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도시계획학 석사학위논문

**Climate-induced migration as adaptation
in Mongolia: insights from drought- and
dzud-affected rural-urban migrants in
Ulaanbaatar**

기후변화가 야기한 적응으로서의 이주
-몽골 울란바타르의 가뭄과 한파에 따른 도농
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Climate-induced migration as adaptation in Mongolia: insights from drought- and dzud-affected rural-urban migrants in Ulaanbaatar

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**Climate-induced migration as adaptation
in Mongolia: insights from drought- and
dzud-affected rural-urban migrants in
Ulaanbaatar**

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Abstract

This study analyses the multiple ways in which weather events have affected decisions of rural herding households to migrate into urban centers and impacts such migrations had on the livelihoods of climate-affected households in Ulaanbaatar, Mongolia. Through mapping migration movements in relation to drought stresses, this research illustrates the visible associations between droughts and out-migration in Western regions of the country. By qualitatively inquiring migration experiences of urban migrants in Ulaanbaatar, the research gives deeper insights into complex interactions between climate change and human mobility. The research finds that in Mongolia, droughts and dzud (extreme winter disasters) affect decision to migrate to urban centers directly – by causing loss of livelihood, loss of ecosystem services and indirectly – by amplifying already existing social, political and demographic motivations. But at the same time, droughts and dzud may affect the climate-affected household's ability to migrate by compromising financial resources needed to migrate successfully to urban centers. Among households severely affected by droughts and dzud, migration to urban centers appears to be an adaptive strategy to improve their livelihoods. An important part of adaptation - integration into urban life appears to be eased by social networks and access to information but hindered by a lack of viable jobs, food security issues and difficulties in gaining basic social services. This study concludes that while weather events and related environmental changes have substantial effects on rural-urban migration decisions of herders in Mongolia, existing social and economic circumstances appear to be a prerequisite for sensitivity of the rural community to climate

change impacts. Based on the exploratory findings, this research recommends further investigation of the phenomenon to better coordinate urban planning and rural development policies with climate change adaptation measures in Mongolia.

Key words: Mongolia, climate change adaptation, drought, dzud, rural-urban migration.

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I. Introduction

Recognition of continuous anthropogenic impacts on the global climate has led to a concern over how environmental changes induced by these climatic disruptions is affecting and will affect population movements in the future. The concern is presented on the latest assessment report by the Intergovernmental Panel on Climate Change:

Climate change is projected to increase the displacement of people throughout this century ... Changes in migration patterns can be responses to both extreme weather events and longer-term climate variability and change, and migration can also be an effective adaptation strategy (IPCC 2014, p.766- 771).

Crude estimates produced by some scholars are worth noting; the number of people who will migrate due to the changing climate by 2050 scale up to 130-300 million (Myers 2002), raising concerns over human security and political stability implications amongst national and international organizations. However, such refugee-like responses are only one of many ways populations and their movements may respond to climate and environmental changes. Whether sudden or gradual, environmental changes are seldom the only causes of migration of a household. Environmental changes could also have indirect effects on migration, in addition to the direct disastrous effects such as loss of livelihood, housing or health. Such indirect environmental effects on migration could include economic hardships that are caused by a gradual loss of ecosystem services, making the household migrate for job opportunities elsewhere or environmental degradation triggering conflicts over ecosystem services, thus resulting in demographical or political drivers in migration (Meze-Hausken 2000).

Links between climate change and migration patterns are complex and context-specific (Black et al. 2011). Knowledge of such links and a deeper understanding of these patterns locally are of great value for establishing well-grounded plans and programs to mitigate future climate costs and enhance the adaptation capacity of vulnerable rural households. Building on the statement of problems above, in the underlying document this researcher investigates the links between droughts, dzud and internal population movement in Mongolia, specifically rural-urban migration movements, as well as the impact of migration to an urban center on the livelihoods and wellbeing of climate-affected households. In the remainder of this section, the purpose, objectives, research questions and methodological design of the proposed research are defined, followed by a description of the literature review, theoretical framework and context presentation of the study case. Report of findings, discussions related to the findings and conclusions are presented in later sections.

1. Research purpose and scope

The purpose of the study is to increase understanding of associations between climate change and human migrations by investigating ways extreme weather events and related environmental changes affect ecosystem-dependent households in arid regions of Inner Asia, taking Mongolia as a case study and focusing on the period 1999 to 2013. This study was the first attempt to thoughtfully analyze the role of environmental pressures on human migration in Mongolia and explore such issues in-depth through qualitative data acquired from migrants directly. Understanding of such relationships are of practical importance in designing appropriate safeguard policies that aim to

enhance adaptive capacities of rural communities to climatic changes, rural development plans that are climate sensitive as well as urban planning policies that enable effective responses to sudden influxes of rural-urban migrants.

The study also addresses the scarcity of research work on the impact of global climate change on rural and urban populations in Central and North- Eastern Asia, country states that had undergone major political and economic transitions in the last decades, which have undermined their socio-economic systems and ultimately their resilience. It is hoped that empirical findings from this research will be a useful addition to the evolving climate change-environment-migration nexus scholarship.

The scope of the research is to provide empirical insights into how droughts and dzud had affected household's decisions to migrate to urban centers and how migration has impacted their livelihoods. It is important to note that this research does not intend to predict causality or provide models of future movements or social behaviors, although they do present an interesting opportunity for future research elsewhere.

2. Research objectives and research questions

Objectives of the proposed study are to first, identify regions of out-migration and in-migration spatially and find visual associations between droughts and human mobility in Mongolia; secondly, to investigate how droughts and dzud have influenced migration decisions of previously ecosystem-dependent households; and lastly, to reveal the ways migration to an urban center, in this case Ulaanbaatar city, had impacted livelihood of climate-affected households. To guide the research to fulfill the objectives of the study, the

following three main research questions are asked and addressed:

Question 1: How are migration movements spatially distributed in relation to drought stresses in Mongolia?

Question 2: How droughts and dzud have affected the decision of rural residents to migrate to an urban center - Ulaanbaatar?

Question 3: What are the impacts of urban migration on livelihoods of climate-affected households?

II. Literature review and theoretical background

This chapter will examine the existing literature on climate change vulnerability, environmentally induced migration and parts of mainstream migration research. The aim of this literature review lies in critically engaging with related work from different disciplines and describing the main conceptual framework that will be guiding the research process. In the end of this chapter, it is hoped that a comprehensive understanding of conceptualizations and inquiry of interlinkages among the environment and migration in context of adaptation and vulnerability to climate change is provided, which will lead to a clear and cohesive theoretical framework that will be used in designing research methods, conducting fieldwork and analyzing data in the upcoming sections.

1. Vulnerability of social systems to environmental and climate change

There is continuing academic and public engagement about how by-products of anthropogenic activities are inducing changes in the global climate and how such changes, in return, have already started impacting ecosystems and environments of human populations around the world. This global biophysical change, termed popularly as climate change, is a major political issue, with real long-term implications on the livelihoods of households and ultimately on the national and global economy, particularly of less developed and developing countries. The damages will vary and the long-term future impacts are predicted to cost much more than short-term costs of mitigation and adaptation to abate dangerous impacts. The total cost of stabilizing the

changes is estimated to be equal to 1% of global annual Gross Domestic Product (GDP) (Stern 2007) but the burden costs of adapting are estimated to fall disproportionately on poorer countries, costing 5-10% of their national GDPs (Margulis 2010). This, as Drabo and Mbaye (2011) argue, puts these nations in a “double penalty”; a situation where already existing poverty increases population’s vulnerability to global environmental changes, and the implications of these environmental changes to health and income will further deepen their vulnerability to future changes in the climate.

This research will refer to *environmental changes* in accordance with the definition provided by Johnson et al. (1997) as “a change or disturbance of the environment caused by human influences or natural ecological processes”. In other words, environmental changes are any changes in the surrounding ecosystem that may be caused by natural and/or anthropogenic activities. Anthropogenic activities can have direct impacts (unsustainable land use, forestry, fishery etc.) and indirect impacts (anthropological drivers of global climate change) on natural environments. In return, environmental changes may have direct (extreme weather events, disasters, loss of income) and indirect (possible changes in policies and economic activities of the society) feedback effects on human settlements.

In addition to spatial differences, environmental causes and changes, in conjunction with existing socioeconomic and political contexts (and vulnerabilities), are to have impacts of different intensities throughout different communities. Vulnerability to environmental changes is not only a matter of exposure; it is also caused and shaped in the large part by an inadequacy of human systems. The literature of research on socio-ecological systems provides useful concepts that capture the complexity of coupled

environmental and societal systems. One of which is the framework for vulnerability analysis that is often used for climate change implications on meso and micro levels (communities, households and individuals) (Turner et al. 2003). The authors define three components that constitute the level of vulnerability of a population to certain stresses; exposure, sensitivity and resilience (or adaptive capacity). Thus, even if communities are physically exposed to the same environmental change (climatic variations, natural disasters), they will have different degrees and characters of vulnerability depending on the context of social systems (Leary and Beresford 2009). Wood (2001) explains the same complex interactions through the analogy of a frayed umbrella; certain person or community-specific “environment and society umbrella” exist and when these umbrellas are destructed, the capability to repair or retrofit their umbrellas will depend on their various socio-economic statuses. This, as Wood (2001) states, in the long term makes vulnerable members of the society even more vulnerable, creating a vicious cycle.

2. Linkages between climate change, environment and migration

The modern definition of *human migration* is stated as a “permanent change of residence by an individual or group; it excludes such movements as nomadism, migrant labor, commuting, and tourism, all of which are transitory in nature” (Encyclopedia Britannica 2013). Human migration has been studied for a long time, in one part, as research of human evolution, in major part as research of economical geography and in a more recent part, as the study of impacts of and adaptations to global climate change. The more

classical research on migration branches from the field of human geography and spatial economics, which focuses on explaining migration through either wage differences, labor market dynamics, risk aversion strategy or economic inequality in different communities and societies.

However in the last three decades, an interdisciplinary field has emerged along with the concerns over global climate change that is proven to be caused by human industrial activities. Despite this global concern, environmental factors are still rarely mentioned in mainstream scholarship of migration studies. Although this is being altered, environmental factors of migration are still treated as a relatively “new”, “recent” phenomenon although the factors were one of the main drivers of human mobility for the longest period in human history. Piguet and her colleagues (2011) argue that even the first systematic theories of migration in end of the 19th century ranked environmental factors highly in term of influence. For example, one of core literature in migration studies, “The Laws of Migration” by Ravenstein mentions how along with other socio-political factors such as “bad or oppressive laws, heavy taxation, ..., uncongenial social surroundings, and even compulsion”, “an unattractive climate ... have produced and ... still producing currents of migration” (Ravenstein 1889 p.286).

Based on this general conceptualization of human migration, the scholarship of climate/environmentally induced migration has reached a consensus that “human mobility will be affected by, and in turn will affect, the ways in which countries adapt to environmental changes linked to climate change” (Warner, Afifi et al. 2013) p. 9. The authors identify four main ways in which climate change might affect human mobility:

1. Changes in regional weather patterns (climate);

2. Rising sea levels, desertification, permafrost melt;
3. Increased frequency and magnitude of weather-related extreme;
4. Competition over potentially diminishing or changing water and land resources.

Regions at risk from biophysical changes listed above are high latitudes - wet tropical areas, mid- to low-latitudes - dry tropics, drought-prone continental areas; areas receiving mountain snowmelt and low-lying coastal regions, deltas, small islands, atolls (McLeman 2013a). Scholars have theorized differently the ways in which such environmental changes are affecting and will affect human mobility under climate change, as well as impacts this mobility will have on populations inside and outside the conventional borders of provinces, municipalities and nation states. In the following sections, three main conceptual themes of scholarship of the climate change–environment–migration nexus will be introduced; in brief they are “migration as lack of adaptive capacity”, “migration as adaptation” and “migration for adaptation” respectively.

The earlier body of literature of climate-induced migrations emerged in the 1990s, along with the growing concern over the impacts of climate change. Following this concern, it was predicted that more and more climate migrants will move internally and/or internationally (Myers 2002). The estimated number of people displaced by current and future environmental changes by 2050 range from 150-300 million (Myers 2002, Christian Aid 2007). The term “environmental refugee” or “climate refugee” has been initially used to refer to individuals or communities that are forced to flee from the locale of an environmental disaster. But forced displacement is merely one of many ways in which climate change impacts human mobility - in the recent years with the emergence of the vulnerability framework in studies of impacts of

climate change, this approach to estimating impacts of climate change on human mobility has been critiqued by other scholars (Piguet et al., 2011, Black et al. 2011) for not being able to capture the impacts of environmental hazards on a household's ability to migrate and other social dimensions of human mobility in general.

Later work on environment and migration started exploring social outcomes of migrations and its role in adapting to climate change. Similarly to other bodies of research on social dimensions of climate change, scholars on this side of the argument advocate for conceptualizing migration as an adaptation strategy via the vulnerability framework. With its cores in the understandings of socio-ecological systems, this framework illustrates that environmental causes and changes, in conjunction with existing socioeconomic and political contexts (and vulnerabilities), are to have impacts of varying intensities throughout different communities. Vulnerability to environmental changes is not only a matter of exposure, it is also caused and shaped largely by the inadequacy of human systems to adapt. Adaptation capacity, defined by the IPCC as “the ability or potential of a system to respond successfully to climate variability and change, and includes adjustments in both behavior and in resources and technologies” (IPCC 2007b). In other words, adaptive capacity is a measurement of effectiveness of the agent or an adaptive system, to jump back to a normal state after a change in the environment that affected its operation. From the perspective of this approach, migration is an adaptation to climate change and the ability to migrate is a form of adaptive capacity. Because of such complexity, one cannot conclude that environmental changes always induce mobility in exposed populations; in fact, climatic stresses might inhibit migration by restricting household's access to migration options.

This argument is more likely to apply to individuals or households that are socio-economically vulnerable, who as Black et al. notes “do(es) not have the personal characteristics/resources to migrate” and have “consequently reduced opportunities for mitigating this adverse impact on well-being” (Black, Adger et al. 2011). For these reasons, McLeman and Smit (2006) remind that lack of observed migration does not necessarily mean that there has been no impacts caused by environmental changes, rather, some argue that no response could be due to a lack of adaptation capacity of the communities/households. Approached from this perspective of adaptive capacity and resilience to climate change, migration to a more secure place, environmentally, economically or otherwise, can be considered as one of a variety of potential adaptive responses to climatic stresses.

Migrating from one location to another does not only affect livelihoods and further adaptive capacity of the migrant household/individual, it may also affect the socio-economic resilience of sending and receiving communities. Since migration is a social phenomenon, one of many ways of social transformation and interaction, it would be inadequate if such social effects are not considered in addressing climate-induced migrations. Based on the migration as adaptation framework, recent studies have started exploring how migration could trigger innovation, transfer of knowledge, technology and resource mobility that would contribute to resilience of home and host communities (Scheffran, 2012, Scheffran, 2013, Sakdapolrak, 2014). Another component of the migration-for-adaptation argument is that policies addressing the climate change-environment-migration nexus should be facilitating the migration of affected communities, rather than concentrating solely on adaptation approaches for preventing migration (de Moor, N, 2013, Scheffran, 2012). This is where the literature of “climate change and

migration” is merging with the growing scholarship of “migration and development” that looks at how migration is a way of getting out of poverty and overcoming food security in poorer regions (Siddiqui, 2003, Castaldo, 2012, Crush, 2013).

3. Emerging issues and need for empirical research

The growing literature on climate change, environment and human migration is slowly departing from the alarmist view of hazard exposure to a more opportunistic approach. In accordance with the development of scholarship studying the interconnections between climate change and human mobility, in the recent past, international institutions with major impacts on national policy-making such as the United Nations and its working bodies have also actively started addressing the phenomenon. An intergovernmental organization in charge of reporting main frameworks and findings had published multiple times in their reports that changes in the global climate will influence human mobility. In 1990, the first IPCC report stated that “the gravest effects of climate change may be those on human migration as millions will be displaced” (IPCC 1990, p.56), following in their fourth assessment the report stated confidently that “stresses such as increased drought, water shortages and riverine and coastal flooding will affect many local and regional populations. This will lead in many case to relocation within and between countries, exacerbating conflicts and imposing migration pressures” (IPCC 2007a, p.787). However, the fifth assessment report approaches the issue from a more opportunist perspective:

The risk of displacement increases when populations who lack the resources to migrate experience higher exposure to extreme weather

events, in both rural and urban areas, particularly in low-income developing countries. Changes in migration patterns can be responses to both extreme weather events and longer-term climate variability and change, and migration can also be an effective adaptation strategy (IPCC 2014, p. 766- 771).

Another important milestone in terms of addressing the climate change and its impacts on migration was reached at the 2010 Cancun Accord, where the framework called for “measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at national, regional and international levels” (UNFCCC 2011). In recent years, International Organization for Migration (IOM) in conjunction with leading scholars in the field had been also increasingly active in researching, collecting empirical data and publishing various reports and manuals for policy-makers. IOM’s latest outlook on the migration, environment and climate change recommends “integrate(ing) environmental and climatic factors in all migration policies, mainstream(ing) human mobility into related policy areas of development, disaster risk reduction, adaptation and (focusing) on environmental and climate-induced migration ... as a stand-alone area of work” (IOM 2014 p. xiii).

Although growing in acceleration, the scholarship on the nexus of climate change-environment-migration has not yet come to an agreed definition of who climate and environmental migrants are. Due to this, comparisons between empirics and estimates of such migrants are hard to conduct. Since migration is multicausal, it is also needless for the researcher to separate environmental/climate migrants from political/economic/social migrants. The same issues exist in identifying motivations behind migration; a decision

to migrate may have been made due to various reasons, solely environmental and solely non-environmental or a mix of both, direct and non-direct. This complexity makes quantitative investigations - identification and control of variables and most importantly estimation of the number of “environmental migrants” difficult and incomplete.

The empirical findings are not only cross-incomparable but also geographically scarce. While there has been a fair amount of research conducted on the impact of climate change on internal and international migration in North America, Middle East, Northern Africa, sub-Saharan Africa as well as East and South-East Asia and the Pacific, there is little work conducted on the Central, East-central Asian regions (Table 1). Methods used in previous studies vary from purely quantitative analysis to use of survey data and mix of qualitative individual/focus group interviews. This study addresses this gap of empirical research in the Central, East-central Asian region, countries where major political, economic as well as Climatic changes have taken place in the last few decades.

Table 1 Empirical research on impacts of climate change on migration

Region	Empirical research
North America	<p>Feng et al. (2012) find a statistically significant relationship between changes in net-outmigration and climate-driven changes in crop yields in rural counties of the Corn Belt.</p> <p>Laforge and McLeman (2013) examine the role social capital played in migration of drought-stricken areas of southern Saskatchewan in 1930s and find that social capital helped with migration-decision making</p>

	and with migrant's integration into the new community.
Middle East and North Africa	Through a survey as well as qualitative interviews in Algeria, the Arab Republic of Egypt, Morocco, the Syrian Arab Republic and the Republic of Yemen, a research group led by Wodon and et al. (2014) find that households perceive important changes in the climate. The rural households are affected by the changes - losing income, crops and livestock. They also conclude that although climate change is not the main driver of migration flow as present, it is a contributing factor that is likely to exacerbate future migration flows.
Sub-Saharan Africa	<p>In Niger, through interviews with local authorities and survey of 60 migrants and 20 non-migrants, Afifi (2010) finds that environmental changes affect economic factors of migration, resulting in an “environmentally induced economic migration”.</p> <p>Ezra and Kiros (2001) through a multilevel analysis find that out-migration in drought-prone areas of Ethiopia are dependent on the characteristics of individuals, households and communities. They find less out-migration in poorer communities.</p> <p>By taking tree villages in Ghana as an example, Carr (2005) illustrates how rural and environmental changes appear to be have induced a complex pattern of out-migration in the past decades. In the Ghanaian context, environmental changes become inseparable from the local economic and political issues, through differences in power relations.</p>

	<p>van der Geest (2008) presents a survey-based case study of the North to South movement of the Ghanaian context, where the author emphasizes how although environmental changes do play a substantial role in reasons to out-migrate from the northern part of the country to south. The environmental driver of migration is structural environmental scarcity rather than environmental degradation. Illustrating again the importance of already existing economic, social and political contexts.</p>
South Asia	<p>In Pakistan, a 21-year longitudinal survey was conducted to by Mueller et al. (2014) showing that flooding had little impacts on migration. However heat stress on the other hand was found to be increasing long-term migration of men, due to loss in agricultural produce.</p> <p>Massey S. at al. (2010) state that in Nepal, environmental changes are more strongly related to short-distance movements, while perceived declines in agricultural productivity impact long-distance moves. They also find that the impacts vary accordingly to gender and ethnicity.</p>
Central and North-Eastern Asia	<p>In Inner Mongolia, Zhang (2009) investigates the government-led programs that removed and resettled pastoralists from lands with heavy desertification to newly-build villages and local cities. The author finds that migration is used as a coping strategy to environmental degradation by the government rather than by individuals. The study also finds that migrants that were moved to urban areas or new villages are still involved in resource use of the pastoral area (rural</p>

	<p>home), part of their food and income still relies on produce from their livestock in the rural home.</p> <p>In Kazakstan, Bulesheva and Joldasov (2009) find that places affected by environmental degradation have also experienced significant out-migration flows. Environmental degradation is intensified by harsh economic conditions.</p> <p>In Kyrgyzstan, Nasritdinov and Ablezova (2013) find that economic hardships after the fall of Soviet Union had initiated land degradation by pastoralists in the region. Land degradation ultimately had increased the activity of landslides and currently, the main reasons of out-migration from mountainous regions of the country are strictly environmental – landslides and dangers related to it.</p>
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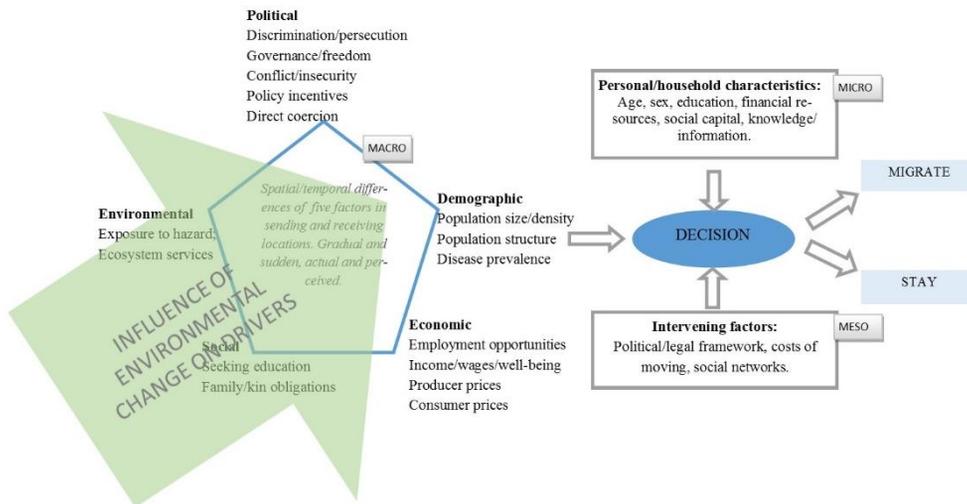
4. Conceptualizing effects of environmental changes on human migration in context of vulnerability and adaptation to climate change

Based on the review of literature, this section builds the general conceptual framework used in the qualitative inquiry, its design and data interpretation. After years of improvement, the existing interdisciplinary literature on human mobility currently agrees on the multicausality of migration: an individual's or household's decision to migrate (or not) is affected by multiple, interdependent, non-static drivers. Such drivers of migration are differentiated by Black et al. (2011) into three categories: “factors related to the region or country of origin... (Push factors)”, “factors related to region or country of destination... (Pull factors)” and intervening factors that facilitate

or restrict migration. By its origin, migration drivers are also further categorized into five family of factors, the spatial and temporal differences of which in both sending and receiving regions affect the decision to migrate (Table 1). This allows the analysis to incorporate the existing migration motivations, which Black et al. (2011) points out to be an “already significant phenomenon in many countries and regions with substantial observed environmental stresses and projected future change”. Therefore understanding of how the environmental changes affect other four families of migration factors – economic, political, social and demographic is as important as understanding how environmental changes affect existing environmental factors of migration (Fig. 1, left side).

Table 2 Five families of migration factors (Black et al. 2011)

Economic drivers	Imbalances in the labor market and wage differentials and/or microeconomic strategy of households to decrease risk and overcome market failures (cost-benefit analysis)
Social drivers	Access to family and social network, culture of migration, migration as a symbol of status, rite of passage, pursuit of education, etc.
Political drivers	Breakdown or change of governance structures, public policies that encourage or prevent migration, political conflict, discrimination or marginalization etc.
Demographic drivers	Malthusian pressure on natural resources, age difference in migrants and accepting destinations, etc.; Demographic factors affect migration in combination with other four factors.
Environmental drivers	Availability, stability, access to environmental services, occurrence of hazardous events. Environment factors affect migration in combination with other four factors



Source: reconstructed from Black et al. (2011).

Figure 1 Impact of environmental changes on a micro-household level

This model developed by Black et al. (2011) also incorporates both the structural (macro and meso) and behavioral drivers of migration (micro), which allows the analysis to be open to finding ways in which environmental changes affect agency of migration. In particular, how environmental changes affect household's ability to migrate (Fig. 1, right side - personal/household characteristics and intervening factors). The existence or intensity of groups of drivers and its interdependence with others will differ from one place to another. Such argument is supported by survey data from different countries, reports the Foresight assessment, where they have found the dominance of social and economic drivers to migration globally, but increased dominance of the latter in low income countries (Foresight, 2011).

On a bigger scale, migration is a form of adaptation for climate-affected households. McLeman's work on migration as adaptation builds on the previously mentioned understanding of adaptive systems and resilience of

adaptive systems to environmental changes. While initial research on environmental migration conceptualized out-migration as a possible symptom of lack of adaptive capacity, McLeman and Smit (2006) understand migration as one of many possible adaptation strategies taken by a household. The authors assume that an option to migrate is not available to every household and when it is available, some households might not have any other option but to migrate, while others might have additional, more preferable options to adapt. Adaptive migration patterns affected by environmental changes are influenced not only by the intensity of such changes but also by the social, economic, political and cultural processes in the society (macro), community (meso) and household (micro) level (McLeman 2013b). Changes in those processes in any level to improve resilience might have feedback effects on the pattern of migration, which could in return have feedback effects on the adaptive capacity of source and destination areas (opt.cit.). In other words, migration may positively and/or negatively contribute to the resilience of sending and receiving communities, which in this study's case are rural and urban communities.

III. Case description: context of Mongolia

1. Socio-economic context of Mongolia

Nomadic pastoral systems are found in regions with the most climatic variability, where agricultural activities are not an efficient activity for maintaining livelihoods. In the same way, over the millennia, Mongolian herders have developed a sophisticated system of nomadic pastoralism. Their adaptation to the harsh local climate and accumulated ecological knowledge helped them efficiently make use of the dry grasslands of Central Asia, producing sustainable outputs that supply all of the basic nutritional needs of herdsman households (Fernandez-Gimenez 1999). Currently, pastoralism creates 30% of the available jobs and an important division of the country's economy, constituting 13% of the gross domestic product (NSO 2012).

The herding communities have faced two major political shifts in the last century, both drastically shaping and reshaping formal social systems, herding practices and pastoral land use patterns. Before 1911 during the feudal era, community-enforced informal regulatory systems and formal regulatory systems by noblemen coexisted to manage pasture land and population movements (Fernandez-Gimenez 2000). An official independence in 1911 and a political shift towards Soviet-Marxism in 1924 was followed by fundamental institutional changes overall and had major implications on rural communities, then constituting around 80% of the total population. With this shift, a new administrative system was introduced merging numerous territorial units into 21 provinces, each with its own provincial centers while defining Ulaanbaatar as the 22nd municipality, which is independent from the Central province (Tuv province) where it is located. By 1950, the livestock

based economy was transformed into an economy with mix of industrial activities and farming in addition to livestock agriculture (Neupert and Goldstein 1994). In 1960, self-sufficient livestock owners were replaced by centrally controlled collectives and planned industrialization rapidly took place. Traditional social organization was altered and a new system introducing schools and health clinics in the local centers, with addition of libraries, bakeries, shop, postal services was imposed. Herders were provided with winter shelters, transportation and water supply. In addition, scientific research in animal husbandry was actively undertaken with the training of veterinarians and livestock professionals (Fernandez-Gimenez 1999). It is thought that some of the traditional ecological knowledge was also lost during the process, since major strategic decisions were no longer needed to be made in the households. Although that may be true, it is also explored elsewhere that the local implementation of the new policies was flexible, leaving important parts of the traditional system intact along with improved pastoral practices through scientific approaches (Upton 2010).

Following the second major political shift towards market economy, the collective system was disrupted in 1992, livestock was privatized along with the previously provided winter shelters and transportation. As noted by Fernandez-Gimenez and Batbuyan (2004) a variety of social and environmental issues followed de-collectivization when “new” herders originating from urban centers disrupted the cooperative spirit of older herders through non-agreed pastoral land use. Although the region had always been prone to harsh environmental changes, political and economic conditions have made the herders exposed and sensitive to both market and environmental changes more than ever. In recent years, pastoral households multiplied in number, have reduced their mobility and shortened migration

circulations to stay near social services in provincial centers and most importantly, the markets to which they supply their products (Batima 2008).

2. Climate change vulnerability of Mongolia

Mongolia is a landlocked country occupying a territory of 1.56 million km sq., that falls into three major ecological zones; mountain steppe, steppe and desert-steppe. The climate of Mongolia is characterized by short dry summers, long cold winters and temperate spring and autumn in between. The temperatures throughout the country have been recorded to range between -49 C to +44 C and the amount of annual mean precipitation is low (300-400 mm), while potential evapotranspiration is high. Because of an already existing high variable local climate, Mongolia is considered to be highly sensitive to climate change and observed changes are documented already (MNET 2014). The Mongolian country assessment of observed climate change concluded that during the last 70 years, mean air temperature has increased by 2.14 degrees Celsius, while the world average temperature change since 1980 is about 0.8 degrees Celsius. Precipitation changes are estimated to be have changed differently from region to region - decrease of up to 12.5 % in central and Gobi desert regions, an increase of up to 9.3% in western and eastern part (Mandakh et al. 2008, MNET 2009). Impacts of such changes on local ecosystems, more particularly on the frequency of rain and snowfall, weather surface water, and permafrost are uncertain, but are confirmed to be already undergoing (Batjargal 1997, MNET 2009, WWF 2011). In this research, droughts, dzud and related environmental changes are to be analyzed closely in relation to human migrations.

2.1. Droughts and dzud

Droughts and extreme winter are considered to be two main pastoral risks related to weather disasters. dzud is a “Mongolian term for a bad winter that kills off many animals. dzud could be preceded by a bad summer with drought that decreases the amount of available pastureland, meaning animals are weaker going into the fall and winter. Winter is colder and has more snow than usual, so that animals cannot graze easily or are frozen to death” (Dinięga 2012). Dzud is what is called a compound event in climate science, when two or more extreme weather events occur simultaneously or successively, combinations of recent extreme events with underlying conditions that intensifies the impact or combinations of events that are not disastrous on their own but coupled together leading to disasters (IPCC 2012).

From recorded 11 incidences of winter dzud in the last 60 years, five were coupled with particularly intense drought in the summer (Reading et al.2006, Sternberg 2010). Extreme weather events have long existed in drylands of Inner Asia but recent studies imply that changes in the climate will have implications on the severity and frequency of the events. For example, Nandintsetseg and Shinoda (2013) concluded that during the last decade, there has been a greater severity and frequency of droughts and have driven a significant reduction in pasture availability in Mongolia. A similar statement is made on the increasing frequency of dzud events by Fernández-Giménez, M. E., et al. (2012) as well. Moreover, the frequency and distribution of drought and dzud events in the long term future (2070-2100) is estimated to increase substantially, especially in the northern parts of Mongolia (Bayasgalan et al. 2009). Another study by Tachiiri and Shinoda (2012) also supports that claim, concluding that the frequency of weather

disasters in Mongolia leading to high livestock mortality during the next 80 years will actually be lower than the past 80 years, but is expected to become highly severe following 2100 due to extremely high temperatures. Recent estimates derived from the modeling of climatic change impact on the frequency and intensity of extreme weather events concluded that with increasing intensity of weather extremes, the livestock mortality rate is to increase simultaneously, reaching as much as 10% by mid of this century (MNET 2009). Thus with climate change impacts, the extreme weather variations in Inner Asia are no longer just natural events, but partially a consequence of the human induced changes in the global climate. The fact that less responsible populations are bearing the brunt of the impact is a political as well as an ethical issue.

2.2. Land degradation and water scarcity

Land degradation and desertification in Mongolia is a pressing environmental issue that has direct impacts on the ecosystem quality (biodiversity, available water) and society (livelihoods and economy). The amount and scale of degradation in the country is conflicting between existing studies; 70% degradation is cited by most degradation related studies (Addison et al. 2012), other estimates of 90%, 80%, and 30% were also made in other works (Batsuuri 2009, Mandakh et al. 2008, Awaadorj and Badrakh 2007). Accordingly to Mandakh et al. (2008) the geographical distribution and intensity of land degradation is the highest in western and south eastern regions of Mongolia. Two dominant factors are identified as causes of this slow-onset environmental change: human activity factors (overgrazing) and climatic factors (changes in temperature and precipitation). Evaporation rate

of moisture available for plants and water availability is directly affected by changes in air temperatures, more so in regions where the annual precipitation had decreased (Mandakh et al. 2008). Although climatic factors of desertification are observed, it is agreed by the scholars in the field that human activities have caused the most damage to pasture land and that livestock numbers need to be kept within the pasture's carrying capacity (Mandakh et al. 2008, Batjargal 1997). However, a recent review of studies on land degradation in Mongolia concluded otherwise, stating that previous studies had often omitted the complex implications of climatic change on local environments and previously assumed dominant human causes of degradation do not completely qualify for any decision-making (Addison et al. 2012). Thus water scarcity and land degradation can and should be also addressed as one of the impacts of climate change related to length and intensity of occurring droughts.

3. Rural-urban migration and urbanization in Mongolia

In Mongolia, mobility was historically valued and movement towards resources was seasonally carried out by pastoralists, who were the main representatives of the Mongolian society. In accordance to the 1918 census, over 80 percent of the population lived in rural areas, which had dramatically changed following a major political shift into a Soviet regime in 1925. The population movement was controlled by the administration and people were moved to industrial centers for needed human resources (Neupert and Goldstein 1994). A large part of the planned migration was directed to newly built urban areas, which is documented to have started to happen during 1940s and 1950s (Bolormaa Ts. 2001) following the First Five-Year Plan of

industrialization. The capital, Ulaanbaatar was one of the main planned migrant receiving cities, although distribution was relatively even in other cities. In the 1960s, a new constitution was passed that restricted private ownership of livestock and private land holding, which led to the integration of nearly all former herders into collectives, where seasonal migrations and designated pasture land were, regulated centrally (Neupert and Goldstein 1994). By the 1970s, the urban population already exceeded the rural, 51% to 49% respectively (NSO 1999) and there was a substantial change from a migratory lifestyle to a gathered settlement. Internal migration in Mongolia during 1918-1990 thus can be defined to be mainly driven by political and institutional changes.

Following the disruption of the USSR in 1989, another political turn happened in 1990 towards democracy and market economy. Two major legislations have influenced population movements in the country. First is the national constitution, passed in 1992, which ceased the centrally controlled movement of the population. In the same year, the pastoral economy was privatized and that initiated major population movements from urban settlements to rural pasture land with intentions to care for their newly acquired private livestock. On the other hand, ongoing urbanization was intensifying due to the occurrences of coupled weather events – droughts and winter storms during the period 1999-2001. This movement trend from rural to urban had continued due to various reasons and presently, around half of the country's population of 3 million live in city of Ulaanbaatar alone.

The latest census survey based publication by the National Statistical Office (NSO, 2011) reports that many herders that have experienced loss of livestock have migrated to Ulaanbaatar, a pattern similar to findings of the previous

survey conducted in 2000 (NSO, 2002). Similarly to the national survey of 2000, many of the migrants in Ulaanbaatar are employed in unofficial sectors. The report also highlights the lack of proper housing and basic services such as electricity, heating and water services among migrant households. Urban agglomeration as well as inadequate housing solutions has had various negative impacts on the urban environment. A lack of modern energy services in newly expanded residential areas in Ulaanbaatar had been the main cause of heavy ambient as well as indoor air pollution in the city. The use of solid fuels indoors is emitting high levels of PM2.5 as well as PM10 pollutants with major health implications not only on migrants that have settled in ger districts but on the whole Ulaanbaatar population. Latest studies have estimated that about 10% of premature deaths in the city are attribute to ambient air pollution (World Bank, 2009), whereas 40% of lung cancer deaths and 29% of cardiopulmonary deaths in Ulaanbaatar are caused by ambient pollution (Allen et al. 2013). In addition to urban health issues, indoor combustion of solid fuels in Ulaanbaatar emits relatively high levels of greenhouse gases compared to the amount of energy produced, as well as carbonaceous aerosols such as black carbon that are global and regional climate pollutants.

IV. Methodological background

Chapter II (Literature review) provided an understanding of the climate change, environment, migration nexus and the evidence of need for empirical research the Northern-East Asian context and finally described the overarching framework for analysis. Chapter III (Case context) provided a general socio-economic, bio-physical context of the country under study – Mongolia, with explanation of historical migration movements and rates. This chapter reports on the fundamental methodological approaches of the researcher, ethical considerations in research, as well as data, materials and methods utilized in the process to address research questions set in the Chapter I (Introduction).

This study has multiple but interconnected objectives set within the context of environment and migration in Mongolia:

1. To identify regions of out-migration and in-migration spatially and find visual associations between droughts and human mobility in Mongolia;
2. To investigate how environmental factors have affected migration decisions of previously ecosystem-dependent households;
3. To reveal how migration to an urban center, Ulaanbaatar city, have impacted the livelihood of climate-affected households.

The first set of descriptive findings will set the stage for the empirical study, providing an overall understanding of movements and possible elements for sampling requirements for the later, qualitative analysis of migrants. Major contributions of the study lay in the empirical investigation of urban migrants, thus greater weight is placed on the qualitative analysis of urban migrants in Mongolia, which relates to Objectives 2 and 3. In the following sections, a

description of the research methodology, utilized data collecting and analyzing methods are provided, finishing with statements of reliability and validity issues regarding the research design.

1. Research methodology and design

Methodology and methods of a certain research work are separate issues however closely connected, together building the research strategy to be undertaken by the researcher. Methodology goes synonymous with a branch of philosophy, epistemology, which addresses fundamental questions such as: “what is knowledge?” ”how knowledge is created?” and “how can we know something to be true?” (Vargas-Silva 2013 p.7). Such fundamental understandings of logic of research is crucial in designing and implementing scientific research. As Creswell (2013) states, this general philosophical orientation, also called paradigms or ontologies, the researcher takes about the world and the research, need to be made explicit; explaining how such worldview shaped the researcher’s approach to research. In research of social phenomenon, particularly human migration, two school of epistemological thoughts are predominantly utilized; positivism and constructivism (relativism). Positivism or its more recent “edited” version - postpositivism is considered to be the more traditional form of scientific inquiry, deterministic in nature, where effects and outcomes have causes, that can be expressed (reduced) into models and theories, which then can be tested to refine, verify or falsify a statement. In a positivist/post positivist study, “research is the process of making claims and then refining or abandoning some of them for other claims more strongly warranted”, in such study, “knowledge is conjectural ..., (therefore) evidence established in research is always

imperfect and fallible” and “data, evidence and rational considerations shape knowledge” and “being objective is an essential aspect of competent inquiry...”(Creswell 2013 p.8). Positivist research often goes hand in hand with quantitative research designs.

Another major worldview that is usually discussed in comparison with positivism is constructivism/relativism. This worldview is often seen as the ultimate approach to qualitative research. Researchers with a constructivist worldview believe that:

...individuals seek understanding of the world in which they live and work. Individuals develop subjective meanings of their experiences – meanings directed towards certain meanings based on their historical and social perspectives, thus, qualitative researchers seek to understand the context or setting of the participants through visiting the context and gathering information personally. Researcher interprets what they find, an (the) interpretation (is) shaped by the researcher’s own experiences and backgrounds (Creswell 2013 p.8-9).

However both worldviews are heavily critiqued by its counterparts as well as by its advocates. Positivist research simplifies events – although providing useful models, the research is unable to explain how or why such patterns have emerged, leaving out valuable knowledge that could aid decision-making. While on the other hand a constructivist research describes and explains events as they are – although providing great insight and richness, the research findings cannot be generalized, undermining its credibility to inform decision making on a macro scale. As a response to these cons, more recent philosophical worldviews are starting to emerge in social research and this change in scientific inquiry in general is also being reflected in the field of human migration studies. One of such approaches is a social transformative

approach for social sciences, that rose in the 1980s and 1990s from group of people who believed that the postpositivist approach to social issues could not adequately address issues concerning the marginalized and segregated individuals or communities in a society, while the constructivists were not able to provide strong support for practical action to help marginalized people (Creswell 2013 p. 9). Social transformation approach is widely utilized in human migration studies as well; Castles (Vargas-Silva 2013) argues that migration needs to be understood as an integral part of social transformation itself, working across socio-spatial levels, from global to national and ultimately to the local. The author also emphasizes how research of specific migration experiences (empirics) needs to be linked to “broader studies of transformations of whole societies and how this is connected to global trends” (Vargas-Silva 2013 p.20). This holistic approach to studying migration calls for an interdisciplinary, mixed-method design, where quantitative data is important in understanding macro-level changes linked to the migration experience, while the qualitative, in-depth analysis are utilized to produce understanding of micro and meso-level changes and actions. Such approach is termed as the “explanatory sequential mixed methods”, where “...the researcher first conducts quantitative research, ... , and then builds on the results to explain them in more detail with qualitative research” (Creswell 2013 p. 15). In other words, by attempting to understand social processes through a social transformative approach, a researcher needs to be aware, at least in general, of forces at multiple levels – global, regional, local that may be shaping the case under study and link findings from the research to broader global issues, which may be not only be socio-political but also biophysical. Awareness of multiple levels in social transformation approach can readily be applied to any social research that is being addressed in context of global

climate change. As it was discussed in a previous chapter of this report (Chapter II), most of climate change social research utilizes the concept of socio-ecological systems and vulnerability of social units in this system to the changing climate. Such vulnerability in fact can be assessed in many levels and adaptation measures can also be taken at different levels. By utilizing the social transformative approach to research, this study specifically looks at vulnerability and adaptation at the household level while staying aware of the local, national, global socio-political systems.

With influences of the social transformative approach, in essence, this research is dominantly qualitative in nature. The study does not aim to find quantitative or predict relationships between environmental changes and human migration. Quite rather the opposite, this research aims at exploring the complexity of past household adaptations to better understand past and present social discourses that are influenced by the changing climate and environment, taking migration as the core human response to be studied. While quantitative inquiry can provide robust results if the sampling and contextual information is accurate and available, it cannot explain why or how such results may have made to be. In studies such as this, where the context is inseparable from the social phenomenon under study and where previous similar studies have not been made to provide with enough contextual information, qualitative research would provide with knowledge, illumination, and understanding on why people make the decisions they do and what may have influenced the decision-making. Qualitative data in this particular research is also warranted by the nature of the social phenomenon and research questions to be addressed. Human migration, especially human migration induced by environmental changes directly or indirectly is a complex process, with influences of both the agent – migrant and the structure

the migrant is in – biophysical and socio-political characteristics. Given the nature of this research, where the contemporary phenomenon (human migration) cannot be fully separated from its context (bio-physical, socio-economical) and the factors being investigated (environmental motivations behind migration) cannot be treated in separation from other motivations of migration (social, economic, political, cultural) – a strategy that meets the characteristics of this research and its goals is an empirical case study of migration experiences. This study also has characteristics of a cross-sectional study, looking at 12 migration experiences at one instance, looking for differences and similarities between these experiences.

2. Data collection and research methods

In research of migration in context of environmental changes, two types of research designs are widely used: first, an agent based qualitative data extraction and analysis to understand migration behavior at the household level and second, a more structural approach through quantifying migration responses to the impacts of the environment geographically and statistically, through surveys (IOM 2008). Piguet (2010) identifies two research strategies that are predominantly equipped in empirical study of environment and migration in a more detailed manner. First is a descriptive study, as the author discusses, focusing “on the identification of the main regions threatened by environmental degradation (the so called hotspots) and an assessment of the vulnerability and resilience of their inhabitants” and the second research strategy is mainly “analytical and attempts to disentangle the impact of the environment from other migration drivers, ... empirically, it questions the role and weight of environmental factors in already happening human

migrations” (opt.cit. p.2). This study however, aims to explore not only the behavioral aspects of effects of droughts and dzud on migrations but as well as the more general trend and pattern of migration in relation to drought stresses. Thus drawing from methods used in previous studies, this study starts with an overall spatial analysis of human migration in Mongolia to produce visual illustrations of past patterns and migration flows at the national level, discovering regions that have experienced the most out-migration (sending communities) and most of in-migration (receiving communities) in order to capture spatial associations of droughts and rural-urban migrations. Once such broader movements are identified, the empirical research in this study is interested in exploring migrants’ experiences as well as views within an urban environment, to study in-depth questions such as why did they migrate, how did they migrate, what did they do to adapt before migrating, how are their integration experiences in the urban center. Detailed list of interview questions can be found the Appendix section (A1, A2). In the following sections, selected data collection and analysis methods will be discussed in detail, explaining how and why such methods were used to address proposed research questions.

2.1.Mapping out-migration and in-migrating hot spots with association to regions with high drought stress indexes

Human migration is a spatial phenomenon, thus an attempt to understand this phenomenon, a researcher is recommended to consider spatial settings and circumstances (Vargas-Silva 2013 p.121). In order to identify main regions, population movements of which could have been affected by droughts, an initial calculation of province-specific net-migrations was conducted.

Province specific net migrations (difference of immigrants and emigrants of an area in a period of time) were measured indirectly through vital statistics method [1] (UN 1970). Demographical data (birth, death rates and total population estimates) that was used in the calculations were acquired from the open access online database of National Statistical Office of Mongolia (NSO, n.d.). To compare the net migration between provinces, net migration rates (net migration per 1000 inhabitants) were identified for all provinces [2]. The net-migration estimates were then combined with Geographic Information Systems (GIS) shape file to produce maps, illustrating out-migrating hot spot provinces and in-migrating hot spot regions. Then the out-migration hot-spot maps from period 1997 to 2008 were stacked with drought stress index map developed by Lee (2015), which captures drought frequency and intensity in Mongolia from 1998 to 2008. This visual correlating approach suggested by McLeman, Herold et al. (2010) was developed “to support qualitative field research into drought adaptation and migration” (opt.cit.) by identifying populations that may have moved out due to exposure to droughts and drought-related environmental degradations in retrospect.

Calculating net-migrations [1]:

$$\text{Net } M = (P_{t+n}) - P_t - (B-D)$$

P_{t+n} – altered population size

P_t – original population size

B – number of births

D – number of deaths

Calculating migration rates [2]:

$$m = M/P * K$$

M – number of migrants

P – population exposed to the likelihood of migration

K – constant 1000

2.2. Qualitative inquiry of rural-urban migrations

2.2.1. Data collection: site and sample selection

This study utilized what is called the non-probability sampling or purposeful sampling. The target population were rural-urban migrant households in an urban center, who were practicing livestock agriculture before migration. Such population constitutes about 30% of the total country population practicing more or less traditional ways of living; pasture-fed nomad or semi-nomad livestock owners or farmers. This target group's livelihoods, the quantity and quality of the grown livestock and/or crop, is highly dependent on the state of the weather and the surrounding environment.

Site and samples to collect data were selected based on the mapping of migration movements in relation to droughts stresses. The main hot-spot of in-migration – Ulaanbaatar was selected as a data collection site and the participants in the study were contacted based on the following requirements:

1. The migrant household's origin (sending) rural locale. A province that they have out-migrated from, which may be one of four out-migrating hot-spot provinces, Uvs, Zavkhan, Khovd, Govi-Altai. These provinces are also regions most prone to droughts and ultimately winter disasters – and land degradation.
2. The migrant household's livelihood dependency on ecosystem services. The participant household income needed have been mostly dependent on agricultural activities prior to or after migration, such as animal husbandry and/or farming.

3. The timing of out-migration. The participant household needed to have in-migrated after the year 1998, a year when a major country-wide drought had started, followed by a 2 year-long winter disaster (dzud).

In addition to urban migrants, key-informants such as academics, experts, project officers in fields of environment, climate change, migration and urbanization were identified to gather information on their opinions on past and current rural-urban migrations, environmental impacts and climate change adaptation. The key-informants will provide with useful background information as well as insights into perspectives of researchers/academics who inform policy making in rural and urban development, internal migration and climate change.

2.2.2. Qualitative data collection technique

Under the general framework of qualitative analysis, a researcher can adopt various data collection techniques including but not limited to interviewing, ethnography and participant observation, biographical research, critical discourse analysis, qualitative surveys. The most widely used method in qualitative inquiry, interviews, can be strictly structured, semi-structured or open ended. There is an overall tendency of treating qualitative interviews as a research tool that is utilized with social constructionist (interpretivist) approaches in order to “obtain(ing) interviewees’ interpretations of their experiences and their understanding of the world in which they live and work” (Rubin and Rubin 2005 p.36). However, this tendency is being actively questioned in the recent years, with emergence of realistic, social transformative approaches to research as mentioned in the research methodology section.

Qualitative interviews can provide in-depth grasp of the matter of concern, particularly the participants' perception of the matter. Wengraf (2001 p.6) defines the act of in-depth inquiry as "to get a sense of how the apparently straightforward is actually more complicated, of how the "surface appearances" may be quite misleading about "depth realities". While it is well known to qualitative researchers that "(they) do not uncover real social structures by interviewing people in-depth" because not all of social reality can be revealed since some realities are shaped outside our consciousness (Archer 1998 p.199), Iosifides (2011) in return argues that "it is equally true that rich insights, data and information obtained through depth interviewing always tell us something about social reality and its real causal powers because agential social practices and actions are related to, conditioned and influenced by emergent structural and cultural properties" (Creswell 2013 p. 179). This researcher shares the same beliefs about qualitative inquiry; although qualitative inquiry might not give a full picture of social reality, that is theoretically generalizable, it still can show a part of this reality if the inquiry is theory driven, designed and analyzed with awareness of bigger socio-political structures.

This research therefore utilized a semi-structured interview method to collect data about migration experiences and investigated five main themes of inquiry: the participant's perception of the roles of environmental factors in migration decision, their experience of migrating to the city, their urban integration issues after settlement in the city, their perception of urbanization and heavy out-migration and lastly their connection with the sending community. The interviews were structured to ensure that the interview had a clear direction and theme but there were also be possibilities for participants

to express personal perspectives and explain as well as expand their answers. The study also utilized the same strategy- semi-structured interview method to understand perspectives of key-informants: key researchers and experts on environmental change, climate change impacts, migration and urbanization in Mongolia. This provides the research a certain characteristics of triangulation and richness – different accounts of the same phenomenon, where the collected data can be compared and contrasted.

In order to explore these themes, the qualitative fieldwork took place in Ulaanbaatar, Mongolia and lasted for about 3 weeks, initiating on March 16, 2015 and terminating on April 3, 2015. The interviews were conducted by the author in the participants' native language – Mongolian, with except of one interview with a visiting international expert with whom the informative interview was conducted in English. Since the research involved human subjects, measures were taken to ensure the ethical righteousness of the data collection and data management. Before conducting the qualitative fieldwork, the research proposal with list of questions designed for interviews was sent to the Institutional Review Board of Seoul National University to be overviewed in order to safeguard the wellbeing of the human subjects involved in the study. The study proposal was certified on the 1st of March 2015 by the review committee (IRB No. 1503/001-012), permitting start of fieldwork in Mongolia.

The participants were contacted on convenience sampling basis, snowballing from initial 3 to 12 people who met the above listed characteristics. Migrant participants were contacted through phone calls to set time and date of the interview beforehand. Before the interviews had started, all of the migrant participants were asked to identify themselves and go over a research

participation consent form that was also certified by the Institutional Review Board of Seoul National University on March 1st, 2015. Each migrant was asked the same set of questions with six main themes: history of migration, motivations behind migration, reasons of migrating to Ulaanbaatar, livelihood changes before/after migrations and their perceptions of continuous out-migration from the rural into urban regions. During migrant interviews a migration history chart was used to assist the conversation and note important points. After about 30-40 minute long interview, each migrant-interviewee was awarded 10 000 tugriks to compensate for the time spent participating in the study. Key-informant participants were contacted via e-mails or phone calls beforehand to set the time and date of the interviews. Three common themed questions were asked of each key-informant, addressing their opinions on the reasons of rural-urban migrations in Mongolia, the impact of environment and weather events in household livelihoods and their opinions on rapid urbanization and population decline in rural regions. All of the interviews were recorded on a voice recorder, kept in a password-protected computer which was informed during the consent form illustrations. Detailed list of research participants and their characteristics can be found below in Table 3 and Table 4.

Table 3 Interview participants, urban migrants

Interview participant	Characteristics	Occupation	Migrated from	Migrated year
Migrant 1	Male, 30s	Informal	Uvs	2011
Migrant 2	Male, 50s	Informal	Zavkhan	2006
Migrant 3	Male, 60s	Guard service	Uvs	2010
Migrant 4	Female, 40s	Informal	Uvs	1999
Migrant 5	Female, 40s	Informal	Uvs	2009
Migrant 6	Female, 50s	Informal	Uvs	2000
Migrant 7	Female, 60s	Informal	Khovd	2003
Migrant 8	Female, 30s	Informal	Khovd	2006
Migrant 9	Male, 30s	Informal	Govi-Altai	2011
Migrant 10	Male, 50s	Construction	Zavkhan	2004
Migrant 11	Female, 50s	Apt. maintenance	Khovd	2011
Migrant 12	Female, 60s	Apt. maintenance	Govi-Altai	2006

Table 4 Interview participants, key-informants

Interview participant	Occupation	Field
Key-informant1	Academic researcher	Droughts and dzud
Key-informant2	Government officer/researcher	Weather events and rural livelihoods
Key-informant3	International NGO officer	Urban services
Key-informant4	International NGO officer	Migration
Key-informant5	NGO researcher	Climate change vulnerability in rural regions

2.2.3. Framework for data analysis

Stories of urban migrants were treated as data referring to and representing effects of droughts and impact of migration in terms of experiences. This researcher was more concerned with the content of the data and less concerned with how data was expressed and structured. To help focus the interviews towards main objectives of the research, the interviews were initially structured according to themes, which also eases the analysis of the collected qualitative data. The six main themes were developed accordingly to the objectives of the research for migrant participants and 5 main themes for key-informants, three of which share common topics (Table 5). Detailed list of the questionnaire can be found on the appendix section (A1, A2).

Table 5 Interview themes in relation to participants

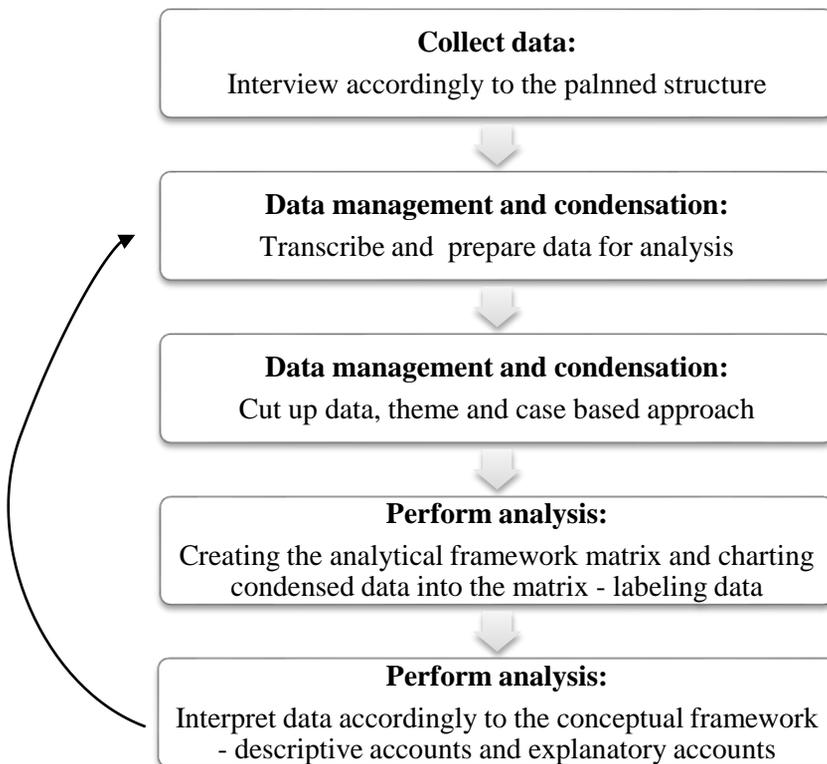
Themes	Urban migrants	Key-informants
Shared themes of interviews	Motivations behind migration (Push factors, migrants perception of why they have migrated)	Key drivers of rural-urban migration
	Livelihood damage, loss, improvement (Impact of the environment on livelihoods, urban integration success)	Impacts of environmental and climate change on livelihoods of ecosystem-dependent households
	Perception of heavy out-migration and urbanization (impact of migration on rural and urban communities)	Perception of heavy out-migration and urbanization (impact of migration on rural and urban communities)

Different themes of interviews	History of migration (how did the migration happen, intervening factors)	Varied among participants
	Reasons of migrating to Ulaanbaatar (Pull factors, factors that enables migration to the city)	Varied among participants
	Adaptation measures taken before migration	Varied among participants

This research had adopted the Framework Method for managing and analyzing qualitative data collected via semi-structured interviews during fieldwork in Ulaanbaatar, Mongolia. Like many other approaches to qualitative data, this method allows comparison and contrasting of qualitative data systematically. Figure 2. below illustrates graphically the approach that was adopted to analyze data acquired from the semi-structured interviews, based on the Framework Model approach of analyzing qualitative data (Gale, Heath et al. 2013). The outcome of the Framework Model is a analytical framework matrix, through which the researcher can conduct analyses cross-cases and inside cases while still keeping connections of data to their cases (interviewees). The sequence of the data management and analysis follows the analytic hierarchy, where the “qualitative findings are built from the original raw data” (Ritchie and Lewis 2003 p.217) and the three main forms of activity - data management, descriptive accounts and explanatory accounts are conducted one after another, while still being iterative.

The raw transcripts from all respondents were categorized on a spreadsheet accordingly to questions asked during interviews. This allowed the researcher read and manage data cross-themes and cross-cases at the same time. Then the data were condensated and put into the working analytical framework

matrix, developed accordingly to the conceptual framework described in Chapter II (Literature review). Total of five charts were built: Migration decisions (economic, environmental, political, social, demographic factors) and effects of droughts and dzud changes on; Migrating to Ulaanbaatar (intervening/ enabling factors) and effects of droughts and dzud on; Impacts of droughts and dzud on livelihoods/well-being of affected households; Impacts of migration (urban life) on livelihoods/well-being of affected households; Impacts of migration on livelihoods of non-migrant households), all together encompassing 19 sub-categories.



Source: Constructed based on Richie and Lewis (2003)

Figure 2 The Framework Method approach to analyzing qualitative data

3. Research reliability and validity

Qualitative inquiry and analysis results in a different kind of knowledge than quantitative inquiry. Due to fundamental epistemological differences, the concept of reliability and validity in qualitative research differs from what is understood as reliability and validity in quantitative research. Even so, the most general understanding of the concepts – reliable or “sustainable” research and valid or “well-grounded” research, as Ritchie and Lewis (2003) argue, need to be applied in order to ensure the quality of data and its interpretation. To ensure research quality, the authors stress the importance of full and appropriate use of the evidential base and detailed display of research methods, analytic routes and interpretation to the readers. This researcher holds the same views regarding reliability and validity of qualitative research practice and had thus attempted to provide detailed descriptions of the ways data was collected, managed and analyzed wherever possible.

The issue and ability of generalization is closely related to reliability and validity of research and is also often addressed when discussing the differences between quantitative and qualitative research designs. When conducting qualitative research, it is useful to mind the different levels of generalization (theoretical, inferential and representational generalization (Ritchie and Lewis, 2003) that can be made from findings and also the limits qualitative research has in terms of those levels of generalization. But it does not necessarily mean that qualitative inquiry cannot provide any representational knowledge. This researcher conceptualizes representational generalization in qualitative research as defined by Lewis and Ritchie (2003, p. 269) that qualitative research “cannot be generalized on a statistical

basis...(r)ather, it is the content ... of range of views, experiences, outcomes or other phenomenon under study and the factors and circumstances that shape and influence that, that can be inferred to the researched population”. Similarly to Lewis and Richie (2003), this researcher also believes that differences in individual opinions and attitudes from migrant to migrant is given but it is at the bigger level of categories and concepts qualitative findings can be considered representational of the parent population - climate-induced urban migrants in Ulaanbaatar, Mongolia.

V. Findings and discussions

1. Mapping out-migrating and in-migrating hotspots in relation to droughts stresses

Through the maps of net out-migration rates per province (Figure 3), it is possible to see that rural out-migration has been an ongoing process since the 1990s. However the rate can be seen to have intensified during the period of 1999 - 2007, especially in Western provinces of Uvs, Zavkhan, Khovd, Govi-Altai and central provinces of Tuv and Dundgovi, where net out-migration had reached cumulative of over 250 out-migrations per 1000 inhabitants in the regions. Even in the later period of 2008-2013 when out-migrations rates had slowed down through-out the country, net out-migrations in Uvs, Zavkhan, Govi-Altai Dundgovi can be noticed to be comparatively higher than in other provinces. Based on the maps of net in-migration rates per province (Figure 4), it is very clear to see that the main in-migration hot spot is the capital city Ulaanbaatar, especially during the period from 1999 – 2007 (over 350 net in-migrants per 1000 inhabitants). This in-migration is less

concentrated during the third period between the year 2008 and 2013. Net in-migration can now be found in other urban centers such as Darkhan Uul, Govisumber and a heavy industry development province – Umnugovi.

When the drought stress index map developed by Lee (2015) and out-migration map covering the period between 1999 - 2007 are combined (Figure 5), there is a noticeable degree of visual correlation between drought stress and population loss among western provinces of Uvs, Zavkhan, Khovd, Govi-Altai and Dundgovi. Similarly to Mcleman et al. (2010) study of droughts in Canadian prairies, it can be stated here that heavy out-migration (over 250 out-migrants per 1000 inhabitants) in these five provinces – Uvs, Zavkhan, Khovd, Govi-Altai and Dundgovi may have been affected in various degrees by droughts and drought-related environmental changes, such as pasture land loss and water scarcity.

1991-1998



1999-2007



2008-2013

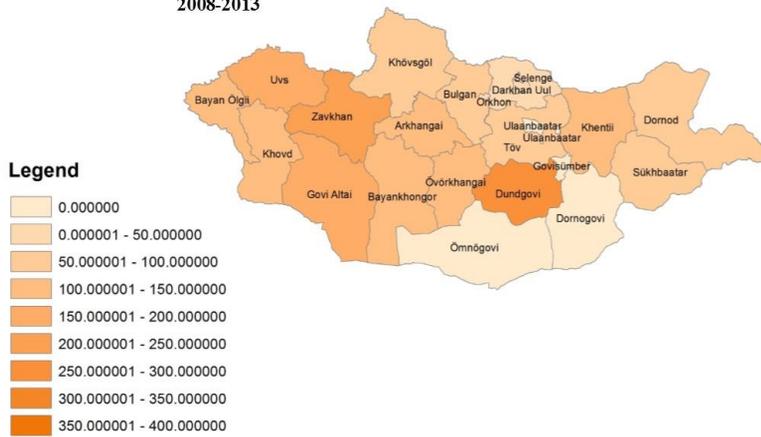


Figure 3 Mapping of province-specific net out-migration rates, number of net out-migrants per 1000 inhabitants.

1991-1998



1999-2007



2008-2013

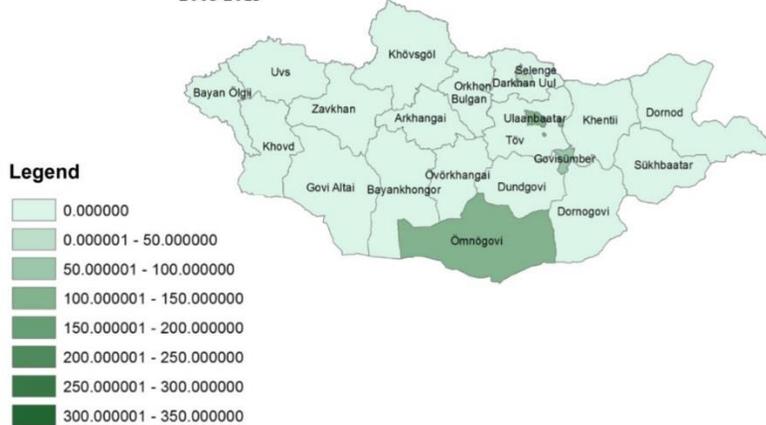


Figure 4 Mapping of province-specific net in-migration rates, number of net in-migrants per 1000 inhabitants.

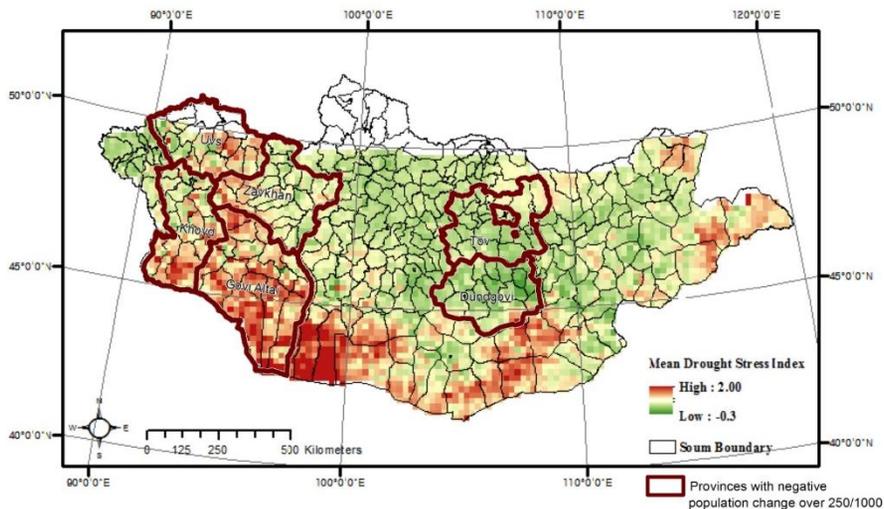


Figure 5 Mapping of out-migrating hotspot provinces 1999-2007 (author) in relation to drought stress map of Mongolia 1997-2008 by Lee (2015)

2. Decision to migrate to Ulaanbaatar and adaptation strategy of climate-affected rural households

All 12 migrants that have participated in the in-depth interviews came from households whose main livelihoods were dependent on traditional, free range livestock agriculture and/or small private crops before migrating to Ulaanbaatar. There were almost an equal number of female and male migrant participants, with slightly more female than the male participants. The typical profile of a participant is a man or a woman in their adult life – 30s, 40s, 50s and 60s, whose children were born in rural regions. Many of the older migrants had one or more children already living in the city. The timing of migration to Ulaanbaatar varied, ranging from just after the drought – year of 1999 to as recent as 2011. The amount of livestock migrants had before droughts and dzud also highly varied, some had as many as 550 heads while

others had about 20 heads of cattle, horses, sheep, goat and/or camels. Some of the participants also had their own small-scale crops, growing staple vegetables such as potatoes, carrots, cabbages et cetera. Livestock loss due to droughts and dzud of 1990 were different as well; many said to have lost most of their livestock, some mentioned to have lost less than others. Most of the participants in this study had informal jobs – selling clothes and other small goods in markets, while some served food and tea along the streets of the markets. While a small number had official occupations working in building maintenance; or construction, which offered better wages.

2.1. Effects of droughts and dzud on migration decisions in rural-urban migrants in Ulaanbaatar

2.1.1. Droughts, livestock loss and decision to migrate to Ulaanbaatar

a. Effects of droughts and dzud on economic factors of migration

Majority of the respondents, 8 out of 12, expressed a direct link between extreme weather events and their decision to out-migrate. They have migrated to an urban center, Ulaanbaatar, looking for employment after losing livestock from the dzud, which had occurred between the years 1998-2001 and in a few cases between the years 2008-2011 in sending rural regions. A female respondent who had migrated from Govi-Altai province due to loss of her family's livestock explains that because there was no other source of income, her family had to move to the city to provide for themselves:

I think it was in 2000, there was dzud and we were left with no more than 20 sheep, goats and one orphan calf ... We lost 90% of our livestock, our country people have generally lost 70,80,90%. The few livestock left could not enough to support us. Our family had many

members, we had no pension. And we came here (Ulaanbaatar) without a choice (Female in her 60s, migrant from Govi-Altai).

A similar story is told by a migrant from Uvs province, where she clearly states that before the dzud, she had no intentions to move to the city but circumstances had made them migrate to the city, looking for other sources of income:

We lost our livestock and we moved here straight away. We originally did not have any intentions to move ...we did not have much livestock, barely over 100, but after the 1999, 2000 year dzud, the few livestock we had were lost, leaving us with one cattle and calf. In order to live and to work, we took our child with us and moved here [Ulaanbaatar] (Female in her 50s, migrant from Uvs).

Damage and loss experienced from extreme weather events such as droughts and dzud in 1999 and 2000 have had direct impacts on herding household's decision to migrate into urban centers. The initial unwillingness to move but having no choice but to move due to lack of jobs in origin rural areas illustrates significance of the state of existing socio-economic systems in deciding to migrate.

In addition to their personal intentions, when asked of their opinions on heavy rural out-migrations in recent years, migrants explain how after the dzud, many people they knew were looking for other means of making a livelihood, however due a to lack of jobs in rural regions, these affected people had no choice but to move to provincial centers and/or urban centers such as Selenge, Darkhan and Ulaanbaatar. A migrant from Uvs province explains that coupled weather events one after another and its impacts on people's livestock made people from her rural home community want to move to cities:

No grass was growing in 2008 and in 2009 when cattle could not get enough fat, in 2011 there was dzud ... it gets really hard. In general,

people lost half of their livestock...After the dzud, for a while, many people moved out. Many move to the city [Ulaanbaatar]. Our people moved to the city Nalaikh [satellite city if Ulaanbaatar], Tuv province and there are people even in Darkhan [city in Darkhan-Uul province] (Female in her 40s, migrant from Uvs).

The same experiences of damage and loss by other households in their community as well as the same linkages between a household's damage and loss and their decision to move to urban centers were observed by the migrant. Migrants were observed to be well informed of the main destinations their community members move to, illuminating social networks that enable migration to certain destinations which will be discussed later in section 2.2. In addition to feelings of loss and damage, throughout the interviews, there was a consistent expression of feelings of uncertainty and risk in practicing agriculture in their homelands. According to some migrants, livestock was considered not reliable and risky due to chances of future droughts and dzuds:

Overall, it had become problematic to develop agriculture, especially free range livestock production will be in greater trouble. The number of livestock is currently rising and although there has not been another dzud similar to the one of 2002s, there is still likelihood of it happening in the future (Male in his 30s, migrant from Uvs).

Here [Ulaanbaatar], a person with skills can work and make money. Livestock is not like that, it is risky. There are good times, but livestock just finishes after a day or night of heavy storms (Male in his 50s, migrant from Zavkhan).

The feeling of risk was expressed by other migrants in respect to their economic stability and health. Concerns over health were mostly raised through stories of others in their home community. A woman who migrated from Khovd province talked about a female relative who was pregnant and gave birth during the dzud of 2008-2011. She talked about how when she

visited them last year the 4 year old boy was smaller than her own 3 year old. The negative impact of extreme weather events on the growth of rural children was also statistically identified by Groppo and Krahnert (2015) through their recent study in Mongolia. In addition to direct negative impacts of loss of livestock on the well-being of herder households, water scarcity was also pointed out as not only a threat to agricultural produce but also to human wellbeing. A migrant from a drier region of Mongolia discusses how droughts have induced a lack of water in her homeland – water scarcity is addressed in relation to not only the health of people in her community but also her attitude towards practicing agriculture in the future:

Guulin [migrant's homeland] is originally a nice land with river and water, but when there is drought, water becomes scarce and human, livestock without a difference die. And the plants stop growing; if there is no water they dry out. There is no hope [for agriculture] (Female in her 60s, migrant from Govi-Altai).

b. Effects of droughts and dzud on environmental factors of migration

All migrants have noticed changes in the environment in their home rural regions, which is not a surprise because as other scholars have noted previously (Marin A. 2010), livelihoods of Mongolian pastoralists heavily depend on the weather, thus they pay close attention to weather events and human activities that influence pasture and livestock production. While more sudden extreme events such as droughts, dzuds were mentioned by all migrants, stories of more gradual, long-term changes were also shared with the researcher. Almost all of the migrants have said that they started noticing changes in the environment in their rural homelands throughout the last one or two decades. Changes in weather patterns – the amount or length of

precipitation and frequency or intensity of storms and winds were discussed by some migrants in conjunction with pasture land degradation. Some said that changes in water and pasture started becoming noticeable after the change to a market economy in the 1990s, while others said that changes had started after the drought of 1998s. While some link such environmental changes with human activity such as cutting down forests and mining for minerals, others expressed how unusual these changes were and how they do not understand why such changes are happening in their home lands:

I am always in contact with them [home rural community], I ask how our land is – and nothing; many were affected by droughts, there was no rain. *How this have happened - do not know, [we] do not understand at all* (Female in her 60s, migrant from Govi-Altai).

Another migrant elaborates on the unusual changes in weather patterns she had been noticing before moving to Ulaanbaatar:

Of course there is pasture land degradation, after Dzud there were less greens. There was no grass, it started becoming drier. Droughts have increased, rain and snow have decreased, wind and storms have increased, and occurrence of various natural events has increased. When it does rain, it rains heavily – these kinds of things are happening (Female in her 60s, migrant from Khovd).

This feeling of unfamiliarity from observing weather events in their rural homes shows how changes in weather patterns can affect herders' feeling of livelihood security. Migrant's continuous awareness of the rural environment and ongoing weather events in rural homes even after moving to urban centers indicate that there is an active and ongoing environmental information transfer between rural communities and urban migrants which may also affect the migrant's decision to stay in the urban destination or return back to their rural homes.

Changes in the biodiversity of animal and plants and the drying of rivers were

also brought up into the conversation by migrants. One respondent recalls how her homeland environment was “rich” when she was growing up as she remembered her uncle warning them of being bitten by wild pigs in the woods and how to cross the river they needed to ride camels because the waters were so deep. Now, she recalled with disappointment, that there are no longer signs of any wild pigs and the river she grew up next to is shrinking – a person could cross the river on foot and the water would barely reach their stomach. Other migrants addressed land degradation as a pressing issue in their rural homes:

There was pasture land degradation during the dzud of 1998. There was no rain, the pasture is fed by water and snow, but either due to lack of water or something, there was heavy pasture land deficit which led to livestock hardship (Male in his 60s, migrant from Uvs). In the Gobi region, near to Altai [migrant’s homeland] there is some desertification. Pasture, greens do not grow; no snow or rain. And there was also drought. I think people have left because there is no pasture anymore (Male in his 30s, migrant from Govi-Altai).

Here, pasture land degradation, desertification and water scarcity were particularly associated with livestock hardship and ultimately out-migrations in their rural communities. In addition to sudden changes in the environment due to extreme weather events, previously mentioned slow-onset events such as land degradation, water scarcity do seem to play notable roles in migration decision of rural households.

c. Effects of droughts and dzud on social factors of migration

By no means have droughts and dzud been the only factors affecting rural household’s decision to migrate to cities. While the loss of livelihoods and ultimately their jobs were a critical push factor, many migrants with pre-

school age, pre-university aged children have also mentioned there being a lack of high schools and higher education opportunities in their rural homes. Migrants explained that they migrated to the city seeking a better future for their children. For migrants who already had children/kin studying or working in Ulaanbaatar it was evident that another dominant motivation for migrations into Ulaanbaatar was family/kin circumstances – a desire to live close to their sons/daughters, obligations to look after their children, grandchildren and et cetera. Although these migrants did not specifically express their motivation to migrate in relation to environmental factors in the beginning of interviews, when asked about their experience of the 1998-2001 dzud, they seemed to be reminded of the experiences during the dzud years and even recall how they felt at the time. A man, who was affected by the dzud of 1998-2001 relatively less compared to other interviewees in terms of livelihood, mentioned how the extreme weather event affects herders in multiple ways:

I was there [rural Zavkhan province] during the dzud, having my livestock die. We had almost 100 small livestock, at least 50 died. That dzud of year 2000 was huge. Losing so much livestock first affects the herder's livelihood, secondly the herder's mind. Another reason to come here for me [in Ulaanbaatar] was because I lost my son in Baruunturuu. Then I thought that it does not longer matter where I live...Instead of sitting like this, I decided to follow my daughter (Male in his 50s, migrant from Zavkhan).

This migrant's story illustrates how weather events have affected him not only economically but also psychologically; how the weather events as well as unfortunate events in personal life have reduced reasons or attachments to stay in rural homeland. Other older interviewees also mentioned how they had different reasons to migrate – taking care of their children in the city, looking after their grandchildren so that their children could work. Migrants

who mainly mentioned social factors behind migration - when questioned about the dzud of 2000s, they do speak of their losses during the drought and dzud with slight reservations from the researcher. They spoke of their hardships, while at the same time insisting that they have migrated to the city for their children's education. This could mean that the loss of livestock might have pushed herders over a tipping point along other already cumulative reasons to migrate to Ulaanbaatar, affecting migration decisions indirectly.

d. Effects of droughts and dzud on political factors of migration

Older migrants, who were working adults during the shift in the political system in Mongolia, a change from a centrally planned economy to a market economy, have also emphasized the impact of such changes on their livelihoods. Migrants in their 50s and 60s mention how previously their home regions were a thriving collective state farm/ utility service centers but with change of government in the 1990s, everything was divided into private hands, costing them their jobs and communities. These participants have also said that due to the loss of previous jobs, they had started becoming dependent on their private livestock, which was partially and in some cases almost fully lost during the dzud of 1998-2001. A woman who used to work in a collective farm in Govi-Altai in the 1980s and resettled in Ulaanbaatar in 2006 explained:

Since the privatization of 1991, there were no homesteads to settle and the few livestock we had was also privatized and moved away. Before all of that, Guulin was a center for three great sectors: feed production, water services and tree farming, and after privatization, everything fell apart and what was left was a village (Female in her 60s, migrant from Govi-Altai).

After the fall of collectives, the place where this migrant used to live and work

was reduced to a small village from a once prosperous agricultural center. This was mainly caused by political shifts in 1990s that led to changes in economic and population mobility policies in Mongolia which have contributed to major migration movements towards urban centers.

Political shifts in the 1990s that led to the re-division of administrative areas of provinces, pastureland between “bags” (group of herding households) have also intensified existing intercommunity and interethnic tensions in Western regions of Mongolia. In some cases that the respondents explain, the tensions between people from different households and different communities had turned into conflicts due to a lack of pasture land and/or water:

When many households grow crops the one big stream of river is not enough. That is why people have conflicts ... (Male in his 50s, migrant from Zavkhan).

In my homeland, there is a place called Tsagaan hutul, the place had finished its livestock during dzud ... There was no pasture left after the dzud, therefore for 3 years, the whole place was prohibited of grazing livestock animals and people who used to have summer homesteads [seasonal grazing land] there were pushed out. The first year was full of conflict; of course people who had settled there for many years would not want to move out (Male in his 30s, migrant from Uvs).

Although mentioned by few, natural resource scarcity in drought- and dzud-affected rural regions do seem to have induced local conflicts or enforce existing conflicts over land allocation caused by the changes in administration in recent decades.

e. Effects of droughts and Dzud on demographic factors of migration

As explained previously, many migrants have expressed how much of their homelands' population have moved out after the political change in 1990s

and dzud of 1998-2001. Accordingly to the opinions of migrants, the resulting small population in rural regions is ultimately linked to the lack of employment, lack of markets to sell their agricultural produce and a lack of social services in their home lands. As an example of the magnitude of the out-migrations from rural regions, a migrant from Govi-Altai point out how few children are started school with her grandchild, which according to her is a result of the declining of population in her village. In rural sending regions, a change in the ethnic structure of the population was also mentioned as one consequence of heavy out-migration. Although the migrant did not express dislikes of the change verbally, her attitude towards the current ethnic structure of her rural home land was notable:

From the year 1997 to year 2003 almost everyone moved here. Now our land is kazakh and kazakhs will not come here [Ulaanbaatar], no matter what. That is why everyone who are left there [rural home] are kazakhs (Female in her 30s, migrant from Khovd).

Changes in demographic and ethnic structures due to droughts and dzud induced flow of population movements towards urban centers as well as to other rural destinations. This may feed future demographic, economic and social factors of migration in rural regions, while at the same time positively or negatively affecting the urban migrant's decision of returning to rural homes.

2.1.2 Droughts, Dzud and intervening factors in migrating

A finding consistent across all respondents was the importance of social and kin networks in deciding to migrate as well as during the process of migrating to Ulaanbaatar. Almost all migrants had family members in the city, connections who provided them with information of job markets and/or

provided land to settle temporarily. If not relatives, many of the older migrants had children already living in the city. A few migrants that did not have family in the city had someone they got to know during their previous visits to Ulaanbaatar. There were also migrants who have moved into Ulaanbaatar based on information about the urban life from relatives already living in the city. For example, one younger migrant described the way people are motivated to move to cities by what they hear from their relatives in the city:

People from here [Ulaanbaatar, central regions] say that life in the city is good. Life is better here. They say that where ever one goes, people are living decently here. That is how they call out and appeal to people. For a while, there were many people who had moved to cities because of that belief (Female in her 40s, migrant from Uvs).

Such spread of information through social networks seemed common; migrants themselves have also admitted to sharing market and job information with their friends and relatives in rural homes. Selling assets was also common among migrants who moved into cities. Many had sold their land, houses if they had any and also whatever livestock they had left from the dzud. Some had sold their livestock in their home lands, while others had sold it on the way to Ulaanbaatar, in more central regions of the country such as Arkhangai or Khentii provinces:

Before I migrated to Ulaanbaatar, I sold everything. Over 10 horses, around 10 camels. I sold my livestock to people in my homeland (Male in his 30s, migrant from Govi-Altai).

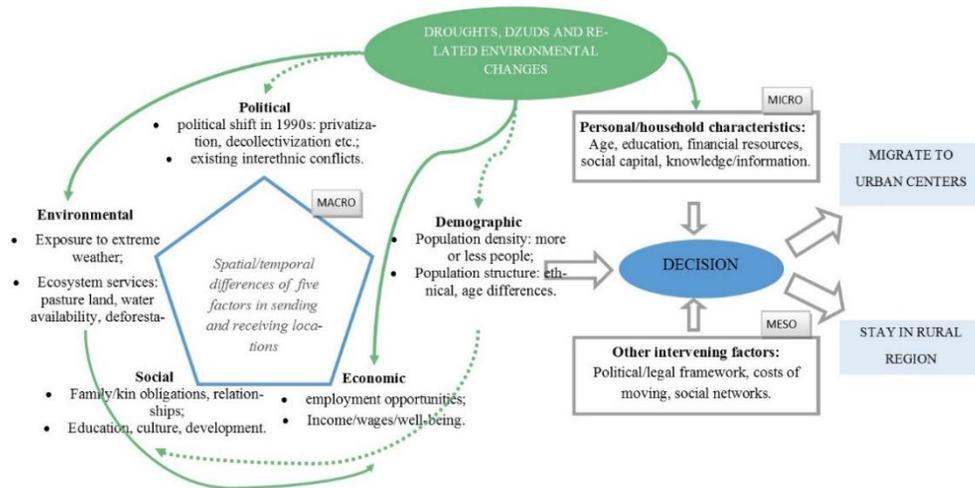
The ones who have resources like me sell their land and houses and move here [Ulaanbaatar] (Female in her 50s, migrant from Uvs).

The more financially secure migrants, who still had substantial livestock left in their homeland under the care of relatives, still sold few livestock in order

to move to the city. Although it is hard to analyze what enables or what restricts migration because the study solely collected stories of people who have already migrated, by looking at similarities between factors that helped affected households to migrate, it is possible to conclude that one way droughts and dzud might affect the ability to migrate (intervening and personal factors in migration may) is through impacting the financial resources of the household that wants to move and additionally through affecting other people's willingness to buy the assets potential migrants are selling; livestock, lands, apartments and gers (traditional Mongolian housing). In other words, the wealth of the herder who wants to move or of others who would want to buy his assets can directly be affected by droughts and dzuds in rural regions.

Through a qualitative inquiry of urban migrants, it was possible to get a deeper understanding about the ways drought and dzuds affect migration decisions in affected households. From the interviews with migrants, first, a direct effect can be found in the ways droughts and dzuds affect economic factors of migration – income, wellbeing and employment rates of the rural region, mainly through loss of livestock which ultimately leads to loss of jobs that supported not only their livelihoods financially but also the household's food security. Drought is a hazard for human and livestock well-being, especially when coupled with heavy winter snowfall and/or extreme winter temperatures (dzud). Such weather events directly affect the environment of the rural region by reducing existing ecosystem services such as pasture land, water, which in return has impacts on agricultural produce (indirectly effecting economic factors of migration). Feelings of risk and uncertainty in continuing agricultural activities were mentioned by many participants.

However, at the same time, few migrants noted on how the environment is restoring itself since the 2000 and 2008 droughts, and thus willingness to return to rural homes because the “mountains and waters are great lately”, “the grass is 50 cm long now!” were also observed from the respondents.



Note: Solid lines represent direct effects while dotted lines represent indirect effects of DDREC. Scheme adapted from Black et al. (2011).

Figure 6 Effects of droughts and dzud and related environmental changes on households' decision to migrate to urban centers.

Although droughts and dzud have affected migration decision through affecting rural households' existing economic and environmental circumstances, by no means are they the only dominant motivation to migrate to an urban center. Many of the respondents already had strong motivations to join their kin/family members who were already settled in the city or to migrate to urban centers in order to provide better education and employment opportunities for their children. In such cases, droughts and dzud have also had indirect effects on the decision to migrate of affected rural households to an urban center by affecting and enforcing already existing and cumulating

demographic, social and political motivations. A schematic illustration of found relationships can be found below in Figure 6.

2.2. Impact of migration on climate-affected households

2.2.1. Migration to urban centers as an adaptation strategy for drought- and dzud-affected rural households in Mongolia

When asked what they did to improve their livelihoods after the dzud of 1998-2001, many migrants took care of whatever livestock they were left with or/and took on additional workload if jobs were available. One family describes their attempts of diversifying their income after the dzud by starting a small business:

My husband and I tried starting a small store, but how much would the store make? We made 5000 to 3000 tugrugs a day, it was failing and we decided to move to the city. We had that store for about a year, there was no profit (Female in her 50s, migrant from Uvs aimag).

Like other participants in study, attempts to adapt to weather events in situ via finding additional off-livestock income sources in their rural homes have failed for this household, leaving migration to urban centers an adaptation strategy of last resort. When asked of their opinions of such migration movements of dzud- and drought-affected households to urban centers, all showed negative attitudes towards heavy urban migration in general, while at the same time explaining how for them and other households, there is no other choice but to migrate.

A finding consistent across stories of herders that were severely affected by droughts and dzud was that migrating into Ulaanbaatar was a way of adapting to damage and loss experienced from the weather events and related

environmental changes in rural sending locations. All participants have described their life during and after the dzud as rough and difficult not only financially but also emotionally:

Of course it affects people's livelihoods, people had finished their livestock, camp of families had little to eat or drink without livestock, it affected their lives a lot (Female in her 60s, Khovd).

During that time [dzud], it was really hard; we couldn't find flour or rice. Losing livestock and oppressed by nature - it was really hard. For a while we were withstanding all of that (Female, 60s, Govi-Altai).

The weather events have threatened food security of affected households, who were self-sufficient herders supplying their basic food staples from their livestock and bought little foodstuff from outside. When asked of their lives after drought, dzud and migration, majority of the migrants, 10 out of 12, said that their livelihoods have improved since coming to the city, all said that their livelihoods did not get worse than the period after drought and dzud. Although all expressed their feelings of hardship in the initial few years, many said that they had adapted eventually. They particularly enjoyed their children's education opportunities, ability to work for money and feelings of "following development", following the mass", which can be interpreted as economic and social satisfaction.

2.2.2. Importance of social networks and information in migrating and adapting

An important part of migrating and adapting to urban life successfully is finding housing and employment in the city. Similarity, throughout the migrants' accounts, many of them had social networks in the city that helped them settle by providing a piece of their land and/or helped them find jobs or

start their small businesses. A migrant from Uvs describes her social networks that have helped her with accommodation as well as employment:

When I first came, I stayed with a relative of mine for 2,3 years. I worked in a hospital for a while and then I made an acquaintance who worked here in Khar-Khorin [market], I started working here and then eventually started a small booth [to sell products] (Female in her 40s, migrant from Uvs).

Even after migrating in to the city, importance of information and ability to gain information seemed crucial for a migrant in integrating to the urban social system. This was clearly described by a younger migrant from Uvs province:

Without knowing people, it is hard to get around ... You see when people move to the city, they stay with their relatives for the first one year. After a while, those people want to have a place of their own, but when one tries to do so, you need to know where to go, what materials to refer to and all. People who are closer to information are gaining more (Male in his 30s, migrant from Uvs).

The migrant addressed various types of information important in integrating to the urban system which not everyone has access to and he further discussed how even if the information is available, for example on a webpage, few have the ability to access this information due to lack of computers, internet or the ability to use both.

2.2.3. Migrant household health and wellbeing in the city

While the previous sections have addressed overall experiences after migrating into Ulaanbaatar that is mainly related on the agency and characteristics of the migrant, this section addresses structural and practical issues that hinder migrant households' livelihoods in the urban center. Before explaining the empirical finding of this study, important insights can be

gathered from previous quantitative studies of lives of migrant household to provide a more comprehensive picture of lives of rural-urban migrants in Ulaanbaatar. The most recent survey-based study of life of migrants in Ulaanbaatar by the World Bank concluded that although rural out-migration overall was found to be negatively correlated with the chance of falling into poverty, the likelihood of falling into poverty was higher for those migrating into Ulaanbaatar compared to local residents of Ulaanbaatar. The study found significant gaps in consumption levels between migrant households and local residents of Ulaanbaatar. Also, the likelihood of living in a ger (slum-like settlements in Ulaanbaatar), the likelihood of using polluting fuels for heating and cooking, the likelihood of having poor access to water services was statistically higher among rural-urban migrants (Shi, Anqing 2011).

The empirical findings from this research agree with previously found relationships by Shi (2011). The study was able to gain additional insight into lives of migrants in the city, specifically food security issues arising from loss of livestock as well as from migration and the ways migrants go about it. For previously self-sufficient herding households, wage employment in the city to purchase food staples seemed to be one of the negative aspects of migrating into Ulaanbaatar. The more vulnerable migrants have mentioned eating less or changing their diet after moving to the urban center. A migrant from Uvs province expresses her concerns on food security:

It is hard in the city, everything required money, money and money. Even food requires money, before we would eat our livestock with 50 kg of wheat and that would last us few months without a worry (Female in her 40s, migrant from Uvs).

This migrant did not worry about food security for months when their household had livestock, but now after losing livestock and migrating, the

household needs to purchase food, which is expressed as one of hardships of living in the city.

In addition to changes in the amount of consumed food, migrants mentioned dissatisfaction with the quality of foodstuff in the city. To consume better and cheaper food, the majority of the migrants receive foodstuff from their rural home regions for free if the livestock is owned by the migrant and for monetary price if the migrant does not have their own livestock. When asked if they help their rural relatives by sending any money, many said that they do send money if there is an urgent need for the rural relative or they send money in exchange to foodstuffs such as meat and milk products:

I buy my foodstuff from there [rural Uvs], if my brothers need money I send them 100 to 200 thousand tugriks. In return I get meat and other products. I just can't give them money as aid - they need the money, I need the meat (Female in her 50s, migrant from Uvs).

Some migrants have also mentioned how they do not trust the drinking water of Ulaanbaatar after looking at the basins of the Tuul River, where the city draws most of its water supply. Another major issue of public concern in Ulaanbaatar – air pollution was mentioned by few migrants but they were not perceived as a major issue affecting their livelihood.

Another issue that is as important as finding employment and housing is acquiring legal papers certifying that they are residents of Ulaanbaatar. Lack of residence certificates significantly undermined their integration into urban living; it took a few migrants a minimum of one year to several years to get an official residence transfer certificate:

Registration was difficult, per person we paid 25000 tugriks, over 70000 tugriks in total. Until we registered, we sent our children to schools by registering them under our brother's name [a brother that resided in Ulaanbaatar] (Female in her 50s, migrant from Uvs).

The process and the processing cost of the residence certificate were mentioned as being too complicated and too expensive. This meant that migrants' school age children were not able to get admission from a district public school. Thus some migrants were only able to send their children to school by registering their children's residence under a relative who is an official resident in Ulaanbaatar:

2.2.4. Feelings of dislocation for older migrants and opportunities for younger migrants

Many of the older migrants said that they felt disadvantaged in finding jobs in the city because of their age but also because many of them lacked higher education, which is an important asset to get employed in an urban center. Due to difficulties of adjusting to an urban life style as well as finding employment, the older migrants expressed feelings of dislocation and feelings of longing for their home lands:

I think of my homeland, every time I look at rivers, I think of my home land. But then people adjust [to living in the city] eventually (Female in her 60s, migrant from Govi-Altai).

At the same time, migrating into urban centers is a way of creating opportunities. Especially for younger migrants, migrating into cities meant economic as well as social opportunities; opportunities of having a job, making a living and an increased sense of independence:

In 2010, my uncle called. He stands at Narantuul market. He said that I am a young person and told me to come to the city, told me that there is little to gain from raising 100 livestock in the countryside. I listened to my uncle's words and came to the city...My life is getting better. Thanks to others. It is nice doing my job and going around like this (Male in his 30s, migrant from Govi-Altai).

Given both the challenges and opportunities of urban migrations and urban life, when asked if the migrant has plans of returning to their rural home, or to practice agriculture, answers were mixed. Migrants who are of younger age and/or who have secured an income in Ulaanbaatar seemed to be willing to stay in the city. While migrants who have not quite improved their livelihoods or improved enough to match their expectations of migrating into the city were considering going back to their homelands or going to land where there are less droughts and winter storms to raise livestock again. Migrants who were willing to go back to livestock raising mentioned how life is better in the rural regions now, how nature is restoring itself again and how there is much of grass and rain in recent years. This indicates possibilities of return migrations among urban migrants and its association with environmental variables in rural home.

3. Discussions

The study of the impacts of climate change on human mobility has been emerging actively in the last decade. The issue has gotten attention not only from academics that are interested in the impacts of climate change but also from major international organizations due to concerns over urban agglomeration in less developed countries as well as the international legal aspects of such climate-induced migrations and/or displacements, most especially in cases of small island countries. Various case studies have been conducted in the South-East Asian, Middle-East and North African, Sub-Saharan regions finding context-specific, complex relationships between climate change, environment and migration. This study has explored a similar social phenomenon in context of Mongolia, looking specifically at urban bound migrations from drought vulnerable Western and Southern regions of

the country.

3.1 Insights from key-informants and other relevant sources

To ground the academic research to issues surrounding heavy urbanization and rural development in Mongolia, a general informative interview was made with non-governmental, governmental and international organization officials based in Ulaanbaatar in addition to interviews with urban migrants. Throughout conversations with climate change related academics and researchers, many stressed the great need to a produce body of research connecting local environmental deterioration and climate change with its social and economic impacts. An overall need to connect policy-making processes with scientific studies was also mentioned. For that to happen, the respondents have addressed the lack of stable institutional structures in Mongolia, which was not surprising because during the time of the fieldwork in Ulaanbaatar in March of 2015, many ministries, academic research entities and national universities were being once again structurally changed following elections. When asked if they think urban bound migrations are an adaptation strategy or a lack of adaptive capacity of a climate-affected household, answers were mixed. Even if they thought migration is partly caused by weather events and its impacts on the environment, they believed migration is not the optimal adaptation strategy for the affected rural households.

In conversations with professionals and researchers in rural and urban development fields about urban bound migrations, there was a general tendency to attribute rural-urban migrations to a lack of jobs in rural regions of the country. There was also a consensus on the idea that rather than concentrating resources in solely expanding major cities in Mongolia, there

is a need to create socio-economic resilience in rural regions through development. When asked of their opinions about how well migrants do in Ulaanbaatar and in other urban centers in general, concerns were expressed about a lack of employment opportunities for migrants in the city, insufficiency of basic social services of education, healthcare and affordable housing.

Although interviews with scholars and policy-makers regarding internal migration were not conducted, a great body of materials and research reports were obtained directly from the experts. Two major survey-based study of internal migration in Mongolia were conducted by the Population Teaching and Research Center of National University of Mongolia with funding from the United Nations Population Fund, published in 2001 and 2009 respectively. Brief analysis of main texts that report the state of internal migration is useful in understanding how much climate change impacts are considered in explaining internal migration in Mongolia.

The first survey-based “Micro Study of Internal Migration 2000” aimed at studying the social, economic and demographic determinants and factors affecting migration in Mongolia. The study concludes that “the main reason for migration are to seek employment, the desire to move closer to markets, to improve living conditions, to secure a better future for their children and the comfort of living closer to relatives” (PTRC 2001, page xvi). Although the report provided useful findings to aid policies concerning regional developments and population movement, there was little to none acknowledgment of environmental factors or impacts of climatic changes on the environment among factors affecting internal migration in Mongolia.

The following survey study of 2009 provides a more comprehensive

understanding of motivations behind internal migration as well as its consequences. Unlike the previous study, the final report of the second study provides a full sub-chapter discussing differences in the nature and environment of origin and destination areas – stating that “negative rather than positive climatic changes might prevail, since the frequency of natural disasters related (global) warming such as strong snow and sand storm, hail storms, heavy rains, floods, ice meltdown, forest fires has increased as well as damage from them. Such damage occurs more often in rural areas, where agriculture is predominant, so it is *affecting indirectly the increase of rural to urban migration*” (emphasis added by this author, RTRC 2009, p 54). The major pull factors of migration to Ulaanbaatar were found to be desire to be close to development (39.8%), lack of jobs in the rural home region (29.8%), desire to receive support from relatives (25.6%) and educational opportunities for children (22.4%) and main push factors were found to be loss of livestock and source of livelihood (14%). Although relatively comprehensive in terms of accounting for environmental factors behind migration and possible negative effects of climate change on rural systems, the study had treated many crucial factors of migration in separation from weather events which led to underrepresentation of impacts of loss of livestock on other dominant motivations behind migration such as unemployment in rural regions, desire to be close to and receive support from relatives.

From the brief analysis of opinions of major stakeholders, it can be concluded that a connection between weather events, environmental changes and migrations are in fact made to a certain extent by migrants as well as the official entities that study and address internal migration. But such weather events and environmental, socio-economic impacts of weather events are rarely addressed in context of climate change, which illustrates the need of

mainstreaming climate change into studies of migration in Mongolia. On the other hand, experts that are involved in studies of climate change and its impacts are in fact concerned with the damage and loss associated with extreme weather events. However, for the latter group of researchers, migration of affected rural households to urban centers is widely considered as an unwanted strategy of adaptation to climate change, indicating the need of research addressing the role of migration in building resilience in vulnerable rural communities to climate change.

3.2 Responding to climate-induced migrations in Mongolia

Governments of all levels – rural and urban, national and international bodies need to act on the issues as well as opportunities of climate-induced migrations. The policies that are designed in the upcoming years will shape migration and adaptation experiences of many climate affected herders as well as multiple urban agglomeration issues in major cities of Mongolia. For Mongolia, actions taken to address climate-induced migrations are recommended to proceed inside rural and urban development frameworks of the country, while being incorporated into the national climate change adaptation plans. In incorporating climate-induced migrations into any policies related to urban health, rural development and most especially climate change adaptation, roles and responsibilities of international organizations is substantial. Therefore active involvement of the United Nations and its independent working bodies, particularly of International Organization for Migration is encouraged to engage actively in responding to climate-induced migrations in Mongolia. The findings from this exploratory study suggests further advanced research to better inform policy-making in the following directions:

3.2.1 Policies and programs that decrease sensitivity of rural communities to climate change impacts

This study showed that in addition to direct livestock loss, pasture land degradation and water scarcity in their home land (which may be caused by climatic as well as non-climatic factors) had effects on livelihoods and ultimately migration decisions of rural households. Therefore policies and programs that protect existing ecosystem services are crucial in lessening the impact of climatic changes as well as mitigating loss and damage caused by future extreme weather events. A project currently under implementation “Ecosystem based adaptation for water security in Mongolia” co-funded by the Adaption Fund, the Government of Mongolia and United Nations Development Program is exactly doing that by securing critical water catchments in Altai and Eastern regions of the country via working with rural communities, governmental and non-governmental agencies. Institutional and financial support for similar programs would be an important part of building resilience in vulnerable regions of Mongolia.

Empirical findings also suggest that political as well as economic changes in Mongolia in the 1990s and the transformation process since had made agriculture-dependent rural communities more vulnerable to extreme weather events than before. Socio-economic resilience enhancing programs such as the restoration of the institutionalized agricultural practices, possibilities of gaining income from other sources than agriculture and creating access to modern energy services would reduce sensitivity of rural communities to extreme weather events and environmental changes, which would ultimately prevent vulnerable urban bound migrations.

3.2.2 Policies and programs that facilitate migration that is beneficial not only to the migrant individual/household resilience but also to their sending and receiving communities' resilience

Unlike other cities in many developing countries that are in risk to impacts of extreme climate events, major cities in Mongolia are relatively safe in terms of direct impacts of climate change. However this study has illustrated how as major destination hot-spots of climate-affected rural households in the country, cities of Ulaanbaatar and Selenge, Darkhan and Nalaikh are indirectly impacted socio-economically and bio-physically by climate change. In order for migration, a possible adaptive strategy of households to climate stresses, to be beneficial to both the migrant and receiving communities, migrants need to be able to integrate into the urban system of the major receiving host – Ulaanbaatar easier, which entails elements such as affordable housing, social services, information accessibility, and job training/searching services, that can be addressed from the municipality.

VI. Conclusion

1. Research summary

The aim of this research was to better understand the connections between climate change, extreme weather events, environmental degradation, loss of livestock and human mobility through migration stories of urban migrants in Ulaanbaatar, Mongolia. This research represents the first attempt to give insight into how human mobility is affected by climate change in Mongolia through first-hand data from acquired from urban migrants in Ulaanbaatar, The main objectives of this research were to:

1. Identify regions of out-migration and in-migration spatially and find visual associations between droughts and human mobility in Mongolia;
2. Investigate how droughts and dzud have influenced decisions of ecosystem-dependent households to migrate to urban centers;
3. Reveal the ways migration to an urban center, in this case Ulaanbaatar city, had impacted livelihood and wellbeing of climate-affected households.

The quantitative part of the study suggested that in the last two decades, people moved out the most from Western and Southern regions and moved in the most to central, urban regions of Mongolia. Out-migration rate was the highest during the period between 1999 – 2007 and there was in fact a visual overlap of regions that experienced most out-migration and parts of the country that by Lee (2015) were identified to have experienced the highest amount of drought stresses during the period between 1997 - 2008, indicating

that out-migration from those regions may have been associated with droughts and drought-related environmental changes.

The main contributions of the research lay in the qualitative inquiry of stories of rural-urban migrants. Findings from the qualitative fieldwork complemented the presumed associations of droughts with rural out-migrations in Western and Southern regions of Mongolia. Empirical findings further suggest that droughts and dzud have substantially affected the decision and ability of ecosystem-dependent rural households to migrate into urban centers. The effects are direct – affecting household income, wellbeing and agricultural productivity, as well as indirect – affecting already existing social, political and demographic factors; in other words pushing rural households over a tipping point of already cumulating reasons to migrate. It can be concluded from here that the sensitivity of migration patterns and rates to droughts and dzud are largely dependent on existing and non-climatic environmental, political and socio-economic variables of rural regions.

Another notable finding was that social networks (and information provided by them) and financial resources (wealth) were identified to be important intervening factors in migration. Since droughts and dzud affect the rural household's wealth, extreme weather events may ultimately compromise the household's ability to successfully migrate to urban centers.

For severely drought- and dzud-affected rural households, migration to urban centers seems to be a form of adaptation; by migrating to urban centers, households seek to improve their livelihoods and recover from damage and loss experienced from droughts and dzud. However, migration to urban centers entails opportunities as well as hardships for climate-affected households in Mongolia. Finding employment and a place to settle were

largely attributed to migrant household's social networks in the urban center. While livelihoods of affected households in general improve after migrating, integration into urban centers may be hindered by food insecurities due to prices of foodstuff in the urban center and difficulties of gaining basic social services for themselves and for their children because of registration difficulties. Yet despite these difficulties, many migrants perceived their migration to urban centers as a positive change in their own or their children's lives, most especially in cases of younger migrants in Ulaanbaatar.

The findings from this study substantially contribute to climate change – environment – migration nexus scholarship. First, the paper had addressed the gap of research on impacts of climate change on populations in North-Eastern Asia, presenting the first attempt to qualitatively analyze the complexity of climate-induced migrations in Mongolia. Second, the findings from this paper provide not only with additional evidence of climate-induced migrations but also empirical illustration of complex ways climate change affect household's decision to migrate.

Based on the exploratory empirical findings, this study urges mainstream migration studies internationally as well as locally in Mongolia to integrate past and future climate change impacts in their studies. The study also recommends the National climate change adaptation plan of Mongolia to consider rural-urban migrations as one of possible adaptation strategies taken by households in response to climate stresses in rural Mongolia and to further investigate ways in which certain policies and institutions could assist in creating more resilient internal population movements in the country in response to climate stresses.

2. Limitations and self-reflection

This study is not without its limits. There were several difficulties during the fieldwork related to the short timeline as well as the respondents' general reluctance to discuss the severity of their hardships. Although the researcher hoped that interviewing migrants as a person from the same cultural background and a native speaker of Mongolian would help unveil more in-depth data, whether due to the researcher's approach or cultural interferences, migrants were observed to be slightly unwilling of talking about any misfortunes that may have happened to them, which may have partially undermined the validity of the data. The researcher acknowledges that purposeful sampling by snowballing from one migrant to another may have prevented the researcher from encountering the most vulnerable migrants that did not have employment in the city, since many migrants knew each other through work and about half of the sampling underwent at a market, where many of the migrants worked informally. Further studies should carefully consider positionality of the researcher during interviews as well as possibilities of conducting more diverse sampling.

3. Future work

This research had exposed the complex effects weather and environmental changes have on migration decisions of households. To improve on this research and in order to capture the magnitude of impacts droughts and dzud have on migration rates as well as certain relationships between severity of livestock loss, household characteristics and migration, a survey-based quantitative study of urban migrants as well as rural residents are recommended for further studies.

The study also raises other questions that deserve further investigation to better aid climate change adaptation as well as internal migration related policy designs in Mongolia and other regions with rural populations majorly dependent on animal husbandry. The study briefly touched on how migrants send a small amount of monetary aid and market information from the city to their rural community. They also become part of social networks that connect rural communities to job and educational opportunities and entrepreneurship possibilities. But on the other hand, heavy out-migration of educated and working age adults poses risk of brain drain, population ageing and ultimately the disappearance of prospective herders, which may have serious implications on the agricultural sector of Mongolia, where traditional nomadic pastoralism holds substantial economic as well as cultural values. Due to this, it would be useful to understand what the impacts of migration could be on resilience of sending rural and receiving urban communities. As well as identifying instances of rural climate-affected households who wanted to migrate to urban centers but were not able to do so. Last but not definitely the least, in the near future it would be important to look at the gender differences of climate change impacts, migration and urban integration experiences among migrants. Paying attention to migration experiences of women in comparison to men and identifying notable differences would aid sound policy making as well as contribute to overcoming the mainstream gender-blind approach to climate change research.

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Appendixes

A1. Interview Questionnaire

Data Collection Technique: Semi-structured interview (Migrant)

Personal information

? Question 1

Please tell me about yourself?

- Where and when were you born?
- What do you do?

? Question 2

Please tell me about your family?

- How many members do you have in your family?
- Where were your parents born, you (and your siblings) born?
- What do they do? Where do they do it?

A. **THEME: History of migration (Factors that enabled the migration)**

? Question 1A

As you know, many people are moving to cities in the last few years. Where have you lived before moving to Ulaanbaatar?

- How long have you been living here?
- What did you do there (sending region)?

? Question 2A

How did you migrate? How was the decision to move made?

- When was it made?
- Who do you think made the final decision?

? Question 2E

How are your opinions on this heavy out-migration and urbanization?

B. **THEME: Reasons for migration (Push factors, livelihood changes)**

? Question 1B

Why do you think the decision to move was made?

- Why did your family leave your home land?
- Can you describe your home to me?
- Have you noticed changes- social, economic, demographical or environmental in your home land in recent years, decades?
- Since when have you started noticing these changes?

? Question 2B

How much of livestock did you have before migrating?

- What did you do to them before coming to the city?

- How were you (your family) impacted by the droughts and dzuds of 2008 and/or 1998?
- How much would you say was the impact of the droughts and dzud on you household's livelihood? Probing: the impact was big (loss of livestock), medium, little.
- Were there other reasons you relocated?

? Question 3B

In your community, were there lots of out-migrants?

- Did you, your family know a lot of them?
- Where did they usually go?
- Why did they usually leave?
-

C. THEME: Reasons for migrating to Ulaanbaatar (Pull factors, enabling factors in migration)

? Question 1C

Where did you move to before coming to Ulaanbaatar?

- How did the family get to the destination?
- How did you feel once you got there?
- Where did you live?

? Question 2C

Why do you think you (your family) have moved to Ulaanbaatar not to any other place?

- Probing: for services, educational opportunities, health care, existing family members in the city. Why was that important?
- Do you plan to stay there? Why?
- What do you like about the city?
- What do you do not like about the city?

D. THEME: Adaptive measures taken other than migration

? Question 1D

Before you decided to move, what did you do to get by in your village?

- Probing: Changed jobs, ate or brought less food, sold assets, borrowed money, depended on money send from family in the city or abroad, depended on international/national aid etc.
- If you sold your assets, what did you sell? How did you sell it?
- If you borrowed money, where did you borrow it from?

E. THEME: Livelihood losses, gains, challenges after migration

? Question 1E

- How has your family's life been since you have moved here?

- What were the biggest challenges? (Probing: Getting a job, housing, health care, registration, education for children, getting basic services such as water, heating, electricity, sewage)
- What were the biggest opportunities?

? Question 2E

You have mentioned that your family business is/was (animal husbandry, agriculture), do you think you will continue that business in the future?

- If so why, if not why?
- Under what circumstances will you want to continue/return home?

? Question 3E

Do you often go back to your hometown?

- For what reasons? What do you do when you go home?
- If not, why not?

? Question 4E

Families like you are in a way links between your home community and the city, what do you send or receive to/from your home land?

- What do you send? What do you receive?
- If it is okay, may I ask how much money, how often do you send?

A2. Interview Questionnaire

Data Collection Technique: Semi-structured interview (Key-informant)

Personal information (Warm up questions)

Please tell me about yourself?

What institute do you affiliate to? What do you do in the organization?

? Common questions for all participants:

What do you think are the main reasons people are migrating into cities?

Do you think the environmental states, weather changes are affecting households in the rural?

What are your opinions on heavy out-migration and urbanization?

? Questions for a government official:

Many rural residents are moving to urban centers such as Ulaanbaatar, Darkhan and Erdenet. Why do you think there is such strong flow in the recent decades?

What is the government doing about these heavy migrations?

To what extent do you think weather changes (Droughts, winter disasters), desertification has to do with these movements?

Is there public assistance for people who have been affected by extreme weather events? Can you please describe them to me?

To what extent do you think these programs have succeeded? If was not very helpful, what do you think was the issue?

In the future, what kind of programs do you think will be beneficial for the rural herders and urban migrants?

In general, how important are environmental issues in the decision and policy making? Do you think it is a priority for the government?

? Questions for a non-government official:

Do you think climate protection is a priority for the Mongolia government? If so, please give an example. If not, why do you think it is not being addressed as a concern?

What do you think are the main factors behind environmental degradation in the country?

How has climate change affected this country? How has environmental degradation had affected the rural population in particular?

As you also may know, these weather and environmental impacts affect agricultural productivity, in case of dzud, animal and human survival. How do rural households adapt to these changes? What survival strategies they adopt?

Is there adequate assistance or institution in place to address such issues? If so, how much is public awareness of these programs? If not, what programs do you think to be initiated to benefit these affected people?

As you may know, there is heavy migration towards urban areas, particularly Ulaanbaatar. How much do you think environmental changes (droughts, land degradation, heavy winters) are contributing to these movements?
Do you think migration is a viable way to adapt to environmental changes in the countryside? If so why? If not, why?
What are your opinions on migrant integration in the city?
What do you think should be a priority issue to address in the near the future?

국문초록

기후변화가 야기한 적응으로서의 이주

-몽골 울란바타르의 가뭄과 한파에 따른 도농
이주를 중심으로-

빌레그사이칸 수미야
서울대학교 환경대학원
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2015년 8월
지도교수 윤 순 진

이 연구는 몽골의 가뭄과 한파 (dzud)가 목축 가구의 농촌-도시 이주 결정에 미치는 영향과 도시 이주가 이러한 기후 변화의 영향을 받은 가구의 생계와 복지에 미치는 영향을 분석했다. 우선 몽골의 1999-2013년 사이의 이주 움직임을 지도로 나타냄으로써 몽골 서쪽에서의 심각한 가뭄 스트레스가 도시 이주와 연결이 있다는 것을 확인하였다. 그 후, 질적 연구방법인 심층면접을 통해 울란바토르 시로 이주해온 이주민들의 경험에 대해 살펴보았다. 그 결과, 가뭄과 한파가 생계와 생태 서비스의 손실로 가구의 이주 결정에 직접적인 영향을 미쳤으며, 다른 한편 이미 존재하던 해당 가구의 사회적, 정치적, 인구 통계학적인 이주원인을 더욱 악화시킴으로써 이주 결정에 간접적인 영향을 미쳤다는 것을 발견했다. 또

한, 가뭄과 한파가 가정 재정 상황을 악화시킴으로써 이주하는 데에 필요한 재정 능력에 악영향을 미칠 수 있음을 알 수 있었다. 따라서 기후 변화를 심각하게 경험하여 도시로 이주한다는 것은 이주 가구의 생활 수준을 개선할 수 있는 유일한 방법인 동시에 기후변화 적응 전략이라 할 수 있다. 이 연구 결과를 몽골 전체 기후변화 이주민의 경험이라고 일반화시킬 수 없지만, 피면접자들의 경우, 도시로 이주한 것을 그들의 삶에 있어서 긍정적인 변화로 인식하고 있었다. 이주민들의 도시적 삶으로의 통합은 적응의 중요한 부분으로, 사회연결망과 정보 접근 등이 도움이 되는 반면에 식량안보 문제와 기본적인 사회 서비스 부족 등이 장애가 되는 것으로 보인다. 따라서 이 연구로 부터 도출된 결과는 몽골의 도시 계획과 농촌 개발 정책을 기후 변화 적응 대책과 연결시킬 필요가 있으며, 향후 연구에서 보다 세밀한 연구가 진행되어야 함을 시사한다.

주요어 : 몽골, 가뭄, 한파, 기후변화 적응, 농촌 - 도시 이주.

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