsibility for the content and analysis contained in this report. All comments, criticism and remarks may be addressed to

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Legenda

Measures for land		Measures for livestock
1 mu = 0.067 ha		sheep equivalents (SU):
1 ha = 15 mu		1 sheep = 1 SUs
1 jin = 0.5 kg		1 goat = 0.8 SUs
1 kg = 2 jin		1 yak = 4 SUs
		1 horse = 6 SUs

BAH = Bureau of Animal Husbandry

CAB = Civil Affairs Bureau

DM = dry matter

Dri = female yak

EC = European Commission

FAO = UN Food and Agriculture Organization

Ffw = Food for Work schemes

FH = female headed

Hh = household

GoC = Government of China

ICIMOD = International Centre for Mountain Development

LAs = local authorities

Jinpa = local NGO

Mbu = *Caterpillar fungus*

Mkt = market

PRA = Participatory Rural Appraisal

QLDP = Qinghai Livestock Development Programme (EC-funded)

Shoat = sheep and goats

SSG = Snowland Service Group

S.U. = Sheep equivalent Unit

Troma = local tuber (*Potentilla fulgens*)

Tsampa = local food (based on barley flour, sugar and dry cheese)

Tzun = administrative unit, village

Xien = administrative unit, county

Xiang = administrative unit, township

Yuan 1 = 0,1 euro

3RHP = Three Riverheads Program

4WP = Four Ways Program

1 - INTRODUCTION

1.1 - ASIA organization

ASIA is a Non-Governmental Organization established in 1988 by a group of people interested and concerned about Tibetan culture. President and founder of the organization is Prof. Namkhai Norbu Rinpoche, who is a well-known name among Tibetans, due to his longstanding commitment to protect and develop the Tibetan society. ASIA major activities relate to emergency and development projects on the Tibetan plateau, concern for the educational sector among Tibetans as well as for environment and development education in Italy. Further specific information may be sought at www.asia-onlus.org.

1.2 - Aim of this report

The objectives of the mission and this related report are:

- to critically assess and analyse socio-economic conditions in the project area, identifying most pressing problems and needs;
- to develop a strategic plan for intervention aimed at improving local pastoral livelihoods;
- to define a specific pilot initiative (10 months) aimed at supporting pastoral and agricultural production systems as well as enhancing income-generation opportunities. This is to be based on an already existing proposal, which has been selected for funding;
- to identify appropriate participatory mechanisms which allow local beneficiaries to play a proactive role in the project;
- to exchange all these elements with the project staff and set up related monitoring systems.

ASIA has in fact already raised funds for a short-term intervention in the area, but its strategy is to be revised in order to enhance longer term sustainable assistance and development processes. The first field mission lasted two months (25/9 to 23/11 2003) and is to be followed by two shorter-term missions, aimed at further assessing local market and income-generation mechanisms as well as providing appropriate monitoring and evaluation to the project activities. The second mission lasted five weeks during springtime 2004.

1.3 - Methodological elements

During the field survey, three levels of information and data have been carefully assessed in order to include a variety of indications and perspectives:

- **Local authorities** at different levels have represented an important source of information about governmental policies as well as local communities' needs and problems. Information has always been collected with semi-structured interviews and through official data and discussed with local GoC representatives. Although official GoC data are not always reliable, they provide anyhow interesting indications about major trends in the area.
- **Local communities** have represented the major target of this survey. Participatory methodologies have been tailored and set up and local staff trained accordingly in order to enhance and facilitate local people and groups to freely express themselves. These PRA methodologies mainly hinged upon Livelihood Matrices, Herd Interviews and Problem-Solution Analysis. Interviews, meetings and discussions were mainly developed with groups of people rather than individual beneficiaries, in order to enhance dialogue-based mechanisms. These groups tried to include the variety of social, gender and age diversities at local level.

The use of Livelihood Matrices was very instrumental to understand livelihoods dynamics and trends among the different communities. Main issues tackled through the addressed: sources of income, diet composition,

winter coping strategies, main animal husbandry problems, human and animal health problems. The resulted matrices are attached in Annex 6.

Herd Interviews were facilitated by the fact that different class ages are given specific names (see Annex 2). Referring to the different individual animals of local herds and flocks provided with the opportunity to get a comprehensive understanding of herd composition, management and dynamics (e.g. health problems, etc...). The Problem-Solution Analysis was applied wherever time constraints did not allow for more through discussions. This was also a very useful tool to assess beneficiaries' perception of their problems and possible solutions.

- **Reference literature** has been an important source of secondary data. More specifically theoretical papers from the Center for Research on Tibet (www.cwru.edu/affil/tibet/nomadpapers) and implementation reports from the EC-funded Qinghai Livestock Development Programme (which was recently implemented in neighboring areas) provided the project with comprehensive and consistent reference materials. Main documents and materials utilized are reported in the Bibliography (Annex 5).

1.4 - Monitoring and Evaluation

During project implementation two M&E missions are scheduled, in spring and autumn 2003. These missions are double-folded in that will allow for monitoring current project implementation while also providing further information and indications about further stages of the intervention.

Given the short term nature of this intervention and the consistency of ongoing changes in the local context, any structured monitoring system is likely to fail in providing clear indications to the project management. The only way to grasp relevant information about project performance will be through participatory surveys aimed at assessing local perception about the specific activities and the adoption levels of innovative practices once the intervention has phased out (school enrolment rates, participation to para-vet training, school herds management, forage management, etc...)

In the longer term the following indicators may apply:

- Adoption rate of project innovations;
- Households' sources and consistency of incomes;
- Animal performance indicators (milk productivity, mortality, calving, abortion);

An important component of further assessments and monitoring activities is to develop a sound understanding of local market mechanisms and dynamics. Unfortunately no such analysis was available at the time of the survey and the Provincial Statistical Yearbook – which could have provided some basic indication about local marketing – was not made available by local authorities.

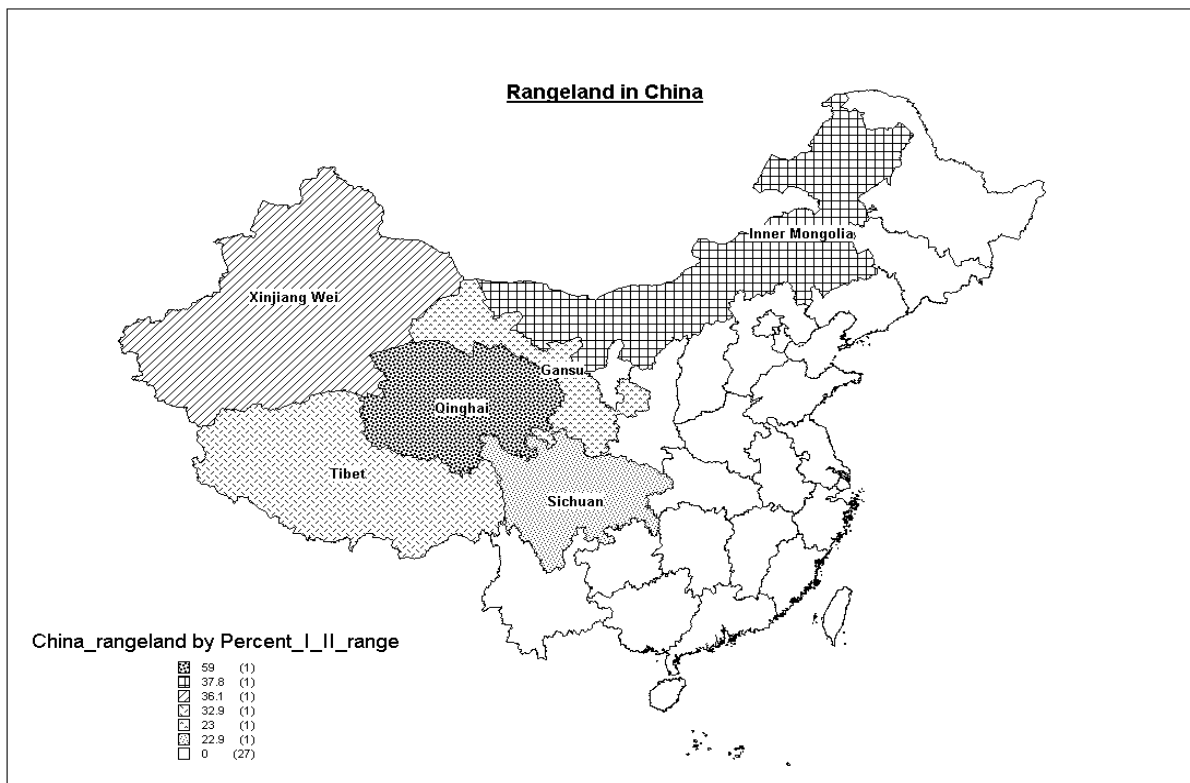
2 - THE PROJECT AREA

Rangelands of the Tibetan Plateau in Western China encompass about 168 million hectares, 42 % of China's total rangeland area, and support an estimated two million pastoralists in one of the world's largest pastoral areas (Miller D., 2000). Despite it represents one of the poorest areas of China, the plateau holds special strategic importance due to its geographical, cultural and natural features. Its high altitude and alpine arctic climate provide harsh natural conditions, which have inhibited human development in the region. Transhumant pastoralism has proved to be the most effective and sustainable land use in this environment, although pastoral communities are increasingly subject to recurrent snow disasters, which represent a major threat to their livelihoods.

2.1 - The Tibetan Plateau

The Tibetan plateau contains some of the highest altitude grazing lands on earth; pastoralism is found at elevations of 3,500 to 5,400 m in environments too cold for crop cultivation. The Tibetan plateau has a bitter continental climate, with rangelands exposed to high insolation and dry climate throughout most of the year. Winter temperature falls deeply below zero, snow may fall and persist for many consecutive weeks in winter. Rainfall characterizes the summer season, when the eastern portion of the plateau receives a mean annual precipitation of 500-800 mm from the Chinese southeast monsoon between June and September, while much lower rain levels shower the western portion. Low temperatures combined with wide diurnal fluctuations limit drastically the growing season, particularly in relation with high altitude, and therefore determines a low productivity of the grassland and curtails options for crop production.

Picture 2.1 - Rangeland in the Popular Republic of China



Tibetan pastoralism is distinct from pastoralism in most other regions of the world, except perhaps the mountainous areas of Mongolia. On the Tibetan Plateau, the key distinguishing factors that separate pastoral areas from cultivated areas are elevation and temperature, in contrast to most other pastoral areas where the key factor is usually lack of water (Miller D., 2000). The two major reasons Tibetan pastoralists developed and persist in these harsh environments are the lack of competition from other land uses – crop or urban – which are limited by climatic factors, and the domestication of a unique animal the yak (*Bos grunniens*), which is well adapted to high altitudes and low temperatures and represents the subsistence animal among herders and it is vital for local economies and livelihoods. Yak multi-purpose role includes production of meat, milk and dairies for local diet, hair and skins for tent, cloth and boots making, labour for packing and ploughing, and dried manure is also the major source of fuel in these environments where trees do not grow. Despite its great resistance to climatic extremes yet heavy livestock losses often occur following periods of heavy snowfalls and

severe cold weather: what are locally defined as 'snow disasters' (SDs) (Cincotta *et al.* 1991, Goldstein *et al.* 1990, Miller 1998, Schaller 1998).

2.2 - Qinghai Province, Yushu Prefecture

Qinghai province is located in Central China, in the north eastern part of the Tibetan Plateau approximately mid-way between Nepal in the south west and Mongolia in the north east. The whole plateau slopes from west to east, with an average elevation of over 4,500m asl and with an undulating topography where alpine pasture land and alpine marsh rangeland develop well (Zhaoguang *et al.*, 1986). With a total area of 720,000 km² the province is one of high mountains, steep slopes, alpine mountain valleys and bottom lands with an average altitude higher than 3000 meters above sea level. According to the statistics, 95% of the provincial territory is seasonal grazing grassland with extensive livestock production. The climate of the project area is harsh and characterised by long winters and short summers.

Mean annual temperature ranges between -5,6 and 8,7° C. Average annual precipitation is about 400-500 mm and falls primarily in the summer. The Qinghai province hosts the sources of major Asian rivers such as the Yang Tze, the Mekong and the Yellow river. Overall population in Qinghai province amounts to about 5.021.000, with an average density of 6,8 people/Km². 40% of the people of Qinghai are ethnic minorities - Tibetans (0.93m), Hui Moslems (0.65m) and Tu (0.9m), as well as Mongols, Sala and Kazakhs. Han Chinese are concentrated in the east around the capital Xining and the main cropping areas. Overall population is estimated to have increased at an average rate of 1.5% per annum between 1952 and 1994 (QLDP). Such a growth rate is having an effect on the demand for livestock products used for subsistence purposes as well as on the demand for cash incomes to fulfil the household members requirements. Illiteracy rates among Tibetan herders peaks 75%, against 24,4% rate in the province and a national average of 17%. In the 1995/96 winter this province experienced consistent animal losses due to prolonged bitterly cold weather and thick snow layers hindering livestock access to pasturelands. Official reports attest an overall loss of about one third of the total livestock population. The effects of that event are still deeply impacting on local livelihoods.

Located in the high grasslands of southern Qinghai Province, Yushu Tibetan Autonomous Prefecture has six counties: Yushu, Chengduo, Qumalai, Zhiduo, Zaduo and Nangqian Counties. The capital town, Jiegu, is located in Yushu County about 830 km southwest of Xining. The total area is around 195,000 km² (including the Kekexili National Park). The main economic activity in Yushu Prefecture is animal husbandry, though farming is also practiced in parts of Nangqian and Yushu Counties (from www.plateauperspectives.org). In the prefecture of Yushu (see map in Annex 1) human population approximates 263.040 while livestock consist of about 4.608.800 S.U. (2002 official data). Ethnic minorities from Tibetan, Hui, Tu and Mongolian groups mainly inhabit rural areas, while the Han (57%) populate local cities and towns. The people of the project area are mainly ethnic Tibetan herders. QLDP reports that overall population in the area is estimated to have increased at an average rate of 1.5% per annum between 1952 and 1994. Such a growth rate is having an effect on the demand for livestock products used for subsistence purposes as well as on the demand for cash incomes to fulfil the household members requirements. Illiteracy rates among Tibetan herders peaks 75%, against 24,4% rate in the province and a national average of 17%.

2.3 - Chengduo county

Chengduo is one of the six counties of the Tibetan autonomous prefecture of Yushu, Qinghai province. Chengduo accounts for about 15% of both human and livestock in the prefecture. Governmental poverty chart of Yushu counties classify Chengduo as one of the least poor of the prefecture. Chengduo used in fact to be a rich county, until the recent snow disasters which seriously affected the livestock sector. Chengduo county is composed of 8 xiangs (sub-administrative units) which are described below.

Table 2.1 – Main information about Chengduo County

Administration	8 townships
	57 villages
Total land area	14 740 km ²
Grassland area	14 026 km ² (or 95%)
Useable grassland	12 387 km ² (or 84%)
Elevation (town)	4 415 m
Avg. precipitation	504 mm (annual avg)
Avg. temperature	4.9° C (annual avg)
	- 17.0° C in January
	6.4° C in July
Total population	39 106 people
	8 099 households
Rural population	89.3 percent
Pop density (rural)	2.4 people / km ²
Main nationality	> 95% Tibetan
Livelihoods (in 1990)	58% herding
	28% farming
	14% other
Head of livestock	676 700 head
	(840 000 head in 1983)
Education (in 1990)	19% primary school
Literacy (in 1990)	Tib, 78% non-literate
	(Tibetan women, 92%)

source: www.plateauperspectives.org

Animal husbandry is the prevailing sector of production in the county, but a good percentage of the households conduct field cultivation to a different degree, either for food or for forage production. Local communities can be classified as pure pastoralists or agro-pastoralists, depending on the relevance of livestock and crop production in their systems, as different land uses apply at diverse altitudes. Pastoralists apply forms of seasonal transhumance, with herders moving their encampments and livestock to summer pastures located at higher altitudes that cannot be exploited during winter. These are often characterised by vast alpine meadows that predominate above the tree line.

During autumn they come back to lower and more protected areas where they spend the harsh winter season. Grazing resources in springtime are very critical, as animals are very weak at the end of winter. The sun exposition also plays a role in the grazing pattern as pastures exposed to north is more subject to freeze and therefore presents with limited availability. Although herders tend to rotate different seasonal pastures within defined boundaries, mobility and migration can be extended whenever critical conditions require.

Pastoral seasonal movements are accompanied by traditional tents (black or white), which represent the household dwelling during most of the year. The settlement pattern is extremely dispersed and becomes even more in summer, when households and herds disperse to reach far seasonal grazing areas. A more sedentary lifestyle has emerged in accordance with governmental directives during the era of collectivisation (Manderscheid A., 1998). Since then most families have owned a house that they inhabit during the winter season. These permanent dwellings have recently been associated with the erection of wire fencing to protect winter grazing and the growing of small areas of crops (barley and oats). Intermediate tent camps are set up about 100 m higher in river valleys, and the slopes of hills serve as pastures.

Table 2.2 - Classification of the communities in the project area

CRITERIA	Class A	Class B	Class C
<i>Xiangs</i>	<i>Qinhushe, Zenqin</i>	<i>Zaduo, N Xiewu, N Saihe</i>	<i>Gatuo, Labu, Chenven, Saihe, Xiewu</i>
Relevance of livestock	Pastoralists About 100%	Agro-pastoralists Livestock > 60%	Agro-pastoralists Livestock < 40%
	Mainly self-subsistent Prevalence of yak No goats, sheep hardly milked	Relative importance of sheep and, increasingly, goats Higher market integration Consumption of shroat products and yak for ploughing In some areas also poultry production	
Average altitude (mt)	Around 4000	3500 < x < 4000	Below 3500
Geo-morphology	Plateau	Narrow valleys	Open valleys
Rangeland	Open alpine meadows	Mountainous grasslands	
Agriculture	none	Barley mainly for forage	Barley, potatoes, radish, vegetables
Main reported problems	Degraded pasture, Water (dry summer and frozen winter)	Poor barley productivity	Few animals
Other sources of income	None	Mbu	Mbu
Marketing options	Potentials for sales of animal products	Limited animal surplus and market sales Some households sell crop products	
Sensitiveness 4 ways	Housing and fencing	Shelters, forage production and fencing (mainly in the valley bottoms)	

3 – AGRO-ECOLOGICAL FACTORS

The undulating plateau of the northeast of Chengduo county and the deeply dissected mountainous landscape of its southern portions provide the ecological context for diverse land use. Micro agro-climatic conditions and different production and settlement patterns result in different natural resource management strategies, which mainly rely on semi-mobile livestock breeding and marginal crop production.

3.1 - Pasture resources

Rangeland composition in Yushu prefecture is classified (Ren Zinhou et Al., 1986) as mainly Alpine meadow, with limited extensions of Alpine shrub, coarse grasses and pastureland. Marshes constitute a wide portion of the rangeland in some areas.

The four major classes composing local rangeland are dominated by the genre *Kobresia*:

- 1) *Kobresia pygmea* group,
- 2) *Kobresia humilis* group,
- 3) *Kobresia capillifolia* group and
- 4) *Elymus nutans* group.

The pasture has overall very high protein, fat and energy content but low fibre. The last two classes offer also valuable options for forage harvesting and hay production. Shrub major components are from *Salix* and *Potentilla* species. Toxic species such as *Pedicularis kansuensis*, *Liguloria viragnea*, *Arenaria pulvinata* and *Androsace tepete* make the pasture less valuable and represent a source of livestock poisoning.

As to the figures provided by the Yushu Grassland Station of the Bureau of Animal Husbandry, the following figures may be used as a reference for Chengduo county:

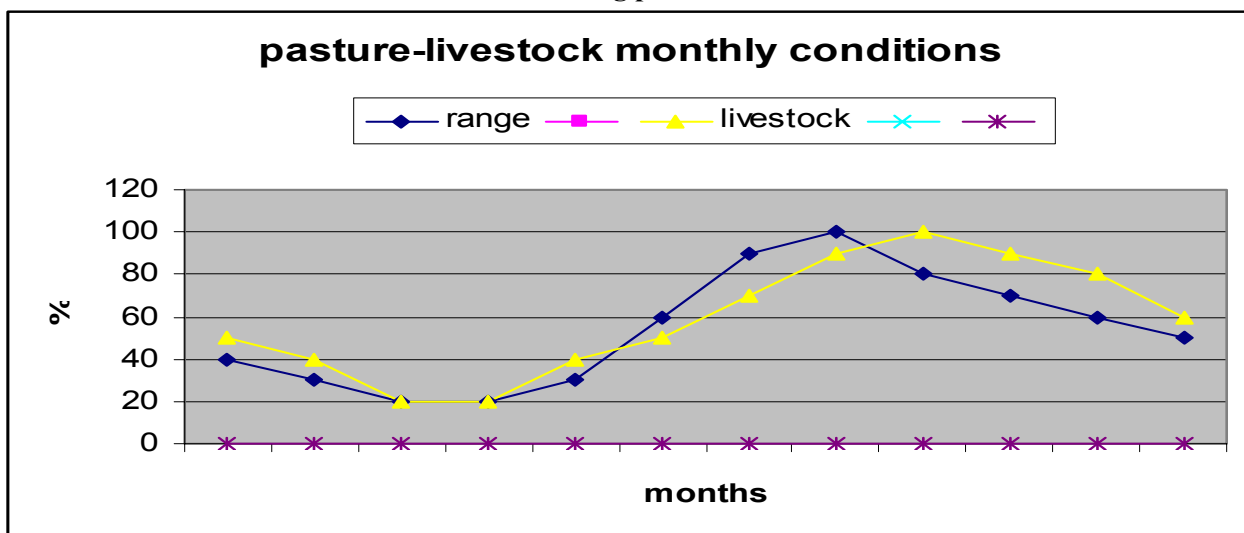
- Average rangeland productivity is about 180 to 250 Kg standing forage;
- One sheep needs about 4,5 kg (wet) or about 2 kg dry forage daily;
- This means that, as an average figure, a S.U. needs about 7 (good quality range) to 10 (poor quality range) - 8,6 average - mu per year to satisfy its needs in a year.

Recent official data report to 17.115.000 mu the rangeland utilizable for grazing purposes in the whole prefecture of Yushu. Official calculations amount to 1.600.000 S.U. the carrying capacity of these pastures, against the current 4.608.800 S.U. (see official data in charts 4.1 & 4.2).

Pasture areas are **seasonally** defined. Some communities move only few kilometres from a seasonal grazing to another. Still they move with the tent camps in order to leave the winter base camp out of animals reach. Most important grazing resource is the one reserved for winter, which is often sited at the valley bottom and protected with fences. The sun exposition plays a role in the grazing pattern as pastures exposed to north is more subject to freeze and therefore presents with limited availability. Summer pastures are often located at higher altitudes in valleys or plateaux which cannot be exploited during winter. Spring and autumn grazing lands are often intermediate between the two major winter and summer areas. Grazing resources in springtime - when animals are very weak - are also very critical. QLDP reports 40/60 the relative amount of winter and summer grazing lands. It is reasonable to assume the same proportion for the project area.

Conditions of grazing resources decline consistently during the seasons when livestock needs are higher: during harsh winter and spring times animals' needs increase, while their feeding opportunities decrease consistently as pastures whiter and snow may cover huge rangeland extension for long periods. Vegetation growth peaks in summer time and terminated by mid/end September, when animal body conditions reach their highest level. Lambing and calving periods occur when pasture as well as body conditions are at their lowest, thus adding a further burden to the animals. The harshness of local winter conditions further compounds this situation, with cold winds and frozen water sources. The level of nutrients is worsening throughout winter and early spring, due to weather influences and plant physiological declines following maturity. Spring is the period of dearth, when animals die as a result of poor nutrition, heavy internal parasite burdens, cold/wet weather and poor grazing management. Both Crude Protein and Net Energy content of local pastures are reportedly deficient during these seasons. QLDP has tested that feeding complements with fodder oats may help but further roughage and higher energy concentrates may also be needed to ensure good animal performance.

Chart 3.1 – Relations among pasture and livestock conditions



NOTE: first month is January

As it is discussed below, ongoing rangeland degradation is a major threat to local pastoralism. Although the QLDP tried to tackle this problem, outcomes were limited, apart from a number of interesting tests and reports. While the issue is indeed a critical one, interventions related to grassland improvements are not currently advised for ASIA, as they are very costly and complex and, if successful, carry results in the long term. Moreover the needed level of investment is often out of the reach of poor population sectors. Non-Governmental Organizations can hardly deal with this problem, which requires huge investment levels, long-term commitment and policy engagement (see Banks T. et Al. 2003).

3.2 - Critical winters

Life conditions on the plateau change consistently from one season to another. Conditions of grazing resources decline consistently closing to winter while livestock needs increase inversely thus impacting on livestock performance. Vegetation growth peaks in summer time and terminates by mid/end September, when animal body conditions reach their best. The level of nutrients is worsening throughout winter and early spring, due to weather influences and plant physiological declines following maturity. Both Crude Protein and Net Energy content of local pastures are reportedly deficient during these seasons. During harsh winter and spring times animals' needs increase, while their feeding opportunities decrease consistently as pastures whiter and snow may cover huge rangeland extension for long periods. Cold winds and frozen water sources may compound this critical situation. Spring is the period of dearth, when animals die as a result of poor nutrition, heavy internal parasite burdens, cold/wet weather and poor grazing management. It is during these times that lambing and calving occur, thus adding a further burden to the herd.

Climate affects stability of rangeland ecosystems in the short term as well as the long term. The climate is severe with short growing seasons creating short-term variation in forage supply. Animal access to forage is often influenced by winter snow cover, which increases herbivore concentration and impacts on accessible rangeland resources. Climate also induces frost heaving, which physically impacts soil-plant complexes and induces erosion on steep slopes. Climate also affects stability of rangeland resources by inducing herders to maintain higher numbers of livestock to reduce risk associated with weather induced animal mortality. Wind "scouring" of rangeland and the formation of wind "blow-outs" is also a cause of erosion and degradation in some locations, especially in high elevation summer pastures (Sheehy, 1998).

While pastoral systems have somehow learned to cope with these extreme seasonal variations, in some years the intensity, the duration and the extension of specific climatic events - named 'snow disasters' (or *kengschi* in Tibetan) – become very critical for local livelihoods. As a popular saying in the region goes: '*we expect one big disaster every ten years, a medium one every five years and a minor one every three years*'. Big events are those when snow layers make pasture unavailable also during autumn and/or spring times. In Qinghai province the most recent big event was in the mid 1990s and seriously affected local herds and livelihoods, with about one third of the total provincial livestock lost to death and starvation. Official records from different prefectures in Qinghai report about 14 major snow disasters since the late 1940s. According to official figures and reports from local herders in Yushu about one third of the total livestock was lost during the 1995 event.

Reports indicate that the frequency and economic loss and damage of snow disasters are on the increase and herders feel increasingly exposed and vulnerable to climatic events, as they notice that the coping capacity of their animals is diminishing. Indications from ASIA projects are in that that the restocking capacity of local herds is slowing down in time, meaning that it takes longer for local herds to recover losses due to critical winters. This in turn curtails herds' resilience capacity and spurs vicious circles that may seriously jeopardize future sustainability of local pastoral systems. The increasing exposure to these critical trends and threatening risks carry a major impact on the livelihoods of Tibetan pastoralists. Poverty, resource degradation and risk are in fact closely interacting factors triggering vicious circle in the local economy and undermining sustainable pastoral development. Due to the poverty, herders' capacity for risk avoidance, reaction and recovering is diminishing as well as herder households get poorer and poorer due to their increasing exposure to climatic

events. At least 14 snow disasters have taken place since the late 1940s: 8 between 1950 and 1970, 3 in the 1980s and 3 in the 1990s (Zhou, 1995). Other documents report the same incidence for other prefectures in the province (CIAD, 1998). A more precise record of climatic critical event in the last five decades is resumed in the table below.

Table 3.1 – Dates and extent of recent snow disasters in Yushu prefecture -

<i>Year</i>	<i>Extension</i>	<i>Livestock losses</i>	
1956/57	Autumn to spring	926.876 heads	
		30% total herd	
1961 to 1965	Series of localized events	N. A.	
1971/72	Autumn to winter	724.000 heads	
		9,17% adults	
		26,7% young	
1972/73	Localized events	N. A.	
1974/75	Localized events	787.000 heads	
		15,54% adults	
		24,3% young	
1981/82	Autumn to spring	1.320.000 heads	
		9,9% total herd	
1984/85	Autumn to spring	990.000 heads	
		17% total herd	
1995/96	Autumn to spring	1.290.000 heads	
		33,37% total herd	

Overall analysis of these data indicates that during every decade there is a three-to-five years period of particularly serious winters. This applies for the time spans 1961-1965, 1971-1975, 1981-1986 and, recently, 1992-1997. It is therefore very likely that the next critical event may introduce to a difficult period that may last more than one year. Should this forecasting become true, these events may seriously affect a huge number of households and herds in the project area, which are still far from recovering from the 1990s events. Although the short time series of data does not allow to assess whether the frequency of climatic extreme events is changing, what can be assessed, by comparing this table with figures in charts 4.1 & 4.2 (people and herds) is that the restocking capacity of local herds is slowing down in time. This means that it takes longer for local herds to recover losses due to critical winters. This in turn curtails herds' resilience capacity and spurs vicious circles that may seriously jeopardize future sustainability of local pastoral systems.

As it may be noted, most serious climatic events are those that begin during autumn (often in October) and extend for a number of months. Thick snow layers cover pasture resources for long periods and make feed unavailable to animals. Cold wind could further aggravate the situation by freezing the snow to ice. Heavy snow falls that happen in springtime are less of a danger as southern-exposed valley sides may be soon warmed by the sun which melts snow layers and make pasture partially available. Spring snow events are particularly affecting after harsh winters, when animals are very weak at the spring onset.

While snow disasters represent no-doubt the major source of risk and of problem for local communities, **other climate-related factors** also contribute to extend pastoral exposure and vulnerability. Every single winter and spring seasons (almost 6 months !) in these areas represent very difficult periods for both households and herds. The impact of yearly winter events on local livelihoods is often quite consistent, although often limitedly accounted for. This impact may include high ewe and dri abortion rates, lamb and calves mortality but also human abortion and high disease incidence rates. Nutritional patterns are the major reasons for these deterioration in livelihood conditions, together with extreme climatic conditions as access to food diminishes while needs arise. Events such as floods, hails and droughts are also quite frequent in the province, although often at a limited and localized scale. Only in 2003 the capital town of Yushu county has been flooded, while

crops have been severely impacted by heavy hailing in Nangqin and Chengdou counties. As it may be expected, these events taking place on the plateau carry also high resonance and impact (flooding) on the lower reaches of the Yellow and Blue rivers.

3.3 - Rangeland degradation

Degradation is generally thought to be the major problem that affects Tibetan rangelands - as indicated by erosional processes and decline in the area of rangeland biodiversity and overall productivity in some extended areas (QLDP, 2000). Degradation is the end product of a sequence of events, originated by a complex combination of human activity and environmental factors that result in conspicuous portions of local ranges (up to 40% in some xiangs) turning into inutilizable lands, due to black beaching, desertification and other soil degrading processes. Despite it is acknowledged that these trends carry major negative impacts on the livelihood of local communities through decreased livestock performances, limited options are available to enable ecosystem restoration. It must be admitted that environmental care performed by local communities is very limited and this cultural issue will also need specific targeting, which could be spurred by possible eco-tourism development.

While many different explanations have focused on one or another as the driving force of these processes (see Sheehy - 1998 - for an exhaustive dissertation on the matter) the contribution played by **major changes from the traditional pastoral resource management** is no doubt a major one. GoC policy reforms during the 1960s and 1970s have in fact reshaped traditional pastoral production patterns by imposing restricted mobility and exchanges to communities and animals. While those reforms may have boosted livestock production in the short term - with livestock numbers almost doubling in three decades - the newly developed pastoral production systems led to outstanding changes in local natural resource management, which eventually triggered fast exhaustion and deep degradation of the plateau rich-but-fragile ecosystems.

Others factors seem to have played a complimentary role in rangeland degradation processes:

- Although the discussion over possible reasons is open and controversial, there is little doubt in that the global **climate change** phenomenon is significantly affecting microclimates on the plateau. The increase in temperatures is causing increased evaporation and decreased humidity. Precipitation records since 1956 indicate a drying trend (Sheehy, 1998). Zhang Guoshneng et Al. have clearly assessed ongoing ecological trends in the regions by analysing the shifting levels of main rivers and affluents (refer to their works).
- Recent gold **digging and mining** activities have brought devastating effects on the rich valley bottom lands in some counties. The gold extraction activity was liberalized in the beginning of the 1990s without any restriction based on environmental concern. Local communities rent their lands to diggers for little gain and now face costly and long-term consequences, which have curtailed their best winter pasturelands. The same applied to wildlife protection, which was no longer protected once the collectives were dismantled.
- The discussion is open also over the contribution of **rodents' infestation** (*Pika and Microtis* – *Ochotona spp.*; *hara and zara* in Tibetan) to rangeland degradation. In some areas nowadays rodents represent the most dangerous threat to the plateau ecosystem. Possible explanations to rodents' indiscriminate expansion are that it resulted from decreased mobility patterns brought in by population increase coupled with GoC policies, which boosted overall anthropization processes. Increased human presence in a more settled manner (with increasing presence of people, hunting, traffic, dogs, noises and alike) has chased out many of the rodents' natural enemies (eagles, foxes etc...), thus providing rodents with a favourable environment for reproducing and expanding. On the other side Tibetan traditional culture traditionally does not easily allow killing natural creatures without a justifiable

purpose, although this is now changing to an extent. As a result rodents remain unchallenged on the rangelands and could easily develop at the expense of grazing resources.

GoC subsequent campaigns hinged on the use of chemical poisons to control their consistency in Qinghai plateau has sorted limited short-term effects but further aggravated the problem in the long term. In the opinion of GoC officials that undertook those campaigns, the poorly systematized usage of chemicals against these animals has ended up in fostering rodents' resistance while mainly affecting rodents' natural enemies who fed with poisoned rodents' carcasses. Side effects are also reported in water and vegetation contamination (World Bank, 1991). The outcomes of these events have broken local food chains and related ecological balances and further spurred rodents' expansions, whose reproduction rate is much higher than that on any of their natural enemies. The only possible ways to tackle this problem is to favour the presence of rodents' natural enemies, which is not an easy task. Some local authorities make special straw reserves available for eagles' nesting and claim the result are encouraging. No doubt this process is a long one and would need short term complimentary activities.

Major questions and issues remain unresolved concerning causes of rangeland degradation and the way to ensure sustainability of pastoral production on the Tibetan Plateau. It must be nevertheless accepted that the traditional pastoral livestock production system, while it may have been the best system for maintaining the long-term balance between environmental needs and human production needs, no longer exists on the plateau. The probability of it being restored in the future is remote, both for socio-political reasons and the fact that the environment in which it existed is no longer the same (Sheehy, 1998).

4 - THE LOCAL SOCIETY

The Tibetan society has undergone a number of huge changes during the last decades. The presence of the Chinese has, among others, developed institutionalisation as well as commoditization processes – meaning the increasing role of institutional and market forces - which challenged traditional production and living patterns. Ongoing integration into the wider Chinese as well as global frames provide with critical potentials and threats to local livelihoods.

BOX 4.1 –Major ongoing trends in the project area

From the thorough analysis of PRA livelihood matrices (see Annex 6), the following trends have been very clearly identified in the project area:

- Overall population figures have increased consistently, paralleled with fluctuating trends in livestock presence (see charts 4.1 & 4.2);
- goats consistency has increased, while yak and sheep numbers have dropped in recent decades;
- herders' diet is shifting towards more market-integrated patterns – this includes increasing relevance of purchased flour and rice as staples, and sugar and margarine as substitutes of traditional livestock products;
- there is an increasing need for income-generation opportunities to meet with raising cash needs;
- degrading environmental conditions (less water, increasing inutilisable lands, etc...) are blamed as the main reason for limited herd consistency and livestock productivity;
- the 4WProgramme is restricting herders mobility and options for traditional rangeland management, while also seriously affecting the herders' socio-economic conditions;
- other GoC policies reshaping pastoral strategies and livelihoods.

4.1 - Population trends

The most relevant ongoing process that is challenging local society, production and livelihood systems is represented by the **human and livestock population trends**. These attest an increase in people's presence

(60% more in the last three decades) paralleled by consistent fluctuations in livestock resources. Tibetans are minority people in China and are therefore exempted from the one-child policy, especially those living in rural areas. Huge immigration of people from other areas of China, especially Han and Hui people, has also taken place in recent decades. On the reverse livestock numbers in the province have been steadily increasing between the 1960s and the early 1970s, after which the growth rate levelled off (Zachernuk, 1998). As an indicative example, official reports from Yushu prefecture, Qinghai province, are in that overall livestock figures have been consistently decreasing since the 1970s, to an extent that 2002 livestock presence has halved the figures from 1973.

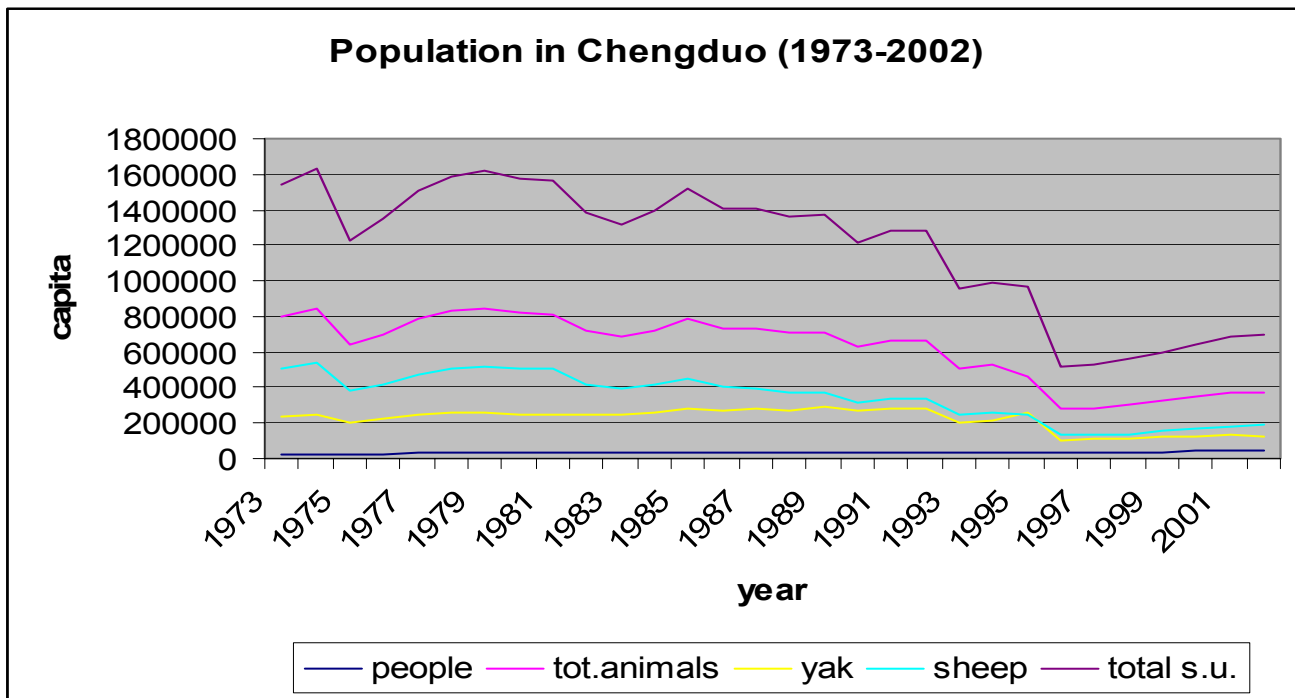
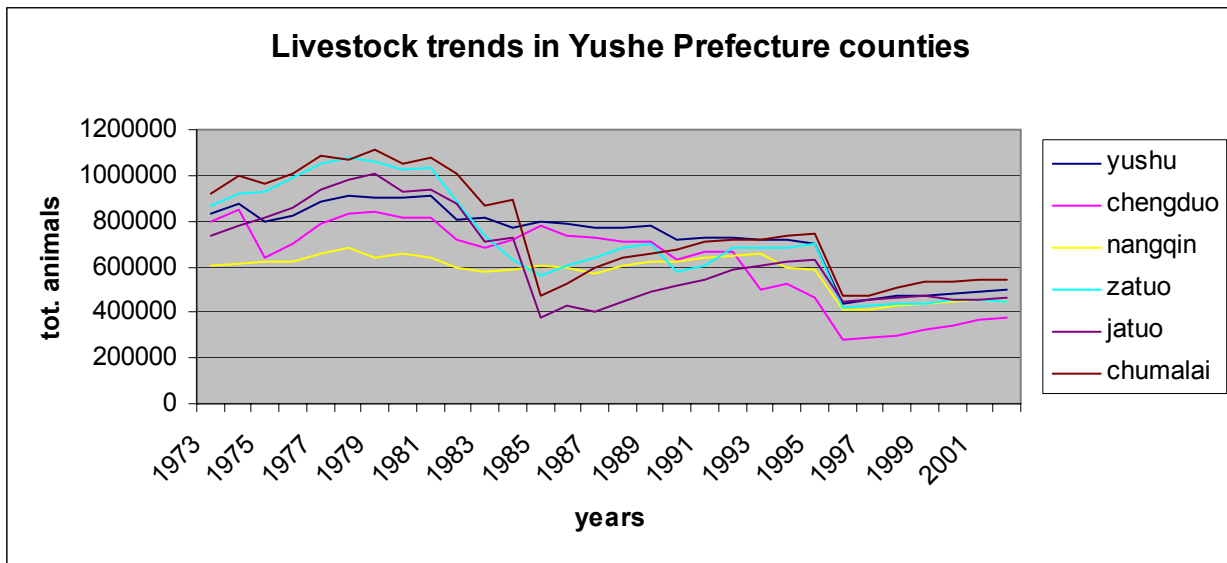
BOX 4.2 – Livestock figures: use with caution

As it is the case for all pastoral areas in the world and as other authors have also highlighted (Goldstein, 1996), official livestock figures need to be treated with caution, as they may sometime reflect other purposes than only field reporting. Figures during the Collectivization period may have been inflated to show the efficacy of GoC policy reforms. On the opposite, livestock figures after the Household Responsibility System was implemented may under-estimate real livestock consistency in order to avoid government taxation and quota system related duties and levies.

Other GoC policies such as the vaccination system and the 3RHP may also affect field figures. The vaccination programme – which is implemented on free-basis – tends to be quite effective and indeed cover local herds and flocks from a number of serious health risks. The delivery of this service is closely intertwined with locally reported livestock figures, and may therefore convince herders to provide authorities with correct numbers. Conversely the 3RH programme – aimed at destocking to preserve local environments – inhibits herders from declaring their true livestock number. Furthermore animals locally herded but belonging to monasteries and urban relatives' may not be accounted for.

Overall human and animal population trends in the area attest an increase in people's presence (60% more in the last three decades) paralleled by huge and worryingly drop in livestock resources (accounted for in the sheep unit (s.u.) line). Tibetans are a minority people and are therefore exempted from the one-child policy, especially those living in rural areas. Official policies state as three the number of children allowed for each family, but it seems poorly attended. As reported in the QLDP documentation - which could rely on longer term data for the whole Qinghai - livestock numbers in the province have been steadily increasing between the 1960s and the early 1970s, after which the growth rate levelled off (Zachernuk, 1998). These trends are also reflected by the official data concerning the project area. Official reports from Yushu prefecture are in that total livestock amount of 1.843.500 total heads in 1950 had more than doubled in 1993, reaching 3.880.290 heads. Despite these overall increasing trends, since the 1970s overall livestock figures have been consistently decreasing, to an extent that 2002 livestock presence has halved the figures from 1973.

Charts 4.1 & 4.2 – Population and livestock figures and trends in Chengduo county In the last three decades (1973-2002)



CHENGDUO county

S.U / year	people	tot. animals	yak	sheep	total s.u.
1973	25312	800300	232600	505400	1538300
1974	26180	848500	245200	538100	1631800
1975	27046	639900	202800	380100	1222800
1976	27762	702600	223200	419900	1345700
1977	28532	786900	247600	477100	1511600
1978	29338	827900	262600	500700	1591200
1979	30167	841800	260100	518900	1620800
1980	30926	816500	248100	506400	1571000
1981	31673	810500	245200	503800	1559500

1982	32430	718100	245800	416800	1380700
1983	32914	683900	246800	389300	1320000
1984	33874	721300	260800	411200	1393300
1985	34701	782600	281500	450800	1514900
1986	35493	731700	271700	401600	1405000
1987	36315	728900	278500	398600	1406000
1988	36835	711400	272500	375400	1359300
1989	37758	711900	287100	371600	1370600
1990	38503	631700	264400	316400	1212500
1991	38729	667200	276500	336500	1280200
1992	38876	665100	277800	334800	1277700
1993	38631	503500	203800	248900	956200
1994	38501	523500	213300	257500	994300
1995	38556	460700	263700	246100	970500
1996	39322	276100	106200	129900	512200
1997	39240	286100	109800	131900	527800
1998	39153	301500	115400	140400	557300
1999	39106	322600	120200	155800	598600
2000	39604	344700	120600	172600	637900
2001	40192	369000	130700	182100	681800
2002	40581	376800	124500	194500	695800

Source: Civil Affair Bureau, Chengduo and local authorities.

Note: 1 yak = 4 S.U. (sheep unit) in these calculations

The consistency of sheep peaked by the beginning of the 1980s, and a decreasing trend has started since then. Yak numbers, on the reverse, have been slowly increasing through recent decades, and almost equalled sheep numbers, when the big snow disaster of the mid nineties struck the region. A very likely explanation for these trends is in that sheep were favoured by GoC policies rather than by local herders. Once the de-collectivization process started and households were given the responsibility and the freedom to restructure their herds, sheep numbers have been decreasing, while yak presence has been on the increase on local ranges. The relevance of goats is also increasing and they often replace sheep, especially among poorer households, mainly due to market-related reasons.

These figures and the related chart also clearly show the major impact snow disasters had on local livestock numbers and pastoral livelihoods. Present herds' performance is still hugely affected by the 1995 events. The short-term trends for the late 1990s attest the faster restocking rate of sheep compared to yak. Raises in goat keeping seem to be the most outstanding coping strategy local communities applied for fast restocking where conditions allowed. The three xiangs where goat breeding is not an option are far behind in restocking processes. Some of these figures may be affected by the different political agenda related to livestock numbers in the diverse periods. It is nevertheless quite clear that current livestock presence is much lower than it was about 30 years ago, while population figures keep on increasing at a constant rate. Analysis of trends of poverty increase on the plateau may well start from this consideration.

BOX 4.3 – A concern for health

Human health problems are reported as a major problem in most communities. Services are so poor that death rates for problem related to abortion and appendicitis are very high. Other problems include Arthritis, Pneumonia, TBC, and children pertossis. Few communities still rely upon traditional medicine practices; modern knowledge and equipment are often needed and requested.

4.2 - Land, Livestock, Labour and poverty

Local communities rely upon an extended household system, which shares resources, labour and needs among different households and generations to a certain extent. Social support systems are present often in poorer areas or during critical periods. Some households may even leave their livestock and grassland to seek for different town-based livelihoods and their livestock is taken care by neighbours or relatives, which will pay the taxes and manage husbandry. Ploughing yaks may also be shared. Traditional patterns related to land, livestock and labour exchanges and rental exist. Herding labour can also be allocated to herds belonging to monasteries – whose animals are ‘holy’ (*tzewu*) and cannot be slaughtered – in exchange for a quote of their milk and wool production.

Land and livestock managed by the different households result from redistribution processes that took place between 1980s and 1990s as a result of the Household Responsibility System, which replaced the previous Collectivisation campaigns (see Chapter 5 about the political frame). By those times animals and pasture lands were allocated according to a number of criteria including household members, soil quality, local livestock consistency, etc... The lack of regulating mechanisms to revise land redistribution according to up-to-date needs and potentials (land cannot be purchased or leased) is perceived as a major problem for future natural resource management patterns as land is further fragmented in time due to the system of trans-generational inheritance system (Goldstein, 1996).

Despite high local population growth rate, about 1.5% yearly, **labour force** availability may be a factor hindering economic development in many households, especially the female-headed ones. One explanation may be in that most youngsters get married, get children and thus form a new family at a very early age, so to leave their family without their labour input as they have to look after and develop their own herd and care for their household members (Chaywanov, 1967). The role played by monasteries and religious centres in attracting households human resources should also be carefully addressed while analysing family and labour dynamics and micro level.

Following policy reforms and environmental factors (which will be analysed later) poverty and social stratification are nowadays quite outstanding in some areas. These are not new issues as historical literatures on the matter and most existing documents have always reported these two features as characteristics of local pastoral livelihoods. The social gap in certain areas is nevertheless raising worryingly, as it also applies in other areas of China. **Poverty** levels in the project area result from a number of different factors and processes. Differences among diverse communities resulted from the way livestock and lands were redistributed when collectivisation period came to an end (1984 the former and 1994 the latter). Most likely inter-communities differentiations were in place even before and are inextricably due to ecological conditions and management capacities. This may also apply to the case of different households in the same community. From the data provided by local authorities nowadays some households manage five times the land of a neighboring one with similar households size.

Poverty criteria according to local authorities (Bawo Dorje, pers. comm.) relate to

- few animals,
- big household size,
- poor soil and range quality,
- lack of alternative sources of income.

Other indicators we suggest to utilize include:

- the distance from major towns and markets,
- the quality and amount of available rangeland,
- exposure to climatic extremes,
- labour force availability,

- the possibility to collect Mbu in one's land (without paying land rental rights), and
- the level of involvement in GoC programmes (see below chapter 5.1).

Thresholds for a classification based on **subsistence level** may consider the following indications from other experiences in the area. QLDP estimates 25 yaks (of which at least 30% should be productive females) are necessary to ensure a household's subsistence (ICIMOD, 2000). Similarly Miller (1997) attests that in terms of animal numbers, around 25 'Sheep Equivalent Units' (SUs) per person is the generally accepted break-off point for poverty. Families with less than 25 SUs per person would not be able to meet their basic needs. Goldstein (QLDP, 1997) developed the following classification for herding communities that may also be applied to ASIA project area:

- **Group 1 - poor:** households with less than 20 animals. Most of the households in this group only raise yaks – few sheep may be attached - their priority being to fulfil the family self-consumption requirements. The restricted family tends to manage its herd together with other households, exchanging labour force or other resources. A limited number of these households are to be found where natural resources, infrastructure and investment are more favourable. These households might benefit from alleviation poverty funds, subsidies in food and clothes or help from the various associations but have no access to credit. Households belonging to this group have to seek for income generating opportunities outside the periods of heavy labour requirement for their own herd and highly exposed to poverty and vulnerable to events.
- **Group 2 - medium:** households with enough animals to fulfil their subsistence and cash requirements. All of them raise both yaks and sheep but without enough saving capacity to invest in livestock improvement (between 20 and 120 animals). Yaks numbers are generally limited by the labour force available while the size of the flock is variable. In this category, different situations may be distinguished according to the local conditions and the herding systems encountered in the area. Sub-groups may be considered according to the composition of the herd, represented by the ratio sheep/yaks.
- **Group 3 – better off:** households with a saving capacity. The estimation of cash income shows that the saving capacity is reached with a herd of more than 120 animals. Like for the preceding group, sub-groups may be distinguished based on the sheep/yak ratio in order to represent different herding systems.

Female-headed households represent a discrete proportion of local population. They can originate from widowhood, from divorces but also from the migration of the male household head. Although these households can often rely on support from local social networks, they are often included among the poorest ones. Useful socio-economic indicators include housing and related facilities, sheep/yak ratios, level of animal husbandry intensification, literacy levels, possession of good and assets.

Widening social gaps increasing lead to:

- **local contractual forms** where labour and/or land and/or livestock are rented from a household to another. Rental agreements are left up to individual herders to negotiate and are framed by traditional mechanisms and customs that would need deeper understanding.
- **out-migration** from the livestock sector, with poor pastoral households eking out their living around townships and urban areas. These households often lost their animals during some harsh winter and did not dispose of means to restock afterwards. Some of these households are entitled to receive attention and assistance from the GoC Civil Affairs Bureau (CAB).
- **Re-establishment of cooperatives** for poor and destitute herders as a way of jointly managing risks and re-capitalise assets.

4.3 – Risk management

Poverty and risk are closely interacting factors triggering vicious circle in the local economy and undermining sustainable pastoral development. Due to the poverty, herders' capacity for risk avoidance, direct reaction and recovering from the risk is lower. Paralleling to that, due to the risk loss, herder households get poorer and poorer. During the 1998 CIAD household survey in Qinghai Province (reported in Liu Yonggong & Wang Haimin, 1998) survey, following risks have been identified by both female and male herders:

Natural /environmental risks

- The risk of snow disasters, recognized by all herders, ranked the first among all risks in terms of economic losses and effects on the animal production;
- Wolf attack, although the damage in terms of economic losses is higher than that caused by animal theft, herders thought that it is not too serious, and can be avoided by patiently taking care of the animals
- Animal diseases, most respondents think that the animal diseases are not so serious as indicated in the statistical data of the county level.

Economic risks

- Marketing failure, most herders think this is a serious risk, but they can do nothing to avoid them.
- Reasons for marketing risks identified by herders and village leaders are: lack of market information; poor market facilities and transportation conditions; no marketing organizations at the community level; Consequently, herders have very lower profit from the products marketing.

Social-economic risks

- Grassland resource conflict is one of the social-economic risks occurring between neighboring communities and outside counties and provinces. Governmental co-ordination on such conflict is quite weak;
- Demographic risk: increased population in the pastoral areas created high resource pressure on grassland. On the other hand high population resulted in poverty of the herder households;
- Animal theft, although less economic losses compared with wolf attack, more psychological stress imposed to herders than other risks. Since the grassland tenure reform, the income disparity between households has been enlarged very quickly. Stealing animal is an illegal way for balancing the disparity. There are two types of animal thefts: community Mafias who have no any livestock properties, and outside theft from Sichuan and other counties. According to the local officials, herders have not yet found a proper measure to control the theft losses, public security agency are normally not involved in the control of stealers.

While Tibetan pastoralists apply a range of strategies aimed at reducing these risks, appropriate institutional support at all levels is increasingly needed for to minimize the exposure to these risks as well as to cope with related impacts.

4.4 - Income-generation and market mechanisms

Another important factor of change in the area is the consistent degree of public as well as private investments which is reshaping local landscapes, with **boosting development of basic infrastructure and facilities** (roads, housing, schools, power plants, etc...) throughout the province. Levels of transportation and trading are reportedly increasing at a fast rate on these portions of the plateau. The main county towns present with many developing constructions and building. The main prefecture road has been upgraded with tarmac in 2002. Many herders report the number of external trucks and traders having boosted since then. This is partly due to the GoC 'Developing the West' strategy and partly to the further liberalization of private market forces, which find interesting investment options in western China provinces.

Increasing concentration of population urban centres and the growing demand for protein-rich food in the world (FAO, 2001) provide real opportunities but also significant threats to pastoral communities. While in fact these

pressures are likely to affect and challenge local traditions and culture, they indeed offer a wider set of fresh socio-economic opportunities to local communities. Market exchanges of local pastoral products could rely on expanding urban demands and increased transport networks, developing townships provide rural households with off-farm income-generation opportunities and out-migrating pastoralists could more easily find alternative livelihoods in non-rural sectors. While providing better options for market exchanges and income-generation, increasing demand for livestock products from fast-developing urban areas also puts a higher burden on local rangelands.

As a result **market integration** of local herding communities is an ongoing process whose relevance is constantly growing. Tibetan herders traditionally commoditize animals' meat, fur, wool and skins, yak dairy products and even dung while agro-pastoralists portions of their crop. Levels of commercialisation of animal and crop products depend on surplus production and from market accessibility. Indications are in that local households are increasingly resorting to the market to satisfy their needs; given the limited livestock productivity, alternative income-generation sources are gaining importance for local livelihoods.

Off-farm income-generation opportunities have developed in the area since the liberalization of - and the increased accessibility to - the market. Sources of these incomes are proportional to closeness to towns (labour) and market (sales).

- **Sales of livestock and farm products** still represent an important source of income, especially during summer, when animal conditions are good and productivity and slaughtering levels high. Wool and hair are mainly sheared and marketed during summer. Crops are normally sold just following harvest time.
- **Collection and sale of wild products** is an important item. The major source of income in the whole region is the collection and sale of the Mbu (*Caterpillar fungus*), a natural product highly demanded in Chinese and local markets. Mbu collection and sales normally takes place by end spring and summer. Although Mbu is a traditional product in these areas, its commercialization has been allowed only since beginning of the 1990s, when overall market liberalisation took place. In QLDP area, Mbu collection and sales alone accounted for about 80% of some households' income, and similar figures have been reported during our field survey.
- Another consistent source of local incomes is **gold digging**, which has been a major source of income for households in specific xiangs (Zaduo, Gatuo) during the 90s, either by direct enterprising or – more often - trough land or labour rental.
- **Labour hiring** is another traditional strategy that allows exchanges among different social strata. Payments may take place in kind on a food-for-work (FFW) basis. Herding labour (grazing, milking, forage collection, shearing, fencing) is the most typical option for local pastoralists, who often have limited skills to find alternative incomes.

During summer some poor households' members may find off-farm income-generation opportunities by hiring their labour for herding, farming or building purposes to close communities and townships. The FFW system also applies to GoC public work schemes aimed at road maintenance, public buildings, infrastructure development, etc... During winter time also women may look for off-farm incomes through weaving, dress-making and skin boot works, while men may seek building opportunities in town. Traditional Tibetan painting and drawing are also reported in some areas as a source of income.

4.4 - Gender issues

Women play a central role in livelihoods on the plateau. Tibetan women wake up very early in the morning and go to sleep very late in the evening, every single day of the year. Although this may seem a typical character of rural societies, its relevance is even more vital in pastoral contexts. Apart from caring for the family and lactating animals, milk and wool processing are typically a women's task, while men herd and take care of the herd and process meat and skin. Summer and autumn are the busiest seasons for women, while winter is the only season when there is some spare time.

Table 4.1 - Women seasonal activities

SPRING		SUMMER	
dig Mbu, crop ploughing and sowing, take care of lambs, prepare meals	Milking (twice a day) and dairy processing, herding, take care of calves, housework, prepare dung, wool lining, churning butter, prepare tsampa, Tibetan chocolate, ploughing, water fetching, collect wild grass x weak animals, weeding, fertilise plots with manure, prepare meals		
AUTUMN		WINTER	
harvest (barley, radish, potato), move tent, ploughing, dry barley, collect dung and form walls, manuring, dairy processing for mkt and winter storing, prepare meals		skin tanning, collect dung, dry and toast barley, feed weak animals, collect dung, weaving, prepare meals	

Source: information developed with local communities

In the Tibetan culture traces of a matrilineal kinship system persist and contribute to a relatively autonomous status of women. While inheritance generally follows patrilineal lines, it is not unusual that in the interest of safeguarding the family property the female line is followed (see also Dideron, 1995). Despite this social recognition, women decision-making and educational levels are still low in the Tibetan rural society. Women, due to their role-bound activities, are more tied to the home/tent and generally less mobile than men, which is one of the reasons women participate less to market and institutional options.

5 - NATURAL RESOURCE MANAGEMENT IN THE AREA

Communities inhabiting the project area depend to different degrees on livestock production with a number of households cultivate barley, radish, potatoes and oil crops to complement animal production whenever conditions allow (mainly in the southern xiangs). Livestock and crop products are often used for self-consumption, but they may be marketed to a certain extent in case of surpluses or critical household need for cash. Collection and consumption of wild products (*Mbu*, *troma* and mushrooms) for food and income generation are also traditional activities in the project area.

Increasingly local households are resorting to the market or to off-farm incomes to satisfy their needs. Production, consumption and marketing patterns change consistently on seasonal basis.

5.1 - Herd and flock management

Tibetan pastoral production systems vary widely across the plateau. Pastoralists usually raise a mix of different animal species. Each has its own specific characteristics and adaptations to the environment. Different species graze on different plants and, when herded together on the same range, make more efficient use of rangeland vegetation than a single species. Different animals also have varied uses and provide diversified products for home consumption or sale. Maintaining diverse herd compositions is also a strategy employed by pastoralists to minimize the risk of losses from disease or harsh winters, since a mix of different species provides some insurance that not all animals will be lost and herds can be rebuilt again. Yak and sheep are by large the most relevant animals; the importance of goats is increasing while horses are decreasing due to GoC policies. The features of these animals are different and their roles complementary, as a result, with yak representing the subsistence animal well adapted to local conditions on the eastern portion, while sheep are more relevant for the subsistence of pastoral communities in the drier western portion. The ratio sheep/yaks is an interesting indicator that reflects the environmental conditions, the availability of marketing as well as the strategy of the household (Goldstein, 1997).

BOX 5.1 – A diversified system (excerpt from Miller D., 1999)

Tibetan pastoral production systems vary widely across the plateau. Pastoralists usually raise a mix of different animal species. Each has its own specific characteristics and adaptations to the environment, and raising yaks,

sheep, goats, and horses together maximizes the use of rangeland vegetation. Different species graze on different plants and, when herded together on the same range, make more efficient use of rangeland vegetation than a single species. Different animals also have varied uses and provide diversified products for home consumption or sale. Maintaining diverse herd compositions is also a strategy employed by pastoralists to minimize the risk of losses from disease or harsh winters, since a mix of different species provides some insurance that not all animals will be lost and herds can be rebuilt again.

Yak is the subsistence animal among herders and it is vital for local economies and livelihoods. It has a great resistance to climatic extremes - as yak is well adapted to high altitudes and low temperatures (Bonnemarie 1986; Cai Li 1989; Pal 1992) – but it is very slow in restocking due to its slow reproduction rate (average of one calving every two years). In lower southern xiangs also yak-related crossbreeds such as Pa and Nzumo – higher milk production but lower resistance - may be found.

Yak herds often present a proportion of one-third mature lactating Dri females. Mature males percentage is higher than other pastoral areas due to their relevance for packing. Yak multi-purpose role includes:

- meat, milk and dairies for local diet,
- hair and skins for tent, cloth and boots making and
- labour for packing and ploughing;
- dried manure is also the major source of fuel in these environments where trees do not grow.

Yak milk is very appreciated for self consumption and marketing of dairy products; it flows in summer and autumn when it constitutes the main diet component. Highest production peak may reach 3 jin/day. Its quality appears excellent for nutritional values as well as for processing, with a 6,5% fat content and a 5% protein content. Meat consumption is also a vital source of proteins in the local diet. Its consumption is higher in autumn and winter.

Conversely **sheep** flocks have lower resistance to the eastern plateau harsh climate - with lower production and survival rates – but recover faster from snow disasters. They are marketable animals who contribute to local livelihoods often in the form of cash sources, but also with their milk, wool and meat. In herding areas, only quite better off households keep consistent flock of sheep (where they maintain an income-generation meaning). They are more appreciated in farming environments, where their performance increases as well as their social appreciation. Sheep generally lamb every year but due to abortion and other factors, the lambing rate is only about 60%. Ewes represent around 45% of the flock as an average.

Table 5.1 – Differentiating features of yak and sheep

<i>Sheep</i>	<i>Feature</i>	<i>Yak</i>
Market value; milk and meat more appreciated in farming areas	Socio-economic Value	Subsistence animal and wealth status symbol among herders
Limited mobility, especially in critical times	Husbandry	May trek further if conditions impose
Limited	Resistance to wet and cold	High
Lower and drier	Preferred environment	Higher and Wetter
Institutions and market	Preferred by	Traditional system
Very fast; start at age of 1	Reproductive rate	Quite slow; start at age of 4
Spring (high mortality)	Offspring	Summer
End spring to summer. Average 1 jin/day Limited processing and only for household consumption.	Milking and dairy products	Summer and autumn. 2 to 3 jin/day of quality milk that allows for good processing. Dairies also marketed.
Affected by forms of parasites and skin diseases	Health problems	Mainly affected by species of worms

Very fast reproduction rates. Milk production in springtime, when livelihood conditions are much stretched. Easy to market, when household's cash need arise. Meat and lambs good prices, while wool value very limited.	Main strengths	High adaptability. Very resistant to extreme winter conditions; can feed on limited amounts if conditions impose; long lasting milk production (up to 2 years). All yak products fetch good market prices.
Quite vulnerable to climatic, wildlife and health problems; little milk production (especially in altitude areas); troublesome husbandry. Market prices of sheep products are very volatile.	Main constraints	Very slow reproduction rates, which make restocking after SDs very slow.

Source: table developed with local communities

Goats and horses also are part of local herds, but to a lesser degree. **Goats** are mainly kept as cash animals because of their valuable wool and skin. Current increases in goat number in farming areas (where their meat and milk are appreciated) is outstanding and may be explained with a number of factors:

- Encroachment of agriculture production which confined pastures to rocky and sloppy areas (where browsers perform better than grazers);
- Goats are cheaper to buy and easier to manage than sheep;
- Goats' reproduction rates are faster than sheep;
- Goats' wool fetches high market prices (about 80 ¥/jin Vs 2,5 ¥/jin of sheep wool in 10/03).

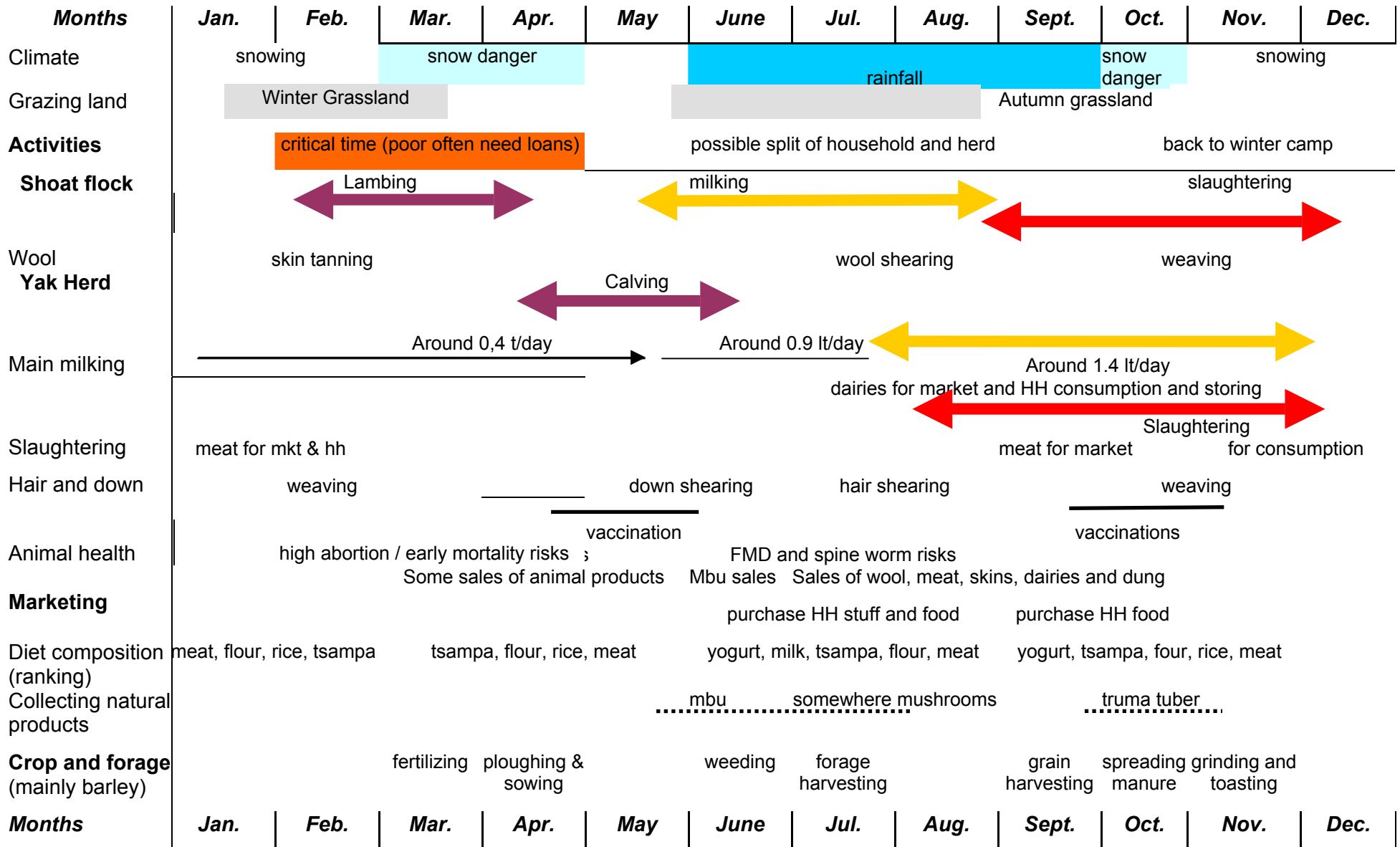
Table 5.2 – Relevance of different livestock products

<i>Product / animal</i>	<i>YAK</i>	<i>SHEEP</i>	<i>GOAT</i>
MEAT			
	Sept to Nov for mkt Nov & Dec for hh use	During autumn for both mkt and hh use	Only in farming areas No mkt value
MILK			
Time	Summer & autumn	Late spring & summer	Late spring & summer
Availability	Little tea milk during winter	Not milked in altitude areas	Milked only in farming areas
Use	Main processing in autumn for winter storing and mkt sales	Mainly consumed fresh; possible processing Only hh use – no mkt	Mainly consumed fresh by poor households; Only hh use – no mkt
HAIR, WOOL & SKINS			
	Fur, downs and skins quite valuable at local markets	Wool and skins of little worth, despite past high pricing	Wool and skin fetch very good mkt price

Source: table developed with local communities

Horses are raised for transportation purposes and are increasingly substituted with motorbikes. Some agro-pastoral households also raise poultry, mainly for children egg consumption. It seems this is a recent adoption among Tibetans communities in this areas, as it used to be prevented by religious believes.

Chart 5.1 - Chengduo County, Yushu Prefecture – AGRO-PASTORAL SEASONAL CALENDAR; 2003



5.2 - Livestock productivity

When a snow disaster happens, all animals are equally impacted by the unavailability of pasture, while in bitterly cold winters sheep and goats tend to be more affected (with high death, abortion and early mortality rates). Small ruminants can in fact trek shorter distances compared to yaks and their physical resistance and coping capacity to harsh conditions are lower. For small ruminants it is also more difficult to melt snow strata to access grassland. Moreover, lambing time is often by the end of the winter season, when ewe conditions are at lowest and range resources still scarce and poor in nutritional terms.

Livestock production coefficients in the province are low compared to other regions in China, as they reflect the severe environmental and nutritional constraints affecting animal performance in the region (QLDP, 2000). There therefore seems to be large room for improving the current system through better use of indigenous genetic resources of both livestock and forage, adjusting the structure of species and also herds/flocks, reducing non-productive animals on the pasture, improving reproductive efficiency and animal health service etc... (H. Jianlin, pers. comm.)

Major livestock productivity problems as reported from local communities are:

- Low winter survival rate among young animals (lambs and calves);
- Poor milk productivity;
- Shortening of milking season;
- Low re-productivity levels;
- Low pregnancy rates;
- Decreased resistance to winter extremes;
- Increased vulnerability to health problems;
- Progressive decreases in size and live weight.

Other relevant problems for herd management as indicated by local herders include predators (mainly wolves/foxes) and theft.

Mature breeding female yak are breeding every two years (since the age of 3 to 4), while sheep ewe reproduce on almost yearly basis (since their first or second year). Low birth rates are coupled with high early mortality rates - QLDP reports lamb mortality at 32% and calf mortality at 21% in 2000 in neighboring counties - making overall restocking processes very low and off-take levels very limited.

As widely reported by herders during the field survey and confirmed by literature reading (Yang, 2000), overall livestock productivity has decreased markedly over the last two to three decades. This worrying decline in animals' productivity is increasingly jeopardizing the sustainability of local pastoral livelihoods. Two major reasons may be identified in:

- deterioration of rangelands conditions and grazing resources which lead to **insufficient nutritional patterns** and
- **levels of inbreeding**, especially among yak herds.

These two major factors have led to a variety of consequent problems (e.g health-related) which have in turn further aggravated these processes. The underlying causes of these problems may have originated by the changes within natural resource management patterns on the plateau, aimed at enhancing people and animal settlement in specific areas. This form of human colonization of the rangeland - which denies to a certain extent traditional Tibetan pastoral mobility and exchange patterns - has in time produced a series of unwanted consequences, which seriously affect the ecologies of local rangelands and livestock. Huge distances among communities and limited mobility given rise to herds with high levels of inbreeding, which seems to be a major reason for decreasing yak performance in the area. While genetic improvement as a whole would require time and resources, restocking programmes could contribute to improve local conditions by distributing yaks brought in by similar but distant areas.

The roots of these ecological and genetic problems are therefore to be identified in the changes that affected traditional pastoralism. While it may be difficult to tackle these structural problems in the short term, sensitive interventions related to the livestock sector may address overall herd and flock performances through improvements in the health as well as the feeding systems. Healthy animals develop better overall productivity and increased resistance to harsh winters, which are the pillars for any development-based process in the area.

BOX 5.2 - A concern for genetics (contribution from Han Jianlin, ILRI)

Here I think there are more work to be done regarding the reform of the herd and flock structure. First, we need look at the breeds of sheep and goat in current flocks because I am not sure if particularly the local sheep flocks are the indigenous Tibetan sheep, crossbreds or other improved breeds (semi-Merino?). I remember that when we did a survey in Gansu the local Tibetan and Mongolia herders complained the poor adaptability of the crossbreds or semi-Merino and low market value of the wool. I personally believe we need to restore and improve the Tibetan sheep genetic resources to increase the meat productivity and quality, (not milk!), disease resistance to parasites and skin quality. For goat, we need to look at the issue of cashmere yield and quality, then the meat yield and quality, genetic resistance to parasites and skin quality through exploring the indigenous Tibetan goat genetic resources, no more exotic breeds! For yak, we need to look at the meat and milk productivity, genetic resistance to parasites and then undercoat yield and quality. All herds and flocks, a good structure of age and reproductive groups needs to be addressed to improve the efficiency of production system because nearly all of the Tibetan herds and flocks are kept with more non-productive animals! Certainly an optimum structure of herds and flocks in certain xiangs needs to be adjusted by considering the ecological, pasture, socio-ecological conditions and marketing opportunities.

5.3 - Crops and forage production

Main domestic crop produced in the area are barley, oat, Tibetan radish, potatoes, local cereals, legumes and oil seeds. Most of these crops may serve for both human and livestock consumption, depending on specific needs and availability.

Barley (*Hordeum vulgare*) is mainly sown in winter livestock corrals, which provide for highly manured and well protected plots for summer crop growth. The rationale reported by many households is that they tend to harvest grains if agro-ecological conditions allow, with straw stored and used as forage. Should climatic conditions not allow grain production or the owned animals are many, barley is used for forage production. Grains in fact can be easily purchased at the market, while forage resources during winter time are vital to keep animals performing. Sowing time is during spring and forage harvesting in July before the flowering stage or in September as a by-product of grain production. In areas where conditions allow (mainly agro-pastoral communities of the southern xiangs) households cultivate barley for their own grain consumption on open plots around their housing.

Oat varieties (*Avena sativa*) used to be a widespread option before, but their relevance has decreased in recent times. Oat cropping is hindered by seeds availability and by the GoC programme that inhibits productive use of valley bottoms in altitude areas. Oat performance seems to be comparatively better in altitude areas and indications are in that it may well perform in the project area. Herders and farmers report that oat perform better than barley and provides better quality forage. Oat is also reported to have very well performed in the QLDP area - Guoluo prefecture, which ranges mainly from 3000 to 4100 and present ecological similarities to neighboring Chengduo prefecture. Production in those demonstration sites reached values between 2500 to 4400 kg/ha of fresh hay production at most sites, and even reached seeding stage at mid-altitudes. Oat is in fact the crop suggested by the GoC 4WP to enhance forage production. Attention should be given to the sowing depth, which should not be too shallow, otherwise the root system grow too weak. Oat seeds can be self-produced for about 6 to 7 years, afterwards fresh seeds must be purchased.

Another plant that locally provides interesting forage and/or food resources is the **Tibetan radish**, which is cropped in some areas (Gatuo, Labu, Xiew xiangs), dried and sliced for animal feeding during winter time. Rough indications are in that the high carbohydrate content of the radish is a good complement to barley hay and available pasture, so to improve animals' performance and resistance in wintertime. Tibetan Radish seeds can be self-produced for about 10 years without major production decrease. Some households also eat the radish themselves, but it relates to very poor social status or conditions

Potato production is expanding in southern xiangs of the county some areas and is becoming an important component of agro-pastoral diet. Production levels are good but surplus marketing is still a problem. In a limited number of areas communities also grow **legumes** (varieties of peas recently introduced from other provinces in China) mainly for forage purposes. This is an interesting potential whose extent and relevance should be further assessed. It is in fact doubtful whether the project can contribute to these efforts at this stage. Minor cereal and root crops are also reported.

Table 5.3 – Main features of major crops and forage yields -

<i>Crop</i>	<i>Sowing time</i>	<i>Sowing density</i>	<i>Average yields (forage)</i>
Barley	April for grain	25/30 jin x mu	Up to 400 jin DM
Oats	May for forage	35/40 jin x mu	Up to 8000 jin fresh
Tibetan Radish	May to end June	2,5 jin x mu	Up to 4000 jin DM

For oats and the Tibetan Radish, the major problem local farmers face is the poor availability and the high price of the seeds. Conversely barley seeds do have specific marketing, as most households just sow parts of the grains they purchase for consumption.

5.4 - Winter coping strategies

Traditional community strategies aimed at reducing exposure and impact of recurrent snow disasters mainly rely on seasonal grazing, transhumance mobility and herd size maximization and diversification. More recent complementary techniques involve fencing of critical pasture, degrees of fodder production, hay storing and winter animal shelters, especially for young animals. Livestock winter feeding strategies are particularly relevant with this respect. During winter and spring seasons animals have to face with increased nutritional needs to cope with harsh climatic conditions while their feeding opportunities decrease consistently as pastures whiter and snow may cover huge rangeland extension for long periods. Limited mobility patterns and degraded rangeland conditions have brought in further difficulties to these times. A number of strategies is traditionally applied by local herders to tackle these constraints.

Where conditions allow households grow barley and other crops as forage or harvest wild grasses and store them on their roofs in order to feed them to critical animals (young, re/productive and sick ones) during the harsh periods. In the project area herders' capacity to conserve forage resources for difficult times is favoured by cold and dry climatic conditions. Stronger animals may be sent elsewhere not to affect limited grazing resources for the other herd components. Remaining weak animals are often fed separately with complementary feeding, which balances energy and protein losses. Local products that may serve these needs are radish/potatoes (which may provide caloric starch) and kinds of local peas (for their protein content) or local grains.

Fencing and protecting critical pastures for winter and spring grazing, is another strategy traditionally applied by Tibetan pastoralists. Earth walls were built with this respect, and they can still be seen in the project area. This practice was applied also during the collectivization system. Sunny sides are generally fenced first and used selectively to keep the weakest animals: youngest calves in autumn and winter, ewes in early spring. Although local authorities and GoC programmes support and incentive these coping strategies (4 Ways Programme), the efficacy and effectiveness of related institutional efforts are to be improved.

5.5 - Animal health

Matched with poor nutritional levels due to grassland conditions, livestock health problems hugely affect herd productivity and resilience and are the main reason for the high mortality rate amongst young animals. Although the relevance of specific diseases changes from an area to another, the overall impact upon herders' livelihood as a whole is quite consistent (e.g. decreased milk quantity and quality, slow restocking rate, low market value of livestock products, limited winter resistance, etc...). Problems related to inbreeding phenomena are also reported as a major reason for decreasing livestock performance in the area, especially for Yak. This problem has been increasing in the last decades, probably as a result of reduced mobility patterns of local herding communities.

BOX 5.3 – Most relevant animal diseases in the project area

In the county of Chengduo major animal health problems reported for yak include Hemorrhagic Septicaemia, Anthrax, spine and brain worms, while *Clostridiosis*, intestinal and skin parasites represent a major burden for local sheep and goats. Diarrhoea problems (often due the *Escherichia coli* and/or similar strains) and gastrointestinal parasites consistently affect local herds performance in that are amongst the major reason for calves and lamb mortality (together with cases of pneumonia). Direct threats to human health such as *Brucellosis* and *Echinococcosis* are also reported in the area.

Participatory surveys implemented through the Herd Interview technique (Waters Bayer, 1994) indicated that yearly losses provoked by animal health problems affect about 15% of the overall county herd. This figure could not be certified, as there is no record and reporting of animal deaths at local level. Technical documents from the EC-funded Qinghai Livestock Development Program (QLDP) in neighbouring Guoluo prefecture seem to confirm this relevance, with average prefecture figures reporting approximately 10% of yak calves and 25% of lambs dying each year before reaching maturity.

Governmental concern mainly addresses transmittable infectious diseases (Anthrax, HS, *Brucellosis*, FMD and sheep-five-diseases) often through vaccination campaigns, while allocating a minor interest upon common diseases and parasites despite their economic relevance. Internal and external parasites represent in fact a major threat to local livestock conditions, as they facilitate the incidence of other major diseases, by leading in turn to low reproduction, high abortion and early mortality rates. Although herders acknowledge the relevance of parasites, these still receive little attention. Despite recent public efforts to revive the para-vet community based animal health service - which delivers some degree of training and vaccines - animal health conditions are not yet properly monitored, diagnosed and controlled (see chapter 6.3). Once an animal becomes sick there is little to do at local level most of the times.

5.6 – Herd products

Almost all animal products and by-products are utilised in local livelihoods. Meat, milk, hair and skins are all utilised for internal household use, but may also represent an interesting source of income. Yak dried dung cakes may be marketed to urban dwellers in autumn and winter, but their value is very limited. Yak bones are sold somewhere for soap making purposes.

Meat is often brought to markets when households' need for income is high (in winter or summer) or when animals (often at least 3 years-old males for yak) are slaughtered in autumn for dry meat storing and revenues utilised to purchase grains and other staples. Herders prefer selling small ruminants rather than yaks to face cash needs. There is a reluctance to sell live animals due to cultural-religious reasons, although this is diminishing. Market off-takes are still limited, as herders try anything they can to avoid destocking their herds and flocks. Past experiences recall state-developed slaughterhouses and meat processing factories that shut down because

of little livestock offer (Manderscheid A., 2002). The number of sold animals has increased in recent times, also due to the impact and fear of the forthcoming 3RHP with its destocking approach. Most meat traders in the area are Muslim and, although they are reported to pay better prices than Chinese and Tibetan ones, religious differences are still accounted for.

Yak milk is very appreciated and utilised for consumption and marketing, whereas shoat milk availability and use change from the northern higher portion to the southern. Yak milk is not often sold raw, although that would be the pastoralists' preferred options.

Dairy products such as yak butter and yoghurt tend to be marketed when there is surplus in the summer and early-autumn seasons. Urban demand for these products is good although pricing mechanisms still unfair. Yak cheese is not often marketed as its value - time taking and labour and energy intensive processing - is not appreciated by local market prices; it is instead used for self consumption as a component of *tsampa*. Some international agencies are trying to develop local cheese processing and export with interesting but so far limited outcomes (visit www.tibetcheese.org). The major problem stays in that Chinese consumers do not traditionally eat cheese and local demand is low. Tibetan urban dwellers consume cheese but they mainly receive it from herding relatives.

BOX 5.4 – Yak, milk and market

The local environment provides with some good working potentials for locally-based market opportunities of traditional yak milk and dairy products. These elements can be summarized as:

- Overall milk and dairy production are quite consistent. Long (1994) reports that the Tibetan Plateau represents a favorable situation for yak milk production as local milk production (...) is of a good quantity compared to that of other genetic types and other Yak areas.
- Local yak milk quality appears excellent for nutritional values as well as for processing, with a 6,5% fat content and a 5% protein content (unpublished data of the Qinghai College).
- Yak products from the project area enjoy appreciation in the region and further (reports are in that they are also well-known in the Tibetan Autonomous Region).
- Local ecological conditions allow for favorable milk and dairies hygiene and storing options.
- The human setting is also favorable in that main road networks (for transport) are quite developed, electricity facilities (for refrigerating or processing purposes) are at reach and townships are fast developing (see the intensity of house building in Jiegu and in Xiewu), with potential growing demand for protein-and-fat rich products.

Options to improve the local processing and marketing of traditional yak dairy products should therefore be explored beforehand.

Milk from small ruminants is more appreciated in the southern agro-pastoral areas, although only for self consumption. Most sheep-keepers in the altitudinal pastoral open plateau – northern xiangs - reported not milking sheep to avoid that either the ewe or the lamb will eventually die in winter because of nutritional deficits. In any case milk performance and lamb survival in those harsh conditions are quite low. Only poor households consume milk from goats. Dairy products from small ruminants are not marketed.

Hairs and skins provide pastoralists with good sources of income. Yak fur and down fetch interesting prices. The coat of a yak consists of rough hair on the surface and fine wool (cashmere or *kulu*) below. The outer hair is as resistant as goat hair, while yaks have hair of sufficient length beneath the belly to produce a hardwearing weave. Sheep wool used to fetch good prices till some years ago, due to Chinese factories interested in purchasing. Nowadays it is mainly utilized for household internal needs and purposes as its price is irrelevant.

Goat cashmere wool still fetches good market price – about 400% of the sheep one – although it is also decreasing. Shoaat wools are mainly sheared and marketed during summertime. Weaving activities often take place in winter, when women have more time available. Skins are mainly available during winter and springtime when animals died or are slaughtered for food needs. Shoaat skin during summer reduces its price to almost a half due to poor quality. Yak and goat skins may generate interesting income, while sheep skin does not.

Market information systems, distances and transport networks still pose major problems to develop marketing options for some of these products. Local entrepreneurial efforts are developing, mainly related to dairy and wool processing and trading. These initiatives may represent interesting entry points for any development activity in the area.

Table 5.5 - Autumn 2003 prices in the project area

<i>Price (¥/jin)</i>	<i>Q.huihe</i>	<i>Zenqin</i>	<i>Zaduo</i>	<i>Gatuo</i>	<i>Chenven</i>	<i>Saihe</i>	<i>Xiewu</i>	<i>Labu</i>
<i>Animal prods (1 jin)</i>								
Yak meat	5 to 6	6 to 7	6.5	6	6.5	5	6	6.5
Sheep meat	4 (winter)	5 to 6	7	7	6.5	5	6	6.5
Yak butter	8.5 to 9	9 to 11	9.5		9 to 11	11	11	11
Yak cheese	4.5 to 4.8	2 to 4.5	1.3 to 3.2				3.5	3.5
Yak yogurt		2 to 3					2	
Yak milk		1.5 to 2.5			2		2	
Sheep wool	2.8		2		2.1	2.3	2.5	2.5
Goat wool					70	70	70	65
Yak fur		3.3	2.3		X			
Shoaat skin	40 to 80	60 to 70	45		X	65	60	60
Yak skin	200 to 1000	60 to 1000	130		X	130	130	120
Dung (sack)		2.5					2.5	2
<i>Cereals (100 jin)</i>								
Barley	60	60	65		X	60	65	66
Flour (wheat)	120 to 130	70 to 140	100/100		X	50	90	90 to 100
Rice (1 jin)	1 to 1.2	0.8 to 1.4	1.25		X	0.85	1.5	1.5
Sugar (1 jin)	1.6 to 1.8	1.5 to 2	170/100		X	2.5	2.5	2.5

Source: ASIA staff field collection

5.7 - Local market dynamics

Tibetan herders traditionally commoditize animals' meat, fur, wool and skins, yak dairy products and even dung while agro-pastoralists market portions of their crop. Levels of commercialisation of animal and crop products depend on surplus production and market accessibility. As in most pastoral systems, seasonality plays a great role in livelihood and marketing patterns. Most animal products are only available in markets during summer and autumn, when good production levels allow surplus sales. Prices vary accordingly, whereas prices of non-livestock staples do not change consistently on seasonal basis. Terms of trade between livestock and non-livestock products change to an extent from one season to another.

The project so far can only rely on the few data collected during the survey, while longer-term inter-seasonal market data collection has been established to spur further understanding. The Province statistical yearbook, which could have provided our analysis with further data and information, was not made available by local authorities on basis of ‘national interest’.

Table 5.6 - Seasonal market relations

BRING	Season	BUY
Mbu; hair and wool products; Maybe animals or meat if cash is needed	SUMMER	Purchase food but also household stuff, clothes and shoes.
Animals or meat; Yak dairy products; crop products if available; yak dung and skins.	AUTUMN	Mainly purchase food for the winter – flour, rice, salt, oil

Source: table developed with local communities

Although relationship between pastoral communities and market mechanisms is a long standing one – as herders have always depended on other areas for their grain, tea and salt consumption - the nature and the extent of these relationships have changed consistently in recent times. Up to 1958 – when the Chinese started administering Tibet – there was no use of cash and meat, wool and dairy products were directly bartered with farmers and traders for barley, mainly, and clothes, salt, etc... During the collectivisation all products were marketed commonly through state-controlled mechanisms (the quota system). Nowadays market forces are unleashed and play a major role in reshaping local livelihoods.

Interestingly enough, from our PRA matrix analysis problems related to far distances and poor road conditions are increasingly perceived as affecting local livelihoods. Although distances have not changed and road conditions probably the same – if not improved - that some decades ago, these are perceived as growing constraints because their impact is higher nowadays than before.

The extent to which ongoing market integration is a natural process or an induced one is here debated. Local approach to marketing seems still highly tied to household needs for income, either to purchase food or to tackle other problems (often health ones). These needs have increased recently due to the implementation of new taxes and policies like the 4WP, which forces herders to get cash through animal sales in order to comply with policy regulations. Other elements leading to increased need for cash relate to the utilization of technical equipments. After further attempts during the collective period, nowadays limited technical equipment is used by Tibetan pastoralists. Solar panels are found in many tents, and provide enough electricity for a bulb and a radio. Motorbikes - which constitute 'the' status symbol for young nomads - are beginning to replace horses to reach the market places and to transport goods (Manderscheid A., 2002).

Market exchanges and income-generation options are mainly aimed at satisfy specific food or cash households' needs. Savings and investment still present with the shape of animals. Despite increasing cash-need and related market-integration, therefore herders still manage their livestock resources in a subsistence-oriented way, which give rise to conflicting and contradictory issues. Limited surplus production and unfair terms of trade play a role in hindering market potentials in the area. Local herds' consistency and productivity are diminishing, thus to make herders less able and willing to sell their products. The limited surplus production of most households is reported as a major constrain to develop market relationships. More often income-generation is not directly related to livestock products but to other sources (refer to chapter 4.3). As an example, in many areas mbu collection and sales may represent the only good poorest households bring to the market.

Pricing mechanisms and terms of trade for herders tend to be unfair due to a number of reasons:

- Structural problems such as distances and accessibility still hinder market dynamics despite recent improvements in the road network;
- Seasonal patterns of market relations do not favour local producers which tend to sell their some products at the same time, thus boosting seasonal offer and decreasing market value;
- The marketing of pastoral products is still a major problem in China. Although indications are in that the demand is rising beef and milk are not traditional components of the Chinese diet;

While providing fresh opportunities for exchanges and income-generation, market mechanisms also raise to an extent the exposure and vulnerability of local communities to external factors.

Elements of increased vulnerability related to enhance market integration can be summarised as follows:

- exposure to price vagaries and unfair terms of trade,
- weakness and unreliability of information systems and transport networks,
- decreased herd mobility and attachment to road networks,
- dietary changes involving decrease consumption of livestock protein-rich products.

These are all areas of concern for any initiative aimed at enhancing local pastoral livelihoods, through appropriate strategies aimed at improving livestock productivity and enhancing marketing options.

6 - THE POLITICAL-INSTITUTIONAL FRAME

Major challenges to the traditional pastoral system have been brought in recent decades by policy changes and socio-economic trends, including population growth. These have resulted in reduced mobility and increases in livestock amounts on the plateau. Increased and concentrated grazing have impacted on natural resource management and led to land degradation, soil erosion and watershed damage by over-riding the natural balances between stock numbers and rangeland capacity, with resulting stresses on natural environments and pastoral society (Matthewman, 1996). According to the existing literature (Honglei, 1983; Goldstein and Beall, 1991; Cincotta et al, 1992) this situation seems to be common the most pastoral areas in China and Tibet.

As it has always been the case for pastoral systems all around the world, relationships between the pastoral society and the central political system have been quite difficult. Development policies for pastoral areas elaborated from the central government have often been ‘osmotically inherited’ from the policies that had ruled crop-farming agriculture, which traditionally relies on diverse (often opposite) principles. As a result Tibetan herders operate within a normative environment that does not seem to reflect their values, interests and priorities and that is at times contrary to them (ICIMOD, 2000). Institutional efforts addressing poverty alleviation, risk management and environmental issues on the plateau will be here illustrated in order to provide a comprehensive picture of the major factors contributing to define the livelihood of Tibetan pastoral communities.

6.1 - A ‘dynamic’ land tenure system

The **traditional land tenure** system in Tibetan areas carried feudalistic tracts until recent times, with huge social disparities between the masters and the servants. The tribal chiefs – often invested with economic and religious power - were owners of 80-90% of pasture and livestock in the pastoral areas. Poor herders who didn’t own any pasture and livestock were hired by these chiefs and pasture lords in exchange for labour and animal products. Like peasants on agricultural estates, herders were hereditarily tied to their estate and did not have the right to take their herds and move to the estate of another lord (CIAD, 1998).

When the Chinese army took power in Tibetan areas during the 1950s, Mao’s major concern was the long-promised reform of the farming systems, hinging upon land redistribution and related reforms. The **Collectivization** process (*Gonshe*) reached the Tibetan highlands in 1958; herders had to put all animals

together and merged the grassland by the three levels ownership, namely, people's commune, production brigade and production team (CIAD, 1998). This system brought major changes in local herders' livelihoods, but it did not alter significantly the traditional pastoral production systems, as it did for other sectors.

Indications from the field and from some literature attest in fact that the Collectivization period was less traumatic and trouble-raising in pastoral areas than in inner China farming areas, due to the extent of communal resource use already involved in traditional pastoralism, such as the communal management of land resources and the risk sharing mechanisms among different households. While the production system was not deeply remoulded, these policy reforms hugely undermined the social and cultural fabric of the pastoral traditional way of life, with consistent consequences for its sustainability. Major challenges to traditional pastoral systems were

- the reduced degree of mobility for people and animals due to assigned pasture areas (smaller than previous estates), which eventually brought major impacts to the sustainability of rangeland management;
- the reshaping of local herds due to GoC preference for sheep production over yak. Particularly between 1964 and 1983 sheep as a proportion of livestock increased significantly in Qinghai province. This also led to overall increase of animal pressure on pastures.

By the early 1980's the **Household Responsibility System** (HRS) was introduced and the de-collectivization process formally brought to an end: livestock turned back into a private asset and a decade later the same also applied for land. Communal land was allocated to individual households according to the number of household members (70% relevance) and the number of animals (30% relevance). Pasture land remains formally property of the state, allocated to herders on a 50-years lease-contract basis. This system enhances overall revitalization of Tibetan pastoralism, although it further restricts pastoral mobility in some areas. Initially this reform was complemented with 'quota systems', where pastoral producers had to mainly sell their products to governmental offices and factories at controlled pricing and marketing mechanisms. By mid-1990's these further constraints were removed, thus allowing herders to freely sell their products to the market. Also the taxation system changed accordingly: before it was based on livestock number, whereas nowadays it hinges upon land owned and household members

6.2 – Poverty alleviation efforts

During the 1980s the Chinese Government has launched a national-wide poverty alleviation program, which is prioritising the remote, mountainous and pastoral areas where livelihood conditions are very harsh. In this context provincial and local governments attached their policy priority to pastoral development through disaster preparedness and subsidised low scale investments through grants or low interest credit loans (see also the Four Ways Programme, below). Different governmental organizations are involved in these efforts. These include the Bureau of Animal Husbandry at provincial and county levels, Poverty Alleviation Bureau, Civil Affairs Department and other organizations.

Since the mid-1990s, the development of China's western provinces has been a priority of the national development strategy. The sustainable development concept was introduced into the rural development strategy (China's Agenda 21, published in 1994) by both the central and local governments. The main policy options focus on (1) poverty alleviation through the promotion of local sector development; (2) sustainable management of natural resources, including the control of environmental degradation and (3) provision of an improved infrastructure and local institutional capacities, including the risk management capacity. Protecting vegetation of pastoral land in the up-reach area of the Yellow River and Yangtze River has also become a key issue for the national environmental protection policy (CIAD, 1998). Other minority-focused and poverty-alleviation initiatives are also implemented throughout the plateau, but their relevance to local livelihoods is limited.

Major tangible results of this 'Developing the West' programme so far consisted in huge levels of public investments to develop basic infrastructure and facilities, which are believed to hinder socio-economic

development in these areas. These investments have resulted in the upgrading of the regional transportation and communication networks, the establishment of a number of hydropower plants and improved basic services, such as the community-based para-veterinary system and the development of the educational sector. Disaster preparedness and management capacities are also targeted. Direct participation of pastoral communities in these processes is still negligible, as government programmes have often failed to involve pastoralists themselves in deciding upon their own development. Participatory rural development approaches are to be developed to make the full use of pastoral potentials while addressing their basic needs.

6.4 – Disaster management

Following the snow disasters that affected parts of the Tibetan plateau in 1995-1997, the GoC decided to strengthen the **Four Ways Programme** (*wen bao*, 4WP). The 4WP aims at reducing pastoral exposure to negatively affecting trends, while providing **technical options** to enhance livestock productivity. It is conceived as a poverty alleviation programme fostering investment levels in modernizing livestock production through subsidy and loan schemes. The program strategy is to convert open-rangeland herders into subsistence ranchers who produce a portion of their output for subsistence (as in the traditional era), and the rest for sale and market exchanges (Goldstein, 1996).

Programme components are:

- Construction of shelter facilities for flocks and herds to better resist winter cold;
- Fences for protecting forage and critical grazing areas;
- Housing facilities for pastoral households during winter time;
- Incentives to the production of forage to better cope with animal feeding shortages.

BOX 6.1 - Four ways to go

While the overall effects of this programme have yet to be clearly assessed, the major impact it has had in the area is driving many households into debt and to aggravate their poverty conditions. Broadly speaking, the communities less involved in and affected by the 4WP seem the ones that face less problems. This does not mean that some of the 4WP components are not relevant and useful to herding purposes, but the schemes applied by the GoC (and the little space for choice left to the communities) have not met herders' appreciation.

In other areas **shelters for animals** have shown some impact in decreasing animals mortality, especially among the young ones. IFAD (2001) reported a decrease from 20% to 4% lambs mortality with the shelter in the lower altitudinal Hainan prefecture. Herders in the project area have not shown great enthusiasm of this facility ('it has not yet shown its usefulness...' as some herders put it). Animal shelters may in fact be more sensitive in lower altitudinal areas, where the consistency of sheep is higher and therefore overall herd's resistance to cold lower. Sheep are in fact more exposed to winter extremes and lambing period is by the end of winter. The standard design of the shelters is often not matching the specific conditions of the diverse households. Most appreciated shelters are those turned into family housing. Many herders would like the shelters to be better ventilated mainly to avoid the diffusion of diseases.

Fences have become more fashionable since the Household Responsibility System - and related 'individualization' of pasture areas - is in place. Traditionally stone and soil walls were erected to protect critical quality pastures for shortage periods. Modern wire fences are therefore instrumental to enhance a traditional practice. In most areas fencing is considered a useful option and in narrow valleys almost all the bottom pasture is fenced. In other areas some fences cross rocky mountains and their application is highly questioned.

The construction of **houses** is also something pastoralists have been developing for ages and the model newly developed by the GoC 4WP is not considered more cost-effective than the traditional one. Indeed houses built

through the 4WP may be mainly seen along the major county roads, whereas traditional stony houses are to be found in internal areas.

Forage cropping in winter animal barns or open fields where conditions allow is a traditional practice (see chapter 5.3) the 4WP tries to strengthen and extend.

Local authorities collect the money from the ‘selected beneficiaries’ and provide them with the ‘key at hand’ facilities. Herders have little to negotiate or contribute in this process: once they are selected they forcedly have to comply with the programme. The 4WP implementation (selection criteria and completion rates) and pricing mechanisms of its facilities change from an area to another – sometimes also due to ‘interest margins’ of some local authorities. What remains constant is that selected households cannot refuse their involvement and that main costs for setting up these components are bore by herders, with a very limited GoC contribution (e.g. in some areas GoC contribution consisted in the window glasses and the wall covering tiles).

Although the programme principles may be acceptable, most herders (together with some local authorities) complain that the costs of such facilities are unbearably high and unaffordable to them. Local poorest households do not seem the prior concern of the programme. 4WP selected households have to sell animals or get indebted in order to comply with their portion of expenses. This issue, added up to already critical conditions created by the 1995/97 snow disaster, has brought more households into the circle of poverty. As a result, the facilities provided through the 4WP are often perceived as sources of debts and that is why most herders are quite critical towards them.

A thorough cost-effectiveness analysis of 4WP investment and the comparative analysis of market versus 4WP prices will be useful to better assess herders’ reticence, as also Miller (1997) suggests.

Moreover while 4WP facilities development may diminish pastoralists’ exposure to harsh climatic extremes - it also decreases options for mobility and induces sedentarization processes, which have already proven to be harmful for both the local environment and the socio-economic conditions of communities. Pastoral mobility is widely acknowledged as a major asset allowing for the sustainability of pastoral production and livelihood in these fragile environments. Threats to pastoral mobility are likely to affect the sustainability of natural resource management on the plateau.

BOX 6.2 – Local institutional room for manoeuvre –

While policy guidelines are established at GoC central level, it is interesting and relevant to assess the way local authorities reinterpret and remould them. In the QLDP Goldstein (1996) interestingly noted how local policy interpretation of livestock distribution led to social differences. Here it is relevant to note the way local authorities try contributed to reshape the 4WP directives in a way that:

- Leaves more freedom to local households in choosing whether participating or not;
- Allows for choosing just some of the 4WP components (mainly the housing in some areas (e.g. E Zenqin) and fences and shelters in others (W Zenqin));
- Avoid including poorer households as they may not have the resources to comply (e.g. Zadu).

In some other areas local authorities reportedly found ways to gain their own profit from the 4WP implementation.

This degree of institutional flexibility (what would be called local ‘room for manoeuvre’) is very important in that it allows for some degree of decision-making at local level of policies, which are often planned very far away (and without local consultation). Although this is accepted to a certain extent, some degree of flexibility is accepted, this interfacing role for local authorities is also a risky task; there are reports of local officials being jailed for having criticized or not fully applied central GoC regulations.

Specific **institutional efforts** are set in place to complement traditional community strategies aimed at reducing exposure and impact of recurrent snow disasters. Apart from the activities related to the 4WP, other forms of disaster preparedness and mitigation include (excerpt from CIAD, 1998):

Risk planning

- Organize field/village meeting on risk management before winter;
- Prepare fodder, medicine, clothes and other materials for emergency relief;
- Organize coordination meeting for emergency relief;
- Predicting the snow disaster in advance.

Reactions to risks

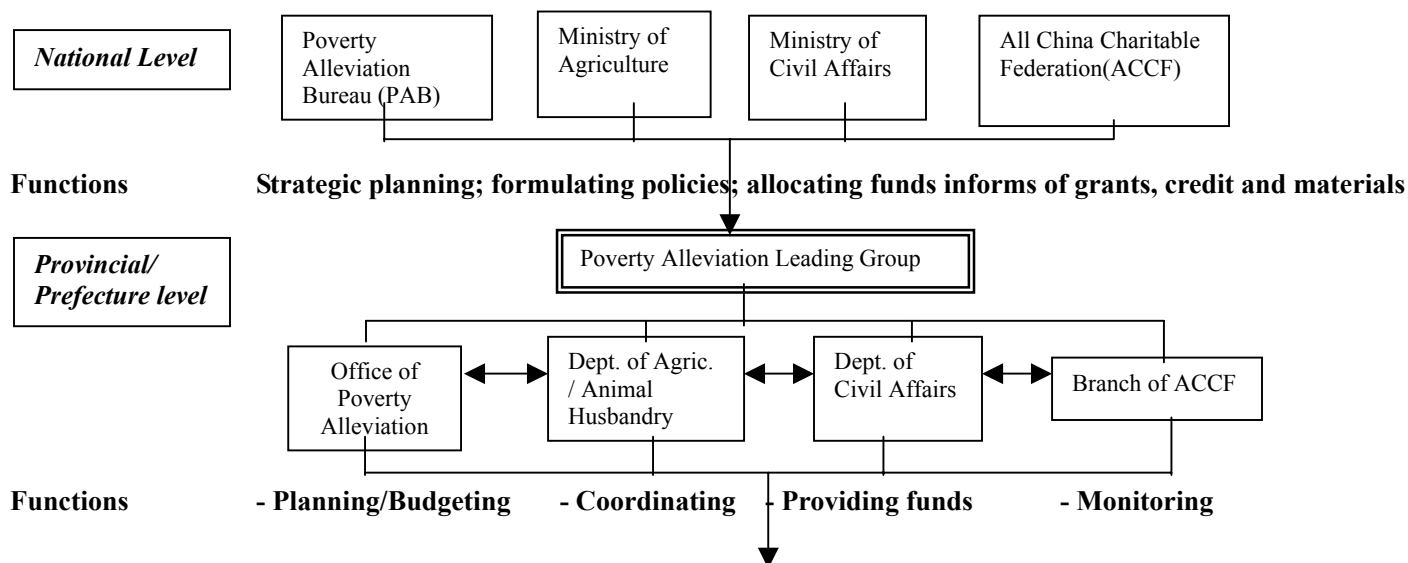
- Governmental reaction to the risks are mainly focusing on providing emergence relief by joint effort of different line agencies, such as Animal husbandry Bureau, Poverty Alleviation Bureau, Civil Affairs Bureau, Medical Bureau under the coordination of the County Emergence Relief Leading Group;
- Organizing distribution of outside donations to the households
- Providing emergence relief materials, such food, feed, cloth and other necessary goods to the affected communities and households;
- The county government had formulated 11 disaster relief working force, about 100 persons, led by county governmental officials, to go to the disaster affected area for solving the problems herders met;
- Village leaders are designated to facilitate the household to household emergence assistance during disaster.

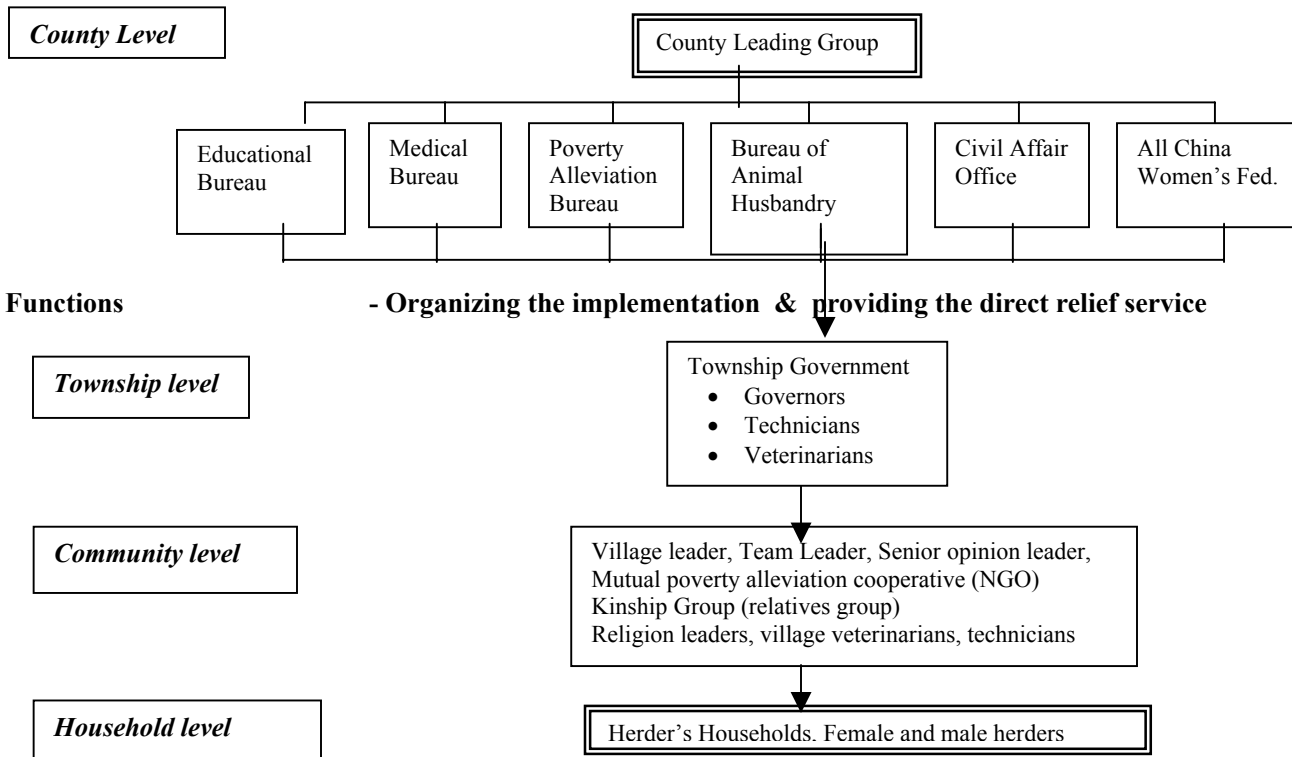
Risk recovering

- The duty for production recovering mainly concentrated in the Bureau of Poverty Alleviation in Dari County. They buy breeding female Yak or ewe for the non-animal or less-animal households to help them recovering. In addition, this organization also helps farmers to establish herder’s organization for self-help purpose;
- The village level activities conducted are that the village heads conduct coordination for renting the rangeland; cooperation of after-disaster recovering within the community;

Both national and international NGOs have not yet intensively participated in the recovering actions so far. Reason for that is the communication between the local community and outside is quite poor unless the government organizations co-ordinate some NGOs. There are still high needs and high potential for involving more national and international NGOs in risk recovering.

Chart 6.1. GoC institutional Structure for Poverty Alleviation and Disaster Management





Source: CIAD, 1998

6.3 – A raising environmental concern

Concern for environmental matters has been growing in China since the Rio 1992 convention. When it comes to the Tibetan plateau the major environmental concern regards the prevention of natural disasters on one side and the development of ecological tourism on the other. Recent GoC policies have tried to address rangeland degradation processes, although the approach seems to repeat traditional misunderstandings about pastoral societies and their role in preserving and sustainably managing natural resources. Plateau herders and farmers are perceived as the culprit rather than the main victims of environmental degradation, and relieving the ecosystem from their presence seems to be the only possible solution. This approach has already produced consistent failures in other rangeland environments in the world, but such lessons are hard to learn.

A recent GoC policy named **Stop cultivating and restore grass and forest lands** (*Tuigeneghuanlinhuancao* in Chinese) restricts crop production in some valley bottoms and imposes reforestation programmes with trees and shrubs instead (in areas where trees had barely existed before). This policy affects the livelihood of local agro-pastoral communities, especially in the lower altitude areas where crop production is feasible (Chenven, Labu, Saihe and Xiewu), as it deprives them from the best production areas. Although local authorities engage in providing compensatory grains to the households whose croplands are affected by the programme, this programme reinforces a sense of uncertainty regarding GoC strategy on the plateau while increasing the dependency of local livelihoods upon institutional assistance.

Often called the “water tower” of Asia – as it serves as main regulator of the water flow in three major Asian rivers - the Yellow, the Yangtze and the Mekong - the central part of the Tibetan Plateau is home to many unique species of flora and fauna, from marsh sedges and numerous water birds to carnivores large and small, a unique assemblage of large herbivores, and special desert-adapted plant associations. Among the most

endangered species are the Tibetan antelope, wild yak, argali, white-lipped deer, musk deer, and the elusive, almost mystical snow leopard (excerpt from www.plateauperspectives.org). The recently launched **Three River Heads Programmes (3RHP - Sanjiangyuan** in Chinese) aims at enhancing environmental protection in this area of exceptional ecological value.

By addressing pastures closures, buffer zones and rangeland rehabilitation, this programme in practice involves destocking and further constrains to traditional pastoralism in these regions. In specific areas pastoralists and livestock are to be completely removed from the rangeland. In others, livestock numbers have to be consistently reduced and local pastures must be protected and kept under-grazed for about 5 to 10 years, the foreseen length of the programme. As to the 3RHP guidelines pastoralists are asked to reduce the size of their herds in order to comply with livestock (s.u.)/range rates defined by the Bureau of Animal Husbandry. As a result affected herders will remain with shrunk herds, while others will give up pastoralism and seek alternative sources of livelihood. Destocked herders will receive compensation through a house in town and monthly subsidies from the government. In specific areas, which have not yet been clearly identified, pastoralists and livestock will be completely removed from the rangeland. In others, livestock numbers have to be reduced to almost its half and local pastures must be protected and kept under-grazed for about 5 to 10 years, the foreseen length of the programme. As to the 3RHP guidelines pastoralists are asked to reduce the consistency of their herds in order to comply with livestock (s.u.)/range rates defined by the Bureau of Animal Husbandry. As a result affected herders will remain with shrunk herds, while others will give up pastoralism and seek alternative sources of livelihood. Destocked herders will receive compensation through monthly subsidies from the government (6000 ¥ yearly for, GoC says, 5 years – but it is not clear how long this remunerating mechanism will be in place). 3RHP also inhibits traditional natural resource management practices such as wildlife hunting but also mbu and truma collection and shrubs for fire. This system is already in place in the County of Madou northern to the project area. Three xiangs in the surrounding of the project area have now been selected to pilot the extension of the strategy to the whole basins related to the riverheads. These are Qingshuihe (in the project county of Chengduo), Laxiu and Zhuoxu (neighboring). From next year also the project xiangs of Zenqin and Zaduo are planned for 3RHP implementation.

These ‘environmentally-concerned’ programmes are aimed at reducing floods and improving soil and water management aspects on the plateau, at the expense of its inhabitants. Good ranges cannot be grazed and the best farmlands cannot be cropped – in order to preserve the environment from the people who base their livelihoods upon sustainable natural resource management. As it is often the case, mountainous areas – and people and cultures – have to bear the costs for outcomes that will benefit lowland people. Other minority-focused and poverty-alleviation initiatives are implemented throughout the Qinghai province, but their relevance to local livelihoods and to this discussion is very limited.

Local authorities are always faced with policies they hardly understand and often do not agree. They are often the first to blame Beijing policies as confusing and inconsistent and lacking participatory consultations. Herders are often unclear by ongoing policy trends and deeply uncertain and confused by the incoherence of the different policies and worried about their consequences. Before everything was forcedly collectivised, then every single asset – including summer pasture - turned into individual property. The best grazing areas cannot be grazed and the best farmlands cannot be cropped – in order to preserve the environment from the people who mostly depend on sustainable manage natural resource for their livelihoods. As an overall consideration, Tibetan herders operate within a normative environment that does not seem to reflect their values, interests and priorities and that is at times contrary to them (QLDP-ICIMOD, 2000).

The institutional level is therefore posing further burdens to the already vulnerable livelihood of local herders. Should the GoC Four Ways and the Three Riverheads programmes be applied at their full extent, no doubt pastoralism, and pastoralists, will soon be at stake in these areas. A scaring indicator is in that herders in Zenqin and Zaduo, where the 3HP is scheduled for in 2005, have already started to consistently sell out their animals, including dri (female yak) and bi (yak calves). These sales will carry an impact upon future local herd dynamics

and pastoral livelihoods. While it is not our attitude to be negative and pessimistic, should these issues not be raised at proper political levels, little can be done at the field level to revert current trends.

6.3 - The veterinary service

Institutional assistance to the local production system hinges upon disease control and prevention through the development of a community-based para-veterinary service. The service represents the major governmental effort to support local production systems and related livelihoods. It is generally appreciated by herders, although some criticism and huge room for improvement exist. Since the privatization of livestock and grazing land through the Household Responsibility System, some services are in fact less rigorously implemented as the GoC has scaled down its assistance to livestock production on the plateau. The veterinary service in Yushu prefecture present with a multi-levelled organized structure involving a total of 235 veterinarians and assistants, 990 village para-vets and 3767 community herder technicians. The para-vet service was established by the Government during the 1950’s to address prevention and control of major livestock diseases through a network of community-based trained staff. Major tasks of this system are: 1) prevention and vaccination campaigns, 2) training of community-based para-vet staff, 3) field surveillance and monitoring. The system was developed by recognizing that the field exposure of Governmental official veterinary staff was – and is likely to remain - very limited, due to a number of factors, including far distances, lack of appropriate transportation, limited incentives to reach herders, limited staffing (which translates into limited time), language and communication barriers (some vet staff is of Han origins).

Table 1 – The staff of the Yushu Prefecture para-veterinary service

Counties	Veterinarians @ County – <i>xien-</i> & Township – <i>xiang</i>	Para-vets Village - <i>tzun</i>	Herder Technicians Settlement - <i>ruka</i>	HT/para- vet rate
Yushu	41	141	767	5.4
Chengduo	56	160	520	3.2
Nangqin	32	291	801	2.7
Zaduo	28	111	560	5.0
Zhiduo	22	138	671	4.9
Qumalai	33	149	448	3.0
Prefecture	23			
TOTAL	235	990	3767	Average 4

Source: Yushu Prefecture Animal Husbandry office

Community-based staff is composed of para-vets at village level and herder technicians at settlement level. The staff is selected at village and community levels, with an average of 2 to 3 para-vets for village depending on the settlement pattern. Selection criteria within the community normally involve educational level, husbandry skills and availability to undertake para-vet tasks. At the settlement level normally the herder technician is also the local leader. The community-based staff assists Governmental veterinarian staff in mobilizing the community towards disease preventive and control campaigns. They link with and report to the vet service at *xiang* level in case of epidemics, actively collaborate to monitor and prevent disease spreading and receive short training/refreshing classes once or twice a year. Para-vets also intervene to treat sick animals at local level and sometimes manage few vet drugs. In order to undertake these tasks, they receive a yearly salary of a few hundreds Yuan per year. No service fee is requested from the beneficiary herders.

Governmental veterinarians and assistants have a university or college degree, whereas the village para-vets and the herder technicians are skilled herders. Once or twice a year the *xiang* veterinarian staff provides some form of **training to the community-based para-vet personnel**, often associated to the vaccination campaigns (in spring and autumn). Governmental vet officers have a certain degree of freedom in choosing the subject and the

duration of the training, although a standard curriculum exists. Trained para-vets have to thereafter transfer technical knowledge to the herder technicians (with a rate of about 1 para-vet to about 4 HTs - see table 1), through practical experience and field-based training. This herder-to-herder extensions approach is monitored by local authorities through local information networks. The training normally takes place in the township of the xiang, where para-vets convene for some days. In most xiangs the para-vet training is limited to one-day classes twice in a year, associated to the vaccination campaign, which happens to be its major (if not only) subject of concern. The best period for training would be Spring time, as herders have more time available, but it often takes place in Summer or Autumn. Para-vets are obliged to participate to these training sessions, as part of their remunerated duties, while herder technicians are invited to participate. The efficiency and effectiveness of the training changes from one area to another, depending on distances, technical capacities of local vet staff and concern of local authorities. Major constraining element is that herders are often busy and not too willing to bear training-related accommodation costs in the township. This often cuts down training length and depth as no participation allowance to cover the costs of staying is budgeted, and para-vets only get a notebook and a pen during the training.

The system has undergone major changes during time. Since the application of the Household Responsibility System (1980s) some services are less rigorously implemented, as the Government has scaled down its direct assistance to livestock production on the plateau. The government still provides free vaccination for transmittable livestock diseases, while herders have now to pay for control of parasites, treatments and clinical services, which used to be also supplied for free before. Nowadays the para-vet system results to be closely intertwined with the vaccination service, and as such it is constrained in its outreach and effectiveness. The lower profile of the government in vet servicing has created a new room for manoeuvre for the local vet officers, especially concerning resource allocation, inputs supply and training schemes.

Main current problems hindering the effectiveness of the para-vet system originate from limited resources allocated to the service. This in turn leads to:

- problems of mobility for governmental staff (lack of transport facilities),
- constraints in the training system (trainees accommodation costs).
- unreliability of the input supply and availability (which makes disease control difficult).

A generation gap is also currently faced by the system, as the para-vets that received comprehensive training from governmental vet officers are now getting old, and new para-vets have limited chances for proper training exercises, as public resources have been curtailed for this purpose. Despite these constraints, the para-vet system is generally appreciated by local herders. Implementation and outcomes vary from an area to another depending on a number of factors, but the overall coverage and efficiency of the service is attested by the limited incidence of the diseases targeted by the vaccination program.

6.4 – A developing educational sector

A major emphasis of GoC policies for ‘Developing the West’ increasingly target the educational sector and addresses improvements of teaching and boarding facilities in schools on the plateau. The process has started recently and will last for some years to come, as it represents a major GoC concern. The process has started recently and will last for some years to come. The county policy is reported as to establishing one primary school for each tzun, and reach 80% enrolment rate in few years. School curricula include basic Tibetan, Chinese, mathematics, sport and music. Requests for support in improving local schooling systems have been raised in all project xiangs. Renchen Dawa, representative of the local NGO Snowland (SSG) appreciates the specific efforts of Chengduo county authorities, which are trying their best to develop local educational systems despite the lack of financial support from the central GoC (as Chengduo is not classified as among the poorest areas to receive GoC support).

Although increasingly pastoral households encourage their children to continue their school education in order to access to alternative livelihoods, they are still faced with a number of problems and constraints, such as the

poor boarding facilities and the costs they have to bear, especially for children's meals. Most local boarding facilities do not have a good reputation and parents feel pupils are not properly taken care. In some areas (Qingshuihe and Saihe) households are also requested to contribute, cash or kind, for the teachers' payment or food. In other communities (e.g. Zenqin) pupils' households have to provide some animals to school herds. These major elements hindering school enrolment rates have been reported during the field survey and confirmed by local authorities and by other local stakeholders. Some schools already have and manage a herd, while others have only the pasture land available. Local authorities have plans to ask every pupil household to bring a Dri in order to set up or expand school herds.

Chengduo county totally numbers 60 schools, including two "minority" middle schools, one township middleschool, an elementary school with a middle school activated (only grades 7th-9th), 11 boarding schools, 34 village schools, 10 local schools founded by local people and financially supported by the government and one kindergarten. The county totally numbers 5316 students, including 769 "minority" school students and 4547 elementary school students. The county schools' personnel amounts to 472 units, 442 of whom are teachers (official data from local authorities) . School holidays consist of the three winter months and about 20 days during summer.

Table 6.1 – Basic situation of ethnic education of Chengduo county

Total school number	53	Town and township boarding schools	11	With boarding facilities	11	Village primary schools	34	With boarding facilities	16
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School name	pupils	School herd		Possibility to re/construct dormitory	Possibility to re/construct kitchen	ASIA main support requested		total funds needed /RMB	OTHER
		Yes/No	N			livestock	shelter		
Qingshuihe town P B S	203	Yes	20	Can	Can	183	2	253.000	Completed
Zhengqin township P B S	148	Yes	10	Can	Can	138	1	173.000	Completed by 2004
Gaduo township P B S	94	Yes	10	Can	Can	84	1	119.000	Completed
Zaduo town P B S	345	Yes	10	Can	Can	250	2	320.000	Completed by 10. 2004
Saihe work station P B S	93	No					1	35.000	
Chengwen town second P S	101	No					1	35.000	
Labu township P B S	234	No		Can	Can		2	70.000	Completed
Xiewu town P B S	385	No					2	70.000	
Labu township second P S	105	No		Can	Can		1	35.000	
Gaduo township second P S	66	Yes	10	Can	Can	50	1	85.000	Completed by 8. 2004
Qingshuihe town Hongqi village P S	55	Yes	10	Can	Can	45	1	80.000	Completed by 9. 2004
--- Zhama village P S	65	Yes	10	Can	Can	50	1	85.000	Completed
--- Gaqin village P S	65	Yes	20	Can	Can	40	1	75.000	Completed
--- Wencuo village P S	50	No							
--- Pusang village P S	52	No							

School name	pupils	School herd		Possibility to re/construct dormitory	Possibility to re/construct kitchen	ASIA main support requested		total funds needed /RMB	OTHER
		Yes/No	N			livestock	shelter		
Zhongka village P S	48	No							
Zhaduo town Gexin village P S	60	Yes	10	Can	Can	50	1	85.000	Completed
---Xiangyang village P S	50	Yes	10	Can	Can	40	1	75.000	Completed
--- Zhiguan village P S	52	Yes	10	Can	Can	40	1	75.000	Completed by 6. 2004
--- Zhiduo village P S	50	Yes	12	Can	Can	40	1	75.000	Completed
--- Dongfang village P S	48	Yes	11	Can	Can	35	1	70.000	Completed
Zaduo township Kema village P S	57	No							
--- Saikang village P S	103	No							
--- Gangyou village P S	40	No							
Zhengqin township Xiuma village P S	50	Yes	12	Can	Can	38	1	73.000	Completed
---Kangna village P S	54	Yes	15	Can	Can	40	1	75.000	Completed

School name	pupils	School herd		Possibility to re/construct dormitory	Possibility to re/construct kitchen	ASIA main support requested		total funds needed /RMB	OTHER
		Yes/ No	N			livestock	shelter		
Second village P S	48	No	No						
Labu township Wuhai V P S	51	No	No						
--- Dongke V P S	37	No	No						
--- Dawa V P S	36	No	No						
---Daida V P S	50	No	No	Can	Can		1	35.000	Completed
----Bangbu V P S	60	No	No						
Saihe station Aduo V P S	48	No	No						
--- Zhige V P S	52	No	No						
--- Beige V P S	30	No	No						
Chenweng town Lagong V P S	26	No	No						
--- Kongque V P S	24	No	No						
---Muxi V P S	20	No	No						
Xiewu town Dangba V P S	65	No	No						
--- Xiasaiba V P S	47	No	No						
--- Shangsaiba V P S	45	No	No						

--- Zhimenda V P S	62	No	No	Can	Can		1	35.000	Completed by 8. 2004
--- Arongzhungba V P S	46	No	No						
Total amount		No	No			1123	26	2.033.000	

Source: information collected by ASIA staff in the field

NOTE: P B S: Primary Boarding School; V P S: Village Primary School; P S: Primary School

The abovementioned 11 boarding schools are often unable to fully serve as real boarding schools because of financial problems. School facilities and equipment are particularly scarce, with kitchen equipment (stoves, etc...) and bunkbeds especially needed. Some of the schools completely lack all lodging facilities. More schools are scheduled for building or upgrading and interventions the area may play a catalyst role in this process provided it does not weaken or substitute institutional or community efforts.

7 - THE PROJECT COMMUNITIES

As it has been discussed the project area is not an homogenous one (see also table 2.2) due to a variety of elements including agro-ecological conditions (relevance of farming and herding activities, impact of different snow disasters, etc..), socio-economic factors (causes of poverty, social-stratification, etc..) and integration into wider economic and institutional frames (market accessibility, implementation of 4WP and 3RH programmes, etc...).

Table 7.1 - Major features of Chengduo Xiangs -

CRITERIA/ XIANG	Q.huihe	Zenqin	Zaduo	Gatuo	Chenven	Saihe	Xiewu	Labu	
Tot. area (km2)	5000	3000	4000	1000	569	311	722	539	
People In 2002	5590	7453	6151	5157	4420	992	3606	2350	
Density pop/km2	1.12	2.48	1.54	5.15	7.77	3.2	5	4.36	
Total tzuns	8	11	6	8	7	4	8	7	
Pastoral %	100%	100%	100%	40%	30%	30%	30%	10%	
s.u./pop rate	19,25	18,15	32,1	11,45	18	20	24	27,19	
Goats presence				x	x	x	x	x	
Stocking rate (mu/SU)	38.67	17.75	13.8	14.45	6.03	10.7	6.16	8.71	
Usable range	78%	70%	65%	70%	70%	68%	70%	70%	
4WP implementation	no	yes	yes	yes	yes	no	few	no	
Income from Mbu			X	X	x	x	x	X	
1995 animal losses (s.u.)	66%	50%	42%	26%	22%	32%	18%	22%	
Yak/sheep rate	1995	0.57	0.8	0.56	0.34	0.9	1.9	2	1.69
	2002	0.42	0.75	0.65	0.13	0.67	0.97	1.96	1.54
Market price (¥/jin)									
Yak meat	5 to 6	6 to 7	6.5	6	6.5	5	6	6.5	
Yak butter	8.5 to 9	9 to 11	9.5		9 to 11	11	11	11	

Notes:

- The stocking rates have been calculated by assessing the number of mu available for grazing (total rangeland * % usable) on the total livestock (measured in S.U.). The usable rangeland percentage does not include black beaches due to rodents' degradation. Yushu BAH Grassland Station indicates in 8.6 the minimum mu/s.u. for sustainable livestock production.
- The yak/sheep rate has been calculated by 1995 (before the SD) and by 2002. 1995 figures better reflect people's choice before the SD struck, while 2002 figures account for sheep faster reproduction rate following the SD. The Y/S rate is anyhow of relative use as the number of goats is quite relevant and on the increase in some farming areas.
- 1995/96 SD losses have been calculated in s.u. terms to provide a more comprehensive picture about impact on local livelihoods.
- Goat figures can only be accounted for since mid 1980s, when xiang reports allow for.

Table 7.2 - Chengduo trends in the last 15 years (comparing SUs from 1988 and 2002)

Xiang	SU 1988	SU 2002	Overall decrease	People outmigrate	notes
<i>Qingshuihe</i>	352940	107687	70%		Yak figures collapsed
<i>Zenqin</i>	338342	135202	60%		Sheep flocks restocking
<i>Zaduo</i>	367252	197391	46%		Halved flock & herd
<i>Gatuo</i>	173024	59132	66%		Yak stabilized at 15% of 1988 Sheep at 75% Consistent goat increase (40%)
<i>Chenven</i>	96862	67915	21%		Yak at 66% Goat increase more than balanced sheep losses
<i>Saihe</i>	32652	15821	45%	X	Yak at 40% Shoat flock stabilized (goat>sheep) Huge people out migration
<i>Labu*</i>	61672	56251	9%	X	Everything stable – restocked Huge people out-migration No need restocking
<i>Xiewu</i>	103000	95714	16%	x	Overall constant SU Sheep stabilized Goats on the increase

Note: data for Labu where incomplete and trends in goat amounts could not be properly assessed.

While people's figures are decreasing for some southern xiangs, **out-migration** from pure pastoral areas is not yet an issue, although livelihood conditions after 1995 SD have hugely dropped. Herders unable to subsist with their limited animals hire herding labour to better-off livestock owners. Destocked herders may abandon pastoralism but move to the xiang township rather than seeking opportunities elsewhere. This may be an indication of limited skills to provide for off-livestock income-generation and alternative livelihood options.

Poverty ranking of Chengduo xiangs according to our field visits, the staff surveys and comments from local officials are as follows:

- 1 – Saihe, mainly due to geographical isolation factors;
- 2 – Zenqin, with high population density (for a pure pastoral area), heavily affected by 1995 SD as well as by the 4WP financial duties;
- 3 – Qingshuihe, which has been deeply impacted by 1995 SD and is now targeted by the 3RHP;
- 4 – Gatuo;
- 5 – Zaduo;
- 6 – In Chenven, Xiewu and Labu poverty is limited to few communities.

Poorest communities in the different xiangs have been identified as follows by ASIA staff on the field:

(Table 7.4)

<i>XIANG</i>	<i>Q.huihe</i>	<i>Zenqin</i>	<i>Zaduo</i>	<i>Gatuo</i>	<i>Chenven</i>	<i>Saihe</i>	<i>Xiewu</i>	<i>Labu</i>
<i>Pastoralists</i>	<i>Not assessed</i>	<i>3 xiangs</i>	<i>Juto, hunchi</i>	<i>Xinshi</i>			<i>Muie</i>	
<i>Agro-pastoralists</i>			<i>Jimi</i>		<i>Garun, lagun</i>	<i>Big, xiga</i>	<i>Aduo rumba</i>	<i>Bambu, dawa</i>

As it may be noted, livestock presence in **Qingshuihe and Zenqin** is quite low compared to the available rangeland and the rate much lower than in the other xiangs. These figures do not back GoC 3RHP, but rather deny its rationale. These two xiangs, which suffered consistent animal losses in the early 1990s SDs have the best potential for restocking activities with external support. The consistency of yak in fact has been extremely reduced, which, in turn hugely curtailed internal restocking processes and overall livelihoods, due to the low reproduction capacity of yaks and the limited relevance of sheep (no goats reported). Moreover, these two xiangs have very limited options for Mbu collection and sales as a source of income-generation. Conversely, these figures would advise to scale down restocking processes in Chenven and Xiewu and, to a certain extent, in Labu and Saihe.

Local authorities in **Labu and Xiewu** have been much less proactive than their neighboring colleagues. They shown little interest in the ASIA initiative and provided limited help to the project field survey. While it makes no sense that local communities pay for poorly committed authorities (although these must be accountable for to somebody...) a major reason for their behaviour may be in that these xiangs present with less problems and needs compared to the others. It is therefore suggested to circumscribe the intervention in these xiangs only to poorer communities and related schools. The same rationale may apply for Chenven xiang, despite the good support provided by local authorities. The governor of Zenqin has been addressed many criticism for mismanagement in various occasions and by many different stakeholders. Although these accusations have to be proved (e.g. by carefully checking the outcomes of ASIA 2001 distributions in the xiang), it may be better to refer to other level of local authorities when operating in that xiang.

Labu and Saihe are characterised by unique geographical features due to high mountains among which the Yang Tze flows. Land use is mixed but farming activities prevail and grazing land is limited. These xiangs suffer consistently from geographical isolation and are the only xiangs people out migrate from.

While poverty in Labu is limited to few communities, **Saihe** xiang suffers chronic poverty conditions, which are mainly due to its geographical location, which hinders major mobility and exchange options. On the other side, Saihe morphological and soil features provide for huge farming opportunities. Local households mainly crop barley and potatoes for local consumption needs, although they may consistently diversify and intensify their production for marketing purposes. Following close negotiations with local communities and traders, the project may here test a specific approach. By providing yak couples (the male for ploughing – through local forms of yak sharing - and the female for milking), the project may request some targeted households to test agriculture diversification options. An option the project may be specifically interested in is the production of legumes protein-rich forage which may serve to improve winter livestock performance of neighboring herding communities.

Zaduo represents here a specific case with higher-than-average social differentiation. This is due to localised options for off-farm income-generation. Some communities have in fact benefited by the gold-digging related activities whereas some areas provide with good potentials for mbu collection. It is possible that some herders might have reinvested these resources into restocking following the 1995 SD.

The same applies to a certain extent to **Gatuo** xiang, although it is more agro-pastoral oriented.

Chenven xiang presents with good production and marketing potentials. Apart from specific remote areas, communities living in Chenven have benefited from better access to institutional and market resources.

In addition to these specific features, priorities identified by diverse social groups are fundamentally different. The main priority of poorer herders is to expand their animal number and increase their off-farm income opportunities to satisfy their needs. The priorities of the middle and better-off groups are more focused to improve their production (grassland, fences, animal health) and their living conditions (herd products marketing, better housing, etc.). Differences are also to be found among agro-pastoral communities.

Table 7.5 - Priorities and problems in QLDP area, as expressed by the different social groups of herders

Priorities	Socio-economic strata			Total
	poor	average	better-off	
Categories of Households				
Raise more yaks	25%	9%	0%	9%
Fencing	25%	18%	35%	28%
Summer Settlement	0%	0%	5%	2%
Control BB Development	0%	18%	5%	7%
Get more Grassland	0%	0%	10%	5%
Grassland Improvement	0%	0%	20%	9%
Rent Grassland	8%	0%	5%	5%
Borrow Money	8%	0%	0%	2%
Send children to school	17%	0%	0%	5%
Money for Food	8%	9%	0%	5%
Grass seeds	0%	18%	0%	5%
Medicine for animals	0%	18%	0%	5%
Get rid of Rodents	0%	9%	0%	2%
Improve Health Care	0%	0%	10%	5%

Constraints	Socio-economic strata			Total
	poor	average	better-off	
Categories of Households				
Snow disasters	9%	0%	0%	3%
Lack of sheep	9%	0%	0%	3%
Lack of labour force	9%	11%	12%	11%
Lack of grassland	27%	33%	59%	43%
Black beach	0%	11%	0%	3%
Purchase food and clothes	36%	22%	0%	16%
Lack of medicines	0%	11%	12%	8%
Lack of animals	9%	0%	0%	3%
Oats seeds availability	0%	11%	0%	3%
Lack of fences	0%	0%	6%	3%
High mortality of animals due to malnutrition	0%	0%	6%	3%
Too many males in the flock	0%	0%	6%	3%

Source: QLDP – Dideron, 1997

8 – INTERVENTION RATIONALE

Appropriate intervention to support sustainable development on the plateau is quite an intricate task. The interactions among the bio-physical environment, the local society and the wider socio-political frame provide a complex context where room for manoeuvre and development options are limited by inconsistent and contradictory factors. Three major elements have to be clearly stated when defining an intervention strategy on the Tibetan plateau:

1 – ‘Do no harm’, meaning that the first outcome of any external intervention should not lead to a further deterioration of current livelihood conditions;

2 – While maintaining a critical attitude whenever conditions apply, do not contradict or work against GoC policies in the area, as those policies will be much more impacting in the area than any outsider thinking and acting;

3 – While seeking active collaboration from local authorities, try to complement and integrate institutional efforts that support sustainable development in the region.

Having stated these major intervention pillars, ASIA current project in the prefecture of Yushu – Qinghai province - mainly addresses:

1. Improvements in pastoral resource management aimed at increasing livestock productivity and enhancing marketing options for livestock products. This objective is to be achieved through supporting and extending the community-based para-veterinarian system, in order to make it more effective and responsive to herders' needs.
2. Enhanced options for education and training aimed at increasing options for alternative livelihoods in the area. This objective is to be achieved through improvements of the boarding facilities in the developing school system, with the distribution of livestock to school herds (improve pupils' diet) and upgrading of current school infrastructure and facilities. Schools represent as well community development centres in this strategy, as they are the most appropriate interface between local communities and the wider society.

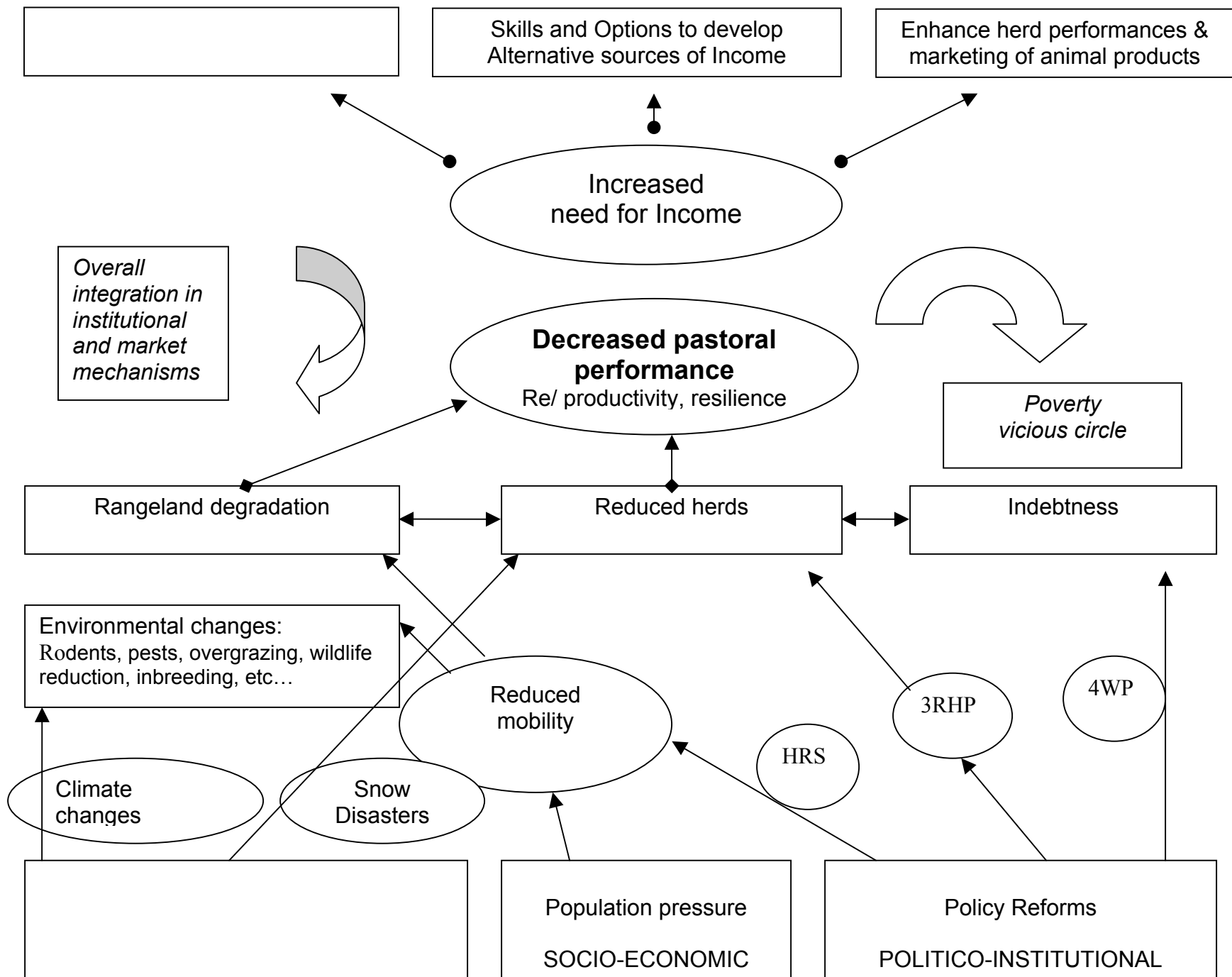
While looking at ways to enhance local natural resource management, intervention in the future should also consider longer term investments aimed at enhancing pastoral associations and empowering communities to shape their own development patterns, vis-à-vis other societal forces.

8.1 - Tackling the complexity

As it has been highlighted, ecological and political factors undermining traditional production and livelihoods systems are closely intertwined. Rangeland degradation processes - a major threat to local pastoralism - has been spurred by increased population pressure coupled with political reforms that, in time, aimed at stabilizing herders' communities. The recently implemented 4WP may be seen as the natural outcome of such reforms, which may provide for short term improvements, while possibly affecting long term rangelands dynamics. The overall picture is of an increasing amount of herding households subsisting in critical conditions. Decreased pastoral productivity increases households' need for income and pushes for seeking alternative livelihood sources out of the pastoral system. Poor households are forced to get closer to towns to seek for income-generation opportunities, to allocate their labour force out of their livestock production, to shift their seasonal movements according to labour and market opportunities. These factors insert them into a vicious circle, which is likely to expel them from pastoralism to other kinds of livelihoods.

The 1995 snow disasters can be considered as the onset of these processes, as it heavily curtailed local livestock numbers. Poor rangeland conditions affect the restocking rate and livestock productivity performance as a whole (thus directly impacting on herders' livelihood). On top of that, the high vulnerability shown by local pastoralism to climatic extremes provided the justification for the GoC to conceive and implement the 4WP, which has further aggravated the socio-economic conditions of local communities. The current situation on the ground is therefore of a huge number of herding families with limited livestock resources, low livestock productivity, high levels of indebtedness and limited options to tackle any of these problems. All this leads to increasing levels of vulnerability and poverty. The new GoC 3RHP is likely to provide another brick to this wall, by further inducing herding households to out-migrate pastoralism towards urban-based livelihoods. While it is not clear how many herding households would voluntarily follow this pattern by adhering to 3RHP schemes, it is already clear that in some areas (e.g. Zaduo xiang) pastoralists are selling out parts of their herds fearing the 3RHP with its destocking principles.

Chart 8.1 – Problems and solutions tree



ASIA is currently undertaking a short term intervention to address most urgent and critical issues in the area (chapter 9). This effort should be followed by a more medium-to-long term development-conceived stage, where all these efforts will be consolidated as strategic investments, which tackle the roots of ongoing livelihood problems towards sustainable poverty alleviation mechanisms.

Table 8.1 - Logical frame for ASIA 2028 intervention in the area

<i>Overall objective</i>	
	Poverty reduction through improved and diversified resource management
<i>Specific purposes</i>	
	Capacity building towards increased food production and income generation
<i>Expected results</i>	
	Enhanced livestock performance
	Improved integration within market and institutional mechanisms
	Increased options for alternative livelihoods
<i>Activities</i>	
	Improve animal health and feeding practices
	Para-vet and related training
	Improve marketing of animal products
	Develop alternative income-generation options
	Enhance educational and training opportunities
	Establish small credit schemes

Any intervention strategy in the area should carefully consider the following critical issues:

- **Appropriate targeting,**
- **Integrate institutional efforts,**
- **Develop human resources,**
- **Involve local stakeholders,**
- **Build upon lessons learnt by similar and related initiatives.**

8.2 - Appropriate targeting

Diverse agro-ecological and socio-economic features create a heterogeneous environment where diverse communities and groups face different problems and challenges. Pure pastoral communities inhabiting the northern xiangs of the county almost completely rely on livestock production and marketing for their livelihoods whereas southern agro-pastoral communities show more diversified production and market patterns, where mbu collection plays a major role in income-generation.

Social differentiation also plays a role in differentiating livelihood patterns. Access to quality pasture, livestock and mbu remain as major sources of differentiation, as described in chapter 4.2. Diverse groups show different problems and priorities when asked about their livelihoods (see Table 7.5). Any intervention strategy should therefore consider these elements in order to enhance its consistency and the sustainability of its outcomes and impacts. Interventions aimed at enhancing human capacity building, livestock productivity, and educational opportunities are likely to benefit all groups, although at different degrees.

The restocking of few animals is not likely to make a major difference for **poor herding households**, as current rangeland conditions - leading to low livestock performances - do not easily allow for pastoral-based livelihoods with a limited amount of animals. Their major source of food and income will still be sought elsewhere. On the contrary, giving these households some more animals could divert labour forces from other sectors (either income-generation or education). Restocking efforts with poor households should therefore consider large herds that will enable reaching the **subsistence level** (refer to chapter 4.2).

Favouring off-farm income-generation (and eventually out-migration) of households from the poor group is an option to be seriously considered, given the current structural constraints and the GoC policies in these areas. Addressing improvements in the schooling system and further options for human resource development will benefit this group in developing options for alternative livelihoods. A very limited number of poor households may also be targeted for individual restocking.

Medium and Better-off households will benefit from project activities aimed at enhancing overall livestock performances and related marketing options. These could be achieved through seed distribution for improved forage production and management, improvements in local animal husbandry through supporting the para-vet system and community level capacity building on dairy quality and hygiene. Further benefits are also foreseen from the construction component, whereby special training on building techniques and increased awareness of materials costs and management will provide options to better comply with the GoC 4WP without compromising their economic situation. All these activities will make local livestock production and pastoral livelihoods more sustainable.

8.3 - Integrating institutional efforts

Differently from other areas in the world inhabited by pastoralists, policies and programmes set by central government authorities carry an important relevance on Tibetan plateau livelihoods. GoC efforts in the project area, ranging from environmental protection to western socio-economic development investments, create a specific environment the project has to clearly account for in order to enhance sustainability of its outcomes and expected impacts. More specifically the ASIA 2003 intervention faces with specific challenges that deserve a thorough understanding.

The restocking component clashes with the forthcoming GoC 3RH Programme that support destocking schemes and herders households settling in urban areas. Not by chance the 3 RHP is scheduled for implementation in 2002 in the Qishuihe xiang and further extension in 2005 will involve Zenqin and Zaduo xiangs. These three xiangs happen to be those with purer pastoral features, which more seriously suffered from the 1995 SD livestock losses (with reductions from 30 to 60 % of the local herd). While the potential and the need for restocking in these areas and among these communities are much higher than anywhere else in the county, GoC developing policy does not make this an easy task. Irrespective of the GoC implementation agenda, herders inhabiting these 3RHP targeted xiangs have already started destocking processes with animals' sales to local traders. This is done in fear of next year's GoC forced destocking at cheaper price. The 3RHP is therefore already impacting on local pastoral decision-making and livelihoods. Any restocking activity is likely to clash with these dynamics and herders may be tempted to use project animals for income-generation.

Decision-making of local authorities concerning the seed distribution component seem to be affected by the will to provide seeds to those communities who has partially lost their crop production due to this summer heavy rain and hail events. Other counties have made specific appeals with that respect (and ASIA is trying to contribute to that of Nangqian county) and it may be the case that Chengduo authorities see this project component as a viable option to tackle that problem (F. Massucco, pers. comm.). While this hypothesis has to be verified, the project management should be made aware of this risk, which would distort project resources from its overall objective. The impact of the 'Stop cultivating and restore grass and forest lands' programme must also be assessed, as most crop-prone areas in suitable xiangs are being reverted from crop production to natural vegetation growth.

The construction component has to be inserted in the complex working environment created by the forcibly implementation of the 4 Way Programme. Ongoing 4WP-related activities do not allow for appropriate understanding of which components are really meaningful, cost-effective to and appreciated by local communities. The programme is generally resented by county herders as it has diverted relevant economic resources in such a critical period following the huge 1995/96 herd losses. Most households that were 'invited' to participate in the programme are now suffering previously inexperienced poverty levels. This component is also a critical one, as it seems that local authorities in some xiangs are playing their own interest within the 4WP schemes.

Conversely, on the positive side, major local political efforts the project may build upon are as follows. A consistent degree of public as well as private investments is reshaping local landscapes, with ongoing and developing construction of basic infrastructure and facilities (roads, housing, schools, power plants, etc...) throughout the county. Levels of transportation, traffic and trading are reportedly increasing at a fast rate on the plateau. While these changes are likely to affect and challenge local traditions and culture, they indeed offer a wider set of socio-economic opportunities to local communities. Market exchanges of local pastoral products could rely on expanding urban demands and increased transport options, developing townships provide rural households with off-farm income-generation opportunities as well as out migrating pastoralists could more easily find alternative livelihoods in non-rural sectors.

Central and local authorities are engaged in consistent efforts and investments aimed at improving and developing educational opportunities for new generations in the area. Local communities seem to appreciate these efforts and often contribute what they can. In some areas sending a child to school is not yet perceived as an investment (but rather as a loss), but the overall attitude is changing in time, as reported by most local stakeholders. Education is increasingly perceived as a source for possible off-farm income-generation, and households increasingly value that option. Practical constraints are still into that a child sent to school is less herding labour for the family, which moreover has to bear some schooling expenses. Poor boarding opportunities (scarce food and accommodation) are often blamed for parents' reluctance towards school enrolment.

Government major efforts to support local production systems have been channelled through the para-veterinarian system. This system developed decades ago along the principles of the – now fashionable – community-based animal health system, which aims at providing herding communities with basic understanding and knowledge of animal health problems, and related diagnostical and intervention options. Major assets this system relies upon are a basic training on local animal health problems and vaccination inputs. Although this system is implemented with quite effective and appreciated outcomes, it shows wide areas for improvement, while also providing options for extending the level of information and awareness at the community level.

8.4 - Developing human resources

Investing upon local human resources is the main way to enhance the sustainability of local livelihoods, either by improving livestock performance or by providing options for alternative sources of income and livelihood. The major outcome of the project with this respect will be the overall improvement of the boarding facilities of local schools through the provision of school herds and the construction of appropriate pupils' accommodations. Poor boarding facilities are in fact a problem often adduced retaining local households to send their children to school. As local authorities are in the process of improving and boosting the educational system, ASIA will play its role by addressing communal rather than individual resources.

Other intervention components involving human resource development are those related to

- the training on improved forage production and management,
- the support provided to the para-vet system in order to extend and improve the current training;
- the training classes of the construction component, whose skills can be used either to provide off-farm sources of income or to better deal and cope with the 4WP;
- the development of technical skills related to off-farm activities.

These components are also aimed at testing technical innovations in the project area, whose outcomes will be monitored and evaluated together with local communities.

Further efforts in this direction shall address development of technical and managerial skills that will allow for increased alternative sources of livelihood. Secondary school systems, adult education and vocational training may be interesting options with this respect.

In order to contribute to the diversification of local livelihoods through **alternative sources of income**, a number of different options exist. These options build upon local skills and limited resources available, such as animal products and women's time during the winter season. Local communities may choose the activity

they prefer to develop, according to local needs and potentials. It is important that the choice is left to the beneficiaries in order to enhance sustainability of these activities. These opportunities may include:

- Hides and skins processing and utilization – the potential here is great, as Chinese markets are increasingly demanding quality product for export manufacturers;
- Weaving activities – although local livestock fibres may not be of too high quality (C. Richards, pers. comm.) the potentials for further utilizing local weaving materials and knowledge are there. This would entail skill training and small equipment investments.
- Dairy processing - while ongoing efforts with this respect in the area mainly address yak cheese processing, the feeling is that the local environment provides with some good working potentials for locally-based market opportunities of traditional yak products (yogurt and butter).
- Poultry development – poultry is increasingly accepted in local culture, especially for children eggs consumption. This maybe an interesting way of improving food and income levels among poorest strata.
- Traditional drawing and painting – these skills are increasingly appreciated by urban dwellers and present with interesting market niches. Systematized and improved used of traditional techniques may be developed.

Further investments in human resource development may include:

- Educational opportunities – support to ongoing local efforts.
- Vocational training – opportunities related to a variety of technical skills are highly demanded and needed in these areas. Field workshop would facilitate the seeking of alternative livelihoods to a number of people which can no longer sustain through livestock production only.
- Adult education - This kind of activity has been implemented in a recent IFAD project in the Huinan province and mainly addressed illiterate women. The outcome of this component was highly appreciated, while its costs were very limited.

8.5 - Involve local stakeholders

This project strategy is also aimed at providing opportunities for full involvement of all local concerned stakeholders. By applying a participatory approach since its inception, the project has so far consistently involved local communities in assessing their livelihood problems and analyzing their causes. With the use of Livelihood Matrices and Problem-Solution analysis exercises local households have also been solicited to develop and discuss possible solutions. Future monitoring and evaluation activities will also rely on a participatory approach to fully involve local communities in assessing and judging project outcomes and impacts (see also Table 9.3)

GoC local authorities have also been fully involved so far. GoC policies in the area have been deeply assessed and discussed with local authorities and the project strategy build upon policy guidelines in order to complement ongoing institutional efforts in the area. Project implementation strategy aims at further strengthening this close collaboration by supporting GoC educational efforts in the province through the school herd system. Bureau of Animal Husbandry initiatives with a community-based approach concerning forage management and animal health provide an interesting area for support. The production of specific user-friendly materials in collaboration with BAH staff could be an interesting outcome with this respect. Furthermore, enhancing training opportunities for the para-vet personnel – which plays an interface role between local authorities and communities – is a further step in closing the gap between institutions and beneficiaries.

The project has admittedly more problems to directly deal with the 4WP and 3RHP strategies. Efforts are anyhow made here not to interfere with these programmes, but to raise awareness among local communities and authorities about their implementation and related possible consequences.

Collaborations with local private and non-governmental organizations in the area are also to be envisaged within specific sectors of interest (e.g. weaving, dairy, environment, etc.). The project may also contemplate the option to actively involve local monasteries in animal restocking components. Livestock may be purchased from local monasteries' herds as well as monks may be requested to contribute some further animals and to help in raising local awareness on school herds' management.

8.6 - Build upon lessons learnt by similar and related initiatives

Apart from minor interventions in the area, major lessons may be learnt from the Qinghai Livestock Development Programme that the EC implemented from 1995 to 2000 mainly in collaboration with the BAH in Guoluo prefecture, which is bordering ASIA intervention area.

The programme involved field research and extension activities to protect the rangelands, increase fodder production and improve animal husbandry practices and services, etc. The project was aimed to achieve its objectives through local and overseas training, provision of technical assistance as well as of the provision of essential agricultural machinery, laboratory equipment, vehicles, etc. (EC, 1991)

Specific project components were the following :

- Applied field research, including grassland and animal husbandry field trials and demonstrations as well as investigations and possible solutions to rangeland problems;
- Veterinary diagnostic services, to improve overall diagnostic work. It includes the provision of diagnostic equipment to the four counties concerned as well as the provincial headquarters;
- Overseas training, for a total of 6 project staff, and for a duration of about 6-10 months each;

The EC-QLDP programme represents therefore a major source of information and indications and a major reference experience in the area. Most of the reports and materials of this programme were made available to ASIA staff (mainly by Mr. Laurens Wester – thank you) and indeed represented an invaluable input to our understanding and analysis (see the Literature Annex for further references).

BOX 8.2 – Learning lessons from ASIA 2001 experience –

Another important reference is the ASIA 2001 intervention in Yushu prefecture which addressed restocking activities. Lessons learnt from the ASIA 2001 project clearly show the need to account for social and environmental value in undertaking restocking efforts:

- Sheep poorly perform in cold areas. Most sheep-keepers in the altitudinal open plateau of Qinsuihe and Zenqin reported they do not milk sheep in summer as either the ewe or the lamb will eventually die in winter for nutritional deficits. In any case milk performance and lamb survival in these harsh conditions are quite low and are likely to discourage such restocking option.
- If sheep are not present in the local herd, raising it involves the availability of labour force to herd them (often a young boy) and to milk them (often a lady). Given the GoC requirements to enroll children in the school system, this may represent a problem for some household.
- Destocked households cannot only rely on sheep to restock their herds and neither to subsist. Most poor households encountered owned at least few yaks, which is the basic mean of their subsistence. Their livelihood source mainly depends on off-farm income-generation activities (which would push them to sell sheep, possibly).
- Sheep are more performing and socially valuable in farming areas, where their milk production is higher and more appreciated. In herding areas, only quite better off households keep consistent flock of sheep (where they maintain an income-generation meaning).
- Sheep restocking is very much in line with GoC policies but little with herders' strategies. A clear example stands from changes in the herd composition since the end of the 'Gonshe', meaning the start of the de-collectivization and the inception of the households' responsibility system. Herders' choice, when not constrained by GoC policy (or affected by snow disasters), has clearly reshaped local herds to an increase of yaks – and goats - at the expense of sheep.

9 – ASIA 2028 INTERVENTION: A diversified approach

The ASIA 2003 project follows up to the ASIA 2001 intervention, which implied restocking of sheep to a number of poor households in different xiangs of the prefecture, among which Qinqishe and Zenqin in Changduo county. This second phase is due to last one year, concentrate efforts in all Changduo xiangs and complement restocking with infrastructure and forage development activities, aimed at improving pastoral and agricultural production and enhance income-generation options.

Table 9.1 – Logical frame of ASIA 2028 intervention

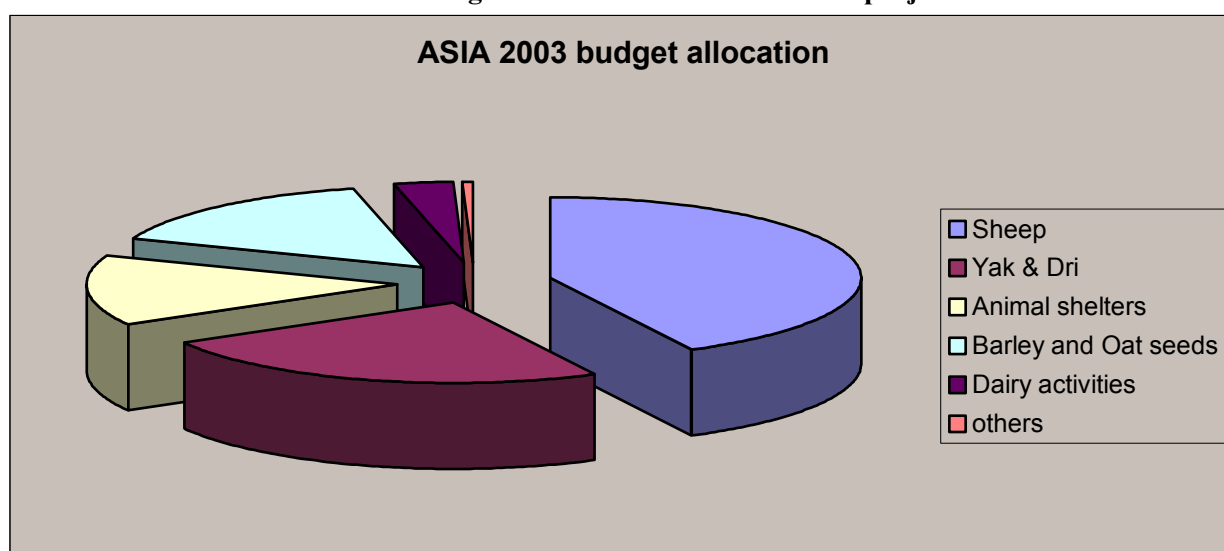
Overall objective	Support the livelihoods of Tibetan pastoralists in Chengduo county
Specific purposes	Support pastoral and agricultural production Promote income-generation opportunities
Results	Strengthen and develop activities and infrastructure related to agriculture and pastoral production Develop organizational and technical skills of local communities
Activities	Restock 500 households with sheep and yaks Build 18 multi-purposes communal shelters Support forage production through seed distribution Provide training on improved dairy processing and marketing

Table 9.2 - Project requests from local authorities

Xiang	Yaks	Sheep	Barley	Oats	Shelter	Training	
<i>Qingshuihe</i>	100	1190	0	0	0	25	
<i>Zenqin</i>	180	1180	0	282	10	26	
<i>Zaduo</i>	100	1180	0	282	10	26	
<i>Gatuo</i>	100	1150	3592	200	0	23	
<i>Chenven</i>	180	1600	7636	200	7	20	
<i>Saihe</i>	40	400	0	0	0	7	
<i>Labu</i>	100	1150	3721	200	5	20	
<i>Xiewu</i>	100	1150	3801	200	5	21	
totals	900	9000	18750	1364	37	168	900

Source: CAB offices in Chengduo

Chart 9.1 – Budget allocation of the ASIA 2003 project*



Note: including agro-pastoral production and training related activities

Generic distribution of livestock and grains in this context may not be the most effective and sustainable activity to support local livelihoods. Given the complexity of the local setting appropriate targeting and tailoring of these resources distribution is needed beforehand. The project mainly addresses pastoral communities, but its current budget composition may show limited impact to these groups, which are mainly located north of the project area, in the harshest environmental conditions, with scarce effectiveness of sheep

performance, animal shelters and forage crops. Furthermore these xiangs will be those most affected by the forthcoming 3RHP, which poses foreseeable threats to pastoral livelihoods in these areas. On top of that local communities have been able to partly rebuild their sheep flocks affected by the 1996 snow disaster, while overall yak figures in the area are still low compared to the pre-disaster times (see charts 4.1 & 4.2).

In order to tackle and overcome these issues, it is here suggested to acknowledge the major differences of the project area and invest upon their specific features. This may be easily done by dividing the ASIA 2003 intervention area in two portions, the northern and the southern one (see also Table 2.2 for reference), and by diversifying the intervention strategy accordingly.

In the northern portion, project resources will be better utilised if channelled through the developing school system, which is receiving relevant - though still inadequate - attention from local and central authorities. The schools that will show effective managerial skills and capacities will receive project support in terms of yaks for the school herd and assistance for improving boarding structures and facilities. All these efforts are aimed at enhancing local educational opportunities. The northern boarding schools with these features amount to about ten (refer to Table 6.1), and are able to absorb the project budgeted yaks.

This strategy will avoid facing most contradictory issues arising in northern xiangs (project restocking VS GoC destocking) while providing good options for sustainable investments in the county. While contributing to restocking local rangelands, this strategy will help assisting and stimulating all groups and households to get their children properly trained and skilled through the educational system, in line with the current GoC strategy to support alternative livelihoods in the area. Complimentary activities will address distribution of oat seeds (as oat provides better forage production in these cold environments) and capacity building aimed at improved livestock performances through the enhancement of the local para-vet system.

In the southern portion environmental conditions make agriculture production more feasible. The 3RH Programme is not scheduled and there is a limited concern over school development. Animal distribution may focus on the budgeted sheep and address individual households in critical areas.

In order to facilitate project implementation, monitoring and evaluation as well as to enhance project impact, it is here advised to concentrate sheep distribution in the poorest tzuns of each xiang (as outlined in Table 7.4 and also taking into account the indications of local authorities).

Livestock redistributed to individual households may consider the project proposal or the EC-QLDP indications about minimal survival thresholds. A revolving fund for livestock distributed to individual households may be set up in favour of local boarding schools which will develop their school herd management capacities in time. The construction component in these xiangs may address pilot greenhouses schemes for productive purposes, associated to the local school system. Seed distribution in the southern portion may concentrate on barley, for both crop and forage production. Intercropping with oat is also suggested to provide the project with indications for future activities. Support to and extension of the para-vet service are also envisaged in these areas.

Table 9.3 – Project strategy for the northern and southern intervention areas

Northern area	Changduo county	Southern area
<i>Qingshuihe, Zengqin, Zaiduo</i>	Xiangs	<i>Gatuo, Chenven, Saihe, Labu, Xiewu</i>
Pastoralism	Major activity	Agro-pastoralism
More extreme climate, limited alternative income, targeted by 3RHP, far and marginal	Constraints	Limited pastoralists
Wider rangelands, school development	Potentials	Good performance of barley crop and sheep production.
Intervention strategy		
School targeting with yak	Animal distribution	Target households in poorest tzuns with sheep
Oat seeds for forage production	Seeds distribution	Barley seeds for agro-pastoral production

		and oat fro intercropping
Educational facilities (schooling)	Construction component	Production facilities (e.g. pilot greenhouses)
Improved animal health, production and products management	Training activities	Improved animal health, production and products management

The component aimed at local **training and capacity building** will be similar throughout the county, although taking into account specific ecological and production features. This component will address issues related to animal health, production and products management rather than only milk processing, as it was initially proposed. It is in fact felt that enhancing animal performance is a prerequisite for further improving any kind of product management (e.g. processing, marketing, ect...).

As a result the revised project strategy will support local livelihoods and enhance local agro-pastoral production systems through

- Targeting local schools for restocking and boarding construction efforts in the northern portion,
- Restocking poorest villages and tzuns and support pilot public facilities in the southern portion,
- Distributing seeds for enhanced forage and crop production,
- Improving the local community-based para-vet system towards enhanced livestock production,
- Improving genetic capitals in local crops and herds,
- testing improved natural resource management techniques (intercropping, processing, etc.)
- Providing opportunities for local capacity building.

In order to increase the sustainability of its outcomes and impacts, the project should trigger and involve participation from different local stakeholders by clearly defining and providing specific roles and responsibilities to them. The following indications are aimed at that.

Table 9.3 - Role and responsibility envisaged for the different local stakeholders

ASIA	Local authorities	Communities
RESTOCKING		
Shift major budget allocation from sheep to yak.	Request GoC BAH to keep school herd out of 3RHP.	Provide for school herd grazing and management .
Distribute yaks (Dri) to local boarding schools in the northern portion.	Help ASIA in formalising contracts with schools concerning herd management and use.	Ensure that herd products used for school pupils.
		Provide for yak feeding and health practices as defined by ASIA.
Distribute sheep to the households of the poorest tzuns in the southern portion on revolving basis.	Support ASIA targeting distribution and monitoring of implementation. Assist in follow up of the revolving mechanism.	Apply animal management improvements and inputs provided through training activities. Comply with livestock management practices and revolving mechanism.
Provide training activities aimed at improvements in animal production.		
SEED DISTRIBUTION		
Distribute oat seeds in the northerner area on intervention and barley seeds in the southern one.	Support ASIA in tendering process and with training and monitoring communities.	Communities show interest and apply specific innovative crop management practices.
Define a sustainable strategy to make oats and radish seeds more available through markets.	GoC local BAH grassland station to provide support by growing and commercialise seeds.	

CONSTRUCTION		
Allocate more budget for improvement of schooling facilities.	Complement ASIA efforts by improving teaching and boarding facilities.	Increase local school enrolment rates.
Provide schools with boarding and productive facilities.		Support school herd management.
Provide local communities with training and materials.		Provide time and labour force for training and construction.
TRAINING ACTIVITIES		
Provide training and inputs aimed at improvements in animal production (mainly health-related).	Collaborations with Bureau of Animal Husbandry.	Involvement of community-based para-veterinary staff and local communities.
Provide training aimed at improvements in forage management.		
Produce a booklet to support these activities (in Tibetan and with drawings).		
Provide training related to the construction component.	See above	

9.1 - Targeting school development

Wherever it is feasible, the project should invest its resources in complementing and integrating ongoing institutional as well as community efforts aimed at enhancing sustainable development processes. More specifically in the northerner part of the project area the restocking and the construction components should **target local schools** in order to support developing educational opportunities. A major foreseen outcome of targeting schools with this intervention is that local households will be given an incentive to send their children to schools. Experiences in Tibetan areas attest in fact that improvements in boarding facilities and capacities boost school enrolment rates.

Animal distribution should consider yaks for these harsh environments, whereas the construction component may utilise resources for complementing the construction or upgrading of school facilities rather than building animal shelters, which prove of limited use in northern xiangs.

Targeting school herds rather than individual ones will provide the ASIA project with a number of added values:

- Greatly expand the number of targeted beneficiaries;
- Avoid difficult and discriminating activities related to individual beneficiaries selection;
- Enhance a longer-term approach by addressing inter-generational benefits through enhanced educational opportunities;
- Individual households will also benefit as they will reduce children schooling costs (e.g. meals);
- Complement existing institutional efforts in the area;
- Negotiate further efforts from local authorities (e.g. upgrading teaching facilities) and monasteries (e.g. contributing animals to the school herd);
- Allow for community monitoring and control of herds' use;
- Facilitate the implementation of improved animal feeding and health practices;
- Active community involvement and spreading of tested innovations;
- Enhance local managerial, monitoring and evaluation capacities;
- ASIA monitoring and evaluation of the outcomes and impacts of restocking and related activities.

While the whole community will benefit from such activities, it is foreseen that they may particularly target poorest population strata. Herding households, especially the poor ones, are now willing to send their children to school, as education is increasingly seen as a way to provide more opportunities for one's children and for future household livelihood. Wealthy pastoral households are those still reluctant to send their children to school, as their children do not seem to need extra opportunities.

Local schools may become sorts of **community development centres** and provide pastoral communities with a much-needed interface with the wider societal frame. Project training-related activities, both for the animal health and for the building components, may be planned in local schools. The school herd will become a shared resource upon which project innovative techniques aimed at enhancing animal performance will be tested for individual households to analyse outcomes and develop decisions accordingly. Para-vet training materials (in Tibetan and with drawings) could be distributed to kids for the individual households. Schools may also be seen as potential areas for future project activities, such as improving dairy processing or enhancing weaving activities.

School targeting may also relate to the **construction component** of the project. Given the limited resources available with that respect, it is here suggested that the resources allocated to construction are invested in co-shared ASIA-GoC schemes aimed at expanding and improving the facilities of local boarding schools. This component could learn from other successful ASIA experiences with bio-architecture in the region (see also www.projetstudio.it). Pilot greenhouses could be associated to local schools in the southern areas and provide options to test improved agriculture production.

In order to keep costs low and to allow for the beneficiaries' contribution, the project could contract a local construction companies on the basis of a locally-tailored design for boarding facilities. Training classes on building practices and techniques may be associated to the construction, in order to create local capacity building on the matter. While allowing the project to remain out of the 4WP implementation - which seems to be a very sensitive issue – this will represent an interesting option to proactively involve local beneficiaries with their labour and provide some construction training and skill development opportunities which people could reutilise elsewhere in the search of off-farm incomes. These added values will in time improve communities' awareness vis-à-vis the costs and benefits of the 4WP activities by helping local communities to be more aware of local materials' prices and to learn their own building skills in order to better comply with 4WP facilities.

Before any resource distribution to schools it is warmly advised to **formalize binding contracts** aimed at ensuring that:

- ASIA provided resources (animals, inputs and materials) belong to the school and cannot be diverted for individual use;
- ASIA animals should not substitute but rather integrate the animals provided to schools by individual households;
- animal products (milk, dairies and hair) will be used for the pupils – no individual use of these animals will be tolerated;
- the restocked herd will undergo ASIA-defined innovative practices aimed at enhancing animal performance and disseminated through the related training;
- animals will not be slaughtered or sold for a number X of years; afterwards pupils' households may decide upon sustainable off-take rates;
- The school director should engage in keeping records (on be-weekly/monthly basis) of animals' performances (health, production, reproduction, mortality, etc...);
- Local authorities engage in undertaking agreed improvements to the teaching and boarding systems.

A number of different levels should be included in these contracting, from the school administration, to the tzun leaders, from the CAB representative to the local educational officer.

It is here advised to ask in advance (before winter time) the different county schools to develop and prepare a strategy for properly managing ASIA restocked animals (indications about pasture land, labour force, products utilization, etc...) and facilities. These strategic documents are to be ready for April, when they should be handed to the project staff for analysis and related decision-making.

9.2 - Considerations for animal distribution

Animal distribution to **schools herds** is to be preferred wherever this option exists, which mainly applies to the northern part of the project area. In the southern portion of the project area, where school development is limited and current capacities are not able to absorb project investments, restocking of groups of poor communities, also gravitating around local monasteries, are to be considered. Should restocking of individual herds also be considered, it is here advised to target only the very poor communities-tzuns of each xiang (as

indicated in Table 7.4 and in authorities' lists). According to the project proposal, each household adult should be able to rely on at least 1 yak and ten sheep, meaning an overall rate of about 3.5 yak or 15 s.u. per capita in order to ensure subsistence levels. EC-QLDP provide slightly higher figures by indicating 25 yaks (or related s.u.) as the minimal subsistence threshold for pastoral households (average of 6 people). Revolving mechanisms where animals' offspring are returned to developing local school have to be set in place for the animals distributed to individual households.

A number of elements, ranging from agro-ecological to socio-cultural, are to be considered when debating the restocking strategy. Apart from the lessons learnt by the ASIA 2001 experience (refer to Box 8.2) overall **factors to be considered** may be summarized as follows:

- ✓ Sheep and yaks are normally herded separately; if we give sheep to a household that only has yaks, another person should be employed in animal caring, often a child/boy. It should be previously assessed whether this labour force is available and not engaged in other educational/income-generation activity. The same applies for animal shelters, which are distinct and separated for yak and shoats.
- ✓ Restocking sheep rather than yaks is likely to make the local authorities GoC policy) and the donor happier (higher number of animals), but no doubt yaks will make the beneficiaries happier. The rationale that sheep are faster in restocking hold little sense due to local grassland conditions, poor productivity levels and the socio-economic values attached to the different animals. It has been clearly assessed that yaks represent the basic subsistence resource in these environments. Moreover given the period elapsed since the SD (1996 to 2003), most sheep flocks have naturally restocked while yaks herds are still far in that process (see data charts 4.1 & 4.2).
- ✓ Sheep are more performing and appreciated in farming areas, although a yak couple may also serve as ploughing power where crop production is feasible, while they show poor performance in altitudinal and cold areas (low milking and lambing rates). Many households – especially in farming areas - are restocking their flocks with goats, so it makes little sense to provide them with sheep.
- ✓ As inbreeding is an acknowledged problem among yaks in the area, restocking efforts could help partially tackle this problem by utilizing animals from similar but distant areas, by giving due attention to relevant ecological factors such as climatic and pasture conditions. Past experiences have shown that animals imported from different areas may suffer either from climatic adaptability or for poisoning through feeding with dangerous plants they were not aware of. Past GoC restocking programmes that imported animals from other areas failed in recognizing these elements and many animals died consequently. It is here advised to purchase animals for redistribution in the counties surrounding the project-targeted one, to take all these lessons learnt into account.

Inbreeding problems in the area represent a main area of concern for the project. Distribution of good quality yak males for reproduction purposes is here to be considered, to complement yak dri females for restocking distribution. This options is to be very appreciated by local communities and authorities and indeed could represent a major investment towards improved yak breeding in the county.

As a result concerning school herds, female yaks (*dri*) are to be preferred for restocking as easier to manage and more milk productive. It is therefore suggested to translate project budget allocation from sheep to a higher amount of *dris*. Animals may also be purchased from monasteries' herds (often composed by females) in order to integrate possible local contributions. Locally existing forms of contract will enable also schools without own pasture and labour force to maintain and develop ASIA school herd. This is the case already for existing school herds and these mechanisms do not seem to too difficult to replicate.

Restocking-related activities include:

- ✓ Animals acquired for restocking should be fully checked, vaccinated and treated before being brought and distributed to beneficiaries in a different area. This is to avoid the spreading of diseases from different areas as well as to protect the newly distributed asset from local health risks.
- ✓ To provide the project strategy with a longer term approach, the restocked herds may undergo specific cares aimed at testing enhancing productivity options. These could include timely de-worming and anti-parasitosis treatments together with improved feeding practices. Restocked animals will be used as demonstration herds, so that the whole community may learn and benefit.
- ✓ Tagging of distributed animals is an important tool for future monitoring and evaluating project outcomes. On one side it will allow understanding herders' use of restocked livestock, while the other it may serve to analyse the effectiveness of specific animal husbandry practices.

- ✓ A livestock revolving fund for livestock distributed to individual households is to be set up in favour of local boarding schools, which will develop their school herd management capacities accordingly. Also local authorities expressed the need not to provide any individual gift and enhance public responsibility over the project resources.

9.3 – Supporting the para-vet system

A major area of concern when dealing with improved resource management and enhanced income-generation opportunities in the Tibetan region is no doubt the overall performance of local herds and flocks, which form the basis for local livelihood patterns. Among the few successful experiences with this respect in the area, the functioning of a government-supported community-based para-veterinary system is the most relevant one. It represents the main institutional effort targeting pastoral livelihoods in the area with relevant degrees of coverage and effectiveness. It also provides good and interesting options for improvements and investments in animal husbandry on the Tibetan plateau.

BOX 9.1 – Constraints to the current rural extension systems (FAO, 1998)

Within the framework of the UN Task Force (FAO, UNDP, WFP, World Bank) on "*Sustainable Agriculture, Rural Development and Food Security*", a FAO backstopped study on the *Extension Effectiveness in the China Western Provinces* was conducted in 1998. The major findings and conclusions of that study were related to the effectiveness of the agricultural and pastoral extension systems. The study found that:

- an inefficient management and weak linkages these services suffer from at the provincial, county and township levels;
- inadequate facilities and resources to service the clientele at the grassroots level;
- low levels of technology dissemination and adoption;
- an urgent need to provide in-service training for county and township level staff in both technical matters and extension methodology;
- limited women's involvement and participation in decision-making process despite their significant contributions to farm labour.

Lessons learnt from the Community Animal Health Workers (CAHWs) approach – which shows degrees of success in other pastoral areas – may apply to the Tibetan context. Initial support may involve complementing governmental efforts towards capacity building and provision of adequate equipment. Community-based para-vet staff needs in fact adequate training and resources, together with improved monitoring and control. Longer term project efforts will address the sustainability of the service and the capacity for local communities to monitor and evaluate its outcomes. While acknowledging and investing upon the potentials of the current system, ASIA efforts will in fact seek to improve its effectiveness and outreach, in order to enhance herders' husbandry skill, herds' performance as well as overall communities' capacities. A pilot strategy will be tested in Chengduo county and then extended to the whole prefecture of Yushu.

Major ASIA efforts address the **para-vet training** activities, which provides for an interesting window for raising awareness and improve technical skills of herders. Both the technical as well as the methodological components of the training will be strengthened by extending the training period, by selecting and including women para-vets and by providing adequate support with extension materials and equipment. Examples with this respect include the dissemination of locally-tailored technical handbooks (one for the para-vet – with in-depth writings – and one for the herder technicians – with mainly drawings), the use of a slaughtered animal for the animal physiology classes (a sick yak was preferred by trainees), the provision of a basic toolkit to all the county para-vets (e.g. surgical knives due to the relevance of brain worm and Warble fly in the area) and the use of a microscope during the classes. Participants will also benefit from a small daily allowance (8 Y) to cover logistic costs during the training. Training curriculum is attached in Annex 9.

Complimentary project activities aimed at developing a **comprehensive animal health package** address the revival of Tibetan ethno-veterinary knowledge (EVK) and practices (e.g. use of herbs and plants with anti-parasitic potentials) as well as the introduction of basic participatory techniques for improving community-based disease surveillance (participatory epidemiology) and for monitoring and evaluation of service impacts

(PRA problem ranking). Xiang vet offices have been provided with updated technical literature. The project will also address improvements in the supply and management of veterinary inputs - which is considered unreliable and inefficient - through group purchases and revolving funds mechanisms. A basic kit of reference drugs will be identified - anti-parasites (*Ivermectin* and *Deltamethrin*) and basic antibiotics (*Streptomycin* and *Penicillin*) - and appropriate sourcing and management established. Training on basic accountancy as well as storing and utilisation techniques of vet drugs is also considered.

In support to these efforts, some livestock (yak and sheep) have been distributed to selected local schools. Apart from supporting the educational sector by improving school boarding facilities with enlarged school herds (that provide food and income for the schools), this option also provides local communities with **demonstration herds** for improved animal husbandry. The management of ASIA school herds will in fact involve the application of improved husbandry practices - from animal health cares (especially treatments against seasonal parasites and against diarrhea agents in young stocks), to feeding practices (e.g. oat forage production), to disaster preparedness (e.g. fencing of critical pastures) - in order to show the effectiveness of improved management as well as the related economic benefits. School animals are visible and accessible to most herders, and may therefore serve for the purpose of public awareness and dissemination. Project livestock for school herds is sourced from neighboring counties with similar agro-ecological conditions to the project area, in order to provide chances for genetic improvements, while excluding the risks of low adaptability.

9.4 – Considerations for seeds distribution

As seen in chapter 5.3 most herders and agro-pastoralists in the project area mainly barley for crop and/or forage purposes. Only a limited number of households reported utilising oat and Tibetan radish for forage production. Mainly reported problems for barley relate to the poor and degenerating genetic quality, while poor availability and the high price of the seeds affect the cultivation of oats and the Tibetan radish.

Given the different conditions, project strategy for seed distribution could diversify in northern and southern xiangs. Oat shows higher potentials in northern environments, while barley is preferred in the southern portion of the intervention area, and project distribution should follow accordingly. Barley and oats seeds may also be distributed together in order to exploit production synergies. **Intercropping of barley and oats** has in fact proved to enhance overall forage productivity levels as well as to improve forage nutritional value (IFAD, 2000). As cropping times coincide, this is an option the project may test. Appropriate testing of oat production and its productive synergies when intercropped with barley may generate interesting results for improving overall forage production in the area. Should the barley-oat intercropping options be applied, basic training packages should complement timely seed distribution.

Problems related to **seed reproduction and marketing** could also be addressed by the project in order to increase the impact and the sustainability of the intervention. This mainly applies for oat and radish seed resources, as barley seeds do not seem to have specific marketing (as most households just sow parts of the grains they purchase for consumption). Close collaboration relationships with the BAH should be established with this respect.

The amount of seeds the project has budgeted far exceeds any local capacity to absorb these seeds for productive purposes. Should households be allocated more seeds than they need, it is likely that some of these seeds will be used for direct household consumption, with a minor impact for the project. This applies specifically to barley and suggests to scale down overall project budget allocated to the seed component and to turn these resources to improve school boarding facilities.

Tendering procedures related to seed selection and purchase should be undertaken before the end of this 2003 mission. As harvesting activities have just taken place, this strategy will allow for getting a higher product quality for a lower price. It will also smooth next year's timely distribution activities.

10 – RATIONALE FOR LONGER TERM INTERVENTIONS

Longer-term objectives of any intervention in these areas should address to improved livelihood patterns for herders' communities while supporting environmental recovery. In order to pursue these challenges overall

livestock performances should be improved and risk management as well as marketing mechanisms enhanced. These outputs are to be achieved through improved local organisational capacities and enhanced interactions between the crop and the herding sectors. Women may well play a leading role in this process.

A tentative Logical Frame for setting an appropriate intervention in the area is here presented (Table 10.1), for further discussion. It is here reiterated that addressing the root causes of poverty, vulnerability and marginalisation for Tibetan communities in Yushu prefecture implies a long-term concern and commitment. Reverting rangeland degradation and enhancing livestock performance will by no means take place and affect local livelihoods in little time. Short term and emergency interventions may prove of limited effectiveness in the area and even harmful to an extent.

Moreover the importance of monitoring shifting livelihoods on the plateau is considered a very critical process. Considerable changes will take place, both on the ecological and the socio-economic domains, during the following decades throughout the ranges of Qinghai Province. These changes should be properly monitored and decision-making shall follow accordingly. This report may serve that purpose by representing a sort of baseline study for future reference.

Table 10.1 – Tentative LogFrame for ASIA longer term intervention in the prefecture of Yushu

Intervention logic		
Overall objective	Expected results	Activities
Enhance the livelihoods of Tibetan pastoral communities in Yushu prefecture, Qinghai province – PRChina		
Specific objectives		
Strengthen organizational capacities of local communities in order to:		
1 - Better manage local natural resources to enhance environmental as well as economic opportunities	a) Improved animal husbandry and rangeland management practices	Strengthen exchanges between farming and herding areas (crop-livestock exchanges), appropriate training of para-vets and herders technicians (including women), community-based piloting of innovative techniques and varieties, locally-tailored drug supply system
	b) Assist local communities to integrate within ongoing GoC environmental programmes in the area (3RHP)	Support local CBOs/NGOs active on these issues (Great Rivers, Upper Yangtze group), Establish dialogue-based platforms between local authorities and communities, pilot community-based grassland management schemes, learn from other experiences in the region (e.g. Plateau Perspectives), Environmental education
	c) Development of locally-tailored devices to make the best use of solar power	Piloting and dissemination of electricity panels, solar cooker, etc.. Bio-architecture for public facilities (e.g. schools)
2 - Improve local disaster preparedness	a) Enhance the capacity of local communities and authorities to prevent and respond to climatic extremes	Appropriate utilization of technical devices (forage production, fencing of critical pasture, herd management), improve institutional cross-levels reporting, establish market-based early warning systems, radio-based networks; Strengthen institutional capacities on information networks and emergency preparedness (forage stocks, etc...)
3 - Receive appropriate basic services	a) Integrate ongoing institutional efforts towards improved access to 1 - primary education, 2 - health care	Support local CBOs/NGOs active on these issues (JINPA, Snow Land), improve GoC infrastructures & facilities with bio-architecture design, Support pupils' nutritional levels with school herds, scholarships, Training to village doctors and midwives, establish mobile clinics

4 - Extend income generation opportunities	a) Improve relationships of local communities with the market	Enhance organisation capacities of local communities vis-à-vis market mechanisms (e.g. group marketing, transport solutions), pilot loans & credit schemes, establish appropriate market information systems, explore alternative markets, weekly Xiang marketing
	b) Increase income generation opportunities through: 1 - Increased livestock productivity, 2 - Improved marketing of agro-pastoral products; 3 - Development of alternative/off-farm sources of income 4 – Exploit tourism-based opportunities.	Improve animal husbandry (§ 1.a), increase off-take rates Support of value-adding processing (dairy, hides & skins, dry meat), training on hygiene and quality matters, Enhanced education opportunities (§ 3.b), vocational training, skill formation, Guided tours to areas of environmental (parks) or cultural (shrines) relevant areas, horse rental, handcrafting