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# Index-based Insurance and Risk Management Among Nomadic Mongolian Herders

Kelsey Larson  
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Index-based Insurance and Risk Management  
Among Nomadic Mongolian Herders

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## **Abstract**

Mongolian herders must contend with the risk of *dzuds*, harsh winters that can kill large numbers of livestock. To do so, they use a mixture of formal financial tools and traditional risk mitigation techniques. This paper is a study of the interaction between the Mongolian Index-based Livestock Insurance Program and traditional informal risk mitigation techniques. The researcher interviews herders in Bulgan *soum*, Arhangai *aimag* and Galuut *soum*, Bayanhongor *aimag* to compare the IBLI program's impact in a community that has had IBLI since 2006 and one that only received IBLI in 2012.

This study finds that insurance purchase is positively correlated with stronger social networks. It also finds that lower income herders are less likely to purchase insurance. However, herders trust social networks to support them in *dzud* years more than they trust formal financial institutions. Herders also face substantial basis risk beyond the risks covered by IBLI. While the IBLI program is growing in popularity and some herders find it a source of greater financial security, this study concludes that more work is needed to enhance other risk mitigation tools and to support IBLI uptake among poor herders to effectively mitigate the risk of *dzud*.

**Topic codes:** Economics, Development Studies, Disaster Management

**Keywords:** dzud, Index-based insurance, nomadic herding, microinsurance

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## Introduction

There is a reason why traditional Mongolian shamanistic religion is presided over by the Eternal Blue Sky, and that is because the weather dictates a nomadic Mongolian herder's livelihood. Mongolia has one of the harshest environments of any nation in the world, with average annual precipitation of 230 millimeters a year and winter temperatures that can drop to  $-40^{\circ}\text{C}$  (Amgalan, 2010). Annual fluctuations in temperature and precipitation create natural disasters called *dzuds*, harsh winters that may kill half or more of the animals within a herding community. While Mongolia has recently experienced a mining-driven surge in economic growth, herding remains vital to the livelihoods of many Mongolians, accounting for 40% of employment and 20% of Mongolia's gross national product (Amgalan, 2010, p. xvii).

A *dzud* disaster can be the result of several types of weather phenomenon that lead to animal fatality. Eriksen (2014) marks several of the more common types as "white *dzud*," "black *dzud*," "icy *dzud*," "cold *dzud*," and "hoofed *dzud*." In a white *dzud*, excessive snow covers up the grass, inhibiting grazing, while a black *dzud* is marked by too little snow that may force herders to choose between abandoning their waterless winter pastures or going to areas with better water and little grass. Icy *dzuds* happen when the top layer of snow melts and refreezes, leaving animals locked out of the grass. Finally, hoofed *dzuds* occur when the land is overgrazed and animals cannot get enough grass to eat. Most of these types of *dzud* occur following a summer drought, which leaves the animals with little pasture so they cannot gain the nutrition needed to survive the winter.

Following the disastrous 2000-2002 *dzuds* in which 11 million head of livestock--a third of Mongolia's herd-- died of frost and starvation, wiping away the assets of thousands of Mongolians, the World Bank and the Mongolian government began a search for a way mitigate *dzud* risk for herders (Mahul & Skees, 2007). After several years of research and consideration, they found one in index-based livestock insurance, abbreviated as IBLI. Index-based insurance is an insurance policy that gives out payments based on an indicator correlated with a

specific type of loss. For example, crop insurance may be indexed to temperature and rainfall, or **flood insurance may be indexed to rainfall**. The Mongolian IBLI program started by the World Bank and the Mongolian government in 2005 is indexed to winter mortality by species. Measurements are made at the level of the country's 256 *soums*, Mongolian administrative units akin to counties. In this program's design, herders receive payouts equal to the fraction of the *soum's* animals that died. Payments begin once a species' winter mortality in the *soum* rises above 5 or 6 percent, depending on the policy (Mahul & Skees, 2007). For example, if a herder insured 100 goats and 20% of the *soum's* goats died that winter, they would receive a payout equal to the worth of 20 goats. This is independent of the hypothetical herder's own losses: whether they personally lost 10 goats or 50, the payout is the same.

In my research, I address the question of how herders use IBLI and other risk mitigation strategies to deal with the risk of livestock mortality. In particular, this study looks at what factors play into herder's decisions to purchase livestock insurance and what tools herders actually use to cope with *dzud* risk. Most writings to date about the IBLI program focus on the macro-level disbursement of funds and examine IBLI without looking at other risk mitigation techniques used by herders. In my research, I examine IBLI as one among a set of tools that herders use for risk mitigation, and I interviewed herders themselves to get their perspectives on whether the IBLI program is helpful or not.

This issue of risk management is both important and urgent to face. The risk of *dzud* is likely to become more severe with time as Mongolia experiences the impacts of climate change. Over the last 70 years, Mongolia's mean summer temperature has become hotter by 2.1°C, and the winters have become colder over the last two decades (Namkhainyam, 2009, p. 25). Combined with an increase in the volatility of annual precipitation levels, these climate change effects are expected to drastically increase the risk of *dzud* in the decades to come. (Namkhainyam, 2009) For nomadic pastoralism to continue to produce a viable livelihood for herders, Mongolia needs mechanisms to keep the monumental—



and increasing—risk of losing livestock to *dzud* or drought from overwhelming Mongolian herders.

### *Historical Background*

The need for IBLI only appeared after the collapse of Mongolia's socialist government in 1992. During the rule of the Mongolian People's Republic, Mongolia's livestock herds were nationalized starting in the 1950s and remained so until the MPR's collapse in the 1990s (Baival & Fernandez-Gimenez, 2012). During this time, the vast majority of livestock was owned by the state, although herders were allowed to keep personal herds of 100 or fewer animals. The Socialist government played a central role in dealing with the risk of dzud. Herders worked as part of collectives which could move large single-species herds across the landscape, their mobility facilitated by the trucks and equipment of the collective farms (Humphrey, 1999, p. 11). In harsh years, the collectives could travel vast distances to bring their herds to better pasture. These movements mimicked a traditional Mongolian strategy for dealing with poor weather, a trip called an *otor* that involves taking the animals to a different region in years when the pasture was poor. MPR farms produced large amounts of hay for the winter on collective farms and provided low-cost veterinary care (Baival & Fernandez-Gimenez, 2012, p. 10). When massive losses did occur, the Socialist government would help restock the collectives with animals from other areas of Mongolia.

Following Mongolia's democratic transition in 1990, the new government rapidly privatized Mongolia's herds and dismantled the collectives. This and the sharp economic downturn Mongolia experienced in the early 90s led to a surge in the number of herders, as unemployed city-dwellers claimed their shares of the national herd and moved to the countryside. The number of herding families rose from 147,000 in 1990 to 284,000 in 1995, marking an enormous migration of the Mongolian population. (Amgalan, 2010) It also shifted the burden of livestock mortality risk from the state onto the herders, a state of affairs that had not occurred in the lifetimes of the herders alive at the time.

To worsen the situation, the socialist institutions that lessened the impact of *dzud* on the herds collapsed. The former collective haymaking enterprises also collapsed. Tractors and other farming equipment used to make hay were given out to the former drivers of the collectives, who often had no way to get spare parts when their tractors broke down. (Humphrey, 1999, p. 56) Those herders whose families were not able to acquire one of the former collectively-owned trucks during the privatization process also lost access to the trucks that they once would have used to go on *otor*, a series of longer migrations to more distant pasture made in years with poor grass.

Between the loss of collectively managed risk mitigation techniques, the increased pressure on pasture from new herders expanding their herds, and the shift of the burden of *dzud* risk onto individual herders, Mongolian herders were set up for a perfect disaster in the *dzud* of 2000-2001. During this time, one third of Mongolia's livestock died, and thousands of suddenly impoverished Mongolians moved into the *ger* district slums surrounding Ulaanbaatar (Barnett & Skees, 2006). These severe events brought the issue of Mongolian livestock mortality to the attention of the World Bank, which worked with the Mongolian government to investigate potential solutions to the high risk of *dzud*. In 2004, the Mongolian government passed legislation allowing the IBLI program to be put in place, and the program was implemented in 3 aimags starting in 2006 (Mahul & Skees, 2007).

### *Traditional Risk Mitigation Techniques*

Herding cultures largely have a threshold herd size above which a herder is likely to recover from a bad year, and below which a herder will struggle to keep their herd at a subsistence level. In low-income households, there can exist a "critical threshold" of resources and assets, such as livestock, above which the family can support themselves on a positive growth path and below which they have to cut into productive assets to remain at a subsistence level, trapping them in poverty. (Barnett & Barrett, 2008, p. 1768) When there is such a critical threshold, a sudden shock such as losing animals to a *dzud* can push a household

below that level and into poverty. In Kenya, this number is estimated at 10 to 15 “tropical livestock units” consisting of 1 cow or 7 to 8 goats.(McPeak & Chantarat, 2010). In Mongolia, most individuals approximate this subsistence level at 200 animals, though many herders today have herds that fall well below this level. Many studies on risk management among the extremely poor suggest that they manage risk with a goal of keeping their assets greater than this point at which they may become stuck in a poverty trap (Barnett & Barrett, 2008). This makes herders with small numbers of animals highly risk adverse, as they cannot afford to lose many more of their animals.

To keep their herd sizes above this point, herders use informal risk mitigation techniques. For example, herders diversify sources of income within the household, create reciprocal social bonds, and find more diverse income sources. (Chuluundorj, 2006) Chuluundorj also found that herders may increase the size of their herd to deal with the risk of *dzud*. If herders have a large number of animals, it is likely that even a devastating *dzud* will not push the family below the subsistence line. However, this risk mitigation technique negatively impacts herders collectively: if the livestock herds grow too large, they may overgraze the land and push the steppe’s delicate ecosystem out of balance. This leads to erosion, desertification, and poor grass quality. In the 1990s, the Mongolian herds climbed from 23.7 million head of livestock in 1980 to 33.5 million in 1999, the result of more people becoming herders after the economic collapse of the early 90s and herders increasing herd size as a risk mitigation technique. (Amgalan, 2010). Herds have remained large, and this has eaten into Mongolia’s pastureland reserves. A study conducted by the Swiss Agency for Development and Cooperation, a major donor to Mongolia’s livestock initiatives, found that degradation of the pastureland has accelerated sharply in the last 20 years and that pastureland productivity has fallen by 28.6% in the desert area and 52.2% in the steppe over the last 40 years.(Amgalan, 2010, p. 11)

Herders also rely heavily on their social networks. Researchers have catalogued “substantial material flows” of goods between herding households and their urban relatives, as herders send dairy and meat products to the cities and

their wage-earning relatives send money and goods in return (Sneath, 2012). These urban relatives can offer additional support in the form of loans or gifts to help herders recover from losses or deal with unexpected adverse events. Social networks among herders also help deal with the risk of livestock risk: herders offer one another valuable, region-specific herding advice that can help herders make good decisions in the face of Mongolia's unpredictable climate (Baival & Fernandez-Gimenez, 2012). In addition, herders help one another accomplish tasks such as moving their homes and herds to new pasture or splitting their herds to graze each species on optimal terrain (Chuluundorj, 2006).

### *The Finances of Risk Management*

IBLI's design is intended to avoid several of the major barriers that have previously prevented the implementation of a livestock insurance program in Mongolia. Two, common to all types of insurance, are adverse selection and moral hazard. Adverse selection occurs when potential policyholders know more about their risk than insurers do, leading to only the riskier individuals seeking insurance (Barnett & Barrett, 2008). Moral hazard happens when, because a policy holder is protected by insurance, they choose more risky behaviors. In either case, these phenomena can push up the cost of insurance, pricing it out of economic viability. To avoid these situations in conventional insurance requires vigilant monitoring and screening mechanisms, which are often impractical at the small scale of microinsurance. In microinsurance schemes, the transaction costs of evaluating risk and monitoring behavior can easily drive the price too high to be economically viable (Barnett & Barrett, 2008, p. 1770). Transaction costs are particularly high in the Mongolian setting, where nomadic herders roam sparsely populated areas connected by poor roads. An insurance company could not put in the money to go visit every herder making a claim or buying a policy and evaluate the health of their herds, the state of their pastures, and whether their animals died from *dzud* or poor decision-making. This has made livestock insurance policies based on individual losses impossible to implement in Mongolia. Index-based insurance, on the other hand, ties payouts only to overall *soum* mortality levels,

erasing much of the transaction costs associated with individual loss based policies.

Designers of IBLI also believe the program will indirectly helps herders to get bank loans at lower interest rates. The higher the rate of defaulting on loans, the higher the interest rate goes, and uncompensated natural disaster losses can create a large number of defaults. (Barnett & Skees, 2006). However, when herders have insurance, banks can be assured that even in case of *dzud*, herders are less likely to be forced into default. This will enable easier access to financial assets overall for Mongolian herders. In a best case scenario, easier access to bank loans for herders could help them purchase productive assets, such as trucks for moving to more distant pastures, and boost their income over the long term. It can also help them take out loans to expand their herds or finance their children's education. The Mongolian index-based insurance program has explicitly made this connection, and herders are offered lower rates on loans from Xaan Bank if they purchase the insurance (Mahul & Skees, 2007).

Furthermore, researchers hope that IBLI will help the Mongolian government be better able to assist herders during *dzud* disasters. Dealing with a widespread natural disaster such as *dzud* taxes the Mongolian government's ability to pay for necessary assistance programs. While developed nations struck by disaster are usually able to draw on revenues from a wide range of sources to deal with disaster, developing nations like Mongolia lack the budgetary freedom to divert funds to disaster relief (Mahul & Skees, 2007). Having herders purchase insurance not only benefits the individual herders, but it hopefully decreases the amount of government aid that herders impacted by *dzud* will need.

However, many researchers also have concerns about the potential downsides of index-based insurance programs. Index insurance comes with a potentially large downside for consumers called basis risk. Basis risk is defined as "the difference between the payout offered by the index and actual damage experienced" (Akter, 2012, p. 274). In the case of the Mongolian index-based insurance scheme, this basis risk is the difference between overall soum mortality rates and the losses a herder experiences personally. Even in a year when overall

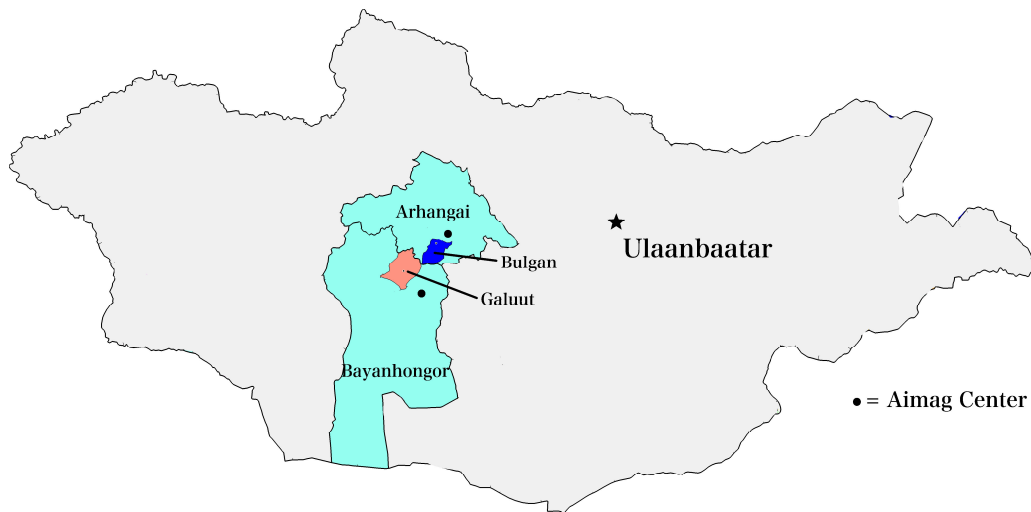
soum mortality remains low, a herder could lose a larger share of their animals to predation, disease, or personal bad luck, and that loss would go uncompensated by insurance.

In addition, marketing and selling insurance while keeping costs low can be a serious issue even for index-based insurance products. (Akter, 2012) found that in the case of Bangladesh, poor regulatory frameworks, a lack of demand among homeowners, and the high costs of effectively administering a program makes index-based flood insurance far too expensive for the majority of homeowners. Demand, however, is not constant and can change with well-designed research and education efforts. Kenyan researchers found innovative ways to reach out to herders by designing games that mimicked an index-based insurance program for drought risk (McPeak & Chantarat, 2010). However, these marketing efforts may be costly and can push the costs of running a program higher than is sustainable.

Furthermore, (Binswanger-Mkhize, 2012) notes that index-based insurance can fail to be beneficial to farmers if the costs of switching from informal to formal risk mitigation techniques is high, or if they are well insured by informal social mechanisms already. Also, volatile prices for goods can create a source of instability for household income the index-based insurance cannot cover. Especially if herders depend on just a handful of products for their cash income, price fluctuations can have a considerable impact on herder well being. For small-scale herders who face tight credit constraints and might be able to benefit from switching to insurance, they may also lack the money up-front to insure their animals.(Binswanger-Mkhize, 2012, p. 7) Also, many of the purchasers of the Mongolian index-based insurance scheme bought only the lowest possible amount of coverage (Binswanger-Mkhize, 2012, p. 9). This level of coverage may be inadequate to effectively mitigate the impact of a severe *dzud* on herder well-being.

## Methodology

This study centers around a comparative analysis of two neighboring *soums* chosen from Bayanhongor and Arhangai *aimags*. Bayanhongor was one of the three aimags chosen to pilot the Mongolian IBLI program in 2006 (Mahul & Skees, 2007). Arhangai was one of the last aimags in Mongolia to get the program, only receiving the IBLI program in 2012. These program start dates mean that Bayanhongor herders have experienced a major *dzud* with the program in place, while Arhangai herders have not. Bayanhongor herders have also had six years more of education about the insurance program than the Arhangai herders.



**Figure 1: Research Sites**

Within these aimags, I chose Galuut *soum* in Bayanhongor and Bulgan *soum* in Arhangai for my research. I selected neighboring *soums* in order to minimize climate variation, which alters herding practices and weather-based mortality risk. I chose Bulgan and Galuut in particular because our academic program had contacts in both *soums*, allowing me to more easily access the communities, and because they are located at similar distances from their aimag centers and from Ulaanbaatar, the two population centers these *soums* are most strongly tied with. Galuut's *soum* center is located two hours' drive from

Bayanhongor's aimag center, while Bulgan's soum center takes an hour to reach from Arhangai's aimag center. Both aimag centers are located a day's drive from Ulaanbaatar. Khangai Nuruu national park, as well as a nearly impassable range of mountains, separates the two soums. Few roads pass between the soums, and travelling between the two is most easily done by returning to the aimag center and driving between the two places from there. Both soums belong to the mountain steppe ecological zone of Mongolia, with the southern border of Galuut edging into desert steppe. Due to this climate zone, both *soums* raise yak rather than cattle, and they have very few camels. They are also located in some of the higher *dzud* risk areas of Mongolia (T. Oyunbat, 2014).

The largest difference between the two *soums* is that Galuut is mostly bare of trees, while Bulgan's mountains are largely forested. Bulgan herders use the trees to construct winter shelters and fences, heat their houses, and provide natural windbreaks around their winter pasturelands. Galuut herders can only make their winter windbreaks from stone, which are far less effective and far more difficult to make. Water availability also differs in the two *soums*. In Galuut, herders cannot move to their winter camps until the first snow, as their animals rely on eating snow to get enough water at their winter camp sites. Bulgan herders do not have this difficulty with the majority of their winter sites.

I spent approximately 7 days in each aimag, with three days spent interviewing herders in each location. In Bayanhongor, I spent an additional



**Figure 2: Bulgan and Galuut Winter Preparations**

Top: Herders in Bulgan, Arhangai load logs to bring to herders in the nearby valley. Bottom: a winter shelter used by a champion herder in Galuut, Bayanhongor. Photos by author.



two days interviewing *soum* officials in the *soum* center. Sickness left me unable to do the same in Arhangai. I also spent two days in each aimag center interviewing former herders and aimag officials. I also gathered datasets from Bayanhongor's and Arhangai's respective Aimag Statistical Centers on the human and animal populations in the soums of research.

When interviewing herders, I used the interview format attached in Appendix A. The interviews had four parts: the first about social networks, the second about the family's finances and relation to banking and insurance, the third about winter preparation, and the fourth about the 2009 dzud. In the first part of the interview, I gathered data about the herders' social network in order to better understand the informal networks of support that herders have through family and friends. I therefore recorded the locations, occupations, and frequency of meetings that my interviewees have with their various relatives. I also asked what forms of assistance they received from their friends and families, and how frequently they communicated with their friends and relatives. The second part of the interview asked herders about their finances, including their herd size and their income sources. It then asks about herder's relationships to banks and the IBLI program. The third section gathers information about the informal risk mitigation strategies herders use to deal with winter, including purchase and production of fodder, pasture condition, and how they get information about drought or dzud. The final section asked about herder's experiences in the 2009 dzud. Questions cover government aid received, whether they were covered by insurance, and which informal risk mitigation techniques they used that year, such as not breeding some of the animals or going on *otor*.

### *Interview sample*

While in Bulgan, Arhangai, I surveyed 9 current herders and 2 former herders. Each interview lasted approximately one hour. Herders were chosen for interviewing largely by the driver's suggestion, which he offered based on proximity to the host household where I was living. While random selection of interviewees from all Bulgan households would have been desirable, given the

limited timeframe of the study and my lack of access to comprehensive soum records, this process allowed for a greater sample size and reduced transportation costs, which can be sizable in the population-scarce setting of rural Mongolia. Therefore, the Bulgan sample was centered on the southwestern part of the soum, approximately a half hour's drive from the soum center. I traveled there from November 6 to November 14, so most Bulgan households had already moved to their winter camps. After interviewing households, I asked permission to take photographs of their winter camps, which I received in all cases.

I was unfortunately unable to go to the soum center to being ill from food poisoning on the days I intended to go there. Instead, I interviewed former herders from Bulgan in the aimag center, located through the informal networks of Bulgan people I had interviewed and stayed with. As fewer former herders were present in the aimag center than expected, I was only able to locate and interview two former herders.

In Galuut, I interviewed 10 herders from across the soum, largely in the northern area. Similarly to Bulgan, my driver selected the households I travelled to, and I requested that he try to pick households representative of the range of economic class present in Galuut. This sample came across a wider geographic area, including respondents from 9 *khot ails*, or family camps.

In both locations, all households approached for the interviews agreed to be interviewed. The individuals interviewed were split fairly evenly between male and female interviewees. Approximately half of the time, both spouses were present and participated in the interview. The interviews usually lasted approximately 45 minutes to an hour. Interviewees were paid 5000 MNT for participating, an amount equivalent to US\$2.50.

While my sample seems to include a diverse range of households within each area, there is a possibility that my results could be skewed by omitted variable bias. The most likely source of this bias is that the driver chose the families for the sample. Since the drivers were more likely to go to households they knew, this may have skewed my sample towards the more social and well-

liked individuals in an area. If this occurred, my results may evidence stronger social networks in the area researched than the majority of herders experience.

This study may also have translational issues. The translator who travelled with me to Bulgan was unable to go to Galuut. While they gave the same translated survey in both places, the translators may have given different clarifications of the questions, possibly nudging participants towards certain answers. This source of bias may explain why the herders in Bulgan most frequently mentioned receiving rice, flour, and oil as forms of government aid, while the Galuut herders typically mentioned medical kits and warm clothes.

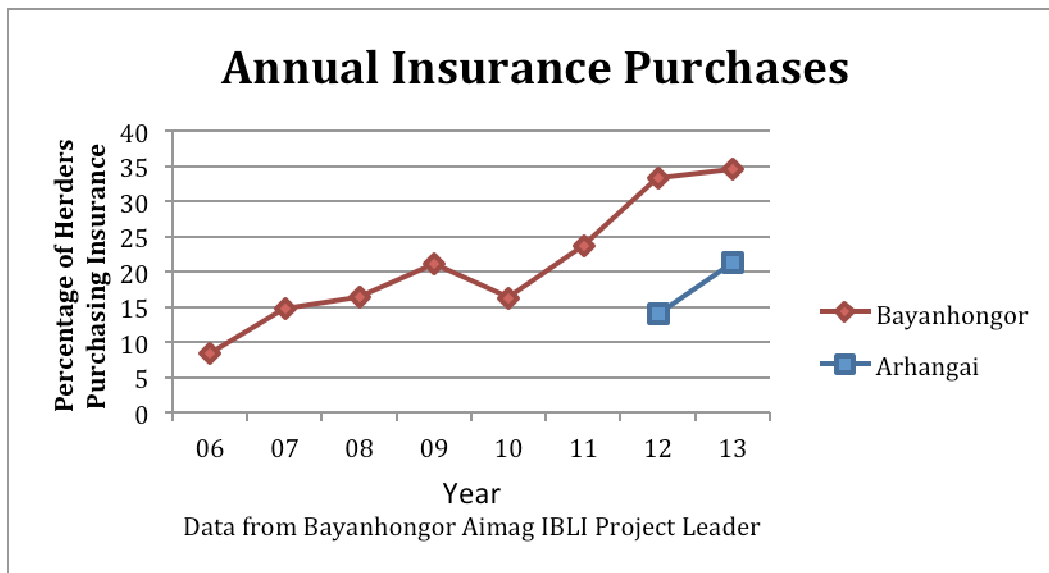
## Results and Discussion

### *Implementing Mongolia's IBLI program*

Mongolia's IBLI was designed as a three phase program. The first, the pilot stage, ran from 2006 to 2009. During phase 1, the program was implemented in 3 aimags, selected to represent the major ecological regions of Mongolia: Ovs aimag in the mountainous western side of Mongolia, Bayanhongor aimag to represent the Gobi and the high-mortality central mountains, and Hentii aimag as part of eastern Mongolia. (T. Oyunbat, 2014) This phase of the project was designed to test whether IBLI would prove an effective strategy in Mongolia and, if successful, to refine the project for further expansion. Two project directors were hired in each of the participating *aimags* to coordinate the program's implementation. In my interview with one of Bayanhongor's two project coordinators, he explained that the project then hired two coordinators within each *soum*. These coordinators were brought to the aimag center to learn about the IBLI program and were trained in how to teach herders about the program, and they spent the summer and fall of 2006 traveling to herding households to educate them about the program.

Representatives from the three participating insurance companies then traveled out to the *soums* in the fall of 2006 to sell the policies. An estimated 95% of herders living in the pilot program *aimags* received face to face education about the insurance project. (Mahul & Skees, 2007). The project began with a 7% strike point, meaning that herders would begin to receive payouts when a species' mortality hit above 7%. Almost no payouts occurred in the program's first year, as the 2006-2007 winter was not terribly harsh (Coordinator, 2014). Despite the rigorous efforts at selling the insurance, approximately 8.5% of herder households in the pilot aimags bought the insurance in its first year (statistics from Bayanhongor program coordinator), and most herders purchased insurance to cover only 30% of their herds, the lowest share allowed (Mahul & Skees, 2007). Considering the newness of this insurance program and the distance that herder

households are located apart from one another, this percentage was considered acceptable.



**Figure 3: Annual Insurance Purchases**

IN 2009, the program's pilot was deemed successful, and the World Bank and Mongolian government moved forward into phase 2 of program implementation. In phase 2, IBLI expanded into all twenty-one of Mongolia's *aimags*. They added one in 2009, 5 in 2010, another 6 in 2011, and the final 6 in 2012. Arhangai *aimag*, home of Bulgan *soum* and one of my research sites, implemented IBLI in 2012. As the program expanded, it developed a structure similar to those in the pilot *aimags*. Two program coordinators were hired in each *soum*, and insurance agents and *soum* officials traveled to herder households to advocate the new insurance program.(T. Oyunbat, 2014).

In 2012, the program had successfully spread to all 21 *aimags*, and the IBLI program is currently in phase 3, the transition to operating the program as a sustainable service. The *aimag* offices for the IBLI program were closed this past year as part of part of this transition, since they had successfully helped to connect insurance companies, *soum* governments, and local leaders to promote the insurance(T. Oyunbat, 2014). Now, educating herders about the insurance is the responsibility of *soum* governments and insurance companies. *Aimag* and *soum*

statistical centers continue to compile statistics on livestock mortality for the use of the insurance companies. In 2013 13.6% of all herders in Mongolia purchased the livestock insurance. Bayanhongor, with 34.5% of herders purchasing the insurance, has the highest rate of insurance purchase, and Hovsgol *aimag* is the lowest with a 2.6% rate of coverage.

Also as part of Phase 3, Mongolia has begun to buy reinsurance for the IBLI program. Since *dzuds* usually hit a large area of Mongolia at the same time, severe *dzud* years put heavy pressure on the insurance companies' ability to pay the policy. For example, while the program has paid an average of 100 to 200 million MNT (10 to 20 thousand USD) per year since the program's start, they gave out the equivalent of 1.3 million USD in four aimags (T. Oyunbat, 2014). To protect from this situation, the IBLI program has sold reinsurance on global markets. The reinsurance policies stipulate that if payments for the IBLI program go above 105% of premiums in any given year, the international reinsurance companies will pay the reinsurance markets may also benefit the Mongolian government: reinsurance of natural disaster risk can lift some of the burden of the government by transferring some of the risk of *dzud* internationally. Mongolia's case is similar to that of Kenyan pastoralists, who also face frequent and devastating droughts. Researchers found that Kenya could benefit by shifting some of their economic burden onto international investors, so that the government structures would be less overtaxed in *dzud* years (Chantararat, Mude, Barrett, & Carter, 2013). While the government still contributes to ameliorating the impact of *dzuds*, with the national government paying for livestock losses when they rise above 30%, having IBLI and international reinsurance will hopefully lessen the economic impact of future *dzuds* on Mongolia.

As another part of the third phase of IBLI, the insurance program intends to roll out additional insurance products. To make the risks covered by the insurance program less covariant and thus less risky for insurance companies, the World Bank is designing other products that are not tied to winter weather conditions. The first product to be added is crop insurance. As risk analyst at the World Bank T. Oyunbat explained, "Crop season is from spring to fall, and the

livestock mortality happens in winter and the beginning of spring. So they have two totally different risk factors. Even if we have a bad year with the livestock, they still can have a good year with the crops.” This will make the reinsurance a far more commercially viable product, sustainable into the future.

### *Insurance Uptake: Education, Wealth, and Social Networks*

Educating herders about IBLI proved one of the chief challenges in making the program work. At the time when IBLI was designed, most rural Mongolians had never been exposed to any sort of insurance program. “When we first started, all the insurance market was pretty much concentrated in the city. They had only Mongol Insurance that had branches in the 21 aimag centers, none of the other companies had any branches,” the risk management specialist at the World Bank explained. “We didn’t just have to teach about IBLI, we had to expand insurance awareness overall.” To further complicate matters, Mongolia has the lowest population density of any country and roads and transportation networks remain poorly developed, so the IBLI program faced substantial barriers in connecting to them.

To reach out to the herders, the Bayanhongor IBLI program’s *soum*-level coordinators conducted trainings for *soum* officials, people such as veterinarians who dealt regularly with herders, and leaders of the *bags*—Mongolia’s smallest administrative units. In addition, the *soum*-level coordinators and the insurance representatives both traveled to almost every household within the *soum* to disseminate information and encourage sales. (Coordinator, 2014) Both the World Bank official and Bayanhongor program coordinator interviewed agreed that the success of these education programs depended substantially on the education level of the herders. The Bayanhongor coordinator stated, “most of the families who purchased the insurance in 2007 were the ones who were educated and understood, although some might have just been following the decisions of other people they knew.”

The degree to which herders felt well-informed about insurance varied widely between the two *soums*. In Galuut, Bayanhongor, 70% of respondents felt well-informed about the insurance program. In Bulgan, Arhangai only 22% of

respondents felt well-informed about the program. This gap confirms that the extra six years of experience with the program and education by insurance representatives and others has had a substantial impact on herder's understanding of insurance. Herders in Arhangai still held many misconceptions about the insurance program. For example, one herder explained that they think it is a good program because "we sometimes lose many animals to wolves, and it is good to protect from that." However, wolf attack risk is not covered by the IBLI program. Another said that they did not consider themselves well informed because they did not know where they should file their individual insurance claims. While the insurance salesfolk have left the majority of herders in Bayanhongor with a good understanding of IBLI, herders in the more recently added Arhangai still need more material to educate them on the IBLI program.

The question of education is an important one for IBLI's success. How well informed herders feel about insurance correlates closely with whether herders purchased insurance in the last year. 20% of herders who did not feel informed about insurance purchased it for this winter, while 90% of herders who did feel informed

about the insurance purchased it for this winter. Herders mostly derived their information about the insurance from visiting insurance

<b>Sources of Insurance Information</b>		
Received information from:	Bulgan	Galut
Television or Radio	11%	20%
Insurance Representatives	90%	100%
Others (veterinarian, <i>bag</i> officials)	11%	10%

**Figure 4: Sources of Insurance Information**

representatives. As shown in figure 4, television, radio, and other officials and workers played a slight role in informing herders about the insurance program, but the dominant source of information by far was the insurance representatives. This statistic indicates that especially in Bulgan, Arhangai where fewer herders feel informed about insurance, keeping up the visits of insurance representatives will be important to increasing the uptake of insurance.

A family's wealth also plays into the decision to purchase insurance. Families who purchased insurance this year had an average herd size of 399



animals, while families that had not purchased insurance had an average herd size of 191. This is a statistically significant difference, with a t value of 0.02 from a heteroskedastic one-sided t-test. The reason for wealthier herders purchasing the insurance more frequently is that they are more easily able to pay the premiums in the spring. Among the nine herders who did not purchase the insurance, four cited the cost of insurance as a reason that they did not purchase it. As one Galuut herder stated, “it costs a lot, and I’m not guaranteed to get anything back from it.” Another complained that “it’s expensive to cover enough of the herd to matter.” Mongolians often cite 200 animals as the herd size required to make a subsistence living, so these herders with an average of 191 animals have little money to spare. Paradoxically, these herders who are too poor to purchase the insurance are precisely the people who would be hardest hit by a *dzud*, which would cut even further into their already slim assets.

This refusal to purchase insurance due to its cost and uncertain returns is not uncommon in the literature on microinsurance. Insurance programs in countries without a tradition of insurance face the further barrier of needing to persuade people that insurance schemes can be a viable investment and are worth making even for individuals existing at a subsistence level. In Bangladesh, where a microinsurance program was implemented to protect against potential flood loss, over a third of respondents in a study of the targeted farmers refused to buy the insurance because they would not receive money if there was no flood (Akter, 2012, p. 269). As they struggle to meet their subsistence needs, it is difficult to convince the poorest sector of the population that investing their money in a product that will often return them nothing is a good decision. Furthermore, even if convinced that the insurance is a good product, these poor herders may be unable to raise the cash to purchase the insurance. The herders who did not purchase the insurance make an average of 100,000 MNT (approximately \$50) less than the wealthier herders in cash. Asking poor herders to part with some of their hard-earned money is a difficult idea to sell.

Unexpectedly, herders with stronger social networks seem to purchase insurance more frequently rather than less (**Figure x**). As city relatives and

friends can help provide economic and labor support in the wake of a severe *dzud* year, many theorists would expect that herders who already have access to these

<b>Social Connections of Purchasers and Non-purchasers of Insurance</b>			
	Purchased	Did not purchase	t-value
Gave a relative help within the last month	81%	73%	.12
Received help from a relative in the last month	36%	12%	.20
Number of employed urban relatives	3.9	3.4	.16
Average daily phone calls	7.0	4.0	.05
Helped a friend in the last month	45%	0%	.008
Received help from a friend in the last month	36%	12%	.121
Trust their families to help in case of <i>dzud</i>	77%	12%	.009
Trust their friends to help in case of <i>dzud</i>	55%	12%	.059

**Figure 5: Social Connections of Purchasers and Non-Purchasers of Insurance** informal risk mitigation techniques would purchase insurance less frequently. In this case, however, herders do not seem to be weighing the assistance from insurance against possible assistance from friends and family. Purchasers are far more likely to trust that their friends and families will help them in case of crisis (Figure 5), but they still choose to purchase the insurance.

There are several possible explanations for this correlation. One is that these higher levels of trust and social connectivity may be correlated with higher wealth, which my study does not control for. Herders with more money can more easily send presents of meat and dairy to their city-dwelling family, help friends, strengthening their social bonds. This wealth also would allow them to purchase insurance more easily. The causal relationship could also run from social connections to wealth: having more helpful friends and family members may make herders able to build larger herds. One Galuut woman, whose herd consists of only 110 animals, explained that her herd is so small because she and her son lack the manpower to herd a larger number of animals. Larger herds must also be moved more frequently: while nomads with smaller herds move their felt homes only three to four times a year, two of the herders with 600 and 800 animals

respectively move their homes ten to twelve times annually to keep their animals on fresh pasture. This move usually requires the assistance of family or friends, so only herders with stronger social networks can make these frequent moves needed for larger herds.

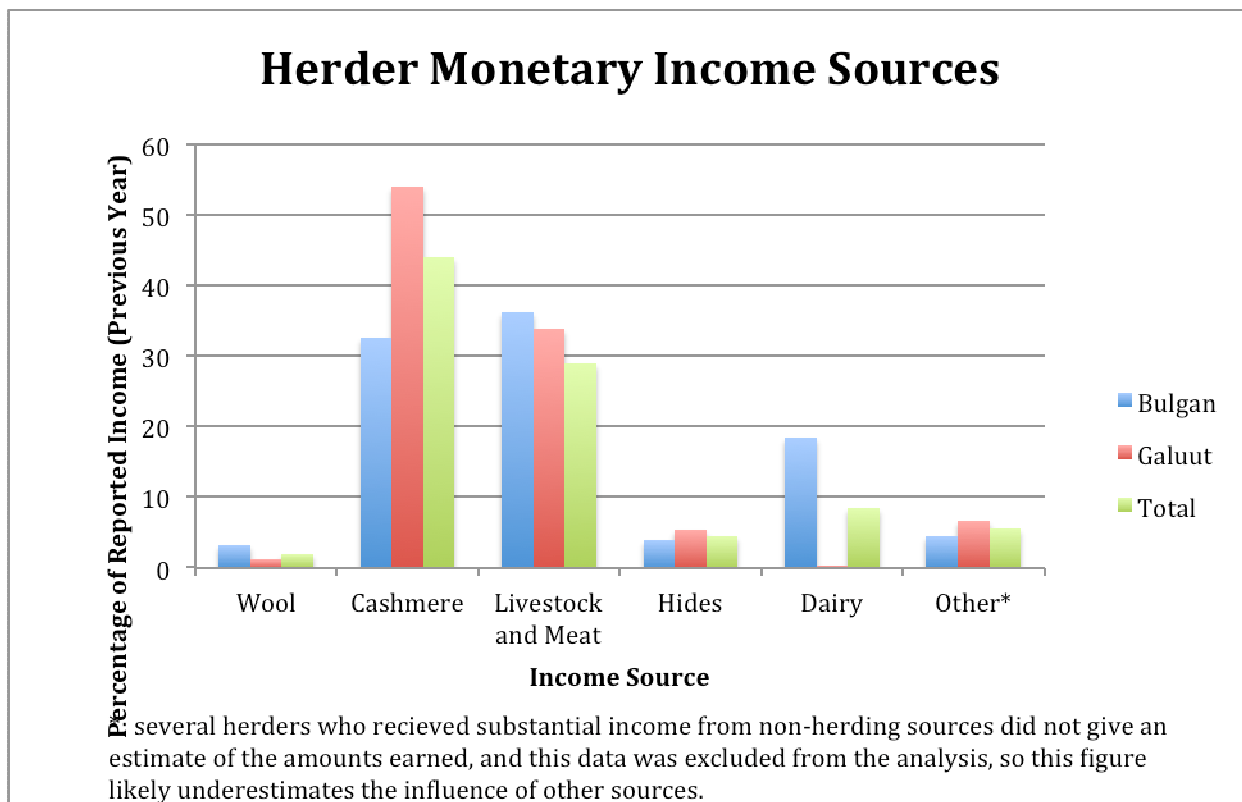
Several social factors did not show significant correlations to insurance purchase, such as the frequency of receiving visitors to a family's ger or going to other family's gers for help. Purchasers and non-purchasers of insurance also received manpower help in the 2009 *dzud* from their friends and family at similar frequencies. They also see their relatives with similar frequencies. Although the precise relationship between social networks and the purchasing of insurance is not entirely clear, it is obvious that alternative sources of *dzud* protection are not significant drivers for the decision to purchase or not purchase insurance. Rather, the decision to purchase insurance seems largely driven by the level of trust that herders have in the program and the income levels of the purchasing herders.

### *Uncovered Risks*

While IBLI insurance protects herders from some portion of the risk of *dzud*, it does not protect herders from all of the risks associated with nomadic herding. Markets also create their own volatility for herders, as the global market dictates prices for the handful of goods herders sell, especially cashmere. Among my sample group, cashmere sales accounted for 44% of all reported cash income, including 54% of income among Galuut, Bayanhongor respondents and 36.6% of the income of Bulgan, Arhangai respondents. In the spring of 2014, the herders in my sample received between 60 to 80 thousand MNT per kilogram of cashmere, compared to 500 MNT per kilogram of cashmere. With cashmere playing such a dominant role in the economic lives of herders, any fluctuation in the price of cashmere can threaten their economic status. Unfortunately, cashmere's market prices have been subject to large swings over the last twenty years. Cashmere passed through three bust-boom cycles between 1990 and 2012, and these fluctuations have been both rapid and dramatic. For example, cashmere sold for

\$42 a kilogram in 2007, but plummeted to US\$12 a kilogram in 2008 (Sneath, 2012, p. 461).

When these fluctuations occur, they often have a large impact on herder households, especially in regard to their ability to meet fixed financial obligations



**Figure 6: Herder Monetary Income Sources**

such as loans. Many herders take out seasonal loans that require biannual payments, once after the spring cashmere season and once after the fall slaughtering season. 47% of the herders interviewed (44% Bulgan, 50% Galuut) stated they had taken out loans, and the majority of the loans fit into this category. Many used the loans to pay for daily expenses during the rest of the year, when cash income remains low for most herder households. Others used the loans to purchase cars, motorcycles, or other similar assets. When asked whether repaying the loans creates a substantial burden for their families, most herders replied that it depended on the year: whether the winter had killed many of the animals they intended to sell, and whether cashmere prices brought in the expected spring influx of cash. “In some years,” said one Bulgan herder, “it can be very, very

hard, when there is not enough money.” Furthermore, animals are more likely to fetch a poor price in years with high livestock mortality. When a natural disaster strikes, many herders attempt to sell their animals at once, leading to a drop in the price of the animals (Skees, 2008). Price fluctuations may occur at random some of the time, but they also can compound the hazards of risks of *dzud*.

This type of income revenue risk creates a large risk for herder households that IBLI, which is tied exclusively to livestock mortality, does not cover. Instead, herders hedge this risk using informal mechanisms, such as keeping their herds diverse, to hedge against this risk. When asked why they herd their chosen mixture of animals, most replied that it was because of the diversity of products derived from the different animals: goats’ cashmere, sheep’s meat, and yaks’ and horses’ milk. While cashmere is sold, the majority of the other products are kept for household use. By producing a mixed herd that can provide their subsistence, herders keep from fully relying on the market to provide the goods they need, and avoid becoming dependent on their cash income. Selling both whole livestock and cashmere also diversifies their goods on the market, so that a downturn in one might not hit the other.

Similarly, some herders choose to find non-herding sources of income. 9 of the 17 herders reported receiving some income from a source not tied to herding. In Bulgan, herders made money from cutting and selling wood to the aimag center, hosting tourists in the summer, and sewing traditional Mongolian garments known as *deel*. Galuut herders did part time work for more wealthy herders, sold dried dung as fuel, and sent family members to work in UB or the mines in the southern areas of Bayanhongor. These income sources often added on 100 to 200 thousand MNT. While not as much as the average 1.77 million MNT earned annually through cashmere, these part time jobs help protect herding households against the impact of cashmere price fluctuations.

Some herders also use bank savings to deal with both market risk and livestock mortality risk. Most herders agreed that saving money in a bank account is a worthwhile investment: Those herders who gave a number of how much someone like them should have in their bank account gave estimates ranging from

1 million to 20 million MNT. When asked why, herders responded that they should save for their children's education, in case of a sudden need or illness, and in case the winter is bad. In the survey, 90 percent of herders stated that they trust banks, showing that herders overall believe that the financial system is a secure place for their funds.

However, the herders also found growing a savings account extremely difficult. Only 1 respondent—who owned a herd of more than 400 animals—had as much saved as they thought they should. Also, 44% of Bulgan herders interviewed and 60% of Galuut herders interviewed reported having no money in their bank account at present. As most herders within the sample live at or near the subsistence level, with 14 of the 19 stating that they would spend an unexpected sum of money on things like food or winter clothing, they struggle to set aside money. As one Bulgan herder stated, “Some rich people have a lot of money, but poor people don't get very much. For poor people like me, it is very hard to save money and not spend it.” As a result of this difficulty, 8 of 19 herders interviewed had no money within their bank accounts, and 3 of the remainder stated that the only money within their bank accounts came from their pension, government subsidies for children, or herder's loans. For most rural herders, savings seems an infeasible method for protecting against *dzud* or market risk, and keeping their assets in livestock seems preferable. Some herders, when asked how much they should keep in their bank account, responded that accumulating cash savings was unnecessary. One older Galuut herder shrugged, “Savings is good if you can, but our family doesn't trust money. We trust the animals.” Another Galuut herder added that there was no need to save money in the bank because they could simply sell animals if they needed funds. Compared to a low-interest-rate bank account, many herders prefer the returns provided by expanding their herds.

Herders also experience substantial risk to their livestock assets that is not fully covered even when they are insured by IBLI. During the 2009 *dzud*, Bulgan herders lost an average of 49% of their herds with a standard deviation of 20 percentage points. The Galuut sample lost an average of 22.5% of their livestock

with a standard deviation of 27 percentage points. These high standard deviations mean that many herders' losses varied sharply from the overall trends in the *soum*. As the overall *soum*-wide losses are the basis for IBLI, this high standard deviation means that IBLI's payments may fail to match the actual losses experienced for many herders. Some herders cited this high variation as a reason for not purchasing the index-based insurance. One Bulgan woman with a smaller herd who had not purchased the insurance explained, "the insurance would be helpful if it covered people losing one or two animals. Then I would buy it."

Herders also lose animals to predators, a risk that insurance does not cover. Six of the Bayanhongor respondents reported losing animals to wolves within the last year. One herder, whose herd contains only 150 animals, lost 10 sheep and goats to wolves in the past year. A wolf attack can wipe out as many as a dozen animals in one night, a potentially disastrous loss for a low-income herder. Other herders lost portions of their young sheep and goats to eagles. These risks, however, can more easily be buffered by informal networks: when a herder loses animals to predators, their neighbors and family likely did not experience the same sort of loss, so wealthier family members and friends can give the herder some animals or loan them some money if needed. While wolf attacks are not the most devastating disaster that can hit a nomadic herder, they can be influential for herders near the poverty line, and should not be ignored when considering risk management for herders.

### *Non-IBLI winter risk mitigation*

Herders continue to use traditional risk mitigation strategies to deal with the hazards of winter. Herders put great stock in the importance of preparing their herds well for winter. When asked why some herders lose more animals than others in harsh winters, herders regularly cited quality of winter preparations, the

<b>When there is a harsh winter, why do some herders lose more animals than others?</b>		
	Bulgan	Galut
How well they prepare	67%	70%
Whether they chose a good winter site	22%	60%
Whether the pasture is good	44%	40%

**Figure 7: Perceptions of Livestock Mortality Causes**

quality of their winter site, and the quality of the pasture (Figure 7). A Galuut herder stated that “it depends on three things: how well they can fatten their animals on their summer pasture, how good their winter camp location is, and how hard the family works.” Another Galuut respondent summarized it more simply: “lazy people lose animals.” None suggested that luck plays an important role, though the weather’s fluctuations play a large role in determining winter mortality.

What precisely this work entails varies somewhat between the two *soums*. In Arhangai, the first item mentioned is making the shelter warm. Bulgan herders bring their animals back to wooden shelters at night, penned in with wooden fences. Figure 8 shows a typical Bulgan shelter, with 4 foot high wooden fences and covered areas tucked into the back of the corral. As part of winter preparations, Arhangai herders also gather dried dung to cover the floor of the shelter. This dried dung helps keep the ground warm for the animals, and must be changed out



**Figure 8: Typical Bulgan Shelter**

several times over the course of the winter as it is wetted. Galuut herders lack the trees to make this type of shelter, so they instead look for winter sites on the slopes of mountains that provide natural protection from the wind. In some of these spaces, herders also add low stone fences as additional protection against the wind. Compared to the omnipresent Bulgan shelters, the rock Galuut shelters were quite rare, present in only one interviewee’s winter site.



Bulgan herders also make far more fodder for the winter than Galuut herders. Most Bulgan herders harvest large amounts of grass in the summer and fall to keep as hay for the winter. They are kept in fenced-off piles of hay approximately four to six feet in height (Figure 9). Bulgan herders



**Figure 9: Bulgan Hay Storage**

consider this fodder enough to sustain their animals for one to two particularly hard weeks, and after that they would need to purchase any further fodder required. While every Bulgan herder interviewed had prepared fodder themselves for the winter, only 20% of Galuut herders had prepared fodder themselves. Instead, Galuut herders buy some oats in the late winter and early spring when needed. The interviewed herders were not entirely clear on why they find harvesting hay unnecessary, but many stated that they just buy fodder when it is needed. It is possible that the winter pastures in Galuut provide adequate grass for more of the winter, or that Bulgan herders find it easier to harvest hay than Galuut herders do.

Herders also monitor weather conditions closely to judge the approaching winter. 81% got information about the upcoming winter from the TV, 31% talk about the winter with other herders, and 36% personally watch the sky for the weather. Interviewees considered judging the winter a delicate and very necessary art. They cited *soum* officials and elderly expert herders as important sources for information about the upcoming winter. However, herders do not significantly alter their preparations based on warnings of *dzud*. “I prepare like every year is a *dzud*,” said one Galuut herder. A shelter only needs so many layers of dung, and gathering grass for feed is a very labor-intensive task, so herders do not have many changes they can make to their winter preparations.

One change that some herders do make, however, is to travel on *otor*. An *otor* is a trip to better pasture made in years when the pasture is particularly poor.

Going on *otor* is a risky and labor intensive venture: only the large stock such as yaks, cows, and horses can usually make the longer trips, so the household must split their labor and leave some people behind to tend the sheep and goats. Poor households may be unable to go on *otor* because they lack the cars or trucks needed to travel long distances. The Galuut herders who went on *otor* in the 2009 *dzud* went an average of 90 kilometers from their usual homes. Traveling on *otor* also increases the risk of conflicts over pasture: one wealthy Galuut herder who traveled to another *soum* during the 2009 *dzud* explained that in the area she and her family traveled to, “many people told us that we should move on and that they didn’t want us.” To keep herders traveling on *otor* from overgrazing the land they travel to, *soum* governments make agreements on how many herders are allowed to travel on *otor*, how many animals they may bring, and where they may go (President, 2014). The Galuut *soum* president explained that the national government assists in these preparations, taking meteorological data and monitoring the pasture’s quality to see when allowing herders to go on *otor* is necessary.

Herders also keep use herd diversity to hedge against winter risk, as well as the risk of price fluctuations. Different commonly herded species vary widely in their ability to withstand extreme cold, drought, and lack of pasture. Therefore, keeping herds with a mix of species allows herders to hedge against the risk of losing all their herds to a natural disaster. Keeping diverse herds also has the benefit of providing a diverse range of animal products for the family’s use. This risk mitigation technique does come with several downsides, however. Keeping herds diverse in this matter requires considerable effort on the part of herders, since the horses, cattle, and yaks must be herded separately from the goats and sheep (Ericksen, 2014). Furthermore, the animal regarded as most hardy in a harsh winter, the horse, also is one of the least productive. Horses are used to produce meat and *airag*, a popular drink made of fermented mare’s milk, as well as to herd the other animals. Few families mentioned selling horses on the market, and the majority raised only a handful for their family’s use. Furthermore, when asked why they keep their herds diverse, nearly all the herders answered that it

was because of the diversity of animal products offered by the different species. No herder in either *soum* mentioned the risk of winter mortality as a reason for herd diversity.

### *Experiences in the 2009 dzud*

The 2009 to 2010 winter devastated Mongolia's herds in a "cold *dzud*". During the summer of 2009, a drought struck much of Mongolia, leaving animals in poor condition for the winter. Furthermore, there was little grass available for the animals to eat over the course of the winter. Lacking the body fat that they should have built up over the summer, animals died *en masse* from exposure to the cold in the late winter and early spring. As one Bulgan herder explained, "we had no grass, the weather was very harsh, and the temperature was too cold. Our animals were weak, and then they froze." The climatological differences mentioned earlier between Galuut and Bulgan had a large impact in the 2009 *dzud*. During the *dzud*, Galuut lost 23% of its total animals while Bulgan lost 37% (Figure 10). Losing an additional 14% of their animals meant that Bulgan *soum* experienced a greater impact on their quality of life and their livelihoods in 2012 compared to the Galuut herders. As such, 90% of Bulgan herders interviewed stated that their quality of life in 2010 had been severely impacted by the *dzud*, while only 10% of Galuut herders in the interview sample said the same. Notably, the losses reported by the herders in my Bulgan sample were 11 percentage points higher than the *soum*-wide mortality for that year, possibly due to the specific geographic area of Bulgan *soum* in which I conducted my survey.

<b>Impact of the 2009 <i>dzud</i></b>		
	Galuu	Bulgan
Average herd loss ( <i>soum</i> -wide)*	23%	37%
Average herd loss (survey sample)	22%	48%
Quality of life severely impacted by <i>dzud</i>	10%	90%
Quality of life somewhat impacted by <i>dzud</i>	30%	10%
Quality of life not significantly impacted by <i>dzud</i>	60%	0%

*: data provided by Bayanhongor and Arhangai statistical centers
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**Figure 10: Impact of the 2009 *Dzud***

Many herders were unprepared for the scale of the *dzud* that hit them in 2009, despite their heavy use of sources of weather information. Herders constantly share information with one another and speculation about weather conditions, creating a local base of knowledge about winter conditions (Baival & Fernandez-Gimenez, 2012, p. 8). Across both sites, herders harness the power of the phone to keep up this constant network of information. They make an average of 5.8 phone calls per day, calling friends and family to chat, ask about the well-being of their herds, and swap information about the weather. They also get information about upcoming weather conditions from national weather sources such as television and radio. 73% of herders get information about the weather from TV, and 90 percent own a TV in their households. Despite these formal and informal sources of weather information, only 47 percent of herders surveyed reported that they had received warning that a *dzud* would occur.

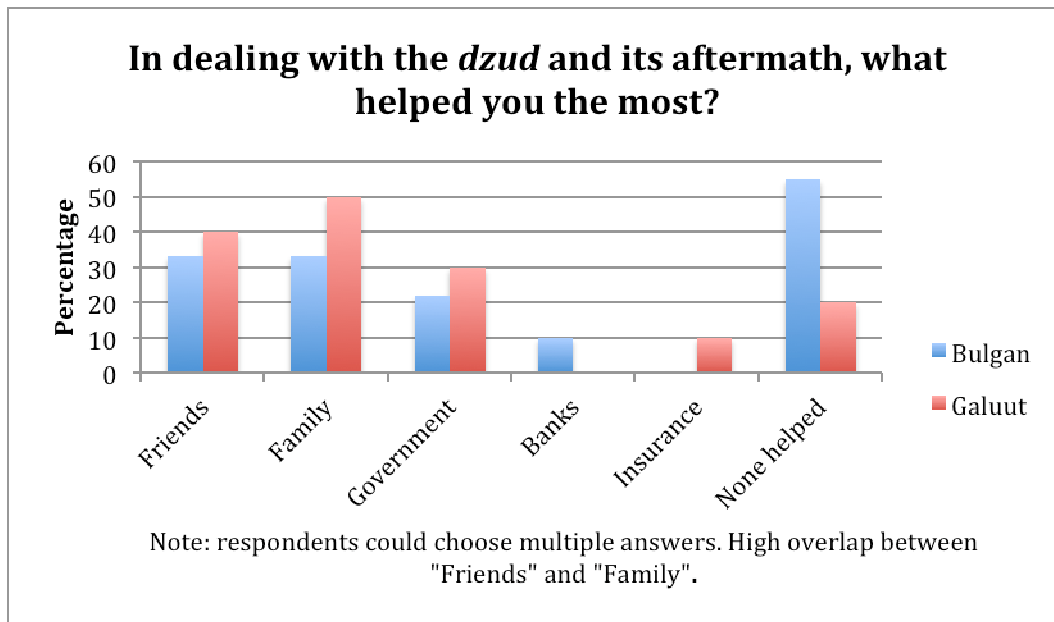
Although not all herders were warned that a *dzud* was likely to occur, they did realize that the winter was likely to be harsher than usual and took appropriate steps. After the summer drought, many herders decided to “hold the ram” in the fall, meaning that they did not breed all of their female animals. This is a serious decision for a nomadic household: not breeding female animals deprives them of both herd-expanding young animals and milk products important to household nutrition. However, “holding the ram” can increase the odds that their herd survives the winter, since the female animals do not have to spend life-preserving body fat on feeding their young animals. In the winter of 2009-10, 50% of Bulgan herders and 40% of Galuut herders did not breed at least some of their animals. In total, Bulgan herders bred 65% of their animals and Galuut herders bred 77%.

In addition, 80% of herders, the same across the two *soums*, travelled on *otor* that year. The *soum* government president in Galuut explained that they negotiated to allow families to go on *otor* that year to several neighboring Bayanhongor *soums*. In particular, several Galuut families mentioned that a group of 10 households took their large livestock such as horses and yaks on *otor* to the

south. *Otor* distances ranged from 20 to 200 kilometers among Galuut herders. Some of the herders struggled with the logistics of travelling on *otor*. One Galuut herder mentioned that he had needed to ask around the area to find someone with a truck who could help to move his house on *otor*. One of his friends was able to assist, but most of the interviewees who did not go *otor* stated that their main reason for not going on *otor* was a lack of trucks or a lack of manpower. For those herders able to go on more distant *otors*, the payoff was often substantial. The wealthy household that travelled 200 km on *otor* reported that among the large livestock they were able to move on *otor*, only 5% died.

While I lack the data to make a conclusion comparing the impact of insurance between the two *soums*, Bulgan households who purchased the insurance found it quite helpful to their recovery from the *dzud*. The five households in my sample who had purchased insurance in 2009 received an average of 360,000 MNT per household in payments from the insurance companies, which 4 of 5 herders described as “somewhat helpful” to recovering from the *dzud*. Four of the five herders who bought insurance in 2009 bought it again this year, an indicator that they found it worth investing in again.

The government also played a significant role in helping herders to deal with the 2009 *dzud*. Herders listed food aid, blankets, warm clothes, and medical supplies among the benefits that the government delivered to help herders get through the *dzud*. All Bulgan herders surveyed and 70% of Galuut herders received fodder from the government, an important factor in keeping their livestock alive. Most herders ran out of their pre-prepared fodder by January or February and struggled to keep their animals fed until the new grass began to grow in April. While those herders with bank savings flung their money at fodder, the government provided some free sacks of grain and bales of hay. They also offered discounted 50 kilogram bags of oats for 5,000 MNT. Given the slender amount of fodder that Galuut herders in particular pre-prepare for the winter, government fodder assistance made a large impact on the ability of herders to keep their animals alive through a difficult winter.



**Figure 11: Sources of Dzud Assistance**

In recovering from the winter, herders had the assistance of the *soum* government, insurance companies, banks, and their social networks, but they felt the impact of their social networks most strongly. In Figure 11, we can see that herders felt their friends and family provided the greatest sources of help. Almost none in either *soum* felt that the formal financial institutions, banks or insurance companies, were the most helpful. The most aid came from social networks. 44% of Bulgan herders and 70% of Galuut herders received manpower assistance from their families. However, a surprisingly large share of herders felt that they received assistance from no one but their own households. Especially in Bulgan, herders were adamant that they had little support from any of the sources listed. “Everyone was overwhelmed, everyone was busy,” one Bulgan herder explained. “The only person who was able to help us was us.” As Bulgan lost more animals to the *dzud* than Galuut, it is possible that fewer individuals in Galuut *soum* were able to help out their friends and neighbors because they were overwhelmed by the *dzud*. Natural disasters like *dzud* are difficult for communities and nations to handle exactly because they harm so many people at once: while *soum* governments and insurance companies may have distributed substantial amounts

of aid, the damage done was so extensive that the herders impacted did not feel substantial benefits.

### *The Missing Former Herders*

Searching for people who had quit herding, in either the aimag center or among my informants in the countryside, proved difficult. Only 1 of my Bulgan informants stated that they knew someone from their *soum* who had lost all of their herds, and I was only able to find 2 people in Tsetserleg who had left herding after the dzud. Herders attribute this partially to hard work on the part of herders in the years following the dzud and partially to the help of government programs. One Galuut informant stated, “I knew someone who had only 30 animals left, but he got 5 or 6 pregnant cows from the government restocking program in the spring. He worked very hard, and in a few years he had a hundred animals or so again.”

One interviewee added that “some people lost a lot of animals, maybe 80%, but no one I know lost all of them. We worked hard and built the herds back up again.” The numbers from the Arhangai Statistical Office seem to support his conclusion, with the population of

Bulgan soum remaining almost the same between 2009, 2010, and 2011 (Figure 12). The aimag center’s population rose from 17770 people in 2009 to 20054 in 2010, implying that some people did choose to leave the countryside after the *dzud*. However, in Bulgan there seems to have been no mass exodus from herding in the wake of the *dzud*. Rather, the *dzud* pushed herders to a bare subsistence level, with 8 of 9 Bulgan herders in the survey sample stating that their quality of life was severely impacted by the *dzud* in 2010.

I was similarly unable to find stories of former herders in Galuut. Only 2 herders stated that they knew anyone who had lost all of their animals to *dzud*,

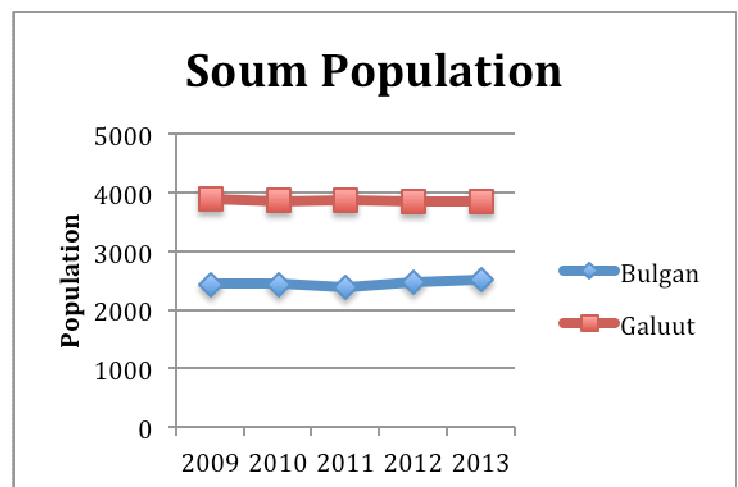


Figure 12: Soum Population

and my translator informed me that they were both referring to the same family. One of my herder respondents stated that he himself had lost all of his animals in the dzud. He had been unable to take proper care of his animals that winter because his father was ill, and he couldn't get the manpower to move his animals to better pasture. After the dzud, he reported, the *soum* had a meeting where local herders who were less impacted by the winter contributed animals to help two severely impacted herder families restart their herds, and his was one of the two families chosen. Five years after the dzud, he now has a herd of 110 animals, a fraction of the 400 animals he lost and hardly enough to sustain him at a subsistence level. As such, he works part time for some of the wealthier herders in the area to earn money and livestock products.

One possible explanation for the lack of former herders is that there are few employment alternatives to herding for those who leave it. 35% of the relatives of current herders who are no longer herding and live in urban centers are unemployed. With this lack of employment options facing them, it is unsurprising that the vast majority of herders, even those who lost many of their animals to the dzud, chose to regrow their herds rather than move elsewhere. Furthermore, many herders seem to enjoy their herding lifestyles and the communities that they live in. While some of my interviewees did state that they wished they had received more education and could work at a better-paying position than herding, many Mongolian herders who I spoke to informally and in the context of my interviews mentioned that they take pride in their lives as herders.



## Conclusion

Index-based livestock insurance is joining a larger set of tools to help with winter risk mitigation in Mongolia. Mongolian society has struggled with the risk of *dzud* for generations, and those challenges are likely to only get worse over the coming decades as global warming further destabilizes Mongolia's already volatile climate. A large share of the damage caused by this phenomenon seems likely to land on the shoulders of individual herders, a heavy and damaging burden. In the face of this phenomenon, herders need more support beyond that provided by their friends and relatives. When a *dzud* can destroy half of a herder's assets over the course of a single winter, there is a need for formal institutions to mitigate the damage caused, and IBLI seems a natural solution in the age of the market.

As IBLI moves into Phase 3 and looks for ways to integrate as a sustainable institution, the IBLI program needs to keep up door-to-door education and sales efforts, especially in the *aimags* more recently added to the IBLI program. Building trust for this program is not an easy task. Most herders have never held any form of insurance before, so creating confidence in IBLI requires building trust in the institution of formal insurance from the ground up. As most of these herders exist at a subsistence level where any extra funds are likely to go to basic needs, convincing herders to actually purchase IBLI requires salesmen to convince herders that IBLI is not just a useful tool, but so important to their way of life that it is worth giving up on important purchases to possess. While I had hoped to analyze whether having strong informal networks of support discouraged the purchase of insurance, I found that signal overwhelmed in my data by the powerful impact of education, trust, and wealth on herder's decisions to purchase insurance. From my research, it seems that education and wealth are two of the most important factors in influencing insurance purchases.

Insurance representatives and local government officials are best positioned to build the type of trust necessary to make IBLI successful. Areas such as Bulgan, Arhangai gain most of their information about the IBLI program from the in-

person visits of insurance salespeople and *soum* officials, and they do not fully trust the program yet. In Bulgan, only 22% of herders feel well-informed about insurance and only 25% trust the insurance to make payments when needed. This is almost the flip of the Galuut herders, 70% of whom feel well-informed and 90% who trust the insurance to make payments when needed. The combination of longer exposure, more in-depth education about the insurance, and seeing the insurance pay out in the context of a severe *dzud* has taught Bulgan herders that IBLI is a worthwhile protection against *dzud* risk. While IBLI can likely begin to pull back on heavy education efforts in areas like Galuut that trust and understand the program, areas like Bulgan still need more intensive and in-person education to help them feel comfortable around the program. As IBLI starts to remove some of the local structures used to first create the program such as the *aimag* coordinating offices, they should be careful not to remove the local on-the-ground education programs in places that have only recently received the program.

However, IBLI alone is not enough to protect herders, especially the poorest and most vulnerable to *dzud* risk, from the effects of natural disaster. For herders on the edge of subsistence, purchasing insurance requires them to give up money needed for subsistence now for an uncertain return later. The data from Galuut shows that while poor herders in the Galuut area feel relatively educated about IBLI, they cannot or will not pay for coverage on enough of their herds to make a serious difference. To protect these poor populations, the government will have to take further actions to help support informal risk mitigation institutions and to make insurance less expensive for low-income herders.

This is especially necessary because of the risks that the program fails to cover. It is not economically viable to sell insurance protecting herders from individual loss connected to wolf attacks or winter loss beyond what IBLI's index marks, but these risks weigh substantially on the minds of herders. Especially for small herders, the loss of ten or twelve animals to predators or winter can be a serious economic shock. The greatest danger of the IBLI program is that it may be painted as a panacea for herder's risk of livestock loss, which it is decidedly not. When planning for severe winter, Mongolia needs to keep in mind that herders

will lose varying shares of animals and may need different types of assistance in the *dzud*'s wake. Projects like restocking programs can help provide this type of after-the-fact support for rebuilding after livestock loss.

One important institution for protecting against livestock loss in general is maintaining reserve pastures for *otor*. In harsh years such as 2009-10, almost all herders traveled to *otor* pastures to find better grass for their animals. Preserving quality pastures allows this institution to continue: if even *otor* pastures are overgrazed, herders lose the flexibility to use other pastures when their usual areas are experiencing a year of poor growth. Mongolia's pasture quality is inherently volatile and changes considerably over even small differences: despite the proximity of Galuut and Bulgan, herders in the two locations face different winter challenges and may have quite different livestock losses in any given year. Some local governments are currently supporting anti-overgrazing measures such as creating leases for grazing lands and setting aside reserve pastures, and these efforts need to be supported into the future.

In addition, more support is needed for employment outside of herding. At present, even herders who lose devastatingly large amounts of their herds to *dzud* continue herding, though they often become trapped at with a herd size well below the 200 animals considered necessary for subsistence. This is a classic poverty trap, where people who experience a severe economic shock may be unable to ever build up their assets again and may be permanently pushed into a poor standard of living. Given the high proportion of herders' relatives living in *soum* and *aimag* centers who are unemployed, it is likely that many of these herders choose to stay on the land despite their small herds because they have no feasible economic alternatives. If more job opportunities existed outside of nomadic herding, people who fall through the safety nets of *dzud* protections and are unable to build their herd up again would be able to find other sources of economic employment that could better support their families. The fact that so few herders leave the land after a *dzud* is not inherently a sign that herders are recovering well: it is also a sign that there are few opportunities for them elsewhere.

For herders, IBLI is slowly earning a place alongside the support of kinship networks and *soum* governments as a way to reduce the impacts of *dzud* on their livelihoods, as increasing shares of the population understand and trust the program. However, uptake on IBLI remains low, with only 30% of herders purchasing the product even in Bayanhongor, the *aimag* with the highest purchase rate in Mongolia. If it becomes more widespread, IBLI could substantially benefit the government's ability to effectively mobilize and help herders in *dzud* years, and also provide a greater level of financial security for herders. In time, if formal financial risk mitigation techniques improve, herders may be able to rely less heavily on high-cost risk mitigation techniques such as raising too large of herds and raising animals of less productive species. At the moment, however, IBLI has too weak an influence to foster this sort of systematic change. It leaves out important demographics and ignores the high variability of *dzud* year losses. To create a more resilient system of herding for the challenges Mongolian herders will face in this century, IBLI can play a part in risk mitigation, but it cannot stand alone.

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## Appendix 1: Herder Survey

### Part 1: Social Relations

1. Please list all family members who live in your household.

Relationship	Gender	Age

2. Please list other family members (parents, children, siblings, and other close relatives)

Relationship	Gender	Age	Occupation	Residency	Frequency of meeting

3. Have you received any help from them during the last month?
  - a. If so, what?
4. Have you given any help to them during the last month?
  - a. If so, what?
5. In the past week, how many times have people have visited your ger?
  - a. What do they do visit for?
6. In the past week, how many times have people from your household visited other gers?

- a. What do they visit for?
7. How many people do you talk with on the telephone a day?
  - a. What do you talk with them about?
8. In the last month, have you received any help from your friends?
  - a. If so, what?
9. Have you given any help to them during the last month?
  - a. If so, what?

#### Part 2: Finances and Assets

1. How long have you been herding?
2. How many animals does your family own?
  - a. Goats
  - b. Sheep
  - c. Horses
  - d. Cows
  - e. Camels
3. Do you herd any animals that are not your own?
  - a. If so, whose and how many?
4. Why do you herd this mixture of animals?
5. How many animals did you sell this year?
6. How many animals have you given as gifts this year?
7. How many of animals have you slaughtered for your own use this year?
8. How many animals have you lost to theft, disease, or predators this last year?
9. How much money did you make since last November from:
  - a. Selling cashmere?
  - b. Selling wool?
  - c. Selling livestock?
  - d. Selling meat?
  - e. Selling hides and skins?
  - f. Selling dairy?
10. Does your family make money from anything other than herding?



- a. If so, what and how much?
11. Does your family own any of the following things:
- a. TV
  - b. Radio
  - c. Solar Panel
  - d. Power generator
  - e. Motorcycle
  - f. Car/jeep
  - g. Truck
  - h. Extra ger
12. If your family got an unexpected sum of money, what would you spend it on?
13. Does your family have a bank account?
- a. If so, how much do you have in it?
  - b. How often do you visit the bank?
  - c. Are you saving for anything specific? If so, what?
  - d. Do you see banks as trustworthy?
  - e. How much money do you think that someone like you should keep in their bank account?
14. Do you have access to bank loans if they are needed?
- a. Do you currently have any loans? If so, what did you take them out for?
  - b. Does repaying your loans create little burden, some burden, or a large burden for your family?
15. Have you ever purchased livestock insurance?
- a. If yes, what was the first year you purchased livestock insurance?
  - b. Where did you purchase the livestock insurance?
  - c. (Whether yes or no) Why did you buy/not buy the insurance?
  - d. Did you purchase livestock insurance this year?
  - e. If so, for what percentage of your stock?
16. Do you feel well-informed about insurance?

17. What sources did you get information about insurance from?
18. Do you think insurance is cheap, expensive, or reasonably priced?
19. Do you trust the insurance program to give out payments when it is needed?
20. What do you like about the insurance program?
21. What do you dislike about the insurance program?

### Part 3: Winter preparation

1. How many kilometers does your house move a year?
2. How many times do you move a year?
3. Do you have a lease for your winter camp?
4. Has there been conflict over pasture in this area?
5. How much fodder have you prepared for your animals?
6. Did you buy any fodder this year?
7. How long would your fodder feed your animals if they couldn't graze?
8. What type of animal do you think survives best in harsh winters?
9. Where do you get information about whether there will be drought or dzud?
10. What do you do to prepare for winter?
11. When there is a harsh winter, why do some herders lose fewer animals than other herders?
12. Is your winter pasture in good condition, a bit degraded, or very degraded?
13. Is your summer pasture in good condition, a bit degraded, or very degraded?

### Part 4: 2009 dzud

1. Before the 2009 dzud, how many animals did you own?
2. How many animals did you lose in the dzud?
3. Did you get any extra manpower help from your friends or relatives?
4. How long were you able to feed your animals with fodder you had bought or prepared?

5. Did you get fodder from the government?
6. Did you buy fodder? If so, how much?
7. Did you get any other forms of aid from the government?
8. Did you have insurance during the dzud?
  - a. If so, how much did they pay?
  - b. Was the insurance payment very helpful, a little helpful, or did it make little difference?
  - c. Were you happy with your interaction with the insurance company?
9. Did you receive any warning about the possibility of dzud?
10. How did you respond to this warning?
11. How many of your animals did you breed that year?
12. Did you go on otor that year?
13. Did you have any conflicts over water or grazing land?
14. Did you have a well-kept winter shelter for the animals?
15. Why do you think you lost the number of animals that you did?
16. Do you know anyone who lost all of their animals to the dzud?
  - a. What happened to them?
  - b. Why do you think they lost so many animals?
17. Did you or anyone you know get animals through a restocking program?
18. To what extent did the *dzud* affect your quality of life in 2010 compared to 2009? Severely, somewhat, or largely unaffected?
19. In dealing with the dzud and its aftermath, which of these helped you the most? Friends, family, soum government, aimag or national government, insurance companies, or banks?
20. If another dzud happened this year, which of these would you trust most to help you? Family, friends, soum government, insurance companies, or banks?

## Appendix 2: Consent Form

(Note: given to subjects in Mongolian)

### *Consent for Participation in a Research Project*

Risk Mitigation and Index-Based Insurance among Nomadic Mongolian Herders

Researcher: Kelsey Larson

**Purpose and Procedures:** You are invited to participate in a study to examine methods that herders use to mitigate dzud risks and prepare for winter, with specific emphasis on the role of index based insurance. You will be given a survey about their social networks, their economic decisions, their experiences in the 2009 dzud, and their winter preparations. This survey is expected to take between an hour and an hour and a half to complete. You will receive 5,000 tugrik for participation. The results of this study will be written in an Independent Study Project paper submitted to the School for International Training, and may be later used for a senior thesis at Yale University in America or for articles submitted to a magazine journal. The researcher is an undergraduate student studying economics at Yale University.

**Risks and Benefits:** There are no physical risks associated with this study. However, some questions may make you uncomfortable and there is a risk of breach of confidentiality. Every effort will be made to keep your information confidential, by this cannot be guaranteed. Although this study will not benefit you personally, we hope that our results will help NGOs and local, state, and government officials to better understand how herders deal with winter and how they can design programs to help herders more effectively.

#### **Voluntary Participation**

Your participation in this study is voluntary. You may refuse to answer any question or questions for any reason without penalty or loss of benefits. You may also terminate and stop the interview at any time and for any reason, and this will not result in loss of the 5,000 tugrik.

**Confidentiality** - All information you present in this interview may be recorded and safeguarded. If you do not want information recorded, you need to let the interviewer know. All names in this study will remain confidential and protected by the interviewer, will be kept anonymous, and will not be published in the study. The information given in this survey will only be shared with university agencies responsible for oversight of human research and with other researchers so that they can check the accuracy of our conclusions, though we will only do so if confident that your confidentiality is protected. Photographs will only be used with the participant's permission. Photographs will not be connected with the participant's name or responses.

Questions:

If you have any questions about this study, you may contact the researcher, Kelsey Larson, at [Kelsey.larson@yale.edu](mailto:Kelsey.larson@yale.edu) or 9420-2875, or Mongolian SIT Academic Director Ulziijargal Sansarjan at [ulziijargal.sanjaasuren@sit.edu](mailto:ulziijargal.sanjaasuren@sit.edu). If you

would like to talk with someone other than the researchers to discuss problems or concerns, to discuss situations in the event that a member of the research team is not available, or to discuss your rights as a research participant, you may contact the Yale University Human Subjects Committee, 55 College Street, New Haven, CT 06510, 1-203-785-4688, [human.subjects@yale.edu](mailto:human.subjects@yale.edu). Additional information is available at <http://www.yale.edu/hrpp/participants/index.html>

Please check one of the two following boxes:

- Yes, the researcher may use my photograph (which won't include my face) in research papers or online articles about this study.
- No, the researcher may NOT use my photograph in research papers or online articles about this study.

**Agreement to Participate:**

I have read the above information, have had the opportunity to have any questions asked, and agree to participate in this study.

\_\_\_\_\_  
 \_\_\_\_\_  
 Participant's name printed  
 date

Participant's signature and

\_\_\_\_\_  
 \_\_\_\_\_  
 Interviewer's name printed  
 date

Interviewer's signature and