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TECHNICAL SUMMARY

Managing Agricultural Risk at the Country Level: The Case of Index-Based Livestock Insurance in Mongolia

By Olivier Mahul and Jerry Skees, World Bank Policy Research Working Paper No. 4325, Washington D.C.: World Bank, 2007.

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Introduction

The following is a summary of *Managing Agricultural Risk at the Country Level: The Case of Index-Based Livestock Insurance in Mongolia,* by Olivier Mahul and Jerry Skees, published by the World Bank in August 2007 (WPS4325).

The Mongolian economy is heavily dependent upon livestock reared by semi-nomadic herders. Livestock provides sustenance, income, and wealth to nearly half of the population. Over 80 percent of the country's agriculture sector is based on herding, while agriculture accounts for nearly one-third of the nation's gross domestic product (GDP). Mongolia's harsh and unpredictable winter weather, however, makes herders vulnerable to massive livestock losses. With such economic dependence upon animal welfare, Mongolia's severe winters can have devastating affects on not only the rural poor, but also on the national economy.

Managing risk in the livestock sector requires both risk mitigation and financial approaches. While herders can implement pastoral risk mitigation measures to prepare for winter storms, extreme weather events are unavoidable and result in widespread animal mortality.

Financial mechanisms are also required to provide herders with immediate liquidity in the aftermath of a major weather event. Traditional livestock insurance based on individual losses has proven ineffective in Mongolia. This is due to high monitoring costs of individual herders spread across vast areas, ex ante moral hazard (herders fail to protect their livestock), and ex post moral hazard (herders falsely report animal deaths).

Given this challenge, the Government of Mongolia requested assistance from the World Bank to address catastrophic livestock losses. After a thorough analysis, the World Bank recommended an index-based insurance program based on livestock mortality rates by animal species and *soum* (county), as well as a comprehensive risk financing strategy combining self-insurance, market-based insurance, and a social safety net.

The Index Based Livestock Insurance Program

The proposed index-based insurance product indemnifies herders based on the mortality rate of adult animals in a given *soum*. The index-based livestock insurance (IBLI) pays out indemnities whenever the adult mortality rate exceeds a *soum's* specific threshold. Such a design is less prone to moral hazard, adverse selection, and high administrative costs compared to traditional insurance. Furthermore, this system incentivizes individual herders to manage their herds in a way that minimizes the impacts of major weather events. For example, if a skilled herder experiences no loss while a neighboring herder endures a large loss, the skilled herder is rewarded for their effort by receiving a payment based on the total *soum's* losses.

A pilot project was conducted using the IBLI in three *amiags* (provinces). Two key features of the index-based livestock insurance program—Layering Livestock Risk and the Livestock Insurance Indemnity Pool (LIIP)—are detailed below.

Layering Livestock Risk

The design of this insurance program combines self-insurance, market-based insurance and a social safety net. With these three layers of

livestock risk, both commercial insurance via the private insurance sector and social insurance via the public sector are provided. The characteristics of the three layers are as follows:

- **Herder Self Retention** This is the self-insurance layer of the insurance program where high frequency but low severity losses are retained by the herders and managed through risk mitigation activities or individual capital.

- **Base Insurance Product** The Base Insurance Product (BIP) is the market-based insurance product which finances less frequent but more severe losses. The BIP is sold and serviced by insurance companies on a voluntary basis. Herders pay premiums priced at commercial rates according to the value of their animals and the relative risk in the *soum*. Herders may insure between 25 and 100 percent of the estimated value of their animals. Payments begin once the indexed mortality rates are triggered at 7 to 10 percent and are capped once the mortality rate surpasses the exhaustion point (cap) of 25 to 30 percent. The exact rates vary by *soum*.

- **Disaster Response Product** A social safety-net product, or the Disaster Response Product (DRP), covers catastrophic losses, i.e., losses beyond the exhaustion point. The DRP is provided by the government to complement the commercial product. Herders who purchase the BIP are automatically registered for the DRP at no additional cost. Herders who do not purchase the BIP must pay a small fee to receive the DRP coverage. DRP payments use the full value of animals as the base of value insured.

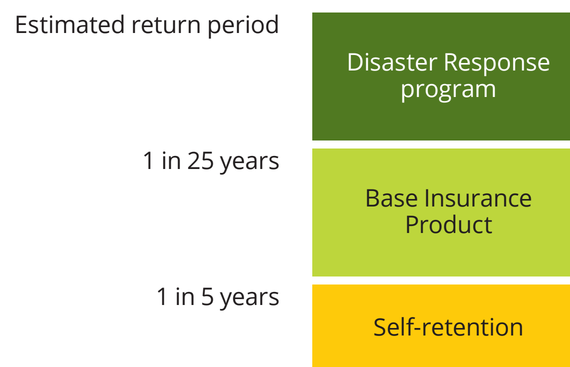
Livestock Insurance Indemnity Pool

Mortality rates are highly correlated across the regions of Mongolia, creating significant risk for the commercial BIP product. Given concerns about financing extreme losses, the pilot design includes a syndicate pooling arrangement for insurance companies, or the Livestock Insurance Indemnity Pool (LIIP). The herders' premiums are deposited in the LIIP until the settlement period, thereby fully protecting the indemnities.

The LIIP also "ring-fences" the agriculture insurance sector, protecting the domestic insurance market against extreme losses. Losses exceeding the LIIP reserves are fully covered by the government's unlimited stop-loss reinsurance treaty backed by the World Bank credit. Reinsurance premiums paid by the LIIP to the government are deposited in reinsurance reserves. The reserves satisfy the first layer of losses beyond the stop-loss at 105 percent of the insurance premium volume (excluding operating costs). Once the reinsurance reserves are exhausted, the government can access the World Bank contingent credit to cover further losses.

The LIIP pooling mechanism allows participating companies to spread risk among all insurers selling the BIP (commercial insurance) product.

FIGURE 1. Layering Risk



Because the BIP is a standard product with set premium rates for all companies, the issue of trust and due diligence of the underwriting skills of participating insurers is greatly reduced.

There is also potential for international reinsurance. The LIIP establishes a framework for a more traditional pool where local insurers build reserves to absorb moderate losses and eventually transfer catastrophic losses to the international reinsurance market. Because the pooling arrangement is both risky and profitable, reinsurers may be willing to provide capital and enter quota-share arrangements on that risk. To the extent that the risks within the pool are standardized, using the same measures and procedures, this mechanism may also serve as a means to securitize the livestock risk.

Lessons Learned

During the pilot period, three insurance companies were authorized to sell the IBLI product in the three pilot *aimags.* Key findings of the pilot period include:

- **Individual herders still face basis risk** The primary disadvantage of index-based insurance is the potential of basis risk. An index payout may not be enough to cover an individual herder's loss or a herder may experience losses when the mortality rate does not trigger a payment. Because of this, self-retention is still important and other risk coping mechanisms should be enhanced.
- **In general, herders are unfamiliar with index-based insurance** Herders must have a clear understanding of the BIP (the commercial insurance product) and DRP (safety-net product) terms and conditions. Otherwise, misunderstandings and confusion about the IBLI program can lead to its demise.
- **The majority of herders purchased the lowest level of coverage (30 percent of the value of their animals)** In the second year of pilot program, herders will be able to select either a 6 percent or a 10 percent mortality threshold for the BIP. Educational efforts will encourage the herders to select the 10 percent threshold with a higher value of insurance as a better risk management strategy to protect against the most severe losses.
- **Lenders respond favorably to the new insurance product** Three major lenders provided lower interest rates to herders purchasing the BIP insurance. On average, rates were lowered by 1.2 percentage points annually. In some cases, banks offered increased lending amounts to herders covered by the BIP insurance. It is anticipated that access to credit will increase even more as the BIP insurance develops.

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