IFAD

ИФАД

Working paper: Arkhangai and Khüvsgül aimags

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ABBREVIATIONS AND ACRONYMS

CPM	Country Programme Manager
GOM	Government of Mongolia
HMRC	High Mountain Research Centre, Ikh Tamir
IAH	Institute of Animal Husbandry, Zaisan
IDS	Institute of Development Studies
MOF	Ministry of Finance
MOFA	Ministry of Food and Agriculture
MTR	Mid-Term Review
PALD	Policy Alternatives for Livestock Development
PCR	Project Completion Report
PIU	Project Implementation Unit
PRA	Participatory Rural Appraisal
SCF	Save the Children Fund
SLA	Subsidiary Loan Agreement
SSO	State Statistical Office

LOCAL TERMS USED IN THE TEXT

Aaral	Dried curd product
Aimag	Province
Bag	Administrative subdivision of a *sum*
Bod	Traditional large ruminant unit
Bog	Traditional small ruminant unit
Dzuud	A freezing over of the snow in spring which makes it impossible for grazing animals to penetrate to the grass below
Idesh	Slaughtering animals for meat before winter
Khuural	Meeting, assembly
Negdel	Co-operative herding enterprise established at *sum* level in the socialist era
Otor	A rapid winter movement of stock in case of *dzuud*
Sum	Administrative unit into which an aimag is divided
Suur	Encampment. Now discontinued social unit prevalent in the Socialist period

1. Introduction

IFAD first proposed a Poverty Alleviation Project for herders in Arkhangai Aimag following the initial discussions in early 1994 and a mission visited Mongolia in September 1994. To provide more comprehensive social and economic background data, FAO was requested to prepare a TCP, representing a collaboration between the PALD Project and locally recruited consultants, approved in May, 1995. To complement the FAO/TCP findings, a survey was conducted in the Project Area between 23rd August and 7th September, 1995. The Arkhangai Rural Poverty Alleviation project was declared effective in December 1996. After the Mid Term Review in 1998, the Project scope and implementation was extended to Khuvsgul *aimag.* Following an extension of six months, the Project was completed in December 2003, although livestock loan repayment will continue till 2012.

A Mission was fielded by IFAD's Office of Evaluations (OE) as part of the Methodological Framework for Project Evaluation (MFE), introduced in 2002. The objectives are: to assess and document the results, impacts and effectiveness of the Project; to develop insights and recommendations that will improve future projects design in light of the IFAD Strategic Framework, PI Regional Strategy and the Country Strategic Opportunities Papers (COSOP). Simultaneously, a household survey of beneficiaries of both vegetable and livestock loans was conducted by the Centre for Policy Research (CPR), following a methodological framework and data analysis systems designed by the present author[1]. This working paper provides background data for the main report on the two aimags and also presents some preliminary analyses of the household survey.

The dynamics of herding households in Mongolia have been well-studied since 1991. A major source of information, both generally for Mongolia and in Arkhangai Aimag, is the series of reports of PALD (Policy Alternatives for Livestock Development) a collaboration between IDS, University of Sussex, and the IAH, Mongolian Agricultural University. The principal publications and reports of relevance to Arkhangai are as follows; Cooper (1993, 1995), Cooper & Narangerel (1993), Edstrom (1993), Fernández-Giménez (1995), Mearns (1991, 1993), PALD (1993), Potkanski & Szynkiewicz (1993), Temple, Swift and Payne (1993).

A valuable overview of regional issues in relation to Inner Asian pastoralism is Humphrey & Sneath (1999) with two volumes of associated papers (Humphrey & Sneath 1996). A more recent overview takes in both the steppe grasslands and the vertical transhumance of the Himalayan region (Suttie & Reynolds 2003). Apart from this, studies such as DanAgro (1992), Honhold (1995), Mearns (1996), Erdenebaatar (1996, 2003), Fernandez-Gimenez (1997, 1999), Schmidt et al. 2002, Tumenbayar (2002), Upton (2002) provide valuable background data for overall changes in the economy and ecology of this region.

Statistical data in Mongolia is usually efficiently collected and published and national statistical data is available up to 2004 in NSOM (2005). In addition, each Aimag publishes its statistical yearbook, and these are available for Arkhangai (ASO 2004) and Khuvsgul (KSO 2004). Climatic and market data are collected slightly more sporadically, and could only be collated by hand from local meteorological services. Nonetheless, they provide sufficient reliable data for an analysis of local trends. The Human Development Report for Mongolia for 2003 (GOM/UNDP n.d.) also includes valuable analyses of statistical data, though it concentrates particularly on urban issues. UNDP also commissioned a special study of urban migration, published in 2004 (GOM/UNDP 2004).

Design and monitoring documents often treat the project as a world of its own, insulated from external change. Given that Mongolia has undergone massive economic, social and ecological change in the decade since RPAP began, this evaluation tries to bring in some of the broader issues that have affected the way the project unrolled.

[1] See Appendix 1 for more details of this survey

2. Environmental background and ecology

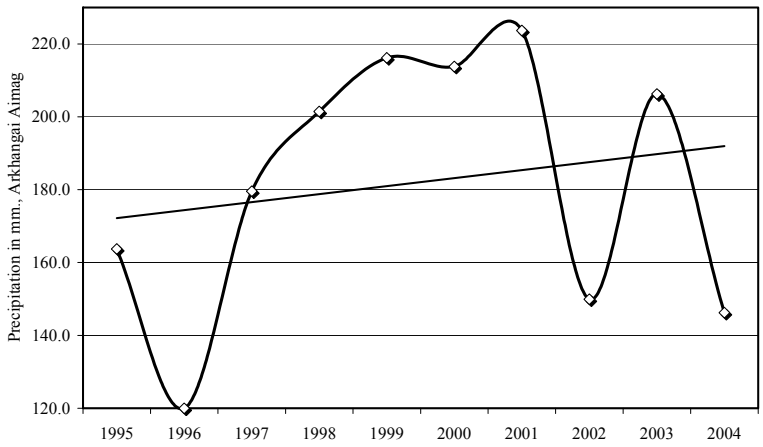
2.1 Vegetation

General overviews of the vegetation of Mongolia can be found in Hilbig (1995) and Jigjidsuren & Johnson (2003). The great majority of Mongolia consists of temperate grasslands, with typical steppe species. Lower hills are covered with pine forest, but in Khuvsgul there are high mountain chains with typical alpine vegetation. Steppe vegetation is characterized by a predominance of grasses, especially *Stipa* spp., *Cleistogenes soongorica* and *Festuca* spp. Legumes are scarce, and the commonest are *Medicago falcata* and *Astragalus* spp. The montane forest steppe has *Festuca* spp. and *Artemisia* spp. as dominants.

2.2 Rainfall and climate

Mongolia is virtually arid, with heavy snowfalls possible for six months of the year. Mean temperatures can reach a mean as low as -36ºC between December and February, peaking at -42ºC in the exceptional winter of 200-2001. Meteorological data usually aggregates rain and snowfall into a single figure in mm. It is widely believed by both herders and officials that Mongolia has been experiencing drought conditions over the last decade and that this explains the poor condition of the grass. To establish the truth of these assertions, rainfall and snow data were collected for both Arkhangay and Khuvsgul aimags[2]. Figure 1 shows annual rainfall for Arkhangai aimag since 1995. Although variable, the trend shows a slight increase over the decade.

Figure 1. Annual rainfall trends, Arkhangai, 1995-2004

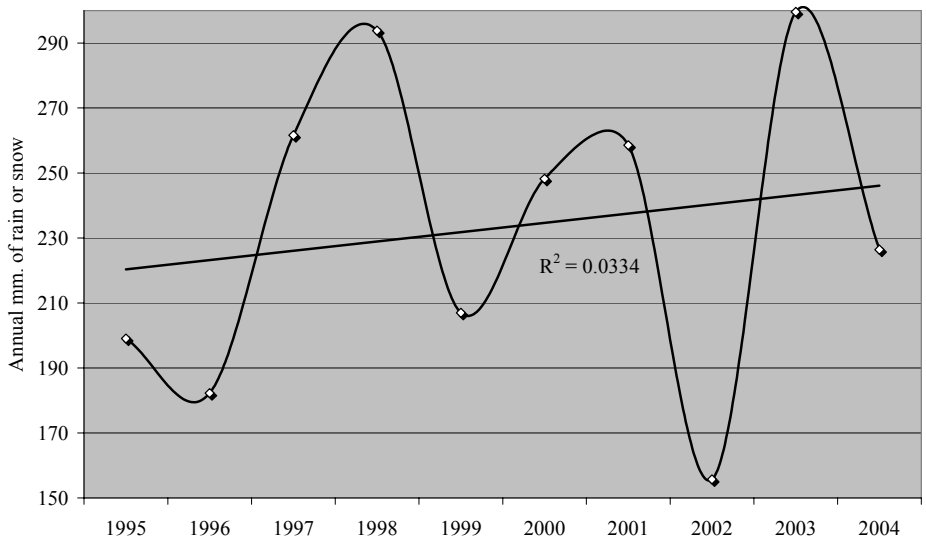


Source: Meteorology Office, Tsetserleg

Figure 2 shows the annual rainfall for Khuvsgul aimag, 1995-2004. As with Arkhangai, despite a major deficit in 2002, the trend is a slight increase.

[2] It is very striking that neither PIU had already collected and analysed this data and were thus prone to repeat inaccurate surmises on weather trends. The relevant body in Ulaan Baatar would not release such data to MoFA, which reflects poorly on co-operation between government bodies.

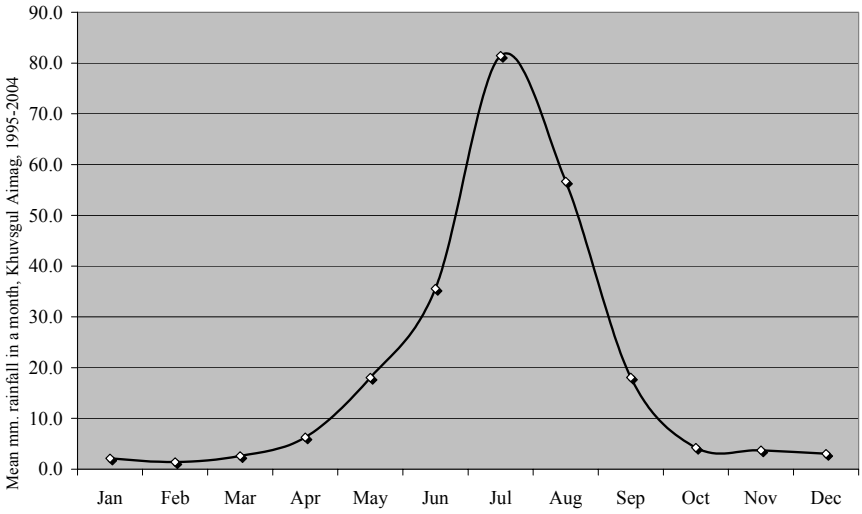
Figure 2. Annual rainfall trends, Khuvsgul, 1995-2004



Source: Meteorology Office, Moron

Both these datasets show that the aggregate rainfall has been static or increasing. To check the hypothesis that rainfall has been poorly distributed, Figure 3 shows the merged monthly rainfall for the same period. It appears that intra-annual rainfall follows a standard pattern which has not changed over the decade.

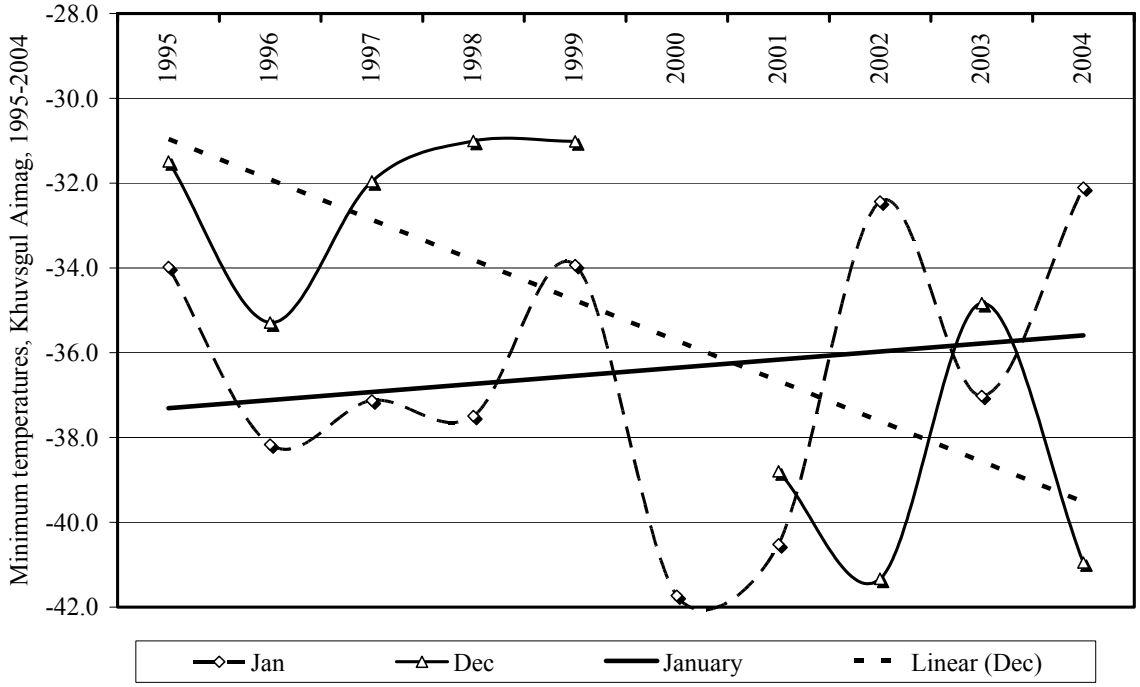
Figure 3. Intra-annual rainfall, Khuvsgul, 1995-2004



Claims that poor quantities or distribution of rainfall are responsible for the condition of the pasture are clearly wrong.

The major risk to livestock in these two aimags is *dzuud*, a climatic condition when the ice freezes above the snow, preventing animals digging through to reach the grass. Temperature data is not as reliable and complete as rainfall, but Figure 4 shows the minimum temperatures for December and January in Khuvsgul aimag for 1995-2004. Minimum temperatures are most likely to indicate a risk of dzuud.

Figure 4. Minimum temperatures, Khuvsgul, December/January, 1995-2004



January temperatures show no very marked trend, but December temperatures have plummeted from -31ºC to -39ºC. This is very dramatic, but as data for two years are missing, may be need to be treated with caution. Nonetheless, if these figures are any guide, the frequency of dzuuds is likely to accelerate.

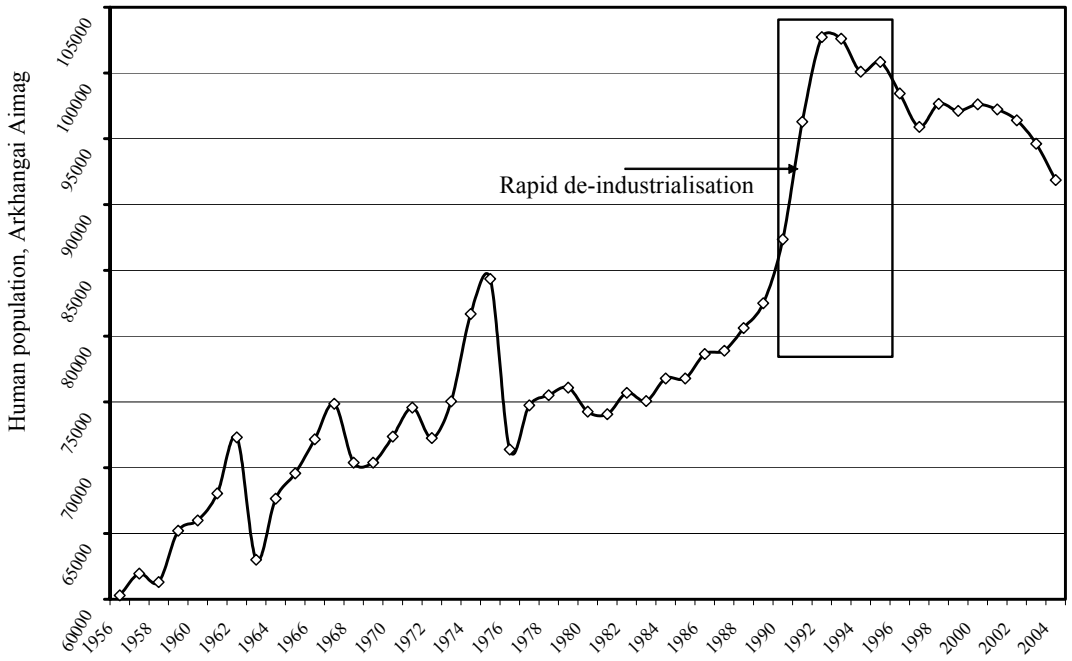
3. Demography and human population

3.1 Demography

3.1.1 Arkhangay

The human population of Arkhangay is ethnically homogeneous, consisting almost entirely of Khalkh Mongols. It is divided into 19 *sums*, each of which has a population of around 1500-6500 individuals in 1000+ households. Figure 5 shows the human population from 1956 to 2004.

Figure 5. Arkhangay aimag: human population 1956-2004

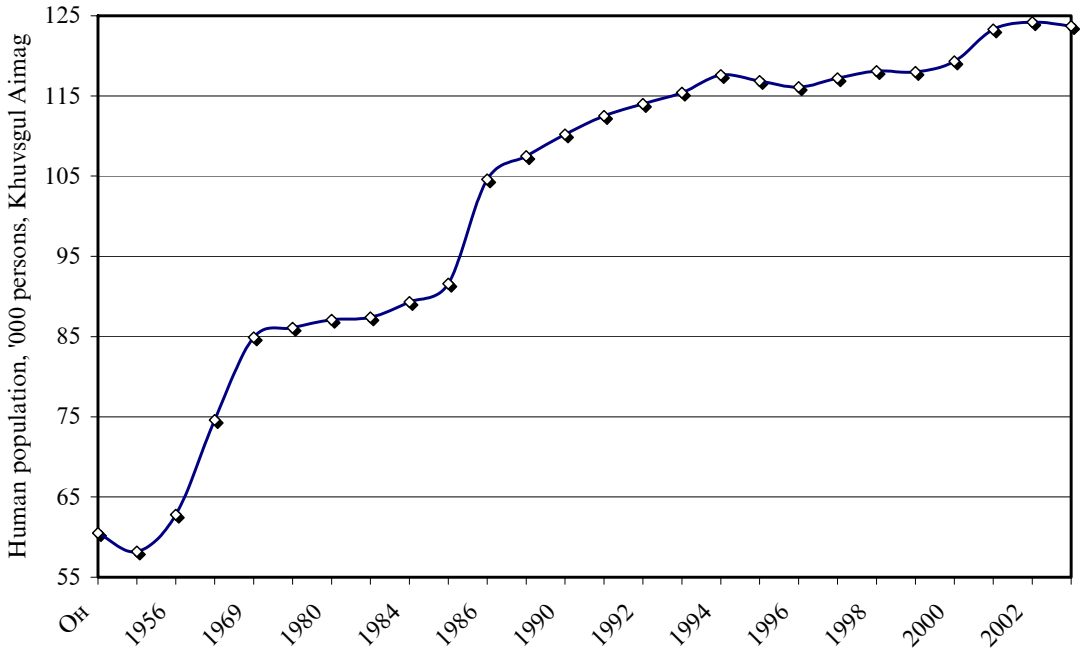


Essentially, the population climbed slowly throughout the *negdel* era, until 1991, when rapid de-industrialisation followed the end of the political influence of the Soviet Union. Soviet-subsidised industries collapsed and many households were abruptly without employment, returning to rural areas to try and become. These new herding households often failed due to lack of experience and when opportunities came to move back to this cities, they drifted away again. Hence the population of Arkhangay rose until 1995, since when it has been gradually falling. It is likely that these figures under-represent the rate of migration, since Arkhangay, with its relatively rapid connection to Ulaan Baatar, also has a large number of split families, with part herding and part in the capital, either temporarily or permanently.

3.1.2 Khüvsgül

The peoples of Khuvsgul are less homogeneous than Arkhangai, with some Darkhan, and Tsaatan reindeer herders in addition to the dominant Khalkh population. Figure 6 shows the human population of Khuvsgul aimag from 1944-2004. Figures until 1979 were collected only sporadically, but indicate a figure less than half that for the 1990s onwards.

Figure 6. Khuvsgul aimag: human population 1944-2004

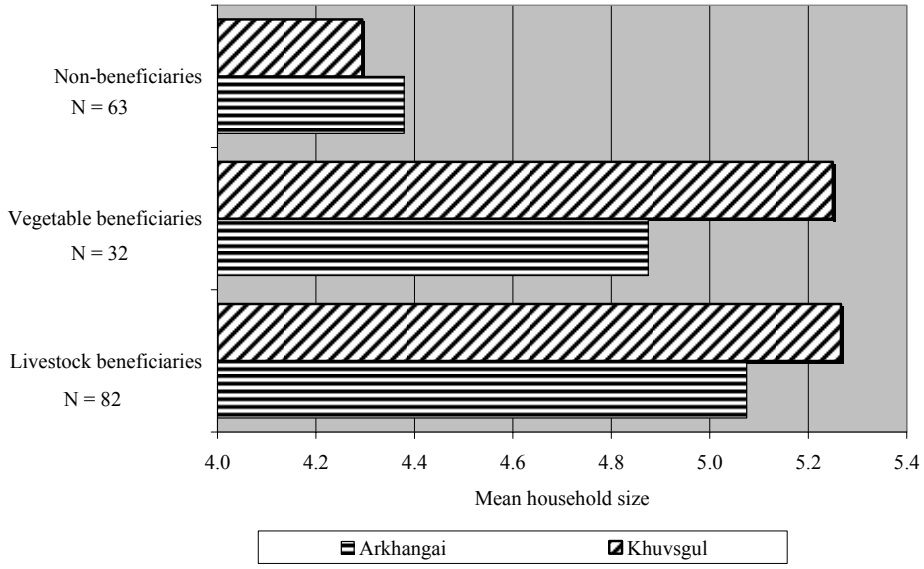


The data for Khuvsgul should be contrasted with Figure 5 for Arkhangai with its sharp rise 1991-1995. No such rise occurs in Khuvsgul, nor is there a subsequent drop-off of population, reflecting a move to the towns. The likely interpretation of this is that Moron, as a major trade entrepôt with Russia, and more recently a starting point for an active tourist trade around Lake Khuvsgul, provides relatively more employment than Arkhangai and thus its populations have been retained. Interviews in rural sums suggest that migration is significant, but is probably being counterbalanced by population growth and the arrival of entrepreneurial households in the aimag centre.

3.2 Social structures

Households in Mongolia are ideally small patrilineally recruited groups based around the *ger*. Children usually live with their parents until they marry; one of the expenses of marriage is the cost of a *ger*, which can lead to children of poorer households marrying quite late. Generally speaking, one would expect wealthier households to be larger, but in Mongolia, they tend to be smaller than poor households because they disperse resources to their children more quickly. Figure 7 illustrates this rather neatly; vegetable beneficiaries, which are based around the sum centres and grow vegetables because they do not have enough animals to maintain a herding enterprise, have the largest households. Livestock beneficiaries are wealthier than vegetable growers, but less wealthy than non-beneficiaries, have marginally small households, while non-beneficiaries have much smaller mean household size.

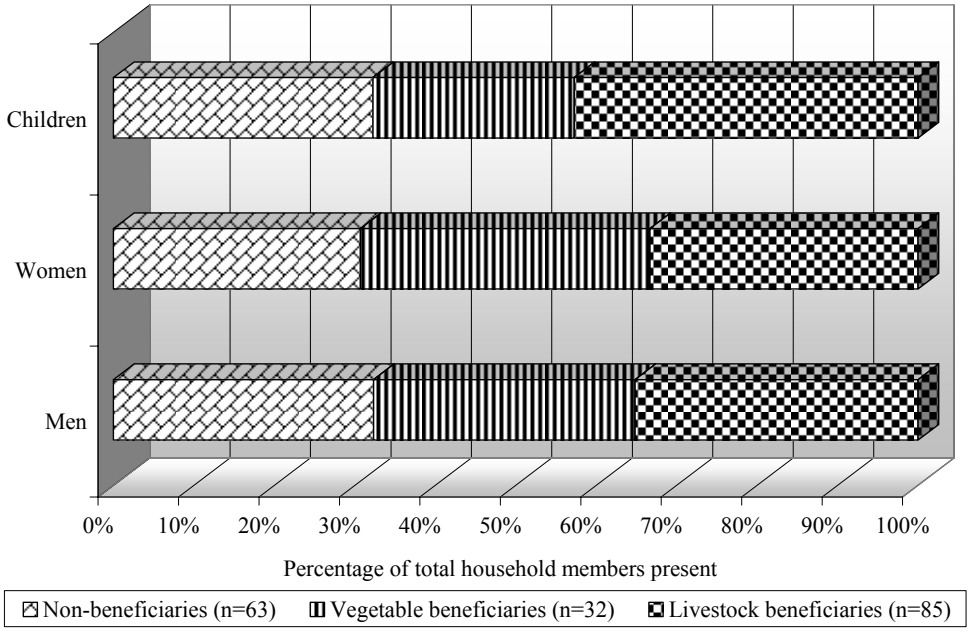
Figure 7. Household size of different categories in two aimags



Source: IFAD survey

Apart from total household size, internal differences in the structure of household members present reflects the different wealth categories. Figure 8 compares average numbers of men, women and children in the three categories of household.

Figure 8. Internal structure of household categories



Livestock beneficiaries have markedly more children at the *ger* than the other categories. Almost certainly, this is because they are unable to pay for them to get married or go away to school. Vegetable beneficiaries, on the other hand have significantly more adult women, reflecting the tendency for this category to include widows and female-headed households.

Women-headed households constitute at least 5% of total households in the two Aimags. This a quite a high proportion for a pastoral society and is a reflection of the fact that Mongolian social norms do not put a great deal of pressure on women to marry or widows to remarry, and tolerate women with children but no husband. Such households are likely to be poorer than the norm, in part because the production of wealth is

closely related to labour availability and such households will less easily recruit male labour for heavy tasks such as fuelwood cutting and haymaking. They must therefore exchange other resources (products, cash or work) to ensure these tasks are carried out.

Matrifocal households. One of the more remarkable features of Mongolian social structure are the presence of matrifocal households; i.e. units where there is no permanent male in residence and a woman lives with her unmarried daughters and grandchildren. Such households were first noted in the Gobi desert regions in the nineteenth century and are generally considered to have evolved from the culture of the lamaseries, which absorbed up to 30% of young males (Potkanski & Szynkiewicz, 1993). Whatever the origins of this pattern, it is not confined to the Gobi and matrifocal households are encountered throughout Arkhangai Aimak. It may well be a legacy of the socialist era, when women had a relatively high status, that no prejudice against such households exists and there is no societal condemnation of women with children but without husbands. Indeed, such households can only persist through co-operation with households with surplus male labour, so that heavy tasks, such as haymaking and cutting down trees are done for them. Since *khot ail*s and relatives are willing to form such co-operative bonds matrifocal households are likely to persist.

The *khot ail*. An important aspect of the pre-1991 situation was that, as far as possible, kinship and relationship allegiances were ignored or actively discouraged by the system. Grazing camps, *suur*, were created of unconnected individuals intended to establish supra-kin bonds for herding purposes. Since the *negdel* period there has been a nation-wide formation of co-operating herding groups usually called *khot ail*s. *Khot ail*s existed in the pre-Revolutionary era (prior to 1921) but information about their precise nature and functions is sketchy. These form no part of the administrative system and are fluid in structure and membership. The key components are the degree to which the members related by kinship and to what extent they stay together in summer and winter. There have been various attempts to formalise *khot ail*s as an element in development, but this has been largely unsuccessful. Nonetheless, it is clear that successful herders tend to belong to *khot ail*s, as they have share labour and watch against predators more effectively. As Figure 7 shows, non-beneficiary households tend to be small than those of beneficiaries, giving a greater incentive to share labour. Table 1 shows the percentage of interviewees who were members of a *khot ail*; non-beneficiaries are significantly high than beneficiaries.

Table 1. Membership of a khot ail?

	Beneficiaries		Non-beneficiaries	
	n= 85	%	n = 63	%
Yes	54	63.5	51	81.0
No	31	36.5	12	19.0

Source: IFAD survey

Vegetable beneficiaries do not usually own enough livestock to join a *khot ail*.

3.3 Labour migration and its consequences

During the *negdel* era, labour migration was relatively insignificant. Whole households would move to cities to take up work in factories, but rural households tended to stay in the countryside. With the exit of the Russians in 1991, many factories closed down, as their continued functioning was dependent on subsidies, which were no longer forthcoming. This led to many families returning to the countryside in the period 1991-1996 (Figure 5 and Figure 6). However, not only could the rural economy not support this influx of unskilled would-be herders, but the opening up of the economy meant new opportunities in the town as well as other possibilities of earning cash wages, particularly in the gold mines. As a consequence, households began to send more members away, in the expectation of remittances but also to seek improved education and in some cases, to undergo religious training. Recent dzuuds have accelerated the pace of urbanisation. Households that lose a significant proportion of their stock tend to move to *sum* centres, *aimag* centres or Ulaan Baatar. Loss of herding skills makes it more difficult to return to the livestock sector, although many

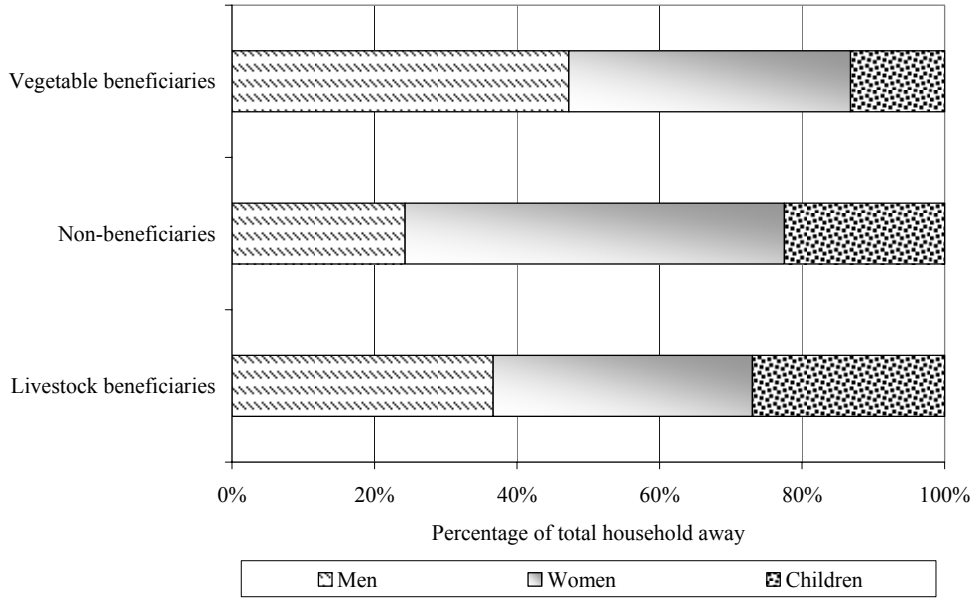
of these households live in very poor circumstances, especially where vegetable cultivation is not possible. Migration is now very much part of the structure of rural households and has had profound effects on the ability to manage herds and overall subsistence strategies. With reduced labour for herding, households tend to keep their male children away from school; hence overall literacy is falling. Similarly, with remittance income, households with non-viable herds remain functional instead of migrating to sum centres.

Table 2 and Figure 9 shows households in the three categories surveyed, livestock and vegetable beneficiaries, compared with non-beneficiaries, in terms of the relative percentage of members away. Migrants are further subdivided into adult men, women and children. The striking differences between the categories which can be explained by the relative wealth of the households.

Table 2. Percentage of migrants in different household categories

	Livestock beneficiaries	**Non-beneficiaries**	**Vegetable beneficiaries**
	n =85	n = 63	n =32
Men	15.6	7.6	38.3
Women	15.4	16.7	32
Children	11.5	7.0	10.7

Figure 9. Household migration by category



The richer the household, the fewer men are away, as they are retained to herd the animals, potentially a much greater and steadier income source than any type of wage labour. The vegetable households send away the most men, to try and work for wages and support the household. Richer households lose more women, both to education and urban employment. Non-beneficiary households send away fewer children, as they prefer to retain them for work. Vegetable households also send away few children, usually because they cannot afford to pay for education away from the sum centre.

4. Livestock

4.1 Numbers

4.1.1 Overview

Mongolia has a remarkable statistical service, with records dating back to the 1930s. Hence it is possible to establish time-series data for livestock populations and search for trends. There are, however, a number of pitfalls in using this data and these are discussed here. Official government statistics in Mongolia usually add all different species together to give total livestock numbers. Such figures are of marginal value, as the varying composition of herds across the country means that comparable absolute figures may be composed of herds of very different economic value and grazing impact. The reason for this unusual procedure may be that there is an underlying conception of an ideal mixed herd, encompassing the five national species. In addition, yaks, cattle and their various crosses are treated as a single species, although figures for individual types are collected at sum level. Camels and reindeer are omitted from the graphs because their numbers are so low as be not clearly visible. Nonetheless, they are important as transport species and should not be omitted in overall considerations.

Mongols has a traditional system of comparing across species by normalising all animals to a single unit, the *bod*. The *bod* was taken to be one large animal, such as a yak or a horse. Small ruminants were known as *bog* and there were taken to be 7 *bog*s in a *bod*. This system has been somewhat elaborated in various reports and government documents, especially in relation to camels, and there are usually considered to be 1.5 camels in a *bod*. Similarly, some sources reduce the value attributed to goats, making them a tenth of a *bod*. Although this is probably more scientific, it is not used by herders and will therefore create management problems if adopted by a project. The *bod* system is therefore;

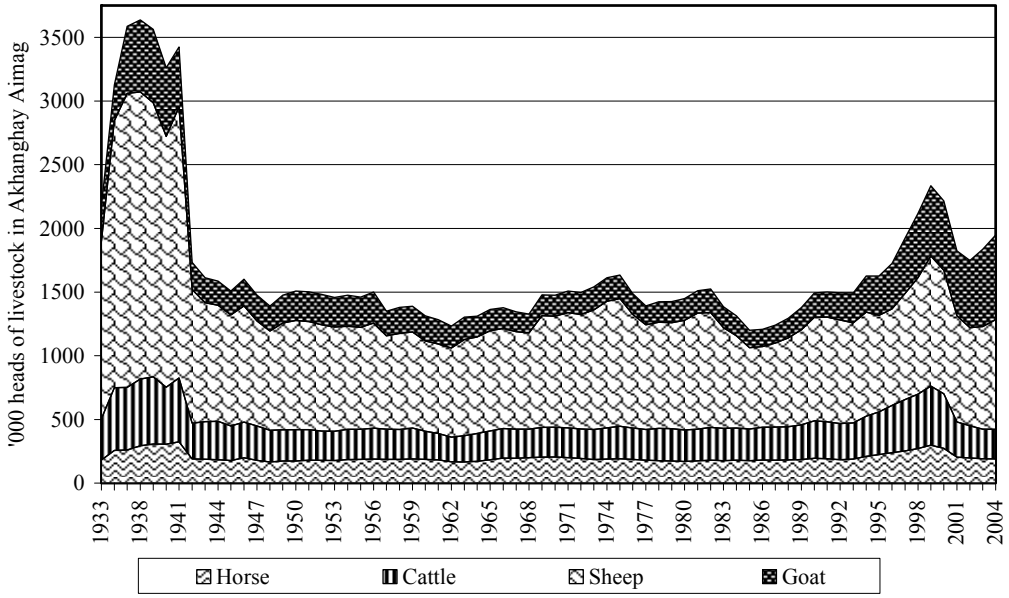
Species	**No. in Bod**
Camel	1.50
Horse/Yak/Cow	1.00
Sheep/Goat	0.14

The advantage of the *bod* system is that it is known and used by herders and is the usual means of expressing overall herd size. Bods were used throughout RPAP to calculate both holdings and loans.

4.1.2 Arkhangai

Livestock numbers have been collected in Arkhangai since 1933, and absolute livestock numbers are shown in Figure 10;

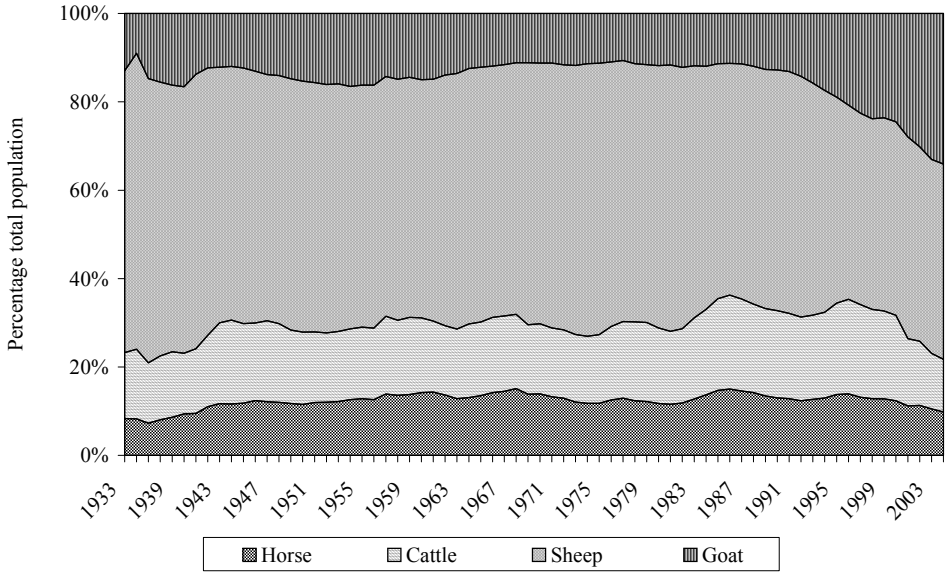
Figure 10. Absolute livestock numbers in Arkhangai aimag, 1933-2004



It is a moot point as to whether the figures can really have been as high as they appear in the 1930s. Certainly, once collective farms are established from the 1940s onwards, figures stabilise and neither relative nor absolute numbers change much until the 1990s. With the end of the negdels, absolute numbers climb rapidly, show a sharp drop following the dzuud of 2001 and now beginning to climb again. Human population has been falling since 2000 in Arkhangai (Figure 5) which shows that individual herd size in relation to households is actually rising quite rapidly.

Figure 11 shows the relative numbers of livestock in Arkhangai, which illustrates the balance of species in the herds. The trend here reflects the national picture, which is for all species to decline except goats. Since 1995, the number of goats has increased sharply in relation to other species, a consequence of the rising price and exceptional market for cashmere. Even though cashmere prices have been flat since 2000, greasy cashmere is still a product far more valuable than any other deriving from livestock.

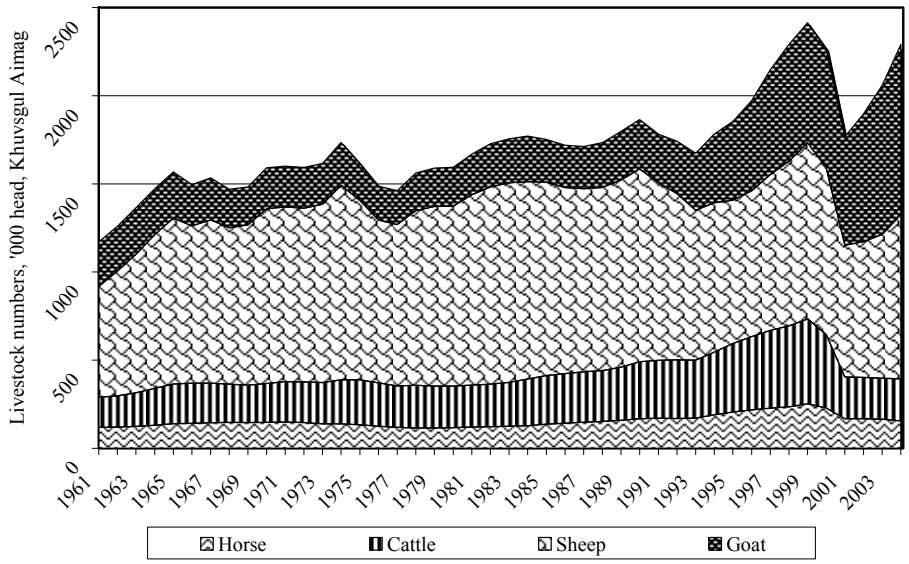
Figure 11. Relative livestock numbers in Arkhangai aimag, 1933-2004



4.1.3 Khuvsgul

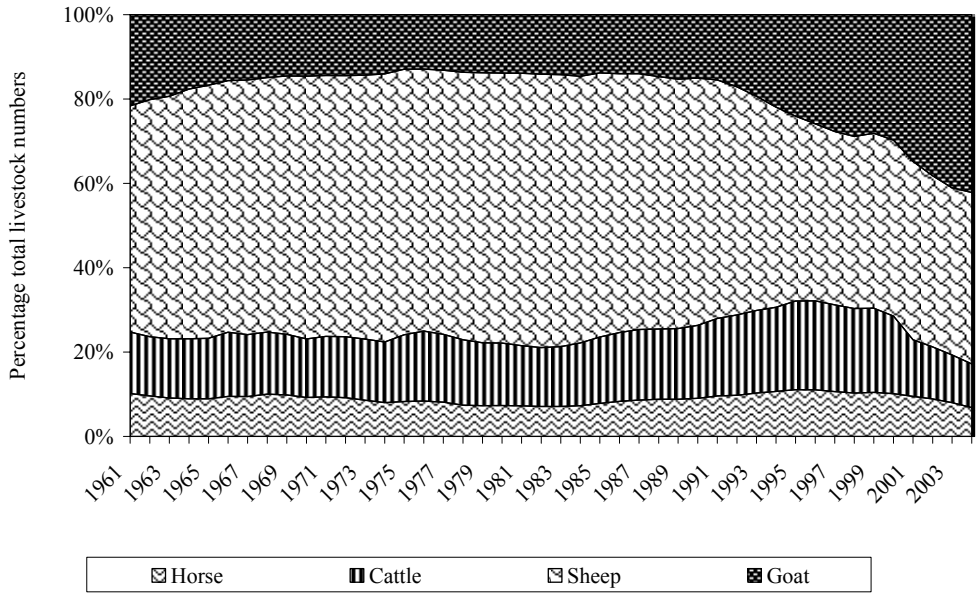
Livestock numbers have been collected in Khuvsgul since 1961, and absolute livestock numbers are shown in Figure 12;

Figure 12. Absolute livestock numbers in Khuvsgul aimag, 1961-2004



The pattern is very similar to Arkhangai, with virtually static figures throughout the negdel period, a gradual rise until the dzuud of 2001, a sharp fall and then an even quicker recovery. Figure 13 shows relative numbers of livestock species in Khuvsgul, where the trend towards investing in goats is even more marked. Goats constitute more than 40% of all livestock in the aimag.

Figure 13. Relative livestock numbers in Khuvsgul aimag, 1961-2004



4.2 Species

A valuable overview of the livestock genetic resources of Mongolia reflecting the situation in the early 2000s exists (Bynie 2004).

Camels. Bactrian camels exist in only small numbers and are used principally for transporting loads, especially the *ger*, in seasonal movements. Numbers have been declining as more households get access to trucks.

Reindeer. Mongolia represents the very southernmost extension of the reindeer-herding area, more normally associated with Siberia. Nonetheless, a small population of reindeer, kept by the Tsaatan people, is found in the far northwest of Khuvsgul aimag. Reindeer are kept for milk, meat, skins and transport. The entire herd was vaccinated under the RPAP.

Horses. Horses remain one of the most important animals for Mongolian herders, both for personal transport and for the production of *airag*, fermented mare's milk, which is considered a national drink. Horses are of great symbolic importance and considerable status attaches to the owners of large herds. Rich herders frequently invest their surplus wealth in expanding their herd of horses, in part hoping to breed a prize-winning racing horse. Horses are used to pull two-wheel carts in the northern *sums* of Arkhangai aimag. Horses are eaten, but are not raised as a meat animal, but rather slaughtered at the end of their useful life. The manes and tails of horses can be clipped and sold for small amounts every year. Horses are generally regarded as requiring little management, as they can largely be left to graze unherded and can find their own fodder even in the periods of deep snow. This does, however, make them more susceptible to theft, which has become an accelerating problem in northern Khuvsgul, along the border with Tuva. Horse numbers are decreasing nationally as Mongolia switches increasingly to a market economy, but some individual herds have increased markedly especially where owners regard them as prestigious.

Yaks. Yaks form the basis of subsistence in most of the western *sums* in Arkhangai and are scattered throughout the region. They have highly diverse coat colours, but the yaks in this region are all considered to belong to a single breed. Yaks have the ability to survive the intensely cold winters in the alpine regions and can usually find food throughout the year, except in the event of a *dzuud*. The yak is the principal draught animal in the alpine regions. It can be crossed with cattle to produce a first generation cross, the *khainag*. These animals are used to pull the carts that move the *gers* and their furniture during seasonal transhumance. Usually, several yak-carts are linked together to form a train to move hay, firewood and household goods. Yaks produce a large number of saleable products. The long hair can be clipped and sold and also the yak down or fine body hair, which resembles goat cashmere. Yak hides can be sold, although prices are not high. The cream content of yak milk makes possible the production of a great variety of dairy products. The more solid products such as *aaral* curd can be stored and sold to traders. As a species indigenous to the region, yaks have the advantage of requiring relatively low management. Once they have been taken to a pasture they can relatively often be left without a herder. Poor families in *sum* centres frequently allow their yaks to find grazing every morning and count on them to return in the evenings. Yaks are reported have a high calf mortality, although there is no numerical data to support this at present. Yaks and cattle interbreed and therefore making distinctions can be problematic. However, there are good genetic reasons for not perpetuating crosses into the second generation and most herds have remained reasonably pure. Yak numbers should be better recorded, as there is anecdotal evidence that yak numbers are increasing following the dzuuds.

Khainag and ortom. The first generation cross between cattle and yaks is known as a *khainag*. These hybrids are fertile, and generally show hybrid vigour. They are large in size and are often castrated and used for traction, pulling carts. If a *khainag* is bred again with a yak or a cow, the second generation cross is known as an *ortom* and is generally both weak and often infertile. Herders therefore generally take care to avoid the production of many *ortom*s and this acts as a natural brake on the wholesale crossbreeding of populations.

Cattle. Local races of cattle have the ability to withstand extreme temperatures. Nonetheless, they are less hardy than yaks and losses were heavy in the dzuud of 2001. The milk of cattle is highly prestigious and the skins can be sold. Rising beef prices reflect urban demand and it is likely that cattle numbers will increase again in the coming years. Cattle may be castrated to create oxen for draught purposes and these are used to pull carts in the steppe area.

Sheep. Sheep are the most numerous domestic species in absolute terms. The local breed, known as Terkh, is a coarse-wooled breed. Although the milk of sheep is drunk, it is considerably less prestigious than that of yaks or cattle. However, mutton is considered to be the best meat for consumption and most often offered to guests. Sheep require herding, partly to prevent them scattering and to keep away predators, principally wolves and snow-leopards. There are considerable economies of scale in herding sheep; one man on horseback can herd as much as a thousand sheep, although most flocks are smaller than this.

Goats. The local breed of goats are known principally for their cashmere, a high-value export product. They are usually small, almost achondroplastic, with black coats. They have the reputation of being difficult to herd and the bucks must be separated from the does from March to September. Historically, with herds that contained a balance of species, goats demanded extra labour as they had to be separated form the large animals. Goats and sheep can be herded together and herd-owners are increasingly switching to a strategy of managing large herds of small ruminants and reducing the numbers of 'large' ruminants.

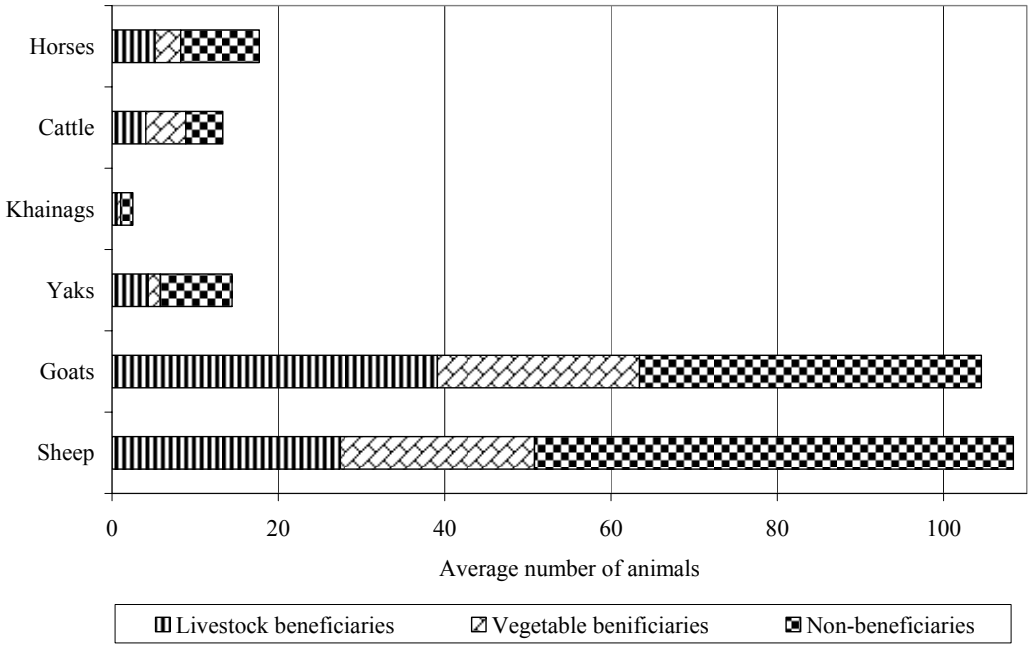
Pigs. During the socialist era when the Russian population was still high, pigs were kept on quite a large scale, especially close to military bases. The bran wastes from state farms could be used to feed the pigs which were otherwise left to root for food in the summer. Pig numbers have apparently much reduced since 1991. However, the increasing numbers of vegetable gardens may well induce producers to take up pigs again, since prices are high and pigs may be fed on vegetable wastes.

Poultry. Mongolia's climate may well seem inimical for poultry, but there are nonetheless some chickens kept in both herder households and *sum* centres. The trend towards the creation of permanent wooden houses, may well make chicken production more practical on a larger scale.

4.3 Livestock ownership within RPAP

Total animals owned and herd composition within and outside the project reflect the situation of herders. Figure 14 shows the mean number of animals owned by household category.

Figure 14. Livestock holdings by household category and species



Non-beneficiary households own more animals for almost all species except cattle. The predominance of yaks and sheep in these households, suggests they place greater emphasis on herding than cash income and probably that they herd in areas more remote from sum centres. Interestingly, their goat holdings are almost

the same as livestock beneficiaries, suggesting that beneficiaries have preferentially invested in goats, presumably to increase their cash income to repay their loan. Vegetable beneficiaries clearly prefer goats and sheep, as these are easy to herd near sum centres and suit their cash needs. This may also explain why goats preferentially survived the 2001 dzuud (Table 5) as they could be sheltered more effectively in sum centres.

5. Rangeland: management and sustainability

5.1 Background to Mongolian rangelands

When RPAP was being designed in 1995, the ecology of Central Asian rangelands was generally poorly known. However, experiences of degradation in African rangelands made it imperative that the development of liberalised economy did not have similar negative consequences. As a consequence, it was strongly recommended that the project work closely with researchers, NARS, and institute a programme of rangeland monitoring, a recommendation repeated in various monitoring reports. In the event, nothing was done in this respect, except that towards the end of the project, contracts were signed with the Centre for Nomadic and Pastoral Studies to provide lists of pastures and the households associated, in case pasture leases were implemented. In the event, these documents seem never to have been used.

Regrettably, the forebodings of the project documents have been realised. A major switch in emphasis in the pastoral economy towards goat production has led to large-scale degradation of the rangelands, a fact recognised by all households interviewed[3]. The move to sum centres set in motion by the 2001 *dzuud*, but accelerated by a desire to access schools, clinics and other services, has created greater pressure on forage resources in the immediate area around the sum centres. The consequence has been a loss of biodiversity, with many areas now dominated by a few unpalatable species. Stronger, more wind-resistant grasses form tussocks, while the disappearance of mosaics of species has increased soil erosion.

The main features are the loss of important pasture grasses such as *Festuca lenensis* and the invasion of toxic species such as *Stellera chamaejasme* and *Aconitum czekanovskyi*. These processes were identified in the rangelands of Inner Mongolia in the early 1990s and seem to be repeated here (Shan 1996). Table 3 shows the grass species identified as disappearing and Table 4 the toxic species that are spreading in the pastures.

Table 3. Disappearing fodder grasses in Arkhangai aimag

Latin	Mongolian
Festuca lenensis	ботиул
Helictotrichon schellianum	Бутнуур
Thermopsis lanceolata	Хонголчог
Androsace incana	Далан товч, үхрийн нүд
Echinops dahurica	Хонгорзул
Oxytropis filiformis	Ортууз

Source: HMRC, Ikh Tamir

Table 4. Spreading toxic grasses in Arkhangai aimag

Latin	Mongolian
Stellera chamaejasme	Хар хантааз
Veratum nigrum	?
Aconitum czekanovskyi	Хүн хөрс / Шар хөрс
Cycuta verosa	Голын хор

Source: HMRC, Ikh Tamir

[3] Interestingly, the degradation was generally attributed to 'drought' despite the fact that meteorological statistics show that combined rain and snowfall have not changed significantly over a decade.

Species change is linked to preferential grazing by small ruminants, leading to marked wind erosion in some places and a loss of grazing potential. This seems to be identified with *gang*, drought, and is probably *not* low rainfall but an inability of the soil to retain water. This is probably due to changing infiltration characteristics of the soil, over-extraction of subsurface water and loss of seed reserves through faunal pressure.

Erdenebaatar (2003) conducted a survey of hay-making in Rinchinlkumbe sum in northern Khuvsgul in 2000 and noted typical features of pasture degradation. He notes 'crucial changes in the vegetation cover, species composition and overall productivity have taken place due to several factors, including':

- severe overgrazing leading to soil damage and pasture degradation.
- an increase of non- or less-palatable indicator plants, namely *Chenopodium album, Artemisia sieversiana, Caragana bungei* and aromatic species of *Artemisia*;
- icreased herbs in summer and autumn pastures and the appearance of moving dunes indicate serious damage to soils and grazing areas;
- shorter grass as heavy grazing damages the long vegetative shoots of valuable species, causing a decrease in overall height. Ederly herders of Rinchinlkumbe remember grass being twice as high in the 1960s and early 1970s along the rivers Sharga and Shishkhit, where herders now spend the entire warm season

The relatively static grazing pressure on the rangelands of Mongolia since the 1940s, and the generally good state of pastures in the early 1990s, led many researchers to consider these were equilibrium systems, kept in check by livestock losses during dzuuds (see e.g. Sheehy 1993, 1996). The traditional notion of the importance of the 'five species' had the consequence that grazing pressure was diversified, which retained biodiversity. It now seems extremely likely that these assumptions were incorrect and that Mongolia and associated regions are non-equilibrium systems. In other words, they do not have a 'natural' state which can be restored by simply reducing grazing pressure. Once changes become established the ecological balance of the rangelands will develop according to a new dynamic. Fernandez-Gimenez & Allen-Diaz (1999) have suggested this as a model to understand the changes now occurring.

Water is also a major problem in the rangelands; many formerly perennial streams and rivers are dry and lake levels are falling. Throughout Arkhangai and Khuvsgul, herders reported springs drying up. The explanation is unclear; legal and illegal gold-mining may be responsible in some areas, but high levels of extraction are also implicated. Another reasons may be deforestation; the expansion of sum centres (built entirely of wood), increased demand for firewood have all increased the rate of legal and illegal logging. This has resulted in highly visible stripping of hillsides around sum centres. In addition, throughout much of the region, a disease or infestation seems to be killing trees; it is not uncommon to see entire hillsides of dead trees. It seems reasonable that dense tree coverage would trap more water, reduce evaporation and thus provide the water for springs; get rid of the trees and the water simply runs off[4].

Many dry areas of rangeland can be made usable by the insertion of boreholes. These were common in the *negdel* era, but the pumps are usually now broken. RPRP has engaged in some pump rehabilitation, but this has been largely overtaken by the drilling of private boreholes. The water-table in Mongolia is fragile, because of the low rainfall, over-extraction leads rapidly to low yields. Herders want government to insert new boreholes in presently waterless rangeland; this should be resisted at all costs. Unused rangeland acts as a reserve of faunal and floral biodiversity which repopulates grazed land after *dzuud* or drought.

[4] The widespread notion that there has been a 'drought' in the last decade may be a deduction from the observable fact of springs and lakes drying up. It is a worrying reflection on the unresponsive nature of science that no clear explanation for this circulates and there has been as a consequence no effective policy response.

5.2 Invasive animal species

A new problem of significant dimensions has been invasions of grass-eating species, notably 'mice' (actually voles) and grasshoppers especially in the western sums. These plagues are typical of the overgrazed grasslands of Inner Mongolia and since 2000 have begun to take hold in the northern aimags of Mongolia.

'Mice' (Voles etc.)

Plagues of 'mice' (usually voles, but also jirds) were first observed in Inner Mongolia in the 1980s (cf. Zhang et al. 2003, Zhong et al. 1985; Zhou et al. 1992; Wang et al. 1999). Dmitney (1985) seems to be the first to report on the relationship between rangeland and small mammal populations. They have spread northwards into the Gobi in the 1990s and began to affect some western sums in Khuvsgul and Arkhangay by the end of the 1990s. Rats, pikas and voles also eat grass seeds, thereby reducing the reproduction of annual grasses. The main species are;

Jird	*Meriones meridianus penicilliger*
Brandt's vole	*Microtus brandti*
Daurina pika	*Ochotona daurica*

These animals eat grass seeds, thus reducing both the volume of biomass and the biodiversity of pastures. Research has shown that these infestations are stimulated by short grass and that numbers are reduced when the grass reaches normal height. This strongly confirms the link with overgrazing and high proportions of goats, which keep the grass permanently short. In addition, traditional predators such as the red fox, *uneg* (*Vulpes vulpes*) and the sand fox, *khyars* (*Vulpes corsac*) are disappearing. The exact causes are unknown, but the hunting of the fox for its skin, and declining numbers of raptors, eagles and vultures, has reduced predation. Exactly why raptors should also be in decline is unclear; perhaps the declining biodiversity of the grasses also reduces habitats for other species on which raptors depend.

Responses to rodent invasions have so far been essentially antagonistic, simply attempting to kill them. If the present analysis is correct, then reducing rodent populations by 'ecological' means (such as pouring water down their holes or gassing them with motor-cycle exhausts) is destined to fail. Invasions will simply return the following year. Only when the problem is analysed correctly and the causes well understood can appropriate solutions be developed. Rebalancing the ecology of the grasslands and timely hay-cutting are more likely to resolve this problem in the long term.

Grasshoppers

As with rodents, plagues of grasshoppers began in Inner Mongolia in the 1980s (Shan 1996; Zhang *et al.* 2003). They have spread northwards through the Gobi and are now making serious depredations in Khuvsgul since about 1999, especially in the western sums. Grasshoppers and crickets are part of the natural fauna but typically arrive in autumn after the stock have grazed the annual grasses. However, species such as *Calliptamus abbreviatus* now comes earlier in the year and eats the grass before the livestock can graze it, thus competing directly with domestic animals for forage. Grasshoppers also damage agricultural crops and home-garden vegetables. Their appearance is related to low humidity: in years of good rainfall, such as 2005, numbers are less. Grasshopper invasions seem to follow rodent invasions and are probably related to the decline of small bird species that predate insect eggs. This in turn reflects the loss of grass species that are the typical food of graminivorous birds.

There is no clear solution to this problem, but worryingly, attempts to control it seem to come down to poisoning. These are unlikely to succeed without also rectifying the ecological balance; the result is more likely to be a cumulative build-up of toxins in the soil, eventually poisoning animals and thence humans. As with mice, the solution is to rebalance the ecology of the grasslands, by ensuring the biodiversity of grass species and thereby increasing habitats for predators.

5.3 Pasture: static or dynamic and implications for carrying capacity

Our understanding of the dynamics of cold arid rangelands is not merely a matter of scientific curiosity; it relates very directly to the design of development interventions. One of the key policies of rangeland development in Mongolia is the creation of more direct ownership of pasture through leases or herding contracts. This in turn depends on assuming that a particular demarcated area has a calculable carrying capacity, in other words that it will support a certain number of animals, based on standard formulae for the relationship between livestock and available biomass. This procedure is entirely satisfactory when not subjected to any empirical test of its validity. Potential problems seem to be four;

- Since 1999, Mongolia has undergone a series of catastrophic climatic events, including *dzuud*s and droughts. This has the consequence that animal numbers change, of causing large-scale migration away from affected areas and of encouraging changed herd composition when reconstituting herds. Pressure on pasture resources thus varies from year to year.
- Grazing pressure has resulted in a gradual change in grass species from nutritious to less digestible species as well as the spread of toxic grasses. This *cannot* be seen in satellite imagery and only emerges from extensive ground-truthing. There is no evidence this has been undertaken.
- Plagues of grasshoppers and rodents, which vary from year to year, compete with livestock for grass, making the pasture resource unpredictable.
- Water resources also seem to be very unpredictable with known springs and rivers drying up unpredictably, which affects biomass of grass.

These changes have important implications for the traditional 'carrying capacity' approach, which is now based on very outdated science (see e.g. Sneath 1998). If rangelands *are* 'disequilibrium' or 'dynamic equilibrium' systems (Behnke & Scoones 1993; Fernandez-Gimenez, & Allen-Diaz 1999) any major impact on the floral and faunal ecology shifts the ecological balance into a new state, not inherently predictable from previous states. The faunal infestations and climatic shifts as well as unprecedented pressure on the grasslands fulfil all those conditions. If so, a fixed cartography of carrying capacity cannot easily be used for planning and herding contracts based on such assumptions are doomed to fail.

6. Risk and risk management

6.1 Risks to stock

6.1.1 General

Risk and risk management have been considered by Temple, Swift and Payne (1993) in relation to Mongolia as a whole and by Fernández-Giménez (1995) in relation to Arkhangai. The main risks to livestock production were given by herders as the following;

a) *Dzuud*. Spring icing over of grass
b) Health risks. Both epizootic and enzootic (see above)
c) Predators
d) Theft

6.1.2 Dzuud

Dzuud is undoubtedly the single most serious threat to livestock production in Mongolia. Dzuuds are classified into several types, but the most important is 'white dzuud', i.e. that which ices over the snow, preventing animals from digging down to the grass. An analysis of climatic data by Temple, Swift & Payne (1993) classifies Arkhangai and Khuvsgul as medium-risk provinces with a major *dzuud* once every 7-14

years. The most recent serious dzuud was in 2001, with losses of over 40% for cattle (cf. Figure 10 and Figure 12) in the RPAP area. Individual sums can have significantly higher losses. Table 5 shows the percentage losses for the main species during 2001.

Table 5. Percentage losses by species in the 2001 dzuud

Aimag	Camel	Horse	Cattle	Sheep	Goat
Arkhangai	+10.7	-25.3	-35.3	-14.3	-6.1
Khuvsgul	-40.0	-26.6	-43.2	-21.0	-8.8

Source: Aimag statistical digests, 2004

The preferential survival of goats must clearly have been a major stimulus to invest in goats when rebuilding herds, even apart from the price of cashmere.

The impact of dzuud varies from one year and region to another; for example, there was a serious dzuud in Dzavkhan Aimag in 1999 and many herders fled into Khuvsgul, in some cases causing the livestock populations of particular sums, such as Tariat, to more than double. Dzuud can be so extreme as to cause the loss of an entire herd. This *may* reflect on the competence of herders (failure to prepare enough hay) but often it is simple bad fortune.

Herders have essentially two strategies to counter *dzuud*; *otor*, a rapid movement of animals to a less affected area or bringing in hay or other fodder. In the negdel era, sums had systems of maintaining strategic stocks of hay and army helicopters could drop fodder on isolated herds. These systems have been dismantled without any replacement. The only possible action an individual herder can take to protect his herd against *dzuud* is to prepare considerably more hay than would be usually needed. This has a high labour cost and to prepare every year for an emergency that happens once every seven years is extremely wasteful, especially as hay will not store more than one year. Hence herders of all wealth categories are willing to take the risk of preparing only a normal quantity of hay. Preventive action should thus be taken at the sum level, where a truck can be kept to move fodder and hay can be stored every year and then sold off if not used. In most years this operation must make a loss, since unused winter hay is not very marketable. However, the value of livestock saved once every few years should counterbalance the annual losses.

Livestock systems elsewhere in the world are not generally subject to this type of catastrophic loss, except through (rare) epizootics. The Mongolian system can recover rapidly because of the abundant forage resources and low pathogen loads. However, a consequence is that 'rich' households can become 'poor' overnight; a transition uncommon in settled agricultural societies. A significant consequence is that as herders rebuild their herds, they make choices that reflect their sense of evolving markets. The widespread dzuud of 2001 gave many herders, whether through restocking projects or otherwise, to switch the internal configuration of their herd to include fewer large animals and more goats to take advantage of cashmere prices.

6.1.3 Predators

In contrast to elsewhere in the world, predation, especially from wolves, remains a significant source of livestock loss for herders in Mongolia. Three species of predator were cited as a danger to herds by producers, wolves, snow-leopards and lynxes. Snow-leopards (*irbis*) and lynxes (*shiluus*) are confined to the montane regions and are now in such small numbers that any threat can be discounted. They are themselves severely threatened and should be a target for conservation efforts. Wolves, however, are both common and regularly attack herds, even close to *sum* centres. As they often kill many more animals than they can eat, the impact on a small producer can be devastating. During the period of the *negdel*s, large-scale collective hunts were organised each winter, to reduce wolf numbers. This tradition was disbanded with the break-up of the *negdel*s, with the consequence that wolf numbers are rising and attacks on flocks becoming more serious. Moreover, poor herders may be worse affected, since the prevention of wolf attacks essentially requires labour, which is often the resource poor households lack. Wolf predation is worst where grazing land is

adjacent to high mountain areas. Responses to predator attack mirror the problems of common property resources: hunting wolves is difficult work and there is no guarantee that the wolf an individual kills will attack his particular flock. Hence the need to organise wolf hunts collectively. Since 2003, the government has reversed its policy on hunting and now pays a bounty for every wolf killed. Some sums are now organising wolf-hunting on a significant scale. RPAP has had no policy to respond to predator losses although these have also been a reason to cease repayment for some beneficiaries.

Minor predators, notably foxes, eagles and vultures, play an important role in the maintenance of biodiversity in the grasslands and at the same time as acting to reduce wolf numbers, there is a strong need for government policy to protect these species that are presently freely hunted and which do little damage to the herds.

6.1.4 Theft

In the era of the *negdel*s, livestock theft was almost unknown. The tight controls on movement and the absence of markets made this an impractical crime. Theft is now becoming a worry to herders, although its incidence is still patchy. Two types of theft were reported; the stealing of small ruminants, for immediate slaughter, usually attributed to impoverished sum centre residents, and horse-theft, particularly by rustlers based in Tuva. Some individuals had lost as many as a dozen horses to theft, so this can be significant. As the economy becomes more monetarised and markets and trade networks develop, theft will become a more serious threat to producers as it is elsewhere in the world.

6.2 Risk Management

6.2.1 Action by herders

A key risk reduction strategy in Mongolia is hay-making, which is essential to livestock nutrition in winter and can act to reduce losses in *dzuud*. Hay-making is essential to livestock nutrition in winter and can act to reduce losses in *dzuud*. In the *negdel* era, hay-making was carried out by the sums using either tractors or horse-drawn scythes and was collective rather than individual. The equipment was dispersed after 1991 and most hay-making is now carried out by individual households and by hand. Households with labour problems (children away, members sick) often cannot make enough hay and are at risk during *dzuud*s. As more households move towards sum centres, hay is harder to find in nearby areas. Plagues of ‘mice’ and grasshoppers reduce (sometimes by 40%) availability of grass for hay. RPAP was mandated to buy hay-making machines, but these were never bought. This undoubtedly increased livestock deaths from *dzuud*, and also affected poorer households more severely as they are concentrated close to sum centres. Moreover, there is a growing trade in hay; commercial operators either cut wild grass or establish irrigated pastures. The hay is not sold locally, but sent east to the more intensive producers close to Ulaan Baatar, or south to the Gobi. Environmental degradation, notably plagues of ‘mice’ (§5.2) reduce (sometimes by 40%) availability of grass for hay. RPAP was mandated to purchase hay-making machines but these were never bought, as the financial return was deemed to be uncertain. This undoubtedly increased livestock deaths from dzuud, but also affected poorer beneficiary households more severely.

6.2.2 Insurance

Mongolia had a very effective system of livestock insurance during the *negdel* era, and it is said that some 90% of domestic animals were insured. Assessment of insurance claims was via the *negdel* authorities and some 80% of the value of an animal could be recovered via this system. The project design originally envisaged insurance as a safeguard against climatic, epizootic and predation losses. Compulsory insurance was included in the first year of the loans, but was subsequently voluntary, and herders chose to drop it due to the cost. Some beneficiaries did try and claim *dzuud* losses in 2001 but the claims were settled for only 30-60% of the insured amount against the standard insurance coverage of 80% of the proven losses due to

natural risks. The insurance company also found a number of reasons to make no payments, for example in Erdenebulgan sum, giving the reason that it was not included in the government's list of *dzuud*-affected sums. It seems hard to imagine[5] how commercial insurance could be viable in the face of a risk as high as complete loss of herds every seven years. Accelerating environmental degradation and climate change is likely to make the risks to a private insurer still greater in the coming decade. Insurance did not work and this should have been recognised from the outset. If insurance is eliminated, then the alternative is minimisation of risk through collective action by the *sum* and Aimag authorities. In most cases, the risks described threaten all classes of herders, although poor herders may well be worst affected. Action such as emergency fodder reserves or collective wolf hunts do not bring an immediate return, but the long-term benefit to the sum in terms of the value of animals saved is easily demonstrated.

7. Markets, trade and product sales

In the era of the *negdel*s, livestock and its products were sold by the state farms to the central purchasing system. As a result, virtually no informal sector existed to trade in these products. The former system has been largely dismantled, and has been replaced by a thriving informal sector. The capital has a range of companies buying products, typically fibres and skins, but the countryside has been penetrated by mobile traders, often Chinese and Russian, who may buy directly from the *ger*. Live animals are the single most important item of trade, and almost every household has to barter some stock against staples. The principal livestock products sold are dairy items, fibres, hides and skins.

Poor households cannot usually afford to sell any dairy products as they must consume all they produce. Rich households usually sell those with long storage, such *aaral*, dried curds, and *tsurum*, dried yoghurt. Most households with more than 2-3 sheep sell wool and almost all those with goats sell the cashmere. Yak and cattle hair and yak down are often sold as well as the manes and tails of horses. Almost all types of household sell skins, both of their own animals slaughtered for *idesh* and of any animals they eat.

8. RPAP Project Performance

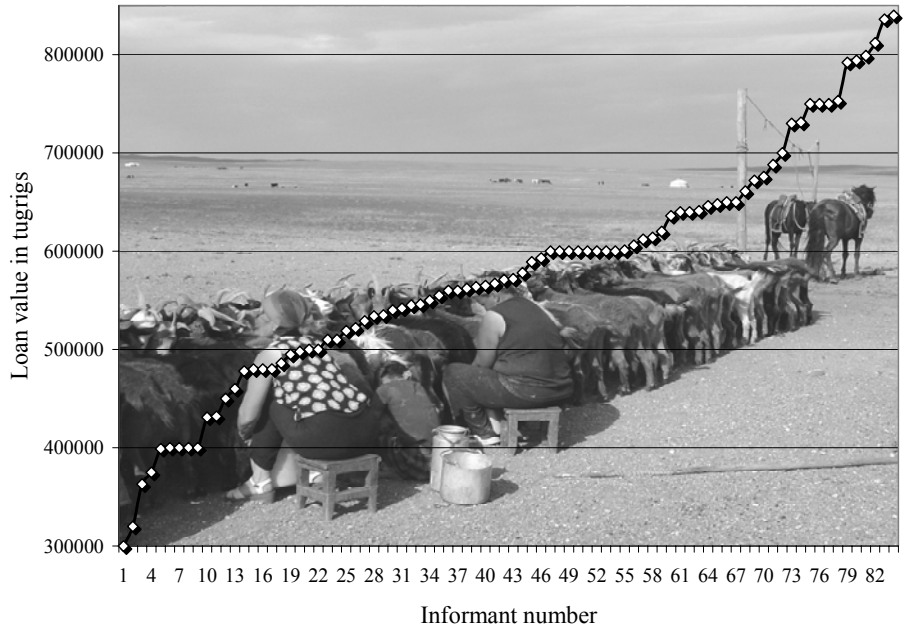
8.1 The livestock component

The main element of the livestock component was restocking, supplying in-kind credit to poor households. Although a training component for herders was envisaged, in practice it lacked any tangible impact on their livelihood and skills, as activities were confined to introduction and familiarisation of the livestock loan terms and procedures. The original eligibility criterion, herders owning a minimum of five and a maximum of 20 *bods* of animals, was revised upwards to 10 to 20 *bods*. During the MTR in 1998, the Project proposed a further revision to 15-25 bods. The original values for eligible households were set to try and capture poorer households, but the object of the PIU was to reduce the credit risk. However, these proposals were not adopted either by the MTR or subsequent missions. Credit was not to be given for species other than cattle, yaks and sheep. The assessment of likely beneficiaries was undertaken jointly between community leaders and the project officer and was based on assessment of herding skills and ability to repay. Repayment was originally envisaged as being in kind, but the PIU unilaterally switched this to cash repayment, as this was simpler to administrate and even where households lost animals, they could repay through wage labour or sale of assets. As a consequence of these changes, the rural poverty reduction objectives of the livestock component of RPAP did not achieve the desired results.

The cash value of loans varied from ₮300,000 to ₮840,000, with a mean value of ₮572,000. The top-end figures seem inappropriately high for a project intended to benefit poor people and presumably correlate with the loans given to households with more than 30 bods (Figure 16). Figure 15 plots the cash value of loans for individual livestock loans;

[5] Despite this, the World Bank is going ahead with a livestock insurance project. See (Skees & Enkh-Amgalan 2002) for a description of proposed insurance strategies.

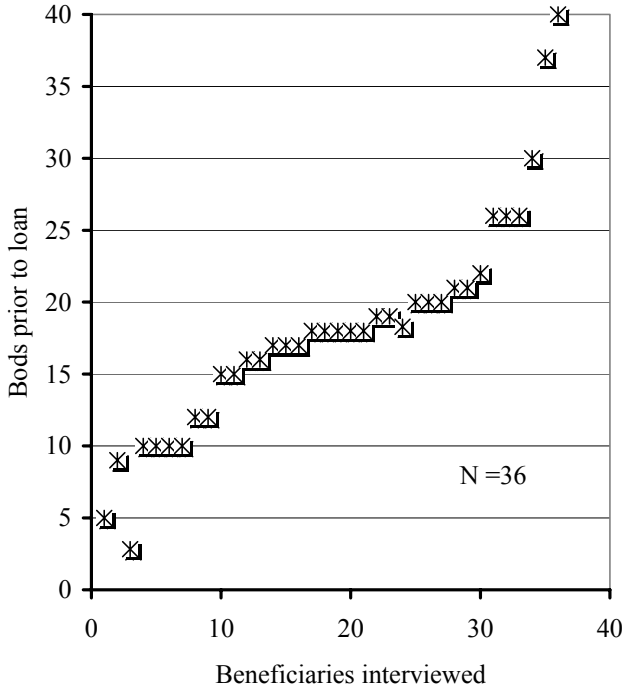
Figure 15. Cash value of loans



As the figure makes clear, they tended to cluster in the 5-600,00 range.

Poorer households were in practice largely excluded, as loans to households clustered around the upper limit of eligibility in terms of number of bods, often exceeding it, thereby focusing on the middle/rich stratum of society, i.e. those with 20 bods or above, representing ca. 100 animals. In Khuvsgul, beneficiary households with holdings of 30-40 bods prior to loan signature were encountered. Significantly, despite a wealth of statistical data, none was available analysing households holdings prior to loans. However, this information was collected by the sociological team from interviewees, through consultation of the original agreements. Figure 16 shows this data plotted as points and illustrates the clustering of households with 15 bods and above.

Figure 16. Bod holdings prior to loan

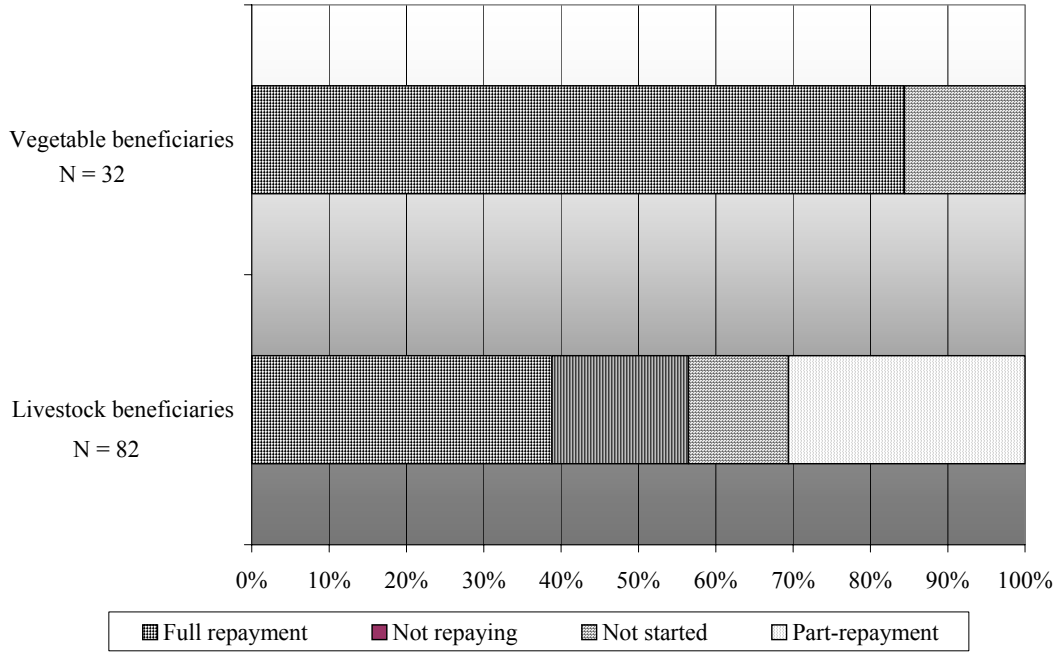


The major problem, however, was that the consequences of livestock losses and the difficulties of subsequent repayment were never properly considered. The initial solution was insurance (see §6.2.2) but this was dropped after one year and could never have been viable. If a household loses more than a certain number of animals, its herd no longer becomes viable, as they must sell animals for subsistence and numbers do not increase fast enough to replace those sold. The number of animals that constitute a 'viable' herd has been much debated, but probably cannot be fixed, as it depends on household size, cash and other obligations and the herding location. Losses can be due to weather, predators, theft and disease, but clearly, losses due to dzuud are the single greatest problem, since a herd may rapidly fall from viable to zero.

RPAP has never had a clear solution for beneficiaries experiencing such losses, since it is

difficult to see how 'beneficiaries' can ever accumulate enough capital to repay their loans sustainably. Many loan histories begin with the beneficiary paying up to date, trying to pay after major losses and eventually ceasing. Figure 17 shows the repayment status of beneficiaries interviewed in the household survey. Vegetable beneficairies have all either repaid or are just on the cusp of a new loan. However, just under 40% of livestock beneficiaries are still repaying in full, a significant number have never started and 'part-repayment' usually means they began repayment but have now ceased.

Figure 17. Repayment status of beneficiaries



It is important to recognise that this does *not* represent the full extent of the problem. At least one further serious dzuud can be expected before the end of the repayment period (2013), perhaps more. This will leave yet more households unable to repay in full. Moreover, even supposing an administrative solution is found to forgiving the debts of households affected by dzuud, this will leave a small number of households where losses from other sources, such as predation, have similarly made herds non-viable.

The consequence has been that a significant number of beneficiaries are heavily indebted, and officials are still trying to recover the loan. All the households that lost their herds in the dzuud, mainly in 2001, are still being actively pursued to repay their debts, despite the fact that they are evidently too poor to do this. Interviews in various sums (and also by the CPR researcher), have encountered many worried householders, who are distressed but have no obvious solution. In Tariat sum, some half of the households had simply left the aimag to avoid their debts. Those left behind are households with fewest resources, typically widows and female-headed households, who thus are coming under the greatest pressure to repay. The project accountants have confiscated their ID documents, so that they can take a levy on their pensions or child allowances (which are paid at the sum level). Other families have sent their children to work in the gold mines in order to pay their debts. IFAD is thus in a situation of indirectly persecuting the very people whose mandate it is to assist[6].

Although RPAP policy was originally to exclude goats, at some point this was changed in Khuvsgul, apparently on the advice of a UNOPS officer[7] (and certainly not a rangeland scientist). Presumably the

[6] Mendbayar (Undur Ulaan sum, 8.9.05) commented, 'I sent in an application for a loan and then became afraid of being in debt if there was a dzuud. So I withdrew my application'. A wise decision, perhaps wiser than some of those taken by experts.

[7] Project staff assert this was the case, although no documentary evidence has been provided.

profitability of cashmere goat production was considered likely to increase capacity to repay, which may be the case. However, it also acted to increase goat numbers and thus damage to the rangelands.

Vaccination of the herds of beneficiary households was also envisaged under the project, and this seems to have been carried out efficiently. Mongolia has a well-staffed and generally knowledgeable corps of veterinarians, built up during the period of the *negdel*s. During the early period of the free market economy, the veterinary service underwent a decline and indeed is currently regarded as unreliable in some aimags, where herders bypass it. However, in 2002, the service was privatised, under an arrangement whereby vaccination against key epizootics was administered by the now private vets for a 'service fee', fixed by government, which accounts for somet 60% of their income. All herders in the two aimags were very positive about the service provided by veterinarians and indeed, reported losses to both epidemic and chronic conditions seem to be at very low levels. However, some interviewees in the separate household survey complained about lack of responsiveness, so the picture may be variable.

8.2 The vegetable-growing and income generation component

Vegetables have been produced on a small scale in sum centres since the *negdel* period, and this has continued to expand, because they represent an important alternative income for households without sufficient animals, and because the growth in urban centres. More widespread ideas about the role of vegetables in nutrition has increased demand. Since the early 1990s, there have been some large-scale producers, growing vegetables in fenced fields and using paid labour to tend the fields. However, backyard production has also increased, and RPAP credit certainly played a role in accelerating this process.

Loans for vegetable production were small, and over a short cycle, and almost all were repaid satisfactorily (Figure 17). Some thirty-two vegetable credit beneficiaries were interviewed for the household survey, sixteen each in Arkhangai and Khuvsgul. Of these, 27 had been repaid in full and five were yet to begin repayment[8]. Although a 240 m^2 plot was suggested, most plots were much smaller - more like 60 m^2, which would contribute to household food supply but not generate surplus cash. Of the credit beneficiaries, 17 were women, and 15 men, which reflects the predominance of female-centred households in sum centres. There were undoubtedly positive impacts on the beneficiaries in terms of better nutrition and improved knowledge and skills. However, the reach of the project was limited, as at least 50% of the *sums* in each *aimag* are unsuitable for vegetable production using currently available techniques. Moreover, according to aimag figures, vegetable production decreased markedly after the project closed, indicating low sustainability.

8.3 Constraints on performance

A distinctive feature of the performance of RPAP was that most of the subsidiary activities, i.e. those without specified targets, were not carried out. These include; purchase of haymaking equipment, socio-economic and household studies, rangeland monitoring and others. The major reason for this was the nature of the original Subsidiary Loan Agreement (SLA) signed between MOF, MOFA and Arkhangai *Aimag* (1997) according to which all funds drawn from the IFAD loan were repayable by the *Aimag (*contrary to the provision of Loan Agreement whereby only funds required for the Livestock Distribution and Restocking Credit would be relent to the *Aimag)*. The terms of SLA were denominated in US dollars, thereby passing the foreign exchange risk to the *Aimag*. At the recommendation of MTR (1998), amended SLAs with Arkhangai and Khuvsgul were finally signed in May 2001. Even so, the fact that the aimags were responsible for repayment made them extremely unwilling to undertake any activity for which the financial return was not very clear. In practice, credit was the only activity that had a sure return and therefore they pursued this actively, and were very zealous in pursuit of repayment

[8] This presumably indicates that they had taken loans under RPRP

9. Recommendations

9.1 Immediate Tasks

Debt relief. A failure to consider the consequences of dzuuds serious enough to eliminate entire family livestock holdings has left many households with insurmountable repayment problems. The financial burden on aimags created by the SLA has meant that the poorest households are being harried for debts it is unrealistic to expect to be repaid. This burden falls particularly on widows and single mothers because other beneficiaries with more resources have simply decamped. IFAD must thus find an institutional solution to resolving this issue. In principle it was agreed between GOM and the CPM at the wrap-up in Ulaan Baatar that some type of debt relief would be designed; in view of the distress of the beneficiaries, this should be formalised and implemented without delay.

Further dzuuds. Existing trends suggest that at least one more serious *dzuud* can be expected before the scheduled repayments end. As no plans are presently in place to either mitigate the effects of the 2001 *dzuud* for existing beneficiaries, or to deal with exacerbated repayment problems that can be expected from a future *dzuud*, an appropriate strategy must be developed, preferably as part of the same package as that will provide debt relief to those already in repayment difficulties. In addition, it suggests that any strategy, particularly the purchase of hay-cutters, that may reduce the impact of such a *dzuud* should be treated as high priority.

Rangeland monitoring. There is every reason to think the rangelands in Arkhangay and Khuvsgul have undergone major damage since implementation in 1996. One reason for this is the significant increase in goat numbers, especially after the 2001 *dzuud*. The consequent loss of species diversity may well have accelerated the mice and grasshopper invasions documented above. IFAD should certainly not have underwritten strategies that result in this type of environmental damage. Project closure means that this decision cannot now be reversed, but it is important to try and assess the impact on the grasslands, especially as other projects (such as the WB SLP) have also permitted beneficiaries to increase goat numbers. IFAD should ensure that a public programme of rangeland impact assessment is undertaken, preferably through the co-operation of institutes that apparently already collect data but do not release it.

9.2 Future Intervention

Rangeland science. By 2004, 40% of RPAP beneficiaries had *less* livestock than when they took the loan, which hardly suggests a well-designed project. The principal reason is the incidence of *dzuud*, a climatic phenomenon whose intervals of occurrence was already known prior to project appraisal. In addition, the overall condition of the rangelands in both aimags has deteriorated. Unless IFAD is prepared to engage more directly with technical aspects of extensive pastoralism in low-temperature regions, it would be better to simply not intervene in these systems.

Knowledge systems. Mongolia has no less than four institutions who are monitoring rangeland in some way[9], yet there is a complete absence of inter-communication between these institutions, as well a failure to make any of their results public. There has been no flow of information at all to MoFA, the section of government most in need of clear scientific advice. Kay questions such as the reasons for plagues of mice and grasshoppers, and the reasons for the drying up of springs remain unresolved, although these are essential to the formulation of livestock interventions. At the same time, outmoded notions of carrying capacity persist and use up resources better devoted to evidence-based activities.

Translation. A major reason for non-implementation and non-compliance on a massive scale has been the absence of translations, principally from English to Mongolian, but occasionally Mongolian to English in the case of the SLA. No UNOPS supervision reports were ever translated, the MTR and all types of supplementary documents were left in English. Neither aimag today has senior staff with the capacity to absorb and follow up on the often complex language of this material. As a consequence, there was a

[9] The Institute of Botany, the Institute of Hydro-Ecological Monitoring, the Institute of Animal Husbandry and

complete lack of follow-up on supervision recommendations. IFAD should ensure that translation of key sections of all major documents with implementation implications is mandatory.

Supervision. RPAP failed to execute almost all 'soft' components of the project, such as socio-economic data collection and rangeland monitoring. UNOPS and IFAD did not act to ensure compliance, which has had unfortunate consequences for beneficiaries and the later stages of project implementation. While it is evidently too late for RPAP, further phases of existing projects and proposed new projects should not be permitted such lax supervision.

Providing for access. Mongolia is a country with long access times, both to *aimag* offices and thence to beneficiaries. One reason for the failure to pick up on a number of problems of RPAP was undoubtedly the extremely short time previous missions spent in the field (e.g. the MTR). IFAD should allocate funds for longer missions with minimum days for field visits.

Other livestock loss. No serious consideration has been given to other major causes of livestock loss, notably predation and theft[10]. The incidence of these is significantly more patchy than *dzuud* but can be serious for individuals and also presuppose high labour costs. A strategy also needs to be developed to deal with present beneficiaries in repayment difficulties for reasons other than *dzuud*.

Hay. A failure to cut adequate hay has clearly played a role in exacerbating losses from *dzuud*, especially as those who live close to sum centres and find it difficult to get access to hay are often households with labour problems, especially female-headed households. If haymaking machines were purchased and operated commercially at the sum level, hay stocks could be increased, thereby reducing losses to *dzuud* in some locations. This would also compete more effectively with grasshoppers and mice for hay resources, starving these species of feed, and thereby reducing the incidence of plagues. Moreover, as poorer households are concentrated around sum centres, this would preferentially benefit them.

Decentralising development. A major cause of local overgrazing in Mongolia is the movement of households and their herds from remote aimags to more central ones, from remote pastures to sum centres, from sum centres to aimag centres and thence to Ulaan Baatar. Effective pasture management is partly simply a matter of dispersing pressure on forage resources. Since infrastructural development is an important motive for this type of movement, it should focus on;

remote rather than central aimags
bag rather than sum centres

Schools and clinics remain a high priority with herders, as well as access to major trade routes. Place these and similar facilities in remoter locations and herders will be attracted because of the relatively good condition of pasture.

9.3 Elements of Future Projects

Future project design should consider more carefully the issue of 'social protection' (dealing with the stratum unable to become economically active) and with the stratum that could become economically active but for which a wider range of options than livestock must be proposed.

Data collation. Neither aimag project office had the capacity to collate and analyse basic data on numbers, market prices and weather, although this is essential to project management and would enable more effective adjustments to be made over the course of the project as well as allowing more realistic discussions with beneficiaries. Much of this data is available in nearby offices, usually in electronic form. MOFA in Ulaan Baatar has almost no effective links with other arms of government charged with collating such data. IFAD

[10] One beneficiary lost 57 sheep to a lightning strike and is now in repayment difficulties. This initially seemed unlikely, but further investigation supported the story.

should ensure that project documents make the collection and regular analysis of such data intrinsic to the design.

Extension has been either weak or non-existent. Virtually no herders have received effective advice on improved animal production. Indeed the PCRs seem to misunderstand the definition of the term, confusing it with disseminating information about the achievement of the project. Radio is an effective means of reaching herders, but only if the material they hear reflects their concerns. Projects should;

eschew television and newspaper articles
ask herders for the topics they wish to hear more about and focus on these

Similarly with training and workshops. The majority of these seem to have been about repayment conditions rather than actually improving animal production. The same strictures apply; ask the herders. Resources were wasted bringing a PRA 'expert' from China to present slides on pig production and Dutch citrus production. The team never encountered a single individual who had properly understood the message of these presentations. A focus on relevance is strongly recommended.

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Appendix 1. Details of the Household Survey, carried out by Centre for Policy Research (CPR)

Design of questionnaires, data entry and analysis: Roger Blench
Researcher: Shombodon
Dates of fieldwork: 28th August to 18th September, 2005
Sample sizes:

Livestock Beneficiaries	85
Vegetable Beneficiaries	32
Non-Beneficiaries	63

Itinerary

Aimag	Date	Sum	Bag	Name (Mongolian)	Name (English)	Position
Arkhangai						
Khuvsgul						
	14/9/05	Renchinlkhumbe		Долгорсүрэн	Dolgorsuren(female)	Project officer
	14/9/05	Renchinlkhumbe		Болдбаатар	Boldbaatar (h)	Herder
	14/9/05	Renchinlkhumbe		Нарантуяа	Narantuya (w)	Herder
	14/9/05	Tsagaannuur		Ганбат	Ganbat (h)	Herder
	14/9/05	Tsagaannuur		Эрдэнэбат	Erdenebat	Soum governor officer
	15/9/05	Tsagaannuur	Hogorgo/ 2 nd/	Баттулга	Battulga (h)	Herder
	15/9/05	Renchinlkhumbe		Батжав	Batjav (h)	Herder
	15/9/05	Tsagaannuur		Өвөгдорж	D. Uvugdorj (male)	Tsaatan
				Цэнд	Tsend (female)	Tsaatan
				Ганбат	Ganbat (female)	Tsaatan
				Отгон	Otgon (female)	Tsaatan
				Отгонжаргал	Otgonjargal(female)	Tsaatan
	15/9/05	Ulaan-Uul		Эрдэнэбат	Erdenebat / male /	Project officer
	15/9/05	Ulaan-Uul	Soyo	Батсайхан	Batsaikhan (h)	Herder
	16/9/05	Ulaan-Uul	Soyo	Далайдамдин	Dalaidamdin (h)	Herder
	16/9/05	Ulaan -Uul	1 st bag	Борхүү	Borkhuu (h)	Unemployed
	17/9/05	Tsagaan –Uul		Галбаатар	Galbaatar (male)	Project officer
	17/9/05	Tsagaan-Uul		Сосорбарам	Sosorbaram(male)	IGA officer
	17/9/05	Tsagaan-uul			Bayarjargal	Governor of the soum
	17/9/05	Tsagaan-Uul	Agar bag	Ганхуяг	Ganhuyag (h)	Herder
	17/9/05	Tsagaan-Uul		Жаргалсайхан	Jargalsaikhan (h)	Herder
	17/9/05	Tsagaan-Uul	Agar bag	Цэнд-Аюуш	Tsend-Ayush (FHH)	Herder
	18/9/05	Shine-Ider soum		Ганболд	Ganbold / male /	Governor of the soum
	18/9/05	Shine-Ider soum		Мөнхбаатар	Munkhbaatar (h)	Herder
	18/9/05	Shine-Ider soum		Бямбасүрэн	Byambasuren (h)	Herder