

Micro-Insurance: The Poverty Reduction in Mongolia

by

CHIMED-OCHIR CHINZORIG

51216608

July 2018

Master's Thesis Presented to

Ritsumeikan Asia Pacific University

In Partial Fulfillment of the Requirements for the Degree of

Master of Development Economic

TABLE OF CONTENTS

TABLE OF CONTENTS.....	ii
LIST OF TABLES.....	iv
LIST OF FIGURES.....	vi
LIST OF PICTURES.....	vi
CERTIFICATION PAGE.....	vii
ACKNOWLEDGMENTS.....	viii
SUMMARY.....	ix
CHAPTER 1: INTRODUCTION OF THE STUDY.....	1
CHAPTER 2: LITERATURE REVIEW.....	6
Micro-insurance.....	6
Index-Based Insurance.....	8
Index-Based Livestock Insurance.....	12
Theoretical background.....	15
CHAPTER 3: THE METHODOLOGY OF THE STUDY.....	19
CHAPTER 4: THE RESULTS AND DISCUSSION OF THE STUDY.....	24
Statistical analysis of questionnaires.....	25
Part 1 - Socio-economic background and knowledge, attitude and practice of insured and uninsured herders on insurance.....	25
Part 2 - Influencing factors to demand of insurance.....	33
Part 3 - Coping actions after shock among insured and uninsured.....	38
General discussion.....	55
Chapter 5: THE CONCLUSION AND RECOMMENDATION OF THE STUDY.....	59

The conclusion of the study	59
The recommendation of the study	60
APPENDIXES	61
REFERENCES	68

LIST OF TABLES

Table 2.1	Index Based insurance practice in some countries
Table 3.1	Estimation of sample size
Table 4.1	Frequency of study population
Table 4.2	Education level of household members
Table 4.3	Monthly income of insured and uninsured households
Table 4.4	Average number of livestock owned by insured and uninsured households
Table 4.5	Main reason of livestock loss
Table 4.6	Variables examined in the logistic regression model
Table 4.7	The output of correlation analysis between status of being insured/not insured and other predictor variables.
Table 4.8	Full model
Table 4.9	Descriptive output of regression model
Table 4.10	Output of regression model
Table 4.11	Main reason of purchase of insurance for livestock
Table 4.12.a.	How did insurance payment help of recover?
Table 4.12.b.	The market price of livestock that compared with insurance price of livestock
Table 4.13	Usage of insurance payment
Table 4.14	Loss of livestock and willingness of repurchasing
Table 4.15	Loss of livestock and repurchasing condition
Table 4.16	Insurance payment and coping activities
Table 4.17	Trust in insurance companies and experience with loss of livestock
Table 4.18	Repurchasing and satisfaction

Table 4.19	Repurchasing and perception on insurance payment
Table 4.20	Reason for not purchasing insurance
Table 4.21	Opinion on main reason of insurance and experience with dzud
Table 4.22	Opinion on main reason of insurance and experience with loss of livestock
Table 4.23	Reason not to purchase insurance
Table 4.24	Types of coping activities after risk

LIST OF FIGURES

- Figure 2.1 Cost structure of traditional and index-based insurance products
- Figure 2.2 The time structure of IBLI
- Figure 2.3 Insurance payment rate
- Figure 3.1 Classification of study participants
- Figure 4.1.a. Age structure of insured and uninsured (head of households) (by percent)
- Figure 4.1.b. Insured and uninsured herders' age structure of spouse (by percent)
- Figure 4.2 Number of family members
- Figure 4.3 Average number of livestock (by province)
- Figure 4.4 Herders faced dzud in last 5 years
- Figure 4.5 Herders had loss in last 5 years
- Figure 4.6 Insured herders by year and average livestock mortality rate of 3 provinces
- Figure 4.7 Insurance premium and insurance payment (by thousand MNT – Mongolian currency unit)
- Figure 4.8 Level of trust in insurance company

LIST OF PICTURES

- Picture 4.1 Study area (Map of Mongolia)

CERTIFICATION PAGE

I, Chimed-Ochir Chinzorig (Student ID 51216608) hereby declare that the contents of this Master's Thesis are original and true, and have not been submitted at any other university or educational institution for the award of degree or diploma.

All the information derived from other published or unpublished sources has been cited and acknowledged appropriately.

CHIMED-OCHIR CHINZORIG

2018/06/15

ACKNOWLEDGMENTS

It is a great pleasure to acknowledge to my deepest thanks and gratitude to my supervisor, Professor Kim Sangho, for his tremendous support and valuable guidance. I will be sincerely grateful for all his kindness, and I will always remember his valuable advice in my future career.

I also would like to express thank to my Professors of Development Economic department, and all faculty and staff of Ritsumeikan Asia Pacific University for their hard work and support.

Last but not least, I would like to extend my deepest gratitude to my family and especially to my beloved sister Odgerel.Ch, who always supported me for everything.

SUMMARY

Research background/the problem: Almost one third of Mongolians lived below the income poverty line as of 2016 and poverty level is much higher in rural area (35.1%) than in urban area (24.8%). Herders mainly accounts for majority of those living in rural areas. Due to the extreme weather condition, herders face several environmental and non-environmental hazards such as dzud (harsh winter condition with heavy snowfall which a large amount of livestock die), drought, livestock theft, wolf attack, and infectious diseases. To cope with this shocks, households are more likely to smooth their consumption which may lead future poverty. Many researches also showed the fact that consumption smoothing activities such as depletion of assets may create significant costs in their future and indirectly and directly cause the persistent poverty. Due to the increase of poor herding households, the government of Mongolia and World Bank collaborated to start an Index-Based Livestock Insurance (IBLI) project. The government of Mongolia points out that IBLI is a one of the possible solutions of risk management for poor and vulnerable herders. IBLI project's primary goal was to establish an innovative insurance system to minimize the vulnerability of herders to losses due to severe weather conditions. Unfortunately, the usage of IBLI is still in its early stage of development, and coverage of insurance is still too low. During the period of 10 years upon start of IBLI project, only 5% of all livestock had been insured by IBLI. Therefore, it is warranted the deeper research to examine the consumer's perception in order to improve the insurance coverage, accessibility and feasibility.

The research goal: The goal of research is to study the demand of micro insurance among herders and develop recommendation to policy makers on how to improve the micro insurance system for vulnerable group in Mongolia.

Methodology of the study: This is cross sectional study and herders were interviewed in accordance with pre-prepared questionnaires. Two types of questionnaires were developed for insured herders and uninsured herders. The questionnaires consisted of 27 and 19 questions for insured and uninsured herders, respectively and of them 13 profile questions are identical for insured and uninsured groups. The profile questions were focused on studying the socioeconomic background of herders and their knowledge, attitude and practice in regard of insurance. Total 95 herders (45 insured and 50 uninsured) participated in the study. The sample size was calculated by Taro Yamane's formula. The primary data were collected from study population living in 3 provinces as aforementioned. Both descriptive and inferential statistical analysis (logistic regression) were done to analyse the questionnaire data. MSExcel and Stata were used for statistical analysis.

Result of the study: Result showed that education of spouse and number of small livestock greatly influenced ($p < 0.05$) to being insured. Number of small livestock has great influence on higher insurance coverage. The increase of number of small livestock influenced to being insured. Education level of insured spouse is quite higher than uninsured spouses, thus, more educated spouses might have great power of decision making at household level. Insured herders are not fully satisfied with insurance payment while uninsured herders showed more trust to insurance company.

Conclusion of the study: Firstly, demand of herders regarding IBLI is generally high. Herders who possessing greater number of small livestock such as sheep and goat are more likely to be insured. As well, education level of spouses of insured household are also more likely to be insured which has higher than uninsured spouses. Secondly, difference of insured and uninsured herders' is trust in insurance companies, and coping actions after shock. In the

end, insured herders use insurance payment after shock. Majority of uninsured herders have no coping actions.

Recommendations of the study: First, insurance providers need to take actions to increase awareness and perception of herders on insurance program through effective trainings, discussions, especially face-to-face meeting. It will lead to higher level of trust and satisfaction. Second, insurance policy needed to be adjusted or be flexible. The cut-off point for eligibility of being insured or way of insurance payment could be adjusted. According to the current rule, individual herder is not eligible for insurance payment unless livestock mortality rate of soum is lower than 7% regardless of his/her amount of loss. However, statistics showed that most of soums' livestock mortality rate was lower than 5% in past 5 years. In that case, individual who has great loss are not eligible for insurance payment. Although community based insurance like IBLI has advantage of preventing moral hazard, individuals sometimes are affected by shock in great level. In the end, as herders have no constant income, insurance premium system could be adjusted to current condition. For example, insurance payment might be bartered with livestock.

CHAPTER 1 – INTRODUCTION

In 1997, insurance body shifted from a governmental perspective to privatization. In recent days, insurance sector of Mongolia represents only 0.9% of financial market, and 0.54% of Mongolia's gross domestic product (GDP) being the total premium accumulated, as of 2014 (Central Intelligence Agency, 2013). This percentage is significantly below the expected average for developing nations (2.98%) and developed countries (6.9%).

Due to the high performance and low income, insurance companies of Mongolia focus on serving for middle to high income group. Unfortunately, low income and vulnerable group are most unlikely to have access to insurance products due to unaffordable premiums and inappropriate product designs.

Numerous researches showed that a micro insurance has a great potential to assist vulnerable and poor people in coping with shocks (Barnett B J, 2008); (Gine X, 2008) and micro insurance has steadily gained popularity over the last decade in low- and middle-income countries as a development instrument (Morduch, 2005).

The National Statistical Office announced that 29.6% of people of Mongolia lives below the income poverty line in 2016 (United Foundation of Statistical Information of Mongolia, 2017). This number is 35.1% in rural areas which is higher than in urban areas (24.8%). Farmers, especially herders account for majority of those living in rural areas. Due to the extreme weather condition, herders face several environmental and non-environmental hazards such as dzud (harsh winter condition with heavy snowfall which a large amount of livestock die), drought, livestock theft, wolf attack, and infectious diseases. To cope with this shocks, households are more likely to smooth their consumption which may lead future poverty. Many researches also showed the fact that consumption smoothing activities such as

depletion of assets may create significant costs in their future and indirectly and directly cause the persistent poverty (Kaianga H, 2006), (Barnett B J, 2008)

Due to the increase of poor herding households, the government of Mongolia and World Bank collaborated to start an Index-Based Livestock Insurance (IBLI) project. The government of Mongolia points out that IBLI is a one of the possible solutions of risk management for poor and vulnerable herders. IBLI project's primary goal was to establish an innovative insurance system to minimize the vulnerability of herders to losses due to severe weather conditions. Unfortunately, the usage of IBLI is still in its early stage of development, and coverage of insurance is still too low. During the period of 10 years upon start of IBLI project, only 5% of all livestock had been insured by IBLI.

IBLI is one of possible solutions to recover herders' loss from natural disasters such as dzud and drought. Under the IBLI project, The Government of Mongolia and Insurance providers were responsible for compensation for livestock death in the following manner: a) if the livestock mortality rate for soum (territorial administrative unit of Mongolia and provinces are divided into soums) was lower than 7%, herding households were responsible their losses by themselves; b)if loss was from 8 and to 30% , herders received the insurance payment (reimbursement) from insurance providers; c) if loss was higher than 30%, The Government of Mongolia should cover herders' losses. In another word, herders retained small losses that are considered not to affect their lifestyles, while larger losses were transferred to the private insurance companies, and only the final layer of catastrophic losses were managed by the government.

Motivation behind the Study: Mongolia is a 18th largest and the most sparsely populated landlocked country that located between forests of Russian Siberia to the north, and deserts of China to

the south. The territory of Mongolia has a different ecological transition zone with three different biomes. Due to global climate change, the average temperature of Mongolia raised in last 65 years has been more than 2°C (Batima, P et al., 2005). Because of raise of temperature Mongolian winters have grown warmer, heavy storm events have increased, and familiar weather cycles have altered. Heavy winter snow and ice storms cover pasture grasses so animals are unable to find grasses to eat and quickly starve and die in the cold harsh winter. In 3 consecutive years from 2000 to 2002,, Mongolian herders lost around 11.2 million livestock which are more than 20% of all livestock. During these three years, 81,300 herding households lost their 50% of livestock, and 12.1 thousand herding households lost their entire livestock (United Foundation of Statistical Information, 2017). Just 7 years later in 2010, herders again faced with huge loss of their livestock in dzud. This was the biggest loss ever had in past 60 years in Mongolia. This catastrophic event affected the great level of poverty for herding households and their huge migration from rural to urban area.

The research goal: The goal of research is to study the demand of micro insurance among herders and develop recommendation to policy makers on how to improve the micro insurance system for vulnerable group in Mongolia.

The research objectives: In order to achieve the goal of the study, the following objectives are put:

- To examine the background of herders who are insured (hereafter insured) and herders who are not insured (hereafter uninsured)
- To study the factors influencing to insurance coverage

- To investigate how insured and uninsured are likely to cope with shocks
- To examine the knowledge, attitude and practice of insured and uninsured herders regarding insurance

The research questions: In order to achieve the research objectives the following research questions were raised:

Research question 1: What is the difference between insured and uninsured herders in terms of their socio economic background?

Research question 2: What factors influence the demand of micro insurance for herders?

Research question 3: What is the knowledge, attitude and practice of insured and uninsured herders and how are they likely to use consumption smoothing activities to cope with shocks?

The significance of the study: In brief, it is believed that the current study's immediate or long term (most likely) significance for policy making and reducing poverty could be, 1) the research finding suggested the several options to determine/stimulate the stakeholder process which can be improved to allow/enable herders to take up the micro insurance and establish a tactical criterion to enhance an access to insurance and delineated regulatory action course for government and insurance providers; 2)the recommendations were developed for policy makers to alleviate the policies on micro insurance scheme for herders who are vulnerable part and majority of rural population; 3)if proper policy is implemented to enable herders to access affordable micro insurance services, herders will be protected from harmful consumption smoothing activity which may lead to persistent poverty and it will minimize economic losses via elevating the micro insurance penetration.

The limitations of the study: The main limitation of the study was the coverage of target population. The study covered only 3 provinces out of 21 due to the limited period for data collection. However, these 3 provinces in Mongolia are considered to be representatives of entire country in terms of ecological condition, number of herders and socioeconomic background.

Thesis organization: This thesis contains main five chapters including,

- Chapter 1 - Introduction of the study (background of the current problems, goal and objectives of the study, research questions, significance of the study and limitation of the study)
- Chapter 2 - The literature review of micro-insurance, index based insurance, index based livestock insurance and some cases of IBLI products of other countries.
- Chapter 3 - Methodology of study explains the research design of the study, data collection, calculation of sample size, study participants, and structure of questionnaires.
- Chapter 4 - The results and discussion of the study consisted of the main findings of the study and discussed the results.
- Chapter 5- Conclusion of the study and recommendation concluded the overall study results and provided recommendations to solve the problems identified in the study.

CHAPTER 2 – LITERATURE REVIEW

This chapter discuss the theories and concepts about following matters defined, stated and identified in scientific literature:

2.1. Micro-insurance

2.2. Index-Based Insurance

2.3. Index-Based Livestock Insurance

2.3.1. Practices of IBLI for some countries

2.4. Theoretical background

2.1. MICRO-INSURANCE

The Micro-insurance was defined first by David Dror as defined as: “micro” as the level of society where the interaction is located which is smaller than national schemes, and “insurance” refers to the economic instrument. Further he stated that micro-insurance units are community-funded health insurance schemes that are neither commercial nor national. Currently, micro-insurance include much larger range of activities that most people would consider “micro-insurance” today (McCord, 2011). Based on the definitions stated in various literature, micro-insurance can be defined as an insurance product for low-income groups. Some other definitions are as below:

Craig Churchill, - Preliminary Donor Guidelines:

“The protection of low-income people against specific perils in return for regular premium payments proportionate to the likelihood and cost of the risk involved.”

Micro-insurance Academy, India:

A risk transfer device characterized by low premiums and low coverage limits, and designed for low income people not served by typical social insurance schemes.

International Association of Insurance Supervisors:

Insurance that is accessed by the low-income population, provided by a variety of different entities, but run in accordance with generally accepted insurance practices. Importantly, this means that the risk insured under a micro-insurance policy is managed based on insurance principles and funded by premiums.

ILO's Micro-insurance Innovation Facility:

A mechanism to protect poor people against risk (accident, illness, death in the family, natural disasters, etc.) in exchange for insurance premium payments tailored to their needs, income, and level of risk.

IAIS Issues Paper:

The financial service that besides savings, credit and cashless payments which the poor use to manage their risks.

David M. Dror and David Piesse (2014):

Firstly, micro can be understood as a characteristic of the financial situation of the clientele, i.e., an insurance targeted at low-income people in developing countries.

Secondly, micro can be understood as characteristic of the product, i.e., an insurance offering limited benefits for small premiums.

Thirdly, micro can be understood as characteristic of the process by which the schemes are created and administered.

Molly Ingram and Michael J. McCord (2011):

“Micro-“- Insurance products that are designed to be appropriate for the poor in relation to cost, terms, and coverage

“Insurance” - Financial product that protects against unexpected losses through pooling resources. Policy holders pay only the average loss experiences by its risk pool.

2.2. INDEX-BASED INSURANCE (IBI)

The purpose of index-based insurance (IBI) is to compensate clients in the event of a loss. IBI is used to protect against shared rather than individual risks such as the risks associated with weather fluctuations, disease outbreaks or price loss. The index-based insurance product was recommended by World Bank in 2001 to all developing countries. As of 2017, the World Bank in collaboration with local governments are implementing 15 projects in 11 countries with 6 different index-based insurance products such as farming, catastrophe insurance pool, and livestock. *(See details from Table 2.1)*

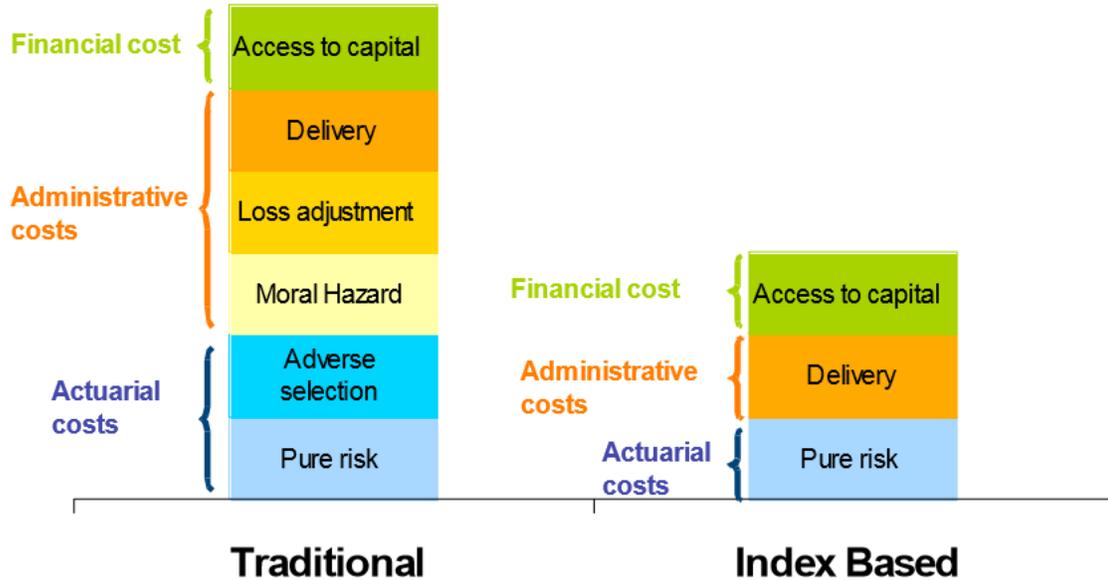
Table 2.1 Index Based insurance practice in some countries

№	Insurance type	Countries	Condition
1	Index based farming insurance	USA, Canada, India, Brazil	Weather dependent crop yields
2	Turkish Catastrophe insurance pool	Turkey	Fires, explosions, tsunami and landslide that are caused directly by earthquake
3	Index Based Livestock Insurance	Mongolia	Dzud – harsh winter condition with heavy snowfall
		Northern Kenya, Ethiopia, <i>South Sudan</i> ¹	Flood, and drought

Countries that participating Index Based Livestock Insurance are divided into two parts based on weather condition.

¹ South Sudan is in the early stage on the implementation of IBLI

Figure 2.1 – Cost structure of traditional and index-based insurance products



Index-Based Insurances’ one of the biggest advantages from traditional insurance product is deduction of moral hazard. For example in Index-Based Livestock insurance, due to the insurance payment base on livestock mortality rate herders have no chance to inform fake insurance case. Unlike the other insurance products, the Index-based insurance is quite different from traditional insurance. Even though there are several definitions of the Index Based Insurance in the literature.

According to Andrew (2010), the traditional insurance payout is calculated based on a case-by-case assessment of an individual client’s loss. However, the index based insurance payout is calculated based on an external indicator such as location, weather, and other circumstances.

Helen (2015), also defined the Index Based Insurance is differs from traditional indemnity insurance, where payouts are explicitly based on measured loss for a specific client. This means that index insurance is not designed to protect farmers against every peril, but is

instead designed for situations where there is a larger scale, or regional risk, or a well-defined climate risk that significantly influences a farmer's livelihood.

In Sommarat (2013), index insurance contracts offer payoffs based on the realization of an aggregate performance indicator, or index, rather than on individual-specific outcomes.

According to official website of (Index Based Livestock Insurance (IBLI), 2011), Index-based insurance (IBI) represents an exciting innovation that could allow vulnerable rural smallholder farmers and livestock keepers to benefit from insurance and thus reduce climate-related risk. Because index insurance is based on the realization of an outcome that cannot be influenced by insurers or policy holders, it has a relatively simple and transparent structure.

Burke (2010), the researcher describes the purpose of index-based insurance (IBI) is to compensate clients in the event of a loss. IBI is used to protect against shared rather than individual risk such as the risks associated with weather fluctuations, disease out breaks or price loss.

The case of India: In 2003, Hyderabad-based micro-finance institution BASIX and Mumbai-based insurance company ICICI Lombard, with technical assistance from CRMG, launched the first pilot program for index-based weather insurance in the developing world in the Mahabubnagar district of Andhra Pradesh. This pilot program sold weather insurance policies protecting against low rainfall to 200 groundnut and castor farmers. In 2004 BASIX incorporated farmer feedback into the design of the second generation of improved weather insurance products that were sold to over 700 farmers, several of whom were repeat customers from the 2003 pilot. In 2005 BASIX scaled up the program further, selling over 7,600 policies in 36 locations in six Indian states. These new policies were refined versions

of the 2004 products and offered improved risk management features for farmers, but had a generic, standardized structure which made it easier for BASIX to retail to many clients in many locations. Intense training sessions with loan officers, who became literally one-stop-shop customer service agents, allowed BASIX to offer a large array of rainfall insurance products to its farmer clients. In 2006, BASIX sold rainfall and multi-peril weather contracts including temperature and relative humidity to over 11,000 customers. Since 2003, the Indian weather insurance market has grown rapidly. Four insurance companies have sold weather insurance policies to farmers. Indian weather risk has been reinsured into the international risk markets. For the 2005 rainy season, a leading Indian seed company bought a bulk weather insurance policy so that it could attach free weather insurance coupons for a minimal level of drought coverage to its cottonseed packets which were sold to 100,000 farmers in Maharashtra.

2.3. INDEX-BASED LIVESTOCK INSURANCE

Northern Kenya, Ethiopia and Mongolia are countries which have implemented the Index Based Livestock Insurance. Recent days, South Sudan is implementing some actions to participate in IBLI project. The indicator and condition of IBLI in Northern Kenya and Ethiopia are different from Mongolian IBLI. IBLI of Mongolia, dzud is the pervasive hazard. In last 60 years, herders of Mongolia have faced several big dzud. However in 2000-2002 herders of Mongolia faced 3 consecutive dzuds and lost around 11.2 million livestock which was almost 20% of all livestock. During these years, 81.3 thousand herding households lost 50% of their livestock, and 12.1 thousand households lost entire livestock. Due to this loss in 2005, Index Based Livestock Insurance project started in Mongolia.

The case of Northern Kenya: In case of Northern Kenya, drought is the most pervasive hazard, natural or otherwise, encountered by households on a widespread level. Almost every year more than 3 million herding households regularly are hit by severe droughts. In the past 100 years, Northern Kenya recorded 28 major droughts, 4 of which occurred in the last 10 years. For livelihoods that rely solely or partly on livestock, the resulting high livestock mortality rate has devastating effects, rendering these herders amongst the most vulnerable populations in Northern Kenya. As the consequences of climate change unfold, the link between drought risk, vulnerability and poverty becomes significantly stronger. Therefore the Kenyan insurer and bank launched commercial sales of IBLI in northern Kenya in January 2010. The product was designed by Cornell University and the International Livestock Research Institute (ILRI) to insure pastoralists against catastrophic drought-related livestock mortality, measured using high-resolution satellite data of vegetative cover in the area. When IBLI's index calculates that on average more than 15% of an insured division's livestock are predicted to have died due to drought, indemnity payouts are made to all policyholders in that division. Individual losses are not verified in IBLI.

The case of Ethiopia: In July of 2012, IBLI was launched in the Borana zone of Southern Ethiopia. Due to statistical differences between historical herd loss patterns in southern Ethiopia and northern Kenya, IBLI-Ethiopia tracks a slightly different measure of drought risk than that used in Northern Kenya. IBLI-Ethiopia tracks the cumulative deviation of vegetative cover from the historical average, which signals when forage levels have become catastrophically low for livestock survival. IBLI-Ethiopia disburses indemnity payments when average forage cover falls within the 15th percentile range of historical drought

conditions. IBLI-Ethiopia is designed and implemented by Oromia Insurance, ILRI, and Cornell.

The case of Sudan: In Sudan, climate change is expected to have a strong negative impact on livestock production in pastoralist (herders) areas. The expected increase in temperatures coupled with unpredictability in rainfall patterns will decrease the availability of water and pasture, raising the risk of animal mortality and livestock losses. Such losses can have a devastating impact on the livelihoods and food security of a large part of the population, as well as having a significant impact on the larger economy, for which livestock represent a major component of GDP. Livestock is the largest subsector of the South Sudan economy that is 60% of GDP is from agricultural (pastoralist), and 50% of exports is also agricultural exports. In Sudan, IBLI is still in its early stage of implementation. To decrease the risks drought poses to Sudan's pastoralists and livestock sector, IBLI product was proposed at two levels that into 1) Macro-level insurance as a government funded social safety net aimed at poorer herders that covers catastrophic losses, and 2) A meso-level insurance product sold through private insurers and lenders aimed at wealthier pastoralists and livestock traders. In terms of the technical aspects of contract design, this insurance product is similar to IBLI products in Kenya and Ethiopia, which are based on a remotely sensed NDVI ("greenness" index) and trigger a payout when the vegetation in a given area falls below a certain threshold (e.g. 15% of historic average for a given season).

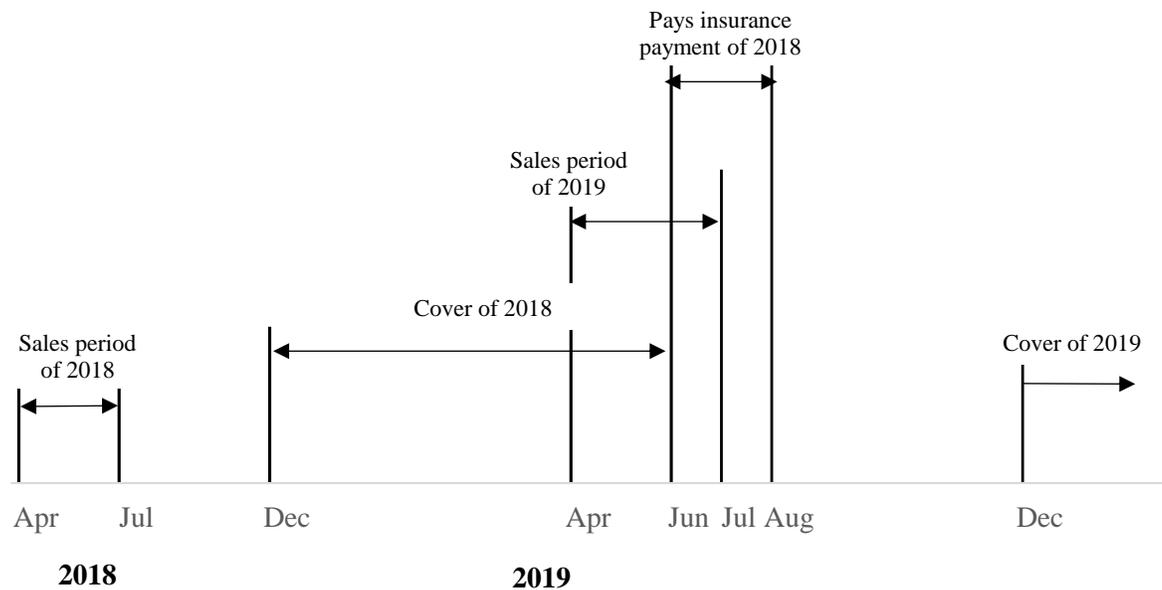
2.4. THEORETICAL BACKGROUND

Coverage period of IBLI: IBLI was sold over directly after the winter season (April to July).

Therefore this insurance premium will be next year's insurance cover (December to June).

Please see Figure 2.2.

Figure 2.2 shows the time structure of IBLI



If a herding household buys IBLI in the first year's April to July sales period, it was insured by December to June of the following year and receive indemnity payout² in second year's June to August (Index Based Livestock Insurance, 2011).

² Indemnity payouts – insurance payment

How to calculate insurance premium: The premium rate differs across Mongolia. On the one hand the premium rate is different for each species and on the other hand the premium rate is set on aimag (province) level. This differentiation takes the nationwide varieties of livestock mortality into account and guarantees a premium rate adjusted to the local environment. The insurance pays out when the livestock mortality rate exceeds the threshold (Rose, 2014).

The herders have several opportunities to customize IBLI to their individual needs. For each of the five most common species they can decide whether to insure, e.g. a herder has the possibility to only insure his goats but not his horses. Furthermore, the herder can select how much of the species' value the herder wants to insure, ranging from 1% to 100% (Skees, 2006). The value is calculated by the number of animals the herder owns multiplied by the average value at the local market.

The following example shows the insurance mechanism: Assume a herder in Davst, a soum in Uvs, wants to insure his 20 horses. The local market price of a horse in Uvs is 320 000 Tugrug³ and the premium rate is 1.75%:

$$\text{Total livestock value} = 20 \times 320\,000 \text{ Tugrug} = 6\,400\,000 \text{ Tugrug.}$$

If the herder decides to insure his horses at 100% of value his insurance premium, is:

$$\text{Insurance premium} = 6\,400\,000 \times 1.75\% = 112\,000 \text{ Tugrug.}$$

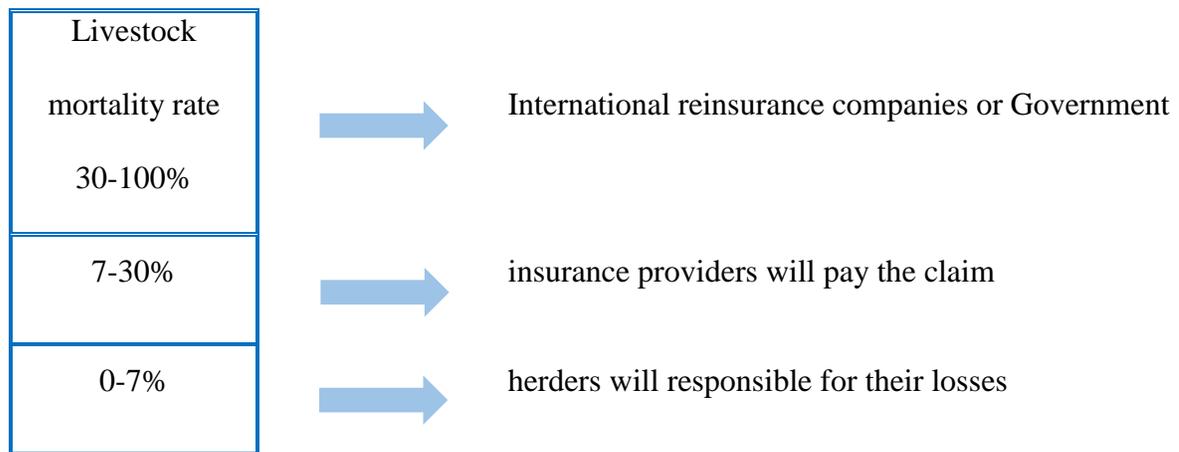
³ Exchange rate (30.05.2018): 1 JPY (Japanese yen) = 22.16 MNT (Mongolian tugrug)

Mahul and Skees (2007) found that in the first sales period in 2006, the herders purchased 30% coverage on average. Thus, for 30% coverage the premium is:

$$\text{Insurance premium} = (6\,400\,000 \times 30\%) \times 1.75\% = 33\,600 \text{ Tugrug.}$$

Process for indemnity payment: Indemnity payment is paid based on livestock mortality rate of soum as mentioned in introduction section. Otherwise indemnity payment is not made based on individual loss of herders' livestock. Figure 2.3 showed the payment system.

Figure 2.3. Insurance payment system



Livestock mortality rates are calculated by type of livestock such as sheep, goats, cattle, horses and camels. Calculation of livestock mortality rate put below:

$$\text{Livestock mortality rate of soum} = \frac{(x-y)}{x} \times 100\%$$

x – Total number of livestock in end of the year

y – Total number of livestock in middle of the year

This livestock mortality rate will be deducted from the threshold value of 7% and will determine the percentage of compensation.

Suppose the horse mortality rate in the soum is 13%. The index exceeded the threshold of 6%, thus the herder receives a payout. First the payment rate needs to be calculated by subtracting the actual horse mortality from the threshold:

$$\text{Payment rate} = \text{Livestock mortality} - \text{Strike} = 13\% - 6\% = 7\%.$$

Finally, the herder receives:

$$\text{IBLI payment} = 7\% \times (6\,400\,000 \times 30\%) = 134\,400.$$

Consequently, if the herder purchased 100% coverage, he would receive:

$$\text{IBLI payment} = 7\% \times 6\,400\,000 = 448\,000.$$

Herders retain small losses that do not affect the viability of their business, while larger losses are transferred to the private insurance industry and only the final layer of catastrophic losses is borne by the government.

CHAPTER THREE - THE METHODOLOGY OF THE STUDY

This chapter explains the methodology of the study including the research design, research timeline, sample size, structure of two questionnaires, and sources of data and process of data collection.

The study is designed as a cross sectional study. The study has been implemented with the following steps:

- Defining the research goal
- Determining the research method
- Defining the survey participants (Selecting provinces of Mongolia, defining the sample size)
- Developing two questionnaires
- Collecting the data (Interviewing insured and uninsured)
- Entering and analyzing data
- Producing findings, making conclusions and developing recommendations

The study area: The study participants consisted of herders from three different provinces of Mongolia including Dundgovi, Bayankhongor and Uvs, which could represent the different ecological zones such as mountain, desert and forest area. Index Based Livestock Insurance program was implemented first time in these three provinces.

Sample size: Sample size was calculated based on Taro Yamane’s formula as follows: (*See the details from Table 3.1*)

$$n = \frac{N}{1 + Ne^2} \times 95\% \quad \longrightarrow \quad n = \frac{229,400}{1 + 229,400 * 0.01} \times 95\%$$

Table 3.1 Estimation of sample size

Assumptions	
n – Sample size	= 94
N – Population size*	= 229,400
e^2 – Margin of error	= 0.1
95% - Confidence level	= 95%
Estimated required sample size	
n	= 94

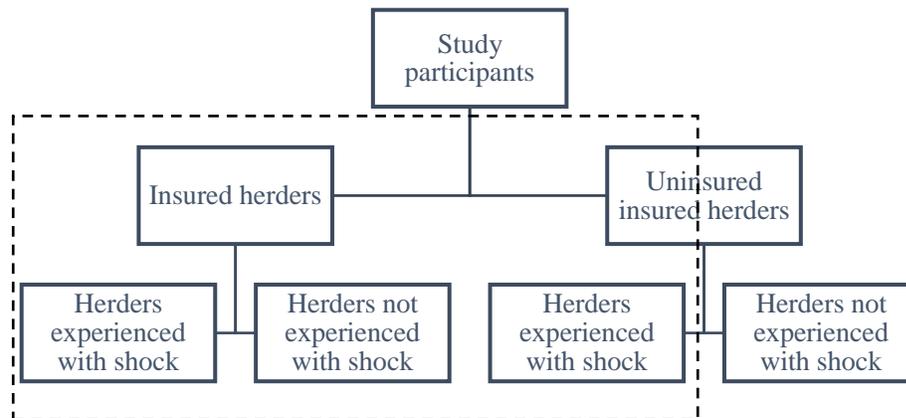
*- number of herding households in Mongolia

Study participants: Based on calculation of sample size, I involved total of 95 herders (45 insured and 50 uninsured) in the study. The study participants were divided into four different groups as follows (Total number of participants/% among total study population) (Figure 3.1)

:

1. Insured who have experienced with shock (23/24.2%)
2. Insured who have not experienced with shock (22/23.2%)
3. Uninsured who have experienced with shock (31, 32.6%)
4. Uninsured herders who have not experienced with shock (19, 20%)

Figure 3.1 Classification of study participants



Due to the common constraints happened in Mongolia such as low density of population, inaccessibility to herders and road condition, the data collectors were only able to involve herders who can be reached.

The herders who had no willing to participate in the survey were skipped and interviewer moved to next one. The respondents who were operating herding more than 5 years were eligible to participate in the survey.

Questionnaires: Two types of questionnaire were developed for insured herders and uninsured herders. The questionnaires consisted of 27 and 19 questions to be taken from insured and uninsured herders, respectively; and of them 13 profile questions are identical for insured and uninsured groups. The profile questions were focused on studying the socioeconomic background of herders and their knowledge, attitude and practice in regard of insurance. Remaining 14 and 6 questions were specific to either insured or uninsured. (Please refer to Annex)

The questionnaire for insured

- Socio economic status and coping mechanism - 13 questions
- Herders' knowledge, attitude, and practice of insurance - 14 questions
- Total - 27 questions

The questionnaire for uninsured

- Socio economic status and coping mechanism - 13 questions
- Herders' knowledge, attitude, and practice of insurance - 6 questions
- Total - 19 questions

Data collection: The primary data were collected from study population living in 3 provinces as aforementioned. 17 of 95 questionnaires were taken by myself, and remaining were taken by branches of MIG insurance company that located in corresponding provinces. Each branches collected 27-34 questionnaires from insured and uninsured herders. The data collection was done during August - October 2017. Although the questionnaire structure is self-questionnaire, I decided to have face-to-face interview with all respondents to avoid the misunderstanding which could further lead to information bias. Therefore, all respondents

were interviewed in accordance with questions which was prepared in advance. Please refer to “questionnaires” section and Appendix for detail.

Data entering and data analysis: Both descriptive and inferential statistical analysis (logistic regression) were done to analyse the questionnaire data. MSExcel and Stata were used for statistical analysis.

CHAPTER 4 - THE RESULTS AND DISCUSSION OF THE STUDY

This chapter showed the results and discussions of the study and explained in the following steps.

4.1. Statistical analysis of questionnaires

- Part 1 (response to Research question 1) – Socio economic background, knowledge and attitude of insured and uninsured herders on insurance
- Part 2 (response to Research question 2) – Influencing factors to demand of insurance
- Part 3 (response to Research question 3) – Coping actions after shock among insured and uninsured

4.2. General discussion

4.1. STATISTICAL ANALYSIS OF QUESTIONNAIRES

The survey participants (95) from Bayankhongor, Dundgovi and Uvs province were divided into 4 groups including insured herders (45) (experienced /23/ or not experienced with shock /22/) and uninsured herders (50) (experienced /31/ or not experienced with shock /19/).

PART 1 (Research question 1) - Socio economic background of insured and uninsured herders on insurance

Province: Table 4.1 shows the frequency of the study population. 34 (35.8%), 34 (35.8%) and 27 (28.4%) herders were involved in study from Dundgovi, Bayankhongor, and Uvs province, respectively. Researcher tried to include the equal size of insured and uninsured herders in the study, however, only 8 out of 27 were insured among participants from Uvs province. As aforementioned in methodology section, it's quite difficult to reach to desired population due to sparsely located population and road condition etc.

Table 4.1 Frequency of study population

No	Province	Insured	Uninsured	Total
1	Dundgovi	19	15	34
2	Bayankhongor	18	16	34
3	Uvs	8	19	27
	Total	45	50	95

Mongolia has a huge landscape that has 4 seasonal weather. I selected three provinces which could represent the western, central and south part of Mongolia. IBLI also was initiated in these three provinces, thus, these three provinces were considered to be more experienced with insurance program compared to other provinces. (Picture 4.1)

Picture 4.1 Study area (Map of Mongolia)



Age: Figure 4.1a and 4.1b shows the age structure of head and spouses of household. Majority of heads and spouses among both insured and uninsured households are aged between 31-50 and average age of households among insured and uninsured was 45.7 while average age of spouses was 42.2.

Figure 4.1.a. Age structure of insured and uninsured (head of households) (by percent)

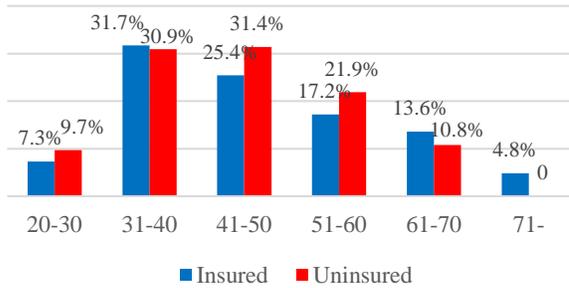
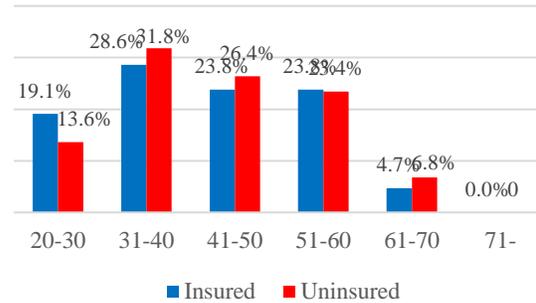


Figure 4.1.b. Insured and uninsured herders' age structure of spouse (by percent)



Education level: 86% and 60% of heads of insured and uninsured households had at least secondary level of education, respectively. 81.8% and 63.1% of spouses of insured and uninsured households had at least secondary level of education, respectively.

14 % and 35.6% of insured and uninsured heads were non-educated (having less than 8 year education), respectively, whereas 11.4% and 28.3% of insured and uninsured spouses showed having no education, respectively. (Table 4.2)

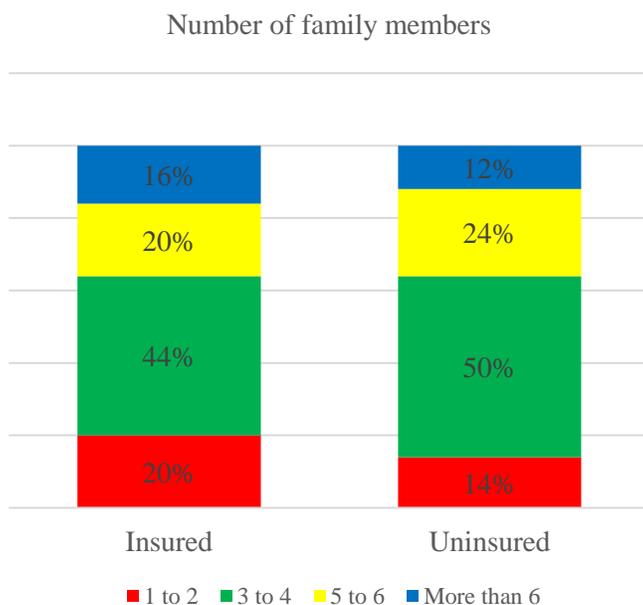
Table 4.2 Education level of household members

Education level	Number of head of household		Number of spouse	
	Insured	Uninsured	Insured	Uninsured
None	14.0%	35.6%	11.4%	28.3%
Primary	55.8%	44.4%	34.1%	52.2%
Secondary	30.2%	15.6%	47.7%	10.9%
Vocational	-	4.4%	6.8%	6.5%
Higher	-	-	-	2.1%
Total	100%	100%	100%	100%

The education level seems to be quite low among herders participated in the study. United foundation of statistical information (2017) reported that disparity of education level in urban and rural area is quite dramatic. The main reason is that college and university graduates of provinces are highly likely to move to capital city to work and people who either didn't enter to university or left secondary school become herders. Therefore, the education level of herders is quite similar in all provinces.

Number of family member: 16 (16.8%) households had 1-2 members, 45 (47.4%) had 3-4 members, 23 (24.2%) had 5-6 members and 11 (11.6%) had more than 6 members. (Figure 4.2)

Figure 4.2 Number of family members



Almost half of respondents had 3-4 family members and it is quite similar to national statistics on average number of members per household, which is 3.6 people per household. Batmunkh (2011) showed that 47.9% and 46.1% of households living in Ulaanbaatar city and rural area had 3-4 family members, respectively (Batmunkh, 2011).

Household income: Majority of insured (80%) and uninsured (93.3%) households were estimated to earn 0-250 USD per month, respectively. Very few percentage of insured and uninsured households reported that they earned between 251 – 1000 USD per month. (Table 4.3)

Table 4.3 Monthly income of insured and uninsured households

Income	Insured	Uninsured
0-250 USD	36 /80%/	42 /93.3%/
251-500 USD	6 /13.3%	2 /4.4%/
501-1000 USD	3 /6.7%/	1 /2.2%/
More than 1000 USD	-	-
Total	45	45

Almost all herders don't have constant income source, therefore, their earning (cash) constitutes from selling their livestock products such as meat, milk, wool and skin. Mongolian culture abstains to slaughter livestock in spring and summer time. Therefore, the major income from selling livestock's meat comes in fall and winter season. Selling wool, especially goat wool is big market in the end of summer time. During the summer time, milk and milk products' market is more available. Thus, income from livestock market is very much seasonal, meaning that there is no stable income. Therefore, the amount of cash presented in Table 4.3 was measured through dividing annual income (estimated by herders) by 12 months to approximate the monthly income. Thus, this is very rough estimation.

Number of livestock: Table 4.4 showed the average number of livestock owned by insured and uninsured households.

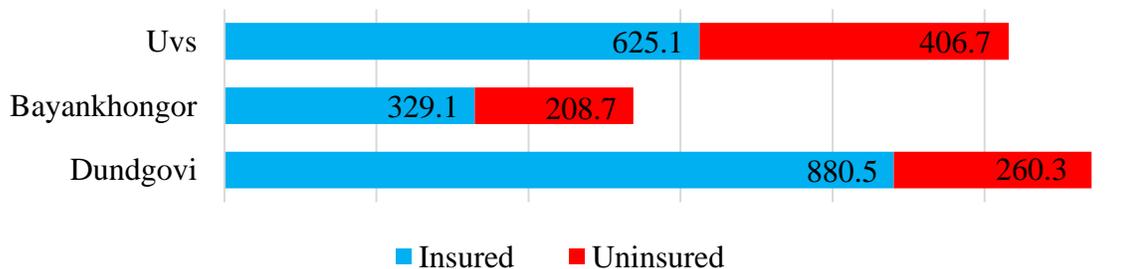
Table 4.4 Average number of livestock owned by insured and uninsured households

	Sheep	Cattle	Horse	Camel	Goat	Total
Insured	313	25	34	16	259	647
Uninsured	150	23	21	11	151	356
Total	463	48	55	27	410	1003

Table 4.4 showed the average number of livestock owned by insured and uninsured households in three provinces. Insured herders own more livestock (647) than uninsured (346). Number of livestock might affect to willingness of being insured, thus, it was examined by logistic regression and result will be shown in next part.

Figure 4.3 shows the average number of livestock by each province and herders owned larger number of livestock were insured than those who owned smaller number of livestock in each province.

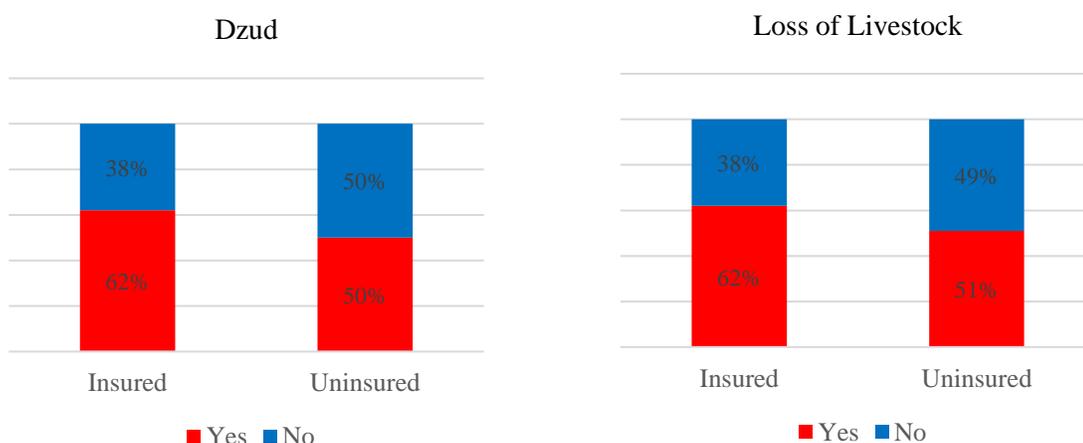
Figure 4.3 Average number of livestock (by province)



Dzud (heavy snowfall): 28 (62.2%) insured herders had faced dzud in last 5 years while 17 (37.8%) had not. 25 (50%) uninsured herders had faced dzud while rest of them had not. (Figure 4.4)

Loss of livestock: 28 (62.2%) insured herders had loss of livestock in last 5 years while 17 (37.8%) had not. 24 (48.9%) uninsured herders had loss while 25 (51.1%) had not in last 5 years. (Figure 4.5)

Figure 4.4 and 4.5 Herders faced dzud and had loss in last 5 years



Regarding dzud and loss of livestock, it happened to be impossible to define whether being exposed to dzud or having loss of livestock affected to being insured, because, researcher failed to consider the time sequence of events (dzud/loss of livestock and being insured). For example, herders were only asked if they had been exposed to dzud or had loss of livestock last 5 years, but they were not asked if they were insured before or after dzud/loss of livestock. It made conclusion impossible to be properly done to examine the relationship between dzud/loss of livestock and willingness of being insured.

Main reason of livestock loss: Table 4.5 showed that majority of both insured (82.7%) and uninsured herders (77.3%) lost their livestock due to weather-related conditions (dzud).

Table 4.5 Main reason of livestock loss

Reasons	Insured herders	Uninsured herders
Weather related shock	19 /82.7%/	24 /77.3%/
Infectious disease	1 /4.3%/	5 /16.3%/
Wolf attack	2 /8.6%/	1 /3.2%/
Livestock theft	-	-
Reduced livestock because of less household members	1 /4.3%/	1 /3.2%/
Other	-	-
Total	23 /100%/	31 /100%/

Very few insured and uninsured herders lost their livestock due to infectious diseases and wolf attack.

Statistics showed that Mongolian herders lost 1,668.4 thousand livestock by dzud, 73.7 thousand livestock by infectious disease, 452.1 thousand livestock by other reasons such as wolf attack and thievery in 2016 (United Foundation of Statistical Information, 2017). Although major causes of loss of livestock in Mongolia was weather related condition, there were several cases of wolf attack, thievery and infectious diseases. Therefore, extending the coverage of IBLI would be interest of some other herders who wanted to be insured for reason other than dzud.

PART 2 (response to Research question 2) – Influencing factors to demand of insurance

Logistic regression was conducted to explain the relationship between status of being/not being insured and some possible influencing factors. The variables examined in the logistic regression model were illustrated in Table 4.6.

Table 4.6 Variables examined in the logistic regression model

Variable	Type of variable	Coding
Status of being/not being insured	Binary	Insured – 1 Uninsured - 0
Fammem (Family member)	Ratio	
AgeH (Age of head)	Ratio	
AgeS (Age of spouse)	Ratio	
HouseholdI (Monthly income of household)	Ordinal scale	1- <250 USD 2- 251-500 USD 3- 501-1000 USD 4- >1001 USD
EduH (Education of head) EduS (Education of spouse)	Ordinal scale	1- None 2- Primary 3- Secondary 4- Vocational 5- Bachelor or higher
Big LS (Number of big livestock)	Ratio	
Small LS (Number of small livestock)	Ratio	
Province	Nominal	Dummy variables are created: Uvs Province – if yes 1 otherwise 0 Dundgovi Province – if yes 1 otherwise 0 Bayankhongor Province– reference variable

The following assumptions were set:

1. Dependent variable is measured on a dichotomous scale.
2. Observations are independent of each other. Dependent variable has mutually exclusive categories.
3. There is no multicollinearity among the independent variables.

Multicollinearity among all independent variables was checked and independent variables which are highly correlated were removed from model. Given that checking multicollinearity is not that much straightforward in logistic regression, I tried to check it by creating correlation matrix of the predictor variables.

Table 4.7 shows the output of correlation analysis between status of being insured/not insured and other predictor variables.

```
. correlate Fammem AgeH AgeS HouseholdI EduH EduS BigLS SmallLS Province_Dundgobi Province_Uvs
(obs=94)
```

	Fammem	AgeH	AgeS	Househ~I	EduH	EduS	BigLS	SmallLS	Provin~i	Provin~s
Fammem	1.0000									
AgeH	0.1139	1.0000								
AgeS	0.1236	0.9589	1.0000							
HouseholdI	0.0895	0.1944	0.1213	1.0000						
EduH	-0.2043	-0.1890	-0.1484	0.0553	1.0000					
EduS	-0.1670	-0.3236	-0.3002	0.0437	0.4874	1.0000				
BigLS	0.1916	0.1195	0.0788	0.2411	-0.2245	-0.1710	1.0000			
SmallLS	0.1452	-0.0179	0.0046	-0.0813	0.0919	-0.0249	0.6171	1.0000		
Province_D~i	-0.2072	-0.1042	-0.0350	-0.0363	0.0776	-0.0768	0.2124	0.3094	1.0000	
Province_Uvs	0.2033	0.0737	0.0664	0.0225	-0.2007	-0.1875	0.0733	0.0911	-0.4655	1.0000

Cut-off point for multicollinearity was chosen that correlation coefficient is equal or more than 0.6.

As shown in correlational analysis, number of big livestock and small livestock as well as age of spouse and head were considered to be highly correlated ($r>0.6$). Therefore, full model with all predictor variables was run to detect the variables with highest p value. The number of big livestock ($p=0.572$) and age of head ($p=0.672$) showed the highest p value, thus, they were removed from the model. (Table 4.8)

Table 4.8 Full model

```
Iteration 0: log likelihood = -65.070703
Iteration 1: log likelihood = -46.87404
Iteration 2: log likelihood = -46.664865
Iteration 3: log likelihood = -46.663994
Iteration 4: log likelihood = -46.663994
```

```
Logistic regression                               Number of obs   =           94
                                                    LR chi2(10)     =           36.81
                                                    Prob > chi2     =           0.0001
Log likelihood = -46.663994                       Pseudo R2      =           0.2829
```

Insure	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Fammem	-.2859613	.201754	-1.42	0.156	-.6813918	.1094692
AgeH	-.0392949	.0930182	-0.42	0.673	-.2216073	.1430175
AgeS	.0661017	.0949225	0.70	0.486	-.1199431	.2521464
HouseholdI	1.194836	.8144076	1.47	0.142	-.4013739	2.791045
EduH	-.5058253	.4900538	-1.03	0.302	-1.466313	.4546624
EduS	.8392456	.3823543	2.19	0.028	.089845	1.588646
BigLS	.0060312	.0106665	0.57	0.572	-.0148748	.0269371
SmallLS	.0041366	.0013633	3.03	0.002	.0014646	.0068085
Province_Dundgobi	-1.116127	.743805	-1.50	0.133	-2.573958	.341704
Province_Uvs	-1.982389	.7675968	-2.58	0.010	-3.486852	-.4779274
_cons	-3.206792	1.966365	-1.63	0.103	-7.060797	.6472138

Upon removing two variables, the logistic regression analysis was done with following predictor variables: family member, age of spouse, household income, education of head, education of spouse, number of small livestock and province. Before running model, Table 4.9 and 4.10 shows the descriptive output of variables and regression model.

Table 4.9 Descriptive output of regression model

```
. summarize Fammem AgeS HouseholdI EduH EduS SmallLS Province_Dundgobi Province_Uvs
```

Variable	Obs	Mean	Std. Dev.	Min	Max
Fammem	94	4.053191	1.483725	2	8
AgeS	94	42.26596	10.82925	22	68
HouseholdI	94	1.138298	.4300804	1	3
EduH	94	1.957447	.7019925	1	4
EduS	94	2.265957	.8820252	1	5
SmallLS	94	425.4787	345.2258	37	1540
Province_D~i	94	.3617021	.4830696	0	1
Province_Uvs	94	.2765957	.4497133	0	1

Table 4.10 Output of regression model

```
. logit Insure Fammem AgeS HouseholdI EduH EduS SmallLS Province_Dundgobi Province_Uv
```

```
Iteration 0: log likelihood = -65.070703
Iteration 1: log likelihood = -47.085728
Iteration 2: log likelihood = -46.911332
Iteration 3: log likelihood = -46.910548
Iteration 4: log likelihood = -46.910548
```

```
Logistic regression                               Number of obs   =           94
                                                    LR chi2(8)      =           36.32
                                                    Prob > chi2     =           0.0000
Log likelihood = -46.910548                       Pseudo R2      =           0.2791
```

Insure	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
Fammem	-.2712597	.1968888	-1.38	0.168	-.6571545	.1146352
AgeS	.0271196	.0256448	1.06	0.290	-.0231432	.0773824
HouseholdI	1.252325	.7623851	1.64	0.100	-.2419224	2.746572
EduH	-.5754681	.4461734	-1.29	0.197	-1.449952	.2990158
EduS	.8534239	.3805469	2.24	0.025	.1075657	1.599282
SmallLS	.0045207	.0011502	3.93	0.000	.0022665	.006775
Province_Dundgobi	-1.01296	.7044441	-1.44	0.150	-2.393645	.3677247
Province_Uvs	-1.965202	.7633951	-2.57	0.010	-3.461429	-.4689754
_cons	-3.330903	1.853321	-1.80	0.072	-6.963346	.30154

Overall model is statistically significant (Prob >chi2 = 0.0000) and education of spouse (p=0.025), number of small livestock (P=0.000) and Province uvs (P=0.01) seemed to be statistically significant predictors to status of being or not being insured.

The prediction equation would be:

$$\text{Log}(p/1-p) = -3.33 + b1 * \text{EduS} + b2 * \text{SmallLS} + b3 * \text{Province Uvs}$$

$$\text{Log}(p/1-p) = -3.33 + 0.85 * \text{EduS} + 0.005 * \text{SmallLS} - 1.97 * \text{UvsProvince}$$

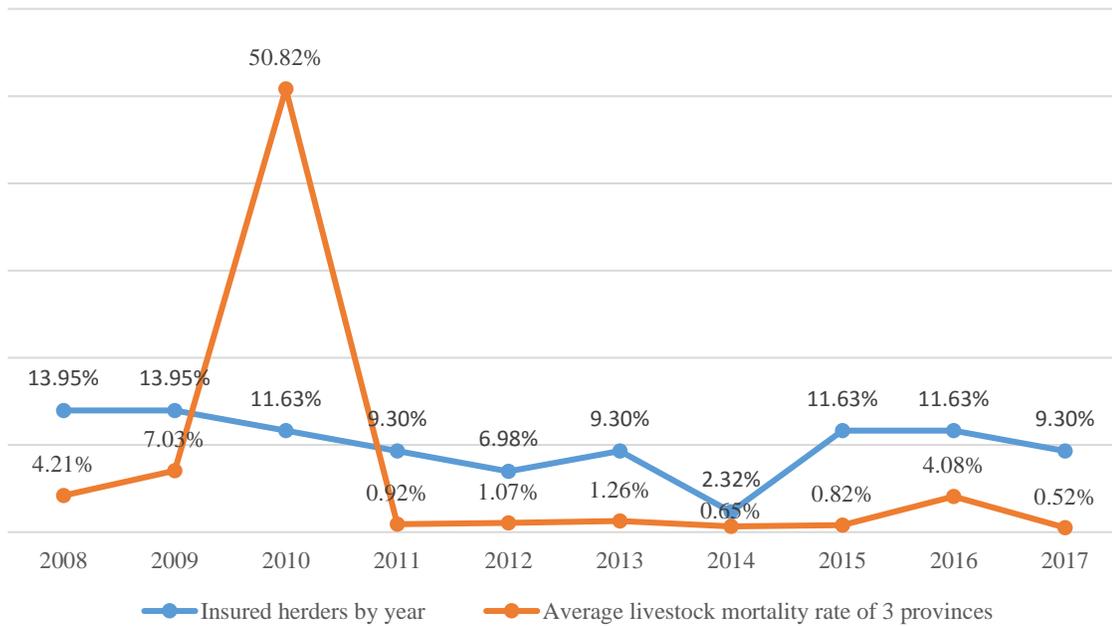
1. EduS - a one-unit increase in EduS (education of spouse), its expected 0.85 increase in the log-odds of the dependent variable insure, holding all other independent variables constant.
2. SmallLS - a one-unit increase in SmallLS (number of small livestock), its expected 0.005 increase in the log-odds of the dependent variable insure, holding all other independent variables constant.
3. Uvs Province – Herders in Uvs Province are less likely to be insured by -1.97 times in log odds compared with Bayankhongor province.

PART 3 (Response to Research Question 3) - Knowledge, attitude and practice of herders regarding insurance

Insured herders:

Year: 17 (39.5%), 12 (27.9%) and 14 (32.6%) herders were insured during 2008 and 2010, 2011 and 2014, and 2015 and 2017, respectively. (See the details in Figure 4.6)

Figure 4.6 Insured herders by year and average livestock mortality rate of 3 provinces



(United Foundation of Statistical Information, 2017)

Figure 4.6 shows the percentage of insured herders by year. 27.9% of herders were insured in 2008 and 2009 but only 3.38% were insured in 2014. Again, 23.26% were insured during 2015 and 2016. In insurance practice, increase of insurance coverage is quite common after

any shocks, however, as shown in figure, percentage of insured herders didn't follow the livestock mortality rate.

Main reason to purchase insurance: Table 4.11 showed that main reasons of purchasing the insurance for livestock (for insured) and opinion on reason of purchasing the insurance for livestock (uninsured).

31 (68.9%) insured herders answered that their main reason for purchasing insurance was to protect from possible losses while 25 (52.1%) uninsured also thought that main reason for purchasing insurance would be to protect from possible losses. (Table 4.11)

Table 4.11 Main reason of purchase of insurance for livestock

Reasons	Result of Insured herders	Result of Uninsured herders
To protect from possible losses	31 /68.9%/	25 /52.1%/
Under campaign	3 /6.7%/	2 /4.2%/
To participate any other projects	3 /6.7%/	8 /16.7%/
Thought it was necessary	1 /2.2%/	3 /6.3%/
Not sure	6 /13.4%/	9 /18.7%/
Other	1 /2.2%/	1 /2.1%/
Total	45 /100%/	48 /100%/

Although insured herders were involved in insurance programs with correct reason which is to protect from loss, some herders were involved in insurance program during

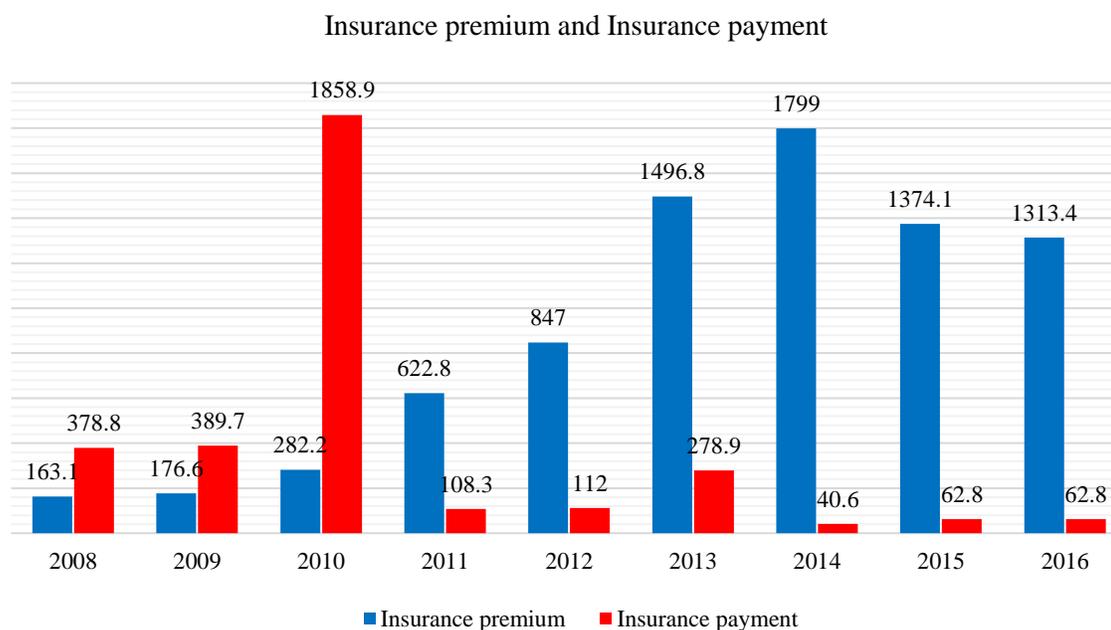
campaign with incentives or to become eligible for any other projects in the future. For example, if herders want to get loan from bank, they must be covered by IBLI. In 2016, there were 2 brokers such as Khan bank and State bank made 60.4% of all insurance premium of IBLI (Agriculture Reinsurance in Mongolia, 2017).

The main reason of this IBLI is to protect herders from possible losses. Therefore, herders had basic perception of the insurance policy. However, herders need to be provided more proper information on importance of IBLI.

Insurance payment: 29 (64.4%) herders have never received insurance (indemnity) payment while 16 (35.6%) respondents have partially received insurance payment.

Statistics showed that Mongolian herders lost around 20% of livestock in dzud during 2009-2010, therefore, amount of insurance payment was highest during these periods. Livestock mortality rate decreased after 2010 and 60% of our study population were covered by insurance after 2011. Therefore, it might be likely that majority of insured herders didn't face dzud after they were insured, thus, they didn't receive any insurance payment. Figure 4.7 shows amount of insurance premium and insurance payment and it clearly shows that highest amount of insurance payment (1858.9 thousand MNT) was paid in 2010, which is followed by huge disaster occurred in 2009. Insurance premium dramatically 2012 and 2013 and it might indicate that number of insured herders increases after any shocks happened. This assumption slightly contradicts with the result shown in Figure 4.6. It might be due to that Figure 4.7 showed the situation of entire country whereas Figure 4.6 showed the three provinces against mortality rate of entire country.

Figure 4.7 Insurance premium and insurance payment (by thousand MNT – Mongolian currency unit)



Help of insurance to recover: 12 (75%) herders responded that insurance payment was not enough to cover loss. None of insured herders were satisfied with the insurance payment.

Table 4.12.a how did insurance payment help of recover?

Reasons	Insured herders
Didn't help at all	1 /%/
Almost no help	12 /%/
Kind of helped	1 /%/
Yes helped	2 /%/
Very much helped	-
Total	16 /100%/

Table 4.12.b shows the market valuation of livestock that compared with insurance valuation of livestock. Comparing with these prices, the insurance price is not same level in market price. Therefore, herders can't buy new livestock with insurance payment.

Table 4.12.b Market valuation of livestock that compared with MNT (Mongolian currency unit)

Livestock	Market price of LS in provinces (thousand MNT)			Insurance price by IBLI (thousand MNT)
	Uvs	Bayankhongor	Dundgovi	
Sheep	46	46	70	38
Goat	30	31	41	26
Cattle	391	376	598	250
Horse	429	349	479	320
Camel	483	475	648	400

(United Foundation of Statistical Information, 2017)

(Agriculture Reinsurance in Mongolia, 2017)

Usage of insurance payment: 16 herders of total insured received insurance payment and only one (6.25%) of them bought new livestock with insurance payment. Others used insurance payment for buying some household staff (37.5%), livestock fodder (18.75%), paying loans (18.75%). (Table 4.13)

Table 4.13 Usage of insurance payment

Usages	Number and Percent
Bought new LS	1 /6.25%/
Moved to different place to settle new life	-
Bought food and other household necessities	6 /37.5%/
Bought livestock fodder	3 /18.75%/
Built new shelter	2 /12.5%/
Paid back loans	3 /18.75%/
Paid other things (education, health expenses)	1 /6.25%/
Other	-
Total	16

Herders who lost their livestock in dzud are more likely to breed livestock survived from dzud rather than buying livestock or migrate to urban area once they lost most of livestock to settle new life.

Trust in insurance companies: Study result showed that 11 (25%) insured herders didn't trust insurance companies, 13 (29.5%) had almost no trust, 12 (27.3%) chose the answer "so-so", 8 (18.2%) almost trusted and none of insured herders showed trust in insurance companies.

Among uninsured herders, 6 (12.2%) of them responded that they don't trust insurance companies, 11 (22.4%) had almost no trust, 12 (24.5%) of them chose answer "so-so", 13 (26.5%) of them had almost trust, 7 (14.3%) trusted insurance companies. (See figure 4.8)

Figure 4.8 Level of trust in insurance company

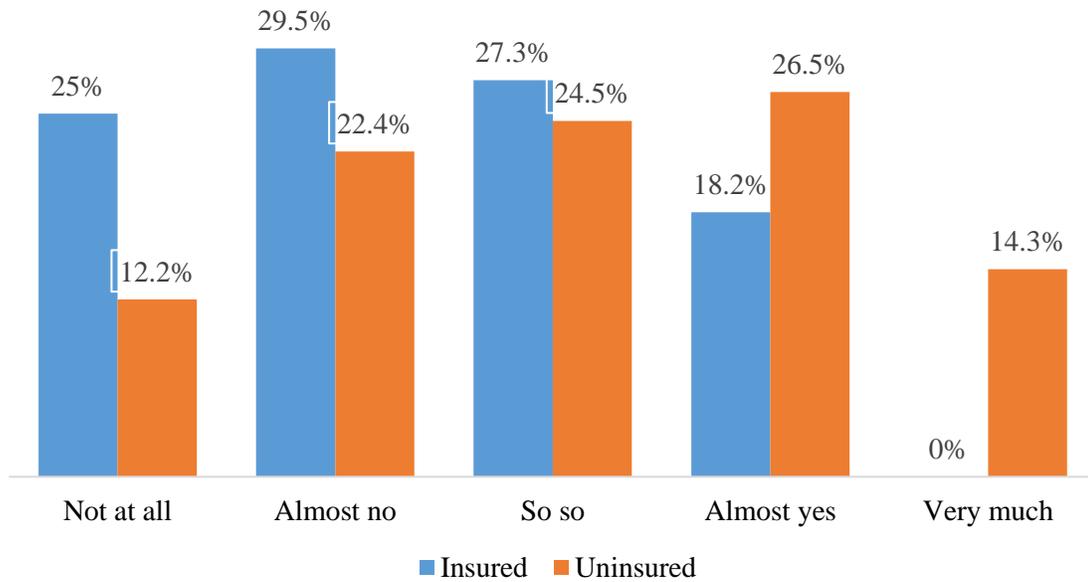


Figure 4.8 showed that uninsured herders have higher level of trust in insurance companies than insured herders. Low level of satisfaction with insurance payment among insured herders possibly affected to low level of trust. Uninsured herders hadn't experienced with any insurance process and they have no practice on insurance payment, therefore, their opinion on insurance company might be quite positive compared to insured herders.

Repurchase: 27 (60%) herders responded that they will repurchase insurance while 18 (40%) herders tent not to repurchase.

Although 45.5% of insured herders “almost trusted” and “so-so trusted” in insurance company, 60% of insured tend to repurchase insurance. It probably indicate that herders might prefer to be insured although they are not fully satisfied or trusted. Therefore, if insurance companies improve their policy for livestock insurance, more herders will be covered. Some factors were examined in 2 way analysis.

Table 4.14 Loss of livestock and willingness of repurchasing

Loss of LS	Why don't you want to repurchase this insurance?							
	1*	2	3	4	5	6	7	8
Yes	1	1	4	1	1	2	-	-
No	-	-	1	1	2	4	1	-
Total	1	1	5	2	3	6	1	-

*Number 1-8 is found in the questionnaire which is attached as an appendix

Because of fewer number of sample size, it is quite difficult to make conclusion based on two-way tables. However, those who had loss of LS don't want to repurchase because of low insurance payment and expensive insurance product. The insurance payment didn't enough to cover their losses. On the other hand, herders who loss of LS hadn't thought that insurance payment is costly.

Table 4.15 Loss of livestock and repurchasing condition

Loss of livestock	In what condition would you repurchase?					
	1*	2	3	4	5	6
Yes	1	1	5	2	1	-
No	-	-	1	7	-	-
Total	1	1	6	9	1	-

*Number 1-6 is found in the questionnaire which is attached as an appendix

Result shown in Table 4.15 confirmed the result aforementioned. Those who had loss of livestock would repurchase if insurance payment fully cover their losses while those who hadn't losses would repurchase if price is affordable.

Table 4.16 Insurance payment and coping activities

Insurance payment	What was the coping activities your household used after the risk happened last time?									
	0*	1	2	3	4	5	6	7	8	9
Yes	1	11	-	-	-	-	-	-	-	-
No	7	-	1	-	2	-	-	-	-	1
Total	8	11	1	-	2	-	-	-	-	1

*Number 1-8 is found in the questionnaire which is attached as an appendix

Table 4.16 showed that insured herders mainly use their insurance payment as coping action whereas uninsured had never taken any coping action.

Table 4.17 Trust in insurance companies and experience with loss of livestock

Trust in insurance company	Ever had loss of LS	
	Yes	No
Not at all	13 /46.5%/	3 /13.6%/
Almost no	9 /32.1%/	5 /22.7%/
So so	5 /17.8%/	8 /36.4%/
Almost yes	1 /3.6%/	6 /27.3%/
Very much	-	-
Total	28 /100%/	22 /100%/

Table 4.17 shows that those who had loss are most likely not to trust in insurance company but those who had no loss showed more trust in insurance company.

Table 4.18 Repurchasing and satisfaction

Repurchase	Were you satisfied the insurance payment?				
	Not at all	Almost no	So so	Almost yes	Very much
Yes	-	-	5	4	-
No	1	3	3	-	-
Total	1	3	8	4	-

Herders who were not satisfied with insurance payment tend not to purchase insurance again.

Herders who were satisfied (so-so and almost yes) responded that they will repurchase insurance.

Table 4.19 Repurchasing and perception on insurance payment

Repurchase	What do you think insurance payment helped to recover?				
	Didn't help at all	Almost no help	Kind of helped	Yes helped	Very much helped
Yes	-	3	1	3	-
No	1	8	-	0	-
Total	1	11	1	3	-

People who thought that insurance almost didn't help tend not to repurchase. But there are still several people who wants to repurchase although they thought that insurance almost didn't help.

Uninsured herders:

Ever heard about IBLI: 42 (84%) respondents heard about IBLI while 8 (16%) respondents never heard about IBLI.

The reason not to purchase: 12 (25%) herders thought that they are not expecting any shocks to happen to their family, 10 (20.8%) herders didn't purchase because of high cost, and 6 (12.5%) herders had no idea how to apply for insurance program. (See details in Table 4.20)

Table 4.20 Reason for not purchasing insurance

Reasons	Number and percent
Never heard about insurance	2 /4.2%/
Don't have enough information about insurance	5 /10.4%/
No idea how to apply	6 /12.5%/
Insurance agents are too far from my home	2 /4.2%/
Nothing serious will happen to my household	12 /25%/
We can manage problems ourselves	3 /6.2%/
Insurance is too expensive	10 /20.8%/
Heard it's a long/bureautic process to realize claim	2 /4.2%/
No trust in insurer - heard that insurers don't pay	4 /8.3%/
Insurers can go bankrupt and run away stealing my money	2 /4.2%/
Other	-
Total	48 /100%/

This question intended to have multiple-choice answers. Due to herders' education level, it was impossible to ask them to fill out questionnaire. Hence, herders were interviewed by data collectors. Herders started struggling to remember the first answer while data collector was explaining next choices of answer. Due to this process, herders possibly missed the important choices and just answered what they remembered.

Table 4.21 Opinion on main reason of insurance and experience with dzud

Reasons	Have dzud happened last 5 years?	
	Yes	No
To protect from possible losses	12 /52.3%/	13 /52%/
Under campaign	5 /21.7%/	4 /16%/
To participate any other projects	2 /8.7%/	1 /4%/
Thought it was necessary	1 /4.3%/	3 /12%/
Not sure	2 /8.7%/	3 /12%/
Other	1 /4.3%/	1 /4%/
Total	23 /100%/	25 /100%/

Majority of uninsured herders (52.3%) who either did face with dzud or didn't responded that main goal of insurance is to protect from possible losses. Therefore, uninsured herders are also well aware of main goal of having insurance regardless of their experience with dzud.

Table 4.22 Opinion on main reason of insurance and experience with loss of livestock

Reasons	Ever had loss of LS	
	Yes	No
To protect from possible losses	19 /65.4%/	6 /31.5/
Under campaign	5 /17.2%/	4 /21%/
To participate any other projects	1 /3.4%/	2 /10.4%/
Thought it was necessary	1 /3.4%/	3 /15.7/
Not sure	3 /10.2%/	3 /15.7/
Other	1 /3.4%/	1 /5.7%/
Total	29 /100%/	19 /100%/

Majority of uninsured herders (65.5%) who either did have loss of livestock or didn't responded that main goal of insurance is to protect from possible losses. Therefore, uninsured herders are also well aware of main goal of having insurance regardless of their experience with having loss of LS.

Table 4.23 Reason not to purchase insurance

Reasons	Ever had loss of LS	
	Yes	No
Never heard about insurance	-	2 /11.1%/
Don't have enough information about insurance	2 /6.7%/	2 /11.1%/
No idea how to apply	2 /6.7%/	2 /11.1%/
The insurance agents are too far from the place I live	1 /3.3%/	-
My household has not needed insurance /nothing serious will happen to my household/	-	5 /27.8%/
My household has not needed insurance /We can manage problems ourselves/	2 /6.7%/	-
Insurance is too expensive	14 /46.6%/	6 /33.3%/
Heard it is a long / bureautic process to realize claim	2 /6.7%/	-
No trust in insurer – heard that insurers don't pay	5 /16.7%/	-
No trust in insurer – they can go bankrupt or run away steeling my money	2 /6.7%/	1 /5.6%/
Total	30 /100%/	18 /100%/

Almost half of those who had loss of livestock (46.6%) didn't purchase insurance due to high cost. One third of those who didn't have loss of livestock also considered that insurance premium is too expensive, thus, they didn't purchase it.

The coping activity after risk (dzud): 8 (26.6%) and 17 (54.9%) insured and uninsured herders didn't have any coping action, respectively. 10 (33.4%) herders who faced with shock used insurance payment to cope with shock. 9 insured herders (30%) sold some stuff to recover from losses. (Table 4.24)

Table 4.24 Types of coping activities after risk

Activities	Insured	Uninsured
No coping action	8 /26.6%/	17 /54.9%/
Insurance	10 /33.4%/	-
Use own funds and savings	1 /3.3%/	2 /6.4%/
Get free of charge help from government	-	3 /9.7%/
Get help from local associations you belong to	2 /6.7%/	1 /3.2%/
Get free of charge help from relatives/friends (not to be repaid)	-	-
Get help that we have to give back (borrowing without interest)	-	-
Borrowing loan with low interest from relatives/friends	-	-
Borrowing from bank and finance institutions	-	6 /19.4%/
Sell some stuffs to recover the loss	9 /30%/	2 /6.4%/
Total	30 /100%/	31 /100%/

Types of coping actions after shock differ between insured and uninsured herders. More than half of the uninsured herders have no coping actions after shock. And rest of them had at least one type of actions. On the other side, insured herders used their insurance after shock. However, there are still some insured herders who have no coping actions.

4.3. GENERAL DISCUSSIONS

The current study aimed to define the factors influencing to coverage of livestock insurance by comparing the socioeconomic background and insurance experience of insured and uninsured herders. Three provinces (Uvs, Bayankhongor and Dundgovi) were selected for the study based on their representativeness in terms of weather condition. IBLI also started being implemented in these selected three provinces, therefore, I considered that larger number of insured herders are available to be studied in selected three provinces. Regression analysis showed that herders in Uvs province are less likely to be insured compared with Bayankhongor province. Uvs province is one of the coldest province located in the western area of Mongolia. Thus, greater number of herders are naturally expected to be insured because they are at higher risk of having dzud compared to other provinces. I was not able to find the statistics on IBLI insurance coverage of these three provinces, thus, further investigation is needed to examine whether or not this regional difference on insurance coverage is valid. IBLI seems to be voluntary insurance, however, as seen in practice, herders have no great willingness to purchase insurance and insurance coverage depends on how active insurance company worked to persuade herders. Therefore, it is also difficult to define the regional difference unless herders are insured with own interest.

Result of regression analysis also showed that education of spouse and number of small livestock greatly influenced ($p < 0.05$) to being insured. Education level of insured spouse is quite higher than uninsured spouses, thus, more educated spouses might have great power of decision making at household level. Compared to other Asian countries, Mongolian women have great role of decision making at family level.

Sheep and goat are classified as small ruminants (called small livestock) whereas cattle, horse and camel are classified as large ruminants (called big livestock). Small and big livestock have own specific characters and some herders even treated with small and big livestock differently. For example, some herders more likely to insure big livestock because they are 1) more vulnerable to harsh weather condition like heavy snow storm compared to small livestock; 2) more expensive than small livestock; 3) mainly fewer than small livestock, thus, breeding is slower than small ones (total number of small and big livestock owned by insured is 1.9 and 1.4 times higher than those owned by uninsured, respectively). However, others are more willing to insure small livestock because number of small livestock is quite larger than big ones. Thus, there is not big enough warm place to keep them during dzud and they are affected by dzud easily.

Due to the reasons aforementioned, all livestock was classified into small and big livestock to be examined in the analysis. Result of regression analysis showed that increase of number of small livestock influenced to being insured. I also tested the model with total number of livestock (without classifying into small and big) and result showed that increase of total number of livestock statistically significantly influenced to coverage of insurance (coef=0.004; p=0.000). Therefore, number of livestock, especially, small number of livestock has great influence on higher insurance coverage.

Majority of insured herders responded that they will not repurchase insurance and uninsured herders expressed that they didn't buy insurance due to its high cost. However, regression analysis showed no statistical significant relationship between household income and being insured. Therefore, it might be explained in the following ways: 1) herders are

managing to purchase insurance in spite of their low income; or 2) herders are not willing to be insured although the insurance payment is quite affordable for them.

Majority of insured herders were not satisfied with insurance payment and showed no trust to insurance company. It might be related to higher expectation of herders on insurance payment but reality is that IBLI insurance is not individual based but more community based insurance. Individual herder is not eligible for insurance payment unless livestock mortality rate of soum is lower than 7% regardless of his/her amount of loss.

Some herders who were not fully satisfied with insurance were willing to repurchase insurance and it might mean that herders were quite aware of importance of insurance although they are not fully satisfied with insurance payment. Less of satisfaction might depend on very extremely expectation of insured herders.

I tried to investigate whether or not herders' experience with dzud or loss of livestock affected to insurance coverage, however, this attempt failed because of lack of consideration of time sequence between event (dzud and loss of livestock and time of being insured). For example, herders were only asked if they had been exposed to dzud or had loss of livestock last 5 years, but they were not asked if they were insured before or after dzud/loss of livestock. It made conclusion impossible to be properly done to examine the relationship between dzud/loss of livestock and willingness of being insured.

Study result showed that uninsured herders showed more trust to insurance company. It is obvious because they never experienced with any dissatisfaction with insurance payment.

Mongolians especially herders prioritized the recommendation of acquaintances, friends and family members to make decision for any event. Therefore, insurance herders with low satisfaction might persuade uninsured herders not to purchase insurance. Insurance companies need to work efficiently to disseminate realistic information on insurance and provide proper knowledge with herders.

As of 2015, 35.1% of the herders, a quarter of the entire population, are living in below the national poverty line. The herders' poverty and livestock loss has been in the center of the discussions in last years. The Government of Mongolia and Agricultural Reinsurance JSC of Mongolia has been collaborating to have universal coverage of IBLI insurance among herders. Unfortunately, as of today, it is infeasible due to lack of capacity of insurance companies. Insurance companies have no great interest to implement IBLI insurance program due to the high operation cost and low profit. On the other side, herders also have no willingness to participate in insurance program due to the lack of perception of insurance benefit.

There are strengths and limitations in the study. This is the first attempt to examine the IBLI demand among insured herders against with uninsured herders in Mongolia. The previous works had been repeatedly reporting about only insured herders. The main limitation of the study was the coverage of target population. The study covered only 3 provinces out of 21 due to the limited period for data collection. If sampling from all provinces were available, the study would define the regional difference of insurance status.

CHAPTER 5 – CONCLUSIONS, AND RECOMMENDATIONS OF THE STUDY

CONCLUSIONS OF THE STUDY

The study concluded that

- Socioeconomic status, knowledge and attitude of insured and uninsured herders are quite identical despite of showing the education level of insured spouse is quite higher than uninsured spouses.
- Both insured and uninsured herders are well aware of importance of insurance, however, insurance coverage among them are not satisfactory.
- Uninsured herders showed more trust in insurance companies than insured herders. The main reason for dissatisfaction of insured herders is believed to be low insurance payment.
- Both insured and uninsured herders have quite high expectation on insurance program, thus, this affects to gap of service quality.
- Education of spouse and number of small livestock are shown to influence to insurance coverage.
- Majority of insured herders are most likely to use insurance payment for all losses, however, they are not fully satisfied with insurance payment.
- Majority (54.9%) of uninsured herders have taken no coping actions after shock.

RECOMMENDATIONS OF THE STUDY

The finding of current study provides with insurance providers basic evidence and information to maximize the herder's satisfaction, to improve the content of IBLI product and to increase the participation of herders in IBLI. The following recommendations are developed based on findings of the study.

- Insurance providers need to take actions to increase awareness and perception of herders through effective trainings, discussions, especially face-to-face meeting. Face-to-face meeting is more efficient way of communication to improve the awareness of herders because the majority of herders live in remote area with no accessibility to media such as radio, internet and television. Although herders are accessible to media, they are less receptive due to their low level of education.
- Low insurance payment and low level of satisfaction lead less trust in insurance companies, thus, it is suggested that insurance providers should improve the content of insurance product along with payment system to ensure the trust among the herders.
- Insurance providers jointly with corresponding stakeholders need to discuss to revise the cut-off point for eligibility of being insured. According to the current rule, individual herder is not eligible for insurance payment unless livestock mortality rate of soum is lower than 7% regardless of his/her amount of loss. Although statistics showed that most of soums' livestock mortality rate was lower than 5% in past 5 years.
- New payment system including kind of barter system is needed for insurance among herders because they have no constant income and are not able to pay insurance premium by cash although they are willing to be involved in insurance program.

APPENDIXES

QUESTIONNAIRE 1: INSURED HERDERS EXPERIENCED WITH SHOCK

• **Socio-economic status and coping mechanism**

1. What is your province?

2. How many members are in your household?

- 1-2 people 3-4 people
 5-6 people More than 6 people

3. Age of head of family and spouse

Head of family:

Spouse:

4. How many of family members are employed and employment status?

- 1-2 people 3-4 people
 5-6 people More than 6 people

5. Employment of family

Family members	Permanent	Temporary	Freelancer
Head of family			
Spouse			
Child			
Other			

6. What is your income source of family?

- Constant wages Social benefit
 Pension Income that sells livestock goods
 Other

7. What is your household income of month?

- 0 - 250 USD 251 – 500 USD
 500 – 1000 USD More than 1000 USD

8. Education of head of family and spouse?

	None	Primary	Secondary	Vocational	Higher
Head of family					
Spouse					

9. How many livestock does your household have?

Camel	Horse	Sheep	Goat	Cattle	Total

10. Have dzud (harsh winter condition with heavy snowfall) happened in past 5 years?

- Yes No

11. Ever had loss of livestock?

- Yes No

If Question 11 is “Yes”, please answer the following questions

12. What was the main reason of your livestock loss?

- Weather related shock
 Infectious disease
 Wolf attack

- Livestock theft
 - Reduced our livestock because of less household members
 - Other
13. What was the coping activities your household used after the risk happened last time?
- No coping action
 - Insurance
 - Use own funds and savings
 - Get free of charge help from government
 - Get help from local associations you belong to
 - Get free of charge help from relatives/friends (not to be repaid)
 - Get help that we have to give back (borrowing without interest)
 - Borrowing loan with low interest from relatives/friends
 - Borrowing from bank and finance institutions
 - Sell some stuffs to recover the loss

• **Herder's knowledge, attitude and practice of insurance**

14. When did you start to insure?

15. What was the main reason to purchase insurance for livestock?

- to protect from possible losses
- under campaign
- to participate any other projects
- thought it was necessary
- not sure
- other

16. Where did you hear about insurance?

- from face to face interview of IBLI
- from insurance agent
- from television and radio
- from newspaper and magazine
- from manuals and handouts
- from advertisement
- all of above

17. Have you ever received insurance payment?

- Yes
- No

18. If yes, were you satisfied with that?

- not at all
- almost no
- so so
- almost yes
- very much

19. If not, why?

- claiming process is complicated
- payment is tricky
- amount of insurance payment is not enough
- different from actual evaluation
- Other

20. What do you think how insurance payment helped to recover?
- didn't help at all
 - almost no help
 - kind of helped
 - yes helped
 - very much helped
21. How did you use your insurance payment?
- Bought new livestock
 - Moved to different place to settle new life
 - Bought food and other household necessities
 - Bought livestock fodder
 - Build new shelter
 - Paid back loans
 - Paid other things (education, health expenses)
 - Other
22. To what extent do you trust insurance company?
- not at all
 - almost no
 - so so
 - almost yes
 - very much
23. What are the 2 things you like the most about insurance product which you purchased?
- Insurance coverage
 - Amount of insurance payment
 - Claim processing
 - Insurance provider
 - Price of insurance
 - Service of insurance
 - Other
24. What are the 2 things you dislike the most about insurance product which you purchased?
- Insurance coverage
 - Amount of insurance payment
 - Claim processing
 - Insurance provider
 - Price of insurance
 - Service of insurance
 - Other
25. Would you repurchase this product?
- Yes
 - No

If Question 25 is "No", please answer the following question

26. Why don't you want to repurchase this insurance product?
- Insurance payment was lower than market price
 - Insurance payment was too late
 - Insurance payment didn't cover all my losses
 - Couldn't receive my insurance payment
 - To be responsible my losses

- Insurance is too expensive
- Not necessary to insure because of low risk
- Other

27. In what condition would you repurchase?

- if insurance payment process would be quicker
- if insurance valuation would be real
- if insurance payment would enough to cover my losses
- if insurance price would be cheaper
- If time of insurance payment would be faster
- Other

QUESTIONNAIRE 2: UNINSURED HERDERS EXPERIENCED WITH SHOCK

• **Socio-economic status and coping mechanism**

1. What is your province?

2. How many members are in your household?

- 1-2 people 3-4 people
 5-6 people More than 6 people

3. Age of head of family and spouse

Head of family:

Spouse:

4. How many of family members are employed and employment status?

- 1-2 people 3-4 people
 5-6 people More than 6 people

5. Employment of family

Family members	Permanent	Temporary	Freelancer
Head of family			
Spouse			
Child			
Other			

6. What is your income source of family?

- Constant wages Social benefit
 Pension Income that sells livestock goods
 Other

7. What is your household income of month?

- 0 - 250 USD 251 – 500 USD
 500 – 1000 USD More than 1000 USD

8. Education of head of family and spouse?

	None	Primary	Secondary	Vocational	Higher
Head of family					
Spouse					

9. How many livestock does your household have?

Camel	Horse	Sheep	Goat	Cattle	Total

10. Have dzud (heavy snowfall) happened in past 5 years?

- Yes No

11. Ever had loss of livestock?

- Yes No

If Question 11 is “Yes”, please answer the following questions

12. What was the main reason of your livestock loss?

- Weather related shock
 Infectious disease
 Wolf attack
 Livestock theft
 Reduced our livestock because of less household members

- Other
13. What was the coping activities your household used after the risk happened last time?
- No coping action
 - Insurance
 - Use own funds and savings
 - Get free of charge help from government
 - Get help from local associations you belong to
 - Get free of charge help from relatives/friends (not to be repaid)
 - Get help that we have to give back (borrowing without interest)
 - Borrowing loan with low interest from relatives/friends
 - Borrowing from bank and finance institutions
 - Sell some stuffs to recover the loss
- **Herder's knowledge, attitude and practice of insurance**
14. Have you ever heard about Index Based Livestock Insurance (IBLI)?
- Yes
 - No
15. If Question 14 is “Yes”, where have you heard about it?
- from face to face interview of IBLI
 - from insurance agent
 - from television and radio
 - from newspaper and magazine
 - from manuals and handouts
 - from advertisement
 - all of above
16. To what extent do you trust insurance company?
- not at all
 - almost no
 - so so
 - almost yes
 - very much
17. In your opinion, what is the main reason to purchase insurance for livestock?
- to protect from possible losses
 - under campaign
 - to participate any other projects
 - thought it was necessary
 - not sure
 - other
18. Why haven't you purchased an insurance for livestock?
- never heard about insurance
 - don't have enough information about insurance
 - no idea how to apply
 - the insurance agents are too far from the place I live
 - my household has not needed insurance /I think nothing serious will happen to my household/
 - my household has not needed insurance /We can manage problems ourselves/
 - insurance is too expensive

- heard it is a long/bureaucratic process to realize claim
- no trust in insurer – heard that insurers do not pay
- no trust in insurance companies – they can go bankrupt or run away stealing my money
- other

19. If some shock happened what would you do?

- do nothing
- get free of charge help from government
- get help from local associations you belong to
- use own savings
- get free of charge help from relatives/friends (not to be repaid)
- get help that we have to give back (borrowing without interest)
- borrowing loan with low interest from relatives/friends
- borrowing from bank and finance institutions
- sell some stuffs to recover the loss
- other

REFERENCES

- Agency of Air quality. (2018, Feb). *Air pollution in Mongolia: Air Quality Index*. Retrieved from Agency of Air quality's website: <http://agaar.mn/index?lang=en>
- Agriculture Reinsurance in Mongolia (2017). Sales report in 2016 of Index Based Insurance. Retrieved from the Agriculture Reinsurance Company's website: http://agreinsurance.mn/files/Sales_2016.pdf
- Andrew, M., Carter, M., Ikegami, M., et al., (2010). Insuring Against Drought-Related Livestock Mortality: Piloting Index Based Livestock Insurance in Northern Kenya. *Project summary*.
- Asian Development Bank. (2017). Poverty in Mongolia. Retrieved from Asian Development Bank's website: <https://www.adb.org/countries/mongolia/poverty>
- Association of the Insurers in Mongolia (AMI). (2017). Coverage of Driver's Liability Insurance in Mongolia. Retrieved from the Association of the Insurers website: <http://ami.mn/amimn/index.php/2013-04-10-09-08-36/171-hamragdalt>
- Bank of Mongolia. (2017, Mar). Payback ratio of Mongolian herders. Retrieved from Bank of Mongolia's website: <https://www.mongolbank.mn/>
- Barnett B J, B. C. (2008). Poverty Traps and Index-Based Risk Transfer Products. *World Development*, 36, 1766-1785.
- Batima P., Natsagdorj L., Gombluudev P., Erdenetsetseg B. (2005, Jun). Assessments of Impacts and Adaptations of Climate Change (AIACC). *Observed climate change in Mongolia*. Working paper N 12.
- Batmunkh, B. (2011). Economic and Statistic department of Mongolian National University.

- Household and family situation of Mongolia*. Journal of National Statistic Committee of Mongolia pp 15-17.
- Burke, M., Janvry, A.D., and Quinter, J., (2010). *Providing index-based agricultural insurance to smallholders: Recent progress and future promise*. Berkeley: EGG Foundation .
- Ezilon world maps. (2015). *Mongolian map – Physical map of Mongolia*. Retrieved from ezilon website: <https://www.ezilon.com/maps/asia/mongolia-physical-maps.html>
- Faraz Shibli (2017, Feb 24). *Steppes and the city: Rural to urban migration in Mongolia*. Retrieved from The University of Oxford’s Centre on Migration, Policy and Society (COMPAS) website: <https://www.compas.ox.ac.uk/2017/steppes-and-the-city-rural-to-urban-migration-in-mongolia/>
- GAC. (2015). Survey of households in Ulaanbaatar city. Retrieved from Corporation of Government Apartment website: <http://tosk.gov.mn/4070.html>
- Gine X, T. R. (2008). Patterns of rainfall insurance participation in rural India. *World Bank Economic Review*, 22(3), 593-566.
- Helen, G., Hansen, J., and Garvin, S., (2015). Scaling up index insurance for smallholder farmers: Recent evidence and insights . *Climate Change, Agriculture and Food Security (CCAFS) Report No. 14*.
- Index Based Livestock Insurance (IBLI). (2011). *Index Based Livestock Insurance IBLI*. Retrieved from the Index Based Livestock Insurance website: <https://ibli.ilri.org/index/>
- Joanne Lu (2017, Feb 27). *Severe winter dzud continues to ravage Mongolia*. Retrieved from

Human Osphere website:

<http://www.humanosphere.org/environment/2017/02/severe-winter-dzud-continues-ravage-mongolia/>

Kaianga H, U. C. (2006). Consumption smoothing? Livestock, insurance and drought in rural Burkino Faso. *Journal of Development Economics*, 79, 413-446.

Mahul, Olivier., & Skees, Jerry. (2007). *Managing agricultural risk at the country level: The case of index-based livestock insurance in Mongolia*. World Bank Policy Research Paper, 4325.

McCord, M. I. (2011). *Defining "Microinsurance": Thoughts for a journey towards a common understanding*. Illinois : The MicroInsurance Centre.

Molly, I., and McCord, M.J.. (2011). Defining "Microinsurance": Thoughts for a journey towards a common understanding. *Discussion paper*.

Mongolian National Public Website. (2016, Dec 27). *The preliminary results of the livestock census in 2016*. Retrieved from the Mongolian National Public website: <http://www.mnb.mn/i/104763>

Morduch, B. A. (2005). *The Economics of Microfinance*. London, England: The MIT Press. Retrieved Sep 04, 2015, from: http://www.fgda.org/dati/ContentManager/files/Documenti_microfinanza/Economics-of-Microfinance.pdf

Mukund Palat Rao., Nicole K Davi., Rossanne D D'Arrigo., Jerry Skees., Baatarbileg Nachin., Caroline Leland., Bradfield Lyon., Shih-Yu Wang., and Oyunsanaa Byambasuren. (2015) . *Dzuds, droughts, and livestock mortality in Mongolia*. Environmental Research Letter

Nomun-Erdene, D. (2013). Proceedings of the Mongolian Academy of Sciences. *Migration*

of Ulaanbaatar city and social status of migrants (Vol. 53 No 02 (206) pp. 43-50).

Ulaanbaatar, Mongolia.

Olivier, M., and Skees, J., (2007). *Managing Agricultural Risk at the Country Level: The Case of Index-Based Livestock Insurance in Mongolia. Policy Research working paper No. 4325.*

Olzii, J., and Munkhgerel, G., (2006). *Penetration of Index Based Livestock Insurance in Mongolia. Project implementation unit of IBLI handouts.*

Piesse, D. M. (2014). *What is Microinsurance?* Rotterdam : Microinsurance network and Micro Insurance Academy .

Project implementation unit of IBLI. (2006). *Index Based Livestock Insurance handouts.* Ulaanbaatar.

Public Finance International. (2015, Jul 2). *Mongolia's poverty rate continues to fall.*

Retrieved from Public Finance International's website:

<http://www.publicfinanceinternational.org/news/2015/07/mongolia%E2%80%99s-poverty-rate-continues-fall>

Rose, Julian. (2014). *Index-based livestock insurance in Mongolia.* Innsbruck, Austria: Faculty of economics and statistics.

Skees, J., & Enkh-Amgalan, A. (2002). *Examining the Feasibility of Livestock Insurance in Mongolia.* World Bank Policy Research Paper, 2886.

Sommarat, C., Mude, A., B.Barnett, C., et al., (2013). *Designing index-based livestock insurance for managing asset risk in Northern Kenya. The Journal of Risk and Insurance, 205-237.*

United Foundation of Statistical Information of Mongolia. (2017, May 22). *Public migration.*

Retrieved from the United Foundation of Statistical Information website:

<http://www.1212.mn/tables.aspx/>

World Health Organization (WHO). (2017). *Mongolia: Road Traffic Accidents*. Retrieved from the World Health Organization website:

<http://www.worldlifeexpectancy.com/mongolia-road-traffic-accidents>