

**TRANSFORMATION OF THE AGRICULTURAL
SYSTEM AND ITS IMPACT ON FOOD SECURITY IN
MONGOLIA, 1991-2014**

*Thesis submitted to Jawaharlal Nehru University
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DOCTOR OF PHILOSOPHY

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DECLARATION

I declare that the thesis entitled “**TRANSFORMATION OF THE AGRICULTURAL SYSTEM AND ITS IMPACT ON FOOD SECURITY IN MONGOLIA, 1991-2014**”, submitted by me in partial fulfillment of the requirements for the award of the degree of **DOCTOR OF PHILOSOPHY** of Jawaharlal Nehru University is my own work. The thesis has not been submitted for any other degree of this University or any other University.

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CERTIFICATE

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*It belongs to you Father,
your fathomless love made me to realize the real worth of this mortal life
is to 'serve others',
know the unknown to uncover the underlying truth,
to discern between wisdom and folly,
and serve for selflessness.
Thank you papa for being the source of energy within me,
you are within me... Yes, I believe you.*

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ABBREVIATIONS

ADIS	-	Animal Disease Information System
AWLR	-	Agricultural Water and Land Resources
BSE	-	Bovine Spongiform Encephalopathy
CBD	-	Convention on Biological Diversity
COMECON	-	Council for Mutual Economic Assistance
FDI	-	Foreign Direct Investment
FSRI	-	Food Security Risk index
GDP	-	Gross Domestic Product
GAP	-	Good Agricultural Practices
GHP	-	Good hygiene practices
GOM	-	Government of Mongolia
HIEA	-	High-External Input Agriculture
HYV	-	High Yielding Varieties
IFAD	-	International Fund for Agricultural Development
IMF	-	International Monetary Fund
IPES	-	International Panel of Experts on Sustainable Food Systems
MOFALI	-	Ministry of Food and Agriculture and Light Industry
MPRP	-	Mongolian People's Revolutionary Party
MSP	-	Minimum Support Price
NFSP	-	National Food Security Programme
OECD	-	Organization for Economic Co-operation and Development
TNCs	-	Transnational Corporations
UNDP	-	United Nations Development Programme
UNEP	-	United Nation Environmental Programme
USA/ US	-	United States of America/ United States
USSR	-	Union of Soviet Socialist Republics
WB	-	World Bank
WTO	-	World Trade Organization

MONGOLIAN COMMON TERMS

- Alba* – Feudal obligation owned by pre-revolutionary subjects to their lord
- Albam mal* – Official or duty animals
- Aimags* – Provinces (highest level territorial and administrative division)
- Arrend* – Lease system
- Avar* – Agricultural redevelopment
- Dzud* – Extreme and snowy winter
- Khaluun Nutag* – Hot Grazing
- khot ail* – Common encampment consisting of several independent households
- Khural* – Governing assembly
- Geley* – Contract system
- Ger* – Traditional Mongolian tented dwelling not connected to water and heating connection
- Morin Khuur* - Horse-headed fiddle
- Negdels* – Collective farms/ Herders’ collective of the socialist period
- Otor* – Movement of livestock to more distant and less used pastures
- Ovoo* – Stone cairn
- Seruun Nutag* – Cool Grazing
- Tsagaan sar* – Lunar New Year
- Tugrik* – Mongolian currency unit
- Udagan* - Skillful women

PREFACE

We cannot and can never isolate food from its grower community, its localness, its geographical space, its cultural identity, its bonding with socio-cultural exchange and its interactions with local festivals, celebrations, rituals and ceremonies, all are intrinsic and innate in food of a particular region. The essence of food lies in its localness, its indigenous natural and cultural space together constitute its soul. Diluting the localness of a geographical space, is like, losing the identity of food. Globalization has wiped out the localness of food and agricultural system and given way to the uniformness of food and agricultural system. This visionless universalization of food and agricultural system in every part of the world made the food and agricultural system more vulnerable and jeopardized. The global food and agricultural system not just failed in providing food security, but resulted in never-ending episode of agrarian crisis and sever farmers unrest.

Today the very concept of food and food security revolves around the agricultural production, demand, supply, market economy, food price, food inflation, accessibility, affordability, purchasing power etc. but the erosion of cultural identities, theft of the localness of geographical space, alienation of the grower community with farm practices, all are important components which made deep influenced on the identity of food of any place. Following the single coded universal agricultural system dissolved the food identities and their connect with their local space.

The concept of food must be assessed in totality and not in isolation as everything is somehow somewhere linked with its other natural components. Therefore, it is important to find out that delicate linkage and with in-depth knowledge and understanding of food dynamics, food as a part of diverse cultures and its grower communities, food accessibility, food availability, food safety and food sovereignty could be achieved. Even within local folk songs, food cults and rituals of the grower communities, the essence of food is alive, it has a soul, food is a life giver and attaining the highest level of godhood.

Mongolia reflects a unique case where food security and the agricultural system symbolized its in-depth association with its nomadic culture of herding. Horse nomads of Mongolia always praised for their warrior skills, but it is their innate association with the non-human world which remained the real strength behind its nomadic civilization which assisted them in maintaining huge army by providing mobile food resources available to them in the form of their traditional herd composition of the five animal species. The traditional Mongolian pastoral livestock production system remained central economic activity of the Mongolian grasslands from ages.

The role of social networks and the high mobility of the traditional Mongolia pastoral livestock production system were identified as few of the major characteristic of the agricultural system in

Mongolia which assisted in maintaining the food security of specifically the herder's families in remotest areas. The states policies restricted the nomadic movement and severely obstructed the mobility factor as well as the functioning of the social networks which directly impacted the food security of the nomadic herders in Mongolia and indirectly impacted the sustainability of food and agricultural system in fragile Mongolian grassland ecosystem. The sudden transition to a new economic and political system in Mongolia during 1990s has been resulted in abrupt changes in every sphere of life. The system based on market economy led to an episode of agrarian crisis in its preliminary phase but the situation never get its due share of attention and in place of livestock sector, it is the mining sector which became the focal point of the economy and attracted FDIs from every sphere. The economic growth of the country increased but, the rural urban gap resulted in completely lopsided development and slowly made the country dependent of exported food for meeting the country's daily requirements.

The recent experience of perilous economic crisis in Mongolia led to the situation of indebtedness as the country is not in the position to repay its mounting international lending. In present situation the Mongolian currency, 'Tugrik' has become the world's worst performing currency. The country is facing a never-ending episode of international financial overdue. The economic system is collapsing and the people are in search of new economic model which is designed based on the Mongolian experiences and not to thoughtlessly following the western model of economic development. The resurrection of the livestock sector and revival of the food and agricultural system has been recognized as few of the necessities which has the potential to rebuild the Mongolian economy and solve the problem of acute agrarian crisis and food insecurity. Unfortunately, government policies and programmes targeted to the agricultural sector failed to appreciate the contribution of the Mongolian herders and their traditional pastoral livestock production system in maintaining a sustainable food and agricultural system in the Mongolian grasslands which is assessed as one of the most pristine and delicate ecosystem of the world known as 'the steppe'.

The recent aggressive pace of mining boom has been seen as a threat for Mongolian grasslands. The water scarcity has become a brutish reality, besides even the remotest areas are facing problem of water pollution due to environmentally unsound practices of opencast mining. The soft environmental laws and overdependence of the economy on international trade, specifically Chinese dominance further jeopardize the fate of the weak nation like Mongolia. The real strength of Mongolia lies in its fathomless nomadic power and its livestock resource which has the potential to revive the spirit of the nation. Grasslands, in a way, control the economic rhythm of the Mongols, and nomadic herding remains as the prime economic activity which also preserves the very identity of the Mongols. Historically, and till now, it is the grasslands the livestock assets of the country, touching every life, every sphere of life of the Mongolian nomads. In essence, traditional livestock production system and

nomadic herders preserve the *Mongolianness* of Mongolia. The soul of Mongolia lies in its animal wealth and its nomadic identity. Every space has its own uniqueness which is reflected in its localness. The localness of any space preserves its identity which is reflected in every form of natural entity, like food and agriculture, folk songs, dances, traditions, rituals, festivals, all are threaded together in a geographical space of that particular area or region where both the human and the non-human world reunites.

India shares a special closeness with Mongolia, besides being spiritual neighbor the in-depth study revealed that there lies a deep respect for the non-human world in both the ancient cultures of the world. An innate cross cultural resemblance has been observed, horse cults, fire cults as well as the warrior skills possessed by the Aryan horse nomads of the ancient India or by the Mongol horse nomads under the leadership of 'Great Khan', it is really hard to demarcate the boundaries or differences. The in-depth observation has discovered that the non-human world was always remained intrinsic part of the culture and even now has been given special place in both the cultures. The non-human world has been remained an intrinsic part of the food and agriculture system in both the countries. In terms of geographic location, Mongolia is a land locked country bordered by two super power of the world, Russia in the north and China in the south. In terms of distance, India is far away and shares a small share of trade relation with Mongolia, yet its spiritual and cultural interconnect make this relation very special and give possible reasons to identify the in-depth understanding of this cross-cultural resemblance shared between both the countries. At some point, the cultural similarities between India and Mongolia are found to be superimposed on one another as if both the cultures have been remained part of the similar ancient cultural steams. A further deeper outlook needs to be explored to uncover the underlying and embedded truth. Every aspect provides new means to explore the possibilities of finding something meaningful, cross comparison between Mongolian divine musical instrument of '*Morin khuur*' and Indian '*Veena*' were also drawn, as we all believe that 'music is the language of souls', and even the non-human world is fascinated by it and can understand the signs and symbols associated with it, specifically used by herders to communicate with their herds and added immensely to their herding skills which remained unacknowledged. The importance of nomadic food and diverse traditional practices of food preservation and storage, prevents the herders from food shortage even during the adverse period. Pragmatic as well as the traditional value of horse and the 'five animals' concept in Mongolian culture, and its spiritual association with the ancient Indian culture, all historical aspects were deeply assessed and compared for both the ancient civilizations. Significance of horse cult and horse-headed figure *Hayagriva* was also explored to find out the cultural roots of nomadic pastoralism in ancient history. The in-depth knowledge and association with the non-human world in India and Mongolia remained a major focus for the further research study, and is the pure reflection of much deeper interconnect between both the ancient cultures.

Food and agricultural system has been approached only in terms of production, productivity and yield. But the other facet of of food and agricultural system like its connectedness with geographical and cultural space, its association with its grower communities, all have been largely remained unappreciated. This research study tries to explore the other facets of food and agricultural system and to discover that how much significant they were in enhancing the food security situation in Mongolia. This research study introduced a new concept “Theft of geographical space”, and discover that it is really important to explain the current situation of the agrarian crisis faced by the Mongolian herders, which is reflected in the worldwide situation of agrarian crisis as well. The study provides better scope to understand the situation of transformation of the agricultural system and how it is linked with complicating the situation of agrarian crisis and worsening food insecurity by devastating the localness of food and agricultural systems.

Chapter 1

Introduction

1.1 Background

In Mongolia, the world's largest remaining natural grassland, the Steppe, has shaped the way of life of the nomadic herders and survived their livestock for hundreds of years and ensured their food security. Every community has a unique relation with its space. The local agricultural system of any geographical space is the outcome of unique relation between the mankind and its local environment. With Mongolia's transition to market economy in the post-Soviet era, the agricultural system was transformed from its roots. The economic transition to market economy brought basic structural changes which had deep impact on the livestock based economy of Mongolia followed by dreaded phase of agrarian crisis. All the crucial sectors of Mongolia's economy, like the industries, energy and agriculture based industries were nearly collapsed in the absence of financial, political and the social support. The political and economic history of Mongolia remains highly volatile with rapidly changing global politics. As a result the natural grassland has undergone abrupt environmental changes due to the modernization and the new governmental policies and programmes which inhibited the movements of nomads and forced them to settle. Mobility remains at the core of the survival strategy of nomads. The massive transformation of agricultural technologies for increasing the production of especially export oriented goods, meat and wool from livestock resulted into the pasture degradation and costs immensely to the exquisite grassland ecosystem by fuelling the desertification processes. These episodes of base level changes in agricultural system jolted the environment and the survival system on which the food and agriculture primarily depend upon. Hence, Mongolia with its high dependence on imported food and agricultural system and landlocked geography requires revival and the rejuvenation of its traditional pastoral livestock production system for truly achieving food security, especially for the vulnerable groups of nomadic herders.

Mongolian history has seen different phases of transformation in its agricultural system, from traditional Mongolian pastoral livestock production system before 1960s to command economy based collective farms controlled and maintained by the state from 1960 to 1990; and then to the phase when the free-market based economy was adopted after 1991 following the collapse of the former Soviet Union. The transformation of agricultural system from traditional to command economy, and

from command economy to the free market economy in Mongolia, led to severe alteration in the delicate linkage between the nomads and their local environment, which undervalued the linkage of nomadic pastoral livestock production system with the environment and overvalued the agricultural production and farm yield. This also led to the transformation of agricultural technology from traditional to the modern style which drastically reduced the genetic base of the native livestock varieties and promoted invasive species which are considered better in terms of higher yield. Agricultural production has, thus, shifted from consumption to sale. More importantly, this transformation of agriculture system has severely affected the nomadic herder's society, as they have been forced to give up their lifestyle in order to settle down, but now most of the herders have become urban migrants and are facing a state of double jeopardy. The sharp increase in the cost of cultivation has shrunk the access of the poor to food. It points to the fact that among the world's most food insecure population, the majority is represented by the farmers and all those involved as farm labourers. They produce food for the entire world, but they themselves have limited access to it.

The development of the concept of "food security" started gaining attention from 1970s (IFDA 2014a). The concept of "food security" was highlighted during the World Food Conference of 1974 which stressed on the increasing food production in the food deficit countries and for the development of coordinated system of national and international level grain reserves. However, it ignored the vital concern of food access to poor and marginalized. The widely accepted definition of food security as given by the United Nations Food and Agriculture Organization's World Food Summit (FAO 1996) and accepted in Mongolia is: "All people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet the dietary needs and food preferences for an active and healthy life". Four main elements of food security are: Food availability, food accessibility, food utilization and food stability; these are known as the four pillars of food security. The definition of food security has been changing from time to time: earlier it was primarily meant for increasing food production. Then the concept of food security started to focus on the issue of access to food which remained mainly influenced by the "entitlement theory" (Sen 1981) and welfare economics. Now the food security and the growing

environmental thoughtfulness have come up with the concept of “household food security” which is crucial for assessing the food security at the ground level.

The global politics of feeding the hungry remains the core reason for promoting high cost agricultural technologies, yet these technologies are unable to meet the desired goal of feeding the poor. Food security remains a distant dream for many. Still there are 1.4 billion poor people surviving on a trivial figure of US \$ 1.25 on a per day basis and out of it, one billion people living in rural areas are primarily dependent on agriculture for their lives and livelihood. The concentration of ownership and control in agriculture has slowly but steadily shifted from growers to the Transnational Corporations (TNCs) operating in many countries under the umbrella of globalization. The corporations have started increasing their hold in the world agriculture and food system, and encouraged livestock production near few large processing facilities which they operate under a single corporate house. Corporates have taken special care in deciding the location of such large processing facilities where there is negligible threat of union activities so that they can successfully maintain low wages for the labour and soft environmental law. Livestock production has become highly concentrated in regions where large processing and packaging facilities are available under single corporate house. The agriculture and livestock production system has seen major changes in its spatial relationship with the environment, ownership and control on the food system and where the local communities have little or completely no control over the agricultural system which indicates towards a volatile future for mankind.

In such a situation, traditional agricultural system has positive points to follow so as to achieve the food security. Nomads of Inner Asia are known for their tough survival tactics in the fragile grassland ecosystem. The legendary traditional knowledge and the in-depth understanding of the local natural environment prepared nomads to survive in the harsh climatic conditions and allowed them to develop deep and innate linkages which had grown with time. In the traditional pastoral livestock production system, the agro-biodiversity remain at the core of the nature’s survival system, the composition of the herds includes the five animal species: the sheep, goat, horse, camel, and cattle or yak, which promoted a balanced use of pastureland which left almost zero footprint on the exquisite pastoral land of Mongolia. Native plant and

animal species remain well acclimatized with the delicate environment of Mongolia. The concept of five animal species is regarded as scientific wisdom which allows a balance on the basis of the grazing habits of each animal, as every animal has a different dietary pattern, and thus prevents the overgrazing of pastureland. Similarly, the flexibility and the high mobility of nomads with their herds is a practice which has now been recognized by environmental experts as highly sustainable and scientific use of delicate grasslands. The '*Otor*' movement by the nomadic herders has put forward an excellent example of the traditional wisdom to survive in the tough climate without deteriorating the equilibrium between man and the environment. The nomadic foods and their way of preparation, all are unique, scientific, and sustainable and also considered as the future food for mankind by the experts. For Mongolia's food security it is necessary to revive its traditional agricultural system based on subsistence in which the family controls its food from seed to plate, so that the entire nation become food secure. The government's role in controlling a food system has been declining day by day, as the TNC's have integrated the global food system, which is dependent on their very twist and turns.

1.2 Review of Literature

Worldwide the agricultural systems have undergone colossal transformation. With the global food and fuel price shocks, which were chiefly felt during 2008, food and agricultural systems have become an area of global concern. In Mongolia, the food security plays a vital role. The landlocked geographic location and high dependency on imported food for meeting even the daily food requirements exerts great pressure on Mongolia's agricultural system. The literature survey has laid the foundation for understanding the transformation of agricultural system in Mongolia and the status of country's food security.

1.2.1 Transformation of Agricultural System

While reviewing the literature on the transformation of agricultural system in Mongolia one comes across the writings of a few authors who put forward strong theoretical explanations for the transformation of agricultural systems worldwide. In Marxian theory of unequal distribution of the surplus production Marx postulated that "invention then (in his time) becomes a business and the application of science to

direct production itself becomes a prospect which determined and solicits it". Marx was way ahead in foreseeing the process of division of work by which tasks within agriculture would become specialized and remain concentrated in hands of different specialists who often reside off the farm (Hogg 2000, 42-43). For example, Morse (1996) narrated that Monsanto, the US based biotech giant has become the 'Microsoft of Engineered foods' by eliminating competition with the help of patents (Hogg 2000, 229). Marx observed that, poverty and hunger are the outcome of the unequal distribution of agriculture surplus in which the Lion's share of the profit is kept away by the capitalist. The "entitlement theory" and the welfare economics have remain highly influenced by Marxian views. It discarded the explanation of food non-availability as the reason for famines, and brought to focus the notion of food accessibility, the state of democracy and its relation to food security (Sen 1981, 44-64; 2000, 9-11). The unequal entitlements of food among the people, low purchasing power and the high food price have made food inaccessible to the poor even though it is available in the market.

Marx and his views on sustainable agriculture were deeply rooted in maintaining a healthy and fertile soil and not by blindly applying heavy doses of artificial fertilizers which are purely guided by modern soil sciences in order to favour the capitalist agriculture (Foster and Magdoff 2000, 43-44). It was James Anderson's 'theory of rent' which was based on fertility of land, which deeply influenced Marx views on sustainable agriculture. Anderson was a Scottish agronomist, a political economist and a contemporary of Adam Smith. Even Ricardian theory of rent, was purely guided by Anderson's analysis of differences in the soil fertility due to which certain amount of premium is assigned to it. This premium amount forms the basis of the 'theory of land rent'. But the most fascinating part of Anderson's explanation is that, he in his argument strongly supported the possibility of improvement in soil fertility by adopting proper measures like 'manuring, draining, and irrigating'. According to him, with these soil fertility measures even the productivity of least fertile land could be raised a point where it would be much closer to that of the most fertile land. But in the absence or application of improper measures, the reverse could be possible which would lead to the soil degradation (Foster and Magdoff 2000, 48).

The technological changes and how are they influenced by the factors of production, especially labour, is well represented in the theory of “induced innovation”. The root of the theory lies in the ‘fatefully vague passage’ in Hicks’ theory of Wages (1932) in which it was assessed that the high labour cost might bias the direction of invention or innovation in a labour-saving direction within privately owned firm. The theory justifies the technological innovation in the agriculture sector in the United States (Hogg 2000, 48-49). It suggests that all the technological innovations are not intended for the benefit of the society, and are not applicable everywhere on societies of different cultural, social or economic setups. In the reductionist theory, both the “Green” and “Gene” revolution have been assessed. Reductionism became a powerful tool in the innovations of agricultural technologies in which the complexity of natural phenomena and processes are reduced into a more simple form so that only the benefit of the technological innovation is represented, but the complex nature of related ecological and the socio-economic problems are figured out of the screen and kept secret until there is immense damage reported to the environment and society (Kvaloy 2004, 5-25). The theories facilitates in understanding the transformation of agricultural system in Mongolian perspective. These theories are of immense value for assessing transformation of agriculture system and food security.

The theory ‘Peasant economy’ closely explained the entire process of agricultural system transformation and its sensitivity with the traditional Mongolian pastoral production system which would be of immense importance in understanding the impact of this deep rooted process of change. This theory has been really one of the best explanations for this colossal transformation and its impact on specifically the family-based domestic pastoral production system. The ‘Peasant economy’ is as a separate family based domestic production system, which in the case of Mongolia truly explains the process of nomadic pastoral production system in the light of ‘herder’s economy’. Its closeness with the family based domestic production system had always remained at the central place of this self-sustaining agricultural system which remained crucial for maintaining the food security of the herder’s family. This theory is really helpful in explaining today’s collapsing of the local agricultural systems and how ‘market economy’ and the ‘peasant or herder economy’ are completely separate economic system in their functioning and vital for the

sustainability of the local food and agricultural system of any geographical space (Chayanov1924, 577-613).

What one could find in Mongolia's case is that after the collapse of the former Soviet Union in 1991, it experienced abrupt changes in almost every sphere of life. The year 1990 has been considered as the year of 'dual revolution' which had blown away the seventy years of Soviet system of command economy and moved to free market economy under the democratic system (Honeychurch 2010, 405). The transition was fatal for the rural sector which uprooted completely because of neglect of services, transport infrastructure, communication and direct market access to herding families. It also deeply impacted the Mongolian nomadic herders and their livelihood. The modernization of Mongolia by the international funding agencies guided the country's developmental policies which produced lopsided growth of the rural and the urban Mongolia and created severe imbalance.

The transition to Market economy after the collapse of the Soviet Union resulted in two significant changes in Mongolia's pastoral land use: firstly, the number of herders increased as with privatization of animals even the non-herders joined the profession and secondly, there was a surge in the migration from urban to rural areas, but the number of animals raised by one herder decreased to about 61percent. On the one hand, it increased the number of herders on the same extent of grazing land besides increasing the threat to the carrying capacity of the pastures. On the other hand, it decreased the labour productivity as the number of animals raised by per herder declined sharply which dissolved the social safety net for the herders (Muller and Bold 1996, 38-42). This can be considered as one of the major blow for the pastoral economy of Mongolia.

With Mongolia's transition to a market economy an agrarian crisis jolted the entire nation. The agrarian crisis can be clearly seen in the form of the collapse of crop production sector and the near shut down of the 'crucial energy sector'. The GDP (Gross Domestic Product) contracted to 25.2 percent between 1990 and 1993. From 1994 Mongolia's economy started recuperating from the situation of standstill (Spoor 1996, 615-616). During the Soviet period, the country was entirely dependent on the Council for Mutual Economic Assistance (CMEA), the Soviet trade bloc, for capital-intensive industrial and agricultural sector. The collapse of the Soviet trade bloc

greatly impacted the import dependent agricultural sector of Mongolia. The agricultural production and yield slumped down in the absence of agro-chemical inputs. Not just the privatization of livestock sector, but the absence of market institutions, the absence of legal framework and micro-institutions to facilitate credit banking services, transport and processing services all together were blamed as the main reason for the agrarian crisis in Mongolia and not the privatization of livestock sector. The agrarian crisis resulted in increased income disparities, decline in health services and the escalation of rural poverty. The concentration of processing industries in Ulaanbaatar uprooted the nomadic herders from rural areas towards the urban centres for availing facilities and sustaining their livelihood (Spoor 1996, 621-625).

This massive transformation of agricultural system not only impacted the historical roots of a geographical space, but also resulted in the erosion of nomadic pastoral production system, that has preserved their cultural as well as their place identity. I would like to term this deep rooted change as the ‘theft of geographical space’. Yes, it is very much a theft of not just local identity; it is a complete change in the spatial relationship of both the human and the non-human world. A localness of a space, its dynamic and complex relation with its natural space, its resilience, its resistance to any climatic change or adaptation to local environmental change, are all an intrinsic part of the survival system and its sustainability. But diluting the geographical barriers, the localness of a space has led to both the theft of cultural as well as space identity.

Place identity is a core feature which gives an innate and inborn understanding and deeply embedded spatial relation of both the human as well as the non-human world with its local geographical space. In essence, it not just preserves their cultural identity but has also preserved the understanding of localness of their native place, its environment and everything besides. In the study on Mongolian Kazakhs, the concept of place identity could be well understood (Barcus and Werner 2015, 119-128). In the study about MongolianKazaks and their migration to Kazakhstan after 1990s political turmoil and again their home coming to their birth place in Mongolia, strongly indicated the value of place identity (Barcus and Werner 2015, 119-128). After the disintegration of Soviet Union in 1990s, nearly half of the Mongolian Kazakhs

population migrated to their ‘imagined homeland’ of Kazakhstan. But as soon as a decade passed, the Mongolian Kazakhs started returning to their home in Mongolia. There is a famous Kazakh proverb that truly indicates their love for their place of birth. It says ‘*menin zherim-tugan zherim*’ (my only land is my birth land). Their strong sense of place identity is deeply associated with their local natural space, its understanding and everyday life.

Another vital ecological perspective that is emerging in the international politics is the relation with nature and non-human animals, animal rights, environmental ethics and its relevance in sustainable food and agricultural system. The traditional Mongolian pastoral production system sets forth one of the best ways to represent this deep rooted association of the human and the non-human world. It is strongly argued that instead of anthropocentric structure, the inter-species conception of politics should be given the central place in addressing the non-human world (Youatt 2014, 217-223). The anthropocentric structure ossifies in boundaries demarcated by human world, and always remained obscure.

1.2.2 Transition to Market Economy and its Impact on Food Security

After Mongolia’s transition from centrally planned to the market economy the annual inflation touched the peak of 330 percent in 1993 which declined to 75 percent during the first half of 1994. Three factors have been identified as the main causes behind the soaring inflation: Firstly, the fiscal contraction which reduced the ability of state to finance and sustain the social programs of Mongolia; Secondly, the privatization of livestock and highly unequal ownership of livestock; and thirdly, cutting down of education and health budgets and cost recovery policies all together resulted in the formation of a new underclass of “ultrapoor” families especially in rural Mongolia (Subbarao and Ezemenari 1995, 2-3). With the dissolution of the traditional social safety net, the food security emerged as a major concern for the brigade of ultrapoor. During June 2008, the year when food price shock was felt globally, the food inflation in Mongolia was highest in East Asia with 48.5 percent (World Bank 2008, 2). According to the Food Security Risk index (FSRI) for the year 2013, Mongolia falls under the high risk category (Maplecroft 2013).

Currently, Mongolia is facing much more volatile changes in the economy. The economy grew and touched the peak of 17.5 percent in the year 2011, which trembled down to an economic growth of 12.4 percent in 2012, which further declined to 11.3 percent in the first half of 2013 (World Bank 2013, 9-11). In the first half of 2014, Mongolia's Gross Domestic Product (GDP) growth remained at 5.3 percent (NSO 2014). It suggests of a trembling pace of Mongolia's economy and its growth. In terms of sectoral share of employment to the total employment, mining sector contributed to just 4 percent, whereas the agriculture sector contributed to the highest share with 28.9 percent for the year 2013. It suggests that, the agriculture sector which provides majority of the employment especially in rural areas but it is reeling under the pressure of unbalanced development and poverty.

Chinese dominance over Mongolia's economy and increasing Sino-Mongolian trade cooperation in the post-Soviet era has threatened its environment and food security. China mainly export the food commodities like- flour, rice, sugar, fruits which not just threatened Mongolia's indigenous food industries but also impacted its food security. "Mongolia mainly exports - copper, cashmere, skin, hide, and their markets are increasingly becoming dependent on China, thus there is the risk of Mongolia turning into a raw material supplier of a foreign country" (Soni 2005, 6-8) and the major chunk of profit goes in the hand of China which has drained Mongolia of its cashmere supply and destabilized its processing industries as well. In the recent past, Mongolia has started reviving its economic and trade cooperation with Russia that has been considered necessary for countering its overdependence on China (Soni 2011, 46). Both Russia and China have been considered of great significance for security management of Mongolia and it cannot afford to ignore them (Soni 2006, 18-20). Thus, here it is imperative to build concrete relationship with rest of the world for achieving comprehensive security for long term which takes into account military or defence security, economic, technological as well as the ecological security all together.

The rate of overall inflation in Mongolia remained at 13 percent as of September 2014 (NSO 2014). The limited capacity of domestic industries due to the lopsided regional development of Mongolia is blamed as the prime reason behind the rising inflation which is termed as the "Imported Inflation" and is expected to further push

Mongolia's inflation into upward direction and directly going to impact the food security. The funds for development remain highly concentrated in the urban capital city of Ulaanbaatar and in 2005, it was estimated that only about 5 percent of monetary aid reached beyond the capital city, which was considered as the main cause behind the lopsided development of Mongolia (Bruun 2006, 214-216). The flow of migrants from rural to urban areas, especially around the capital city of Ulaanbaatar resulted into rapid urbanization and swelling of capital city. The mounting of corruption in the weak political system is also blamed for the lopsided development of Mongolia as flow of funds for the development of rural areas never get disseminated (Honeychurch 2010, 406). A recent study by International Fund for Agriculture Development (IFAD) (2014b) state that more than half of the total population of Mongolia is now living in urban areas, and more than a quarter of Mongolians lives in Ulaanbaatar, the capital city. Many migrants are living in *Ger* city which lies in the periphery of the city with all the disadvantages and hardship of urban life. As high as 50 percent of the inhabitants in these *Ger* settlements are poor. Migration in rural areas has become imperative as the rural-out migration forms a negative correlation with the chance of falling into poverty and those who did not migrate have a much higher rate of poverty incidence than that of rural-to-urban migrants (World Bank 2011, 10-16). This suggests us about the level of desertion of the rural areas, which further jeopardizes the agricultural sector. Steady and strong agriculture sector is essential for controlling the food price and ensuring the food security.

Mining boom is another important feature of the market economy system, which has left deep rooted changes in the land use and land rights in Mongolia, specifically on the herder's everyday life and livelihood. It was carefully assessed and argued by Tumenbayar (2002) that the rights of the herders are too weak as they are not clearly defined under the current Mongolian legal system (Suzuki 2013, 269-270). This has made the herders rights more defenceless when compared with the mining rights defined under the Mongolia's mineral law. All this has led to the further degradation of the pastureland and shrinking of herder's space. In a survey by United Human Right Team Group (2006) on herders, Ninjas, local government staff, and company executives, it is revealed that local residents participation was completely absent in the decision making process regarding mining in their local area. It indicates the true

facet of the lopsided development processes undertaken by the government that sidelines the importance of pastoral system and herders rights.

Desertification emerged as a major environmental problem in the Mongolia and resulted in a huge blow for the food and agricultural system. Dorj et al. (2013, 217-229) in his careful observation on Mongolian grassland and the situation of desertification, has argued that community-based Grassland management in Mongolia's Gobi widely achieved not just checking the environmental problem, but have also proved to be of immense importance in sustaining herders livelihood by increasing their family income. Agriculture is assessed as one of the core sector of Mongolian economy and about 80 percent of the country's land is used for the purpose of agriculture. Under the intensive livestock production system, the adoption of foreign breeds for increasing agricultural productivity immensely contributed in the desertification of the sensitive grassland ecosystem of Mongolia. The shift from 'sheep-keeping' to 'goat keeping' in the herd composition in response to the international demand for Cashmere under market economy system completely transformed the agricultural system in Mongolia. The study assess that it was this shift, which led to the boom in goat population and was identified as the major cause behind the pastureland degradation and acceleration in desertification process. This resent trend of overexploitation of the pastureland has been given birth to new set of issues involved in the grazing land management and food security of the herder's family that includes the common pool resource and the property rights. Weak governance and overdependence on China in terms of trade and economy of Mongolia, seriously threaten the sustainability of the Mongolian grasslands, and the entire food and agricultural system.

1.2.3 Global Politics on Food and Agriculture

The food price shock in 2008 resulted in the outbreak of riots for the food and spread on a significant region, covering Egypt to Haiti and Cameroon to Bangladesh (UNEP 2009, 5). Worldwide about 1.4 billion poor people live in a petty sum of less than US\$ 1.25 a day (IFAD 2013, 6). With 2008 food price shock, as many as 110 million people were driven under the poverty net and widen its base by adding 44 million more people, as most of the low income group devotes almost 70-80% of their daily income on food (UNEP 2009, 6). The food price steeply increased in a short span, in

2006 the food price increased to 9% which plunged to 23% in 2007 and further surged to as high as 54% in 2008 (UNEP 2009, 12). More importantly the food inflation has increased at a much higher pace than the aggregate inflation. In Europe and Central Asia overall inflation averaged to 10 percent, whereas the food inflation was 15 percent higher than the aggregate inflation and more particularly the bread and cereals inflation was as high as 23 percent in 2007 (World Bank 2008, 2). This signifies that globally food and agricultural systems have become much more volatile and are directly impacting the food security.

In order to understand the global food politics in Mongolia's perspective, it is essential to learn about how the globalization and market economy assisted the corporate giants to take the control of world resources in their hand. The corporate had taken special care in deciding the location of large processing facilities where there is negligible threat of union activities so that they can successfully maintain low wages for the labour and soft environmental law (Foster & Magdoff 2000, 51-55). The livestock production is encouraged near such locations under single corporate house. First, the separation of people from the farm, and now the separation of animals from cropland that produces their feed, not just disturbed the soil nutrient cycle, soil fertility but have broken the physical connectedness of animal with its local environment and biodiversity. This transformation forced the cropland to become entirely dependent on petroleum based agro-chemicals for increasing soil fertility.

The horizontal and vertical integration has been observed as the two important ways with which corporate increased their control in agriculture systems. Most food firms started as small and local firms but as they become profitable they expanded its base in other geographical areas (Heffernan 2000, 61-75). The expansion occurred through building new facilities, acquisitions and mergers. In this process the small players get eliminated from the market with the planned horizontal integration of corporations in agriculture which involved two important features: planned overproduction and selling the product below the cost of production. Secondly, for eliminating competition, the firm increases its ownership and control of a number of stages in a commodity system just like diversifying into different commodity system, this structure gives the firm more economic power. This is how the vertical integration encourages few TNCs to control the global food system from 'seed to shelf'. This

gives us a better understanding about the transformation of agriculture system under the market economy.

In a remarkable study 'Seeing like a State' (Scott 1998), in-depth observation was made on the transformation of the agricultural system from traditional system to the state controlled system under the socialist collectivization process. It was clearly observed that collective farming is not successful at growing every crop. With a comparison, it is made clear to understand the applicability of the collective farms for certain crop types like wheat, rye, oats, barley and maize. Whereas for fruits, vegetables, small, livestock, eggs dairy products and flowers, the collective farms are considered 'ineffective'. In the study, it has been identified that there are systematic differences between different categories of crops or agricultural produce as their institutional setting might vary. With a comparative study of wheat and raspberry crops, the depth of the problem was identified and assessed. In case of wheat crop, once it is planted, it requires minimal attention till the crop is ready for harvest. It was observed that cutting and thrashing just completed in one operation after which it is blown in trucks heading for granaries or transportation. Wheat crops are easy to store and kept for a longer period without much losses. Whereas, in the case of rasp berries fruit, which grows as bush plant, requires particular soil and careful attention all through its growing and harvesting period. More importantly, it is impossible to pick it with machines and its storage require lots of care as it is a highly perishable and last for few days only. If stored in too high temperature or packed tightly, it gets spoiled within hours.

Hence, rasp berry crop needs delicate handling in almost every stage of crop production. This indicates towards a major contrast that exists between crop handling and production for diverse crops. Every crop has its unique set of sensitivity to the environment that needs to be addressed separately, rather than applying uniform set of agricultural system. The significance of local knowledge and experience still holds the central place for the success of and food and agricultural system (Scott 1998, 193-222). In a way, it gives a deep message regarding the transformation of agricultural system worldwide.

1.2.4 Mongolia and its Initiatives to ensure Food Security

The government undertook numerous programmes on food and agricultural system transformation after the coming of the new era of free market economy based system was adopted. Food security has become a central issue because of exponential population growth and the rising food prices. Specifically, the urban poor who all migrated due to the devastation of the rural economy based on livestock production system in Mongolia, it has become really hard to ensure their food security. Low purchasing power and escalating food prices brutally jolted the urban poor immensely because their affordability sharply declined with the sudden transition to the cash economy based system. Earlier, the rural economy was purely based on domestic production system of herder's families which doesn't required cash to maintain their food security. The traditional system was self-sustaining, as the food and agricultural system required minimal outside dependence in terms of food accessibility. This is a very well structured feature of the traditional Mongolian livestock production system which needs recognition for its agricultural knowledge and family food security of the nomadic herders.

Unfortunately government of Mongolia failed to recognize the importance of traditional Mongolian knowledge in sustaining the food and agricultural system and hardly given much recognition to nomadic pastoralism in the new policies and programmes concerning the food security in Mongolia.

1.2.5 Traditional Mongolian Livestock Production and Relevance for Food Security

The pressure on world biodiversity and ecosystem services on which pastoralism primarily depended has increased many folds. Biodiversity is directly responsible for 40 percent of the world's economy, mainly contributing to the agriculture and forestry sectors. Around 70 percent of the world's poor lives in the rural areas and directly depend on biodiversity for their food and social security. The extensive pastoral livestock production systems cover about 25 percent of the earth's terrestrial surface and had remained a way of life for about 100 to 200 million population worldwide (Proda 1991; CBD 2010, 1-5).

In studies, the delicate nature of the regional ecosystem of Mongolia has been identified. The Mongolian desert and desert-steppe has been identified as ‘non-equilibrium environment’ and grass-steppe and forest-steppe as ‘equilibrium environment’. Environmentally ‘non-equilibrium environment’ represents a more delicate ecological system which is more vulnerable in comparison to the ‘equilibrium environment’ (Mearns 1991, 25-33; Fernandez-Gimenez and Allen-Diaz 1999, 871-885). The annual production from plant communities is less diverse and are classified as more ‘equilibrium environment’. In both the ‘equilibrium’ and ‘non-equilibrium’ Mongolian environment, the livestock grazing management strategies are primarily based on extensive grazing management as applied in the traditional Mongolian pastoral livestock production system, due to which both the grazing land ecosystems remained in an ecologically stable state (Archer and Smeins 1992, 4-5). Mongolian Plateau region has been considered vulnerable if highly mobile livestock and flexible grazing management strategies are not followed, which from ages maintained the sustainability of grazing land (Purev 1990, 44-60). The modernization of animal feed and fodder industries has given priority to increasing production rather than understanding the adaptability of native plants with the delicate Mongolian environment. The de-collectivization of ‘*negdels*’ (agricultural cooperatives) in the post-Soviet era also resulted in the influx of non-herding population to herding and led to the overcrowding and overexploitation of the grazing land and transformed the concept of community into the state of ‘tragedy of commons’ (Mearns 1996, 321-330). This transformation not just threaten the ecological sustainability of grazing land as every herder made defensive move to grab the best grazing first for securing their future needs, but had also entirely changed the herder’s attitude towards their local environment and land (Humphrey et al. 1993, 58-59).

One of the renowned extensive research studies on Inner Asian region and nomadic pastoral system has been described as *End of Nomadism?* (Humphrey and Sneath 1999). It is argued that the seasonal movement of nomadic herders maintained the sustainability of the sensitive pastureland in the Inner Asian region. *Otor* movement of livestock is one of the core features of the traditional Mongolian pastoral system which were used by nomadic herders occasionally to intensively feed their animals. In this way, a healthy herd was maintained, which could survive the extreme weather conditions with grass scarce winter and spring seasons. The *otor* movement was also

considered beneficial in reducing the pressure on the grazing land, especially when there is shortage of forage or environmental damages become more severe, in such conditions grazing the livestock would result into irreparable damages and huge environmental cost in terms of environmental externalities of overgrazing in delicate grassland ecosystem. With careful observation, it was identified in the study that the pastoral movement system of nomads was an outcome of the embedded concept of agricultural sustainability in the traditional Mongolian pastoral system. The movement system was found to be highly frequent both spatially and temporally the direction of movement was examined to be both, horizontal as well as vertical which are purely guided by the availability of pastures and water at different height of the land.

It is well indicated in studies that the sustainable use of land and water resources are going to determine the future of food and agricultural system and food security situation of any region. Bayan Nur is in Inner Mongolia and is a water scarce region. It is clearly observed that it is the effective use of agricultural water and land resources (AWLR) are going to play key role in the food security of water scarce region of Bayan Nur (Geng et al. 2014, 43). Water and land resources are identified as few of the most vital resource in the food production system and ignoring them can anytime trigger a situation of acute food crisis. Hence food security has become one of the central features of the sustainable development agenda today. The results from the study indicated that the process of agricultural production is strongly determined by the degree and the direction of water and land resources utilization and also the type of agricultural production.

Mongolia is highly dependent on its environment for herding and with the environmental degradation and fast pace of changing climate, future of the agricultural system and food security remained at brutish state. The frequent and abrupt events of *dzud* and drought lasted for three consecutive years, from 1999 till 2002. Then in 2009-2010 *dzud*, which resulted in the loss of about 20 percent of the country's livestock population and affected almost 28 percent of the Mongolia's human population (TFESSD 2011, 1). The Ministry of Nature, Environment and Tourism, Government of Mongolia (MNET 2010, 30) assesses that the desertification

has affected almost 70 percent of the grassland of Mongolia, which has taken the form of natural disaster.

The relevance of mobility and social networks were also explored and identified as few of the most remarkable features of the traditional Mongolian pastoral system. Many studies which remained focused on the pastoral system, addressed the underlying facts behind the relevance of mobility factor in maintaining the sustainability of the grasslands. In a comparative study by Behnke (et al. 2010), they tried to make a comparison between the migration habits of the wild animals and the livestock migratory system. The study really provides an in-depth understanding about the pastoral movements. Three sets of variables significantly influence the migration path of migration of the wild ungulates and the domesticated herds, which includes – the distribution of resources, competition for the resources, and constraints on the access to these resources. It was observed that pastoral movements and migration system followed within it assist us to understand the problem of resource availability to the nomadic herders.

After 1991, many people got unemployed and joined herding as their sole means for livelihood, was market as a major feature. It was observed that the socio-economic trends in different grasslands region of the world that fraction of those people who are not herders or herding specialists, increased manifold and immensely impacted the grazing lands (Harbou and Danguioua 1991; Behnke et al. 2010, 152). It was directly resulted in the decline in the long range livestock mobility. It remained truly applicable in case of Sudanian zone (Turner and Hienaux 2008, 59-80; Behnke et al. 2010, 152).

Maria Fernandez-Gimenez (1993) in his extensive work on Mongolian pastoral system identified the relevance of ecological perception of the Mongolian herders in maintaining the sustainability of the entire productivity system. According to her close examination, herders in Mongolia classified their pasture resources under the two broad categories – firstly, by season of use and secondly, by the nutritional characteristics of forage resources, which were further sub-divided. The forage resources, based on its nutritional characteristics are divided into two categories-

The ‘thick’ or ‘hard’ grass found on the flood plain and in ‘wet’ montane meadows, these thick grasses in herders perception were considered as of poor nutritional quality and are mostly suitable as forage for big animals like yaks, cattle and horses.

The ‘thin’ grasses were found in steppe and hillsides regions and are preferred as forage by small animals like sheep, goats, and are considered by herders as more nutritious, ‘tasteful’ and having high energy content (Fernandez-Gimenez 1993, 39-40). Pasture resources classification based on season are summer, autumn, winter and spring pastures, reserve areas and distant emergency pastures called ‘otor’ places. It was observed in the study that summer season pastures were perceived by herders to “have higher density and lower quality forage”, whereas during winter and spring season pastures were considered to be of “lower density and higher quality” (Fernandez-Gimenez 1993, 40).

The herders ecological perceptions, their knowledge about their local areas and their animals, is simply remarkable and are beautifully assessed in the study which is strongly needed for an effective policy designing and sustainability of the delicate grassland ecosystem of Mongolia. It was examined that ecological knowledge and resource management, both are important for right decision making. Herders experiences, their worldviews, their knowledge about local space and natural entities, everything matters a lot for improving decision making and right kind of approach for the local resource management and development. This case study from Mongolian forest steppe remained highly valuable in terms of providing use of herder’s ecological perception about camp locations and sensitivity of the pastoral system with its local natural space (Fernandez-Gimenez, 1993, 43).

Honeychurch (2015) in his work on the topic, ‘Inner Asian and the the Spatial Politics of Empire: Archaeology, Mobility and Cultural Context’, the value of mobility and the role of social exchange and social network were assessed. The development or silk route along with the trade routes, played important role in the development of social exchange and stronger social networks based on kinship which also functioned as a social and economic security for families in crisis. The practice of Mongolian pastoralism includes “many ways to buffer against productive risk”, the possibility of sudden environmental shifts have the potential to completely eradicate their herds within weeks, in Mongolia (Honeychurch 2015, 90; Fernande-Gimenez 2000, 1322).

The subsistence skills of the Mongolian herders observed to have significant role in dealing with the difficult events occurred due to sudden weather and environmental changes, like snowstorms, epizootic diseases, steppe fires, and the drought etc., which posed immense threat to the livelihood of nomadic herders as well as to their ‘surplus wealth’ (Honeychurch 2015, 90). The value of Mongolian pastoralism was well recognized in providing “many ways to buffer against productive risk”, which through its traditional practices, both at individual level and community levels, prepare stronger strategic moves in producing “multiple subsistence sources of food and storage techniques for meat and dairy products” (Honeychurch 2015, 90).

An important observation with this research study was, to understand the traditional Mongolian pastoralism and its community practices which include the “technique for dispersing herds over space against localized downturn and social storage through reciprocity, obligation, and ritual” (Sneath 1993; Honeychurch 2015, 90). It indicates towards a deep association of the herd and herdersman with their local natural settings, its climate in understanding the possibilities of unseasonal risk and potentials for events of sudden ‘environmental shifts’ (Honeychurch 2015).

It has also stressed that the importance of these unique traditional practices largely remained unnoticed, unrecognized as those who were involved are the nomadic herders, lacking scientific justification or expensive lab inputs. Ironically, the real knowledge is treated as folly, whereas crafty knowledge is treated as ‘innovation’, or ‘revolutionary’. Money defines everything; it is truly difficult to identify the differences between wisdom and folly. The herders skills represented in their “intimate knowledge of pastures, climate and animals and how these three intersect over time” (Honeychurch 2015) clearly points towards the value of herders skills for the sustainability of grasslands. The herders individual skills as well as their community based collective skills, both were largely remained ‘unappreciated’ (Honeychurch 2015), and are now observed as one of the most important protection against the herd losses. These herding skill are not a day phenomenon, it comes from the in-depth interaction, knowledge and experiences gained with ages of association and interdependence between herders and pastureland, their animals and the climate. The knowledge and understanding gained with such an in-depth, intense interactions set remarkable strategies to escape from the extreme situation of ‘herd loss’ and

provides “flexible adjustment of the productive, spatial, and social variables to meet short-term sustainability” (Fernandez-Gimenez 2000, 1318-26; Honeychurch 2015, 90-96).

Mongolia is a landlocked country, due to which it remains in a geographically disadvantaged position and makes investors to incur high transportation costs, thus putting hurdles for foreign investors. However, China enjoys the geographical advantage and it is believed that no other investor can compete with it in Mongolia (Soni 2005, 7-8). The weak governance and economic dominance of China in terms of foreign investments, Mongolia is facing overexploitation of its delicate natural environment, especially for mining activities. The state weakness in the implementation of environmental laws in the mining activities by the corporate giants like Rio Tinto and China’s foreign investors have also been posing threat for the environmental security of Mongolia. Nomads herding for more than 25 years believe that it has become harder to sustain their livelihood as the mining activities have polluted the water and land in the countryside and their animals are getting sick. There is less water and holes in the land everywhere (Stewart 2014). A conflict is growing that points towards the revival and rejuvenation of the Mongolian traditional agricultural system.

Few major gaps have been identified in the literature surveyed for understanding globalization, agriculture and food security in Mongolia, particularly the transformation of Mongolia’s agricultural system during the country’s transition to market economy in the post-Soviet period. The literature mainly centred on Mongolia’s political and economic changes during the transition period but hardly concerned about the changes in the survival system of Mongolia which remained deeply connected with the environment and the traditional lifestyle of the Mongolian nomads. The traditional practices do not find appropriate place in government programmes and policies for reviving the entire nomadic survival system. New and alien technologies are promoted but the traditional wisdom does not find much attention in the modernized and advanced agricultural system. More importantly, the mobility of nomads and their traditions preserve their identity and form the basis of their survival system. This research study is going to add a new dimension by assessing the Mongolian traditional agricultural knowledge and system and finding their

relevance for sustaining the future of Mongolian agricultural system and its food security. This study is going to fill the gaps in the earlier studies on the Mongolian agricultural system and its food security in the era of globalization.

1.3 Definition, Rationale and Scope of the Study

The agricultural system is an outcome of the interaction of mankind with their local environment. Every agricultural system represents the in-depth relation with the local community, and with ages of accumulated experiences a knowledge system evolves. In the past, the agricultural system of Mongolia remained deeply connected with the food security of nomadic community. Both the agricultural system and the food security are inter-linked and represent a dynamic system. There are numerous definitions of food security and it differs according to geography, politics, economy and the socio-cultural aspect of any country, or a region or a community. It can be classified into different levels like global food security, regional food security, national food security, household food security or individual food security. Basically it is a normative concept which put forward an idealizing state where nutritious and safe food is available and accessible to all, for maintaining a healthy life on daily basis. The growing environmental concern and its delicate links with the food security of the people led to the development of the concept of “household food security” which covers the wider perspective in food security, like allocation or the entitlement of food within a family. Household food allocation touches even minute details regarding the gender issues within a family, which reflects the gender issue in much detail.

The rationale behind the study of globalization, agriculture and food security in Mongolia in terms of transformation of agricultural system and its impact on food security after the country’s transition to market economy from 1991 till 2014 is to understand the relevance of Mongolia’s traditional agricultural system in the household food security of especially the nomadic herders. The disruption of nomadic lives and livelihood which remain deeply connected to the pastoral livestock rearing almost collapsed the rural economy and the agricultural sector due to Mongolia’s transition to new political and economic system. The high dependence on imported food, the mounting trade deficit, rising food price and “imported inflation”, all are areas sensitive for the food security of Mongolia. It requires rejuvenation with the

help of sustainable food and agricultural system. Mongolian nomads are still striving hard to sustain their nomadic identity and their traditions. There are much deeper and serious concerns threaded around the transformation of agricultural technology, which disconnects agriculture from its traditional roots. Globalization and free market economy all are big fantasy. It is ironical that these big words were considered as a recipe for food security, but it had pulled down food and agriculture system in an outrageous nexus of transnational cooperation, and powerful economies of the world which all dictate the free market economies and control the global food economy. The ultimate rationale of the study lies in understanding the global food politics and its impact on Mongolia's nomadic society and food security.

The study provides a focused view about the changes going on in the local food systems and how the local food systems are forced to give way to global food system. The scope of this study is limited to the period 1991 to 2014. The year 1991 has been taken as the starting period because it remains as an important turning point in the history, politics, economy, social as well as physical environment of Mongolia which had jolted almost every sphere of lives and livelihoods of the Mongolian nomads. The year 2014 has been chosen as the cut-off year for this study, as it covers a long period, a span of more than two decades in which structural changes in the agricultural system has taken place that completely transformed the system from production for consumption to sale. The launching of "National Food Security Programme" (NFSP) covering the period 2009-2016 in Mongolia is considered as one of the major initiative by the government of Mongolia. The cut-off year of 2014 is also chosen because it is going to be strongly assessed in terms of the implementation and the relevance of the food security programs like NFSP for ensuring food security in Mongolia, especially at the household level.

1.4 Research Questions

1. How does the agricultural system impact the food security?
2. What were the reasons behind the transformation of Mongolian agricultural system in the post-1991 period?
3. How did the global politics on food and agriculture impact Mongolia's food security?

4. Whether the institutional mechanisms implemented for Mongolia's food security helped at the grass root level?
5. How did the global food price rise influence the food security of nomadic herders?
6. How far does the traditional Mongolian pastoral livestock production system sustain the household food security?

1.5 Hypotheses

- Transformation of agriculture in Mongolia has resulted in a shift from consumption to production oriented system.
- Food insecurity in Mongolia has led to a dependency on cash economy to access food.
- Environmental sustainability and food security are dependent on traditional practices of livestock rearing in Mongolia.

1.6 Research Methods

Both the qualitative and the quantitative research methods are used for this research study. With the help of literary sources and the statistical data both the qualitative and quantitative data is acquired for this study. The literature survey of, both the primary and secondary sources of information are used for this study including the governmental and non-governmental published works, like books, Journals, magazines, newspapers resources. With the help of personal interaction, observation and in-depth interview from subject matter expert Prof. William Honeychurch of the Department of Anthropology at Yale University (USA), as well as interactions and narratives form the students and non-resident Mongolian in United States of America and questionnaire answered by Mongolian respondents who all shared a family history of nomadic herding and some of them have even practiced herding and lived a nomadic life in their past. In a lecture on the economic and political situation in Mongolia by Jargalsaikhan (2016), a famous and renowned economist and political analyst as well as a prominent journalist from Mongolia, which was organized by Jawaharlal Nehru University (JNU), New Delhi, he gave his deeper insight on few important issues and addressed the issues of economic crisis, politics and food security in Mongolia, which contributed as primary data source. Other data sources

included reports and raw data provided Prof. William Honeychurch that he has collected for his research studies on Mongolian pastoralism. Prof. Maria Fernandez-Gimenez of the Department of Forest and Rangeland Stewardship, Colorado State University, Fort Collins (USA) also contributed her research articles, unpublished work and research data for this research study through E-mails. United Nations data as well as Government of Mongolia's data also assisted in extracting the primary source of information.

This study has also used geo-informatical data from research articles for validating the facts and figures accumulated with the help of literature survey and personal interactions and narrative interviews with Mongolian respondents and experts on Mongolian pastoralism, scholars and researchers. The remote sensing data gives us a detailed view about the changes in the land use and land cover of Mongolia for the time period 1991 till 2014 selected for the study. The land use changes in the post-Soviet era, in which Mongolia's transition to market economy took place was deeply assessed with the help of literature survey and statistical data which strongly supports this research study.

In the light of current political and economic situation, the transformation of agricultural system and its impact on food security in Mongolia was assessed thoroughly.

1.7 Organization of Chapters

A detailed overview of the thesis chapters are mentioned below which are organized based on the research questions and the three hypotheses were tested and arguments were made in order to justify the area of research study and its relevance in the agricultural sustainability and food security. The relevance of every chapter in the research study is summarized and a detailed organization of the core chapters, their designing and its structuring are mentioned below:

Chapter 1: Introduction

The introduction of the chapter is simply the best part of the research thesis which introduces the entire research study, its process, its research questions, hypotheses, research methodology as well as the organization of the chapters. A detailed literature

survey which is known as the 'review of literature', remains as the backbone of the research study and immensely helps in identifying the gaps in that particular study area. The rationale behind the research study as well as the selection of particular period which marks the starting and the cut-off year for the study has also been dealt in the process. The introductory chapter has a separate section which deals with the research design and the use of research methodologies for conducting this research study. As such, this chapter provides the background of the agricultural system in Mongolia and an intensive survey of literature and also the details about the research methodology adopted for the study and the limitation faced during the research study, all are important part of the chapter.

Chapter 2: Transformation of Agricultural System in Mongolia: A Historical Perspective

The second chapter provides a historical perspective on the agricultural system in Mongolia based on which a historical framework has been threaded for this research study. In addition it also discusses the key reasons for the transformation of agricultural system in Mongolia to set the tone for analysing such transformation in the post-1991 period. The chapter explores few important theories which provide an in-depth understanding about the transformation of the agricultural system globally. The chapter also examines the cross cultural resemblance between India and Mongolia, and identifies sensitivity of the historical perspective from different facets.

Chapter 3: Global Politics on Food and Agriculture in Mongolia

In the third chapter, the global political perspective has been covered in terms of food and agriculture system which has finally been contextualized in Mongolia's case. The chapter gives an insight on the global and the local transformation of the food and agricultural systems and its impact on smallholders, especially on the nomadic herders of Mongolia. The globalization and privatization in Mongolia soon after its transition to market economy system and its overall impact constitutes the core of this chapter. The transformation of agricultural system and the shift from food production for consumption to the production for market has had a, deep impact on the herding community which resulted in radical changes in the herder's attitude towards pastoralism. This aspect has been analysed in this chapter.

Chapter 4: Transition to Market Economy and its Impact on Food Security

The fourth chapter mainly remains focused on Mongolia's transition to free-market economy and assessing its impact on the food security of the country. It discusses how the agricultural system faced massive jolts that the country became dependent on the imported food commodities for meeting the domestic demand. Besides, it also discusses the post-1991 structural changes in the level of production, technologies of production, the subsidies and government incentives, which remarkably impacted Mongolia's economy and left deep imprints on the entire food and agriculture system

Chapter 5: Pastoral Livestock Production and Food Security

The fifth chapter provides the relevance of traditional Mongolian system of pastoral livestock production in the current situation especially in ensuring the food security at the household level with the sustainable agricultural practices. It also examines if the adoption of traditional system would indeed benefit the raising of insufficient food production in Mongolia to reduce dependence on the cash economy to access food.

Chapter 6: Government Programmes and Policies

The sixth chapter deals with various policies and programmes adopted and implemented by the Government of Mongolia, especially after the transition to free-market economy from 1991 to 2014. The National Food Security Program which was adopted by the government for a time period of 2009 to 2016 remains at the focus and has been assessed in terms of its grassroots level implementation with pros and cons.

Chapter 7: Conclusion

The last chapter provides a broad summary of the entire study. The hypotheses designed for this research study have also been tested which immensely helped and provide deeper insight into our understanding. In the end, based on the research findings and in-depth observation finally conclusions have been given which really try to fill the research gaps in the concerned area of study as well as put forward some serious arguments. The conclusion part also includes some of the suggestions, in order to benefit overall Mongolian the environment and society.

Chapter 2
**Transformation of Agricultural System in
Mongolia: A Historical Perspective**

Exploring the history of Mongolia and its connectivity with outside world events and changes are really important for understanding the transformation of its agricultural system in relation to the global trend. It has been observed that food and agricultural systems globally is moving in the direction of uniformity, with application of similar agricultural technologies, and in the rush to compete for meeting the international market demand, priorities of the agricultural system are changing brutally. Although diversity is a necessity for agricultural system survival, yet a uniform and much simplified version of modern agricultural technologies are given way to replace the local agricultural system with the global agricultural system. It is a deep-rooted change which yet needed to be explained. Learning the history of agricultural transformation is possibly the most significant way to find the explanation for the shift in the priorities of agricultural production system.

Mongolia is a country which purely belongs to nomads and religion here has always remained an area of interest, strongly rooted in identity building process with the political and economic changes. The holy horse has been remained at the core of Mongolian nomadic civilization. The horse has never been much respected as the way they are esteemed by the nomads of Mongolia. Although, in the *Vedic* and the post-*Vedic* period horse remained deeply associated with the horse culture as they are well known for their warrior skills in which horses played major role in the battle field. In Mongolia it is said that “a child start riding a horse before he starts walking”, their love for horses were truly immersing. In their traditional instruments, and in every single piece of art and culture, horse is emblazoned in it.

The historical perspective provides us with a better understanding of the transformation of agricultural system in Mongolia, especially after its transition to a new political and economic order where international market rules everything. In order to gain insight into the transformation of agricultural system and assessing its impact on food security in Mongolia, the research work came across with numerous theories related to the global politics on agriculture. These theories are found immensely important to explain the impact of the transformation of agricultural system and globalization on every nation-state and its economy in quite similar way, especially on the weak and poor nations. The transition to the market economy also viewed from diverse angles, for instance, religion and religious values attached with

the food and agricultural system, the prevailing situation of the political economy and its relation with the historical order of international relations with the outside world.

2.1 Theories on the Transformation of the Agricultural System: Mongolian Perspective

There are numerous theories on the transformation of the agricultural system but only few are able to accurately analyze the prevailing situation of global agrarian crisis and unrest among the agriculturalists. This research work came across some interesting theories which really have paved the way to understand the transformation of the agricultural system. These include the following theories:

- Marx and Sustainable Agriculture
- Induced Innovation Theory
- Reductionism in Agriculture
- Chayanov's Theory of Peasant Economy

2.2 Capitalism in Agriculture

In the pre-capitalist society, peasants are the direct producers, they are the owners of the then means of production, specifically land and in case of herders, they are the collective or community based owners of the local pastureland and even access distant pastureland, in case of extreme weather events or long distance migration in group, community or in well-adjusted seasonal migration pattern based on collective understanding among different nomadic groups or community of herders who allows their free movements. It has been observed that, "the division between the appropriators and producers has taken many forms in different times and places, but one can general characteristic they have had in common is that the direct producers have typically been peasants. These peasant producers have remained in the possession of the means of production specifically land" (Wood 2000, 24). It is clearly indicated that, in the pre capitalist societies, peasant were the direct producers and remained the owner of their means of production, specifically land. It was further observed that these peasant producers can directly access the means of their own reproduction and the notion of 'surplus labour' here was appropriated by exploiters

like landlords and state officials, which are termed as 'extra-economic' means under the pre capitalist societies (Wood 2000, 24-25).

It is the property relations, the possession (or the ownership) of the means of production which was marked as the major difference with the transformation of agricultural system between all the capitalist society and capitalism. The place of production hardly matters, whether it is from rural to urban, it is the property relation between producers and appropriator that is of primary concern.

The main characteristic of the capitalist mode of production was observed as the 'dispossession of the direct producers', whose surplus labour is appropriated by purely 'economic means'. It has been observed that in fully developed capitalism, the direct means of producers are property-less and their main focus lies in the sale of labour-power exchange for wages. It is the only means of production that has completely and directly controlled by capitalist and in which the 'workers surplus labour' is taken away by the capitalists. In this way the 'lion share' of the profit in the form of 'surplus labour' was taken away by the capitalist, and a small portion is directed towards the majority of farmers involved in the process of production (Woods 2000, 25).

Here, it is important to understand the role of market in capitalism which is really complicated. The market acted as a mediator between the producers and the appropriators. Market has always remained a major part of the human societies to facilitate the exchange of surplus goods. But the role of market in capitalism has remained really complex to understand, it is beyond the straight relation of exchange of surplus goods. Today the high-dependence on the international market have become a reality, and fluctuating prices of agricultural commodities have made the agriculturists more vulnerable. It was truly analyzed and the power of market was very well stated as, "...the spread of market imperatives has taken the form, for example, of compelling (with the help of International Monetary Fund) farmers in the Third world to replace strategies of agricultural self-sufficiency with specialization in cash crops for the global market" (Woods 2000: 40).

2.2.1 Marx and Sustainability

The degradation and depletion of soil fertility suddenly became a major problem during the period 1830-1870 which led to the surge in the demand for fertilizers, to enrich 'worn-out soil' with nutrients. The capitalist agriculture seen it as a major hurdle, the modern soil science development was closely associated with the need for improving and increasing the fertility of soil in order to sustain capitalist agriculture (Foster and Magdoff 2000, 43-44). Marx in his view on sustainable agriculture was influenced with the work of James Anderson, who in his work 'An Enquiry into the Nature of the Corn Laws' in 1777 put forward 'theory of rent' based on the fertility of land. According to Anderson, 'rent was a charge for the use of the more fertile soil (Foster and Magdoff 2000, 47).

Malthusian-Ricardian theory of rent was basically rooted in Anderson's analysis of difference in soil fertility and certain premium assigned to it. Anderson was a Scottish agronomist and political economist and was a contemporary of Adam Smith. Marx praised Anderson for his work on analysis of soil fertility and the cost of cultivation and found it more superior and closer to reality than the explanation given by Malthus and Ricardo. He examined the difference in the fertility of land and further linked it with the premium or rent in relation to the fertility of land. The most important aspect is that, Anderson strongly supported his argument that soil fertility can be improved if proper measures like "manuring, draining and irrigation, the productive of land could raise to a point that brought it much closer to that of the most fertile land; but also that the converse was true, and human being could degrade the soil" (Foster and Magdoff 2000, 48). The natural survival system does respond if it is given time and means like manure, water and proper drainage to recharge and rejuvenate itself. And that power was truly recognized by Anderson as he was not just an agronomist, political economist, but was also a practicing farmer who deeply observed all the natural phenomena and taken note of them to support his analysis. Anderson blamed that decrease in soil fertility mainly caused by failure of the modern agricultural system to adopt the "rational and sustainable agricultural practices". The importance of maintaining agricultural sustainability was well stated in the Anderson's work. Marx criticized the "irrationality of capitalist agriculture" based on the original ideas of Anderson's work on classical rent theory and Liebig's soil chemistry to strongly stand

before his argument that against “the Malthusian-Ricardian national law doctrines of overpopulation and diminishing agricultural productivity” (Foster and Magdoff 2000, 49). During 1840 and 1850s, Marx supported the use of fertilizers as a way to improve the fertility of soil and overcome with the problem of diminishing returns and overpopulation. But it was observed that after 1860s, Marx started concentrating on soil-nutrient cycle in response to the seriousness of the agricultural production crisis due to diminishing soil fertility (Foster and Magdoff 2000, 49).

2.2.2 Town-Country Divide and Robbing of its ‘Capital Stock’

Herry Carey, a US Economist, in 1850s stressed that it is the town and country divide which immensely contributed in the net loss of soil nutrient and decreasing soil fertility and crisis in maintaining agricultural production. Carey in his work ‘Principle Social Science’ (1858) strongly argued that, the ‘enlargement of trade power’ involved everyone ‘robbery of earth’ with its soil nutrients which is termed as ‘capital stock’, the very essence of maintaining soil fertility (Carey 1867, 215; Carey 1987, 199; Foster and Magdoff 2000, 46). Anderson (1801) examined in his work ‘A class investigation’ of the circumstances that have led to the present scarcity was resulted due to non-availability of natural source of fertilizers caused by division between town and country. The concentration of animals in livestock production centers far away from the agricultural land in the countryside deprived soil with animal manure which directly enhances the soil fertility. And in place of application of animals and human wastes to maintain soil fertility, it is diverted as urban sewage in Thames river in London which not just polluted the river but also exposed people living in “the lower part of the city to the most offensive effluvia” (Anderson 1801, 73-75; Foster and Magdoff 2000, 48-49). Anderson put forward his strong arguments against Malthusian view on agricultural crisis in relation to the exponentially increasing population and its stress on land.

Marx in his first volume of ‘the Capital’ criticized capitalist agriculture for robbing the soil of its nutrient. Marx argued that

“... All progress in capitalist agriculture is a progress in the art, not only of robbing of the workers, but of robbing the soil...Capitalist production, therefore, only depends on the techniques and degree of combination of the social progress of production by simultaneously undermining the original source of all wealth – the soil and the workers” (Marx 1976, 637-638; Foster and Magdoff 2000, 49).

Marx in his deep observation on capitalists' agricultural system remarkably promoted the concept of ecological sustainability (with the replenishment of soil nutrient and maintaining soil fertility). For maintaining soil health, use of human and animal wastes were seen as a healthy practice to replenish and rejuvenate the soil nutrient cycle and its fertility. Marx also strongly argued that, these are natural ways of enhancing fertility of soil and yet the notion of ecological sustainability was of least interest for the capitalist mode of agricultural production, which remained immensely important for society, specifically farmers and herder's community, the producers in agricultural society (Marx 1976, 948-949; Foster 1997, 278-295; Foster and Magdoff 2000, 50). But even after facing serious crisis in agricultural production due to decreased soil fertility, least initiatives were undertaken to overcome with the ever increasing urban sewage in the water bodies, the robbing of earth of its natural wealth or its 'capital stock' continued with transformation of the agricultural system into a chemical based agricultural production system. Synthetic fertilizers, agro-chemicals, pesticides, all have become essential part of modern agriculture or imperialist agricultural mode of production system. After the Second World War, few important changes were observed, Firstly, the large scale of production of nitrogen fertilizers as an important agricultural production input. Secondly, the use of agro-chemicals, specifically lethal pesticides increased to guard crops against pest attack. These two changes have transformed the basic agricultural system from its roots:

1) The Use of Nitrogen Fertilizers:

After the end of the Second World War the huge availability of explosive were directed for the making of nitrogen fertilizers. It was clearly observed that, the same process was followed for the purpose of nitrogen fertilizer, as for the production of explosives for the war. The end of the world war was mainly behind the accumulation of huge stock of explosives, primarily meant for the war, which “. . . freed up a large capacity to make nitrogen fertilizers” (Foster and Magdoff 2000, 51).

2) The Pesticides as Important Agricultural Input:

After the end of the Second World War, another thing, that happened was the stockpiling of the huge stocks of lethal chemicals, “originally developed for the military purposes as defoliants and nerve agents” (Foster and Magdoff 2000, 52),

were diverted to agriculture and was started using for killing of the pests in the form of agro-chemicals. Soon, pesticides have become an important modern agricultural production input. These agro-chemicals transformed the agricultural system from its original base of naturally available low-cost input based agricultural production to high-cost input based agricultural production. This transformation led to a steep increase in the cost of cultivation and decreased the net income of the producer communities, specifically the farmers. This could possibly be marked as the real cause behind the increased indebtedness of the farmers. As they were trapped in the treadmill of agro-chemical use, which forced the farmers to use one after another chemical and a chained process of agro-chemical usage was followed for a successful agricultural production. Analogous is the case of livestock farming which was alienated from agricultural farms in the countryside to a distant location for its closeness and connectivity to the market.

2.2.3 Livestock Production and Changing Spatial Relation: From Family Farm to Corporate Farm

The replacement of natural organic waste and leguminous crops which are also used as highly nutritious hay crops for feeding the livestock, deeply transformed the livestock feed. It was observed in studies that "...legume clover and alfalfa hay crops had previously been fed to ruminant animals such as beef and dairy cows and sheep" was no longer needed (Foster and Magdoff 2000, 52). This change reduced the availability of healthy crops residues which earlier were used as hay crops for livestock get replaced with more specialized crops production without any need for legumes to supply nitrogen for non-legume crops like wheat, corn, barley, tomatoes etc. On the other hand, the specialization in livestock production concentrated it in corporate farms where branded agricultural livestock products were supplied to the market. The specialization in the livestock production not just grow animal fodder but also set up few large processing facilities for which "... they selected locations that offered certain advantage such as lax environmental laws, negligible threat of union activity and low wages" (Foster and Magdoff 2000, 52). These changes led to agricultural transformation in two ways –

- 1) Separation of Humans from the Farmland
- 2) Separation of Animals from the Farmland

These two important changes led to the transformation of relation between the agricultural system and its local space. This change alerted the spatial relationships of plants, animals and humans (Foster and Magoff 2000, 52). This separation was observed in studies on transformation of agricultural system and it clearly indicates that, “Breakdown of physical connection between the animals and land producing their feed had worsened the depletion of nutrients and organic matter from soils producing crops. Crop farms must use large amount of synthetic fertilizers to compensate for the loss of vast quantities of nutrients as their products are sold” (Foster and Magdoff 2000, 53). This abrupt process of alienation of the natural components of a space not just degraded the soil quality, but immensely altered and threatened the agricultural system by distancing it from its real wealth, the native plant species, local animal breeds and human with displaced, degraded and devoid into a lifeless countryside.

This transformation of agricultural system has many facets attached with it which can be seen in the form of ‘robbing of earth’, or the ‘theft of space’ in relation to the separation of a local space from its natural components of plants, animals and humans under the capitalist agriculture and this separation was found to be more forceful in the corporate agricultural system. The growing unresponsiveness of soil, and the high-cost external inputs have ruthlessly burdened the farming community and had led to the making of the ‘great agrarian crisis’ faced by the existing agricultural system in every corner of the world. The system has started collapsing in every part of the world, as globalization and increased role of transnational corporation in agriculture, seriously impacted the agricultural system and this deep-rooted transformation left no one untouched.

2.3 Induced Innovation Theory

Induced innovation theory is originally rooted in ‘fatefully vague passage’ in Hicks’ theory of wage (1932, 124-125), in which the direction of invention or innovation could be influenced with the high labour costs. These innovations or invention was found to be diverted specifically in the labour saving direction within the privately

owned firms (Hicks 1932, 134-135; David 1975, 33; Fellner 1961, 305-308; Ahmed 1966, 344-357; Hogg 2000, 48). The theory was originally meant for the worker's wages and how it influenced the direction of invention or innovation, mainly to reduce the labour cost to a minimal level and increasing the profit. In the similar way, the level of wages was observed to be closely associated with the price of a commodity, for instance corn crop in the work of Adam Smith, Thomas Robert Malthus and David Ricardo. Ricardo in his explanation about food price rise, applied the same concept and analyzed that, "profit do not necessarily increase since the wage also rise" (Hogg 2000, 43). Ricardo observed 'wages' as an obstacle for maximizing the profit. It was explained as "... a constraint on profits which Ricardo was anxious to see removed" (Hogg 2000, 43).

In explaining the agricultural transformation, Hayami and Ruttan (1971) adapted the theory of induced innovation in the agricultural sector and explained how now innovation or invention in terms of agricultural technologies remained bias in the direction profit maximization for corporate and reducing farmers control and share of labour cost. Because of this it can be much clear to understand that "... not at all technical changes are induced through a demand-driven process, some being supply driven as a result of exogenous advances in the status of science and technology (Hayami and Ruttan 1971, 59; 1985, 89; Hogg 2000, 50). It was further explained that, the Induced institutional change and induced technical change are deeply connected and both are induced for a 'similar signals'. With this theory it was clearly indicated that, not all innovations or inventions are beneficial for the society, or "the application of new knowledge of science, engineering, agronomical principles" but primarily for profit maximization (Hogg 2000, 51). The research administrators and and research scientists was found to be purely working in response to economic indicator of profit maximization for corporate world. This clearly indicates that, it is the markets that strongly influenced even the direction of science itself, as the funding remains a major issue for any new scientific initiatives and not the knowledge creation for the benefit of society or increasing quality of life.

It was observed in the study that if market can influence the direction of technical and institutional change, then there is a strong possibility that it can also 'influence the direction of science'. The theory clearly maintained the relation of 'power structure'

and the role of ‘vested interest groups’ in a society in influencing the innovation. And “... if the institutional innovation is expected to result in a loss to a dominant political block, the innovation may not be forthcoming even if it is expected to produce a large net gain to society as a whole” (Hogg 2000, 59). It was observed that ‘socially’ undesirable ‘institutional innovation’ may possibly be given preference “if the return to the entrepreneur or the interest group exceed the gains to the society” (Hayami and Ruttan 1985,107-108; Hogg 2000, 59). It indicates the role of power structure and vested interest groups, which eliminated the ‘marginalize language’ and replaced it with the ‘language of cost-benefit analysis’ (Hogg 2000, 59). But the theory barely talked about the environmental concern of the agricultural development. It was purely remained focused on ‘high-external input agriculture’ (HIEA) and no consideration was made towards the use of techniques other than the high external input agriculture. The ecological implications of these agricultural inputs were never questioned for their impact on mankind and were nor even challenged. It was really surprising that, these inputs were seen as a symbol of agricultural development by increasing productivity and production. Everything cannot be seen in terms of market driven mechanism of demand and supply, but the innovation and invention of new technologies must take into consideration the sustainability of the entire agricultural system.

2.4 Reductionism in Agriculture by Froydis Kvaloy

Kvaloy (2004) in his report effectively point out how reductionism became a powerful tool in the innovations of agricultural technologies. ‘Reductionism’ in agriculture means the process of reduction, in which the complexity of natural phenomena (e.g. biological diversity and its connectedness with other natural entities) and processes are reduced into a more simple form so that only the benefit of the technological innovation is represented but the complex nature of related ecological as well as the socio-economic problems are figured out of the screen.

Kvaloy also examined the historical context of both the ‘Green Revolution’ and ‘Gene Revolution’ and then separately done a proper assessment of both the agricultural technologies. He had also highlighted the consequences of Green Revolution as well as Gene Revolution separately and then revealed a reductionist approach followed by both the technological innovation. The issue of reduction in the agro-biodiversity was

addressed under the agricultural technologies of both the ‘Green Revolution’ and ‘Gene Revolution’. Two beautiful examples are put forwarded under the agricultural Gene revolution one of the Bt Cotton and another of the golden rice.

The basic aim of the report is to highlight that how theory of reductionism plays an important role in flourishing the science based research and development in terms of agricultural technological innovation. The reductionism when applied in the innovation of agricultural technology, the it became a tool in reducing the complexity of a natural processes phenomena because technological application in the existing environment may result into unexpected ecological, economic or social problem as the natural environment is dynamic, so do the people living on it and their activities. The complex nature of associated ecological, social as well as economic problems never comes under public awareness and kept secret until there are immense damage reported to the environment and society.

These theories form the basis to reevaluate the significance of the transformation of technologies in the Mongolian agriculture system and to assess the need for such unsustainable technological innovations. Every technological innovation are not for the human welfare and are most of the time follow the principle of profit making through the nexus of corporate, scientists and the politicians.

2.4.1 Agricultural Technological Innovations and Missing Flow of Environmental Awareness

Carson (1962) in her work “The Silent Spring” exposed the darker facet of the technological development and deliberate attempt of the innovators to cover the harmful impacts of their products. A completely missing flow of information to the consumers and the importance of environmental awareness has been remained the focal point of the study. Different cases have been examined and the role of innovated agricultural technology in devastation of the wildlife in America with the toxic agrochemicals was remarkably featured. The use of agricultural chemicals in the form of Aldrin, Dieldrin and Heptachlor, and their massive aerial spraying resulted into the death of thousands birds during spring season of 1961. The birds were found littering in the countryside dead or dying in pain. The wonderful voices of various song birds were disappeared. The spring has really become silent as the beauty of the

nature was laced with poison and only thing that remained was a deep silence of death. Few of the major findings of her work bring in focus the unsustainable nature of agricultural technology which in turn provides the basis for this research study regarding the misuse of technology in the name of advancement and development of mankind (Jha 2012, 6-12). These are being discussed in following paragraphs.

2.4.2 Pests, Pesticides and Human Zeal for Controlling the Nature

With the modernization of agriculture, pesticides have emerged as a major input in the entire production process. Monoculture increased the severity of pest attacks and then started a new era of poisoning the nature and simultaneously increasing cost of cultivation as the dependence of agriculture increased on pesticides. The unethical way of terminating pests with end numbers of applications of pesticides in America had been taken place in the name of welfare of the environment and society (Carson, 1962). Pests are also living component of the mother Earth which is having its own separate place in the environment. Human beings are not given any authority to judge that who will be given license to live or who will be terminated from this natural world (Jha 2012, 10-11).

Each and every living and non-living creations of God are valuable assets of the nature. It is beyond our knowledge to assess the importance of the creations of God. Various pests like Caterpillar, butterflies and thousands other are staple diet of birds. they also life support system of nature which rejuvenate it from time to time by degrading various pollutants released in the environment. Massive release of toxic chemicals in the environment for pest-control resulted into the environmental threats in the form of resistant strain of bacteria, mosquitoes and other pests, which dragged Indian agricultural technology into the treadmill of more and more use of pesticides. That is why variety of pesticides is used to overcome with the problem of pest attacks.

2.4.3 Simplification of the Natural Complexities and the Erosion of Agro-biodiversity

After the intensification of agriculture, large field are put under the single crop farming system. Single crop farming does not take advantage of the principles on which nature works and agriculture is viewed as a discipline of engineering. Nature has introduced great variety into the landscape, but man has displayed a passion for

simplifying it. The most dangerous impact of these technological innovations in the name of technological advancement are in the form of the removal of the ecologically in-built checks, through which nature controls the species within their bounds. This intern had resulted into the frequent events of massive pest attack, which not beyond the control of nature as the in-built checks were altered. This reduction of the agrobiodiversity severely affected the agricultural production and put the food security in peril (Shiva 1991; 2005; Paroda 1991; Jha 2012, 10-12).

For a new scientific innovation, it is only that part is shown that the scientists consider relevant but the darker side of technology in the form of related threats to human beings and the environment never communicated to the public (Shiva 1991). In terms of environmental awareness, no guideline or precautionary advices were provided among the farmers for handling deadliest chemicals in the form of pesticides. Even the ultimate consumers of these products are not aware about the related problem of food-chain contamination. The advertisement of all branded pesticide companies very nicely presented before public but none of the threats associated with its handing and the application or safety measure, completely remain out of screen. It shows us the dark facet of technological innovation which kept secret just for short-term monetary gains by the influential people which include the nexus of corporate and politicians (Jha 2012, 10-12).

2.5 Chayanov's Theory of Peasant Economy and Agricultural System

Agriculture is the mainstay and sustainer of every life but what will happen when agriculture system starts falling and become vulnerable to sustain itself. Exactly similar situation is faced by local agricultural systems and agriculturists in today's world. The corporate world is mercilessly eating up the share of agriculturists and dragged the entire agricultural system towards an unsustainable path of development. The food security has now become a critical issue in maintaining the sovereignty of any nation or state. The situation has become extremely serious with growing water crisis, degradation of pastureland, increased severity of extreme weather events, unprecedented change in temperature, and precipitation. It is strongly believed as the result of climate change, which has immensely threatened the future of agricultural system and food security of both human and the non-human world.

For understanding the massive transformation of the agricultural system, a more in-depth explanation was provided in the ‘theory of peasant economy’ by Russian agricultural economist, Alexander V. Chayanov, which was propounded nearly a century ago. The situation of agrarian crisis has touched almost every part of the world and needed stronger explanation. The agrarian crisis has revealed an ugly facet of the transformation of agricultural system which could possibly find its deep rooted explanation in the study *‘Die Lehre von der bauerlichenwirtschaft’* (the theory of peasant economy) was published in Berlin (Germany) in 1923. Chayanov’s theory basically represented a ‘non-capitalist economic systems’ and how they function. Chayanov used the term ‘family farm’, which he referred to as ‘those peasant households that relied almost exclusively on the labor of family; if peasant farm used any hired labor it was in order to establish their basic economic equilibrium between demand satisfaction and drudgery of labour at a more favorable point, not necessarily in order to make a profit (Chayanov, 1924; Thorner 1966, vi; 1971).

The term ‘family farm’ here presented in today’s context, specifically by western European and Anglo-American use, where it means a family-run enterprise aiming to make a profit’. This term completely differs by Chayanov’s explanation of ‘family farm’, which primarily means ‘a farm normally run by a family, without hired outside labour. The aim here is not purely profit-making, but for family income. It was observed that Chayanov’s masterpiece given a concrete explanation in the form of “a theory of peasant behavior at the level of individual family farm, i.e., at the micro level” (Thorner 1966, xii). Micro level means the basic economic unit of the agricultural system, the family farm, from where every transformation of the agricultural system was originally rooted and takes its form at the macro level, or at the national level. Two important aspect of Chayanov’s theory, which completely resembles the situation of agricultural system in Mongolia, are:

- Economic unit of ‘Family farm’ applicable as ‘family herding’ unit
- ‘Peasant Economy’ system relevance as the ‘Pastoral Herders Economy’- A separate economic unit or system which completely differs from the capitalist and socialist production system

For giving proper , concretized explanation Chayanov added a brief study, *“zur Frage einer theorie der nichtkapitalistischen Wirtschaftssysteme”* (Chayanov 1924,

577-613), which translated in English as “on the theory of non-capitalist economic system”, where he strongly supported the existence of ‘peasant economy’ agricultural system and argued that, “ at the national, or macro level, peasant economy ought to be treated as an economic system in its own right, as a non-capitalist system of economy” (Chayanov 1924, 577-613; Dietze 1934:52; Thorner 1966, xii).

2.6 Science as a Part of Culture: An Historical Insight

Agriculture and agriculturists share an innate interconnectedness. If we look deep inside the ancient history of agriculture, it remained a part of culture, specifically in India and Mongolia. It was observed that in the Vedic and post-Vedic period, spirituality and agriculture were deeply associated with each other and there was a special place for the non-human world. It was observed that a fascinating cross-culture resemblance has been found between India and Mongolia. The detailed historical insight was made; specifically, about the special place devoted for the non-human world has been observed to be innate part of both the cultures. There are many concepts and principles which clearly indicates a stronger cross-culture resemblance in terms of closeness of agriculture with spirituality, in both India and Mongolia.

2.6.1 Mongols, Nomadic Culture and Buddhism: The Never Ending Quest for Identity

The concept of Inner Asia gains due importance in the current scenario of global political and economic system, but its frontiers remained volatile in the past. The shift of power-balance between the sedentary civilization and the nomads remained as important feature of Inner Asia (Sharma, 1988; Soni 2014, 87-100). It was considered as one of the oldest conflicts of modern times, and “this rivalry between the steppe and the sown” or the nomads and sedentary farmers, have long remained important strategically. The ‘Great wall of China’ justifies this notion which was purely built to prevent the plunders by the nomads on the sedentary agriculturists, mainly for food (Bagchi 1955; Lattimore 1962: 37-38). Different facets are attached to the existence of ‘Great Wall of China’ and also supported by the notion of prevention of the sedentary population from tax evasion and to increase the government control over its territory (Scott, 2014).

A clear demarcation of boundaries in Central Asia always remained an issue of major conflict. The presence of agricultural economy is considered as one of the most important common factors of the civilizations surrounding the region known as 'Inner Asia' (Sinor 1990, 3-4). It was observed that Inner Asia lacked the qualities of powerful state, mainly because it can't provide assured food for large population, or brigade of army which gives the state of political power. Secondly, the way in which a state or a civilization is defined is highly subjective criteria, and till so far not much is done to define what freedom actually means to human beings, those who are completely alienated from their cultural roots, a cultural background differs from their own (Sinor 1990, 1-2). Putting everything on the same framework, specifically political and economic framework with a complete disconnect with its cultural background is not a healthy notion. The framework needs to be changed, according to the needs of people. It was examined that, language, race, religion or 'shared destiny in the past or the present, etc., as a criterion to classify or demarcate a region, but an individual identify its community in very different way 'then used by the outsiders. It is well stated that, "... individual tend to identify their own community by criteria which may be different from those made on the basis of, often ephemeral, political arrangement which are given priority in defining an area over more lasting, deeply rooted national or cultural traits (Sinor 1990, 1). This clearly indicates the importance of cultural background in the identity of any individual, its community, its local space, the area which is inhabited by its community of any region.

On the similar grounds, 'Inner Asian' region existed as a separate cultural entity, gained with its tough geographical and climatic features unfavorable for agriculture and its vast grassland promoted extensive pastoral livestock production system (Sinor 1990, 4). Food availability and harsh physical geographical conditions are examined as the major factor which obstructed the formation of powerful state in Inner Asian region (Sinor 1990, 4). In a way the extensive pastoral livestock production helped the delicate grassland to sustain by following the sustainable agricultural production system with a population carrying-capacity highly superior for the Steppe, in comparison to the Tundra or the forest. The basic reason behind the time to time nomadic invasion, specifically settled agricultural economy in China found to be deeply associated with 'poverty and famine' among the nomads (Jagchid 1970, 40; Sinor 1990, 7, 11). Jagchid (1970, 40) also analyzed that, "the provision of food

could, and on many occasions did, avert invasions”. It would be unethical to use the term ‘Barbarians’ for the nomads of inner Asia, Specifically Mongols, as most of their nomadic invasion in China was discovered to be purely associated with meeting their basic requirements of ‘food’, to escape death from either famine or military attack on sedentary agriculturalists of China.

Environmentally, ‘Inner Asia’ is rich in diverse plant and animal species and home to world’s most pristine grassland, the ‘Steppe’. Pastoral livestock production system had undergone colossal changes, specifically after 1990s, the end of socialist era and the beginning of the transition to market economy. One more important feature of Inner Asia is the special place given to Buddhism. Buddhism is the religion which has deeply influenced the nomadic culture of Inner Asia. The strong resemblance between shamanism and Buddhist practices that now Buddhism represented as the state religion in Mongolia, which is one of the most prominent country of Inner Asian region (Soni 2014, 87-100).

In the marvelous collection of narratives of fieldwork of the Central Asiatic expedition, named as ‘On the Trail of Ancient Man’, the history of Mongolia was profoundly observed and it was stated that, “... Mongols are unmoral rather than immoral. They are children of nature, with animal instinct unchecked” (Andrews 1926, 94). This sketches an image of Mongols’ before us. Although, there are diverse views, as Mongols have undergone drastic changes with increased interaction and interconnectedness with Buddhism. Mongols have always remained fascinated with religion, specifically Buddhism had made a mark and even now designated as the ‘religion of state’. Many research studies have indicated that, Buddhist revival is believed to be a stronger reason behind the concretization of the Mongols identity. It is purely seen as a tool to be used for revival of Mongols identity, specifically after the prolonged period of socialist era which immensely suppressed the religious identity of Mongolia.

2.6.2 Coexistence of Human and the Non-Human World: Relevance for Sustainable Agriculture

The existence of every single natural entity is unique and estimation of its value remained beyond the human calculative mind. Attaching values with nature’s every

existence as per the need and desirability of the economic man constituted the core of the human world. It has been closely observed that an innate association exists between human and the non-human world. The existence of human world purely depends on the non-human world. Agriculture represents the best example where deep association between the human and the non-human world long existed and remained vital for their existence. The cultivation of plants and animal husbandry, all activities have necessitated the innate involvement of both the human and non-human world.

In few of the most ancient civilizations and vibrant culture, India and Mongolia, both are intrinsically associated with the *agri-culture* and their sense for the realization for the non-human world. History of Mongolia represented the flourishing nomadic culture where the non-human world always remained at the core and closely associated with it. The Great Mongols, a tribal nomadic community explored and expanded its empire to a geographical stretch that no one ever be able to establish. Ironically, they are the one who were considered obsolete, semi-barbaric in nature, lacking all sort of modernity, and modern technologies, yet they were invincible in terms of their warrior skills and art of military strategies which made a mark in the history of mankind. Mongolia and Mongols remained jolted with their transition to diverse and completely contrasting political and economic system. From traditional system to the state controlled command economy in the socialist era, and after the collapse of Soviet Union, it transformed in a new system based on market economy with newly felt democratic political system (Soni 2002, 174). After 1990s, Mongolia's transition to a new political and economic order brought colossal changes which impacted the political, economic, social cultural, spiritual and every sphere of life (Jha 2017, 294-295).

India, remained a distant neighbor of Mongolia, yet innately connected in the form of spirituality where Buddhism reflects the state religion. The culture of both the spiritual neighbors, India and Mongolia are observed to be surprisingly similar and many times even superimposed on one another, as if there lies a deep interconnect between both the world of ancient cultures. The fire worshippers, the horse cult, special place for non-human world etc., are few of the examples which give us vital clues that these ancient civilizations and their cultures are at some point in the history were part of a single system surviving on similar value system. Similarities were also

found in terms of the principles followed for maintaining the environmental sustainability and the way it was deeply embedded in traditional cultural practices.

2.6.3 Concept of Sustainability and its In-depth Association with the Non-Human World

The traditions which are followed from ages are now assessed for its deeply embedded concept of sustainability and its supreme level of scientific explanations and temperament. Similarly, when we come across with the divinity of the non-human world in some ancient cultures and traditions, deep connection was observed between the role of nature and dependence of human world on it. An ancient system or tradition cannot be discarded or termed obsolete as against the fast paced highly modern technological system, but immense thoughtfulness is required for establishing the embedded value system in every traditional knowledge system.

In the case of Mongolia, the nomads remained deeply associated with the non-human world, especially their grazing land and the five animal concepts, the mountain where they perform *oboo*, a mountain cult, and every entity of the non-human world, for instance rivers, fire, etc., had been given a divine status, and fused in diverse cults, customs, and traditions associated with it. The concept of breeding of five types of animals by every nomadic family and the composition of herd, seasonal movements and the altitudinal movements of the nomadic herders, all are highly scientific in nature and purely followed the path to sustainability. Agriculture remained always the first love of Mongols and played significantly role in the economy, but now things are changing and mining has overtaken the agriculture, and emerged with immense magnetism to attract huge sum of foreign investments (Soni, 2015, 45).

Buddhism is considered as a major realm immensely influenced the Mongols, so much so that now Buddhism is the state religion or better called national religion of Mongolia (Soni 2014, 87-100). It was observed that India and Mongolia have had civilizational links as old as over a period of 2,700 years and “these links are fascinating, intense and inseparable; transcending all human activities from language, literature, religion, medicine and folklore to culture and tradition” (Soni, 2015, 44). It indicates that many traditions are much older in nature and were practiced even before the spread and rise of Buddhist influence in Inner Asian region.

In India, from ancient *Vedic* and post-*Vedic* periods, agriculturists have developed a sustainable, highly balanced system with their local natural space. The deep association of the *Vedic* culture with non-human world still remains as one of the most significant area of research and many western concepts like deep ecology, Gaia hypothesis, principles of sustainability, all are considered to be innately connected with the traditional knowledge system associated with the *Vedic* and post- *Vedic* periods. Agriculture is one of the prime activities in India and mainstay of life and livelihood. In essence agriculture preserves the *Indianness* of India (Jha 2018, 31); major share of population still primarily depends on agriculture for making their living they perform cultivation. Hence, the practices of ancient agricultural knowledge are still alive and most of them are performed by small and marginal farmers as they are not in a state to afford expensive inputs of highly modernist agricultural technologies.

The highly scientific nature of ancient Indian soil classification which was practiced during the *Vedic* period has been identified to be very much similar to the modern soil classification. The animal science was highly developed; the different divisions of veterinary sciences were well established. Different branches of Ayurveda were devoted for the treatment and cure of humans and the non-human world of plants and animals. Few of the renowned works from ancient India includes “*Vrkshaayurveda*” (plant-ayurveda) of Surapala/Varahmira, “*Asva Ayurveda*”, “*Gajaayurveda*”, etc., all are praised for its deeply embedded concept of sustainability (Majumdar 1971, 254-261; Raychaudhuri and Kaw 1964, 144-151).

Mongolia, on the other hand, has a vast extent of delicate steppe grassland and their animals. From land to the people, music, art, culture, cults, and the economy and even the currency of exchange, all remained intensely associated with animals. It is remarkable feature that tribes, neighboring the Mongols to the east and to the north-east, the Manchu, the Chinese and Russians, all kept pigs, “but the Mongols never” (Montagu 1956, 72). The food system of Mongols has been altered and pigs, poultry and vegetables are included and considered new for the Mongolian diet. Breeding of five animal species with a defined portion of mixed herd composition by the nomadic herders of Mongolia is now recognized as one of the key factor in maintaining the sustainability of the sensitive and pristine grasslands of steppe (Jha 2017, 296-297).

The frequent seasonal and altitudinal movements of the herd added high mobility which is one of the most sustainable and highly scientific traditional agricultural practice followed by these nomadic herders.

2.6.4 Horse Nomads of India and Mongolia: A Deeper Cross-cultural Resemblance

Domestication of horse was considered as major activity which revolutionized the lifestyle and added mobility to the mankind with much greater speed and immensely contributed in increasing the interaction of humans with new world or the unknown, and the unexplored world. Starting with horse, its evolution had taken place in the northern America and during the quaternary period, the horse migrated to the land of Eurasia. The true horse *Equus* is believed to be appeared during the Pleistocene period. The *Narmada* river valley in Madhya Pradesh and *Shivaliks* above Chandigarh region in India, examined as the places where *Equusnomadicus* has been found in the Middle Pleistocene alluvium (Randhawa 1980, 283). Tarpan, a wild of south Russia become extinct in 1851 in Ukraine. And Przewalski, the wild horse, till the Russian revolution in the twentieth century, was able to survive, sustain and could be seen venturing primarily in Mongolia (Randhawa 1980: 283).

In India animals have always remain an intrinsic part of their culture and animal cults enthralled no other culture as much as the ancient cultures in India (Jha, 2017, 297). In the history of mankind, Aryan nomads remained deeply associated with horse and horse chariot. They used horse as a source of entertainment in the form of chariot race, a sporting activity for enhancing their warrior skills. And during the war time they used their horse as a weapon. In Vedic culture horse was considered sacred as well as symbolic of god form. In studies it was observed that, “. . . in major Vedic rituals, horse was considered as a symbolic of *surya* and *agni*” (Sridhar 2001, 683).

In Rgveda, a detailed description of horse of various kinds, colors and breeds were given. The seers recognized the horse as those who draws the chariot of god and goddess through the air and it was strongly believed that around seven horses were yoked in the chariot of Sun-god. It was further observed that, “*Vedic* people offered prayers to their anthropomorphic gods to bestow them the herds of healthy horses and implore them to use a diseased horse” (Rgveda 1.17. 117.4; Sridhar 2001, 682). Since

the *Rgvedic* period, the horse remained as the most favored among the other animals in the mythological and religious rituals and events of Hindus. Horse played significant role in *Regvedic* times, as the one who draws god's-chariot but also praised as a sacrificial animal, for instance *Asvamedha* sacrifice, it was observed that, "in *Vedic* sacrifices, horses were symbolic of sun and fire. For *Vedic* people horses was the emblem of war, and was identified with rain god" (Rgveda 1. 64.6; Sridhar 2001, 700). During the post-*Vedic* period, horse mainly became symbolic of sexual power (Sridhar 2001, 700). *Vedic* and post-*Vedic* people are deeply immersed in the animal world and observe them not as a separate entity but as a unifying link between the human and the non-human world. It was established in studies that, the *Vedic* and post-*Vedic* people ". . . viewed the animals from the cosmic and temporal planes, trying to classify them based on their habit and habitat in a broad way . . . Around 260 animal's names was identified by McDonnell and Keith in the entire *Vedic* literature" (Sridhar 2001, 680).

Horse has always been considered as one of the important animals for the Mongols, which is engraved into every piece of art and culture in Mongolia. Beginning with the horse-headed divine musical instrument "*Morin khuur*" to the traditional food preparation from the mare's milk "*airag*", a highly valued drink made from mare's milk, horse still remains innate part of Mongols everyday life and livelihood. We cannot imagine Mongolia and Mongols without a horse, and that is why they are better known as the 'horse nomads'. Horse added the real strength and speed to the Mongols. Mongols, the 'horse nomads' are praised for their horse breeding, riding and warhorse skills (Jha 2017, 296-298).

If we deeply reassess the spiritual sphere of interconnect and interaction, it could be bluntly observed that in both India and Mongolia, the non-human world, and especially the horse and other animal figures was not just involved in various traditional cults, but were spiritually of high esteem.

- ***Hayagriva: Enigma Surrounding the Horse-Headed Figure***

In both India and Mongolia, horse-cults remained intrinsically associated with culture and exist even today as they were practiced in the early history. It clearly indicates that an innate relation shared by humans with the non-human world (Jha, 2017, 298).

Hayagriva is considered as a form of Vishnu, a *Vedic* deity, having an immensely important place and is closely associated with the god of knowledge as he restores the *Vedas*. An in-depth study by Gulik (1935, 28) examined diverse facets of the horse-headed figure *Hayagriva* and its wide spread appeal beginning with India, China, Japan, Tibet and as far as Mongolia. Both in Hinduism and Buddhism, the horse-headed figure god was given immense respect and central place in religious sphere. It was observed that, “the figure of Vishnu-*Hayagriva* was taken over in the Mahayanic pantheon as a *Vidyaraja*” (Gulik 1935, 28). *Hayagriva*, remained as few of the figures which was closely related with the sacred word written in *Veda*'s. In fact, it was observed that no one reached such a prominent position as *Hayagriva*, and his qualities gave him a new transformational role of *Vidyaraja* (Gulik 1935, 28; Jha 2017, 298-299).

Hayagriva, the horse-headed idol is one of the most fascinating figure with its exceptionally widespread followers beyond the boundaries of nation-state. Borderless followers beginning with India, to China, Japan and even in a land locked and distant country of nomads like Mongolia, *Hayagriva*, the horse-headed deity is everywhere left its deep imprint with its divine presence. The Mahayanic of *Hayagriva* was extensively explored by Gulik (1935, 2). In Hinduism, *Hayagriva* is considered to be the restorer of *Veda*'s and associate him with as ‘god of knowledge’. Although, historians differ in opinion about the horse-headed figure, *Hayagriva*, and reexamined that, *Hayagriva* as a tribal deity. In Assam, specifically in Manikutta hills horse-headed figure was worshiped by tribal community pray to horse-headed figure and was believed to be fused in Mantrayana Buddhism, a 7th -8th century Buddhist text, and later transformed and infused in Pan-India Hindu text (as both demon and deity) as well as into the Vaisnava traditions (Jaiswal 1987, 40-57; Nayar 2004, 16).

Even in scientific studies, horse is having amazingly characteristic of understanding human signals, their positive (happy) and negative (anger) responses, and are considered exceptionally intelligent minded animal which could read human emotions (Smith et al. 2016). In Mongolia, horse is considered as a versatile part of their culture and everyday life. Mongolians are also known as the country of nomads and Mongols are considered to be the “best horsemen on the earth” (AMNH 2016). For a nomadic community, like Mongolia, horse remains as an integral part of Mongols life and

livelihood. *Takhi*, the wild horse, also known as Prezwalski horse, considered to be the most important among all of their animal wealth, although it was never domesticated and had gone extinct during 1960's. *Takhi* means 'spirit' or 'spiritual' in Mongolia and represented as a symbol of national heritage. It has been observed that, "the history of Mongols is closely related to horse and ... *Takhi* are still worshipped by Mongols" (AMNH 2016). It signifies that horse has always remained as an integral part of nomadic culture in Mongolia, so much so that it attained a status of local horse-deity. After coming in contact with Buddhist religion, horse-headed deity Hayagriva was instinctively get included and accepted as horse-headed figure deity without any cultural or religious resistance. The animal headed figures have an intrinsically unique place in both Hinduism and Buddhism. The elephant-headed figure and the horse-headed figures, both are deeply infused in the traditional art, culture and religion in India and Mongolia as a part of deep rooted homage to the non-human world. Gulik (1935, 28) identified that, "... his continually increasing importance is moreover aided by the fact that as the horse-headed one, or to be amalgamated with local horse-gods. This last appears to have been the case in Tibet and Mongolia". *Hayagriva*, all through its existence in the past and present always remained associated with the horse-headed figure, which in a way given him a widespread appeal and acceptance as horse-god or horse-headed figure in local cultures, especially among the horse nomads.

Whether it is Aryan horse nomads from ancient period to the present horse nomads in Mongolia, horse and horse cult still hold a pivotal position in both the cultural and spiritual sphere which remained an enigma, yet a deep connecting line between India and Mongolia. And could be further explored to strengthen the India - Mongolia relation and there are immense possibilities to make this friendly relation to reach to a new pinnacle in the emerging global politics in this highly disturbing phase for humanity. India and Mongolia could set a new trend for the globe to follow the innate light of knowledge with praises not just for humans but for the non-human world too. However far the distant one is from each other in terms of their physical appearances of maps, boundaries, frontiers and the buffer zones, etc., if we follow the innate and intrinsic interconnect between us, the cross-culture depth must be explored, and then nothing would matter before humanity.

2.6.5 Indian “*Veena*” and Mongolian “*Morin Khuur*”: Musical Instruments for Divinity

Musical instruments have a true cultural resemblance as music represents the sound of nature which deeply touches the inner core of every soul, both human and the non-human world. In India, music and musical instruments are deeply associated with the meditative state or a state of trans where one can connect with its inner core. Music purely impacts our conscious and sub-conscious mind, and is well represented female deity of knowledge “*Saraswati*”, which embraces a musical instrument “*Veena*”. Goddess *Saraswati* holds the predominant position in Hindu religious activities specifically related to knowledge, music, art and culture and for attaining “*moksha*”, a divine state where person liberate itself from the cycle of life and death, which is considered as the utmost state of knowledge. “*Veena*” is not just a musical instrument but an instrument to attain divinity, the supreme state of knowledge and before playing *Veena* goddess *Saraswati* is worshipped to seek her blessings. Therefore, *Veena* is a divine instrument and even the scholar like C.V. Raman deeply observed the construction and musical over-tones and found that *Veena* closely resembles the human-voice which can regenerate overtones up to sixteenth harmonic (Pisharoty 1982).

“*Morin Khuur*” (horse-headed fiddle) is a musical for the Mongol’s just like *Veena* in India. Horse hair is used strings and made in the shape of a scoop. The significance of *Morin Khuur* in the life of Mongols couldn’t be equated equated with any other any other thing it is irreplaceable from their nomadic origin and considered as one of the most sacred instrument to communicate with the other world, the spirit world or with the world of ancestors. In studies it was found that, “. . . it (*Morin Khuur*) occupied and considered to occupy a special place in the life of nomads. . .” (Nikolaeva 2013, 64). It basically acts as a medium to connect the mortal world with the immortal world, the world of ancestors with its frictional sound. That is why it is considered sacred and associated with attaining divinity. The most fascinating part is that, *Morin Khuur* is also dedicated to a female deity and “. . . was a mean of communicating with the other world by older, knowledgeable, and skillful women (*udagan*)” (Nikolaeva 2013, 63).

If we compare both the musical instrument we found surprising cross-culture resemblance. In both the musical instruments, the portion of the head is represented by an animal which bluntly indicate a strong inclination for the non-human world and their deep connect with divinity. In case of *Morin Khuur* it is a horse headed fiddle whereas in case of *SaraswatiVeena* it is mythological animal called *Yali*, dragon-headed figure which represents the presence of *Visnu*. Both the musical instruments produce enigmatic sound and act as a medium to connect with the spiritual world (Jha, 2017, 300). It is observed that the two worlds could be interconnected with sound, the music and mantras (holy words). In close examination in a research study it was observed that, “the instrument (*Morin Khuur*) performs the role of a mediator between the worlds through sound” (Nikolaeva 2013, 64). In no other culture musical instruments have attained such a supreme divine stature as in India and Mongolia.

2.6.6 Vedic Culture, Cults and its World View

In the *Vedic* world view, the non-human world has been considered an intrinsic part of the human life and also finds closeness to divinity. A balance of inter-dependent relationship was shared by humans with the non-human world, and by assigning a spiritual value to every single non-human entity. Here the concept of “deep ecology” finds its roots and a reason for its origin and importance. The intrinsic value assigned or attached to every single natural entity was evolved as a knowledge system in its purest form where every traditional cult, customs and rituals are threaded around the principles of ‘oneness’, oneness of very single natural entity. The concept of sustainability is an outcome of this very balanced relationship between human and the non-human world.

The notion that people started worshipping natural entities like sun, water, fire etc., because of fear has raised various questions. Is it the real cause or is there any other facet attached to it? If we try to deeply assess the true cause for it, then it is actually the deep intrinsic and priceless value of any natural entities which elevate it to a level of divinity and people start paying respect in the form of idol worship. The *Vedic* and the post-*Vedic* people “viewed animals from the cosmic and temporal place” and classified them according to their habit and habitats (Sridhar 2001, 681). In *Rg Veda*, horse was classified on the basis of their color, kind and several breed of horses were known to them. Horses were designated with different names based on their qualities,

the best types were called *svasvaha*, *Hari* and *Indrahari* (the horse of Indra), *niyuta*, *pr sati* and a special horse type capable of charging quickly and *rohita* was included in this category. *Vrsasva* (a young stallion), *Ayava* (well trained horse), *Aryavaji* (the horse with gentle gait) are few of the different names used by *RgVedic* people for a well-trained horse (Sridhar 2001, 681).

The horse added mobility and strength to the Aryan nomads who were viewed as excellent warriors. It is observed that, “the *Vedic* people proclaimed that they were desirous of facing the enemies with the help of horse ...” (Sridhar 2001, 681-682). One of the most fascinating horse-cult of the Vedic period was *Asvamedhayaga*. In *Ramayana*, the earliest reference to the *Asvamedhayajna* was performed by Dasaratha and his wife Kausalya who performed the horse sacrifice by killing him in three strokes (Ramayana, Balkandam, 14-33; Sridhar 2001, 682). In *Satapatha Brahmana* (XIII.3.3.3) the mystery behind the auspicious number ‘*Ekavimsa*’ (Twenty-one number in Sanskrit language) which is significantly associated with the *Asvamedha* (StyaPrakash 1965, 100). It has been assessed that when the four-year cycle of *yuga*ends, “they represented the deficiency of twenty-one days during which the *Asvamedhayajna* was performed” (Satapatha XIII 5.1.13-15; SatyaPrakash 1965, 101). Numerous astrological phenomena, the movement of celestial bodies, all are linked with a unique symbol in the form of an animal figure. For instance, the twelve ‘*rasis*’ (zodiac signs) and the cycle of *yuga* of four years represented as different animal figures. Even many celestial phenomena associated with time were also represented with the animal’s figures. The twelve *rasis* (signs of zodiac) are represented as different animal figure like Capricorn, lion, fish (cancer, Leo, pieces, etc.). Similarly, the cycle of *yuga* of four years was divided into twenty-one (21) stakes and figures were associated with them” (SatyaPrakash 1965, 100). The movement of sun within a period of four-year cycle was believed to pass through twenty-one points (or stakes) in the sky, all of which was represented by different animal figures. And more to it, even the “. . . solar cycle was divided into about 600 divisions, at which were placed about 600 animals” (SatyaPrakash 1965, 100).

Fascinating analogy has also been drawn between the time and the horse chariot. The supreme *purusa* possessed a chariot which is drawn by seven horses, or seven mouthed single horse. And the “seven wheels of the great time were also known as

the seven sons of the the sun (*saptaputra*)”, and these are the smallest cycle of time: i) *kala*, ii) *muhurata* iii) *dina* (day), iv) *Ardha masa* (half month), v) *masa* (one month), vi) *Rtu* (season), and vii) *chaturmasya* (four months’ season) (AsyaVamasysSuktam, 107). The horse chariot possesses two yokes (*Dhirh*), one of them being the *uttarayana* (the period of summer solstice), and *daksinayana* (the winter solstice) a remarkable and highly scientific way of communicating every bit about the celestial bodies, their phenomena, and movements, as every celestial event was threaded around everyday life and livelihoods of the society. In the ancient Indo-Germanic conceptions, horse remained deeply associated with sun, a supreme source of energy and power which still holds the pivotal position among the *Vedic* deities or horse , which is also closely associated with “all fertility and fecundity rites” (Gulik 1935, 9). Different treaties on horse sciences relating to medical treatments of horse, and a separate field of study had been developed on horse sciences that are known as *Asvasastra* purely devoted on horse studies as horse was immensely important strategically, especially for exceling in the martial skills. In the work of Jadudutta, complete accounts of the medicinal treatment of horse were given (Raychaudhri and Kaw 1964, 145). Just like humans, three humors were also considered as the main cause for all the diseases related to horse and a separate field of Ayurveda, known as *Asvaayurveda* (Equine Ayurveda), was exclusively designated for horse medicinal treatments. Such a level of involvement with veterinary science is rare in the history of mankind which was purely devoted for the non-human world. It certainly signifies that there are deep rooted cultural and traditional interconnect and simultaneously interdependence between human and the non-human world in India.

2.6.8 The ‘Fire Cult’: An Intrinsic Part of Ancient Cultures

Fire is believed as sacred element and considered as the purifier, which has the capability to purify everything. Fire has occupied core position among the deities of *Vedic* and post-*Vedic* period fire. The fire worshipping and offering made into ‘*agni*’ (meaning fire) called *yajna* remained important. In *Vedic* rituals horse was as the symbol of sun and fire, and in Rgvedic period was used as a sacrificial animal in the *Asvamedhayajna* in Ramayana (Rgveda 1.64.6; Sridhar 2001, 683, 700). Fire is equated as the “... the child of wood, mother of the earth, and enemy of all the metals, plays a very important part in several of Asia’s, ancient religions” (Haslund 1949,

121). In India, fire is worshipped even today and sun is considered analogous with fire, or a form of fire.

In Mongolia, fire is considered as sacred and Mongols are well known as the fire worshippers. Fire is deeply associated with the worship of sun. It was observed that, fire is a dwelling place of a divinity, and is in itself a divinity. It is for the fear of insulting the divinity of the hearth that one may not through nails, hair and other “unclean” things on fire” (Haslund 1949, 125). Therefore, fire is divinity and its divine presence could be seen in the form of hearth, and it has a special place in Mongolian *Ger* (traditional Mongolian tent) and Mongols life. It was even believed that the the fire on the hearth has a control over the thoughts, ideas, admirations and desires and its negativity is suppressed by the beak-shaped tops of the four legs of the hearth which symbolize Vulture “before they have found their way into the Mongols heart” (Haslund 1949, 124). It was observed that not just in Mongolia but in the Central Asia also fire is considered sacred and “... throwing cut-off nails, hairs and other “unclean” things on to the fire or by putting their feet against the hearth” was forbidden (Haslund 1949, 121).

Both in India and Mongolia, a cross-culture resemblance strongly exists and both are well known as the “fire-worshippers”. Fire is the most sacred and an integral part of their culture and has a special place in their life. In *Vedic* culture, throwing of nails, hairs or putting feet against the traditional hearths made up of mud, or putting consumed food and water on fire was forbidden and considered to be disrespectful. These customs are practiced even now and are very much alive as a part of culture among the followers of *Vedic* traditions and rituals (Jha 2017, 302-303).

In Krisiparasara, different hymns in the form of prayers and offerings to numerous deities were observed. It was strongly believed that “agriculture bestows wealth and is sacred as it is the mainstay of life on earth” (Vasudeva 1997, 161). Following mantra (in sanskrit) was recited in which fire worshipping attained a special place in agriculture:

Smartavovasvahsukrahprthuramahparasarah
Sampujayagnimdvijayamdevamkuryadadhahlprasarnamm

Before the commencement of plowing *Indra* is to be thought of with reverence following prayers to other deities and after worshipping *Agni* (fire) and *Brahmana* the plough can be drawn (v.133; Vasudeva 1997, 164).

The agriculturist during the *Vedic* period and even now worship fire before any other ritual. Sun, the most important *Vedic* deity and *Agni* is considered as the purifier of all sins in the form of *yajna-aahuti* (offerings to fire in the form of food etc.) the holy fire purifies everything, traditionally the practice of offering of prayers and worshipping of hearth are still alive as an important part of human life among the fire worshippers.

It is well established with this research study that there are intense cross-culture similarities between India and Mongolia. Apart from being a spiritual neighbor of Mongolia, India shares innate relationship, especially in terms of agriculture, and within it, the non-human world which includes animals, plants and every single natural entity. One interesting feature is the presence of the horse-cult and the invincible regards for the horse-headed figure *Hayagriva* in both the countries and its imprint can be seen in the form of every piece of art and culture as well as maintaining a pivotal position in the spiritual sphere.

Food connects us all, and love and respect for animals and their importance in the everyday life and livelihood of the people in India and Mongolia, deeply connects both the countries and their cultures. Animal foods have gained special place within everyday life of people mainly associated with agriculture and pastoral systems of herding, both in India and Mongolia. The fire-worshippers of Mongolia and most widely worshipped *Vedic* deity, “the Sun”, a celestial body, a form of *agni* (fire) which still holds a central position among the *Vedic* deities. Fire is having a divine presence, and a form of natural entity which is still now immensely respected and considered as the most sacred.

The close examination revealed that innate connection existed between two completely contrasting cultures, which made India and Mongolia spiritual neighbours in terms of their association with the non-human world. There is possibility that Mongols could be an extended clan of the Aryan horse nomads, and possibly migrated to the Central Asian region. As there is intense cross-culture resemblance between both the cultures. Although diversion do exist but it also paves the way for a stronger strategic ties in terms of social and cultural terms with a much concrete spiritual ground. This innate relationship between the two countries which still remain unexplored and could become one of the vital areas for strengthening the environmental and agricultural sustainability much beyond its political, geographical and economic space.

2.7 Summary

Undertaking any in-depth observation and inquiry into food and agricultural system and its transformation with time clearly requires a sound historical perspective into the subject matter. The historical roots of any such process of technological changes also provides theoretical basis for the explanation of initiation of such process of change. Diverse theories were taken into consideration for understanding the real cause behind these abrupt changes and how they are not always meant for the benefit of environment and society.

Every sphere of human and non-human world and its deep association with the agricultural system certainly provides in-depth understanding about the real world issues concerning food security. The transformation of agricultural system has remained one of the core areas of assessment in this chapter. It has been examined to be a deep-rooted process of change which has found strong explanation in the form of theories. Few theories have remarkably assessed this process of agricultural transformation globally which immensely contributed in understanding the agricultural system transformation in Mongolia's context.

The historical perspective has also been explored in terms of Mongolia's deep-rooted culture's association with the non-human world and has close resemblance with Indian traditions in the form of its diverse art and culture. It is observed that traditional agricultural knowledge and practices in both India and Mongolia are intrinsic part of their culture and has special place for the non-human world. Mongolia is a country purely based on the livestock economy, where animal remains as the real wealth of the nation, while India is a country where agriculture preserves the '*Indianness*' of India. Fertile agricultural cropland and vast extent of the steppe grassland are the real natural wealth possessed by these two countries. Despite contrasting climate and weather conditions, Mongolia shares an innate relationship with its spiritual neighbour, India in terms of embedded principles of sustainability and a balance that exist between man and its natural space. Deep affection and feeling of respect for the animals is one of the major areas where both India and Mongolia are surprisingly closely linked and strongly resembles each other.

Chapter 3
Global Politics on Food and Agriculture

Food and agriculture are two of the most sacred words of human life. Everyone, somehow or some way, does everything whatever they can in need of these two. While food is life, agriculture is the sustainer of life. Controlling food and agriculture mean controlling the entire human race. Similarly, politics on food and agriculture is quite complicated to understand in today's context of everyday life as people are busy thinking about meeting their daily food requirements. But nobody has time to understand that the hardship of their life is never going to end as there is huge politics involved in it. More importantly, the small farmers, nomadic herders and landless farmers are believed to have no role in the global agricultural production system, but actually they are the real custodians of the very existence of this life. They provide us the maximum share of food and simultaneously preserve the agricultural biodiversity without which it would be really hard to sustain the fragile food and agricultural systems of the world. It is the agro-biodiversity of local food and agricultural system which feeds the world, and is extremely threatened by those who want to control the entire global food and agricultural system and day by day remained involved in devastating these local systems in the name of technology and fictitious development. The local food and agricultural systems are forced to give way to the global food and agricultural system. Why do we need to know about this transformation? Because it touches every life and their livelihood.

Mongolia, especially after its transition to market economy and the collapse of the socialist system, beautifully put forward a deep outlook regarding the transformation of the agricultural system which in a way threatened the food security of the nomadic herding community, who all are the real food providers of the country in order to preserve the identity of Mongols and Mongolia.

Globally food and agricultural systems have undergone colossal change. There are deep rooted policies involved in every sphere concerning the food and agricultural systems. Every geographical space exists and exhibits a unique set of characteristics which all are the outcome of deep interconnectedness of both the human and the non-human world. But emergence of food and agricultural system has had the agro-biodiversity of entire system and severely reduced the genetic base of the agricultural survival system to a level, so that every local system appears the same, uniform and

geographical constraint are diluted and removed to such an extent that the localness, uniqueness and diverseness get transformed in a monotonous uniform system.

In Mongolia, the food and agricultural systems were never as vulnerable as it was after the collapse of the Soviet Union which was followed by the transition of the entire system to a system based on the free market economy. The entire agricultural system got jolted, and became completely dependent on imported food for meeting the daily food requirement. Despite having strong livestock production system based on nomadic pastoral production system, even dairy products were fulfilled by the imported food products.

3.1 Food as a Part of Mongolian Culture

Food represents a culture, which comes out from a local space, its natural entities, and its interaction and interconnection with both the human and the non-human world. It is not a day phenomenon but a process which is as old as the existence of food and agricultural system, the environment, its natural complexities that exist in every natural entity. It is a hard earned fruit of the dynamics and deep interaction of the human and the non-human sphere of any area.

Food is celebrated and still holds a prime place in traditional customs, auspicious rituals, and festivals and in every important cultural practice, for instance, serving tea to the guest. It has been observed that, “Humans have been farming for some 600 generations, and for most of that time the production of and consumption of food has been intimately connected to cultural and social system.” (Pretty 2002, xii). Even in Europe, the earliest text preserved on agriculture explains agriculture as a mixture of two words, as a connection of two vital things, “interpreted as two connected things, *agri* and *culture*, and food was seen as a vital part of the culture and communities that produced it” (Pretty 2002, xii). But unfortunately, the modern farming system fails to recognize this very interconnection between ‘*agri*’ and ‘*culture*’, and its deep association with food. For modern system of agriculture, food is just an agricultural product, a commodity which is perishable, and needs to be transported as early as possible to the markets and made available to the consumers. Here food stands as a commercial commodity, for the consumers. We must not forget that food production

and food itself is a part of ecological system. It thrives and survives on the basis of genetic diversity, species diversity and the ecosystem diversity.

In Mongolia, food is an innate part of culture. Cooking and serving of food are important parts of their everyday life, culture, and serving tea holds a special place. However, after the collapse of socialist system and consequently transition to the market economy, Mongolia has become more and more dependent on imported foods, especially from China (Soni 2005;Reeves 2011, 465).Whereas history of Mongolia specifies that Mongolia never starved because “whenever they need food, they kill their animal and have food”. The nomads of Mongolia deeply followed the ecosystem network, and had always remained food secure, but the modern agricultural production and technological system completely altered their food system and food security, especially of the nomadic herders. They were forced to settle, and their mobility got obstructed in the name of development and modernization of the agricultural production system. It is examined in the studies that Mongolia is highly dependent on China for meeting its food requirements. It is observed that, “Food, more than any other import, is where Mongolia is dependent on the Chinese market. Although a small percentage of cereals and bread comes from Russia, more than 90% of the non-meat foods in Mongolia originate from China” (Reeves 2011, 465). It clearly indicates that the dependency of Mongolia’s food and agricultural system has increased on the international market, even for meeting their “basic food needs at a national level” (Reeves 2011, 466). The place of modern science and technologies in reshaping the culture of an area, its sensitivity towards the local systems like food and agricultural system needs deep reassessment. It is observed that “Modern science due to its inherent nature destroys the culture in which it has developed and discarded the morality of that culture. This is evident in contemporary society in which social institutions and laws are framed to meet the demands of science and the needs of technology... Today, both science as well as technology has become global phenomena, dominating and creating a new culture” (Rehman 2002, 2).

Food is believed to be inseparable from culture, from the preparation of food with hands, to the food that will go into our body, its taste, its aroma, its colour, its texture, its preparation, the way it is eaten and taken as diet, everything touches our everyday life, and is an intrinsic part of culture. For nomads, it is food that has added flexibility

and mobility to their way of life. Food makes them travel, and so over the centuries. It was examined that the diet of Kyrgyz of Afghanistan was similar to the diet of other nomadic societies like the Tibetans and the Mongolians, it closely resembles a typical high altitude plateaus (Paley 2012). In Mongolia, food remained central to the nomadic culture as their complete life cycle, their seasonal movements both in the vertical and in the horizontal directions, everything revolves around food. In essence, food is not just an intrinsic part of Mongolians but it gives and shapes their nomadic identity. The concept of five animals, not just helped Mongolian nomads to sustain the fragile steppe grasslands, but also provided food security for them (nomadic herders) at both the individual and family level. Among the various customary practices associated with food system, it is observed that an auspicious day is selected to start milking and at a proper time with the consultation of a lama, especially for the horse which is regarded as the most sacred and has a deep cultural esteem. The first milk is offered to the world of spirits. And then numerous traditional food delicacies were prepared from that milk (Brunn 2006, 54).

The food system of Mongolians was deeply threaded around the nomadic community culture. The mobility of the nomadic herders was deep-rooted in the food system sustainability and stability which was completely ignored by the modern agricultural production system and considered as a major blow for the maintenance of food security of the nomadic herders. It altered the food and agricultural system and alienated it from its cultural root.

3.2 Understanding the System Change: From Local to Global Food and Agricultural System

Every sphere is unique and their uniqueness comes out from their localness or from the local human and non-human phenomena. Localness of culture and the food and agricultural system are severely threatened by the modernist form of agricultural production system and uniformities the uniqueness of areas or the region into a single coded global food and agricultural system. It became really an important phenomenon to understand deeply, for really understanding the transformation of the agricultural system in Mongolia as well as globally understanding its global appeal.

Freedom of choice regarding the selection of food and agricultural system has been completely removed under the process of promotion of the global food and agricultural system. To make a choice, or to follow a command is all that makes a difference and is what actually made a huge difference between the local and the global food and agricultural system. The freedom of making any food choice would be too difficult to be made if the global system of production replaced the local system of food production. Deep observation has shown that, “Our freedom to choose one bundle of commodities rather than another may have an important effect on the living standards we can have, the happiness we can enjoy, the well-being we can achieve, and the various objectives of our lives we can fulfil. Similarly, the absence of interference by others may have important causal influence on various things that we can do and value doing” (Sen 1987, 3). Freedom of making choices was severely threatened under the new regime of free markets and globalization. In fact, this cocktail has been proved lethal for economically and politically weak nations, especially in terms of food and agricultural system, where the control is completely shifted from the grazers to the global corporate Trans-National (food & agricultural) giants who controls the global market and the free market get transferred into monopolized markets with the help of globalization (Shiva, 2005). There is no such thing as free market, the market is free only from government controls, and interventions especially regarding public food policies and the global corporate giants can freely exact their control. It has been observed and assessed that “the advocacy of greater freedom to earn profit in agriculture and of greater use of free market without much interference by the state and other public institutions (an advocacy that can, incidentally, be found in many documents of the host for this lecture, the World Bank) usually reflects an instrumental-negative view of freedom, applied to food policy” (Sen 1987, 5). One needs to introspect deeply into this colossal level of replacement of local food and agricultural system under the name of development and modernization, by the global food and agricultural system which is primarily funded by the free market economy and expansion of globalization policies.

Hence, it is really important to understand the reasons behind this transformation of the agricultural system. Globally the food and agricultural system have become much more volatile and are directly impacting the food security. In order to understand food Politics from Mongolia’s perspective, it is essential to deeply assess how the

globalization and market economy assisted the corporate giants to take the control of world resources into their hands. There is huge politics involved in this massive transformation of the agricultural system. It was analysed that their transformation of local food systems to the global food and agricultural system, reduced the role of farm family from decision maker to a producer for the market. “The family controlled its food system from seed to plate – the ultimate integrated food system” (Heffernam 2000, 61). Soon after the introduction of industrial agricultural technologies in production system to feed the demands for the industrial cities, the production system transformed its basic cause of production, which is now for the urban markets. “...agriculture evolved from a subsistence agriculture to a commercial agriculture in which the role of the farm family was to produce for the market” (Haffernam 2000, 61).

Alteration in the power relations, control and the market all together gave birth to a new emerging order in the agriculture and food system. Here the role of farmers got replaced by the corporate firms who buy the products from the farmers and in turn process and transport it to the supermarkets and to the consumers. This was a very important change in the food system. When industrial inputs of production were introduced as raw materials for the agriculture the cost of production increased steeply, the high-cost input technologies were provided to the farmers at a subsidized rate (by the State Government) and the production of agricultural produces was basically planned and facilitated for the market, placed at a distant place in the cities and then for the global market. The problem of over production remained a salient feature of this highly modernist, and high input cost agricultural technology and from the economic point of view remained as one of the major sensitive issues which was considered as an obstacle in maintaining the free market economy and a high price for the agricultural produces (Shiva 1991; Buchanan 1985). But this over-produced agricultural produce was either dumped in the ocean or exported as a food aid but never used for reducing world hunger and poverty, as it can lower the market price of the agricultural and food produce. The market economy is behind every move of the food and agricultural system transformation; the problem of over-production is identified as one of the major characteristic features of this high-input cost based agricultural technology. In fact, it is not underproduction, but the problem of over-production which is identified as one of the central causes behind the growing unrest

among the farmers of both developing and the developed world. Even if the food is in plenty and there is over-production of food produce, then also food is not accessible to the poor and hungry. There is a much wider gap when it comes to the distribution of food. And to maintain a price level for over-production is considered harmful for the market economy. For instance, the extremely complicated situation of dairy farming system and milk production in the European Union countries has become a never ending nightmare for the dairy farmers as they are not even getting their cost of production. There is growing unrest among the dairy farmers, every day there are huge protests going on, farmers are leaving their occupation and don't want to continue as dairy farmers. This is an emerging trend in developed world countries, whereas in developing countries the problem of farmers' unrest and dissatisfaction is so grave that farmers' suicides have become a major socio-economic issue (Shiva 1991; 2005). Particularly in agriculture dependent economies, most of the population make a living by farming or related activities. In Europe "farmers (dairy farmers) are culling less productive cows in an attempt to cut costs as the milk price slump continues to bite" (Macauley 2015). It has further been examined that, "The price farmers are paid for their milk is currently about 18 a litre. That is significantly below the cost of producing it, which is about 27 a litre on average. That means a farmer producing a million litres of milk a year is losing between £80,000 and £90,000 a year" (Macauley 2015). Even though the dairy production system in European countries is hugely subsidized, still the problem has elevated to a trending level. But in case of the developing politically and economically weak countries, the farmers have to cope with the market mechanisms on their own, as State provides minimum support price (MSP) only for few crops and ironically, the prices are already so low that farmers are left with no other option, but to accept whatever is being paid to them.

To understand this complicated power play, one need to deeply observe, examine and reassess the market economy, the increasing openness of the market with escalating level of globalization and most importantly the ever increasing control and operating region of the agro-corporate giants.

The market and the farmers' access to the market is another major area of concern as farmers have to depend on mediators like processing firms and transportation to the

market areas as they cannot sell directly to the consumers as they usually lack processing, packaging and transportation facilities. This is one of the key reasons behind making up of corporate empire and with the help of increasing horizontal and vertical integration the corporate world has inconceivably established their control on the entire global food and agricultural system.

- Horizontal Integration
- Vertical Integration

3.2.1 Horizontal Integration

“The expansion of a firm within the same stage of the food system as their original operation is called horizontal integration” (Heffernan 2000, 64). This basically unfolds the process behind the conversion of a small and local firm into a trans-national agro-giant, crossing the geographical limits. “For example, the increase in size and decrease in the number of farms in the United States during most of this century is an example of horizontal integration” (Heffernan 2000, 64). Usually the expansion of small firms takes place through the building of new facilities, acquisitions of small firms and large scale mergers with other profitable firms. The small firms were eliminated and absorbed by big firms. With every elimination or absorption, the economic power and control of the firm increased to an unpredictable level, which became uncontrollable as free market economy restricted the State government’s intervention for public good, and in the absence, allowed the monopolization of the market by a single or few dominating large corporate firms. Today, these few agro-corporate giants exert huge influence on the market and the free market competitive environment is completely overpowered, controlled and even diverted by these agro-corporate giants who have the power of monopolization, and further increase their monopolistic power with the help of patenting the regime which eliminates market competition for an assumed period of time.

It has been beautifully described as being like “the narrow opening of the hourglass which controls the flow of sand from top to the bottom, the processing firms are positioned between the thousands of producers and millions of consumers in the United States and the world” (Heffernan 2000, 66). It clearly indicates the situation of the entire food and agricultural system and how it is clinched in the hands of the

corporate world. Furthermore, it was assumed that, “These firms have a disproportionate amount of influence on the quality, quantity, type, location of production, and price of the product at the production stage and throughout the entire food system” (Hefferman 2000, 66). With this horizontal integration, two important features have been identified as the fundamental formula for the concentration and control of food and agricultural system by the large trans-national corporate houses. These include the following:

- i. Planned Overproduction (of agricultural production)
- ii. Keeping the product price below the cost of production

A regards selling below the cost of production; it has been observed that

the small and local firms could not bear the economic losses for a longer period of time and got eliminated from the market. The diversified trans-national agro-corporate giants having the strength to bear losses for a longer period of time, as they compensate these losses with the profits gained in other diversified sectors in other countries. Due to their large capital wealth they sustain with the losses and continue to overproduce till the small players get completely eliminated from the production system and the control now lies in the hands of these few corporate giants of the world, especially based in United States. The situation of dairy farmers and small firms represents a good example of this attempt of increasing control and ownership of the agro-corporate giants. It can be clearly figured out from the following observation which says that,

“Planned overproduction and selling below cost of production also occurred in the farm-ruined catfish sector early in 1980s. Two major catfish cooperative Southern Pride and Delta Pride, experienced the problem of competing against Con Agro, Cargill and Chiquita, ... The cooperative survived despite the fact that the annual report of one of the TNCs shared a loss in the Catfish division for two years because of ‘overproduction’ in the sector. Conversations with some of the TNC’s personnel indicated the firm was prepared to extend this loss for another year or two” (Heffernan 2000, 68).

Furthermore, the situation was found to be similar for hog sector, where again due to the slumping of the market price for the hog below its cost of production devastated many local firms and small producers in the sector. It was exclaimed that, “During the last half of 1998 and the first half of 1999, the market price for hog was below the cost of production. However, many of the larger and diversified firms continue to construct new facilities as smaller and single-product producers were forced out of the

business. The driving force is in market share, not efficiency” (Heffernan 2000, 68). In an early draft of the report by the International Panel of Experts on Sustainable Food Systems (IPES) as examined by the Guardian says that,

“Now technology and data driven synergies could lead to three companies controlling 60% of Seeds and 70% of agrochemicals worldwide with still greater oligopoly possible – a historic power shift throughout the global agricultural inputs and even greater crop and livestock vulnerability through uniformity” (Vidal 2016; Paroda 1991).

It is further assessed by Technology and agriculture watchdog group ETC that “the takeover is no longer just about seeds and pesticides but about global control of agricultural inputs and world food security” (Vidal 2016). This increasing dictatorial control over the global food and agriculture system, concentration of capital and using of market economy as their puppet which purely become dependent on their twist and turns. The rising price of food and the rising cost of cultivation, both way impacted the small scale producers and the consumers. Aldrian Bebb, a senior food, agriculture and biodiversity campaigner for the Friends of the Earth Europe examined these mega-mergers of agro-giants as highly sensitive. He said, “From Africa and Asia to Latin America and EU (European Union) corporate control over markets and supply chains is displacing millions of small-scale farmers... These dynamics have created some of the world’s highest rates of poverty and hunger among small-scale food producers and rural communities worldwide” (Vidal 2016). This very statement addresses the core issue, which lies beneath the transformation of food and agricultural system. Moreover, it is not limited to a country or a region, but impacts the entire food and agricultural systems globally, and farmers’ unrest is an outcome of this tyrannical control of the agro-corporate giants.

3.2.2 Vertical Integration

Another strategic move of the Corporate World is known as the vertical integration by the large agriculture based Corporates and firms for further reducing the market competition. The vertical integration involves numerous stages in a commodity system. Expansion of “. . . ownership and control of a number of stages in a commodity system” (Heffernan 2000, 68-69), from seed to the shelf, every stage is involved in a commodity system governed, controlled and owned by these few Trans-National agro-corporations. In case of livestock production, livestock feed is considered as one of the most important components of the entire production system.

Livestock feed, to livestock processing, packaging and their dissemination in the retail markets, every stage of a commodity system is owned, controlled and dictated by few agro-corporate TNCs. It shows a clear picture of what is actually happening and has happened in the name of modernization, development and increasing production few large corporate homes/firms control and own the entire food and agricultural system. The level of concentration of ownership and control over agro-chemical and seed sectors can be very well estimated with the following observation.

“In 2013, the top six firms controlled 75% of the agro-chemical market and 63% of the commercial seed market. If the number of firms drops, it will be that much easier for them to raise prices... Consolidation in the agribusiness industry also tends to concentrate political power as giant firms lobby governments to shape the ruler of the food system in ways that support their interest” (Clapp 2016).

Despite all these major technological transformations in food and agricultural system, in studies it was clearly indicated that, for most of the major crops like maize, wheat, rice and soybeans growing areas (24-39%), “yield either never improved, stagnate or collapse” (Ray et al. 2012). It is clearly mentioned in the observation that, “The study for over a period from 1961-2008 in which trends in crop yields for four key global crops: ...amass 24-39% of maize, rice-wheat and soybean growing areas, yields either never improved, stagnate or collapse” (Ray et al. 2012).

This study re-assess the transformation of food and agricultural system, which was purely devoted for assured yield improvement, but actually all those big promises of eliminating hunger and poverty remained not just unfulfilled but created a new set of environmental, social and economic problems.

3.3 Transition to Market Economy: A Mongolian Perspective

Food and agricultural system in Mongolia had undergone complete alteration with the change in political power. From traditional system to the planned economy under the socialist system, and from socialist system to its transformation into market economy system highlights the abrupt changes which completely jolted the entire food and agricultural system to its roots.

Agriculture is considered as one of the few key areas on which the entire economy of the country depends the most. Nomadic pastoral herding is considered as the way of life for the nomads of Mongolia and, in a way, preserves the identity of the people.

Mongolia is located between Russia and China. It is bordered by Russia in the northern direction, and in the east, west and the south direction it shares its border with China. Geographically, Mongolia is a land locked country which forces many political, economic and environmental constraints due to its location. The northern and western region of the country is covered by mountains and mainly in the north, land is covered with forest which is about 10% of the land area (Dorj et al. 2013, 218). The central part of Mongolia is covered by the vast steppe or grassland which is considered as the real asset of Mongolian Nomads. Mongolia is a purely livestock based economy, and nomadic herding was considered as their way of life. In the southern part, it is covered with Gobi or semi-desert. In essence, Mongolia is blessed with a vast and diverse natural beauty. It has been observed that “Nearly 90% can be used for agricultural or pasture pursuits, 9.6% is forest and 0.9% is covered by water. Less than 1% has no effective use” (Dorj et al. 2013, 218-219).

3.3.1 Climate and Agriculture in Mongolia

Mongolia experiences a continental climate with extreme temperatures ranging between +35°C in summer to -40°C in winter at an average. Contrastingly, on one tip of the same land lies a cover of permafrost and on the other tip lays the Gobi Desert. With this one can imagine how diverse the ecological ecosystem network is in a country like Mongolia. That is why the ecosystem is considered to be highly sensitive and fragile, which was maintained remarkably by the highly flexible and mobile traditional Mongolian pastoral livestock production system and traditional Mongolian agricultural and food system by the nomads.

The precipitation is another restricting climatic phenomenon, especially for Mongolian agriculture. It is observed that, in the western and northern mountains some areas receive 450-1000 mm precipitation, as we move towards northern and central areas the amount decreases to 300 mm and in the eastern and southern areas it further decreases to 200 mm of precipitation. The low and varying amount of precipitation, high amount of evapotranspiration and a shorter growing season are considered as one of the major obstacles for food and agricultural system in Mongolia (Dorj et al. 2013, 219).

Despite all of these climatic constraints, the nomads of Mongolia not just managed their household level of food security, but also sustained the food and agricultural system in a highly healthy state. The nomadic livestock production system is considered as the backbone of Mongolian economy and a major source of employment. Agriculture always existed as the mainstay of the people here. Agriculture remains alive in the form of livestock rearing, and grassland as their real wealth on which the entire food and agriculture system relies. The maintenance of the grassland always remained a primary concern for the nomadic herders. They respected, collectively manage, owned and took measures to protect, preserve and sustainably use their grasslands. But as society had undergone drastic political and economic changes and the transformation in the food and agricultural system, the entire perspective got changed, the feeling of respect and care got transferred into exploitation. The collective measures and feeling of togetherness in the community get altered and replaced by self-centred individualism, and the singular aim of increasing production at any cost. Mongolia's transition to the market economy, and the transformation based on highly modernist technologies laid the foundation of this 'over exploitative' and self-centred individualistic culture; it is the technologies which were designed to exploit nature, rather than harmonize with it.

Agriculture has always remained a major sector of Mongolian economy. It has been assessed that "Nearly 80% of Mongolia's territory is used for agriculture. Nearly half of the working population is engaged in agriculture, and many changes in agriculture sector have been taking place recently" (Dorj et al. 2013, 220). It is also observed that Mongolia's agriculture sector is broadly divided into two major sub-sectors, crop cultivation and livestock rearing.

3.3.2 Crop Cultivation/ Crop Production

Although in Mongolia low precipitation, short grazing season, high evapotranspiration, and rugged topography are few of the major geographical obstacles for crop cultivation. It has been examined that about 1.3 million hectare (MH) of land in Mongolia comes under the category of arable land in which half of them are sown with crops like wheat, barley, oats, potatoes and vegetables. Arable land also includes land which is bare fallow (Dorj et al. 2013, 220).

Cabbage, onions, carrots and turnips are few of the main vegetables cropped and cultivated in Mongolia. Mongolia is still highly dependent on imports, especially from China and Russia, in order to meet its food requirements. Mongolia primarily imports flour, sugar, fruits, sunflower and soya bean oil and some vegetable (Dorj et al. 2013, 220).

The Bulgan, Selenge, and Tov always located in the north-central Mongolia, are considered to be “Mongolia’s Breadbasket”. The large crop fields and the center-pivot irrigation have been established in the last 10 years across Mongolia’s “breadbasket” (Penderson et al. 2013, 10). It marks a new era in terms of agriculture with the growing climate change, increased severity of the drought and falling agricultural yields being experienced in the food and agricultural system world over. Productivity and prices for important crops like wheat and maize get significantly impacted by the global warming phenomena (Piao et al 2010; Penderson et al 2013, 10). It was also observed that in the 2010 heatwave in Russia, the unusual heat exacerbated drought and triggered a significant drop in grain production in some regions (Grumm 2011; Wegren 2011, 140-156; Penderson et al. 2013,10). The situation is such that it has become necessary to re-assess the interaction between climate change and agricultural and ecological systems on which depends the entire resource and food security of a region, area or space (Penderson et al. 2013, 11). On one hand, the food and agricultural system transformation and on the other hand, the climatic changes further deteriorate the adaptability of the system change and its impact on the resource and food security of a region, area or space is severe.

It clearly indicates that the vulnerability of the entire food and agricultural system is increasing day by day, and as we move from the local food and agricultural system to the global food and agricultural systems, the level of adaptation further decreases with alien technologies, invasive species and non-native breeds of livestock. It became a matter of concern that is the climate really changing or we have changed the food and agricultural system such that it fails to adapt with the changes which are very well adapted to by the native species of that particular local space or area.

3.3.3 Livestock Production System and the Concept of Five Animals

Livestock production is one of the most important sectors and is considered the backbone of the country's economy. For ages, the Nomadic herders performed a highly mobile and flexible pastoral livestock production system, which was very well suited to the region endowed with grasslands, which are delicate and fragile if the local environment is not managed well. The livestock breeding is considered of vital importance for the economy as it contributes about 70% of the gross agricultural output and livestock sector alone accounts for 20% of economic output in the Mongolian economy. From the perspective of employment generation as high as 40% of the population directly depend upon the livestock sector for their livelihood and as a source of employment (Dorj et al. 2013, 220).

It has been discovered that herding always remained a driving force for economy as well as for meeting the needs of society “during the Genghis Khan period (13th Century); the Ministry of Horses regulated nomadic pasture because of the importance of horse for imperial military purposes. During the Manchu Dynasty (18th Century), camels were important for their use in caravans along with the Silk Road trade route of Central Asia. At present, goat population is increasing because of the high price of cashmere wool in the international market” (Ykhanbai and Bulgan 2006, 108). Mongolia has always remained too closely associated with its livestock. And nomadism still remains as the pulse of Mongolia.

However, with time to time changes in agricultural technologies, the transformation of Mongolia's food and agricultural system failed to recognize its dynamic relations shared by the nomadism, which was designated as obsolete and primitive by the blind followers of modern technologies in the name of development. It has been observed that the Mongolian Prime Minister, Nambaryn Enkhbayar in his speech in 2001, focused his ideas of a modern Mongolia only after giving up their nomadic identity, he simply said that “stop being nomads...” (Murphey 2001, 30-32). According to him, leaving nomadism is the only way to survive and this idea was deeply followed in the government policies by a pure neglect of the livestock production and waning support for herding. On the other hand, the mining and the mineral resource sector was given all forums and support by the government (Honeychurch 2010, 409).

3.4 Global Market Fluctuations and Increasing Financial Indebtedness in Mongolian Economy

From time to time Mongolia has gained attention in terms of its high economic growth which touched the pinnacle. But now, especially after 2013, a phase of doom has begun with a steadily declining GDP (Gross Domestic Product) in Mongolia. The decline was steeper after 2013 which fell from a GDP growth of 11.6% to 7.9% per year in 2014, and 2.4% in 2015 to a mere 1% GDP growth per year in 2016 (ADB 2017). It was forecasted by Asia development Bank (ADB 2017) that Mongolia's growth in 2018 will be driven by agriculture and construction. The ADB study further examined that the level of household consumption in Mongolia has declined to 10.3% in the first half of 2016 (ADB 2017).

The global market fluctuation terribly impacted the country's economy. The global decline in commodity prices, particularly the metal price, and fall in foreign investment since 2014 left Mongolia with no growth and further worsening of economic crisis with rising poverty. A need for addressing Mongolia's structural challenges and economic diversification has started growing and gaining attention. The requirement of a quick response to the fluctuating international pricing of export oriented commodities is viewed as the only way to survive in the atmosphere of highly fluctuating international market. Experts are looking for a 'stronger national economic model', which can have potentials to redeem the economic strength as the economy is facing acute crisis.

The rising food insecurity among the country's 3 million people, especially with low purchasing power and deepening poverty are few areas which need immediate attention (Jennings 2017). The major cause behind the Mongolian crisis was identified as: Firstly, a collapse in foreign investment; secondly, slowing growth in China; thirdly, a weak commodity price (Reuters 2017). The severe economic (and financial) crisis has transformed Mongolia into a 'cash-strapped nation', with burgeoning indebtedness, which is described as the "dinosaur-sized interest payments of a debt load of nearly \$23 billion", a gigantic figure. Mongolian currency is touching abysmal depths and gained the title of 'world's worst performing currency' (Chi 2016), a really tough time for the '*Tugrik*', the Mongolian currency. It has been reported that, the private citizens in Mongolia are coming out to provide help for the government's debt

crisis by donating cash, jewellery, gold and even horses for meeting bondholder's deadline by paying a lofty figure of nearly \$600 million in the financial year 2017 (Reuters 2017). Mongolia finally survived the crisis by reaching a \$5.5 billion (bn) bailout agreement with the International Monetary Fund (IMF) (Mitchell2017).

The mining boom in Mongolia created a new economic wave by touching a sky-high figure of 17.5% Gross Domestic Product (GDP) in 2011, and earned a new name "*Minegolia*". The overdependence of economy on the mining sector, and serious neglect of the agricultural sector, specifically livestock production, and degradation of pastureland jolted the roots of economic model of development. Fluctuation in the global market, specifically the steep fall of the prices of coal, copper and other commodities jeopardizes the fate of every life with increased food and fuel price (Mitchell 2017; Reuters 2017). The economy is highly dependent on foreign direct investment (FDI) and global market driven demand, which needs a quick response, and with highly volatile, sensitive and ever fluctuating commodity prices, could possibly be identified as one of the vital reasons behind the economic break-down of Mongolia.

Extreme winter conditions known as '*dzud*' in Mongolia, was perceived as another game changer in Mongolia's economy. The complete side-lining of the livestock production system immensely increased the rate of livestock mortality due to lacking infrastructural support. '*Dzud*' is also known as and synonymous with 'white death', and increased frequency and severity of *dzud* remains a major area of concern. More specifically, the increased extreme weather events deeply impact the household level food security for the herders, as they mainly rely on their livestock resource for their daily food requirements in the form of milk, milk products and meat.

At the same time, rising food and fuel price (increasing food inflation) and rising poverty further jeopardized the food security of majority of the poor people with low purchasing power. In essence, Mongolia's transition to market economy immensely contributed to an unjustifiable dependence on international market commodity price fluctuation and a threatening FDI trend which pushed Mongolia's economy into a serious debt crisis. These international funding agencies like World Bank, Asian Development Bank, International Monetary Fund (IMF) have a greater role to play in Mongolia's continuation to remain in a weak position, both as a nation and as an

economy. The flow of FDI in Mongolia between 1990 and 2004 reached a total direct investment of USD 1.3 billion (GOM 2005, 39). But when sector wise allocation of FDI is observed, 43% of FDI was made in mining and merely 4.9% of FDI in production of livestock raw materials. It clearly indicates the way the accumulation of foreign investments changed the priority from livestock to the mining sector. This created a huge rift between urban and rural Mongolia and the livestock sector was orphaned by the market economy. Now, after the steep slump in metal prices, livestock sector is regaining its lost fame and the government has shown interest in reviving the livestock sector as a new economic priority and strengthening the national economy from its roots.

The global demand for cashmere, and high commodity price in the international market made a deeper impact in the herd-composition of livestock producers, specifically the small livestock herders. As a result, global market directly contributed in a steep increase in goat population, to meet the cashmere demand. It was marked as the major environmental impact of the transition and development of market economy, and led to the severe degradation of the pastureland (Maekawa 2013, 233). Although cashmere from Mongolia gained high reputation in the global market, but at the same time, it severely altered the livestock production system for earning cash income from cashmere, specifically by the small herders (GOM 2006:11; Maekawa 2013, 244-245).

In 2006, cashmere industry alone constituted 30% of the country's export, which directly led to increase in goat population (GOM 2006, 11). And, it was witnessed that, for the first time, the goat population outnumbered the sheep population in 2003 (Maekawa 2013, 241), which indicates towards an alarming trend and threatened the sustainability of pastureland.

3.5 From Food to Commodity: An Abrupt Transformation of Food and Agricultural System

This transformation of the food and agricultural system has changed the traditional notion attached to food. The feeling of respect and care for the non-human world, the nature, its space, its culture, its belongings get completely transformed into exploitative technologies, primarily focused on production, product and profit. The

commodification of food, as a commodity measurable in terms of money is identified as a major change which completely changed the human perspective about food which was there from ages. Three Mongolian-Jargal, Battsetseg and Sodoo described that how the changes brought by market economy negatively impacted the traditional Mongolian diet and radically changed the herder's attitude towards their animals. It has been narrated that

“Democracy brought huge amount of junk food and soda to people's diet, overweight and are becoming huge health issues. Democracy and free market brought negative changes to the traditional diet, it is not so much organic anymore, herders began injecting steroids to add animal live weight for profit, flour and other things are added to dairy products to increase their volume.”¹

But the 'age of market' changed the age old observation of the mankind about food. Commodity and the embedded reason behind the commodification of food and agriculture is one of the core issues which need a deeper re-assessment. 'Commodity' itself is an extremely complicated term and scholars like Karl Marx (1859) attempted to go into its roots in his legendary work, 'The Capital'. Marx in his thorough and thoughtful observation was able to deal with the highly complex concept like - the commodity, factors of a commodity, commodity and its relation with money, etc. Few important examination and observation suggests that commodity represents (a concept of) individualism, a transformation or transition of a natural entity to economically measurable unit in terms of money, an exchangeable value, which completely undervalued the deep ecological, social and cultural as well as intrinsic value of a natural entity. And now this concept of commodity is further reduced to a more concentrated level where by food can be reduced into mathematical digits.

For this research study Marx (1954, 35) explanation of Commodity in his historic piece of work "The Capital, Volume I" was examined. It is found that, "A commodity is, in the first place, an object outside us, a thing that by its properties satisfies human wants of some sort or another. The nature of such wants, whether, for instance, they spring from the stomach or from fancy, make no differences" (Marx 1954, 35). Marx identified two major factors of a commodity, use value of a commodity and the exchange value of commodity. The use value is a utility of a thing that makes a commodity usable (Locke 1691, 28). It is independent of the amount of labour

¹ Interview of Jargal, Battsetseg and Sodoo on 12 September, 2018, taken by this researcher, assisted by Prof. William Honeychurch (Yale University, USA).

involved or required for attaining or to appropriate its useful qualities. When we talk about a commodity in terms of its use value it basically means the quantities - for example dozens of watches, or tons of Iron. It was deeply assessed that the use value of a commodity becomes a reality only by use or consumption. And when we see commodity in the form of a society, the use value is observed as a material depositories and can give it a new form of exchange value.

Exchange value of a commodity “at first sight, presents, itself as a quantitative relation, as the portion in which values in use of one sort are exchanged for those of another sort, a relation constantly changing with time and place” (Trosne 1846, 889; Marx 1854, 36). Exchange value of a commodity needs to be deeply understood, as it is the prime form in which identifying the value of a commodity purely lies in a hidden hand which has all the concentration of economic power and control area the (human and non-human) resources. It can be very clearly assessed with the following observation that the

“exchange value of commodities are replaceable by each other, or equal to each other. Therefore, firstly, the valid exchange value of a given commodity express something equal, and secondly, exchange value, generally, is only the mode of expression, the phenomenal form, of something contained in it yet distinguishable from it” (Marx 1854, 36-37).

The concept of third value is a value that does not belong to a mutual entity and is decided by interplay of economic institution and the market. For example, Marx tried to clearly point out the hands of an invisible power or institution which decides the exchange between different commodities. The two things, corn and iron, are the two different things and for purpose of exchange “the two things must be equal to a third, which itself is neither the one nor the other. Each of them, so far as it is exchange-value, must therefore be reducible to this third equation in which a given quality of corn is equated to some quality of iron”. The exchange-value is basically a value of a commodity which is expressed in a way so that it can be equated with other “in terms of something common to them all, of which they represent a greater or less quantity” (Marx 1854, 36-37).

3.6 Labour Productivity and Use Value: Role of Labour in Stating the Value of Commodity

Labour is another vital aspect attached with the commodity. If a commodity is not evaluated on the basis of its use value, then the remaining value can be assessed as the product of labour. Labour is very important, as today agricultural labourers are the most vulnerable class and the labourer immersed in production of agricultural crop or livestock based production, it is the labour that remain hidden and never truly reflected in terms of value which actually very much required in each and every level of crop cultivation and livestock rearing.

As it has been observed by Marx (1854, 38), labour is required to produce a commodity in a usable form. So, if we completely leave out the concept of use-value of a commodity, then only common property remains, i.e., all commodities process is a product of labour. It is clearly stated that “If there we leave out of consideration the use-value of commodities, they have only one common property left, that is of being products of labour” (Marx 1854, 38). It is the usefulness and uselessness of a commodity that is the guiding force in deciding the value of a commodity. It is mentioned that, “nothing can have value, without being an object of utility. If the thing is useless, so is the labour contained in it; the labour does not count as labour, and therefore create no value” (Marx 1854, 38). A major thing to note here is that who is going to decide on the usefulness and uselessness of a thing, and who is going to define the criteria for identifying the uselessness or usefulness of a product, it may also vary according to the needs of different economic strata of a society. For example, a product like a luxury good in the form of a diamond is of no use, yet it is highly priced, whereas water which is elixir and is a basic need for the very survival of both human and the non-human world, it is freely available, but accessibility remains as another issue associated to it.

Similarly, a soft drink or a carbonated water like Coca Cola drinks, are of no use and it is assessed that it causes harm to the human body, yet globally it holds a huge commodity market, and ironically it is labelled as the food product. Now who is going to decide what food is and what pseudo-food is. A food product which is sold as a commodity, is basically a market driven phenomena, introduced and controlled by those who controls the market. Now a new ongoing concept in the form of ‘sugar tax’

is coming up to give way to the healthy food in the system. But again, in terms of clarity about many of these existing food and agricultural commodities in the market, it appears hazy to understand the entire mechanization running beneath the market mechanisms and its control.

One more relation, which was very well examined by Marx (1854, 68-69) was the properties of a commodity and its transformation into a new form, from general value to the money-form. The exchangeability was identified as a major property of a thing or an entity which convert it into a commodity. Secondly, the transition of a general value of a commodity to the universal equivalent form, or the money-form is few of the major transformations which completely altered the system from consumption to the production based system. To understand of the concept of commodity deep introspect is required. Its complexities can be well indicated in the following observation, “A commodity appears, at first sight, as very trivial thing, and easily understood. Its analysis shows that it is, in reality, a very queer thing, abounding in metaphysical subtleties and theological niceties.” (Marx 1854, 71). It indicates how complicated it is to understand this whole process involved in the transformation of food as a commodity for sale, and so do its relation with its local natural space and its community like herders or farmers, who all are actively involved in this process of transformation of food to a commodity.

In this research study it is hypothesized that the “transformation of agriculture in Mongolia has resulted in a shift from consumption to production oriented system”. Even before the transition to market economy, in the socialist era of collective farming, this shift was started but with a larger role of state which broadly focused on social and economic security of the people. After Mongolia’s transition to the market economy, this resulted in deep-rooted shift from consumption to production based system. As an impact of the market economy based system and openness of Mongolia to the international market and the agricultural system dominated by agro-corporate giants, the level of transformation and shift of the food and agricultural system to a highly commodity oriented production system deeply jolted the entire agricultural system. This major shift towards commoditization of food gravely increased its vulnerability of food and agricultural system in terms of environmental, social and economic sustainability.

With this study it is hypothesized that food has converted into an exchangeable commodity. It is observed that the very concept of commodity is in itself full of complexities. Commoditization of food is basically its transformation in a money-form, as universal exchangeable form of a commodity, which completely undervalues the environmental and cultural essence embedded in food, its localness, the deep association of food with its space and time, altogether get completely eroded, altered and objectified just as an economically exchangeable commodity. And who is going to decide on its value? It lies in the hands of those who have the control over the global food and agricultural system, global economy and market economy, which run on the twist and turn of the corporate giants. They decide the cost of cultivation. They decide the cost of cultivation, the price of food and agricultural crops, price of food processing, packaging, and the finished good as a commodity for sale in big super-markets.

Because of this, despite performing exceptionally well in terms of agricultural production, farmers are falling under the never ending trap of indebtedness, mainly as the cost of cultivation is higher than the price of the agricultural commodity – crop or milk. And with processing and packaging of these agricultural produce into a supermarket commodity, the price has skyrocketed in the market. The profit, from both the stages, from cultivation to finished product as commodity is absorbed by their agro-corporate giants, and the losses are borne by farmers and the small-scale producers and small local firms. Every step is planned in the direction to increase control, yet the world is raving about ‘the economic crisis’. Every stage of overproduction of food and agricultural products are planned as a well understood corporate strategy to control the entire food and agricultural system.

In Mongolia, a sudden transformation to a new economic system jolted every sphere of everyday life of common people. The herds species composition and high level of mobility are considered as two of the major features of the traditional food and agricultural system in Mongolia, which is considered really important for maintaining “the local micro-environment and resource availability” (Honeychurch 2010, 407). Since Mongolia’s transition from socialism to Market economy in 1990s, there has been an exponential increase in its goats’ population, and is assessed as the major cause behind increasing level of desertification (Reeves 2011, 450). In a study by the

Swiss Agency for Development and Cooperation in Mongolia, assessed that almost 44 to 90% of the land is affected with (the problem of) desertification (World Bank 2006; Reeves 2011, 456). In 2010, the population of goats, alone accounted for more than half of Mongolian livestock assets, where in the traditional Mongolian herding practices in the herd composition the goat population kept less than 10 percent of the total herd of the grazing land (Reeves 2011, 456). The de-collectivization process and the privatization of the ownership of animals, increased unemployment, such chain of events shifted herder's preference to increase goats in their herd as it can give them immediate cash income which was considered as vital for their sustenance of livelihood. It is purely the case of commodification, where the economic profit from the high priced cashmere wool in the international market remained as the prime cause behind the sudden rise of the goat's population.

Mongolia's transition from socialist system to the market economy is one of the major structural changes which transformed the agricultural system deeply and further disassociated it from its traditional roots. The new era of market economy that began with the collapse of the Soviet Union in 1991 requires a deep introspect for this research study which is going to provide us more concrete understanding about the transformation of agricultural system in Mongolia and its deep rooted impact on food security.

3.7 Summary

The transformation of agricultural system in Mongolia has given its preferences for the replacement of local food and agricultural system with the global food and agricultural system. The massive transformation of localness of the food and agricultural system has increased the vulnerability of the Mongolian food production and exposed the Mongolian herders to the highly volatile international market conditions. High fluctuation in the cashmere demand and its high price in the international market have resulted in sudden change in herder's preference for Cashmere goat. The traditional herd composition maintained by the herders for ages has also got replaced with the herder's preference to increase their cash income. This radical change in the attitude of Mongolian herders for their family herd based production system has been seen as one of the major blows and has deeply impacted the food security of Mongolian herders.

Worldwide, the transformation of agricultural system needs in-depth inquiry, as globally the farmers have become one of the most vulnerable groups and fall under the category of food insecure population. It sounds really ironical, that those who grow food for the entire humanity are themselves trapped into the web of indebtedness due to the ever rising cost of cultivation and slumping net farm income. There is something seriously not working in the agricultural sector. Despite increasing food price and rising cost of cultivation, farmers or herders are not even getting back their cost of farm production and seriously running under acute losses and mounting farm loans, resulting in soaring indebtedness. The farmers in the developed countries are safeguarded by the heavy subsidies provided by the governments, but those farmers who belong to the developing world are facing perilous situation between life and death. The farmers suicides reflects us the merciless facet of this transformation of agricultural system. Time has come to recognize this major problem of society which forces the grower communities to a situation of where they prefer immortal world more respectful and peaceful, then to live in the mortal world, full of economically rational people in terms of decision making for poor and marginalized section of the society.

The Mongolian perspective has added strength to this research argument as nomadic herders in Mongolia are also facing problems in terms of the rapid erosion of traditional Mongolian pastoral production knowledge and practices. Mongolia truly represents the face of developing world where livestock rearing is the essence of masses as well as the mainstay Mongolian economy. The sudden economic boom in the mining sector, followed by the abysmal low with 'Tugrik', the Mongolian currency, has become the worst performing currency of the world. The real facet of development under the market economy has become impossible to capture. The flows of FDIs, specifically in the mining sector as well as the ever escalating level of corruption have also become prominent features, which capture the emerging struggles ahead in the uplifting of Mongolian economy.

Chapter 4
Transition to Market Economy and Its Impact
on Food Security

In the context of Mongolia, the collapse of the socialist system brought unimaginable level of sudden changes in almost every facet of everyday life of Mongolians. More importantly, the introduction of market economy and openness in the global economy led to the beginning of a new era. The transformation of the economic system severely impacted the backbone of Mongolian economy, which was found to be deeply rooted into its livestock sector. The lopsided economic development initiative under the market economy not just ignored the rural reforms but completely devastated Mongolia's rural economy which was purely running on the pastoral livestock herding system.

Even during the Soviet-dominated socialist era for a long period of 1921 to 1991, Mongolia faced a farm collectivization process which was met with great resistance from herders. Although nomadic movements were allowed from one season pasture to another, these movements were controlled and influenced by the state authorities (Endicott 2012, 15-16; Humphrey and Sneath 1999, 39). In a study undertaken by Humphrey and Sneath (1999, 39-40) it was narrated that "The herdsman had hay and so forth provided for them, and were instructed where and when to move, so they did not choose places to pasture the livestock themselves. They worked only at the command of, and under the direction of their leaders, and they moved and worked as a group, together, when the leaders instructed". The nomadic herder, Sodnamjav explained and revealed the real story behind the collectivization system under the socialist era. He narrated the story by saying that, "... cutting and making hay, shearing sheep and taking hair from the other animals, dipping the animals, all these things the brigade or groups (5-10 ails) did together. So during this period the people had no personal initiative. They end up just following instructions and waiting to be told what to do" (Humphrey and Sneath 1999, 39-40). Many changes took place during the Soviet era in the agricultural system in the form of massive collectivization process called '*Negdel*' system. The mobility of nomadic herders was allowed during the semi-extensive pastoral production system of grazing management (Sheehy 1993, 20-26). It was found that the deep rooted principles in the traditional Mongolian livestock production system and the *Negdel* system in the Socialist period were closely associated and very much similar in many ways (Humphrey and Sneath 1999, 236). The '*Negdel*' system, the agricultural and food production system was changed to a more industrialized, and mechanized system. The nomadic herders were paid a

fixed salary, with many state-controlled social benefit schemes. But after the collapse of Soviet Union and the Mongolia's transition to Market economy, both the food and agricultural production system and the pastoral herders felt a sudden jolt. The livestock based economy of Mongolia began to loosen its hold and fell into deep agrarian crisis. Understanding Mongolia's transition to market economy is necessary for understanding the entire agricultural system's transformation, and the beginning of the agrarian crisis.

4.1 Transition to Market Economy and Transformation of Agricultural System

The transformation of agricultural system by adoption of high-cost technologies, specifically for fighting hunger seems an absurd notion. It is full of sarcasm, that on one hand we have problem of immense poverty and people can't buy food because of low purchasing power. Simultaneously, on the other hand, every time a modernist and extremely high-cost agricultural technological innovations are offered as the only option to curb the global problem of hunger and malnutrition. It can be clearly seen that, these high cost technologies are not just increasing the cost of cultivation which remains as the major cause for high food price, but have increased the food insecurity among the poor as the high food price make it more inaccessible for the people with low purchasing power.

The collapse of Soviet economy had transformed everything in Mongolia, specifically the food and agricultural system. Under the Socialist era, Mongolia attained a high level of social and economic safety network, in terms of professional health care, education, pension, child and women care, etc. it has been discovered that, during the Soviet era "these benefits and services placed Mongolia far ahead of other Third World nations such as China and India" (Goldstein and Bell 1994, 95). Not just that, the health care system was perfectly managed that most herders in remote communities can have access to it. It was examined in a study that while comparing Mongolia with United States in health care and medicine, "it is noteworthy that the herders in remote communities like Moost had access to professional health care at no cost" (Goldstein and Bell 1994, 94). But it is not the real strength of Mongolia's own economy, but the outside support from the Soviet Union to maintain high national standard for the socialist block. Mongolia, despite acquiring a nationhood at an early stage, but the weak governance and control over the state's economy still remain a

major area of concern, which slowly and steadily posing an ever increasing threat for sustaining its economy and environment (Goldstein and Beall 1994, 96; Soni 2002, 174-180; Reeves 2011, 453-454). The collapse of Soviet economy and the rise of Mongolia as a democratic state, led to an overall system change with the adoption of market economy. The process of change in Mongolia was already started with the economic disintegration of the Soviet Union in the 1980s itself (Goldstein and Beall 1994, 103). Great efforts were put for a rapid structural change which resulted in the introduction of two systems: During 1988, “a new voluntary ‘Contract System’ (*geley*) was begun and a year later a more substantial voluntary ‘lease system’ (*arrend*) was introduced” (Goldstein and Beall 1994, 103).

4.1.1 The Contract System and Agriculture

The contract system in the agriculture was introduced during 1988. A completely new system was basically designed and originally rooted in the privatization process of the agricultural system. The financial rewards offered under the central system of livestock production attracted the herders in the beginning. The herders were given a set production target and if they meet the target only then they can have their financial reward which was set at a higher level than the production level in the ‘basic’ system. This system had given the chance to the herders to manage in its own the higher target if they wanted to earn more money in cash, but with the possibilities of higher risk to achieve the target. “He (herder) had to make up the difference from his own resources if he failed to meet the higher target” (Goldstein and Beall 1994,103). Deep observation indicates that, “... the payoff for the greater risk was not that attractive” (Goldstein and Beall 1994, 104), as despite paying substantial fees for herding the total cash earning had little difference than the basic system of production. For instance, one nomad narrated that, “... fulfilled his 98% lamb target and earned 2,816 tugrik (Mongolian Currency). Had he been on the basic system and performed the same he would still have earned 2,300” (Goldstein and Beall 1994, 104).

The other constraint in the system was the way in which herder were not allowed for keeping animal produced in excess to the target production. Another aspect was, the contract system purely run on a set agreement where there was not social responsibility of the contractor and system was based on exploitative principles and not for improving the herders conditions. The contract farming in many part of the

developing world came under sharp criticism by the scholars, environmentalists, and the social scientists. The freedom of herders was completely reduced into a legal agreement, everything was guided and controlled by the contractors, yet they many time reduced the price on some or the other issues like in the case of potato farming, the size of the potatoes.

4.1.2 Lease System of livestock/Agricultural Production

In the next year, in 1989, the lease system of production was introduced. With this new system, the herding salary was wiped off completely and this was considered as a major step towards the implementation of market governed system aimed purely for increasing animal production and productivity. The animals from *Negdel* for a specified period of time – for instance, one year in 1989 and 1990, and five years in 1991 were ‘leased’ by herders after paying the *Negdel* a ‘lease fee’ for each animal. Based on their performance, the herder received the payments from the *Negdel*. Performance of herders means producing “animal products such as wool, for producing babies and for increasing the weight of the animals” (Goldstein and Beall 1994, 104).

Under the lease system, the *Negdel* no more provided herding fee, free hay, veterinary services, and transportation services as previously done under the ‘basic’ *Negdel* system. Herders have to manage and pay for every service incurred in the new agricultural system of production. One more special feature of the system was, the target production and all the animals in excess of the target could be kept by the herder apart from the total number of private animals the herders family had (Goldstein and Bell 1994, 105). It was observed in the study by Goldstein and Beall (1994, 105) that “sixteen household (12%) agreed to try this system in 1989”. These changes were designed to prepare the herders for the market economy and make the agriculture system more productive for the economy. ‘Making large profit’ became the new guiding principle under the newly adopted production system. A complete shift from the previous system which paid great concern for the herders economic and social safety in terms of health care, access to education etc.,. The nomads and nomadic livestock production system of, both were more and more parted away from their roots, from their highly flexible and mobile agricultural system to a form of

agriculture more sedentary in nature. This transition to market economy further reduced the mobility and in extreme ways, devastated the rural economy of Mongolia.

4.1.3 Market Economy in Mongolia: Beginning of New Agricultural System

After 1990 a new era began that rebuild Mongolia from the rubbles of socialist system. A new trading policy was adopted by the Soviet Union on 1 January 1991 with the nations which previously belong to the Socialist bloc. The trade which was regulated by the “COMECON (the Council for Mutual Economic Assistance) under the USSR-led communist bloc economic organization” purely organized multilateral long-term cooperative programs in the areas of transportation, food, energy, and consumer goods (Goldstein and Beall 1994, 115; Worden and Savada 1991). Mongolia, and other nations belonging to the socialist nations, earlier received immense favours and it was estimated that 94% of Mongolia’s export as well as 97% of imports were with COMECON countries, which clearly indicated the level of dependence on Socialist bloc. But with the beginning of new system, the trade began to be conducted purely based on cash economy as hard currency exposing the domestic market with high commodity price fluctuation was earlier very much relied on barter system of exchange. For Mongolia, it was really hard to bear such a sudden and catastrophic jolt to the entire system which touched almost every human and non-human life. From a trade purely sustaining on the barter-like system of exchange, specifically nomadic herder’s family just like ‘family farms’ (Chayanov 1923; Brunn 2006, 157-158) to a cash economy based system where every exchange was commoditized and had given a price in terms of hard currency, open to market fluctuations in terms of international price of the commodity, inflation, currency devaluation, etc.

Mongolia’s currency ‘tugrik’ was devalued by the government to about 300%, a huge setback for the overall economy, but the move of the government was favoured with a strong view that tugrik will recover once it got recognition as ‘internationally traded convertible currency’(Goldstein and Beall 1994, 116; Chi 2016). However, with market fluctuation and shaky economy, it became too hard to overcome the currency devaluation, and in current situation tugrik has ended up as the worst performing currency of the world (Chi 2016). Many scholars examined deeply the transition of Mongolia to a market economy, for instance Honeychurch (2010, 405) described it as

a ‘dual revolution’, which swept aside a seventy years of Soviet influence to substitute democratic political reform and a free market economic system. For Mongolia, the Western-economic development model remained purely devoted to lopsided development process, which completely remained concentrated on the urban areas, urban mind-set and urban centric single coded model of western development. In a country like Mongolia, animal husbandry remained an integral part of the nomadic culture as well as the sustainer of livelihood for many and considered as a backbone of the economy. Livestock production system basically defines the food security of the nomadic household and strengthens it against fluctuations in the economic system. It has been observed in studies that even during the Soviet era, the ‘forced collectivization campaign’ failed to achieve its goal and resulted in disastrous impact on the livestock resources (Soni 2002, 158). The infamous way of forced adoption of the collectivization process remained controversial, later the system was modified accordingly (Soni 2002, 149-150). Mongolia’s livestock sector has time to time undergone colossal changes. But the neglect of rural Mongolia, its livestock sector, its nomadic herder and its way of life – ‘nomadism’, everything altogether come up with a huge cost due to which the economy remained impacted with the market fluctuations as it was footing on a shaky, shallow and weak base. The adoption and transition to market economy failed to acknowledge the rural transformation, the role of pastoral livestock production system and nomadic herding in the nation building process. The present economic crisis in Mongolia is not a day phenomenon, but purely a result of years of neglect and devastation of rural livelihood and the rural economy. A young Mongolian respondent in her 20s, Gantogtokh– narrated that how economic burden on herders are moving them away from herding and led to a loss of traditional knowledge among the young herders. According to her “Too much economic burden is in fact a big threat to herders. For better lives they seek better education for better lives, which causes migration towards cities. That might be creating a lack of younger generations who should be learning and practicing traditional knowledge and skill.”²

As it has been noted, transition to market economy brought many changes in the system in terms of livestock sector, energy sector, mineral reserves, and mining

² Interview of Gantogtokh on 13 September, 2018, taken by this researcher and assisted by Prof. William Honeychurch (Yale University, New Haven).

sector, and the most striking feature of such changes has been the unimaginative pace of urbanization at the cost of destruction of the rural economy. After the phase of transition, slowly and steadily the Mongolian economy moved from Russian overdependence to Chinese high dependence (Soni 2002; 2005). The situation was completely different for a highly dependent livestock based economy like Mongolia. As a result, the rural economy felt abrupt changes and in the absence of financial as well as political support, the nomadic herders and those who are part of pastoral livestock production system faced immense hardship to sustain their livelihood. Mongolia was quite different than the other pastoral society, and its experience with market economy also differs in terms its much greater magnitude and abrupt pace of change. For Middle East and East Africa, the pastoralists came under the 'marginalized ethnic minorities' and not like Mongolia, where the basic identity of Mongols remained deeply connected with nomadic herding and even alive today in different forms of art and culture. Here, the pastoralists constituted the mainstream group, yet the market economy paid little attention to the needs of majority of population, surviving on pastoral livestock production system (Mearns 2004, 107; Honeychurch 2010, 407-8). It was assessed and well indicated that Mongolia faced immense economic difficulties due to the process of privatization which started during 1991 with the adoption of the Mongolian privatization law. Even the real wages halved between 1990 and 1992, and then declined by third in 1993. Because of steep decline in income, the level of poverty among its population increased. About a quarter of the population has also fallen below the line of poverty and unemployment increased rapidly (World Bank 1994, iii; Humphrey and Sneath 1999, 56).

In the year 1991, lot many reform policies had been passed and steps were taken. The price-reform bill was one of them which "doubled the salaries, pensions, bank accounts, and the price of key items such as milk and bread... also decontrolled prices for 41% of all foodstuffs and 33% of consumer goods" (Goldstein and Beall 1994, 116). It was observed that, industrial production remained disrupted and supply of heat and hot water faced many hurdles due to the frequent power failures which had standstill the economy. "Most food services were nearly empty, and many had even dismantled their shelves" (Goldstein and Beall 1994, 116). Gold and Beall (1994) did observe that the government's policies on herding sector increased the agitation among the nomads of Moost district in Mongolia. Low meat prices and extremely

high production targets were two major areas under the lease system that made them angry. The production targets had been almost doubled from 1990 than it was in the previous years. One of the herders narrated his anger saying: “We don’t understand why the government had doubled and tripled the prices of all things we have to buy but not the things we produce” (Goldstein and Beall 1994, 117). Mongolian herders faced immense hardship especially in terms of the livestock production system and the land-use change.

4.2 Flow of FDIs, Economic Globalization and Mongolian Economy

In Mongolia, since its political and economic transition to a new system based on market economy, special emphasis was given to market competition, privatization, and globalization of the economy by opening the market for international finance, commerce and trade. The FDI (Foreign Direct Investment) are seen as a major area for the economic growth for the country. In studies, it has been observed that not just in Mongolia, but in the East Asian countries also ‘FDI inflow’ has remained a prime factor for pushing industrialization, besides increasing the economic risk associated with overdependence on foreign capital. It is assessed that “East Asia – except – Japan, Korea and Taiwan – is relatively more vulnerable than OECD countries to pressure of economic globalization due to their intense need for foreign capital” (Kim 2012, 11-12). In the name of improving economic efficiency, social welfare policies in most of the developing countries remained neglected. It is also observed that in most of the countries in East Asia, wider population remained completely neglected and the social welfare programmes had covered only a small section of the population. “leaving vulnerable sections of population such as unskilled workers, and farmers outside the system” (Kim 2012,13). The farming and farmers never gained much attention and find place in the social welfare policies especially after 1990s, the phase from which began the era of economic and market efficiency and little heed paid to the plight of the herders in Mongolia.

Sudden surge in the flow of FDI, especially in the mining sector, little by little increased the dependency of Mongolia’s economy on the foreign financial assistance, and moved it away from livestock sector which was always considered as backbone of Mongolia’s economy. This increasing distance from its traditional livestock

production system, and herding and escalating fiscal deficit and ever larger scale of dependence on FDI, resulted in a standstill situation for Mongolia's economy.

Market is a huge term, well explained by Schumacher (1973, 40), a renowned economist, he explained that, "In a sense, market is the institutionalization of individualism and non-responsibility. Neither buyer nor seller is responsible for any pricing but himself". Similarly, in market economy social welfare of large population in terms of health, pension for old age, education, child and maternal care, etc.,. Market economy indeed became a game changer.

4.3 Global Governance: A New Great Game for Power Accumulation and World Market Shares

Global governance has become a means for explanation of the weak developing countries rather than strengthening them in terms of economic development. The fluctuations in the international market pricing system for necessary items like food and agricultural products, and other necessary items have made the weak developing nations highly vulnerable in terms of economic stability. The rising power of the corporate world has become a major player in terms of global governance and power relation and the world market. It is observed that 'the power shift raised fundamental questions about global governance because global governance is founded on power relations (Barnett and Duvall 2005, 39-75; Weiss and Wilkinser 2014, 207-15; Matthew 2014, 912-38). It is clear that power relation is the strong foundation on which the global governance in the form of transnational networks of giant corporate houses purely relied. These giant transnational corporate empires are built with strong support from the international organizations. These international organizations are power houses of global governance and are major players in the establishment and expansion of the trans-national corporate empires. It is an area of deep concern, especially the way in which new order of global governance and power relation is emerging. The poor and the weaker nations are threatened by such developments which forced them to abide and follow the rules set by the international organizations and with increased dependence of FDI had led them into a situation in which their overdependence on FDI and soaring financial credits from the international organizations, made them extremely weak and helpless in terms of decision making. Furthermore, ever increasing indebtedness created a vicious cycle of economic crisis

which is really hard to manage. In true sense, “international organization has been identified, as focal points through which rising and establishing powers can renegotiate the terms on which global governance takes place” (Matthew 2014, 915). It appears like a new great game is being played in terms of global market, global finance, global governance, and politically and economically weak nations. The new great game transformed a “free market economy” to a “slave economy”, highly dependent as well as financially immersed in indebtedness. It can be understood better with the following statement: “... no longer limited to inter-state state diplomacy and intergovernmental forums international organization such as the World Trade Organization (WTO), International Monetary Fund (IMF) and World Bank (WB) remain premier venues of global governance in which international rules are elaborated, decisions are made and agreements are enforced... liberalism of current order is reflected in institutional anchors such as trade liberalization rules of WTO, the commitment to capital mobility of the IMF, interventionist practices of humanitarianism, and economic policy advice favouring market coordination and privatized development...” (Matthew 2014, 915).

The new great game with a motto ‘everything is fair in the name of development’ and ‘technological improvement’ has become a tool of transformation and a way to accumulate wealth, power and ever increasing control. Keynes (1930, 501) established from his deep observation of modern economic progress and identified two major causes behind it: Firstly the ‘technological improvement’ and the ‘ability of capital to accumulate’. It was believed that unimaginative rise in the accumulation of capital, investments and the expansion of production system, dissolved the transnational boundaries and brought revolutionary change and marked the end of the simple production system (Cox 1987, 407, n7; Matthew 2014, 917). It is well established and examined that “... this induced a revolutionary change in the exercise of state power: ‘development’ became the primary means for power accumulation in the international system” (Matthew 2014, 917). This entirely changed the nature of the great game and transformed it into a ‘new great game’ established on new order primarily based on ‘world market shares’ and ‘accumulation of power’ (Matthew 2014, 917). The concept of ‘wealth’ and ‘greater economic security’ is now defined by the world market shares, and not by the value of land based resources. A new world, a new order and a much more complex and competitive economic security,

power relation and accumulation of wealth, and all relied entirely on the world market shares, not territory, or land based resources (Strange 1987, 564-565). These are strong developments which played a vital role in the overall transformation of not just a particular sector like food and agricultural, but the entire economic system on which power accumulation and political order depend.

‘Capitalism’ and ‘Corporation’ are the two most impactful words and both are highly difficult to understand. The innovation of new technologies with the assistance of the corporate world, the capital transformed into a high cost technological innovation and by selling these high cost technologies with much costlier inputs to the developing and less powerful and dependent nations. The international organizations played a great role in the expansion and dissemination of high cost technologies by designing international rules programs and economic assistance in their favour. Irrespective of requirements of a space, its environment, social and cultural as well as ethical aspects, such new technologies being promoted, favoured and are depicted as the only option for economic revival. But actually, the deeper motive remained centred around the expansion of market and ever increasing accumulation of power of both the economic as well as political, observed to be pre-requisite for the global governance.

The world market has increasingly been transformed by the transnational mode of production. Especially for food and agricultural sector, this transformation in the transnational mode of production could well be established. The significant changes are really sensitive and increasingly felt in the form of the rising agrarian unrest not just in developing and weaker nations but even in the developed world, the dairy farm crisis in European countries like United Kingdom has become increasingly evident and there is a tussle between the dairy farmers and retail outlets over the price of milk.

The transnational mode of production completely transformed the basic class structure of state and society which was earlier based on spatial relationship. But the modification under the new production system has returned the class relations which get transferred or modified in a new relations based on functionally defined class. Under this new form of transnational production system, the social and economic structures are rebuilt on an entirely new regime which emphasizes that these restructuring of “social and economic structures have tended to become more transnationally organized and interconnected” (Matthew 2014, 917-920). The

'transnational class linkages' is another important aspect of a strong global governance and empire built by the transnationals in which the production system in a country "becomes connected through the mechanisms of a world economy and linked into world systems of production" (Matthew 2014, 917-920; Cox 1987, 7). It has been assessed that "the social classes in the dominant country find allies in classes within other countries. The historic blocs underpinning particular state become connected through the mutual interests and ideological perspectives of social classes in different countries, and global classes begin to form" (Cox 1987, 7; Matthew 2014, 917-920). This is how the social classes get dissolved and transformed into global classes, or better called 'transnational classes' based on 'mutual interests' and 'ideological perspectives'. It was observed that this 'transnational class formation' began in the North Atlantic in response to Soviet threat, and fostered much of the institutional architecture of the contemporary order (Vad der Piji 1984; Matthew 2014, 917-920).

In the case of Mongolia, the flow of FDI, especially after the collapse of Soviet Union in 1990s could be noticed as an interesting feature which nurtured the transition to a new economic production system based on market economy. After 1990s the flow of international funding agencies and the flow of FDI in Mongolia, highlighted a similar trend which emerged after the collapse of Soviet Union in the global market economy. The market economy in Mongolia was completely overpowered by the flow of FDI, this overdependence in foreign investment extremely impacted the economy and its most important sector, that is, agriculture. The country is now financially indebted and facing a threat in its sovereignty and decision making power. It is assumed that, "Due to its cash shortage, Mongolia had borrowed massively and now owes dinosaur sized interest payments of a debt load of \$23bn" (Chi 2016). The year 2014 was recognized as financially one of the worst phases in the country when the national currency, tugrik plummeted to new low against the US dollar. It was remarkably noticed in studies that "Mongolia's economy had a bruising year in 2014 with barely a week passing without the currency hitting a new low against the US Dollar and foreign investment dropping by a precipitous 74 per cent year on year" (Cashell 2015). It clearly indicates the worsening financial situation and economic stability of Mongolia's economy. But this financial crisis is not a sudden phenomenon, but a prolonged dependence on foreign investments and on international organizations like World Bank (WB), International Monetary Fund (IMF), World Trade Organization

(WTO), etc. The newly demonetized country was so weak at the time of its transition to market economy that it was hardly able to make independent decision.

The rural-urban divide and a severe neglect of the agricultural sector, specifically the livestock sector, resulted in lopsided development and divided the country in rural Mongolia and urban Mongolia. The accumulation of foreign aid and other forms of international investments primarily remained devoted for the urban areas, and even among the urban areas it is the capital city, Ulaanbaatar where the development initiatives remained concentrated and western model of development was followed. It created a huge rift between the rural and urban areas, or we can say, Mongolia and Ulaanbaatar. Ulaanbaatar emerged as a 'primate city' for Mongolia, which inhabited more than 50% of the country's population. This transition to market economy slowly and steadily resulted in accumulation of wealth, attracted foreign investments, all kinds of developmental works, programs and assistance. The concentration of favourable economic opportunities, and simultaneously the total neglect of the countryside and agricultural sector, the major and the most important sector at that time, accelerated the greatest cataclysm in food and agricultural system and jolted the entire economy to the roots. The waves of unorganized migration to the capital city of Ulaanbaatar had become an important demographic, economic and social feature and with that began upheaval of rural Mongolia.

In several studies, it has been clearly assessed that the transition to market economy was full of chaos and disgrace for the nomadic community, which primarily depends on pastoral livestock production system and on the grazing lands. It was examined that, "Already by the mid-1990s a dramatic rural-urban divide was evident (Brunn and Odgaard 1996; Brunn 2006, 215). Brunn (2006, 215-217) in his renowned work on Mongolian nomadic pastoralists and transition to the market economy observed the system change and its impact on basic structure of Mongolia's economy. In his critical analysis he mentioned that, despite acute rural and urban divide, it was estimated that "merely 5% of all foreign aid was allocated to rural development during the 1990s" (Griffin 2001, 99; Brunn 2006, 215). Non-availability of the basic infrastructural facilities like transportation, communication and direct market access in the rural areas, especially for the herding community uprooted the rural economy as well as the livelihood of herding families (Honeychurch 2010, 409). Despite knowing

the fact that Mongolia primarily belonged to the nomadic herding families, whose mainstay is livestock production, these disgraceful development initiatives were unable to provide positive transformation in the rural areas. The urban economy and the urban dwellers, especially of Ulaanbaatar, the capital city of Mongolia benefited with this transition to market economy, but the real motive of these infrastructure building and transformation was not development of the society. The real motive remained centred to prepare a new market for the foreign investors and in doing so, they rebuilt the city of Ulaanbaatar as per the requirements of the financial donors and elites of the society but not for the real Mongolia and Mongolians.

We can find a deeper explanation of this lopsided, elite oriented development model, in true sense, when we re-assess it on the basis of international trends in the world market economy and its core transformer, the globalization of the economy and connecting it with global market and its commodity price fluctuations. This opening of the already weak and dependent economies to the world market and its fluctuations, made these budding economies in the developing world more vulnerable in terms of economic stability as the foreign investors primarily focus on world market while investing and not on the real needs of such weak and dependent nations. This trend of investments made them further dependent on the FDI, and this time in a more vulnerable way.

When we see the trend of the FDI in Mongolia and other Central Asian countries, after the dissolution of the Soviet Union and the termination of the centrally planned economy, it can be assessed that the investment steadily increased. Since 1992 the FDI increased from 2 USD million to 683 USD million in 2008 (UNCTAD 2017), especially in the mineral wealth of copper. It further indicates a single coded investment trend, due to which Mongolia's transition to the market economy became more vulnerable (Pomfret 2011, 146-147). This way the public policies were poorly handled and the state was "captured by a narrow elite" (Pomfret 2011, 148) and provided abundant opportunities for corruption, which was true in the case of Mongolia (Honeychurch 2010, 406). It has been observed in studies that, "From, one perspective, Mongolia today is mostly poor with a small but extremely wealthy elite, an ineffective government plagued by corruption, a dysfunctional legal system and a capital city densely packed with economic migrants from an increasingly desperate

rural sector” (Griffin 2003, 1-2; USAID 2005; Honeychurch 2010, 406). This statement clearly highlights the situation of corruption and the favouring of elites of the society by the FDI accumulation and development schemes.

The decade of 1990s remained as the major time of change in terms of political and economic upheaval. The disintegration of Soviet Union provided immense opportunity to the transnational corporations (TNCs) to expand their control over the peripheral world as the social and political situation was too weak. This encouraged the TNCs to expand more easily without much resistance. The situation was examined deeply and it was found out that, “the disintegration of the Soviet bloc made possible the division of the peripheral world among major TNCs without any real social and political difficulties. Globalization has led to laissez faire policies for the south as well as regionalization and the formation of diverse economic bloc” (Lawrence 1992, 1; Buelens 1995, 518; Dierckxsens 2000, 73). When we further go deeper into details, 1990s was marked as a sensitive time of change in terms of world market and the growing economic role of FDIs. It was assessed that during 1990s about 90% of the FDI generated from merely nine countries of the world which includes the G-7 countries – United States, Canada, Germany, France, Great Britain, Italy, and Japan. Two other developed countries are Switzerland and the Netherlands. The remaining 5% of FDI inflow came from other industrial countries and rest of the 5% had been contributed by the rest of the world (ILO 1993, 293; Dierckxsens 2000, 64-65).

This globalization of market economy, flow of FDIs and the growth of TNC’s, all are interlinked, and the overpowering of individual interests over the citizen’s welfare resulted into an unregulated market economy squarely impacting the entire economic system. The highly fluctuating prices in the international markets make the local economic system more fragile, with the private interest and ever increasing control of giant corporate houses contributing greatly to the cause. This has clearly increased the unregulated anomalies in the market economy and disconnected it from the ‘common good’, with the private interests overpowering and governing the world market economy. This emerged as the core feature of the unregulated market economy. The “common good” is defined as “the person or group comprising a society have interests that cannot be reduced to the sum of individual interest” (Engelhard 1996, 459; Dierckxsens 2000, 16).

It is unfortunate that market economy is blamed for every mishaps or overpower of the private interest based governance, but it is the invisible power, or ‘invisible hands’ which allow the ‘common good’, or common interest of welfare to get transformed into the private or individual interest. This is not the weakness of the market economy, but its functioning and the role of ‘invisible hand’ working in the favour of private interest. Market forces are moulded from the ‘common goods’ to the ‘private good individual good’. It is actually the way in which it is used; it is the malfunctioning of the market economy which is to be held responsible and not the market economy itself. Market economy can be directed towards the function of common or public good with the help of economic regulations imposed by the government, but in the case of weak nation and soft government regulations, it in a way favours private interests (Dierckxsens 2000, 16).

The political and corporate nexus is a reality and corruption gives it a favourable atmosphere to direct the market economy to drift away into a direction where public good is side-lined for the private interests and favours corporate empire building. Almost similar situation was faced by Mongolia after the 1990s. The unprecedented level of corruption and the weak governance together greatly impacted the newly adopted market economic system and even after the massive flow of FDIs, the weak and corrupt governance failed to yield productive results for the public good and divided the country into rich Mongolia and poor Mongolia. It was examined that, “directing the economy in function of the common good necessarily entails economic regulation where private interests are mediated by the interests of all citizens, but in case of contradiction are subordinate to them. Democratic political management is essential to any such regulation” (Dierckxsens 2000, 16).

It has further been assessed that the situation can worsen in the case of ‘extreme neo-liberal economies’, it is narrated that

“ . . . when private interests and laws of the market are taken to such extremes that they oppose citizens and even threaten profits – efficiency itself – we can speak of the common bad. Not even capital can find a way out of this situation. This is precisely what occurs in extreme neoliberal economies” (Dierckxsens 2000, 22).

In today’s world scenario, the predicted situation was depicted with the ever increasing liberalization and expansion of TNCs and has truly acquired a powerful economic position and has built their “borderless sovereign private states”

(Dierckxsens 2000, 111). It is very well examined that, “privatization does not produce economic growth or social well-being, but it does promote the concentration of wealth in the hands of fewer transnational corporations... Transnational Companies are becoming planetary consortia without geographical border and area gaining increasing power over nation-states, imposing their own interests and thus establishing hegemony... These new sovereign ‘private states’ are not held accountable for anything to anyone. They are ‘private states without citizens’ with the power to subordinate numerous national states” (Dierckxsens 2000, 111). This is how new market economy and its relations are entangled with diverse set of issues and have multiple facets which are highly complicated to understand.

Similarly, Mongolia’s transition to market economy was not a simple transformation of the economic order or economic production system, but had multiple facets attached to it that are unfolding its basic character in the present scenario when world is facing global financial and economic crisis. Although Mongolia remained as a distant and politically aloof nation which hardly found much space in stereotype notion of Asian country, where empty land still lies unexplored and its untouched, pristine natural beauty and world heritage of nomadic culture are few of the rarest assets of this world hardly found anywhere as in the rest of the world. In a way, it is a great advantage for Mongolia that it needs further exploration and discoveries, as required for the ancient historical and cultural sites of the world.

4.4 Land-Use Change and Its Impact on Herding Families: An Unsustainable Rural Transformation

Land is considered as the vital natural resource which sustained the survival of its inhabitants. There are numerous aspects associated with the land vital for mankind: Land as capital, Land-use and Land cover, ownership of land, Land utilization, Land’s capacity, Land suitability, etc. There are many facets and in its every facet, land is vital for the mankind.

In Mongolia, land means grassland on which the entire nomadic civilization flourished over the ages. Mongolia is a vast land, and it experiences a purely continental type of climate characterized by weather extremes. Mongolia is primarily dependent on its land resources, whether it is grassland, or the huge mineral wealth

embedded in the land, it constitutes the mainstay of the life and livelihood of Mongols. The Mongols and Mongolia had seen numerous phases and their relations with their native land remain intricately interlaced with their everyday life, their culture and customs. Even in modern Mongolia this relation between the herdsmen and their land remained intensely interconnected but the essence of the relation had undergone colossal changes.

The Mongolian People's Republic territory was better known as 'Outer Mongolia' before the First World War period (Montagu 1956, 9). And Inner Mongolia which comprise of Chahar, Jehol, Suiyuan and Ninghsia, and is called Inner Mongolia Autonomous Region of the People's Republic of China and is inhabited by Mongolians, the largest Mongolian community in China (Montagu 1956, 9). Land use in Mongolia had undergone change with different phases of political, economic and cultural changes in the past. There are important studies by scholars in the field of land use changes in Mongolia, like land-use model by Simukov (1935), Fernandez-Gimenez's (1999) geographical history of pastoral land use in Mongolia, Humprey and Sneath (1999), land-use and significance of high mobility of the nomadic herders, Endicott's (2012) 'A History of Land Use in Mongolia', etc. are few of the major works in assessing the land use change in Mongolia. With these studies, history of land-use in Mongolia can be divided into different political and economic phases. It can also be classified based on its unique characteristics like mobility and seasonal shifts, frequency of movements, altitude, climate and weather extremes, etc. The land-use change can be classified under following phases:

- i. Traditional Pastoral Livestock Production System
- ii. Socialist Collective Farming in the form of *Negdel* System
- iii. Market Economy and Privatisation of livestock and no regulation concerning land use.

Table 4.1: Land-use in Mongolia

Periods	Forms of herding	Pastoral land use
Tribal Organization from the 11 th to 12 th centuries	“ <i>Churee</i> ”: large communal herds of tribes	Communal utilization of tribal land
Outer Mongolia (Manchurian – Chinese dominance) in 17 th -19 th centuries	“ <i>Chotajl</i> ”: smaller herds in comparison to the tribal ones, managed by dependents of the Nobility.	Partition of Mongolia into <i>chosnn</i> . Control by Princes
Mongolian People’s republic after the stockbreeding economy 1960-1990	“ <i>Suur</i> ”: large-scale co-operative herds	State owned land is leased to co-operatives for utilization in the so-called sum-territories
Market economy – Oriented Mongolia around 1994	Small private herds	No regulations concerning pastoral land use.

(Source: Muller and Bold 1996, 30)

This table provides an overall situation of grazing land use changes in Mongolia during different time periods, clearly rendering the history of land use and different forms of herding. This research study mainly focuses on the land use change after the collapse of Soviet Union and Mongolia’s silent and abrupt transition to the market economy. After 1990s, pastoral land use in Mongolia transformed abruptly and as a consequence resulted in degradation of the land.

4.4.1 Unsustainable Rural Transformation and Imbalance in the Herds Composition: Abrupt Phase of Transition

As already explained previously after 1990s, Mongolian economy underwent a process which “transformed its command economy with policies of deregulation, privatization and market liberalization, while simultaneously introducing political democratisation” (Spoor 1996, 615). The situation of crisis seriously impacted the economy and defined as “dual revolution” (Honeychurch 2010, 405) and “turmoil of economic and political reforms” (Spoor 1996, 615), which could be clearly seen in the form of fall in the Gross domestic production (GDP), and the energy sector faced a new shut-down condition which gravely impacted the production system. From 1990 to 1993 the GDP decreased drastically, and contracted in total by 25.2% (World Bank 1992; 1994; UNDP 1995; Spoor 1996, 615). The inflation level was surprisingly high

and jumped to 154.3% in 1991 to 321.1% per annum in 1992, in 1993 the inflation level decreased to 183.0% per annum. In 1994, the situation improved to an inflation level of 66.3% per annum, far better than the previous year's situation (World Bank 1992; 1994; UNDP 1995; Spoor 1996, 615).

The most critical impact on land-use was the privatization of state-owned *Negdel*, a form of farm-collectives for the livestock production. Privatization was believed to be the only option which for a short-period of time favoured the urban to rural migration, as many lost their jobs. On the other hand, distribution of livestock to the herders transformed even the non-herding population to herders, who migrated to the rural areas. As a result, the number of herders increased steeply, while the number of livestock per herder decreased, which means the fall in the productivity of herders. This lopsided development process and use of privatization as the only tool for development immensely damaged the delicate relation of herders with their grazing land. The carrying capacity of the grazing land trespassed and the herd-composition also get altered. The cash economy and high price of cashmere in the international market resulted in swelling of goat population, which altered the herd composition and resulted in overgrazing and overexploitation of fragile grassland which was considered as one of the major cause for fuelling the desertification process and degradation of world's most pristine grasslands.

In studies it was observed that, Mongolia's transition to market economy immensely contributed in goat population increase in the herd-composition mainly because of high economic value of cashmere in the international market. It was found that that, "there is a direct correlation between the transition to a market economy and the steep increase in the number of goats compared to the other four main kind of livestock in Mongolia" (Maekawa 2013, 233). This has led to severe degradation of the grasslands, which intensely impacted the Mongolia's delicate grasslands. The 'five animal concept' was undervalued and cashmere production was seen as a prime source of earning cash income. Due to the transition from the socialist system to the market economy, the cash supply system collapsed and was completely abandoned. In the socialist era, the monthly cash income of herders had remained their major source of assured monthly income. Herders again became dependent on small scale subsistence level of herding with no surety of assured monthly flow of income

(Maekawa 2013, 235). For pastoralists, transition to market economy was a turning point, they not just lost their monthly flow of assured income, but privatization of livestock and increased distance from the market with underdeveloped rural transport networks, further deteriorated the economic condition of the herders and immensely stressed their livelihoods. It was observed that the economic gap between the rich and the poor herders increased sharply, and especially for the poor herders, the dependence on cashmere became highly sensitive.

Maekawa (2013, 236) examined in his research study that, “the most significant change to ordinary herders lives caused by the transition, was the loss of a regular, guaranteed cash salary”. He further assessed the economic transition and its impact on herders and explained “the behaviour of herders, such as internal migration patterns, the fluctuation proportion of livestock, their acute dependence on cashmere”(Maekawa 2013, 236). The cashmere dependence and the exponential increase in the goat population, specifically after the transition to market economy, is now identified as one of the major cause for the degradation and over exploitation of the world’s most pristine grassland, the Steppe.

Every piece of land is of immense value, but unawareness of the land potentialities led to underuse, overuse or misuse it and end up in deterioration of the most valuable gift of nature available to us in the form of land. The multiplicity of the land use makes it more difficult in assessing the optimal use of a piece of land. Hence, maintaining the sustainability of land, it became extremely important to assess land suitability for a particular land use and its requirements. Land is limited and fertile land is a blessing, as it is not just limited but also prone to environmental degradation if not used sustainably. In Mongolia, it is because of ages of healthy land use practices in the form of traditional pastoral livestock production system in different forms like the five animal concept, the *Otor* movement system, etc.,. Time to time the land use in Mongolia had undergone structural changes, but it is only after the transition to market economy that brought deep rooted change in the land use which catalyses desertification process at a much faster pace.

It has been assessed that the change of land use from feudal system in which monasteries acted as economic institution to the pastoral system in which a large herd is kept so that yield could be maximized, resembled the collectivization system,

because of which the changes in land use in the socialist period not much impacted the overall scheme of pastoral system of livestock production. Renowned academicians, Humprey and Sneath (1999, 226) also observed in their studies, that “The monastery was indeed, in this sense, an economic institution, in that it sought to maximize the yield on its investment of livestock...”. With deep introspect in the present and the previous pastoral system it was discovered that,

“In some respect the change from a ‘feudal’ to collective organizational form was a less radical change than the one currently underway, government attempts the transition to a market economy. In both ‘feudal’ and collective periods there were centralized, commandist politico-economic units that regulated residence, the use of pasture, and extracted a surplus through rights to livestock. (Indeed in many cases there centres were in the same physical locations in the two periods) . . . Like the feudal lords and the monasteries before them, the collectives organized movement, single-species herds, and allocated pasture” (Humphrey and Senath 1999, 230).

It was even identified that the word *album mal* meaning - ‘official’ or ‘duty animals’, used for collective or state animals was the term basically found its origin from the term ‘*alba*’ (the feudal obligation owned by pre-revolutionary subjects to their lord) which clearly indicates that the change was not much in the case of basic structure of the livestock production system. The major difference was not seen as production structure but in terms of political power-shift, from feudal lords to the state controlled system.

But after 1990s the transition to a market economy completely altered the fundamental production structure on which pastoral system was surviving. The transformation of the pastoral livestock production system immensely impacted the land use that greatly contributed in aggravating the land degradation process and desertification. In studies, it is also observed that privatization of herd of the agricultural co-operatives was believed to be the major step and was identified as one of the vital economic measure since 1990 (Muller and Bold 1996, 29). It was during November 1993 that regulation on the pastoral land use was passed which was named as the ‘Land use law of Mongolia’.

4.4.2 Exceeding Carrying Capacity and Grazing Land Degradation: A Threat to Household Food Security

The need for a new land use law was felt soon after 1991. The outline of the land use law was there in the mind but it was only in 1994 that the Mongolian government

submitted it before the *Great Hural* (the parliament) (Spoor 1996, 622). The increasing pressure on the fragile grassland with the privatization of collective farms further sensitized the land issue. The extensive livestock sector and simultaneously the issue of the degradation of common grazing land immensely complicated the land issue. Although land remained as the State property but many studies suggested for legislation of private ownership, a general and most favoured solution for managing the common property resources. The major reason behind the pastureland degradation is identified as the overexploitation of common property by the local community in their greed to increase economic profit. The situation was identified as ‘tragedy of Commons’ by Hardin, as he believed that, a pasture ‘open to all’ get exploited for the individual interest of increasing economic benefit, by adding more and more animals in their herd (Hardin 1968; Ykhanbai and Bulgan 2006, 110).

In Mongolia, it was economical that the ownership of a grazing land was not of any individual or open access, but historically it acted as common property for a group of people (Ostrom 1990; Ykhanbai and Bulgan 2006, 110). In studies, it was argued that open access and common property resources are very different in terms of land ownership and land use. It is stated that “common property resources exist where one person’s use subtracts from another’s use, and where it is often necessary, albeit difficult and costly, to exclude other users outside the group from using the resource” (McCay 1999; Ostrom 1990; Ykhanbai and Bulgam 2006, 110).

Whereas in case of open-access to the grazing land, it has been identified as a situation in which “everybody’s property is potentially nobody’s concern” (Ykhansai and Bulgam 2006, 110) and with this very notion an exploitative thought emerges. But the situation is quite different on ground, and it is found that in Mongolian nomadic community and in many indigenous communities and institutions or groups, traditional practices and use of land helped to maintain the sustainability of the land and land resources for centuries (Ostrom 1990; Humphrey and Sneath 1999; Ykhansai and Bulgam 2006, 110). After the end of the *negdal* organization (collectivization) in agriculture and privatization of *negdel* farms into private firms soon faced the economic crisis and became bankrupt by 1995 (Muller and Bold 1997, 38).

Although new system of market economy was adopted with rush, but in the absence of basic amenities like sound infrastructure for breeding of livestock, absence of

connectivity to the market for the sale of agricultural products, and supply chain infrastructure, all together created a situation of ‘structural chaos’, as described by Mearns (Mearns 1996; Mullar and Bold 1996, 38). The agricultural system started failing with this system collapse and greatly reduced the availability of food that immensely impacted the food security (Goldstein and Beall 1994, 115-117; Spoor 1996, 618-624).

More surprisingly, despite the failing rural infrastructure and decreased food availability, the privatization and distribution of *negdel* animals resulted into a flow of urban to rural migration. In unsustainable and failing economic structure, sudden loss of employment created an army of unskilled labour and even the non-herder population got absorbed as herders. This was the major turning point, where newly emerged brigade of unskilled herders with their ignorance exploited the highly delicate Mongolian grassland unsustainably and immensely increased the pressure on land and exceeded the carrying capacity by adopting less mobile and sedentary pastoral system. This could possibly be termed as one of the major blows which immensely jeopardized the fate of herders, herding and grasslands in Mongolia.

The market economy played a huge role in this (Buchanan 1985), as it allowed the herding population to survive on their own. In a highly volatile market condition, adding more and more livestock to the delicate grassland not by a few, but by those facing extreme poverty and hardship to survive them. It resulted into unregulated pastoral land use and threatens the carrying capacity of the pastures. One more striking feature in the rural Mongolia was the ownership of animals, as the animals of the *negdel* was distributed not just to its members but to almost every rural household who had not even been members of it (Mullen and Bold 1996, 39). The herd-composition got altered and a large share of herders’ population emerged as the one having small animal stock. It was estimated that, around “71.2 percent of the animal owners had less than one hundred head of cattle, an order of magnitude tradition regarded as the minimum stock for family subsistence” (Mullar and Bold 1996, 39-40).

It has further been observed that while comparing 1989 and 1994, the number of animal owners increased exponentially about 2.8 times higher than before whereas the number of animals bred by per herder sharply decreased by 61% during the similar

period, which bluntly indicates towards a steep decline in the labour productivity of the herding population (Mullar and Bold 1996, 40). This brought double whammy for the herder. It not just reduced labour productivity of herders, but also made them economically more vulnerable to extreme weather events and land degradation. It sharply impacted the household food security and posed a threat to the maintaining of grazing land. Land use is possibly seen as one of the major factors in terms of agricultural sustainability and food security in Mongolia. A detailed overview of the land use is going to be explored in the next chapter for understanding the deeper aspect attached to the maintenance of agricultural sustainability.

The unethical rural transformation, lack of infrastructure and incomplete integration local markets with the national agricultural markets, especially located in urban centres, increased the problem of rural poverty manifold. In another study, it was estimated that in 1992 as many as 59 percent of rural families had less than 50 animals, which was demarcated as the poverty line for a livestock producer. It was found that most of the private herds are less than 100 head of livestock. Whereas for 19 per cent of livestock producers, the number of animals estimated to be less than 10 animals, which was equated with the situation of extreme poverty (UNDP 1994, 78; Spoor 1996, 621). It has also been revealed that rural infrastructure development with a well-integrated chain of rural regions producing agricultural products are believed to be the vital areas in sustainable rural transformation (Bruntrup 2016, 18). Rural sector in the absence of infrastructural development and proper regulating authorities is blamed for the major cause behind a collapsing economic system. But every time assessing the whole picture based on lack of rural infrastructure, collapsing transporting facilities and integrated national agricultural market system is not going to solve the purpose. They are definitely important issues but core of the matter lies in the uprooting of the livestock based economic system and even after transition to new economic order of market economy, the livestock sector has remained completely less important in terms of economic priorities for boosting the Mongolian economy.

The mining sector has emerged as one of the prime sectors for the economy, attracting huge sum of FDI from the developed world and from every corner of the world (Soni 2015, 37-52). But it can well be established that livestock sector never became an economic priority of the government and is left on the vagaries of highly fluctuating

market system. The most important feature of food security situation in Mongolia is the immense availability of animal protein even to the poorest of the poor herders. But the things have changed now, and the massive degradation and desertification of grazing land, absence of mobile herding practices, concentration of a large portion of population in and around Ulaanbaatar and *Ger* city, lack of interconnect and integration of rural Mongolia to the urban Mongolia, the missing chains of local rural markets and its link to the urban market chains, all together are increasing concerns for maintaining sustainability of food and agricultural system. It also relates to assuring the food security, especially for the herding families, who are not just displaced from rural areas but dissociated and alienated with their century old profession of herding as they fail to estimate the fluctuations in the volatile international economic environment and has completely been uprooted from their traditional roots in the name of development.

Rural transformation is not an immediate phenomenon and neither could it be achieved simply by ensuring its connectivity to the urban market. It needs an institutional rebuilding for its own sustenance and not just for meeting the deadlines of demand and supply for the urban and international markets. The non-agricultural sector should also be given priority for strengthening the rural areas and maintaining the carrying capacity of the pasture land with allowing mobility for the seasonal pastures and the revival of traditional agricultural knowledge and healthy practices.

4.5 Cashmere, Cash and Market Fluctuations: High Dependence of Herders on Cash Economy

The transition to new economic order made deep rooted changes in the agricultural system of Mongolia with increased dependence on global market and commodity pricing. In essence, Mongolia's high dependence on cash economy and fluctuating global market commodity prices, severely impacted the poor rural herding community especially cashmere herders. It is observed in several studies that "the situation for cashmere herders is extremely difficult nowadays and even worsened in many areas of the country" (Lutzke 2007, 5). The severe economic crisis gripped Mongolia after 1991 and most of those people who became unemployed and poverty stricken, left the urban areas and returned to the countryside only to get absorbed as unskilled herders with earning a livelihood mainly on subsistence level of herding.

The dismantling of farm collectives, loss of government employments and the collapse of assured monthly cash salary system left nothing in the hands of herders. With no assured supply of cash income, small herders altered their herd-composition as per the requirements of the international market high demand for cashmere, mainly to earn cash for their life and livelihood. As a result, the population of goat increased exponentially, from 5 million goat population in 1990 it surged to more than 11 million in 1998. In terms of share of goats in the total livestock production, it increased to 20 % during the 1990 to more than double, that was 44 % in 2005 (Lutzke 2007, 8-9). This noticeably indicates a strong impact of international market demand and highly globalized market economy, particularly on poor herder's sudden shift of preference for the goats in their herd. It is mainly because of high economic value of cashmere in the international market, which could possibly maximize the herders cash income.

In a research study it has clearly been observed that “the most significant change to ordinary herders lives caused by the transition was the loss of a regular, guaranteed cash salary” (Maekawa 2013, 236). He identified the behavioural change in the herders primarily in three important ways due to the economic transition which includes: Firstly, the internal migration patterns, secondly, the fluctuating proportions of livestock, and lastly, the acute dependence of specifically small herders on cashmere (Maekawa 2013, 236).

It was examined that the herders can earn “ 25 times larger cash income per year (approximately) by breeding one goat, compared to having one sheep, unless they slaughter the animal” (Maekawa 2013, 238). But recently, cashmere herders are facing acute crisis due to the high price fluctuation in cashmere. The fluctuation in the international price and the global economic crisis which began in 2008, together increased the sensitivity economic environment prone to risks. This resulted in double jeopardy for the poor herders, with low cash in their hand, high food price and the degradation of pastureland, altogether increased the food insecurity with almost no or little cash in their hand.

The overdependence on the market based livestock production severely impacted the food security, especially of the small herd owners. With this it is hypothesize that, “food insecurity in Mongolia has led to a dependence on cash economy to access

food”. The size of herd purely reflects the herder’s preference, and mainly poorer herders for goats, as they sell cashmere without decreasing their herd-size. In 2003, for the first time in the history of Mongolian plateau the goat population outnumbered the the sheep population. It is noticeably viewed as a threat for the sustainability of the delicate grassland ecosystem of Mongolia (Maekawa 2013, 240-241). It is clearly indicated from the study that, in the current scenario, “obtaining cash by selling cashmere is a choice for people who wish to avoid reducing the number of livestock they possess. Cashmere sales do not decrease the size of herds until herders decide to slaughter or sell, or the goat die of natural causes” (Maekawa 2013, 240). But price instability of the cashmere products for the period 2008-2009, also happen to be a period of global financial crisis, exposed the herd based economy to financially more vulnerable position, specifically impacting the poorer herders.

Food security of the poorer population immensely stressed with low purchasing power and limited cash in their hands. The government initiatives taken for solving such a grave level of problem by finding alternative ways to escape from this vulnerable financial environment is really crucial and could be decisive in maintaining the food security of the poor in the country.

4.6 Summary

The observation has been made on some of the sensitive issues concerning the transition of Mongolia to a new system based on market economy. The fall of the Soviet era in Mongolia led to abrupt changes in almost every sector of the economy as well as everyday life. But it is the agricultural sector which remained an area of huge economic turmoil. The sudden shift from command economy to market economy, scrapping of government support to the agricultural sector, the fixed herder’s income, as well as pension and all social security schemes resulted in a situation of agrarian crisis and the industry entirely collapsed in the absence of effective measures.

The agricultural system transformation under the market economy led to a situation of confusion and distress among the people associated with the agricultural sector. The improper dissemination of the modern technologies and the lopsided development between the urban and rural sector obstructed the growth in the not just the agriculture sector but impacted the overall Mongolian economy. Every facet of the agricultural

system transformation was touched, beginning with the lease system to the contract system of production in the livestock sector, all were experimented to rebuild the agricultural sector with privatization at the core within the market economy. The dismantling of previous infrastructure for dairy industries, market chains, as well as the transport sector, all together created an atmosphere of scepticism and distress in the agricultural sector which gravely impacted the production system, and led to a drastic fall from self-sufficiency to the high dependence on imported foods even for the daily consumption.

The mining sector, however, outshined the other sectors in the economy and made a mark with boosting the economic growth. The flows of FDIs have also led to the mining boom, but the very short lived economic growth resulted in Mongolia's overdependence on foreign financial assistance. The soft environmental laws, high level of corruption forming nexus between political and economic sectors, as well as Mongolia's existence as a weak or immature nation, resulted in colossal impact on the economy.

The devaluation of Mongolian currency 'Tugrik' in the recent past, has earned a new name for Mongolian currency, 'the worst performing currency of the world' in the year 2016. It reflects the impact of sudden transition to the market economy, and how exposure to the international market resulted in high fluctuation in the food prices, which made the poor and the marginalized section much more vulnerable and food insecure. The short lived economic growth model has remained a sensitive area of examination, though revival of the pastoral production system is seen as the only and the best possible solution to revive and resurrect the incubating economy.

Chapter 5
**Pastoral Livestock Production and Food
Security**

Food security is a much talked about word, especially in today's context of rapidly transforming food and agriculture systems. The concept of food security primarily remained deeply associated with the increasing agricultural production and availability of food, and less and less about food accessibility and food justice. It can possibly be achieved by increasing the agricultural production which can cure the problem of hunger and malnutrition, and completely eradicate food insecurity for some projected year in the future. Ironically, not by making our food distribution system more justifiable, affordable and accessible for those with low purchasing power, but by innovation and adoption of more advanced high-cost technologies. In reality, food cannot be secured for long, as it is a perishable good. It has life and the moment we pluck it from fields, it starts degrading and its nutritional qualities get reduced every moment. It is the use of heavy doses of chemicals in the form of preservatives and storage facilities, like deep freezing, we manage to give it a longer shelf life. In essence, you cannot secure food as it is full of life, you cannot guard it or put heavy security on it, you can only distribute it to more and more people, and you can increase the accessibility of food for every section of society and even for the non-human world. When we don't share it, don't distribute and keep it guarded inside the food stores, it becomes lifeless; we can only secure the lifeless food and feed it with chemicals in the form of preservatives, just like a human body is preserved in mortuary or in a mausoleum.

Food represents a culture and acquires it from its local natural space, its innate bonding with every sphere of its local geographical space, which includes both the human and the non-human contents of environment. Food represents life, and flourishes in its local and cultural space and attains uniqueness, preserved in the form of its 'localness'. It represents a diverse facet of food, which is a reflection of its agricultural systems, and maintaining this 'localness' of food and agricultural systems, is a necessity for the sustenance and survival of the future of both the human and the non-human world. Just like every human being is different from each other, for instance in terms of its level of consciousness, physical characteristics, mental awakening, similarly, food also is a product of its local agricultural system which differs in its taste, nutritional values, colour, shape, size and its aroma. And when we destroy these local food and agricultural landscapes, what would be left with us? For all the believers and the non-believers in God, it is food which connects us all and is

the only god known and visible to us. When food is god, then sustaining the food and agricultural system is our religion and should be strictly followed. In Vedas, “*anna* is considered as *Brahma*”, meaning food is the supreme form of god, which can only be understood by immersing deeply and acquiring the knowledge. The true form of knowledge embedded in the food, takes us from folly to the state of wisdom, from self to selflessness, from form to formlessness, and from food to the inner soul. It is well indicated in famous sayings that “we become what we eat”. It is a deep thoughtful process, and with true knowledge, everything and every existence in the natural world becomes simpler to understand without losing its complexities.

Mongolian pastoral livestock production system always fascinated the environment lovers. The way the traditional Mongolian pastoral system managed the delicate grassland was outstanding and is an area of study for the environmental experts. The nomadic pastoral livestock production system was one the ancient traditional agricultural knowledge system remaining in the world today which managed to develop a healthy relation with its fragile and sensitive local environment. Mongolia is the heavenly place where the nature is in indigenous form and the grassland of Steppe’s is still remaining in healthy state, but in the ultra-modern and super-fast world where in the name of development, the environment always falls under the category of second preference, it has become really hard to sustain such a pristine state of the grassland ecosystem. The nomads of Mongolia worked as the manager, warriors and the saviour of the exquisite Mongolian environment, but with the booming economic growth with the mining sector, and the alarming pace of the urbanisation in the recent past, the nomads and nomadic livelihood is facing the state of double jeopardy, in terms of loss of livelihood and food insecurity.

5.1 Nomadic Pastoralism: A Way of Life and Identity

With the rapid pace of transformation of local food and agricultural systems, globally the indigenous traditional agricultural knowledge and practices eroded at an unimaginative pace and space. Nomadic pastoralism has never been given central stage in formulating the history of mankind as well as the history of agriculture. Nomadic pastoralism has every time remained associated merely as a disorganized economic activity, where by people survive by wandering places to places in search of food and water.

There is no scientific explanation available for nomads and nomadism, but when we go deep to observe the embedded idea behind every nomadic movement, its frequency as well as the level of mobility, we find that it is none other than the ultimate nature and science, both of them remain intact. They can be magnificently understood, maintained and managed by keeping all aspect of economic, social, cultural and environmental sustainability alive, intact and innately embedded and entrenched in the localness of the space and time. Nomadism, is not wandering without a purpose or an obsolete activity, but an ultimate understanding and adjustment with the sensitivity of the environment, without which it would be impossible to sustain a highly fragile and sensitive ecotone region of the vast grasslands of Mongolian plateau.

Worldwide the local food and agricultural systems are forced to give way to the global food and agricultural system. It has not just eroded the traditional food and agricultural knowledge, but also transformed the entire system into a more and more uniform and concentrated system which is now considered as highly lethal for the survival of food and agricultural system and seen as a threat to maintain food security globally. This resulted in a loss of such a grave magnitude that the scientists have started looking up for traditional knowledge and practices to find solution to sustain the future of mankind. The perspective has completely changed as the activities which was never given importance or considered obsolete and downgraded before the highly modernist agricultural technologies, and are now re-assessed as an asset in dealing with the obstacles put forward by climate change, extreme weather events and other environmental vulnerabilities of the survival system. But unfortunately these traditional knowledge and practices are still not treated as an effective measure and have long remained dormant and become not more than a piece of antique which is valued only when it is dead.

Fernandez-Gimenez et al. (2017, 46-69) with their in-depth study defined nomadic culture and the relevance of traditional ecological knowledge of the Mongolian herders by giving them a sense of identity, a feeling of belonging. The culture is defined “as a set of shared meaning, worldview, rituals, symbols, values, knowledge practices associated material artifacts, created and transmitted by specific group of people over multiple generation” (Adger et. al. 2012; Fernandez-Gimenez et al. 2017, 46-47). It is observed that, “these shared meanings, values and practices, etc. gives

rise to a sense of identity associated with membership in a cultural group with place, and condition responses to change” (Kirsch 2001; Adger et al. 2012; Fernandez-Gimenez et al. 2017, 47-48).

Similarly, in the case of traditional ecological knowledge and practices specific to ‘particular people’ and ‘place’, gives the people of a community of any place a sense of belonging, which gives an ‘identity’ to its people as well as its local space. All are integrated part of one system, and are deeply connected to each other.

5.2 Nomadic Knowledge and Knowledge System

Every knowledge system carries deep imprint of its local natural space, and therefore differs with the knowledge system and is unique. But it is unfortunate that every knowledge system has to pass the test of modernity and they are compared and assessed on similar parameters as set for the and by the western knowledge system. Modernization is a concept which in itself dealing with introspects and question for its origin and applicability even in the western world, like European countries, which were thought to be place of origin for the concept of ‘modernization’. Modernization is an idea, and ideal or normative state which was considered best for the humanity. But with time it was observed that blindly following the concept of Modernization put the very existence of the mankind at stakes by the massive exploitation of the environment and its natural entities (Devy 2006, 95). Now in the ‘age of market’ and the ultra-modern era, many expert bodies on the issue of development are voicing for slowing the pace of development and started praising the traditional knowledge systems and practices for its deeply embedded concept of environmental sustainability.

Similarly, nomads have their own knowledge system and practices and they are fully self-reliant, ready to solve the puzzles that nature put before them with which they started gaining deeper experience and developed a knowledge system based on their own experiences and understanding. The Nomadic knowledge system was purely based on a healthy relationship with their exquisite and truly divine local space and without disturbing the state of equilibrium. It is a true form of experimental science which was gained from ages of trial and error based experience and deeper insight. The knowledge system not just sustained their livelihood but also maintained a deep

connection with ‘nature’s law’ of mutual inter-dependence. It has been observed that ‘Banjara community’, which is a nomadic community in India, has a “. . . very good understanding of space and direction” (Devy 2006, 99). Adivasi scholar, Amerem Rathod also observed that, “The Gaud – Banjara have a spoken language. It constitutes their self-awareness of their knowledge systems. They do not want their knowledge to go out from their community and be misused, because for them, knowledge is God” (Devy 2006, 99).

The knowledge system is well established among the nomads, Adivasi and other tribal groups, but often the form of knowledge is not recognized by the mainstream society, specifically the urban society based on the modernist education system. One more obstacle observed in these studies is also the strong belief of the nomadic communities that not to disclose or spread the Adivasi’ or the nomads’ knowledge. It is indicated that “their (Banjara community) entire system of society, family or kinship, based on the notion of *nayak* or shaman. So the spread of their knowledge is possible only if the leader or shaman agrees, otherwise not” (Devy 2006, 99). Their art, their culture and their traditions and rituals, all are based on nomadic knowledge systems but everybody cannot understand their symbolic knowledge systems. If we wish to really communicate with the nomadic knowledge systems prevailing in different parts of the world, it can be deeply observed in their way of life – for instance, ‘*ger*’ in Mongolia; the way they prepare and process their food; their flexible seasonal and altitudinal mobility – everything says something about their deep knowledge system gained through their local natural space. It was observed in studies that nomads have a superior level of ‘code of moral’ where there is no exploitation of nature or humans, little inequality, or gender discrimination, and where there is abundant love for the non-human world, it may appear that the *adivasis* know more than the non-*adivasis* (Devy2006, 95).

Mongolian plateau and Mongol period of the 13th and 14th century, the knowledge system flourished with the system of grants/appanages (*ayimaq*) and the promotion of east-west exchange of people, goods and information at an unprecedented scale and with unprecedented frequency in all direction by land and by sea. It was observed that, “the system of appanages (*ayimaq*) was an important institution that underpinned east-west exchange during Mongol period” (Noriko 2016, 24). With the medium of

these grants/appanages, talented and best scholars interacted with various aspects of daily life of the people around “to their tent palaces (*ordo*) on the Mongolian plateau” which resulted “in the emergence of venues for pitching for pitching the “knowledge” of one region against that of another, thereby promoting the fusion, vitalization, and rapid advancement of all kinds of scholarship and technology” (Noriko 2016, 24-25). The ‘knowledge’ have includes the fields of medicine, astronomy, agriculture, mathematics, pharmacology etc. The value of accumulation of the traditional knowledge, which is lacking even in the current ultra-modern system, had remained as a major policy during the Chinggis Qan and was continued by his successors. Chinggis Qan’s policy of protecting religious sects, guaranteed livelihood, tax exemptions and favors to the descendants of Confucius, Muhammed, Buddhist, Christian, and repairing and construction of schools attached to religious institutions, all remained a deep rooted part of the ‘knowledge’ accumulation policy which was continued even by his successors.

It was well indicated that all these favours was considered to be a strategic move “... because they valued the accumulation of traditional “knowledge” and the training of capable men that took place at these institutions. Consequently, they also made efforts to encourage the compilation and publication of books that conveyed this “knowledge to a wider audience” (Noriko 2016, 22). These are clear moves in the direction of a knowledge system purely based on integrated understanding. With this, it is clear that, the knowledge system flourished on the Mongolian Plateau was of supreme level, acquired and accumulated on extremely sound principles of mutual exchanges.

5.3 Nomadism and Changes in the Land Use

It is observed that the “conventional Euro-American concept of ‘the environment’ has no equivalent in indigenous Inner Asian languages” (Humphrey and Sneath 1999, 3). The concept of environment varies according to the local natural space and the dependency level among its inhabitants. In Mongolia, the term ‘Baigal’ is found to be deeply associated with the concept of environment. In studies it has been revealed that Baigal means ‘the state of being’, the way things are’, it includes animate beings and inanimate objects. Objects in Baigal are considered as having attributes which can be well equated to the notion of ‘spirit’, “often personified in ritual contexts to as ‘ejin’ (master). Baigal thus includes animals, mountains, trees, grass, weather and so forth

as active subjects which have their own ways of being that affect human beings, just as humans have ways of life that affect them” (Humphrey and Sneath 1999, 3). The concept of environment is closely associated with their life and activities, rituals performed by them. In Inner Mongolia the term *orchin toirol* is deeply associated with the concept of the environment. It is originated as the Chinese idea of environment or natural ‘surrounding’ (*huanjitag*) (Humphrey and Sneath 1999, 3). The meaning of environment is not uniform in Inner Asia, but the concept, irrespective of whatever term devoted for it, represents, deep rooted interconnect between human and the non-human world. Similarly, the pastoral systems also vary in different geographical regions of Inner Asia.

Humphrey and Sneath (1999, 218) did extensive and remarkable work on the relevance of spatial mobility for for sustaining agricultural system in Inner Asian region. Specifically, pastoralism in Mongolia was brilliant dealt and narratives of the Mongolia herders and their experiences with different phases of political and economic change and more importantly the phase of transition to market economy. I would like to mainly focus here the relevance of high mobility and flexibility of nomadic pastoralism for assessing the value of traditional food and agricultural knowledge system. A Russian ethnographer, A. D. Simukov’s classification (1935) of land-use, based on the pastoral movements, detailed the important features of the mobile pastoral system and very well highlighted the then prevailing system.

5.3.1 Simukov’s Six Types of Pastoral Movement System

- I Western Type of Movement
- II ‘Ovorhangai’ Movement System
- III ‘Hangai’ Type Movement
- IV Steppe Type Movement
- V Eastern Type Movement
- VI Gobi Type Movement

Simuko’s land-use classification gives us idea about the land-use pattern, trend and major characteristic which are mentioned below –

I. Western Type of Movement:

The western type of movement is mainly classified on the basis of its summer camps at higher altitude in the mountains where pastures are available only during summers and are impossible to use in any other season. During the autumn season, the movement of pastoralists shifts towards the lower altitude and they descend to feet of the mountains, to hollows or plains. In winters, their movement again shifts to lower slope of mountains to protect themselves against strong winter winds. And during the spring season they stay near their winter camps. In this system, which is primarily represented a linear pattern with a long distance movement of about 100 kilometers. It was examined in the studies that this movement closely resembles the present day movement practices in Mongolia. Hovd sum was observed as a best example of 'western type' system.

II) Ovorhangai Type:

The Ovorhangai type of movement differs from the 'western type' system. The movement system follows a very long distance migration of about 150 to 2000 kilometers during autumn and spring season for a short duration. In summer, pastoralists move to upper reaches of rivers in the Hangai range whereas in winters, they move far to the south in the Gov Altai area.

III) 'Hangai' Type:

the main characteristics of Hangai type movement system is the small distance movement system, the annual movement system cycle is estimated to be not more than 7-8 kilometers and in few cases the distance reduces to 2-3 kilometers from the winter pastures to summer pasture. The reason behind such a short movement is identified as the high and consistency in the productivity of pastures year to year. During summer they migrate to open low valleys and in winters they camp around relatively high ground and prefer slopes protected from strong winds and extreme sun warming.

IV) **Steppe Type:**

The fourth movement system is classified by Simukov as the ‘Steppe type’. The steppe type is characterized by summer pastures near water sources, in the open area but the winter camp location is preferred on southern slopes of mountains or hollows which can provide protection from wind. The diameter of annual movement has been examined around 30-50 kilometers or more in few cases. During winters, livestock have snow in place of water, as the temperature slips too low, but during summers water sources are preferred in the summer pastures. The unique feature of Steppe type is the location of autumn camps which were near sources of natural salt or soda.

V) **Eastern Type:**

On the eastern Mongolian steppe, the eastern type of movement system was followed by the pastoralists in which “summer pastures generally were to the north (often by river Herlen)” (Humphrey and Sneath 1999, 221). During the winters, the movement reversed to the south, where parts of population moved to utilize winter pastures located in hollows with desert type vegetation. This system is found to be closely associated with the ‘Ovorhangai type’, a purely long distance north-south movement system in spring and autumn. The diameter of movement was estimated to be about 100 kilometers.

VI) **Gobi Type:**

Lastly, it is the ‘Gobi type’ of movement system by Simukov’s classification of land-use observed in Mongolia. It is characterized as a short distance movement in a year, but during extreme winter conditions like drought or dzud, the pastoralists are forced to move for a very long distance, as far as 150 to 200 kilometers from their normal camp sites. Flat and open areas are preferred during the summers and mountain or hilly regions were favored during winters with the exception of camel hunters who preferred to stay on plains even during winters.

5.3.2 Land Use in Specific Case Studies of Humphrey and Sneath

It was observed that even within a region, the pastoralists apply numerous movement systems, the movement strategies differ according to the needs of pastoralists and they

act according to their requirements. For instance, in case of ‘Gobi type’ of movement systems, it was examined that the movement differs as per the specialization in herding particular animal species. It is the requirement of pastoralists, and it is difficult to access their highly flexible time-specific, space-specific as well as species-specific movements and it would be difficult to put them in one particular movement system of a region (Humphrey and Sneath 1999, 222).

It was further observed that those herders who move their livestock for a longer distance migration are those who are highly skilled and appointed by monasteries to herd their livestock, or they are the one who have large herds with a herd composition of maximum numbers of mobile livestock- it adds high mobility. They are considered to be more skillful and follow the best movement methods, whereas those who go for smaller migratory movement are considered to be lazy. Humphrey and Sneath (1999, 222-223) found in their studies that the preference of small movement migration is found among the subsistence herders having small number of animals. They observed a difference in the herder’s movement systems based on their economic orientation which was primarily based on their herd size as well as herd composition.

Pastoral Movement System after De-collectivization in Mongolia:

I. Hovd Sum of Uvs Aimag

In Mongolia, after the de-collectivization which began in 1990’s, new pastoral movement system emerged due to the reduction in use of hay. The collapse of collective system also took a toll on the assured hay supply, and with the reduction in mechanized hay-cutting, it intensely impacted the livestock nutrition and livestock production system as a whole. Hay fodder remained important in late winter and early spring season. In the collective period less use of autumn ‘*otor*’ pasturing resulted in the decline of pastoral movements. *Otor* pasturing was a traditional movement system to fatten up the animals in the late summer and during the autumn season in order to prepare them to sustain the harsh late winter conditions and have “sufficient fat reserves to sustain till the late spring season” (Humphrey and Sneath 1999, 236).

In Hovd Sum of Uvs aimag in Mongolia, detailed pastoral movement system was observed in a study by Humphrey and Sneath (1999, 236). Different pasture locations were selected during different seasons. During summer, pastures were preferred on

high mountain areas, specifically above 2400 meters. During autumn the pastoral movement shifts down towards the lakes, at around 1600 meters above ground.

In winters, higher mountain slopes at a height of 2200 meters was preferred by the pastoral households. For spring season pastures, a bit lower location at around 2000 meters was preferred. This movement was found to be much closer to the Simkov's 'western type' of movement and it amazingly resembles the pre-collective movement system which was practiced even during the collective period and after the de-collectivization in the 1990s.

In the study it was observed that the annual amount of mobility and frequency of movement got reduced directly as a result of motor transport reduction, which restricted some families to move as frequently as they did earlier.

The reliance on hay also impacted the movement system of the pastoral families. During collective period the movement was reduced due to the production and supply of hay but soon after de-collectivization the shortage of hay again made them dependent on the traditional practices of long distance migration system to lower their reliance on hay. The pastoral movement system has again become dependent on traditional practices due to shortage in the supply of livestock production input and for sustenance herding to maintain life and livelihood by most of the small herders.

II. Dashbalbar Sum of Dornod Aimag

Dashbalbar Sum in Mongolia is not a mountainous region due to which it was observed that the area of the pastoral movement by the herders was less impacted by the influence of altitude. The pastoral movement system was quite different from the Hovd sum, as it was comparatively lower in mobility a little more than 25 kilometers on an average. Although, throughout the year, few pastoral household prefer to remained on one location. Diverse seasonal pasture movement were observed among the different section of the pastoral household. A general pattern was observed that, river or stream valleys are preferred for winter and spring pastures in relatively lower areas and little higher location for the autumn and summer pastures.

Some pastoralists practiced *otor*, for winter pastures they move to the southern border of the sum in good pastures in vegetation closer to 'Gobi type'. It was observed that

the pastoral families the distance of migration have decreased past few decades. And the major reason identified for decreased in mobility was the introduction of new breeds of livestock in the collective period with assured hay supply. In 1970s, fine haired sheep and in 1980s a high productivity breed of cattle were introduced, which required special care like winter sheds to sustain the extreme winter conditions, large amount of hay and fodder is required as they are less mobile in comparison to the native animal species. To maintain such a delicate breed of livestock, it became a hardship for herders' family after the de-collectivization and privatization process. Reduction in veterinary services and collapse of economic structure led to steep decline in the livestock population. For instance, the sheep population declined to around 1,61,000 in 1993, from a peak level of 2,25,000 during 1975 (Humphrey and Sneath 1999, 249).

III. Sumber Sum of Dornogov Aimag

The sudden decline in the transport facilities immensely impacted the amount of the pastoral movement system specifically the de-collectivization process. The pastoral movement system primarily in the north/south, observed here found to be closely related to the model of the 'Central Hall' type by Bazargur, Chinbal and Siirev-Ad'yaar, and also resembles the eastern steppe type of the Simuko's typology of pastoral movement pattern. Three sub-units of the state farm were taken for the study and each one represented following characteristic:

Farm 1- It has a winter pastures on the higher ground between 1300 and 1500 meters. For summer pasture on shifting little lower on the ground between 1150-1250 meters near Herlen river in the northern part of the sum. The spring and the autumn pastures were located between summer and winter pastures and represents transitional movement.

Farm 2 – The second farm, the winter pastures are located comparatively on the lower altitude about 1150 meters and for summer pastures moves to slightly higher location, about 1250 meters. In the third sub-unit, the location of 1400-1600 meters on the slopes of Mount Sansar was selected for winter pastures. For springs and autumn, pastoral families camp between their winter and summer pastures, a transitional location.

The most important features addressed here was the sharp reduction in the movement system due to decline in the transportation facilities after de-collectivization period. It was observed that not just the amount of the movement decreased but the distance of

migration also gets reduced, which was about 100 kilometers in diameter according to Simukov's description in pre-collective period and reduced to a diameter of about 25 Kilometers in collective period and the decline in the *otor* practices, over grazing of pastures decreased the vegetation cover. The decline in the mobility was blamed as the prime cause behind the decline in the pasture quality.

5.3.3 Sheehy's Three Stages of Transformation in the Livestock Production Systems in Mongolia

Sheehy (1993, 20-26) in his study he observed three major grazing management strategies which represented the changes in grazing management strategies. The land use in Mongolia had undergone sudden changes from the pre-collective period, to collectivization under command economy, to the period of transition to the market economy. The three Mongolian grazing management strategies are-

- I. Extensive Grazing Management Strategy
- II. Semi-Extensive Grazing Management Strategy
- III. Intensive Grazing Management Strategy

The Mongolian environment is full of extremes, the ecological and climatic factors obstruct the growth of vegetation cover which increases the severity of soil erosion many fold as the soil remain unprotected (Palmer 1991). Sheehy (1993) examined few major grazing management strategies in use in the Mongolian grasslands which had observed sudden political and economic changes from a Socialist era of command economy to a completely contrasting system based on the market economy. The three basic grazing management strategies of livestock production was identified by Sheehy (1993) are mentioned below-

I. Extensive Grazing Management Strategy

The 'extensive grazing management strategy' formed the basis of the traditional Mongolian pastoral livestock production system. The system is considered well adapted to the natural environmental conditions experienced in the delicate grassland ecosystem. The herd in such grazing system constituted of a mixture of both small stocks like sheep and goat and large stock such as camel, or horse, cattle and yak with diverse combinations purely according to the adaptability of the animals to vegetation,

terrain and environmental conditions. This grazing management remained deeply embedded in the concept of environmental sustainability. Grazingland is classified into seasonal pastures which are grazed according to the managerial and production objectives of the livestock producers. The small stock livestock producers graze upland areas having rough terrain during the summer in order to restore body condition and during autumn they are grazed on specific upland plant communities which help them to build body reserves of fat. Whereas large stock from which milk produce are obtained are kept in lowland areas which are close to water sources and rapidly growing mesophytic vegetation well suited to large animal bulk roughage feeders (Sheehy 1993).

The traditional herding practices were closely knitted around the environmental seasonal changes. Enkhutuvshin and Tumorjav (2011) in their study remarkably identified that, the nomadic herders centered them on pasture availability, its characteristics, and seasonal changes and act accordingly. Herders remain focused on their livestock strength, weight and flesh. Special attention was given by herders for increasing the animal's actual flesh and muscles as they believe that fatty animals easily lose their fat during the winter season.

Few key elements of the extensive grazing management strategies were identified which includes: livestock mobility, flexible use of land and low-off take from environmentally adapted livestock. The restoration of strong balance between the livestock population and land carrying capacity is the most important characteristic feature of this grazing management strategy (Sheehy 1993). The land managed with extensive management strategy is considered to have moderate to high ecological stability.

It has been observed that the national environment is deeply instilled in every form of nomadic art and culture. Whether it is the musical instruments or the folk song, all are pure representation of the closeness with the nature and every natural entity of the vast Mongolian grasslands. The sand music, a 'mammoth concert' of varying sound which comes out when wind blows away the sand and makes every grain of sand sing. 'Khomy' melody is the best example of singing of the sand dunes of the Gobi Desert (Iyer 1992, 258; Jha 2015, 44). The nomadic herder developed various sound and symbols, which enacted as the signals used for communicating with their animals by

the herders'. Even animals understand these signals of when and where to pasture, graze and drive (Enkhutuvshin & Tumurjav 2011, 1-50). For instance, if a baby camel has been abandoned by their mother, the herders sing special folk songs and play '*Morin khuur*' a traditional musical instrument, which according to herders induces cow camel to respond positively and express care and love for to the abandoned or motherless baby camels (Enkhutushin & Tumurjav 2011). Mongolian nomads and their everyday life is a pure reflection of their in-depth association and understanding of the non-human world. Their music, musical instruments, folk songs, seasonal mobility, all are observed to be well adapted to fragile Mongolian grasslands ecosystem.

II. Semi-Extensive Grazing Management Strategy

In the semi-extensive grazing management strategies primarily applied on the collective livestock production system. It basically follows the principle of extensive grazing management and also includes the energy inputs into the production system. The production here is mainly focused for the personal consumption and for sale of excess animal products. In this system it has been observed that mobility of livestock is reduced and production is concentrated to certain units. The production of high yielding species of livestock remained central to the production system and specialization of certain species are given preferences. In terms of ecological stability varies according to the pastureland, for upland pasture it is considered high, for lowland pasture stability is moderate and for midland pasture the stability is low due to the year-long livestock grazing and increase in the density of livestock population (Sheehy 1993).

In the Socialist era based on command economy, collectivization of farmland and collective livestock production system was established on a massive scale which transformed the traditional Mongolian pastoral livestock production system. The nomads were forced to settle down, or given defined passages by the state for their movement. The movements of nomads were highly restricted and were strictly guided by the state, which remain aloof from the principles of ecological sustainability of the region. It can be assessed from the studies that the forced settlement of nomads was considered as the major blow for the sustainability of the fragile Mongolian environment (Humphrey et al. 1993; Scott 1998; Jha 2015, 44-46). Whereas the

negdals or collective farm system attempted to increase livestock off-take in the traditional pastoral system by using livestock grazing strategies that benefit from high cost modern inputs like supplementary feed for the livestock, specialized livestock breeds which replaced the native plants and livestock species.

Scott (1998) examined the state's role in permanent settlement of the mobile peoples with a hidden motive to empower itself by intensification of its control over the entire territory and bring them back into a system where they have to pay taxes to the state. He explained that, “. . . Nomads and pastoralists (such as Berbers and Bedouins), hunter-gatherers, Gypsies, vagrants, homeless people, itinerants, run-away slaves, and serfs have always been a thorn in the side of states. Efforts to permanently settle these mobile peoples (sedentarization) seemed to be a perennial state project – perennial, in part, because it so seldom” (Scott 1998,1-2). In his study he discovered that the complexities of nature were simplified and reduced into figures like coordinates in a map that can be easily identified. He explained that “. . . need of standardized characteristics to simplify nature's complexities so that it can be easier for the state to monitor, count, assess, and manage”.

Humphrey and Sneath (1999, 39-40) with their legendary work on nomads intensely examined that the individual initiative of nomadic herders was discouraged under the collective livestock production system. Based on their assessment they narrated that “. . . (herders) were instructed where and when to move, so they did not choose places to pasture the livestock themselves. They worked only at the command and direction of their leaders . . .”

He observed that the collective farm system was not successful with every crop, or every agricultural commodity, and its rate of success depends upon many other factors which differ according to the crop adaptability and crop requirements. Scott (1998, 193-222) compared the wheat crop with raspberry fruit and highlighted factors due to which the rate of success varies in the collective farm crops. Wheat crop, once planted require little attention and care until the crop is ready for harvest, as most of the operations were highly mechanized and the crop is also easy to store. But in the case of raspberry fruit, the requirements are different, it is grown on particular soil type and require time to time attention and considered difficult to pick it by machines. The perishability is also high and requires extra care in packaging. Scott (1998)

analyzed in his study and narrated that “at virtually every stage the raspberry crop needs delicate handling and speed, or all is lost”. The success of collective farm and livestock production system varies even with different crops then how one can apply similar production strategy for every food commodity, this system failed to recognize the deep connectivity of traditional system of livestock production with its environment.

III. Intensive Grazing Management Strategies

The main focus of this grazing management strategy is to achieve maximization of inputs into livestock production system in order to maximize the off-take from livestock. The specialization of livestock with higher genetic potential for increasing the production was the central aim of this production system. Whereas environmentally adopted livestock and native species of vegetation was not considered necessary. The maximization of production is the only priority for feeding the market economy which ignored the long term ecological stability of the delicate grassland ecosystem. The feed of livestock comes from artificial pastures. Intensive energy inputs in the form of fertilizers, pesticides, irrigational water all are required for maintaining the artificial pastures. The ecological stability in such management systems is low as all the pasture vegetation is grazed by livestock during all the season which poses the problem of overgrazing and makes the grazing land vulnerable environmentally (Sheehy 1993, 23-27).

After the collapse of Soviet Union, Mongolia got transformed into market economy and the livestock production system was again transformed into intensive grazing management production system. Intensifying the concentration of animals to certain locations benefited the market based livestock production but deteriorated the pastures as they were intensively grazed. It cost heavily to the delicate ecosystem and eroded the nomadic culture as well. It has been identified in the local studies in Buryatia and Chita in Russia and in Inner Mongolia in China that, as much as 75% of the grasslands has suffered some degree of degradation (Gomboev 1996, 21; Humphrey 1999).

Monoculture not just replaced the traditional pastoral livestock production system but also remain concentrated only in sheep and goat rearing for its better suitability for the

market economy (Sneath 1998). It not only transformed the livestock production system but also the traditional herd structure of five kinds of animals called *taran hoshuu mal* in Mongolia, which served diverse purpose in nomadic lifestyle (Baohua 2010, 305). The Modernist livestock production system remains centered to sheep and goat for extracting meat and wool. The development of monoculture resulted into overgrazing of pasture which not only degraded the common property resources (CPRs) but, had also threatened the biodiversity as it had become difficult for the wildlife to find sufficient pasture and water to sustain on the overgrazed land as the sheep and goats are livestock having remarkably high potential for dietary overlap and competition with many wildlife species (Allen et al. 1984, 6; Sheehy et al. 2010, 49-48; Jha 2015, 47).

After the collapse of Socialist (collective) system, exponential increase in the livestock population was observed in the Southern Gobi region (SGR) where it increased from about 762,000 to more than 5 million head. Similarly, drastic changes had been observed in the livestock composition, especially in goats and camel population. It was further estimated that, from 1970 to 2009, goats, which now dominate the national and the Southern Gobi region (SGR) herds, increased from 30 to 57 percent, whereas for the camels, it decreases from 18 to 2.6 percent for the same region (Sheehy et al. 2010). In another work in 2009, Dr. Sheehy updated his previous study on pastureland sampling which was originally conducted during 1996-1997. After a span of 12 years, he found that, there had been a loss of 34 percent of plant species in Gobi region and about a loss of 30 percent in forest steppe region (Wachter 2009). The plant species that had lost were highly palatable to all livestock, especially to goats. Sheehy with his in-depth observation identified two major reasons behind this catastrophic erosion of biodiversity which he explained as “Two conditions have created the loss in species: the proportion of goats in the herd in the last 10 to 12 year, and the areas are becoming increasingly arid. . .” (Wachter 2009). It can be well established from these studies that; drastic shift has occurred in the herd structure which remains a core area of environmental concern today.

The modernist agriculture and livestock production system locked itself into a ‘single-code system’, too simple to assess in terms of profit and loss, the core of commercialization process. With deep observation and studies by Newby (1988) had

identified that “a modernist agriculture is single coded – it does one thing (produces food) and does it well. It draws on no local traditions; it is placeless, inflexible and monoculture. Diverscapes, by contrast, have more elements, more connections between these elements, and thus greater potential for synergies”. After 1990s, the collapse of rural collectives and state farm system and socialist support infrastructure Mongolian economy went to adverse period and transformed into market economy, but market failure especially in agricultural market and over-dependence on imported staple food further fluctuated the growth and development of the agriculture sector and poses threat for food security of the nation, especially at the household level (World Bank 2009). The migration of poor herders to the urban areas further adds to the woe.

5.3.4 *Khaluun Nutag* (Hot Grazing) and *Seruun Nutag* (Cool Grazing)

In a study by Maria E. Fernandez-Gimenez (2000, 1318) the land-use in Mongolia was assessed with great details and the embedded ecological knowledge of Mongolian herders were praised for their sustainable agriculture practices. The land-use was periodically classified in the following three phases -

I. Before 1924

Mongolia was divided into about 100 hereditary territorial units under the religious nobles, the powerful lama. These powerful lamas controlled the territory as well as the seasonal migration of herder’s families and even regulated them. An informal, customary institution had regulated the use of pastures, and the seasonal migration was initiated by herders themselves.

II. 1924 - 1990: Centrally Planned Socialist Economy

It was mainly during the socialist era, new collectivization process began, these collectives are called ‘negdel’ in Mongolia. By 1960, it was observed that, all herders joined livestock collectives and herders were given regular salary with all kind of social security in terms of health, education, and old age pension. The pasture land-use was completely regulated by the collective administration and pastoral movements were also controlled, guided and pastures were allocated to use. The herders were able to preserve their agricultural knowledge and skills, specifically for animal husbandry.

But as the customary institutions were undermined and imposition of state control, deeply impacted and even contributed in the erosion of a major portion of the traditional knowledge and skills (Mearns 1996).

III. After 1991: The Post-Socialist Era of Market Economy

Most state owned collectives, livestock and their equipment were dismantled, privatized and distributed among the herding and non-herding population. In terms of ownership of pastureland, it remained as a state-owned and used by herders of a particular district (sum) and sub-districts (bags) as common grazing land. With the transition to market economy, herders became entirely responsible for applying herd-management decisions, and opened for the volatile and highly fluctuating environment of the market economy which remained deeply connected with the international market that led to the problems of production risks with price fluctuations and high-cost agricultural inputs.

Classification of Pasture Resource by Mongolian Herders

It has been found that herders' knowledge of plant-animal-environment relationships have reflected in their management practices and knowledge system. Herders classified pastures based on close experience with nature. It includes following features – the season in which diverse varieties of plants are grazed, the pasture based on grazing season, (their) nutritional quality, sustainability for the specific animal species, topography, altitude, slope, aspect, ecological zone, plant community, color and soil characteristics, water quality and quantity, distance from camp and degree of utilization by livestock (Fernandez-Gimenez 2000, 1320-1322).

The five traditional animals kept by the Mongolian herders are also classified as cold muzzle (*Seruun khamar*) which includes the animals like camel and goats. The hot muzzle (*Khaluun khamar*) include the horse and yak (or cattle, whereas sheep is considered as an intermediate animal suitable for both the hot and cool grazing territories. Herders classification criteria and selection of natural features purely reflects the live components of a landscape and ecological sensitivity of a local space, based on which they have classified the pasture land-use into two broader categories –

1. ‘Cool’ Grazing Territories (*Seruun nutag*) and ‘Hot’ Muzzle (*Khaluun khamar*) Animals

The pastureland located in the mountain-steppe, near rivers and on the mountaintops and north-facing slopes falls under cool grazing territories (*seruun nutag*). And it was considered as the best pastures for the hot muzzle animals (*khaluun khamar*) like yaks and horses. The species specific pasture classification reflects a special display of ecological traditional knowledge and strong sense of the non-human world and behavior of local animals by the Mongolian herders.

II. Hot Grazing Territories (*Khaluun nutag*) and Cold Muzzle (*Seruun khamar*)

The hot grazing territories (*Khaluun nutag*) includes pastures of the desert- steppe, waterless-steppe pastures south-facing slopes. The cold muzzle animals like camels and goats are considered best suited for the hot grazing territories. Whereas sheep falls under the category of intermediate animals, which can graze in both hot and cool grazing territories.

5.3.5 Variation in Pastoral Movement Patterns within a Sum - A Case study of Khotont Sum by Bruun

Even within Khotont sum, Bruun (2004, 72-74) has identified “tremendous variation in the topography, precipitation, biomass, and access to water”, which contributed immensely in the divergence of the patterns of pastoral movements. In the study, cycle of movement and pastoral activities are closely observed and it was found that the non-human world rules the rhythm of pastoral herding and their every movement. The individual herders preferences for grazing also impact the ‘next herder’s choice’ within a group. And common guiding principles are identified as the prime forces acting behind the formulation of some typical movement patterns among the herders. The general typology acceptable to most herders has been classified as four major structured forms of pastoral movements in the Khotont Sum. These are –

- I. Moving Inside a Valley
- II. Moving Around a Water Source
- III. Short-Range Topographical Movement
- IV. Long-Range Topographical Movement

I. Moving Inside a Valley

In Khotont sum the prime concentration of the herding families were observed around the rivers. In an extensive territory of of Khotont sum and the low population density clearly indicates the importance of water sources for Mongolian herders. The presence of numerous fertile river valleys and the presence of good pastures attract the herders. Favorable conditions and availability of good pastures all through the year allow short distance movement for a few times in the year. But after the de-collectivization, a major shift in the movement system was noticed, and the prime reason was identified as protecting pastureland against outsiders or the ‘intruding families’. Within a valley, movement was observed to be shaped by the topography of the region. The access to water throughout the year critically influenced the movement pattern of of the herding families with ‘deficient labour’ (lower labour strength due to early death, diseases, divorce, old age, or young herders in early process of building their herd. Majority of herding families are small livestock owners with a low level of trade as the region is highly isolated and ‘non-local food’ are barely available.

II. Moving Around a Water Source

This type of movement system was preferred by mainly small livestock owners and in the atmosphere of increased competitiveness for pastureland and adding of new herding family within herds would directly impact the pattern of the movement system. Water source act as the major attraction and is practiced by single or few households. It was observed that, “moving around a water source is mostly practiced by a single or a few households, frequently without literal *khot ail* organization, for instance, by moving to the same general area each season but keeping a distance from one another” (Brunn 2006, 73).

The movement pattern was described with a camp consisting of three households who move together year round with maintaining a distance of maximum of two kilometers from the well, about 12 to 15 meters deep and drawn by hand. But in the earlier times, well was horse-drawn. It was also found that movement pattern also differs based on the family-size, their occupation as well as their herd size.

One family includes a large horse breed that needs to move or about four times a year. The family consisted of his wife, his three children and he himself. Whereas his

mother lives at a close distance to him but in a separate *ger* (traditional tent house) and moves less frequently, only twice a year only twice around the well between his college on plain and winter shelter at the foot of the hill. In general, the same pasture land was used throughout the year. it clearly indicates variation in the movement pattern among the herding families.

III. Short-Range Topographical Movement

The main characteristics of this movement form is the strong influence of topography of an area as the household movement takes place within a bag, or within same visible pastureland. The total distance of movement was estimated about six to eight kilometers. It was considered as the most common form of movement, mainly applied by small to medium scale livestock herders in major portion of the Khotont sum. In some areas, large scale herd owners also practice short-range topographical movement pattern.

IV. Long-Range Topographical Movement

In the post-socialist era of transition to market economy, the long-range topographical movements are frequently employed by the large scale livestock owners or for the large herders. It was observed that, long distance and frequent movement within a year was an outcome of market-oriented herding strategies as keeping a large herd in a place would immediately degrade the the grazing land as the carrying capacity of pastureland exceeds its limit. Therefore, large herd size requires more careful selection of movement pattern. It was observed that, long single movement from autumn to winter pasture was around 30 kilometers. The long distance travel generally crossed bag borders and the total distance travelled throughout the year was estimated to over 60 kilometers.

It has been assessed that individual preference of pasture quality not just influenced the organization of *khot ail* but have also impacted the movement pattern of herders. For example, a herder's family of four members moves independently for a better choice of pasture and traditional agricultural knowledge during spring and autumn season and *ail* in summer and winter season. The long-range movement was carried out even for a medium herd size of 250 animals. The herders purely reflect the herding skills, traditional knowledge of nomadic agricultural system, the practices of

cycle of movements and knowledge about pasture qualities and its seasonal and species suitability. The herder even specified the pasture quality required according to the season "... the need for *agriand butuul* in spring; juicy Mongolian grass without flowers in summer; *taana*, *khumuul*, *tarvagan shiir*, and *shuvuunii khul* in autumn, and *sar tolgoi* and *khuur* in winters" (Brunn 2006, 83). In search of healthy seasonal pastures, he usually moves 5 to 6 times in a year and covers about 30 kilometers.

V. Casual Pasture Selection

Lastly, another category of movement pattern which has been observed in the region is named as 'casual pasture selection'. Under this category a herder has no defined pattern of seasonal movements. It includes newly married who don't have access to good pastures (near their parents site), those who newly joined as livestock herders due to the unfavorable economic circumstances and are forced to migrate to rural areas from the sum centers, towns and cities. It also includes, 'migrant herding households' (Brunn, 2004, 85-86), as they all move from other aimags and sums, and often resulted in conflicts regarding the use of pastureland. Because of this, they carry on with the 'unstructured move' for fetching the the good pastureland. The clash of interest and for fetching the good pastureland has resulted in overgrazing. This exceeds the carrying capacity of delicate pastureland made the movement pattern more and more 'unstructured' and full of conflicts.

5.4 Desertification, Climate Change and *Dzud*: The "Theft of Geographical Space"

The land-use has undergone colossal change in Mongolia which immensely contributed in the degradation of pastureland. Desertification has impacted nearly every part of the land and almost taken a shape of natural catastrophe. The increasing severity and frequency of the '*dzud*', an extreme winter condition that has day by day increasing in its severity, which can be clearly seen in the form of massive livestock mortality. This not just devastated the livelihood of herders but has also threatened the food security of entire nation, specifically of the poor herders.

Climate change is another giant problem which is strongly impacting the pastoralists, because nature directly governs their life and livelihood. The vegetation cover and the availability of good pastureland are shrinking at a much faster pace than experienced

in the past. It has been observed in the studies that, about 90 percent of Mongolia's land area has the potential for desertification where 41.3 percent of the land falls under the category of desert and desert steppe zones (Dorj et al. 2013, 222). Mongolian society and its rural economy, still dominated by the livestock sector and ever increasing pace of desertification could give a major blow to the already indebted economy, dealing with severe financial crisis. Mongolia with its empty vast landscape is divided into six major natural zones: tundra; high mountain; forest steppe; desert steppe; and desert (Droj et al. 2013, 222-223).

Few major components impacting preference for pastureland in each of the demarcated six natural zones differ in many ways. These major components are observed as the pasture productivity, dominant species and type, length of growing season and phenology, which are found to be different for each natural zone. In the study, the component of pasture productivity has been observed to be increasing from deserts in the south to the forest and forest steppe in the north. The pasture productivity ranges between 500 kg/hectares and 1500 kg/hectares from north and south. Similarly, the degradation of the land is found to be closely associated with pattern of grazing land-use. In the study on historical changes in pasture resource, over the last 24 years from 1982 to 2006, NDVI values for July and August clearly indicates a significant change from 1994 onwards with a decreasing trend (Saizen et al. 2010; Shestakovich 2010; Dorj et al. 2013, 223-224). The NDVI changes in desert Steppe and desert zone, over the last 24 years for July and August even dropped below 0.06 thresholds which depicts a 'no vegetation' or 'bare soil' condition (Dorj et al 2013, 223). The study indicates towards a deadly trend of desertification which is impairing the natural zones of Mongolia. It is clearly observed that after 1990s, the alarming trend towards desertification and shrinking vegetation cover was not just threatening for livestock production system but have also jeopardize the household food security of small scale herd owners who constituted the majority among the herder's population. The major cause behind this massive degradation of pasture land and aggravated condition of desertification was identified as 'overgrazing' in many studies. In a study by the Agency of Land Affairs, Geodesy and Cartography in Mongolia, it has been observed that half of the pastureland was degraded to some extent (Dorj et al 2013, 224). The study was primarily conducted for assessing the state and quality of the pasturelands in Mongolia.

Mining has emerged as another major factor contributing not just to pastureland degradation and desertification but also contaminating and depleting the already scarce water resource, specifically the sources of underground water. Mining has turned into an unbearable and never-ending menace for the Mongolian herders, as it severely impacted the quality of land and water. As a result, mining is seriously contributing to the migration, displacement and uprooting of Mongolian herders from the rural areas to the already collapsing urban areas, specifically the capital city of Ulaanbaatar.

5.5 “*Mine-golia*”: Mining Development and its Impact on Water and Land

Mining sector suddenly became the driver of Mongolia’s economy, so much so that Mongolia is often called as “*Mine-golia*”. The economic growth rate touched a lofty two-digit number of 17% in 2011 but unfortunately the sudden boom turned into a doomsday situation with continuous decline in the growth rate. Reputed international organizations like UN, World Bank and other major funding agencies clearly mentioned about the colossal level of impact of mining development on delicate Mongolian pastureland and scarce water resource. The World Bank (2006) in its research report observed that the destruction of permafrost, pollution of water with mercury as well as decreasing river water, all are mainly caused by ‘discharge of tailing by mining companies and Ninjas (informal miners)’ (World Bank 2006; Suzuki 2013, 269).

A major cause behind the over-emphasis on mining sector and the neglect of Mongolian herders and the livestock sector was identified to be a major economic shift, especially after the 1990s, which completely neglected the livestock sector as well as those who are directly dependent on it. It was observed in the studies that, the local residents, especially in the rural areas, neither any role to play in the decision making process, nor any legal rights to oppose mining in their local areas. The permit granted by the Central Government to the mining companies holds the ultimate power which cannot be challenged (United Nations Human Rights Team Group 2006; Suzuki 2013, 269-270).

In mid 1990s, it was observed that about 40% of country’s GDP (Gross Domestic Product) was contributed by the agriculture sector, which includes the animal

husbandry and crop farming as well. But due to Mongolia's adoption of a free market economy, the share of agriculture sector in the GDP declined by 20%, whereas mining sector was given major economic boost and grew rapidly. Since 2003, the contribution of mining sector in Mongolia's total GDP has increased to more than 30%, especially in the recent past. (Suzuki 2013, 270; NSO 2013).

Mongolia is highly rich in terms of the mineral wealth of copper, gold, coal etc. which are mainly exported. It has been examined that in 2000, both the livestock and mining products accounted for almost half of the total export value, but both the sectors have shown completely contrasting results afterwards. Since 2000, the livestock products export steadily declined till 2008 and shrunk to about 10% of the total export value only. On the other hand, mining products grew rapidly and contributed as high as more than 80% of the total exports (NSO 2013; Suzuki 2013, 270-271). It clearly indicates that mining development became an economic booster, mainly after the adoption of market economy. Specifically, from 2000 onwards, mining sector started setting new records in terms of its contribution of economic growth of the country (Suzuki 2013, 270-271). But there is a dark facet attached to it, and that costed in the form of environmental degradation of especially the pastureland and water wealth. Surface mining is the prevalent form of mining in Mongolia and mainly involves excavation of the delicate pasturelands and directly impacts the nomadic grazing and nomadic herders.

One more interesting feature has been examined in in this research study is that about 80% of Mongolian territory falls under the category of pastureland, whereas it is less than 1% of the total area of Mongolian territory of only about 420,000 hectares of land area, where mining license are issued and mining development activities are concentrated (Suzuki 2013, 276-277). That could be a possible reason behind the rigid attitude of the government for allocating mining licenses without consulting and taking the consent from the nomadic herders. The major mining hub is located in Omnogovi Aimag. It is the largest area of licensed mining of about 180,000 hectares then comes Tov and Selenge. The world class mining project like Oyu-Tolgoi and Tavan-tolgoi both are located in Omnogovi Aimag which is in the southern part of Mongolia and its closeness to China gives it added advantage in terms of low transportation cost and nearness to market etc. (Suzuki 2013, 275-277). Although, a

small Mongolian territory is allocated for mining development, it is the way in which the delicate pasturelands are massively exploited. It has the strong potential to impact the country's food and agricultural system as it purely depends upon Mongolia's natural wealth of pastureland and water.

Use of heavy vehicles for transporting the mining products has further stressed the sensitivity of the pastureland. The overloaded trucks, with uncontrolled movements in highly unstructured transportation routes have become major contributor in aggravating the land degradation and a deep conflict between the mining development and nomadic herding (Dorj et al. 2013, 224). In studies it is found that the road on which hundreds of trucks move daily carrying heavy load, like 100 tons of coal along the pastureland, catalyzed the land degradation process. The frequent transportation of large trucks as well as the proposed railway route development along the mining areas which is a part of Tavan-Tolgoi project could be catastrophic in terms of its giant ecological footprint and exceeding the carrying capacity of the fragile pastureland (Suzuki 2013, 279-280).

5.6 Growth of Ulaanbaatar into a Primate City: City of Nomads and the Formation of 'Mini-Mongolia'

The rural economy of Mongolia has critically impacted by the unplanned and unstructured urbanization of the capital city of Ulaanbaatar. The pace of rural-urban migration to Ulaanbaatar has been so high that nearly half of the country's population is living here. Ulaanbaatar has become gigantic and fit to be represented as 'Mini-Mongolia'. In geographical terms it has become the primate city of Mongolia. Primate city is a concept of urban geography which has first coined by Mark Jefforson to explain the city structure and the characteristics of urbanization. With Mongolia's transition to market economy, many lost their government jobs and a wave of urban to rural migration began and put extreme burden on the pastureland by adding more and more animals in the herd. But with growing foreign investment and growing and concentration of financial aids from the international donor agencies (Honeychurch 2010, 405-417) employment increased in the urban areas specifically the capital city of Ulaanbaatar as a result of heavy flow of rural to urban migration. The lack of transportation facilities, concentration of education and health veterinary services and

connectivity to the market, all factor together contributed in the exponential urban growth (Yamamura et al. 2013, 205-206).

It has been found that Ulaanbaatar has grown as a well-established market, in fact considered as the only market in Mongolia where business, services, transport and capital are concentrated. It is estimated that 95 percent of all cash was in Ulaanbaatar during 1999 (World Bank 2002, 11; Brunn 2006, 170). Many herders migrated to urban areas, specifically near Ulaanbaatar, for availing the facilities and access to the market, goods and services (Sankey et al. 2012: 151). These changes contributed to abruptly increase in the use of pastureland near urban areas, which was found to be more intense around Ulaanbaatar (Mearns 2004; FAO Crop Grassland Service 2008; GOM 2009a; Sankey et al. 2012, 151). This huge concentration of wealth, all services, capital, all market facilities, helped the region to generate employment opportunity which attracted the migrants from rural Mongolia, where only 5 percent of foreign aid was found to be assigned. This is one of the prime causes behind the lopsided development and created a steep rural and urban divide.

Since 1990s, the transition phase, Mongolia has witnessed immense changes in its demographic features, specifically in terms of the fast pace of urbanization process as well as the huge disruption in the concentration of population in the capital city of Ulaanbaatar. Although the migration from rural to urban areas began from 1924 during the socialist era, but after Mongolia's transition to market economy, a new wave of urban migration touched extremes. During 1963 as high as 60 percent of the population lived in rural areas, during 1993 the share of rural population have been reduced to 44 percent and now more than two third of country's population live in urban areas (NSO 2013; UNDP 2014, 8-9).

The variation in the density of population ranges between 0.3 people per square kilometer in Umnugobi to as high as 236.7 people per square kilometer in Ulaanbaatar, which clearly indicates the level and the impact of lopsided development (MEGD 2012, 28). In terms of urbanization process, Mongolia has even left behind the world urbanization. Mongolia gained the rapid pace of urbanization mainly after 1990s. It was observed that during 2010, the urban population of Mongolia was 63.3%, way above the share of world urban population which was 50.6%. In Mongolia this rapid pace of urbanization has resulted purely due to the rural

migration/out-migration (MEGD 2012). In 2015, shocking figures of rural devastation could be clearly observed, as 67.4% of Mongolia's population lives in urban areas, while it was only 32.6%. Ulaanbaatar alone contributes to about 45.66% of the population. Ulaanbaatar has thus taken the shape of a 'Primate City' and almost became a kind of 'mini Mongolia' (NSO 2015).

Deep observation suggests that not just economic but the social inequalities have increased due to which the incidence of poverty increased. It is observed that Mongolia's poverty continues to increase, with the poverty rate being 36%. The massive de-population of rural areas is going to further alter the demography (Brunn 2006, 171).

5.7 Relevance of Traditional Agricultural Knowledge for Ensuring Food Security in Mongolia

The food security of the Mongolian Herders, specifically, is threatened by the modern and technologically advanced agricultural system. The swelling of Ulaanbaatar in the form of urban sprawl, the lopsided development mainly after Mongolia's transition to market economy, resulted in the collapse of rural survival system as well as the agricultural system. The agricultural system, in the absence of assured power supply, connectivity to the market, storage facilities, veterinary services etc. started falling and it became really difficult for the herders to remain in the distant rural areas. The traditional knowledge system allowed the herders to live in harmony with nature, while ensuring their food security. Few important traditional agricultural practices are now seen as the only option for the rejuvenation and revival of the food and agricultural system. It includes the practices like maintaining high mobility in pastoral livestock production, following the five animal concept for keeping a healthy herd-composition which has the capability to check the overgrazing of grasslands, the preparation of traditional nomadic food which is now seen as the future food for the survival and sustenance of mankind, as well as the path to food security. Four major traditional agricultural knowledge systems were examined for maintaining food security in Mongolia, specifically of the poor herders. These are mentioned below.

5.7.1 The Role of Mobility, Social Exchange and Social Networks in Maintaining Mongolian Herder's Food Security and Sustainable Agriculture

High mobility of the nomadic pastoral movement system is identified as one of the most significant features in the grassland region of Inner Asia. In studies by Humphrey and Sneath (1999, 267-269), mobility was considered critical for the sustainability of pastureland and the pastoral livestock production system. It is the reduction in the “amount of movement and frequency of changing pastures” was found to be deeply associated with the degradation of delicate pasturelands of Inner Asia (Humphrey and Sneath 1999, 268).

Simukov's description strongly favored the presence of ‘greater movement’ (Humphrey and Sneath 1999, 268) of the pasture system in the 1930s, the pre-collective period. With the beginning of collectivization, high importance was given to ‘yield focused’ or ‘specialists’ pastoral strategy. Despite over emphasis on ‘specialization’ of the pastoral system, the collectives also supported the mobility in the form of ‘long moves’ as “they produced on excellent return of livestock products” (Humphrey and Sneath 1999, 267-270). It gives a strong indication that, despite heavy state control on the pastoral movement system, ‘long moves’ is supported and used as a strategy to enhance the livestock production and products.

After Mongolia's transition to new economic and political order in 1990s, the major emphasis was on the intensification of livestock production, without much support for the rural infrastructure and for the pastoral movement system. The high concentration of herders in and around the region of capital city of Ulaanbaatar, the movement system and pattern got a huge blow. Increased poverty level in the rural Mongolia further favored the concentration of pastoral herder's families around the Ulaanbaatar in order to avail the basic facilities as well as more cash income in their hands, as compared to those living in remote rural areas living with lack of transport connectivity and rural infrastructure. This could be termed as the phase major setback, downturn for the sustainability of the pastoral livestock production system, specifically due to decline in the pastoral movements and these concentrations promoted much more static pastoral system (World Resources Institute 2000).

Many elderly nomadic pastoralists, “placed high value on the practice of *otor* and the frequent moving of animals so as to rotate use of pasture” (Goldstein and Beall 1994, 40; Humphrey and Sneath 1999, 268). The ‘*otor* system’ was praised for its highly scientific approach for maintaining the sustainability of pastureland, as well as preparing the animals to sustain the extreme winter condition with non-availability of good pastures.

Humphrey and Sneath (1999, 265) have studied the pastoral system in Inner Asia, specifically after the end of the collectivization period. They observed that ‘mobility of the pastoral system’ is one of the most vital factor which needs special attention and without which it really becomes hard to maintain sustainable pastoral system. It has been found that in comparison to other parts of Inner Asian region, Mongolia has retained few of the most vital features of the pre-collective era – comparatively high mobility and flexibility in allocation of the pastureland by the state authorities so that it may not pressurize the carrying capacity of pastureland (Humphrey and Sneath 1999, 265; World Resources Institute 2000). But the situation has changed rapidly with increased dependence on cash economy and global market demand which is prone to high price fluctuation and now in the situation of global economic crisis predicting the market become more and more volatile and based on fuzzy logic.

Hence, to the sustainability of pastoral livestock production system and food security of the poorer herders, ‘mobility’ is crucial for delicate pastureland of Mongolian plateau and its people.

A study by Behnke (et al. 2010) compared the use of mobility in the survival and suitability of a food and agricultural system based on the requirements of its geographical space. The ‘horizontal’ migratory systems are common in desert, savanna, steppe, tundra and in plains environments. ‘Vertical’ migratory systems that existed in ‘extreme elevation gradient’ are commonly observed in temperate Asia, which includes particularly the mountain “that stretches from Iran through the ‘Tibetan Plateau and Western border to China’” (Behnke et al. 2010, 148).

In another research study, the temporal changes in forage were deeply assessed, based on which forage-maturation hypotheses was propounded – “the protein content and digestibility of forage are often related negatively to maturation state, so immature

plants found in areas with low vegetative biomass may be nutritionally superior to mature, high-biomass vegetation” (Fryxell 1991, 479; Behnke et al. 2010, 146).

It has been observed in study that natural forage quality and quantity changes with time and space. The temporal change in forage observed as different stages of forage development like state of maturity, immaturity of forage on which the vegetation biomass and its nutritional quality depends. The study basically focuses on seasonal movements by individual herd and the migration routes they prefer for increasing their resource accessibility to sustain themselves.

Access to water and forage are identified as the major decisive factors for determining the movement of livestock in any region. It is an important finding which reveals us about the secrets behind the sustainability of food and agricultural system under traditional Mongolian pastoralism, as it follows the similar migratory routes as followed by the wild ungulates living and surviving in the similar environmental conditions.

It has been found to be closely associated with the natural movement pattern as followed by the wild animals living in that geographical space and its climatic condition. In essence it is the animal’s deep instinct that guides them to survive and adapt to its native environment, and that what is truly followed by the nomadic pastoral production system. The non-human world and their deep instinct, and the understanding of their local geographical space, altogether still remain as the major contributor to the sustainability of the grassland ecosystem.

In the extensive work on mobility of the nomadic pastoral system it has been established that mobility of the pastoral system offers fundamental way to reduce the food shortage for people, wildlife and livestock by using grazing lands where herders create extensive “social safety nets” (Reid et al. 2008, 7). In Massai pastoralists in East Africa, it is observed that a kinship based networks are maintained which provides them immense support and continue with pastoralism and sustain their livelihood. Massai maintains kinship networks which provide mutual assistance to ensure the survival of households during crisis, which mainly includes access to pastures and water (Potkanski 1997; Reid et al. 2008, 8). It is remarkable that pastoral movement is fundamental for maintaining the ecological balance in the grasslands as

it assisted in the dispersal of grazing impact over a space. It is established that extensive herding system and wildlife migration, with regular seasonal movements, disperse the impact of grazing in space as well as allow the system recovery of seasonally used pastures. It is really fascinating to understand the sensitive linkage between the movements of livestock and the ecological sustainability of grazing lands.

Another important feature in the pastoral movement is the accessibility to water points. The concentration of livestock around the water points results in the denudation of the land area around water sources as well as reduction in the plant and animal diversity in such areas. The concentration of livestock in grasslands gives birth to acute environmental problems. Whereas, the frequent movement of livestock in the mobile pastoralism disperse the pressure and use these water points temporarily and move on to their seasonal camps based on pastureland availability (Verlinden et al. 1998; Turner 1999; Reid et al. 2008, 8; Coughenour 2008, 45-77). These studies provide us in-depth understanding about the importance of mobility in the sustainable agriculture and food security of the nomadic herders, not just in Mongolia but different parts of the world. It is really hard to believe that still the government's programmes and policies are more focused on the settlement of the nomadic people with a mind-set that believes "pastoralists as backward, primitive and underdeveloped" (Blench 2000; Reid et al. 2008, 8). It is sad that most of the agricultural policies support farming over herding, and herders have negligible influence in terms of framing of government policies as compared to the settled farming neighbours, in fact in many countries the nomadic herders don't even have any identity (Blench 2000; Horowitz and Little 1987, 59-82; Reid et al. 2008, 9; Galvin 2008, 369-385)

Similarly, social exchanges and social networks have also played immense role in maintaining the family food security among the Mongolian herders. During an interview with Honeychurch (2017) at the Anthropology Department at Yale University, he remarkably narrated the importance of social networks in maintaining the food security, besides explaining that how it helped in escaping from the situation of herd loss to the Mongolian herders at the time of crisis. The social networks are very important for the survival and sustenance of the Mongolian nomadic herders as

they have never remained completely food secure or self-sufficient to maintain their food security. But they purely relied on the system of networks to sustain their animals by using these social networks for accessing distant pastureland in the period of harsh weather condition or sudden environmental shifts. It also strongly supports the notion regarding the high mobility which remained integral part of the Mongolian pastoral production system. High mobility in terms of their animal movements, both vertically as well as horizontally, but also because of the social networks, which immensely contributed to the mobility of the nomadic herders. For example, in Mongolia, a herder family belonging to the northern part of Mongolia would prefer to make a marriage alliance in distant southern Mongolian region. The most important reason behind favouring the distant marriage alliance is to increase and enhance their social network. A stronger family bonding allowed families in crisis to access distant pasturelands as they are part of extended family. The families can use their wider social networks in the time of emergencies, like Dzud etc., when pasture are not available at their place they can move to south to access the pasturelands to escape from the situation of herd loss and food crisis.

Again, in Mongolia, the seasonality has been recognized as one of the vital factors in determining the food security situation. ‘High contrast in season’ in the Inner Asian continental climate has been identified as a major factor which contributed to strategies and practices of the ‘Mongolian pastoralism’. It is embedded in the local customs like “greet people in countryside by inquiring to how a particular season has been for them and their animals” (Honeychurch 2015, 90-104). A remarkable characteristic of these social gathering or greetings exchanges are observed between the ‘seasonal greetings’ and ‘the traditional seasonal movement’ pattern followed in the Mongolian pastoralism. Four major season camps are observed as *zuslan* (summer camps), *ovooljoo* (winter camp), *khavarjaa* (spring quarters), and *namarjaa* (fall quarters) (Honeychurch 2015, 90-104).

The harsh weather condition in Mongolia is also known as ‘period of hunger’, and can be observed during the late winters and early spring, when low temperature for a longer period, and harsh winds together with snowfalls results in extreme conditions. Due to which livestock loses their weight significantly and in the absence of pasture growth they remain at high risk. The seasonal condition weakens the livestock and

makes them more vulnerable to survive the extremity of weather. It is observed that out of four season pasture camps, it is the winter camping which is considered important time for the survival for the family's herds. The location of the winter camps sites are considered valuable which "must provide a setting that gives protection from weather, adequate storage conditions for fodder, and good nearby pastures that can be held in reserve during other season and are accessible despite the snow cover" (Honeychurch 2015, 90-97). Hence, the movement pattern in Mongolian pastoralism and social and customary events, ceremonies, rituals found to have fascinating resemblance with the seasonality of pasture accessibility as well as the food availability. The four seasonal camps strongly reflects the preparedness of herders for harsh and extreme weather conditions observed in Mongolia, and a strategic move to escape the situation of food crisis as well as improving the accessibility of herd to good pasture lands to protect their animals against herd loss.

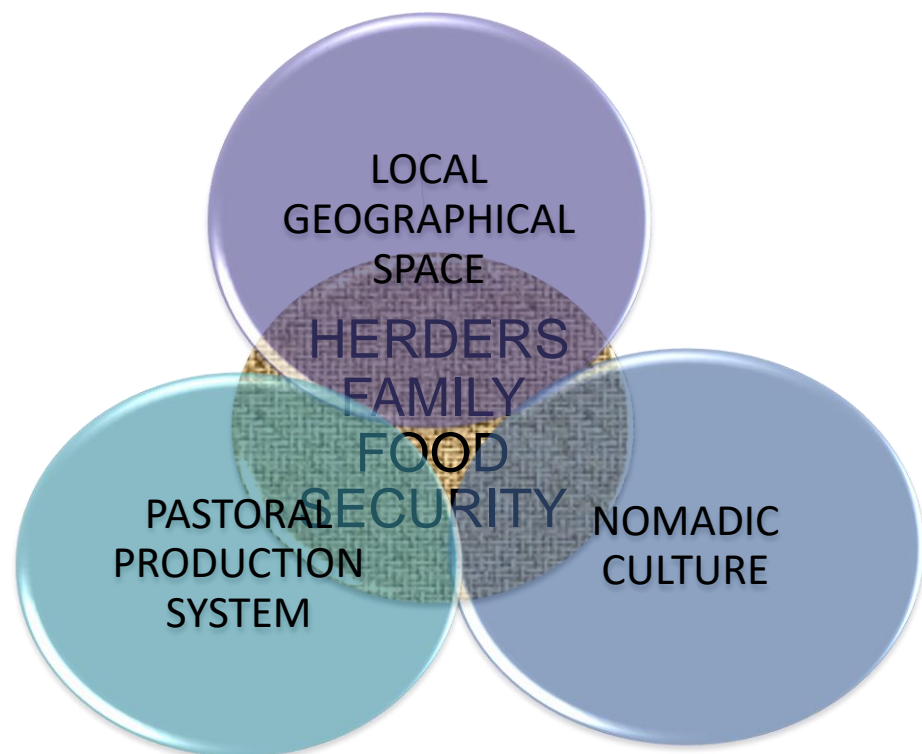
The winter and the early springs are observed to be the season of "greatest hardship for animals" due to "prolonged low temperature winds, and snowfall" as animals "lose a significant portion of their body weight" (Honeychurch 2015). The same time-period of winter and early spring are also identified as 'hungry period and seasonal availability of food was completely exhausted or very limited for this time period. The seasonality of food availability of food deeply influence the livelihood of Mongolian herders as they suffer maximum herd loss as well as family food insecurity during this phase of time which stretches between winters and early spring season.

Herding is observed as more isolated activity during the cold season, but but with the late winters and the onset of spring a remarkable feature of social exchange, kinship celebrations, family gatherings, ceremonies were observed when compared with the other seasonal changes of time . In several studies, it appears that these social exchanges have remained integral part of the nomadic culture and communities and constituted as important feature of the social life of the nomads. These social exchanges are most prevalently seen in the form of family gathering for celebrations, like the lunar New Year called '*tsagaan sar*' in the late winter which offers an occasion for extended family gathering, ceremonial visits between households, and exchanges of information and planning for spring and summer (Honeychurch 2015, 90-91). This indicates a deep interconnect between the seasonality of food

availability, social exchange and the food security within the Mongolian pastoralism as well as its movement pattern which still holds the key to sustainability of Mongolian grasslands. Changes in any one variable like mobility of the pastoral system, or the social exchanges, can trigger a situation of system collapse, both in the form of the excessive herd loss, as well as acute food crisis. The system collapse can be recovered, but in case of complete neglect, may cause irreparable damages which might be calamitous for the sustainability of the local food and agricultural system.

It has been examined that social exchanges, such as, extended family gatherings have nurtured the stronger bonding of kinship with the family and also provides economic and social security and support to a family in crisis, like “redistribution of food and monetary resources... to support any household in crisis” (Honeychurch 2015, 91).

Fig 5.1 Interaction between Local Geographical Space, Nomadic Culture and Pastoral Production System reflecting the Herders Family Food Security



Source: Authors Illustration

In essence, it can be clearly established that it is the deep-rooted interaction between local natural geographical space, the nomadic culture and the pastoral production system all together which is purely reflected in the herder's family food security (Fig 5.1).

5.7.2 A Traditional Way to Sustainable Agriculture and Food Security

Food has remained an integral part of nomadic culture around the world and has a special place in everyday life as it is the giver and sustainer of life on earth. Nomadic food mainly comprised of animal products, for nomadic herders in Mongolia, animals are their food, their means of transportation, their source of entertainment, in essence their life and livelihood and are considered as the real strength behind the invincible military strategies of the 'Great Mongol's King'- Genghis Khan (Konagaga and Maekawa 2013, 13). The five animal concepts has remained as the essence of the traditional Mongolian pastoral production system, which is newly reassessed as highly sustainable animal breeding practices which have immensely contributed in preventing the delicate Mongolian grassland from overgrazing. It is considered as a highly scientific approach for allowing a herd-composition of five animals that all are having different dietary preferences for pasture plant species. The elasticity in the dietary preference reduces the stress on single pasture plant species and highly valued for preventing overgrazing. According to Mongolian respondents whom this researcher had interviewed, "...five animal concept is still widely used and is very much popular".³ Another Mongolian respondent Bukhchuluun described that the "...Five animal concept is the core of the traditional animal herding in Mongolia and it is still in practice!".⁴ It is believed in certitude that the five animal concept is the best possible way to sustain the exquisite grasslands in Mongolia.

Mongolian climate and complex geography have allowed nomadic pastoralists to nurture five types of animals – sheep, goat, cattle (mainly yak), horse and camels. This is referred to as the 'five kinds of animals' or the 'five animal concept' in

³ Interview of Jargal, Battsetseg and Sodoo on 12 September, 2018, taken by this researcher and assisted by Prof. William Honeychurch (Yale University, USA).

⁴ Interview of Bukhchuluun on 12 September, 2018, taken by this researcher and assisted by Prof. William Honeychurch (Yale University, USA).

Mongolia (Goldstein and Beall 1994, 35-38). Mongolia is beautifully defined as the ‘land of five animals’, and all are “emblazoned on its emblem – the horse in the center, with rider, the cow, which includes yaks; the sheep, the goat and the camel” (Montagu 1956, 64). It was further stated that “on these five animals depends the prosperity of the country” (Montagu 1956, 64). A true to reality description of Mongolia by Ivor Montagu (1956) truthfully deserves praise. The value of five animals is analogous to ‘five jewels of Mongols’. Surprisingly, it is not just the rearing of five different animal species but also the population of each of the five species has to be maintained in a traditionally defined ratio for a perfect herd-composition designed to preventing overgrazing as well as maintaining a high level of family food security for the nomadic herders.

In a study of the Moost district in Altai mountains in Mongolia, it has been examined that, “... 61% of the livestock are sheep, 6% goats, 7% yaks and 3% each are horses and camels” which provide livelihood for the nomadic herders (Goldstein and Beall 1994, 38). The value of the animals in the nomadic culture was well narrated by a herder as he said that “the animals are our food and money. They give us dairy products and meat to eat, dung to warm our *ger*, and wool and skins to our felt and clothes. We look after the livestock well, and they give us what we need” (Goldstein and Beall 1994, 38).

But these traditional practices got a major blow, specifically after Mongolia’s transition to new economic order based on the market economy (Fernandez-Gimenez 1999). A major shift in the herd-composition was observed from a period of 1992 to 2013, with high preference for goats, mainly because of high cashmere price in the international market and meeting the global demand for cashmere (Khishigbayar et al. 2015, 9-10). It was in the year 2003 “the national number of goats surpassed sheep ... for the first time in the history of the Mongolian plateau” (Maekawa 2013, 241).

Not just the herd composition, but the livestock density has also exponentially increased as a result of the increase in the small herd owners with an immediate impact of the transition to the new economic and political order. This drastic shift in the herd-composition directly resulted in a significant reduction in the shrub cover, and severely impacted the species richness and diversity, specifically in three zones –

steppe, mountain steppes and desert steppe, primarily from 1994 (Gunderson 2000; Mori et al. 2013; Khishigbayar 2015, 107).

In another study, it has been observed from the instrumental records that, Mongolia has generally warmed by 1.6 degree Celsius mainly since mid 20th century and even experienced catastrophic drought conditions mainly from the late 1990s (Batima et al. 2005; Pederson 2013, 11). These studies give strong indication that, transition to market economy and shift in the herd-composition, exponential increase in goat population, altogether resulted in severe environmental stress and plant species decline in Mongolia.

For instance, *A. Frigida*, one of the most abundant shrub species in mountain-steppe zone significantly declined, directly as a result of increase in the goat population. It was observed that, *A. Frigida* is highly palatable to almost all livestock species, but most preferred by goats and sheep (Damiran 2005; Khishigbayar 2015, 106-107).

In a similar study it was experimented that in grassland region with no shrubs, goats preferred to graze *S. Krylovii* (Fujita et al. 2013; Khishigbayar 2015, 106-107). The severe decline of vegetation cover, specifically shrubs and an increase in the sedge cover gives a strong indication of the ‘grazing-associated degradation’ of Mongolian pastureland (Khishigbayar 2015, 106), specifically in the mountain-steppe zone, the “decrease in highly palatable mountain grasses, strongly supported the notion of vegetation cover change due to unsustainable grazing practices” (Hilbig 1995; Gunin et al. 1999; Fernandez-Gimenez and Allen-Diaz 2001; Khishigbayar 2015, 106). A young Mongolian respondent in his late 20s, Bukhchuluun closely observed nomadic pastoralism from a very tender age while growing-up with his grandparents in Bulgan province. With great pride and dignity, Bukhchuluun recounted that

“...basically I was a herder until I was 15”. His grandparents were really concerned about the sustainability of the grasslands due to increasing numbers of goats. He narrated that “...My grandparents, would say to not have many goats in the herd, because they tend to eat the roots of grasses and those grasses would never grow again. Also there are some other pastoralist’s rule that aimed towards protecting the environment, that is essentially for the good of the grasslands and sustainable use of them. But, now, I think, some of these are not followed. For example, people now tend to have more goats because cashmere is expensive product that gives tremendous income to the herders”.⁵

⁵ Interview of Bukhchuluun on 12 September, 2018, taken by this researcher and assisted by Prof. William Honeychurch (Yale University, USA).

This severe degradation of pastureland, and climatic changes, together, has threatened the sustainability of the pastoral production system as well as the food security of the entire nation. The increase in sedge, decreasing shrubs, and decline in the highly palatable mountain grasses as well as increase in *S. Krylovii* (Khishigbayar 2015, 106) which is drought tolerant, all indicate that severe climatic and vegetation cover changes have taken place and can anytime trigger an emergency like situation for the food security of the entire nation. Besides, it has been resulted in radical change in the herders' attitude towards their herd and the way of herding.

5.7.3 Nomadic Food as the Future Food for Mankind

Mongolian nomadic foods, their preparation and preservation for extreme winter weather conditions, all are really fascinating to observe. It has been well narrated by Battsetseg, Jargal and Sodoo, a group of three Mongolian respondents that the "...food is central to every gathering in Mongolia. The way food was prepared or who prepare it the best are always part of discussions during these gatherings".⁶ People from the outside world really have limited knowledge about the fact that nomads are not just hunters and gatherers but have their unique set of traditional practices to prepare their food. For Mongolian herders, milk and milk products have special place in every Mongolians diet, high content of animal's fat is very much a part of food culture. Every part of the animal body is used as food, wastage of food is synonymous to sin.

In a study by World Health Organization (WHO) it was examined that, "Mongolian consume a large percent (88%) of their fat from animal product such as meat, milk, butter, cheese and the *bordgiz* pastries that are deep-fried in lard, then any other people in the world" (Goldstein and Beall 1994, 48). Yet, when we talk about the cholesterol levels in Mongolian, it was established in studies that the average level of cholesterol was within the normal range among the nomads in Moost district in Mongolia (Goldstein and Beall 1994, 48).

Traditional diet of the herders is mainly constituted of milk and meat products. Numerous local delicacies are prepared and stored for a longer period so that it can be consumed in harsh weather conditions when milk is available in less quantity. Milk is

⁶ Interview of Jargal, Battsetseg and Sodoo on 12 September, 2018. Taken by this researcher and assisted by Prof. William Honeychurch (Yale University, USA).

transformed into different forms of nomadic food delicacies. These domesticated animals are the source of food for herder's family and ensure their long term food security.

The traditional Mongolian nomadic food products of ancient origin have a special place in nomadic life. Few important traditional Mongolian food products, specifically consumed by herder's family are made from milk. The making of different food items from milk undergoes a specialized home-made process of food preparation – first yogurt, then butter, and then cheese and other products are prepared (Goldstein and Beall 1994, 49). Brunn (2006, 64) has observed the Mongolian herders diet and identified common dishes and drinks of everyday life. These are mentioned below:

1. *Tarag* (yogurt) is made from sheep, goat and cow milk.
2. *Orum* (raw butter) is made from sheep, goat and cow milk. There are varieties of butter – *shartos* (yellow butter) is basically boiled *orum* and *tsagaan tos* (white butter) is mixed from boiled *orum*, *aarts* (dried pulp of milk), flour, *eezgii* (curd) and sugar. The herders prepare and preserve their food in a unique way, for instance, the butter removed from yogurt mixture is then filled in the sheep stomach bag and stitched into an airtight bag, surprisingly the butter remained fresh and naturally preserved for all through year (Goldstein and Beall 1994, 49).

Nomads even use the animal parts for storage of their food and as utensils for food preparation. Without using any preservative or advanced packaging high-cost technologies, nomads have their own highly scientific, sustainable, and affordable and low-cost traditional technologies for maintaining their food security, even in the remotest areas with extreme weather conditions.

3. *Eezgii* (curd), is milk milked with yogurt and boiled to reduce into thick paste. These are sun dried and used during winters, as milk soup (Brunn 2006, 64). They are as hard as stones, and are easily stored and kept for harsh winter seasons, when milk is less in amount.

4. *Airag* and *Arkhi* or *Nirmalike* – *Airag* (*Kumiss*), is fermented mare's milk. Mongolian pastoral nomads have still retained such traditional drink which is highly valued and has special place in nomadic lifestyle. Surprisingly, the developed world has now started showing great interest in non-cow's milk (NCM) because of health benefits and research studies which places high nutritional values to camel's and mare's milk. The growing allergies with cow's milk and its high fat content are also strong reasons behind this shift in the preference for traditionally valued food items (Bat-Oyun et al. 2015, 7-8).

Nomad's milk vodka is also prepared from distilled *airag* and *tarag* which has 10 to 12% of alcohol and is enjoyed by nomads. It is known as '*Nirmalike*', a traditionally prepared nomadic drink from milk (Goldstein and Beall 1994, 49). Whereas in the study of the Khotont sum by Brunn (2006, 64), the nomad's milk vodka is named as '*Arkhi*'.

5. *Suutei tsai* (salty-milk tea) – the salty milk tea is served as a part of nomadic tradition. The crushed brick tea mixed with milk, salt and sometimes butter, is taken in large quantity by the nomads (Brunn 2006, 64; Paley 2013). The traditionally prepared salty-milk tea is considered healthier than the tea mixed with sugar. It was examined that in high altitude salt is good for the rehydration of body, and as compared to sugar rock salt is easily available and add flavor to the tea (Paley 2013).

5.8 “Environmental Sustainability and Food Security: Dependent on Traditional Practices of Livestock Rearing”

With this study, it was hypothesized that in Mongolia, environmental sustainability and food security is highly dependent on its traditional knowledge and practices of livestock rearing. For resurrection of the livestock production system, it has become crucial to follow the sustainable agricultural practices which remained innate to the traditional Mongolian livestock production system.

Seeing the situation of acute economic crisis, devastation of rural economy and the degradation of pastureland in Mongolia, it has been warned that a new economic model must be adopted and give prime place to the rebuilding of sustainable livestock production system which has affirmatively stronger potential for the revival of not just

the rural economy, but also for strengthening the economic foundation of Mongolia, as animal herding still lies at the core of the economy and deep-rooted in the nomadic culture of the country. It clearly indicates that it is the traditional nomadic herding which preserves the '*Mongolianness*' of Mongolia, and constitutes the basic identity of Mongols, which can never be parted from the 'Great Mongols' (Jha 2015; 2017, 294-303; 2018, 31).

It is closely observed in this study that traditional nomadic practices form the basis of agricultural sustainability and food security, specifically at the household level for the herders. Everything is well planned and placed so well in the system that neglecting traditional livestock production practices could even cost an overall collapse of the pastoral production system and its delicate link with the food security of both the human and the non-human world.

Mongolia is a land of nomads, and their five animals define their rhythm of life. Pastoral production system is inseparable from its roots that deeply lie in the nomadic traditions woven around everyday life of the Mongolian herders. Changing climatic conditions, and increasing severity of *duzd*, which is an extreme winter conditions, are few of the major issue which portends an intractable catastrophe. The Mongolian respondents described that "...more and more modern technology is being used in the pastoral production system and this place the traditional ways of production in danger... for example, fodder used to be a 'collective activity' and done using manual labor. Now families do it independently as each have Chinese tractors".⁷ These Mongolian respondents also recounted that the preparation of sour cream "...nowdays is made by using Chinese equipment that spins all the milk and separates the stuff". This clearly indicates towards the increasing dissatisfaction among the Mongolians that how their traditional technology is being replaced by the alien technology.

The land use changes and the role of frequency and flexibility of the nomadic pastoral movement system are needed most perspicacious dealings. Land use changes have severely affected the pastoral system in Mongolia as growing urbanization not just stressed the land but forced the humans to live in a baleful condition. Environmental degradation has almost touched the pinnacle in terms of air pollution, water pollution

⁷ Interview of Jargal, Battsetseg, and Sodoo on 12 September, 2018, taken by this researcher and assisted by Prof. William Honeychurch (Yale University, New Haven).

and depletion, land pollution and desertification. Mongolia is no more in a state to neither sustain its pristine grasslands nor do their nomadic heritage, and it is only with the resurrection of the traditional agricultural practices, one can think of a better and food secure future, otherwise everything appears so bleak. Mongolia is not just land locked between Russia and China, but is also locked between the modernization and its nomadic traditions. It is really hard to choose anyone, when both are needed for a much required action.

5.9 Summery

Despite undergoing massive transformation in the agricultural system after the transition to the market economy, it has been clearly observed in this research study that the traditional Mongolian pastoral production system holds the key to the food security of Mongolian herders as well as having immense potential to rebuild the grassland sustainability. The sudden transformation of agricultural system to a completely new technological base has one hand uprooted its link with the traditional agricultural practices, whereas on the other hand, the improper dissemination of highly advanced modern agricultural technologies under the newly adopted market economy led to a situation of agrarian crisis in Mongolia. A completely lopsided development created a huge gap between the rural and urban Mongolia. An atmosphere of uncertainty and scrapping of government support from the Mongolian herders has made them one of the most vulnerable and food insecure group within the country.

Concerning the diversity in the pastoral production system in different parts of Mongolia and its salient features are remarkably observed in this research study which provides immense assistance in understanding the relevance of the traditional Mongolian pastoral production system, herder's knowledge about the traditional practices, and many practices which are still in use, namely, the *otor* system, which provides means for survival in the harsh weather condition of Mongolia. The significance of mobility in pastoral production and the way social networks and social exchanges have worked for the Mongolian herder's family food security are identified as few of the remarkable features which are having immense potentials to deal with the situation of food crisis, specifically within the Mongolian herders. The value of nomadic food for safeguarding the future of mankind is another important area which

needs to be addressed and could possibly yield well-being of its people, although it requires much deeper assessment and studies.

The identity of Mongolia and its glorious ancestral past of 'Great Khan', all are deeply rooted in the traditional pastoral production system, which remained the source behind the invincible military strength of the Mongols. It interestingly preserves the identity of Mongols and Mongolia. The relevance of traditional Mongolian pastoral production in ensuring the food security among the Mongolian herders is an area which needs an in-depth analysis and has been given its due acknowledgement in the programmes and policies initiated by the government of Mongolia on the food security of its people. The government of Mongolia designed and implemented numerous policies and programmes on food security where much of the focus has remained concentrated on increasing the food production, but the issue regarding the access to food has never been given much priority. It is surprising to notice that it is the herders and the urban poor, who constitute the most vulnerable and food insecure section of the society in Mongolia.

The assessment of the government policies and programmes has the potentials to address the real problems concerning food and agricultural system and the way it impacted the family food security, specifically within the herder's community. The projects and programmes concerning the food security situation, which are applied so far, have remained important tools to observe and assist in identifying the gaps in the system and also provide scope to take forward our research study.

Chapter 6
**Government Programme and Polices on Food
Security**

In Mongolia, numerous policy and programmes on food security has been initiated by the government. From ‘the Third campaign’ to ‘the food stamp’ programme, different measures have been undertaken by the government, to ensure the food security in Mongolia. Mongolian economy is really going through a tough phase of economic crisis at least since 2014 and has not remained untouched with the global economic meltdown. In this situation of economic crisis, heavy indebtedness and severe winter condition of *dzud* have increased the livestock mortality many fold, thus contributing to the steep rising of food prices and food inflation, specifically after 2008, which has immensely threatened the food security of the entire nation.

Nevertheless, Mongolia emerged as a strong economy which successfully attracted the FDI (Foreign Direct Investment) and it quickly resulted in sudden economic boom with country’s GDP (Gross Domestic Product) touching a new pinnacle of more than 17% in 2011. However, in the initial years of 1990s, Mongolia’s transition to new political and economic system was really challenging. Government programmes and policies completely changed its orientation, from state-controlled socialist policies to aggressive market oriented privatization programmes. The farm-collectives in the form of *Negdels* were brutally dismantled, the government jobs got evaporated and so do the assured salaries and social security network, which specifically impacted the herders and those who were associated to the livestock production system.

Agriculture and food system in Mongolia is facing serious crisis which has taken a shape of great agrarian unrest. In 2008, the world food crisis and surging food price inflation severely impacted the food security. Specifically, the small scale herd owners faced acute crisis. The increased severity of the deadly *dzud* or ‘white death’ resulted in sharp increase in livestock mortality. This was also believed to be a major game changer and posed threat for maintaining healthy level of country’s food security. The government of Mongolia initiated number of programmes and formulated policy concerning the food security, maintaining a sustainable land use for preventing the degradation and desertification of delicate Mongolian pastureland.

But it was really surprising to see that not much have been done to retain the traditional Mongolian agricultural knowledge and practices which are proven to be of high scientific value and relevant for sustaining the entire pastoral production system on which the food security of the entire nation is completely dependent. This chapter

is going to explore the government programmes and policies and their effectiveness in sustainable agriculture and ensuring the food security of the country.

Food security has become a vital factor in the current scenario of global economic crisis and followed with high fluctuations in the food price and energy price. This economic turmoil has impacted almost every country of the world. Mongolia is not an exception, and is facing now one of the worst situations of financial debacle, and its currency 'tugrik' is now rated as one of the worst performing currencies in the world. This is really going to be a tough time for the government to overcome the budgetary crisis, which may affect the food security of the entire country if proper measures are not taken to resurrect the livestock production system. Hence, the government's initiatives concerning the food security programme needs a deep introspect.

6.1 Food Security and Food Sovereignty: Development of the Concept

Food security has become an important term which gained much importance after the rising food prices and the global hunger. Food security is an imaginary term, but has really become vital for every nation or region. Food security is an integrated term which is much more than its four pillars of food availability, food accessibility, food utilization and food safety. In fact, it is much beyond that, it must also include the food and agricultural system, agricultural technology, water security as well as the energy security and food sovereignty of any nation or a region.

It has become really complicated to clearly identify direct threading or interconnect, as every facet related to food is dynamically interwoven and interlinked, that it is really difficult to explain it on few basic parameters. It cannot be studied in isolation, it is very much part of the agricultural system, the soil, the water, the climate, the culture, the religion, the tradition and a highly specialized art of growing food by the farmers. All together constitute the vital parts of food security, everything is integrated and interconnected, so much so that separating it or ignoring any part of it would really impact the truthful justification or assessment of food security of any country, or a region.

With time the concept of food security not just gained more importance, but has also evolved within much more diverse ways, and with the requirements and emerging issues it keepson evolving itself as adynamic concept.

Food sovereignty is another vital aspect associated with the food security of a country which gained much of its strength after the huge control and stake of the corporate giants on global agricultural and food systems. Food sovereignty has become a core issue concerning the current situation where food and agricultural system is entirely controlled by a few global corporate giants, who not only controlled the food commodity prices but have also influenced the food choices and use of agricultural technologies under a single coded global food and agricultural system.

The fluctuation in the fuel price has directly influenced the food commodity prices by increasing the transportation cost, and as an immediate impact increased the food insecurity among low-income nations with extremely low purchasing power. This replicated with the situation, which can be observed as in the case of food crisis of 2007-2008.

6.2 Food Price Shock, Food Inflation and State of Food Security

Food security is defined at the World Food Summit (FAO 1996) as a state “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life”. Food security is a concept standing on four pillars which include - food availability, food accessibility, food quality, food safety and its use.

With rising cost of cultivation, food articles have become more and more expensive and for the world’s poor more than 80 percent of their household income spent on purchasing food articles. Even after the food is availability in the markets, the low purchasing power and surging food prices create a huge gap in terms of the accessibility to food, especially for the poor. Food security differs according to the purchasing power, community, gender, caste, colour and creed. It also varies according to the national level, sub-national level and household and individual level. Hence, every country or region represent different set of social, economic, cultural, political, as well as environmental characteristics according to which the food security guidelines are prepared (McDonald 2013).

World over, the food and agriculture systems had undergone fundamental changes which modified the earlier systems deep down from their roots. The wave of technological change in agriculture had almost touched every local agricultural systems existing on the earth surface. The highly globalized world, in which

transnational national corporate giants have expanded their reach in every corner of the earth surface, the existence of the local food and agricultural systems is difficult to imagine off. Worldwide the local food and agricultural systems were forced to give way to global food and agricultural systems. Food security is under the threat from the food price shocks and farmers growing unrest. To remove the global hunger and malnutrition we need a food secure world which can only be achieved with sustainable food and agriculture system, only then we can think about peace on Earth.

The concept of food security was highlighted during the World Food Conference (1974), in which the focus was on increasing food production on food-deficit countries and the setting up of coordination system of national and international grain reserves. Food security has become a vital security issue at almost every level, which can be classified into different levels. These are the global level, regional level, national level, sub-national level, household level and the individual level. Out of these levels the most important and the vulnerable is the household and individual level of the food security.

6.2.1 Food Price and Global Food Security Concern

The surging food prices in this globalized world pushed millions of the people into the deep well of the poverty and hunger. The situation has become so grim that the food price shock in 2008 resulted into the outbreak of riots for the food and spread on a significant region, covering Egypt to Haiti and Cameroon to Bangladesh (UNEP 2009).

The skyrocketed food price deeply impacted the lives and livelihoods of many, as most of the low income group devotes almost 70-80% of their daily income on food. This has driven as large as 110 million people under the poverty net and widens its base by adding 44 million more people who was earlier not the part of this category. Even lower middle class population now fall under the poverty line. It's ironical that, one hand the agricultural technologies are rapidly undergoing changes in the name of development and on the hand the poverty net broadens its reach.

The FAO (Food and Agriculture Organization) index of food price clearly points towards the unsteadiness in the food price rise levels. In 2006, the food price increased to 9% which plunged to 23% in 2007 and further surged to as high as 54%

in 2008 (FAO 2008). This signifies that, globally food and agricultural systems have become much more volatile in terms pricing of commodities which would directly impact the food security, especially for the vulnerable groups of the globalized world.

Worldwide the rising inflation has become an area of grave concern, more importantly the food inflation remained even higher than aggregate inflation. In the recent past, the world has seen dramatic increase in both the food and fuel prices. The petroleum based industrial agriculture requires fuel and electricity for food crop production and transport of agricultural goods further added cost (Wright 2009). The increase in fuel price has a much perilous effect on the final food price paid by the consumer (World Bank 2008; Wright 2009). The sudden rise in food and fuel prices increased the inflation in many countries of the world. It has been observed that in 2007, many countries and regions, like in Europe and Central Asia overall inflation averaged to 10 percent, whereas the food inflation was 15 percent higher than the aggregate inflation and more particularly the bread and cereals inflation was as high as 23 percent (Alam et al. 2008).

There is more pressure on world biodiversity and on numerous ecosystem services. It has been estimated that biodiversity is directly responsible for 40 percent of the world's economy, mainly contributing to the agriculture and forestry sectors. More importantly, it is the world's poor population who directly depend on biodiversity for their lives and livelihood. Around 70 percent of the world's poor lives in the rural areas and directly depend on biodiversity for their survival and food and social security (CBD 2010).

Pastoralism is one of ancient and important economic and cultural way of life, primarily dependent on biodiversity and ecosystem services like food, fodder, water, etc. The extensive pastoral livestock production systems cover about 25 percent of the earth's terrestrial surface and remain a way of life for about 100 to 200 million population worldwide (CBD 2010). With extensive research it was found that, pastoralists and their traditional pastoral livestock production systems were able to maintain a healthy balance with its natural environment which was considered highly sustainable. Pastoralists with their experiences gained a unique and deep knowledge about their local environment and built a healthy relation by adopting practices which had left almost zero footprints on environment. But it is ironic that such healthy

practices were discarded and considered obsolete for giving way to the modern and highly industrialized agricultural technologies. Hence, it has become necessity to adopt sustainable agriculture to overcome the uncontrollable calamity in the form of global food insecurity, especially for the world's poor and marginalized.

6.2.2 Agriculture and the World of Patents: A Remote Control of Corporations

In agriculture, patent remains as the central tool for extending corporate control over common property resources and turning them into private property, which immensely possess threat for the food security of mankind. The best way to represent patent is that, it function just like remote controller in the hands of corporate giants which turn the common property resource like seeds or live animals (in Agriculture) into a private property resource of the corporations (Jha 2012, 50-53).

With the help of legal tool of patents, these agro-corporate giants were able to establish monopoly over the global seed market as the seeds freedom remains as the major obstacle for seed corporations (Shiva 2005). Patents, in a way helped these corporations to eliminate their competitors by restricting further research on the patented seed. And as the local and small competitors of these corporations get eliminated, these corporations establish their empire which are extended among various nations and are well known as Agro-corporate giants. Few of these corporate giants control the entire agriculture and food system of the world. The role of patents in monopolizing the market is skilfully narrated in the revolutionary work 'Technological change in Agriculture: locking into genetic uniformity'. It is stated that,

“Patent enforcement is an important tool in building corporate empires and eliminating competition. Monsanto, which has staked much on its quest to become the ‘Microsoft of engineered foods (Morse, 1996), has acquired companies, and stakes in others, reflecting its belief that patents will be key source of competitive advantage in coming years” (Hogg 2000).

The power of agro-corporate giants and their control over agricultural policies of weak nations can be well understood. The patents over life forms like seeds and plants provided the legal authority to corporate in empowering themselves and over powering decision making power of democratic country (Shiva 1996; Laird and Kate 1999; Jha 2012, 51).

There is no freedom of choice, neither in the hands of farmers nor to the consumers. The farmers are forced to go for genetically engineered seeds and the consumers have no other choice but to eat these genetically engineered food as the system of eco-labelling of GM and non-GM food. The real motive remains as the corporate empire building and eliminating the choices of herders or farmers as well as the consumers.

With monopolization of the livestock breed or seed market, no choice has been left with the producer side or with the consumer side. Each and every step of science and technological research and development works under a highly controlled environment where the decision-making power remains in the hands of corporations that put their money to build the capital for research and development (Shiva 1996; Nussbaum 2011; Jha 2012, 51-52; Vidal, 2016). An era of neo-colonization has started in the name of agricultural development. Peasants and herders have again become the slaves of transnational corporations (TNCs).

6.2.3 Rising Cost of Cultivation and Increasing Alienation with Local Natural Resources

As the agricultural production increased many folds, so do the cost of cultivation. With the application of chemical fertilizers and pesticides the local soil and water degraded and within a decade agricultural land become degraded, water for irrigation polluted and unfit for cultivation (as it become highly saline) (Wright 2009; Datta 2009; Jha 2012, 54). With the hybrid animals bred in large industrial space, aloof from the local natural environment of grasslands, and the HYV seeds, this monoculture of agricultural system reduced the agro-biodiversity which long remained as the core factor in achieving the food security (Haverkort and Millar 1994, 51-64; Hogg 2000; Jha 2012, 54).

Levins (2008), an ex-tropical farmer turned Harvard University ecologist, bio-mathematician and philosopher of science, analysed the perils of modernization of agriculture. He pointed out that, in the enthusiasm to increase the agricultural production scientists failed to recognize the problem associated with it, like resistance development in pests due to the intensive use of pesticides; monoculture increases vulnerability to invasion by pests and to unexpected climatic events, and that agribusiness disrupts rural life and displace populations. It was not just technological

transformation but the transformation of entire agrarian structure and the role played by the cultivators (Iyer and Arora 2010; Jha 2012, 51-54).

The modern technology forced the farmers and herders to be a part of market economy and exposed them to market risks which were not there in traditional agricultural system. Farmers become more vulnerable, and their attitude towards agriculture changed as all these influences have direct impact on traditional values, traditions, and economic linkages (Rorabacher 2010; Vasavi 2010; Jha 2012, 54-55). Agriculture has become a challenging occupation where farmers are on the sharp edge of the technological change. It has become impossible especially for the small and marginal farmers to invest in such an expensive input technologies, so they got struck into the credit trap of money lenders and micro-finance institutions which ultimately cost their lives or their mother-like farm lands (Karunakaran, 2010; Jha 2012, 54-55).

6.3 Food Security Situation in Mongolia

Food Security is one of the much talked word in the present world, gripped under the global economic crisis, and stuck with ever escalating food price instability (Wright 2009). For almost a century, the dominance of agricultural technology over the global food and agriculture system extremely transformed the entire food and agricultural system and some of the intractable changes in environment have really threatened the food security of the both human and the non-human world. The country of nomads got jolted with the sudden system change and its transition to market economy, a completely new economic order with a different political setup, from communism to democracy, it left deep rooted impact on every life.

It is hard to imagine that something has so badly altered the grasslands of steppe in the Mongolian Plateau, which remained home to the nomadic herders and to their five-animals. The Government of Mongolia, in the beginning of new era of 'market based economy', had shown least interest for the nomadic herders and nomadic pastoral system. But presently, the government has again started mending its mistakes in the form of the formulation of policies and programmes based on agricultural sustainability and food security.

Mongolia is a land locked country which lies in-between the world major powers, Russia and China. With a vast land area of 1.6 million square kilometers, the country

is endowed with rich grassland ecosystem, mountain ranges, rivers and mineral resources. The climate is full of extremes and the temperature ranging from -45 degree Celsius in the winters on steppe to +45 degree Celsius in summers on the Gobi Desert region of Mongolia. The land locked situation and long distance from sea results in one of the extreme continental climate over Mongolia (MOFALI 2009). Harsh climate and extremely short summer growing period, which is only about 100 to 120 days make cultivation of crops a very limited activity. For a long period of autumn-winter-spring season nothing grows and the land suitable for cultivation is less than one percent of the total land area (MOFALI 2009). Traditionally, nomadic herding and livestock production is the main economic, social and cultural activities in Mongolia which remain as the relic of ancient history of the mankind and agricultural sustainability in the pristine environment.

6.4 Post-1991 Transformation of Food and Agricultural System

After the collapse of Soviet Union in 1990s, Mongolian experienced abrupt changes in almost every sphere of their lives. Honeychurch (2010) in his in-depth study on nomadic pastoralism based on archaeology, history and ethnography of the region examined that Mongolia's transition to free market economics after the collapse of Soviet Union was considered fatal for the rural sector which is still recapturing from the massive blow. 1990 was considered as the year of 'dual revolution' which blew away the seventy years of Soviet system of command economy and moved to free market economy under the democratic system. Honeychurch (2010) applied archaeological research and investigated the impact of the transformation on the Mongolian nomadic pastoralism and the future of nomadic community and their livelihood. He observed that the rural sector was uprooted completely because of neglect of services, transport infrastructure, communication and direct market access to herding families. All these acted as push factors for the reverse migration towards settled and populated areas where they can sell their products and for education and medical services. The modernization of Mongolia by the international funding agencies guided the country's developmental policies which produce lopsided growth between the rural and the urban Mongolia and created severe imbalance. The author observed that the past holds the keys not just for the present, but also for the future of Mongolia and described the true value of narratives of Nomads.

Change is necessary with time, but one must check the direction of development and must take guidance from their ancient past. When we look at the history of agriculture, indebtedness remains as a classic of feature of farmer life in India (Gyanmudra 2010). Even in the *Vedic* period, various literary works were given special attention towards the state of '*Varta*' (economic activities), especially agriculture and kings of the state were given strong instructions to focus their attention on the cultivators, that they are not exploited, given loan on an interest rate of one percent, the king should also ensure that they (farmers) have not exhausted their seeds (Bajaj and Srinivas 1996). It is well understood that system of borrowing always remained intrinsic part of the traditional agricultural systems worldwide and stronger social networks gives them a feeling of togetherness. The cases of farmers' suicides were rarely reported. Hence the answer to the present agrarian crisis and the complicated issues concerning food security of mankind very much lies in the pages of history.

The land use and the land rights remain few pivotal as well as difficult areas which substantially got jolted during the phases of transition from community control, to state control, and finally to the free-market based control. Muller and Bold (1996) in their remarkable study examined and analyzed that the pastoral land use in Mongolia require an urgent attention in the form of new land regulation especially taking into the concerns of the nomadic herders, as the pastoral livestock production still remains the backbone of the rural economy in Mongolia.

6.5 Major Government Programmes and Policies on Agriculture and Food Security

The government of Mongolia has approved many programmes for enhancing the food security of the entire nation. Most of the initiatives were brought with the collaboration of international funding agencies like World Bank (WB), International Monetary Fund (IMF), Asia Development Bank (ADB), United Nations Food and Agriculture Organization (FAO) etc. Mongolia's transition to the market economy brought new streams of change in the functioning of the government and a completely new economic order was established purely based on a new economic order of the market economy strongly connected with the forces of the global market and the process of globalization.

The promotion of privatization process in different sectors, specifically the livestock sector was implemented with painstaking changes in the legal and institutional framework; and intense involvement with the international financial organization, which included their membership in the United Nations. The ‘liberalization in trade and investment policy, the privatization of state-owned enterprises, deregulation of the banking sector and lifting price control’, earned Mongolia a full membership in the World Trade Organization (WTO) in 1997 (Davaakhuu et al. 2015, 139). Mongolia was included firmly as a member in the World Trade Organization (WTO) without much concern about country’s economic and political turmoil, newly tasted system of market economy and being a weak nation. Small scale transition economy, which was seen as a weak nation and lacked decision making power as well as overdependence of the economy on China, specifically in terms trade, all these loopholes, made the nation more vulnerable both politically and economically (Soni 2005, 6-8).

Recent economic turmoil, especially the crashing metal price, high fluctuation in cashmere price and a steep fall in the demand from jolted Chinese economy, all together jeopardize the fate of Mongolian economy. It was examined that, ‘export revenue has fallen 6 per cent in the year to August 2013, with coal exports falling sharply (down 44 per cent in the year to August). Foreign investment has plummeted, dropping 43 per cent in first half of 2013, while Tugrik has depreciated 27 percent against the past two years’ (NSO 2013).

So far numerous policies and programmes have been adopted concerning the food security of Mongolia and for boosting the agricultural production in the country. Specifically, in the post-1991 period the new government had taken initiatives to rebuild the livestock production system to match the needs of the market economy and international market demands. The world food crisis which began in 2008 jolted the country and deeply impacted the food security of especially the poor section of the society (GOM 2011).

The great rural and urban divide and the unethical rural transformation made the government programmes largely ineffective and failed to touch the deep rooted problem of the agricultural system. The increased severity of ‘*dzud*’, an extreme winter condition which resulted in mass slaughter of livestock (GOM 2009a), the high

international market price fluctuations, escalating food prices and squeezing and declining purchasing power, all together have gravely increased its impact on food security to a much wider section of the society that it was before.

In this chapter, numerous policies and programs concerning the food security implemented in Mongolia after post socialist era, is discussed in detail and is going to analyze, specifically in the context of food security of nomadic herders and how it got impacted with the transformation of the agricultural system in the country. Beginning with the transition to the market economy, Mongolian economy had seen different phases of economic boom to doom. The livestock production system has always remained central for the economy as well as in maintaining the food security of its people, especially the small herders which constitute a large and important section of the nation. Mongols are deeply associated with nomadic herding and relate their nomadic culture and identity with it. The food security has become a vital factor in the current scenario of global economic meltdown and rising food prices. A country like Mongolia has not remained untouched with the global economic downturn.

Major government programmes and policies on agriculture and food security are discussed below and analyzed in detail for its effectiveness in terms of its role in providing food security in Mongolia. Few major programmes include the following:

- I. Green Revolution and the Third Avar
- II. Index based Livestock Insurance Programme, 2005
- III. Organic Farming Programme
- IV. Food Stamp Programme 2008
- V. National Food Security Program (NFSP), 2001-2007
- VI. National Food Security Programme (NFSP), 2009-2016
- VII. Mongolian National Livestock Programme

The government programmes and policies associated with food security, food and agricultural system in Mongolia remained at the focus of sudden economic downturn faced by Mongolian economy with a currency devaluation of as high as 300%, and ‘Tugrik became world’s worst performing currency’ in today’s word (Chi 2016). All the attention has now fixed on the revival and rebuilding of the livestock sector which had always remained crucial for a stronger and self-reliant national economy, but

could also assist in improving the food security of the country's poor. Few of the vital steps undertaken by the government of Mongolia, since its transition to market economy really needs to be focused on understanding the relevance of these programmes in food security of the poor people.

6.5.1 Green Revolution Programme (1998) and the Third Avar

Limited resources were allocated for the Green revolution programme during 1998, followed by the 'white revolution' programme in 1999. Both the programmes had completely modified the previously existing system of agricultural production. The Green revolution was implemented from 1997 to 2004 with an overall programme budget of USD 1.7 million (MOFALI 2009). This programme was further extended to the second phase in 2005-2010. Few of the major steps taken in this programme was the distribution of mechanized equipment to private agricultural producers at a subsidized rate with 50% repayment over a three-year period without any interest rate. These programmes specifically targeted the farmers involved in the cultivation of crops and vegetables.

The 'Third Avar' or 'third crop campaign', which is also known as the National programme crop-III, marked a beginning in the year 2008, a year of global food crisis, which really paved the way to come out from the situation of acute agricultural crisis and extremely high dependency on imported food. Cultivation remained limited to small portion of the land, but yet crucial for the food security of the entire nation.

The history of agriculture was explored by many, with concrete archeological findings it was observed that cultivation in Mongolia began during the Neolithic period and found to be fully developed practice in the Bronze Age (Dorj et al. 1971). The agricultural system in Mongolia was deeply observed by Pozdneev (1896-1898) during his expedition and was reported in 1847 with major focus on crop cultivation. He observed that cultivation with fallow period remained integral part of Mongolian agricultural system (Pozdneev 1896-1898; Konagaya 2013, 255-256).

Mongolian ethnographers with their extensive work and field study, made important observation and collected sensitive data and concluded that three types of traditional agriculture system based on the type of plough used. They include - western type, central type, and the southern type of cultivation. Only in the southern type of

cultivation system plough was not used and cultivation was done without using plough. In another finding it was observed that based on types of crops the traditional agricultural system in Mongolia was further divided into three types (Academy of Science in Mongolia 1979; Konagaya 2013, 256) which include the following-

- Fox tail millet type- a widespread crop cultivation type in Mongolia.
- Wheat and barley type- primarily practiced in western Mongolia.
- Vegetable farming type- mainly practiced by Chinese.

The share of agriculture sector accounts for 48.6 percent in 2000 which represents almost the half of the total strength of labour force. But soon after touching the peak it started declining gradually year by year and in 2014 it remained around 28 percent. Despite steady decline in the share of agriculture sector it still accounts as an important sector and contributes immensely in terms of employment, specifically in rural Mongolia. Agricultural sector still acts as the backbone of Mongolian economy. Before the beginning of ‘third *Avar*’ programme in the post-socialist period, the first *Avar* and the ‘second *Avar*’ programmes were initiated. For understanding the third *Avar* programme it is important to observe and study the changes brought to the Mongolian agricultural system during the first and the second phase of the programme in the socialist era. Few important programmes are discussed here which are - Virgin Land programme presented by Khrushchev during the socialistera in 1953. In 1959, the ‘virgin land campaign’ started after the approval of the third general assembly of the central committee of the Mongolian People’s Revolutionary Party (MPRP) (Konagaya 2013, 257).

In the year 1976 another important policy was designed and approved by the Eleventh general assembly of the central committee of the Mongolian People’s Revolutionary Party. The government policy was called “cultivating the uncultivated land’ in order to increase the production of crops, especially cereals” (Konagaya 2013, 258) this was considered as the ‘Second *Atar* Movement’, *Atar* is the Mongolian word which means ‘uncultivated land’, cultivation of these land (*Atar*) had taken shape of agricultural development movement and is called ‘*Atar ezemshik*’. This policy of agricultural development in Mongolia was referred to ‘*Atar*’ (Konagaya 2013, 258). The second *Atar* which began during 1976 was primarily designed to increase the food production in order to meet the swelling population in the capital city. The important purpose for

the second Atar programme in agricultural development was to meeting the demand of food for the swelling urban population (Konagaya 2010, 107-133; Konagaya 2013, 261).

- **The Phase of Transition to Market Economy and the Agrarian Unrest**

The sudden transition jolt to the earlier agricultural system of state farms were felt in the form of ‘shock therapy’ resulted in dismantling the agricultural cooperative farms in the absence of financial assistance by the government, under the new regime of market economy. These huge cultivation fields for too long were abandoned, almost more than two decades and became home to weed plants, primarily *Artemisia* as there were no one to look after these abandoned lands which remained home to major crop production under socialist collective farm system (Konagaya 2013, 262-263). With increased incidences of droughts, dzuds etc., a whole new phase of plant succession started and with which meadow grasses flourished in these abandoned cultivated fields. But still *Artemisia* dominated these abandoned lands. This is how the transition to new political and economic system impacted the agricultural development in Mongolia. Soon then need for recovery and restoration of these huge cultivation lands were felt as it became an environmental problem and a health hazard.

A new programme started by the government of Mongolia to further boost the food and agriculture sector in Mongolia which was named as the ‘Third *Avar*’, which means ‘agricultural redevelopment’. Year 2008 remained a crucial year in terms of food security and agricultural development. World over a major jolt had been felt with escalating food prices and increased extremity of food crisis. Under this programme of agricultural redevelopment, the financial support in the form of buying new agricultural equipments were provided by the government of Mongolia as a state’s initiatives primarily as an important step to overcome the previous mistakes during the transition period (Konagaya 2013, 264).

One of the important aspects of the ‘Third *Avar*’ programme was to redevelop the agricultural land near the capital city in order to increase the accessibility to the market. This programme remained completely focused on the ‘market oriented redevelopment of the agricultural areas, and ignoring the ecological sensitivity of that

region. The concept of agricultural sustainability, as followed in the traditional Mongolian pastoral production system was ignored blindly.

The two major focus of the agricultural programme were, firstly, to increase the market access and to focus on the urban areas, in order to improve food security situation of the burgeoning urban population. The rural Mongolia and in the remote areas, difficult terrains were not given due share of importance in the development of highly modernist form of agriculture as the priority was to develop agricultural system for urban market and to tap the potentials in the rural areas. This market based agricultural development provided a shallow insight into this major problem, which remained deeply rooted and very much dependent upon the sustainability of the agricultural system. No short term solution would provide any respite or solution to this irreparable and gigantic problem of food insecurity and the degradation of Mongolian food and agricultural system.

- **Evaluation of the ‘Third Avar’ Programme**

The ‘Third Avar’ programme was basically designed to meet the demand of growing population, specifically in urban areas, mainly around the capital city region. This agricultural development programme was designed primarily to exploit the potentials of urban market, and as a result the programme remained concentrated around areas near to the capital city, where the accessibility to markets were much convenient than in case of the underdeveloped rural infrastructure due to high connectivity and proper market infrastructure. But evaluating the overall aspect of the programme, it is observed that such a shot-sighted goal oriented programmes were neither going to yield good results for maintaining the food security situation of poor population, nor even able to sustainability of the food and agricultural system, these short term goals are way behind the real target of the development of Mongolian agricultural system.

The sensitivity of the grasslands of Mongolia needs much greater attention in terms of sustainable food and agricultural system development. Traditional Mongolian pastoral production system and traditional practices were not just neglected and undervalued, but while promoting highly modernist agricultural technologies, these traditional practices were termed as backward and obsolete for the present environment and economy. Only the market oriented development was valued, this had changed the

course of agricultural development and blindly promoted single species specialization in both the livestock and the crop cultivation sectors.

The animal species diversity always remained central to the traditional Mongolian pastoralism, where the concept of five animal's species ruled the nomadic pastoral production system. The species diversity had always remained important for the productivity as well as the sustainability of delicate Mongolian grasslands. The 'third *Atar*' is also known as 'third crop campaign' and national programme Crop – III. This programme was basically designed to revive mainly the crop-production sector during 2008-2010. Attaining self-sufficiency in food production, meeting the domestic demand for food, specifically potatoes, wheat crop and vegetables were the prime goal to a satisfactory level this programme enhanced the production of these food items, and also benefited the nation by reducing its overdependence on imported food. Though few major aspects were left behind, the overall assessment and observation suggest that the 'Third *Atar*' programme remained a positive effort by the government of Mongolia.

6.5.2.1 National Food Security Programme (NFSP), 2001-2007

The first national food security programme aimed to achieve self-sufficiency in domestic food production and consumption as well as reducing the high dependence on imported food. The first National Food Security Programme was initiated from 2001 and ended in 2007. For a span of seven years the programme successfully increased the targeted agricultural production. The programme was regarded as one of the most important efforts by the government of Mongolia in terms of increasing the total agricultural production. Mongolian over-reliance on 'imported food-staples' became a major area of concern for the economic stability, as well as for the sustainability of agricultural system.

Key issues addressed during the first National Food Security Programme were identified and considered vital for the new policy and programme on agriculture and food security in Mongolia (IFAD 2012). These issues are mentioned below:

- The current food security situation was weak enough that can anytime trigger a massive food crisis within the country. As a weak nation, the government had failed to ensure to its regulators, industry and consumers.

- Over-lapping the responsibility for dealing with different food security facets to too many organizations. It created an atmosphere of confusion, inefficient implementation of task, and improper dissemination of technologies related to agriculture and food security.
- ‘Too many objectives, sub-programmes and activities’ led to improper dissemination of the National Food Security Programme, specifically among the rural communities.
- The food and agricultural data collection and analysis process were not of good quality and reliability of such data remained doubtful and inefficient in terms of taking stronger and accurate decision where precision of data is imperative. For vital issues like ‘monitoring, evaluation and demand forecasting’ exactness of data is fundamental.

6.5.2.2 National Food Security Programme (NFSP), 2009-2016

The importance of food security was felt during 2008, when global food crisis touched every part of the world. In Mongolia, huge government effort was beginning with a major focus on food security which paved the way for the setting up of National Food Security Programme (NFSP). The government of Mongolia declared 2008 as the “Year of food security and safety” (MOFALI 2009, 12). The ministry under the government of Mongolia, the local governments and the civil society in consultation with and assistance from international development agencies together initiate a major programme on food security of the country called the ‘National Food Security Programme’ (NFSP). This programme was designed to meet the challenges emerging from the global food crisis, beginning from the year 2008 with soaring food prices worldwide. This multi-sectoral programme was prepared during the first half of 2008, a long-term programme was prepared and divided under two time periods, first half of the programme covers 2009-2012 period and the second half of the programme is to be accomplished during the time frame of 2013 to 2016. A major programme covering the entire nation needed a diversified approach to cater to the problem arising at the local administrative level or even at the community level.

The National Food Security Programme (NFSP) was considered to be major government involvement and an initiative purely undertaken by the Ministry of Food, Agriculture and Light Industry (MOFALI). The implementation of the programme

progressed under the the two phases: starting from 2009-2012 and second phase from 2013-2016. Both the phases were divided under three-years span of time-frame. Many innovative strategic developmental moves were implemented within the programme, like – poultry production, fish production, crop diversification, irrigated crop production, import and production of fertilizers etc. these are few of the major steps taken forward to meet the desired result in terms of food security. The establishment of fertilizer plant with annual capacity of 15,000 to 20,000 thousand tones after 2010 was considered really a major boost for crop production process. Huge amount of money was allocated under three different finding agencies: firstly, the government of Mongolia, secondly, donors and NGOS and thirdly, the private sector or civil society. This is how the programme was preceded with a full flow to meet the desired goal of ensuring food security.

A total sum of US\$ 1289.225 million were incurred as a total cost of the programme out of which for meat production a total sum of US\$ 16.4 million, for milk production US\$ 40.1 million, for poultry production US\$ 1.96 million for fish production US\$ 1.2 million, US\$ 15 million for the crop diversification, and US\$ 187.48 million for irrigated crop production were spent on this national level food security programme, one of the huge investment in the food security situation improvement at the national level.

- Implementation and Fund Allocation

It has been observed that the programme proposal under the ‘National Food Security Programme’ was reviewed by a wider and diverse section of society on 8 May 2008 at a workshop organized by MOFALI in its headquarters at Ulaanbaatar. Those who witnessed this important initiative by the government of Mongolia includes- the producer, processor, consumers, the Deputy Aimed Governors, 83 public and private delegates belonging to food and agriculture sector.

In an open forum on the ‘Burning issues for food security and safety in Mongolia’, organized by the president of Mongolia in the Parliament of Mongolia in 3rd June 2008. An approval for the draft on National Food Security Programme (NFSP) was submitted before the Parliament. Every player was taken into consideration, the Aimag governors, herding community which belongs to producer class and the

consumers especially for the urban market, included few of the steps that gained due share of importance for an in-depth understanding and extensive knowledge in the areas related to ensuring food security in Mongolia.

- Aim of the National Food Security Programme, 2009-2016

The NFSP was mainly aimed to enhance the national and household food security, food safety and nutrition as well as providing enabling environment in the form of legislation, policy, consumer education, capacity building and needs-based vocational training, financing the required investments, etc. (MOFALI 2009, 12). With a population of 2.7 million in 2008, the programme on food security was formulated. Although, in terms of population and country's land area Mongolia is the third most sparsely populated country worldwide. When we look at the rural Mongolia, we find out that the population density is too low, just one person per square kilometer. The low population density, poor transport network development and low connectivity make it more difficult for the people living in remote rural areas to access the markets which are centered on urban areas, mainly the capital region. This remoteness and distance from the markets make it more difficult for the rural households and food products to these markets (MOFALI 2009, 15).

- Programme goals, Priority and Objectives

The prime goal of the National Programme for Food Security was centered around providing 'sustainable supply of nutrition, secure and accessible food, which enables healthy livelihood and high labour productivity of the population which involve participation of every section of the society, the citizens, government, public and the private sectors (MOFALI 2009). The goal of the National programme was implemented under the four priority pillars and with 13 main objectives, which include the following:

- Priority Pillar I

Create, enhance and enabling legal, economic and organizational environment for ensuring food supply, food quality and food safety.

1. Revise the laws and regulations related to food security, quality and safety to comply with short and long-term development objectives;
2. Creation of enabling economic, financial and business environment to increase foreign and domestic investment;
3. Building of management structure and inter-sectoral coordination and human capacity to implement the programme.

- Priority Pillar II

Within pillar II, the stable supply of the population with nutrition, secure and accessible foods and increasing the proportion of the industrially processed food in overall consumption. It includes the following:

1. Enhancing food supply by domestic food production staple food to attain self-sufficiency and to minimize the dependence on imported food.
2. Reducing disparities in food access between urban and rural areas and seasonality of supply.
3. Stabilize food supply of population, especially to the people of the vulnerable groups, during natural calamities, economic instability and food food deficits.
4. Update food processing technologies to enhance the market competitiveness of the industry and export capacity of the Mongolian brands of food products.

- Priority Pillar III

Improve monitoring and information networks to secure hygiene and safety of food products and drinking waters. It includes following:

1. Ensuring quality and safety of food products through introducing GAP (good agricultural practices) and GHP (good hygiene practices), at all stages of food preparation, processing, preservation, packaging, transporting and marketing;
2. Improve monitoring and information network of food quality and safety, and related practices.
3. Improving the access, quality and safety of drinking water.

- Priority Pillar IV

Improve nutritious quality of food, supporting adequate healthy diets and reduce nutrition deficiency, preventing from risk factors of non-communicable chronic diseases:

1. Elaborate and implement updated recommended dietary intake norms of the population on food nutrition.
2. Monitor and prevent from micro-nutrient deficiency and non-communicable chronic diseases.
3. Increase the production and consumption of fortified and functional food products.

- Objectives of the Programme:

The main objectives of the National Programme on food security 2009-2016 are broadly divided under 13 heads, each one remained central for the effective implementation of the programme. The 13 main objectives of the NFSP (2009-2016) drafted as in the National Programme on the food security of Mongolia are mentioned below (MOFALI 2009, 9). Within the framework of the programme following are considered as the main objectives:

1. The national programme on food security revised and regulations related to food security, quality and safety to comply with short term and long term development objectives.
2. The National programme creates enabling economic, business and financial environments increases the foreign and domestic investment.
3. To build adequate management structure and inter-sectoral coordination and human capacity to implement the national programme on food security in a much more effective way.
4. The programme objective was to enhance domestic production and supply of staple food to substitute import of which - intensified meat livestock farming, meat processing was supported, intensification of crop production for stabilizing domestic production and supply of specifically flour, and potato, vegetables and building up export potentials. 'Egg' and 'fish' projects primarily designed and developed to meet demands of the urban population as

well as facilitated in the diversification of food consumption among the rural population who were primarily dependent on meat and milk products as these foods are locally available to them.

5. Fifth objective of the programme was to reduce disparity in food access between urban and poor areas and seasonality supply.
6. The sixth objective of the NPFS programme was to stabilize food supply especially to the people of the vulnerable groups during natural calamities, economic instability and food deficits.
7. The seventh objective of the programme was to update food processing technologies in order to enhance market competitiveness of the industry and export capacity of the Mongolian brands of food products.
8. The eighth objective of the programme is to ensure quality and safety of food products through introducing GAP (good agricultural practices) and GHP (good hygiene practices) at all stages of food preparation, processing, preservation, transporting, and marketing.
9. The ninth objective of the programme was to improve the monitoring and information network of food quality and safety, related practices, like to introduce Mongolian and International standards in food safety laboratories and give them ranks according to their standards, certification of food importers, perishable food import with international standards, as well as to take necessary steps on the genetically modified food products, their quality, safety, and risk assessment criteria etc.
10. The tenth objective of the programme was to improve access, quality and safety of drinking water.
11. The eleventh objective of this food security programme was to elaborate and implement updated recommended dietary intake norms, to improve consumer's education of the population on food nutrition.
12. The twelfth objective of the programme was to monitor and prevent from micro-nutrient deficiency and non-communicable chronic diseases.
13. The last one, the thirteenth objective of the food security programme was mainly centered on increasing the production and consumption of fortified and functional food products. It included the import of micro-elements used for fortification in order to increase the supply in domestic markets (intended markets) with these fortified food products. The objective was designed to

introduce and promote healthy and good practices for ensuring the desired goal of food safety under the food security programme.

- **Agriculture, Food Security and its Importance for Mongolian Economy**

After entering a new economic system with a completely market oriented agricultural production system, the food and agriculture sector in Mongolia had undergone massive structural change with this abrupt transition from command economy to market economy. Although agriculture still the key economic position as majority of the country's population depends on agriculture sector for their lives and livelihood (MOFALI 2009, 15). The collapse of food and agricultural system was much more severe as compared to other sectors of the economy, specifically after 1990s, the phase of transition from collective farm based production system to the purely market oriented production.

The increased severity of the winter '*dzud*' which haunted the entire country and its economy repeatedly, had further devastated the pastoral production system and endangered the already vulnerable economy. The great winter '*dzud*' of 1999, 2000 and 2001, eroded nearly one third of the national herd of about 34 million animals, which included – cattle, sheep, goat, horse, yaks and camels (MOFALI 2009, 15). This catastrophic series of events had also impacted the herd composition, the traditional herd composition already undergone alteration due to sudden shift of herder's attitude to earn more cash income as a pure observation of the market trend. The high cashmere price in the international market was examined as few of the significant reasons behind the changes in the herd composition which had also resulted in overgrazing of the delicate Mongolian grasslands.

One of the important features of the phase of transition to the market economy was the collapse of the earlier existing crop production sector, which degraded from a self-sufficiency level to supplying only a quarter or only 25 percent of "the domestic consumption of wheat, 47 percent of vegetables and 86 percent of the potatoes prior to 2008" (MOFALI 2009, 16). Mongolia's agricultural sector situation was really not good after the phase of transition to market economy, and repeated neglect of the agricultural sector infrastructure further collapsed the industries associated with agriculture. Then the global food crisis and escalating food prices bought new sets of

problems with it, like – globalization, fluctuating international market price for cashmere, and ever-increasing prices of imported food, all together resulted in massive food insecurity situation in Mongolia. The timely formulation, processing and implementation of the National Food Security Programme 2009-2016 has been observed as a well-timed action by the government of Mongolia.

- **Food Security Situation and Assessment of National Food Security Programme, 2009-2016**

It has been observed that a total of 1.13 million tons of food consumed in Mongolia in the year 2007. This was only 75 percent of the recommended daily food intake of 1.50 million tons. The 25 percent of the deficient indicates towards the high dependence on the imported foods in order to meet the recommended daily food intake of 1.50 million tons. The domestic production is not even producing enough food and being able to cover only about 75 percent of the total food consumption in Mongolia. This observation led to some of the more serious issues concerning food security situation within the entire nation, but have also figured out some of the very disturbing trends which requires immediate attention and action, specifically concerning the food and agricultural system in order to ensure food security in a global food crisis situation (MOFALI 2009, 29). With a target of 100 percent self-reliance in terms of the domestic food consumption requirement for the entire country was set.

It has been found that the production of food begins to increase by 2006-2007. In terms of meeting the self-reliance target, the first programme period varies according to the performance and availability of food production, the performance differed. For meeting the targets of the meat and milk, which are livestock based food products, remained too close to the target of 100 percent of domestic production. Other food production like potatoes performed really well, whereas the production of vegetables was also remained appropriate, despite harsh climate and limited availability of good cultivable land. In terms of the production of eggs, fish, fruits, vegetable oils and rice/millet etc., the production remained low to very low, and these are areas of food production required special attention as they are non-native food items and are very much dependent on the imported food items for meeting the daily food consumption in Mongolia.

Diversification of food items is considered to be necessary for maintaining the sustainability of food and agricultural system as well as important for the health of the Mongolians, as they really lack the intake of micro-nutrients in their food consumption pattern and traditional diet. In terms of food safety threats, water pollution as a result of unhealthy mining practices, and both the rural communities and their livestock together are facing acute water crisis and water has become more and more scarce and inaccessible.

In an incident of mercury and sodium cyanide pollution due to informal mining process of gold ore, all together resulted in land, air and water contamination in the Khongor *soum* (town) in Darkhan Uul aimag (province), which is 200 kms north of the Ulaanbaatar, the capital city of Mongolia. This represents few of the extreme cases which created a situation of environmental emergency by ‘causing toxicity among the population and the loss of livestock’ (Joint WHO/FAO 2008). The contamination of the vodka with toxic water resulted in the causality of the 14 people and many were hospitalized, due to which banned was imposed by the government on the sale of alternative alcoholic drinks in Namarari2008. These are few of the incidents which are well documented but the problem of the water contamination had become huge problem for maintaining food security and as a consequence of unsustainable mining practices even in the environmentally sensitive steppe grasslands.

Mining is one of the major economic practices which have changed the facet of the Mongolian grasslands and the traditional communities living on it as well as the water, air and almost everything. Mining has also severely impacted the food and agricultural system and in many ways contributed in increasing food insecurity in mining generated contamination of water, land and air, all the three vital natural entities, always remained fundamental for the food and agriculture system of any region or area.

Food security programme purely remained focused to increase the self-reliance in domestic food consumption mainly by boosting the agricultural production manifold. Minimal attention was given on the initiatives for enhancing food and agricultural system in terms of sustainable agricultural practices which were of immense value for Mongolian grasslands. Similarly, little initiatives were undertaken for reducing the

gigantic impact of mining sector on food and agricultural system, in the form of contamination of land, water and air with lethal chemicals. Heavy transportation used for mining had aggravated the problem of desertification manifold. The severity of the problem of water scarcity was also not given much attention. Water is vital for the sustainability and the sustenance of food and agricultural system.

This national programme on food security has focused itself on increasing the food production and reducing the exported food dependence. In many sectors, the programme has remained successful to a certain limit and performed well. But the programme has missed the real issues of food security, that is the sustainability of the local Mongolian food and agricultural system, and without its revival no nation could assure food security to its poor and marginalized population.

It has also been established from these observational studies that domestic production of flour remained only 50 percent of the total domestic flour demand for the country. It can be assessed from the national food security programme that despite being a sparsely populated country, food security in Mongolia has remained a major area of concern as under the market economy the agricultural production is completely guided by the international pricing fluctuations and hardly take into concern the real issue of local food and agricultural system. After observing the government policies and programmes, it could be stated that despite being an important sector in Mongolian economy, not much attention has been given on the revival of traditional Mongolian pastoral system. Neither the local community's views were sought or fully incorporated nor was it considered before designing such internationally funded massive programmes on food and agricultural system and on food security of the poor, specifically the Mongolian herders.

- **Poor Management of Post-Harvest Food Crops, Animal Products and Perishability**

Not just the ignorance of the local food and agricultural system and herder's communities, it is also observed that the poor management of the post-harvest food contributed immensely in the wastage of food. As a result, food wastage further aggravated the problem of food insecurity as well as food safety concern due to the lack of good storage facilities. The problem got worsen due to greater distance from

the markets, specifically local food and agricultural system where every herder in remote rural areas produces large amount of milk and meat products, but high perishability and poor accessibility to urban markets, led to large amount of food not being able to meet the domestic food consumption demand. This poorly developed form of market economy and poor accessibility to the urban markets, resulted in huge wave of rural migration to the urban areas, specifically to the capital city, Ulaanbaatar. This unplanned migration caused colossal damage to rural Mongolia. This displacement of rural Mongolia has also created grave problems for the urban areas. As mammoth agglomeration over-stressed the urban area's facilities and resulted into a total infrastructural collapse.

6.5.3 Index Based Livestock Insurance (IBLI) Programme, 2005

An important initiative by the government of Mongolia, with assistance from the World Bank was the 'Index based livestock insurance (IBLI)' programme. It was approved in May 2005 with a credit amount of US\$ 9.44 million. The programme first began in three aimags as a pilot project with an inclusion of three different risk layers – first, the self-retention by the herders for low livestock mortality rates; secondly, commercial base insurance product for intermediate livestock mortality, and lastly, safety-net disaster response product for high livestock mortality rates. This programme was basically designed to provide financial security to the herders against the events of extreme losses which may have potentials for agricultural risk as well as to provide shield to herders against the major livestock mortality events and individual herder received an insurance amount as a 'payout' which was assessed based on the local livestock mortality in that particular areas, or administrative unit and not based on the individual livestock losses (Mahul and Skees 2007). Under this unique programme herders sustain the smaller losses, but in the case of large livestock mortality or losses, the risk is transferred to the private insurance industry, and in case of extreme events of livestock mortality of losses the risk is transferred to the Government of Mongolia by using a public safety net programme (Mahul and Skees 2007, 2).

The insurance programme took into consideration the livestock mortality rate index by species in a local region called '*soum*'. It was regarded as highly useful and supportive programme specifically for the individual herders who were provided

index based strong incentives in order to manage their herds by minimizing the livestock mortality events impact on them. The insurance payout amounts based on the local area livestock mortality were provided but not on the basis of the individual herder's livestock losses. Specific threshold was divided by the insurer for each local region, like *soums*, and if the livestock losses exceed that threshold figure, then an insurance amount would be paid to the individual herders of that *soum*. The programme was basically designed to prevent herders from extreme and catastrophic events of livestock mortality which poses risk for the entire food and agricultural system, the herder community and impact the food security in Mongolia.

It was assessed that a herder-based economy like Mongolia, providing insurance payouts for the livestock losses was considered an important aspect for not just ensuring the livelihood of the herders, but it was also supported the entire herding community to overcome with the extreme events of livestock losses. The programme was basically an outcome of such an extreme event when in the year 2001, the Government of Mongolia asked international funding agencies World Bank to provide assistance to deal with such catastrophic events. Skees and Enkh-Amgalan (2002) suggested for Index based livestock insurance (IBLI) programme by using livestock mortality data for a particular region and for a specific livestock species insurance payouts were estimated and fixed. This resulted in extensive livestock based studies and observations by international funding bodies like World Bank. It was strongly recommended with these observational studies that self-insurance by the herders, market based insurance and social insurance; all were purely meant for providing social as well as economic security to the herder's household. In terms of the severity of the losses, they were categorized under three different groups: Firstly, individual herders retain small losses; secondly, larger livestock losses are transferred to private insurance industry which functions with market orientation. Lastly, in case of catastrophic livestock losses and the risk is transferred to the government of Mongolia by using public safety net programme.

The insurance payments to the herders remained a difficult area and led to dissatisfaction among the herder's community as individual losses are not taken into the consideration, the payouts were based on the mortality rate index by animal species in a specific region. But many considered this index based livestock insurance

highly useful for the individual herders as it helped them to maintain their herd, their daily lives as well as to minimize the impact of major livestock mortality events. The individual losses herders are not taken into consideration, only mortality rate in a region and of a specific animal species remained a major concern for many associated with livestock sector, specifically the poor herders.

Given the importance of livestock sector and its relevance for the economy, it can clearly be stated that within agriculture sector, it is the animal husbandry which could be considered as the backbone of Mongolian economy. About half of the country's population is supported by livestock sector and within agriculture, livestock sector contributes more than 80 percent share of agricultural GDP (Gross of Domestic Product) (Mahul and Skees 2007, 9). Hence, massive loss of livestock has the strength to paralyze the economy and could even trigger a situation of food crisis as livestock losses means vanishing of household wealth, their livelihood and sources of family food security. Between 1999 and 2002, about one third of the national herd got eroded due to severe winter conditions (*dzud*) in Mongolia (Mahul and Skees 2007, 9).

The impact of massive livestock mortality was felt due to the restructuring of economy, the shift from collective farming system to the market oriented agricultural production system, which favoured the privatization of national herd and family based herding system again became the core of livestock production system. During 1990s, this transformation resulted in steady increase in the number of herder households. It was further established that the number of herding families doubled between 1990 and 1997, the overall herd-size increased from 25-31 million which stressed the carrying capacity of the grazing land (Mahul and Skees 2007, 9-10).

One of the most significant features of this livestock insurance programme is the use of extensive data on livestock losses, based on which animal's mortality rates (MR) by species are assessed on different geographical areas (like, *soum* level). This adds much more clarity and accuracy to deal with the problem. Earlier, the traditional livestock production Programmes in Mongolia remained inefficient and ineffective due to the lack of effective measures to collect accurate data on animals, their death, its causes etc. The Mortality Rate (MR) is defined as the ratio of losses of adult animals in a given year to the census of adult animals the previous year. It was calculated for each animal species for a geographical area of *soum* level over the

period of 1971-2004. Based on the extensive data, the frequency of animal's annual mortality rates species-wise was estimated as has been mentioned below:

- Frequency of Animals Mortality Rate, by Species
 - I) Firstly, based on mortality rates for different animal's species for different regions (soum) it has been observed thatcattles are the most vulnerable animal, and are frequently exposed to the risk of minor losses (MR lower than 5%) and catastrophic losses (MR higher than 20%) in comparison to other animal species.
 - II) Secondly, significant difference has been observed in the mortality rates in terms ofgeographical regions. It has been examined that mortality rates were “higher in the southern region of Mongolia, near the Gobi Desert and in north-west part of the country” (Mahul and Skees 2007, 12).

Table 6.1: Frequency of Animals Mortality Rate, by Species

Mortality Rates (%)	Cattle	Sheep	Goats	Horse	Camel
0 to 5 %	72.9	70.1	71.7	72.2	64.09
5 to 7.5 %	10.6	14.3	12.8	12.6	17.3
7.5 to 10 %	4.9	6.2	5.8	6.1	8.4
10 to 20 %	6.5	6.9	7.3	6.3	9.2
20%and Above	5.2	2.6	2.5	2.8	1.1

Source: (Mahul and Skees 2007)

Based on the mortality rates for the different animal species for different regions, the Index-Based Livestock Insurance (IBLI)' programme was designed and with the layering of livestock risk, the goals of providing commercial insurance in the private insurance sector and social insurance in the public sector were initiated and addressed. Three types of risk layers were broadly categorized as given below:

- High Frequency but Low Severity Losses – Low Retention

This situation occurs approximately once in every five years or more frequently, and are managed and completely retained by the individual herders with the help of risk mitigation activities or individual capital (e.g. Saving, credit).

- Less Frequent but More Severe Losses – Base Insurance Product (BIP) through Commercial Insurance:

These risks occur approximately once in every 5 year or 25 years. The nature of risk was more severe in terms of livestock losses. The type of livestock risks was financed by commercial product, called the ‘Base insurance product (BIP)’ in the insurance market. Herders pay premium price at commercial rate, and receive insurance payouts at the time of such events.

- Catastrophic Losses – Disaster Response Product (DRP):

These are extreme events of livestock losses and estimated to occur once in every 25 years or more. These are covered by a social safety net product called ‘Disaster Response Product (DRP)’, and through this product the impact of risk is transferred to the Government of Mongolian as the domestic insurance industry are not mature enough to bear these losses or to retain such a catastrophic level of livestock losses and domestic market could not transfer it outside the country due to its limited access and exposure to international insurance and capital market (Mahul and Skees 2007, 15-16).

- **Assessment of the Programme**

The Index-based livestock Insurance is considered highly useful, specifically for reducing the impact of livestock losses to the herders, their livelihood and the entire economy. In fact, the overall livestock sector in Mongolia gets benefitted by this programme. It is considered important for maintaining the livestock sector and also the food security of the herder’s household, as animals are their real wealth and investment based on which their family income and family food security depends.

Index-Based Livestock Insurance (IBLI) Programme has been proved to be a major initiative by the Government of Mongolia in collaboration with the World Bank. But

absorbing the impact of livestock losses on the herder's family income and Mongolian economy, together still remains not much effective. The underdeveloped domestic insurance market and its inefficiency in transferring the risks (factor) in the international market has posed real challenge before the nation as well as threatened the existing system.

In addition, despite the layering of livestock risk and use of extensive livestock data, the domestic insurance industry in Mongolia remains vulnerable and exposed to heavy losses through its scheme of commercial product 'BIP' because of the "high spatial correlation of mortality for events in the in the 7 % to 25 % or 30% levels" (Mahul and Skees 2007, 17). The underdeveloped insurance market and ineffective regulatory and supervisory bodies are also blamed for the weakness of the index-based livestock insurance programme.

Another important aspect of the programme is the lack of views of direct herders about their livestock, their familiarity with extremity of weather events of Dzud, its frequency and severity as well as its linkage with seasonality of food availability, and the family food security, all are sensitive issues which require much deeper understanding before designing these livestock based programmes. The grassroots level studies are very limited and are a missing feature while considering large scale government policy and programmes, and only the livestock census data on region specific animal species mortalities were taken into consideration.

The sensitive and more region specific local natural resource based issues are largely remained unappreciated and never given center stage in formulating such massive programmes. The other facets like climate change, and its role in livestock mortality, herders' local, indigenous and traditional knowledge, all have remained completely out of the picture in designing the the programmes meant for the local communities. The local community based knowledge as well as their views could surely provide better ways to design, formulate and to implement the food and agriculture system related programmes in a much more effective way.

The survival, sustenance and the sustainability of the food and agricultural system remained entirely dependent on the uplift of the Mongolian herders and time has come to fully appreciate their contribution in maintaining the sustainability of the

delicate and pristine steppe grasslands with nature friendly practices involved in the traditional Mongolian pastoral production system.

6.5.4 National Mongolian Livestock Programme (NMLP): Phase-I and Phase- II

The National Mongolian Livestock Programme was adopted as an action plan for its first phase starting from 2010 to 2015. The programme was approved by the Great Khural of Mongolia (law based on Article 43 and clause 431) as a major initiative executed from the 'launch of the public unit at soum level that will provide professional and technical services, coordinate and monitor the activities related to veterinary and animal breeding services (GOM 2010, 1). For the effective implementation of the programme, three percent of the national budget of Mongolia was allocated. The government seriously pursued its policy initiative to provide effective solution for the problem faced by Mongolian livestock sector and to overcome the obstacle of growing food insecurity with the growing world food crisis.

The rationale of the programme was to establish the livestock sector as one of the core sectors of the economy which would not just remain the source of employment for rural Mongolia but also long represent as the vital sector in terms of earning foreign exchange through the livestock based exports. The livestock production system and the herders of Mongolia remained as the most neglected sector on which the well-being of entire country depends. It is estimated that during 2008 the agricultural sector employed around 34.6 % of the total labour force. The GDP (Gross Domestic Product) contribution of the agricultural sector is estimated to be 18.8% out of which 86.9 % is from the livestock sector. In terms of export income, it is estimated that agriculture sector contributes nearly 10% of all export income (GOM 2010, 2).

This clearly indicates that livestock has always remained an important sector in the Mongolian economy. The idea behind the implementation of the new programme as 'National Mongolian Livestock Programme' (2010-2015) was to ensure sustainability of the livestock sector and to set comprehensive measures for effective dissemination at the soum level, the basic administrative unit in Mongolia.

The major priority areas for the livestock programme was also set up which are identified in the form of five major priority areas to ensure the effective implementation and making livestock sector more adaptable to the climate change as

well as for the social development. Within the framework of the National Mongolian Livestock Programme (NMLP) five major priority areas are focused broadly as given below:

1. The first priority of the National Mongolian Livestock Programme (NMLP) was to give special focus on the livestock sector and to provide assistance for the effective formulation of a “favourable, legal, economic and institutional environment for sustainable development in the livestock sector” (GOM 2010, 3). Within the first priority area following objectives were set up, which are broadly categorized under three major heads which includes the following:
 - Ensure the sustainable development of the livestock sector and create a legal environment that will promote economic turnover
 - To strengthen the veterinary and breeding services at the local level and bring services to international standards
 - Improve knowledge and education of the professional herders and introduce an advanced technology
2. Enhancing and “improving the animals breeding services based on social demand, increasing the productivity and production of high quality, bio-clean livestock products and raw materials and increasing the market competitiveness”. Within the second priority area following objectives were set up:
 - Improve livestock practices, develop rational livestock herd structure, improve animal breeding services to increase production and improve economic efficiency.
 - Protect the livestock gene pool and introduce biotechnology measures to increase animal productivity
 - Strengthen the livestock breeding services and improve access and results
 - Creating an animal registration database and network.
3. The third priority area of the NMLP was meant for “raising the veterinary service standards to international levels and protecting public health through securing the Mongolian livestock health”. Within the third priority area of the NMLP (2010-2015), following major objectives and activities were implemented –

- Early prevention measures, increased preparedness to combat against and prevent infectious animals that are banned for international trade.
 - Bring the veterinary service structure to international standards; strengthen the capacity of veterinary services to the level that can fully meet commoner’s demands and requirements.
 - Bringing livestock medicine and veterinary tools to international standards.
4. The fourth priority area was to “developing livestock production that is adapted to climate, environmental and ecological changes with strengthened risk management capacity”(GOM 2010, 3). Within the priority area following objectives and activities were to be implemented:
- Improving pasture management
 - Creating fodder and hay production
 - Improving livestock water supply
 - To creating livestock risk management capacity
5. The last, and the fifth priority if the NMLP was “developing targeted market for livestock and livestock products, establishing proper processing and marketing structures and accelerates economic turnover incentive system” (GOM 2010,3). The major objectives and activities under the fifth priority area were categorized under following major heads:
- Develop targeted markets for livestock and livestock products, establish proper processing and marketing systems and increase economic turnover.
 - Create and implement an economic level to provide incentive for the production of the quality livestock products and raw materials
 - Modify and develop livestock industry marketing to capture the intended market.

6.5.4.1 Time-Frame of National Mongolian Livestock Programme (NMLP)

The large scale programme on livestock sector revival was planned, designed, organized, implemented and progressed under two broad time frames, which includes – Phase – I of NMLP: 2010-2015

Phase – II of NMLP: 2016-2021

The programme was categorized under two major phases for a better outcome and removal of shortcomings observed during first phase of the programme, so that second phase of the programme cover every important aspect and areas concerning the sustainability of the Mongolian livestock sector. During the Phase - I of the programme from 2010 to 2015, many important priority areas were addressed and the programme achieved following outcomes:

I. First Phase of NMLP: 2010-2015

- Remained important for the framing of favourable legal environment for providing the smooth implementation of the ‘National Mongolian Livestock Programme’ (GOM 2010).
- Successfully set up professional services for the livestock sector and to improve their accessibility to the herders.
- Special care had been undertaken for improving the livestock condition by taking care of animal health. World organization for animal health assisted Mongolia in achieving the certification for disease free status for bovine contagious pleuropneumonia, sheep and goat pox, and Bovine Spongiform Encephalopathy (BSE), and helping in eradication of the many other livestock diseases.
- Increase the production of hay and fodder for the livestock, safe water supply, making pastureland uses more sustainable and improving improving livestock sector adaptation to the climate changes.
- Lastly, and the most important focus of the programme was to improve herders living conditions and their livelihood. The state agencies designed policies to develop the market structure for the livestock based products and raw materials as well as preventing herders from market fluctuations in livestock product prices.

II. Second Phase of National Mongolian Livestock Programme: 2016-2021

- New law structuring for ‘livestock husbandry development and to create legal framework for its effective implementation and support.

- Register all livestock and create extensive livestock database for effective implementation, monitoring and management of the programme.
- To upgrade Animal Disease Information System (ADIS)
- Livestock sector should be organized and restructure based on factors like climate change, social and economic development, grasslands sustainability, decreasing risk and increasing productivity of the livestock industry.

6.5.4.2 Assessment of National Mongolian Livestock Programme (2010-2015)

The National Mongolian Livestock Programme (NMLP) has remained one of the most significant programmes which truly recognized the importance of the livestock sector for the national economy as well as in ensuring food security in Mongolia.

Every single sector was discussed and taken into consideration for the implementation, monitoring, management and dissemination of this programme. The programme was prepared with the help of extensive livestock sector based data. The comprehensive programme was basically moved the livestock sector in the direction of international agricultural market trends and patterns, like use of highly advanced technologies for livestock production increase, use of biotechnology of genetically improved livestock breeder for achieving the high productivity and yield. In terms of raising the livestock sector product values, a purely market oriented commodity enhancement procedure was followed to raise it to the level of international (trade) standard.

Breeding enhancement process and the increasing livestock breeds adaptability to the shifting climatic conditions remained a major cause of concern and effectively measured, implemented and emphasized through this extensive livestock programme. But few of the major shortcomings are also observed which includes – the overemphasis on the transformation to a more advanced technological Agricultural sector, but not much importance was given to the revival of the traditional Mongolian pastoral production knowledge and practices.

Herders viewpoints have not given importance, nor they were given much priority in designing the, implementation or dissemination of this massive livestock based

programme. The local natural resources like water scarcity due to pollution from mining as well as the problem of overgrazing of delicate pasture lands of the steppe were given minimal recognition. The government of Mongolia failed to recognize the real potential of Mongolian herders which is their fathomless and in-depth knowledge about their local space and herding skills. The importance of the livestock mobility for the pastoral production system sustainability remained unappreciated and hardly finds its place in ensuring the herders' food security and the sustainability of Mongolian food and agricultural system.

6.5.5 Other Programmes on Food Security

I. Food Security Assessment Mission, 2006

Food Security Assessment Mission, 2006 was a joint MOFALI (Ministry of Food and Agriculture and Light Industry) in Mongolian government and UN (FAO/ UNDP/ UNICEF) efforts to evaluate the National programme on food security, safety and nutrition. With the evaluation of the programme it was observed that limited progress has been achieved because of the following reasons: Uncertainty of resources required for the food security programme and organizational constraints negatively affected the progress. The food security assessment mission (2006) finally recommended the national programme for food security.

II. Food Stamp Programme for Food Security and Social Security Assistance

During 2008-2009, this one-year period remained full of economic turbulence which had gravely impacted the economy of every country. In Mongolia, the global economic crisis and extreme winter conditions in 2008-2009 resulted in escalating food insecurity in the country specifically among people with low purchasing power. Due to the rising commodity prices and falling income, the purchasing power of people suddenly get reduced to an extremely low level (MacAuslan and Attah 2015, 121).

The government of Mongolia had taken a vital food policy initiative to deal with widespread food crisis during the 2008 global economic slowdown. The food crisis impacted the most to the population living in the remote areas of Mongolia where

markets are not much developed. The government of Mongolia with the financial assistance and support of the Asian Development Bank (ADB), Japanese Development Agency, World Bank and other partners initiated the 'food stamp' programme with a specified target of poorest 5 percent of households by using Proxy Mean Test (PMT) (MacAuslan and Attah 2015, 122). Under this food stamp programme for curbing food insecurity and social assistance, different measures and criteria were adopted for the targeted population of poorest 5 percent households. The government with the assistance of food suppliers worked in the direction to improve the markets to make the programme effective.

Food stamp was introduced in Mongolia as it is the world's least populated country, and hence with a covering the poorest 5 percent of the household would be much easier to manage as compared to the countries where large share of population falls under the poor household's category. But the demographic characteristic of Mongolia is quite clear. Mongolia is clearly divided in terms of rural and urban Mongolia. Nomadic pastoralism still holds the nerve and is the major source of livelihood in rural Mongolia. In urban areas, the sharp increase in the population has become a major demographic feature of the primate city. In the capital city of Ulaanbaatar alone, more than 40 percent of the people are living. The uncertainty in the employment in urban areas is considered as one of the prime cause behind the rising food insecurity among the urban poor.

The food crisis (2008) and the financial turmoil of 2008-2009 resulted into surge in the food commodity prices. In 2010-11, extreme winter condition of *dzud* resulted in immense livestock mortality in Mongolia. Together all these chain of events exposed a larger section of the poorer households in a condition of acute food insecurity, this programme was undertaken as a strong initiative to provide food security to the targeted section of poor and marginalized population of the country. The programme was considered as a powerful government effort to deal with the targeted section of the population.

6.6 Agriculture and Food Security in Mongolia: Regional Trend and Pattern

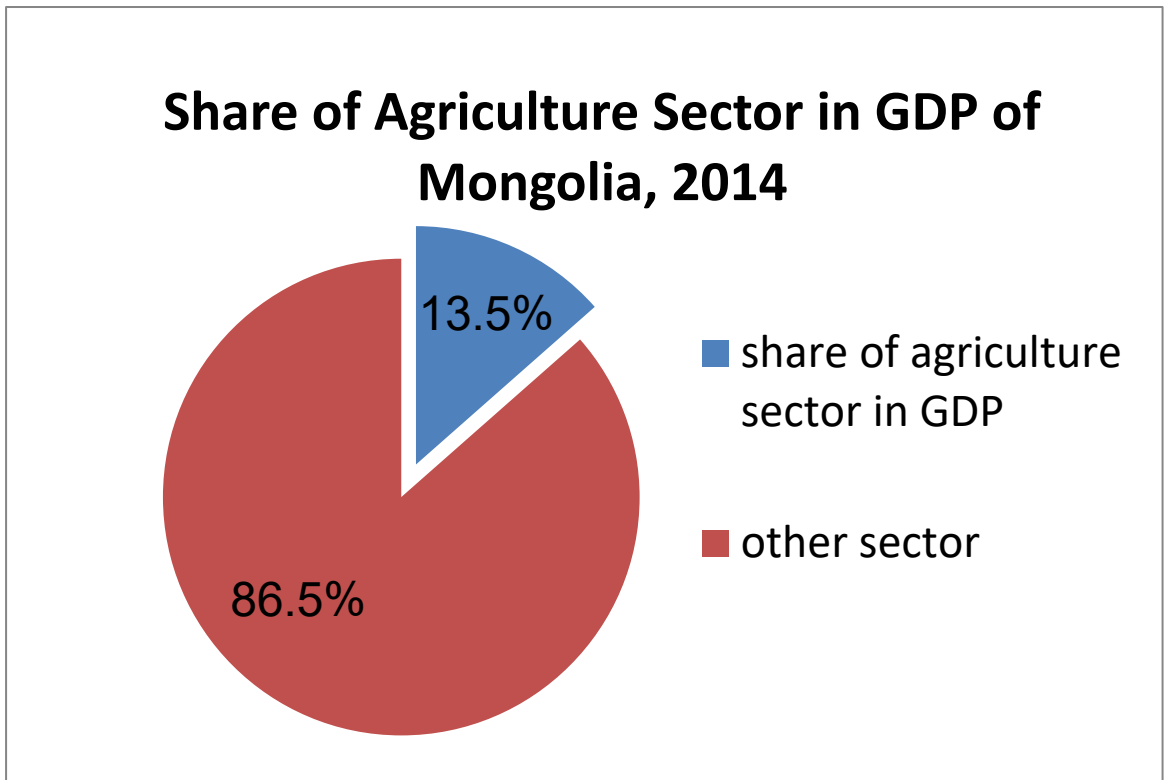
After the collapse of COMECON the assistance provided by the former Soviet Union was not available to Mongolia which made it complicated for the economy to revive

from this difficult situation. During 1990-1992 the Gross Domestic Products (GDP) suddenly declined by more than 20% (GOM 2003, 1-2). Whereas now the country's statistics have been improved, but remained prone to steep fluctuations. From the total GDP of Mongolia in 2014, agriculture sector accounts for a share of 13.5 percent (Fig.6.1). In terms of the share of employment, agriculture sector alone accounts for 28 percent, which represents the contribution mainly from rural Mongolia (Fig.6.2). Agriculture still contributes a major share in the labour force of Mongolia. Whereas in terms of the country's trade, the agriculture sector that contributes 5.9 percent of export in 2014 (NSOM 2014). It is observed that the share of agriculture sector in GDP started increasing after 1991 as the large share of non-herder population joined herding as a profession due to the sudden economic turmoil. It increased from 11.8 percent to 25.7 percent from 1991 to 1992. Afterwards reported steady increase year by year and reached at its peak in 1996 with a contribution of 38.5 percent share in GDP. After 1996 it started falling and touched the bottom with 10.3 percent share in 2011. It again started showing the sign of revival with 11.3 percent in 2012, 13.4 percent in 2013 and 13.5 percent in 2014 (NSO 2014).

The share of agriculture sector accounts for 48.6 percent in 2000 which represents almost the half of the total strength of labour force. But soon after touching the peak it started declining gradually year by year and in 2014 it remained around 28 percent. Despite steady decline in the share of agriculture sector it still accounts as an important sector and contributes immensely in terms of employment, specifically in rural Mongolia. Agricultural sector still acts as the backbone of Mongolian economy.

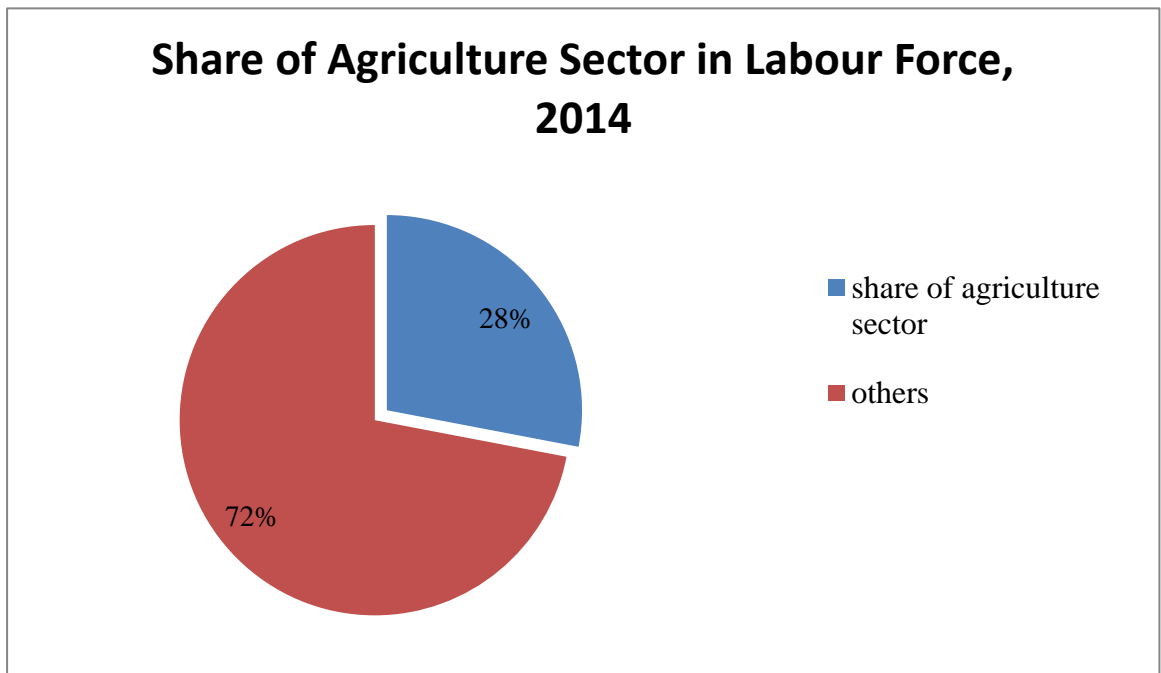
It is clearly indicated from the figures that agriculture sector played important role in the economy of the country as well as remained a perennial source of employment, and is still holding a vital share in the total population of Mongolia. Even after economic downturn and spiraling indebtedness from international funding agencies like International Monetary Fund (IMF) and World Bank (WB), and huge slump in the Mongolian currency '*tugrik*', it is the agriculture sector which had supported the rejuvenation and resurrection of the fallen economy. Now the strength of food and agricultural sector has been recognized by the government. New economic model based on the rebuilding of traditional pastoral livestock production system is now remained as the core constituent in the sustainable agricultural development and in the rebuilding of Mongolian economy.

Figure 6.1: Share of agriculture Sector in GDP of Mongolia, 2014



Source: NSO 2014

Figure 6.2: Share of Agriculture in labour Force, 2014



Source: NSO 2014

6.6.1 Agricultural Production and Food Consumption Pattern in Mongolia

After undergoing through intense study on the transformation of agricultural system in Mongolia, it has become more important now to understand the overall food consumption and agricultural production system, and to more clearly being able to observe its response to the sudden shift in the economic and political systems. This is really going to assist us in drawing accurate results of this massive transformation and its impact on food security in Mongolia.

The region wise agricultural production suggests us about the geographical diversity in Mongolia and how it interacts with the food and agricultural system. The production and the consumption figures are taken into consideration to assess the overall food security level, but the local areas data remained limited due to which the region specific impact on the Mongolian herders remained difficult to extract. But at the county level and regional level, the clarity of data facilitated in understanding the overall impact on food security, and also at household level, to some extent.

The output of main agricultural products in Mongolia for the selected years of 2013 and 2014 are mentioned below. The major food products and production in thousand tons are given in detail (figure 6.3). In the meat production a slight decline has been seen for the selected year 2013 to 2014. In the same period, the overall meat production declined from 299.3 thousand tons to 294.5 thousand tons, whereas beef production went down from 57.7 to 54.7 thousand tons, for mutton and goat meat the production declined from 155 to 153.3, but for the pork, production remained stable on 0.5 thousand tons.

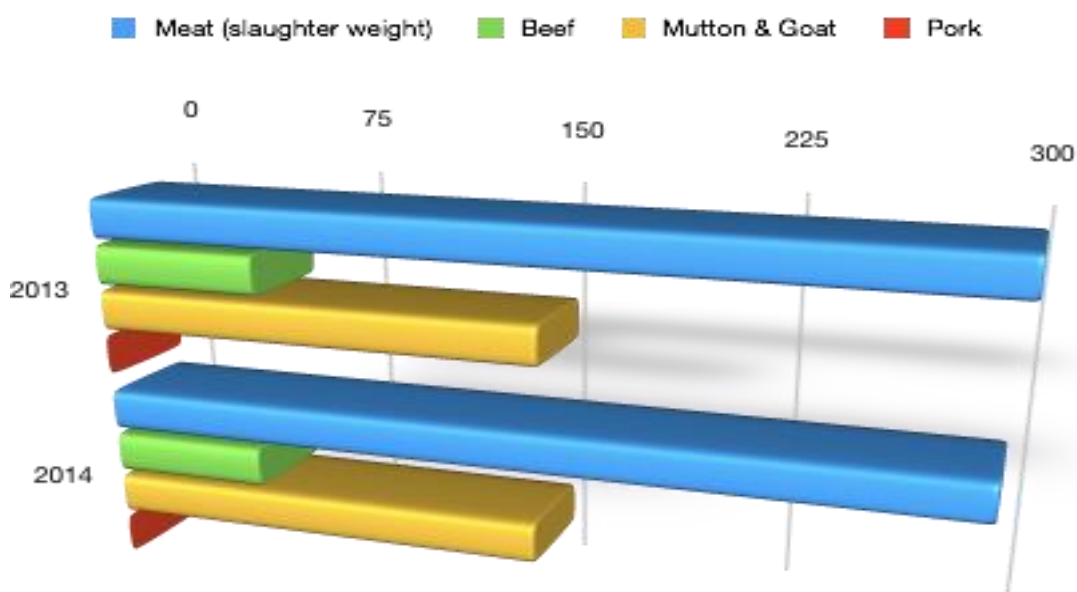
In the case of cereals, the production increased from 350.2 to 518.8 thousand tons, wheat production increased from 331.5 to 488.3 thousand tons, but the production of potatoes declined from 191.6 in 2013 to 161.5 for the next year, in 2014.

Vegetable production has seen a slight increase from 101.9 to 104.9 thousand tons. Similarly, the production of milk increased steeply from 667 to 765.4 thousand liters, while eggs production increased from 63.2 to 72.2 million pieces for the selected years 2013 and 2014.

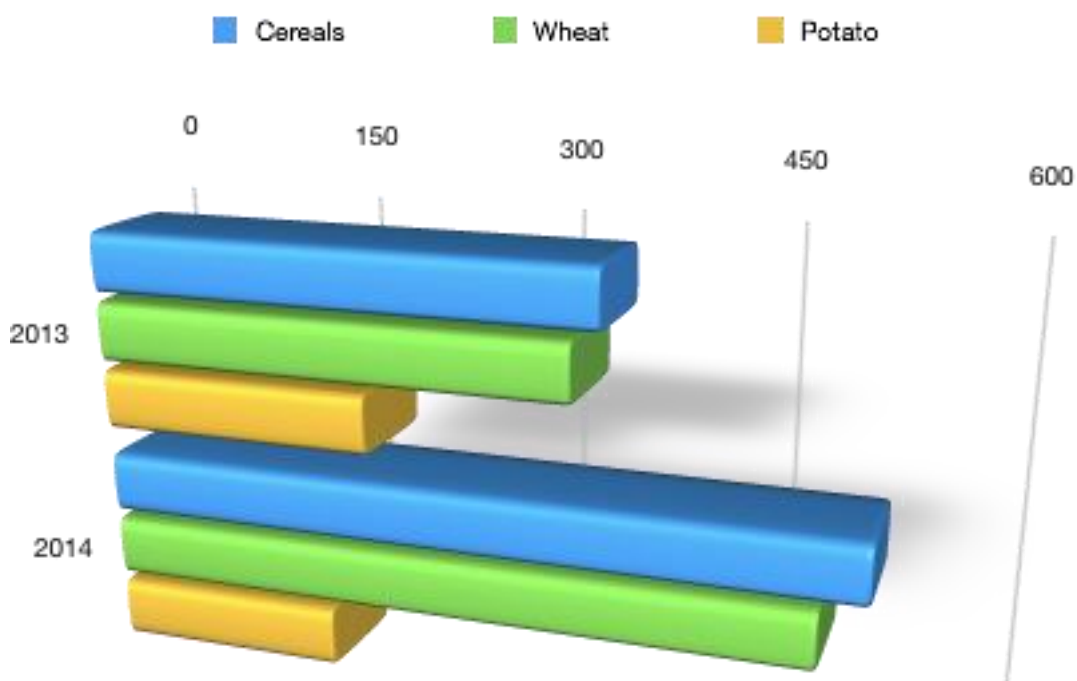
The production of hide and skin in million pieces, for different animal species like horse, cattle, sheep, goats, sheep wool and cashmere, are also assessed and remained constant for the selected years as there is not much increase or decrease has been reported for these products (NSO 2014).

Figure 6.3 Output of Main Agricultural Products in Mongolia of selected years

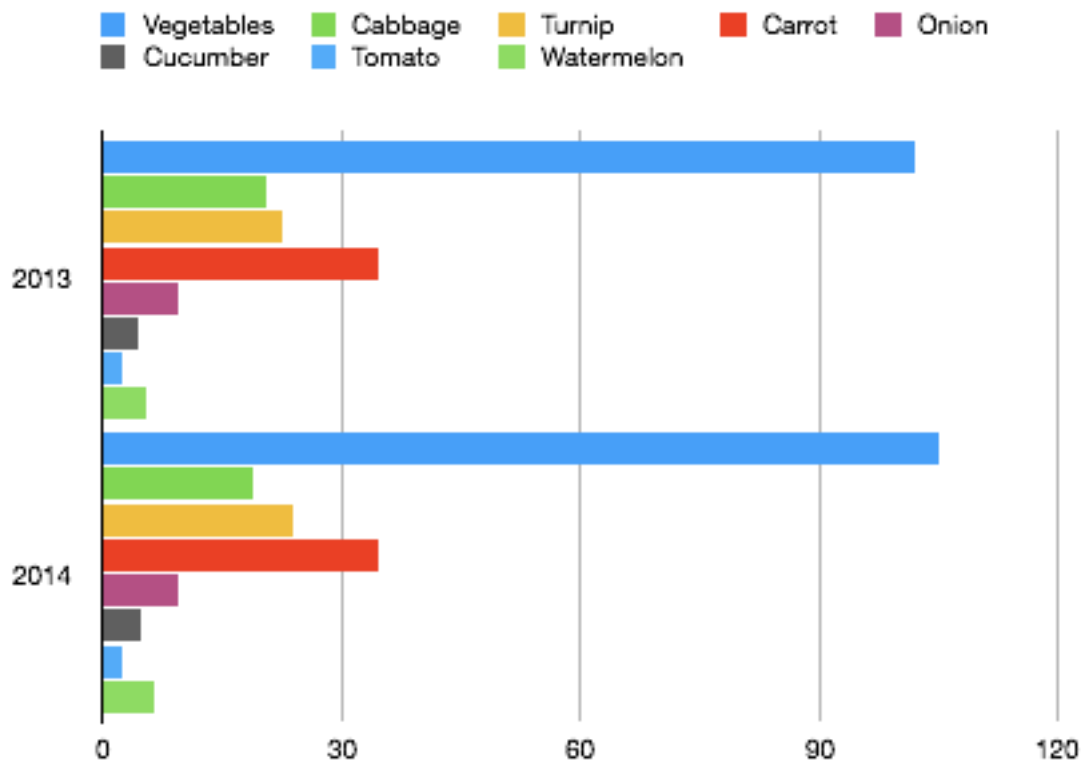
- **Meat Production (thousand ton) of selected years**



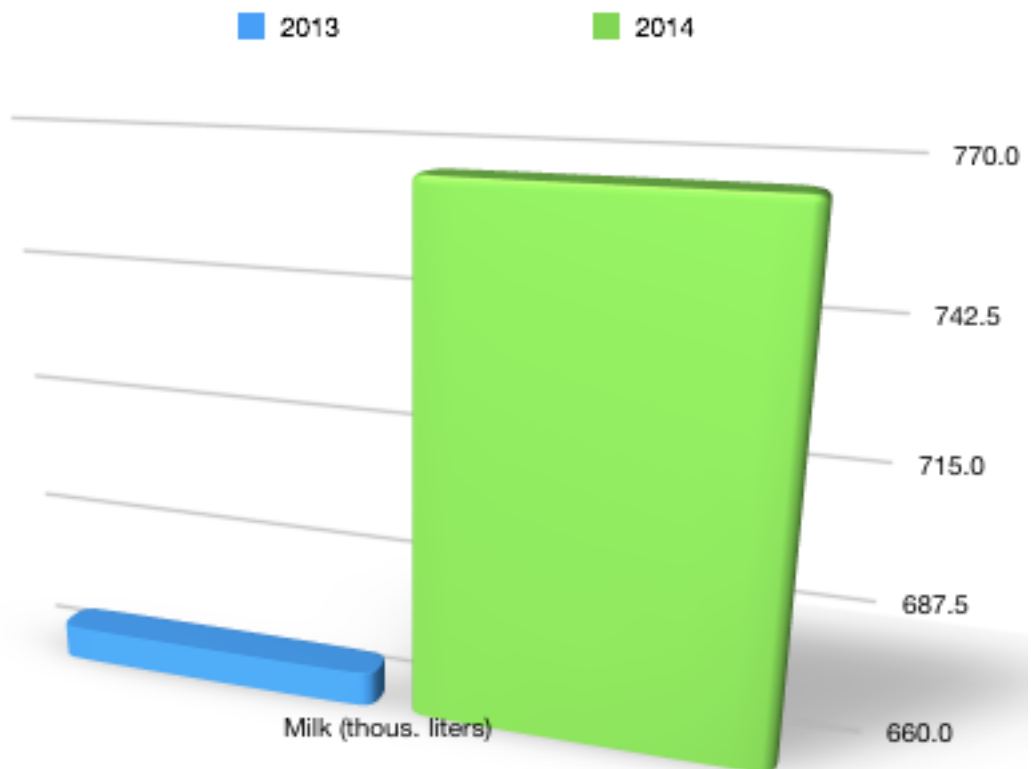
- **Cereal and Potato Production (thousand ton) of selected years**



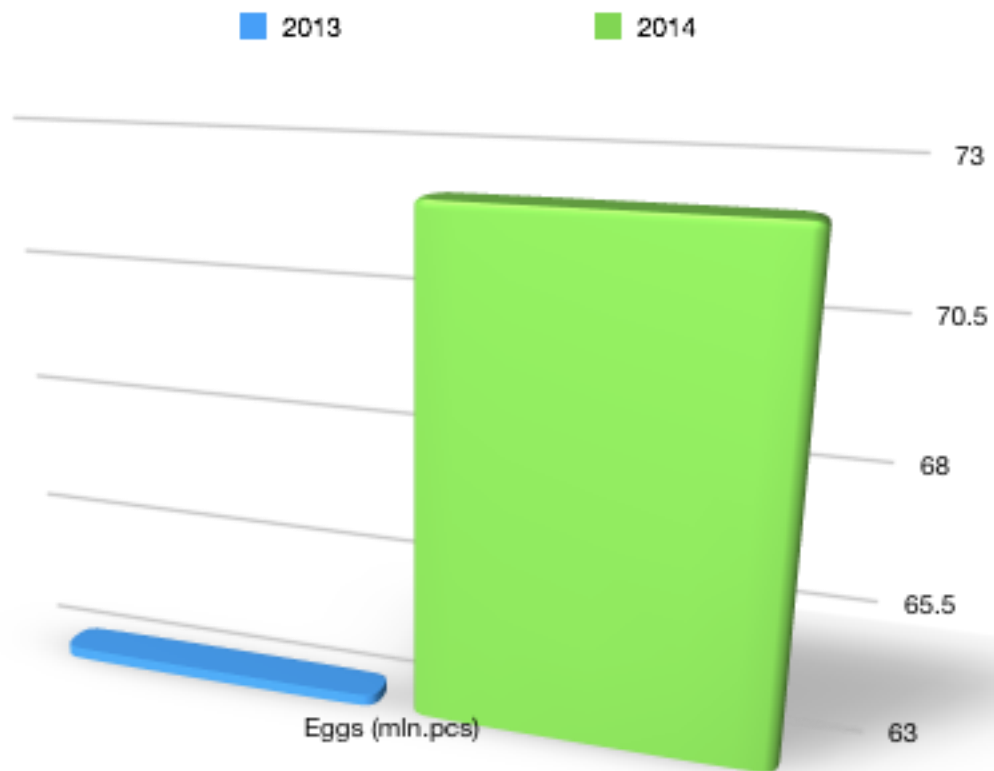
- **Vegetable production (thousand ton) of selected years**



- **Milk Production (thousand liters) of selected years**



- **Eggs Production (million pieces) of selected years**



- **Hide and Skin Production (million pieces) of selected years**

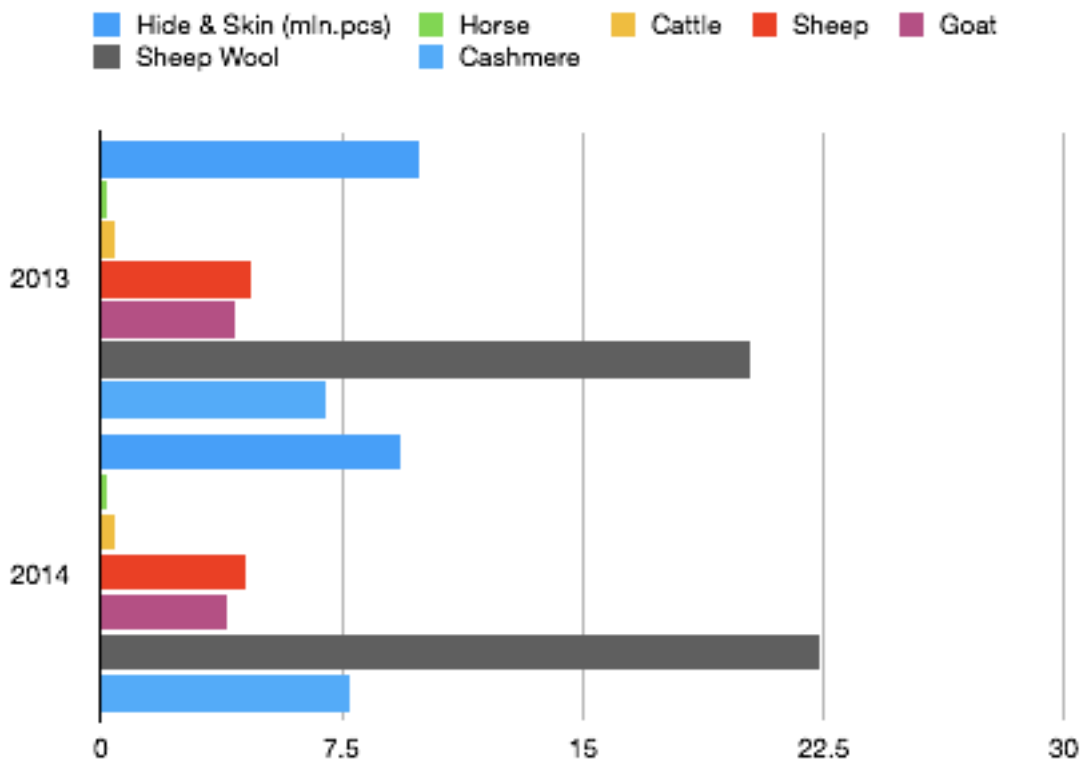


Table 6.3: Output of Main Agricultural Products

(thousand tons)

Agricultural Commodity	2013	2014
Meat (slaughter weight)	299.3	294.5
Beef	57.7	54.7
Mutton & Goat	155.0	153.3
Pork	0.5	0.5
Cereals	350.2	518.8
Wheat	331.5	488.3
Potato	191.6	161.5
Vegetables	101.9	104.9
Cabbage	20.6	18.7
Turnip	22.4	23.9
Carrot	34.5	34.7
Onion	9.3	9.4
Cucumber	4.3	4.7
Tomato	2.5	2.4
Watermelon	5.4	6.3
Milk (thous. litres)	667.0	765.4
Eggs (mln.pcs)	63.2	72.2
Hide & Skin (mln.pcs)	9.9	9.3
Horse	0.2	0.2
Cattle	0.4	0.4
Sheep	4.7	4.5
Goat	4.2	3.9
Sheep Wool	20.2	22.4
Cashmere	7.0	7.7

Source: NSO 2014

**Figure 6.4 Food Consumption Pattern in Mongolia: Livestock Consumption
(thousand heads) by type for selected years**

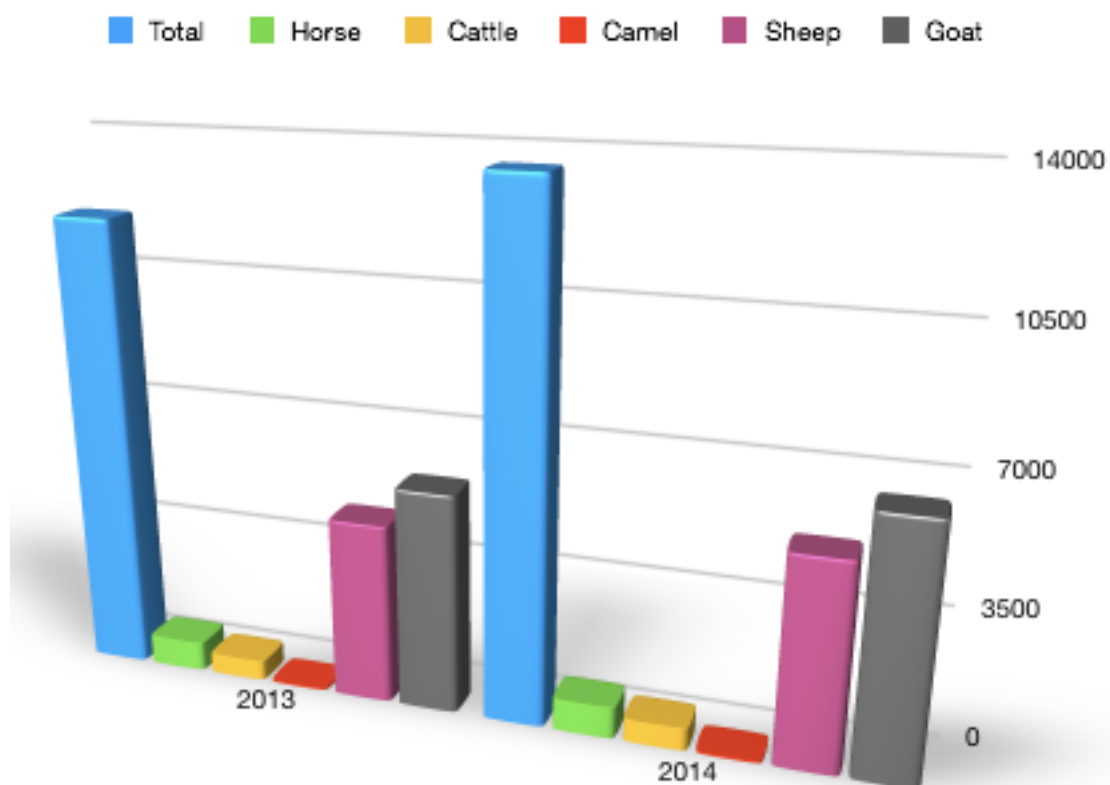


Table 6.4: Livestock for Consumption Use, by type (thousand heads)

	2013	2014
Total	11995.9	13623.9
Horse	772.7	832.3
Cattle	527.9	594.8
Camel	63.7	73.8
Sheep	4801.4	5453.1
Goat	5830.2	6670.0

Source: NSO 2014

6.6.2 Regional Variations and Aimag wise Agricultural Production

The regional variation in the agricultural production in Mongolia has indeed assisted in the much deeper assessment and understanding of the food security situation in Mongolia and how it differs at aimag levels. The overall country is divided into western region, Khangai region, central region, and the eastern region, which for a broader assessment, are further divided into the aimag levels.

In the western region of Mongolia, the cereal production saw a decrease in production from 2013 to 2015, but in the year 2016 a slight increase in production was observed. But the overall production level remained lower than the year 2013 level (Fig. 6.5.1). Within the western region of Mongolia, it is theUvs aimag which represented as the maximum cereal producing area and has emerged as a major contributor in the country's overall cereal production. After that Zavkhan aimag remains as the second important cereal producing aimag of the western region but in terms of its contribution to the overall cereal production in Mongolia, it produces small amount. In other aimags, the production of cereals has remained very low, and their contribution in the national production is too little.

Within the Khangai region, the cereal production is dominated by the Bulgan and Khovsgol aimags, but in the year 2014, the cereal production jumped in the Orkhon aimag. Soon after during 2015 and 2016, the production sharply declined to its previous levels (Fig. 6.5.2). In terms of contribution in the national cereal production from the Khangai region, it is the Bulgan and the Khovsgol aimags which produces maximum amount and contributed a healthy share of production from the region.

The central region is one of the major contributors in terms of food production. The total cereal production was 2,78,470 tones for the year 2013 which increased to 3,70,985 tones in 2014. But the production had sharply fallen in the next year (2015) and decreased to 1,22,223 tons. In 2016, the cereal production again jumped and increased to 3,50,186 tons (Fig. 6.5.3). It clearly indicates towards an unsteady and highly fluctuation trend in the cereal production. It is observed that Selenge and the Tov aimags are the prime producers of the central region of Mongolia. The contribution of other aimags like Dakhan-Uul, Dundgovi and Omnogovi are

negligible. Within the Central region, there are huge food production gaps between different aimags.

In the Eastern region, the cereal production is largely dominated by Khentti and Dornod aimags (Fig. 6.5.4). The contribution of Sukhbaatar aimag remained low, and has not much influence on the overall cereal production for the country. But still the cereal production has fallen shorter for meeting the food security challenged for the underprivileged section of the society in Mongolia, even the Mongolian herders were not remained untouched with this massive problem of acute food crisis within the country, as agricultural production is not the right criteria to assess the much sensitive issue of food security in Mongolia.

6.6.3 Livestock Resources and Grouping of Herder Households: A Major Food Security Concern

It is clearly observed that in the group which ranges between 201 to 500 livestock represents the maximum number of herder households. For the year 2013, it remained 47,467 herder householders, which increased to 51,580 herder householders in 2014. After that, it is about 35,705 herder households who have 101-200 livestock in 2013, this group reported a slight decrease in the number of herder households to 34,906 in 2014 (Figure 6.6.1). A steep decrease from 19,149 to 17,314 herder households in a year was reported in the group with number of livestock ranging between 51 to 100. Whereas in the group with 501-999 livestock, the number of herder households jumped to 20,190 in 2014 from 16,372 in 2013. It has been discovered that the total number of herder households with livestock have increased from around 1,45,000 in 2013 to close to 1,50,000 in 2014 (Figure 6.6.2).

Figure 6.5.1 Cereal Production in the Western Region: Harvested Cereals (tons) on 1st November of selected years

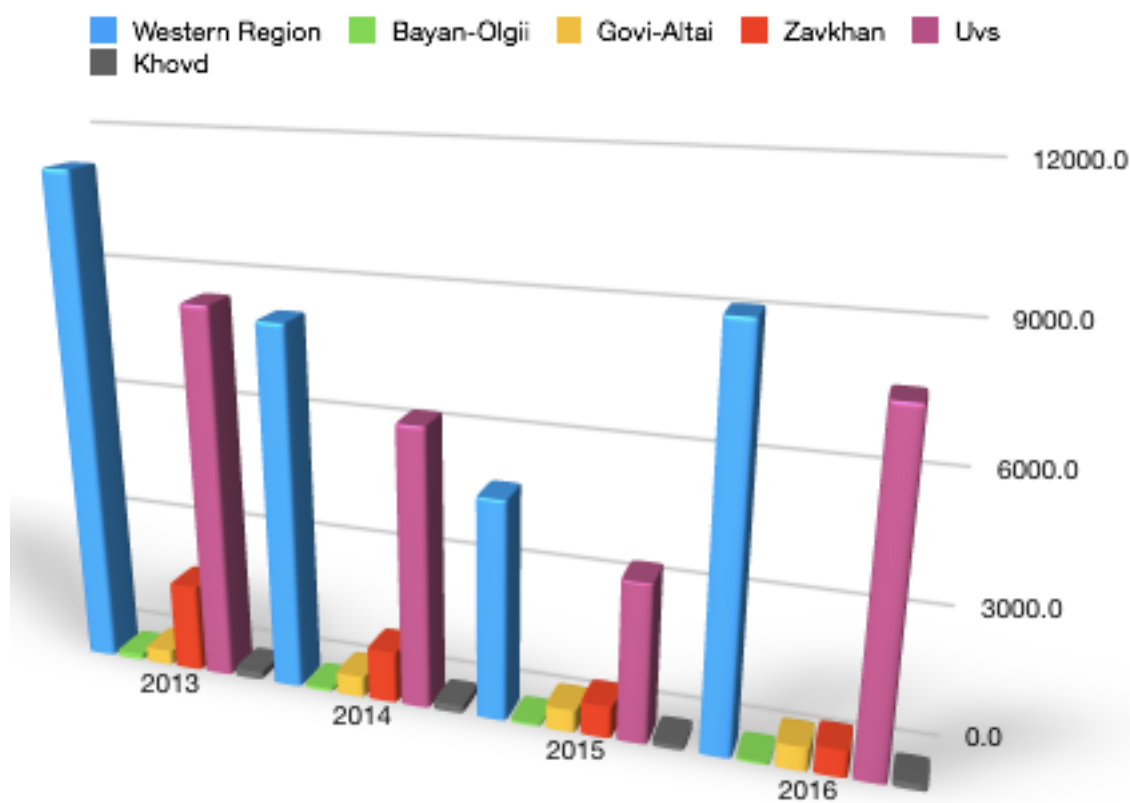


Table 6.5.1: Harvested Cereals (tons) in the Western Region of Mongolia

Regions and the Aimags	2013	2014	2015	2016
Western Region	11275.0	8350.6	5046.0	9218.2
Bayan-Olgii	127.1	70.1	56.9	56.0
Govi-Altai	332.4	475.4	504.1	531.9
Zavkhan	2045.0	1195.0	730.0	610.0
Uvs	8595.0	6438.5	3641.1	7876.4
Khovd	175.5	171.6	113.9	143.8

Source: NSO 2016

Figure 6.5.2 Cereal Production in the Khangai Region: Harvested Cereals (tons) on 1st November of selected years

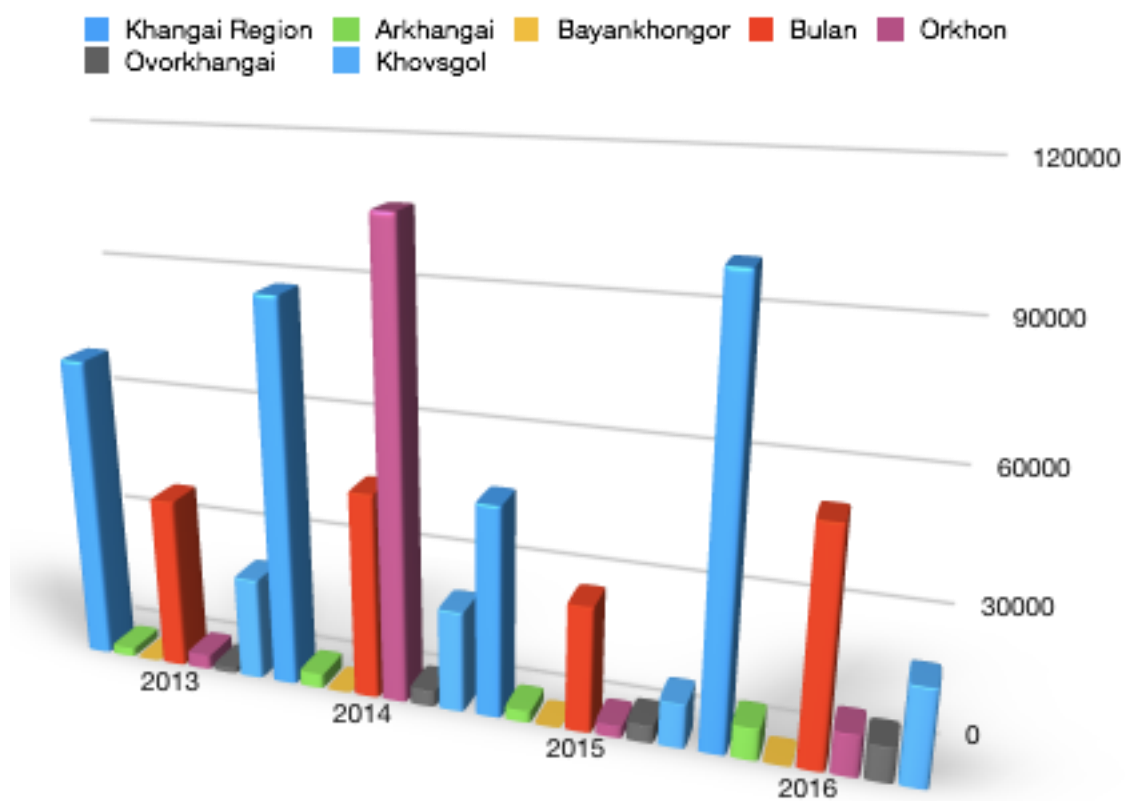


Table 6.5.2: Harvested Cereals (tons) in the Khangai Region of Mongolia

Regions and the Aimags	2013	2014	2015	2016
Khangai Region	70580.9	88881.3	48641.8	100950.8
Arkhangai	1967.0	3290.0	2676.2	7310.0
Bayankhongor	8.9	17.9	21.8	14.5
Bulgan	40061.4	47677.3	28961.2	53710.4
Orkhon	3328.6	107421.2	2749.0	9575.0
Ovorkhangai	1303.0	3721.9	3997.9	8075.0
Khovsgol	23912.0	23433.0	10236.0	22265.9

Source: NSO 2016

**Figure 6.5.3 Cereal Production in the Central Region: Harvested Cereals (tons)
on 1st November of selected years**

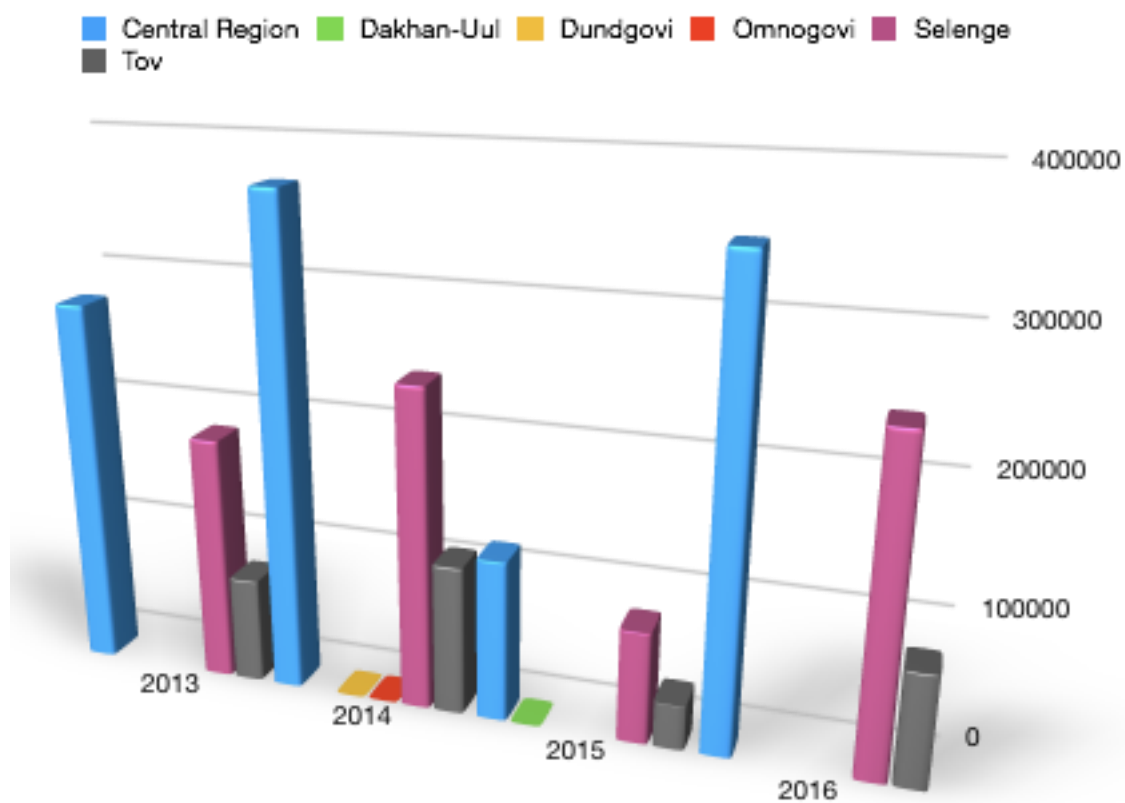


Table 6.5.3: Harvested Cereals (tons) in the Central Region of Mongolia

Regions and the Aimags	2013	2014	2015	2016
Central Region	278470.5	370985.1	122223.1	350186.2
Dakhan-Uul	-	-	0.3	-
Dundgovi	-	0.2	-	-
Omnogovi	-	0.1	-	-
Selenge	186615.9	242943.9	84615.3	246391.2
Tov	80156.9	113177.0	33813.5	84876.2

Source: NSO2016

Figure 6.5.4 Cereal Production in the Eastern Region: Harvested Cereals (tons) on 1st November of selected years

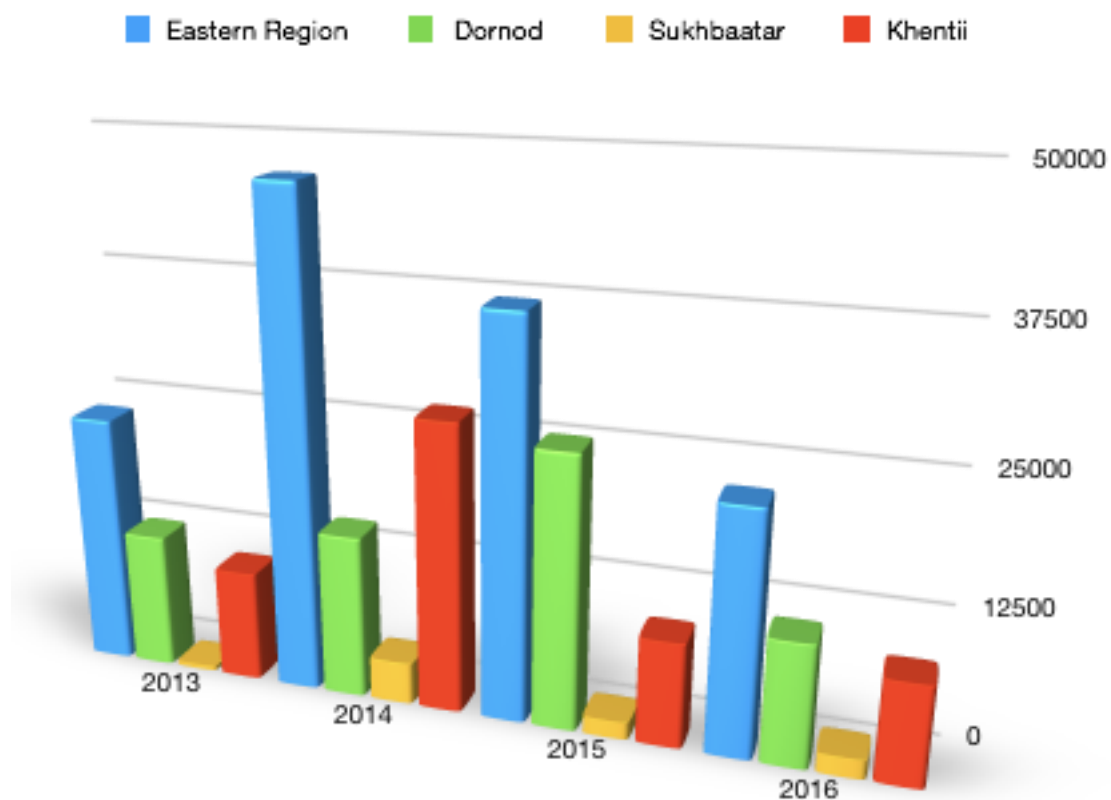


Table 6.5.4: Harvested Cereals (tons) in the Eastern Region of Mongolia

Regions and the Aimags	2013	2014	2015	2016
Eastern Region	23989.2	46939.9	37432.0	22959.9
Dornod	12955.2	15576.0	25848.0	11621.9
Sukhbaatar	430.0	3965.0	1630.3	1820.6
Khentii	10604.0	27398.9	9953.7	9517.4

Source: NSO 2016

Figure 6.6.1 Grouping of Herder Households, by group of number of Livestock

Grouping of Herder Households Based on Number of Livestock

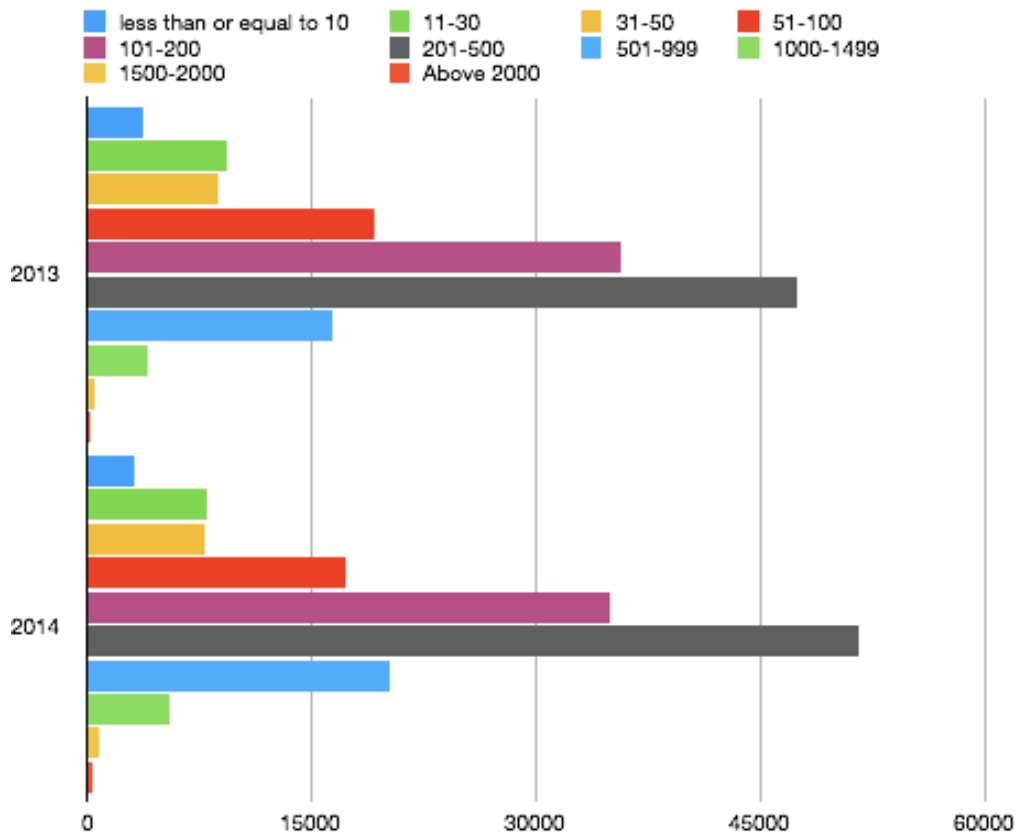


Figure 6.6.2 Total Number of Herders Households (with livestock) for selected years

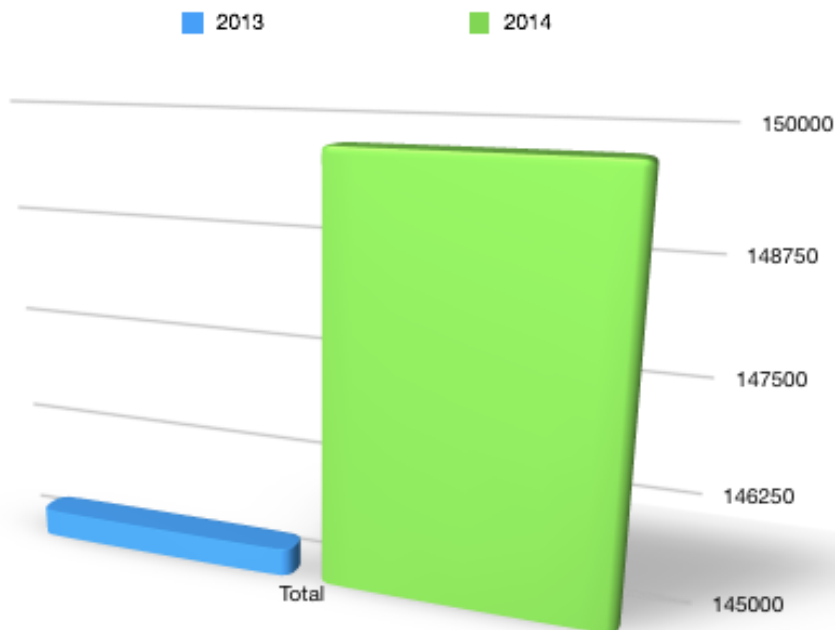


Table 6.6: Grouping of Herder Households (by number of Livestock and Number of Herder Households)

Number of Livestock	Herder Households (2013)	Herher Households (2014)
Total	145311	149735
less than or equal to 10	3729	3220
11-30	9408	8039
31-50	8690	7820
51-100	19149	17314
101-200	35705	34906
201-500	47467	51580
501-999	16372	20190
1000-1499	3983	5505
1500-2000	555	802
Above 2000	253	359

Source: NSO 2014

Figure 6.7 Number of Livestock, by Region and the Capital for selected years (thousand heads)

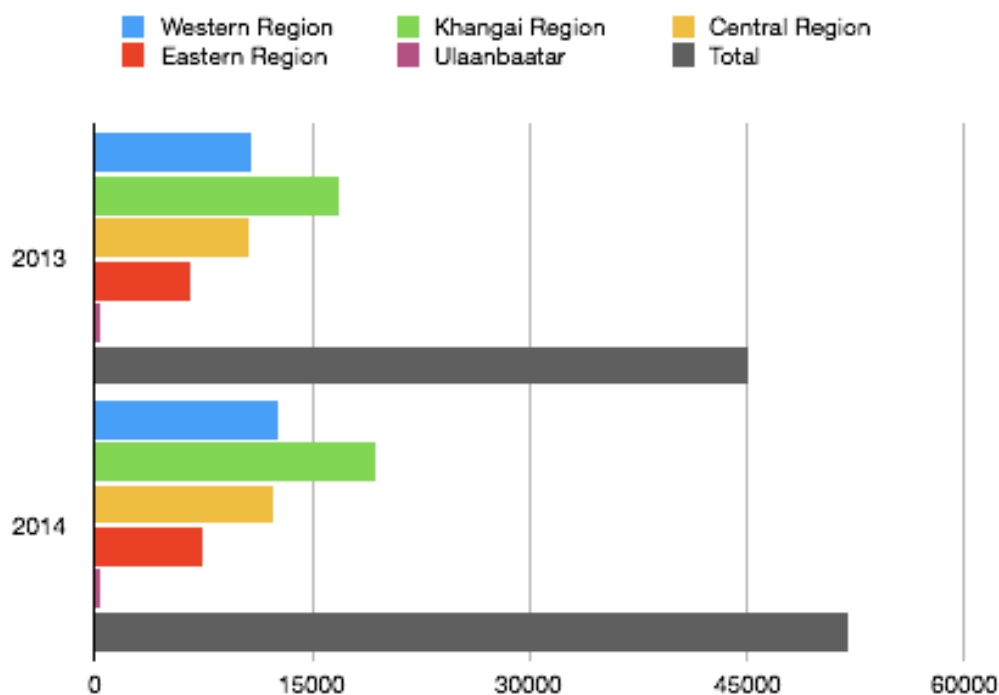


Table 6.7: Number of Livestock, by region and the capital

(thousand heads)

Region, and the Capital	2013	2014
Total	45144.3	51982.6
Western Region	10832.7	12544.5
Khangai Region	16790.7	19283.8
Central Region	10604.9	12288.4
Eastern Region	6586.9	7480.5
Ulaanbaatar	329.1	385.4

Source: NSO 2014

6.7 Food Security Assessment in Mongolia

Food security has been one of the most important factor which is directly linked with the millennium development goal (MDG) 1 to eradicate extreme poverty and hunger, for which Mongolia has set a target to halve the people whose income is below minimum living standard between a period of 1990 to 2015 (GMO 2011; 22-37). But the global economic crisis of 2008 and 2009 and the 2008 food price rise and inflation further deteriorated the situation of poverty and hunger. In the year 2013, new amendments to the earlier existing guidelines on food security law was prepared by the working group. The working group was specially established to draft these amendments to guidelines which finally got approved by the National Statistical Organization (NSO) Chairman Decree No. A/12 OF 2015, January 30. Under the deeper assessment of the national food security and high accuracy, an integrated statistical system was established to provide authentic, accurate and crucial statistical data for designing and planning of food security policies and its effective monitoring and management.

I. Food Availability

It has been strongly believed that food security could be achieved through increasing the agricultural production which in turn would increase the availability of food for everybody. Increasing food grains production, fruits, vegetables, animal products like milk and dairy products, meat products, poultry etc. always remained at the center of food security for any region or a country (Qureshi 2016, 280-281). Based on the geographic scale food security has different levels starting from global food security to regional, national, household and individual levels, all are important for providing an in-depth explanation for ensuring food security at each level. But unfortunately, food security is not just about the agricultural production, at national level it is clearly estimated on the basis of total food produced and the food consumption (Braun 2010). But at the much closer examination of the food security situation, specifically at the household and individual levels it is more about food accessibility, also about affordability and the purchasing power of the poor and underprivileged section of the society.

For assessing the availability of food, the national annual food resource is divided by annual food consumption for standard population. The sedentary population in Mongolia was 3119.9 thousand, and standard population was 2523.6 thousand in 2016. This marked an increase of 62.1 thousand or 2% in the sedentary population and about 46.9 thousand or 1.9% for the standard population over the previous year of 2015 (NSO 2017).

II. Food Accessibility at Household level

In terms of household level food accessibility, it has been observed that food particularly animal based food products like meat, meat products, milk and dairy products as well as other products like flour, sugar, and sweeteners have remained satisfactory. Whereas other foods which are not purely grown in Mongolia like vegetables, fruits and berries, pulses etc., the accessibility to such foods remained unsatisfactory. Accessibility of food products also differs based on the season and divided under two broad categories, the summer season and the winter season. In comparison to winters food like milk and dairy products, sugar and sweeteners are more accessible during summers (NSO 2017). It has also been observed that

Mongolian diet is primarily dominated by the locally available products in the form of meat, meat products, milk, dairy products and flour (NSO 2017, 9).

III. Food Nutrition and Dietary Energy

Another important facet of the food security is the dietary energy and nutrient intake by per standard person. It has been observed that the national average daily dietary calories intake varies during the summer and winter seasons, as well as starkly differs for the rural and urban Mongolia.

Mongolian summer and winter seasons are examined in this research study which is an important area for study on the food security levels. The seasonality of food accessibility and availability has remained a sensitive issue which is identified as a unique feature of food and agricultural system in Mongolia influencing food security, specifically of Mongolian herders. It has been found that national average of daily dietary intake per standard person during summer of 2016 was 2709.2 kilo calorie in total, out of which protein intake was 117.8 grams, fats 84.2 grams and carbohydrates was 366.9 grams. It has also been observed that the calorie intake is 0.5, a 22.1% higher when compared with the recommended daily calories intake value for standard person (NSO 2017, 10).

Table 6.8: Food Accessibility 2016

Types of Food Products	Daily Food Intake for Standard Person (grams)	National Average for Summer (grams)	National Average for Winter (grams)	Accessibility in Summer (%)	Accessibility in Winters (%)
Meat and Meat Products	200	312.1	315.4	156.1	157.7
Milk	150.0	208.7	164.9	139	109.9
Dairy products	200	425	373.2	212.5	186.6
All types of Rice	78	64.2	61.5	82.3	78.8
Sugar and Sweeteners	23	61.7	52.2	268.3	227.0
Potatoes	140	85.3	85.5	60.9	61.1
Vegetables	200	72.4	71.5	36.2	35.8
Fruits Berries	180	33	29.7	18.3	16.5
Pulses	90	0.1	0.1	0.1	0.1
Eggs	19	8.7	8.4	45.8	44.2
Vegetable oil	25	17.9	18.5	71.6	74
Flour	100	183.1	186.8	183.1	186.8
Flour Products	220	184.9	175.3	84	79.7

Source: Household Socio-Economic Survey, NSO 2017.

During summer, the energy and nutrients intake in the urban centers has been found to be different from the rural areas. This remarkable observation revealed that in rural Mongolia, the calories, protein, fats and carbohydrates intake are far more and have exceeded the standard norms. Whereas in urban centers the dietary calories, protein, fats and carbohydrates were low during summer season. The “national average daily dietary calories intake per standard person in winters was 2599.8 kilocalorie, protein 115.9 grams, fat 81.2 gram, which is 4.0-16.0% higher than the recommended daily energy intake value” (NSO 2017,10). Again it is examined that for winter season the intake of calories, protein, fat, and carbohydrates among the rural population the set standard intake and exceeds the norms, on the other side, it remained lower than the standard level for the urban population. It really indicates some of the stinger reflection of the herder’s family food security and the relevance of the traditional Mongolian pastoral knowledge system and practices. We can clearly understand that in terms of dietary energy and nutrient intake, rural Mongolia performance has remained far better than the urban centers. Household food security has been assessed to be at a much better position as compared to the urban household. The rural Mongolia exceeded the calories intake norms set up by the government of Mongolia for a standard person, and it is all because of the herder’s domestic production of animal protein and fats based products which act like ‘Mongolian superfoods’ and gives them ancestral strength of the ‘Great Khan’ to face the harsh weather events. That, the traditional Mongolian pastoral system, its knowledge and practices still holds the key to the household food security in Mongolia.

IV. Food Safety

In Mongolia, food safety standard is still evolving as the processing industry and in recent past many new guidelines have been set up. Since there is not much data available for assessing the real picture of food safety within the country, it has become difficult to draw food safety standard, specifically for the domestic Mongolian foods. There are immense possibilities for the development of food safety sector. Many international organizations, like FAO (Food and Agriculture Organization of United Nations) have provided assistance in the form of technical support and implementation of projects on food security and safety.

One of the important programmes for rebuilding the dairy industry in Mongolia project has successfully been launched and executed by FAO under its global special programme for food security. The program on food safety referred to as GCSP/MON/001/JPN project was implemented during 2005-2007 which was mainly designed to increase the daily products supply to urban centers in Mongolia by reducing the post-harvest losses and restocking (FAO 2011, 4-5). This was considered as one of the major steps towards rebuilding the dairy industry which faced acute crisis and collapsed soon after the transition to entirely new market economy system during 1990s.

In the long run, this project is believed to benefit herders living far away from urban markets who are not able to supply abundant milk and milk products. This project was designed to benefit the herder's population as well as to reduce the market dependence on imported variety of milk powders. It is clearly assessed that large potential lies in the development of food processing industry which can surely turn Mongolia into one of the world's leading exporters in dairy and meat product based industry. The extensive livestock resource of Mongolia is the real 'wealth of the nation'. More than gold or precious stones, the 'five animals' are 'the invincible five jewels' of the great Mongolian grasslands and nomadic herders.

6.8 Pastoral Production System, Nomadic Herders and their Food Security

It is really sad to observe that despite approval and implementation of the numerous government programmes and policies on the development of food and agricultural system in Mongolia and improving food security situation of the country, little attention has been given on the revival of pastoral production system and nomadic herder's domestic production system based on home grown family food.

The neglect of fundamental units of agricultural production system immeasurably impacted the family food security of Mongolian herders. As a result, the entire nation suffered a huge setback in terms of downturn in economy as well as the sustainability of food and agricultural system. This catastrophic transformation of the entire agricultural system has hugely reduced the community and family level food security of Mongolian herders, which ironically form the basic unit of agricultural production, yet fallen under the most vulnerable and food insecure category. This represents a

complete unethical approach of the government policies and programmes concerning food and agricultural system development and food security, specifically for the poor population with limited cash income and low purchasing power to access food at the market price.

The food security programmes have mainly focused to improve the agricultural production, transformation to more advanced agricultural technologies for competing in the world market and for matching the international food quality standards. Even the latest use of biotechnology for gene enhancement in the livestock sector has also remained a major feature of the livestock based programme by the government of Mongolia. The conversion of virgin lands to cultivable land remained a major priority for increasing the agricultural production and improving the self-sufficiency at national level.

‘Third *Avar*’ programme has mainly remained focused to bring back the abandoned cultivation lands to use which are soon abandoned after the collapse of socialist era and were infested with weeds, specifically *Artemisia*, thus causing health complications among the people living along in such abandoned fields. The programme has contributed fairly well in improving the country’s self-sufficiency level in agricultural sector and reducing Mongolian dependence on imported food. It has been observed that by ignoring the relevance of traditional Mongolian pastoralism while undergoing the transformation of the agricultural system has resulted in the radical change in the herder’s attitude towards herding. It has shifted its base from family farm production system or the domestic production system, that is, ‘consumption to sale’, purely to earn cash income.

6.9 Radical Change in Herders’ Attitude towards Pastoral Production System

The transformation of agricultural system due to a sudden shift from command economy to market economy led to radical changes in the herder’s attitude in Mongolia. The market oriented production system and privatization of livestock sector, experimentation with gene technologies (GOM 1995, 40-45) exposed Mongolian herders to the international market fluctuation in the pricing mechanisms. For instance, the case of high cashmere demand which led to the high international price and sudden drop in it led to severe jeopardize the fate of herders’ dependent on

international market. Partially the high cashmere price inflected the herder's choice to maintain a herd composition where cashmere goats outnumbered the other animals' species, which certainly impacted the carrying capacity of the delicate Mongolian grasslands. Herders focus was shifted from production for the consumption to the production for the market oriented system, purely to earn cash income from sale. The marked as the year of change in the history of traditional herd-composition as goats outnumbered the sheep population for the first time ever. This led to a complete inbuilt system change and restructuring of the Mongolian pastoral production system. It is going to leave long term irreparable changes to the sustainability of the food and agricultural system in Mongolia.

Mongolian herders are well accustomed to the local environment and their herding skills. But soon after privatization, the sudden dissipating of employment in urban areas and industries, the non-herders also joined herding in order to survive and to mend their sudden job-loss (GOM 1997, GOM 2008, 14). The country of nomads again felt a jolt in the form of sudden surge in the herding population. These unskilled herders which soon became the part of herding occupation severely stressed the grazing land due to its ever rising livestock numbers. This created a huge problem, especially in terms of the accessibility to grazing land and the overall environmental sustainability of the Mongolian grasslands (GOM 1995, 25-35). It has really been surprising to observe that despite the shift in the production system from consumption to sale, the herder's community became more and more vulnerable and food insecure. Even after the earning cash income in hand, much of the displaced herding communities from rural areas failed to ensure their family food security as with low purchasing power and rising cost of cultivation as well as high market price for food products made it a daily hardship for herders to access food from the market. It has been observed that Mongolia increasingly became dependent on food aids and entered the rank of the WTO (World Trade Organizations) Net Food Importing Country (NFIDs) and the FAO LIFFDCs (Low Income Food Deficit Countries) (GOM 2008, 26-27). Yet, the devastation of family based home grown domestic production system and shift in the production system never recognized as the most fundamental factor in reducing the food security of the Mongolian herders and the urban poor.

The change in the herder's attitude is neither a sudden phenomenon, nor even a day happening. It takes ages to bring such changes into a local natural space and community inhabited on it. The family based traditional Mongolian pastoral production system and its high mobility added far greater accessibility to food, as they are home grown and easily available and affordable, although seasonality of food availability always remained a part of Mongolian herder's harsh life, yet their mobility and social networks assisted them to deal with the extreme situation of food crisis. But now the things have changed, instead of seasonality of food availability period, the food remains all the year available yet not affordable for the poor, specifically the Mongolian herders who have low purchasing power and limited cash in hand. They have been forced to give up their local food and agricultural system to make way for the highly modernize global food and agricultural system. The changes in the attitudes of herders are not their own choice, but to live their lives in the new system they have to change accordingly otherwise it would be even more difficult for them to sustain their everyday lives and livelihood. The radical change in the herder's attitude is in a way reflects the uprooting of the traditional Mongolian practices with the alien technologies which somehow represents an anger, an aggressiveness and a forceful transition, where they were left with 'no choice' of their own. These changes have brought an inclination to the concept of 'individualism' and the feeling of 'togetherness' which existed within the herding community got completely lost. Every change is not for the betterment of the environment and society, the relevance of traditional practices must be appreciated and given their due share of recognition in maintaining a healthy food and agricultural system, which has become certainly a rare thing now.

6.10 Summery

This chapter summarizes the major government programmes and policies concerning the food security situation in Mongolia. The in-depth explanation and the different facets associated with food security in Mongolia have been explored, based on which policies and programmes are assessed. Every programme concerning the food security has been considered and based on their impact factors observed during the study, the programmes have also been assessed for providing and establishing better way to deal with the acute situation of food crisis especially after global food crisis outbreak during the year 2008.

The collapse of socialist era based on command economy system, and transition to new market economy system allowed numerous changes in the previously existing command economy based system. In terms of livestock sector, the collapse of collective farm based system and the sudden dissipation of government financial and infrastructural support to the agricultural sector, and the rapid privatization of the animals in these farm collectives resulted into a situation of Mongolian agrarian crisis. The slower adjustment to the market economy system, the rising dependence imported food and international funding agencies for maintaining food security standard of the country, and the Mongolian herder's exposure to the international market price fluctuations not only led to the irreparable damages to both the livestock sector as well as to country's economy but also resulted in the devastation of the herder's household economy as well as the Mongolian grassland sustainability.

All together, we can say that the unplanned transition to the market economy, lack of development of market chains in the remote rural areas caused imbalanced growth between urban centers and the rural areas. The government programmes on food security unhesitatingly tapped some of the vital issues of the Mongolian food and agricultural system, and time to time new measures were taken into consideration for reestablishing and rebuilding the agricultural sector in Mongolia. But the most important issues remained neglected, such as Mongolian herder's skills, their community based knowledge system and herding practices which were remained unappreciated and not given its due place in designing the policies and programmes. The food security levels in the country has been assessed based on some vital criteria like food availability, food accessibility, food nutrition as well as food safety. The availability of statistical data on food security indicators are crucial for understanding the food security situation in Mongolia, its regional trends and patterns. It has been fascinating to observe that the performance of rural Mongolia in terms of the food nutrition and calories intake was far better than the urban Mongolia. The intake was even above the level set up by the government for per standard person. It indicates the relevance of the domestic food production system that has always remained integral part of the traditional Mongolian livestock production system. The traditional system requires its long possessed share of recognition and appreciation in the policies and programmes of the government primarily meant for the food security as well as sustainability of the food and agricultural system in Mongolia.

Chapter 7

Conclusion

The brief summaries of each of the preceding chapters have been separately drawn for a better understanding of the concepts which are associated with the transformation of the agricultural system and its impact on food security in Mongolia. This research study has examined different facets associated with the agricultural system transformation in order to have a comprehensive understanding of the food security situation in the livestock based food and agricultural system. The high dependence of Mongolian economy on the livestock production system has remained a remarkable feature of the observation and has immensely assisted in understanding the food security in Mongolia, specifically for the herder's families who all are directly dependent on their herds for their food security. Soon after the collapse of Socialist era, the entire political and economic system got transformed but the new system posed immense challenges to the agricultural sector, and hence the food security.

Food security has been long recognized as one of the most sensitive issues for millions, but its evaluation still remains far from the reality. Food security is not just about food availability, food accessibility, food safety, food nutrition, etc., but actually it is far beyond that, as food also represents a culture. Food is alive and it has a life, an identity which is a pure reflection of its localness of natural geographical space and its grower community, everything together constitutes food. Its (food) taste, its aroma, its touch, its feel is different for different cultures and communities. Every food has its own rareness, its signature, its symbol, its beauty, its soul that can be clearly seen in the form of use of certain food for diverse cultures, their celebrations, their ceremonies and rituals. Without understanding these deeper facets of food and its in-depth knowledge, one cannot achieve food security at family and community level.

The essence of food begins with every family, in fact, it remains an intrinsic part of every family-culture, it has a reflection of a family. A strong belief about food consumption in Hinduism is that, food which is enjoyed and shared with others is believed to earn happiness within family, but food which is selfishly consumed without sharing with others is believed to be evil and it may consume the body itself.

Every culture and religion has a different food cult which is an outcome of ages of interaction between food and culture, which builds a strong bonding and nurtures intrinsically mutual relationship. The grower community places high respect for food,

first offers it to local god and goddesses. They see food as something that has a life and are basically the essence of every soul. Food is a life giver because it has a soul, it is very much alive. Security is not the right word in the context of food, as food is truly a cultural representation first which is reflected in our thoughts, the way we believe, the ages of social interaction and exchange between communities, all have contributed to the shaping of the concept of food. We cannot guard food as it is a perishable entity, just like the human body, a mortal soul which can only be nurtured through sharing the food in plenty with others who really need them and want to prevent food wastage. In a world where millions sleep hungry, a culture of sharing and preventing food wastage must be developed as responsibility of everyone, every single soul, both human and the non-human world needs to come together and feel can each other.

The principles of ‘food sharing as the greatest virtue’ and ‘food wastage as the greatest sin’ are some of the strongest representation of food as a part of culture, and these principles have the potential to change the thinking of mankind and to revolutionize the concept of food as life giver, the ‘*Anna Devta*’, meaning the ‘food god’ in Sanskrit, the only god known to us, which we can see, we can feel, we can experience, we can touch, we can smell and even taste. In essence, food connects us all, both the human and non-human world.

Food security cannot be achieved unless the thoughts surrounding food are not represented in their true nature, its social and cultural context cannot be isolated, and it preserves the identity of food and its grower community and its local geographical space as well. Food is dynamic, and so are the concepts surrounding it. Food when removed with its cultural context, loses not just its identity, its local geographical space, but also gets reduced to a commercial entity and its value lies in its price in the international market. Attaining food security for any community is a collective effort which requires involvement of everyone, as food touches every life. Food security can never be achieved by contextualizing food as a commercial entity for sale, where food wastage is seen as a process involved in commercialization of food and not as a sin. Where this sin could be committed by those who can afford the food price, but certainly have no respect for it, the poor are bound to live in the absence of food because they don’t belong to a privileged class. The economy surrounding class

system has overpowered the real essence of food, and degraded the concept of food to a level where it has been reduced to a commercial entity, devoid of any cultural identity and its local natural geographical space.

Food security is a highly debatable issue. In a nomadic civilization like Mongolia which is very different from the settled world, food is a part of highly mobile and social exchange system purely revolving around the Mongolian pastoralism. In Mongolia, food is an intrinsic part of their nomadic culture. They completely remained dependent on their animals, their herds, for their food. The non-human world too remains deeply associated with the human world in the form of 'food'.

This transformation of energy from human to non-human world indicates a unique interplay between both human and the non-human world. The nomadic culture has always displayed their deep respect and care for their herds, even though they kill their animals for meat yet they express great respect for their food and consume every part to prevent any wastage or disrespect, even the blood of the animals is considered sacred and they prevent any blood from falling on the ground while killing or sacrificing their animals. It represents a unique expression of nomadic food culture, and without understanding it we cannot jump to conclusions about the food and agricultural system transformation and its impact on food security in Mongolia.

All the chapters of this research study are organized in a way to get into the core of the research questions surrounding this thesis. Every chapter is designed around the research problem and to find its answer in most possible way. The three main hypotheses for the research study enabled the testing of and led to stronger argument and validation as well as justification to the conclusions. Every aspect has been explored to find out a much deeper explanation for adding more clarity and understanding to the transformation of the agricultural system and to learn about its possible impact on the food security in Mongolia.

7.1 Testing the Research Hypotheses

It is the hypothesis testing part, where the process of thesis formulation finds its deepest source and understanding about the real world issues. Based on the empirical hypotheses it has been observed that, the 'transformation of agriculture in Mongolia has resulted in a shift from consumption to production oriented system'. It is truly

reflected in the change of attitude among the Mongolian herders towards agriculture, their herds and herding. The focus remained to increase the production for sale in the market and not for the consumption which deeply impacted the family food security of specifically the Mongolian herders. Although the system of food production in Mongolia had undergone changes in the socialist era too, the extensive production system was transformed into semi-extensive pastoral production system where the main focus was also to increase the agricultural production under the collective farm system. But after the collapse of the Socialist era, the changes brought under the market economy were colossal and completely uprooted the previous systems. The production now is purely meant for meeting the market demand. The major focus of the pastoral production has been shifted from consumption to the pastoral production for sale in the market in order to earn cash income. It can truly be hypothesized from the situation of transformation of the agricultural system in Mongolia that it led to the changes in the pastoral production system from consumption to the production oriented system at the national level. The family production system has also undergone colossal changes with this sudden shift, from consumption to the production for sale and most importantly it has led to the radical changes in the herder's attitude towards the pastoral production system.

This process of transformation of the agricultural system straightforwardly linked to our next empirical hypotheses, that is, the 'food insecurity in Mongolia has led to dependence on the cash economy to access food'. We can now clearly understand that how this transformation of the agricultural system impacted the food security in Mongolia. The devastation of the Mongolian domestic production system involving the herder's household level, or the family farm/herd was identified as the most important causes behind the increasing food insecurity, particularly among the herder's household, as they have to pay cash in order to access food from the market, which earlier, was available to them with home grown/produced diverse varieties of foods, which were strongly supported by the traditional practice of the domestication of the five animals based herd composition. But soon after the transition to the market economy, the preferences changed and herders started following the market trend by supporting the herd specialization for cashmere goats in order to earn more cash income in hand. Even non-herders joined herding to safeguard their livelihood in the phase of economic and political turbulence. It can be clearly hypothesized with the

situation of the transformation of the agricultural system in Mongolia that increasing food insecurity has resulted in the growing enslavement of the herder's households as well as the poor and the deprived section of the society on the cash economy to access food.

In the age of fluctuating market, high food price and lower purchasing power of the poor and the marginalized section of the society decreases the food affordability and the make the food insecurity more prevalent than ever because of limited accessibility to food in the cash economy. It not just truly reflects Mongolian situation in terms of food security, but has also reflected the situation which is now globally felt by specifically the underprivileged section of the human world.

In the highly sensitive Mongolian grasslands which are home to one of the most pristine 'the steppe grasslands' and the Gobi region, the sustainability of the grasslands is of great importance for maintaining the food security of the entire country. With the pronounced relevance of traditional Mongolian pastoral production knowledge and practices in maintaining the sustainability of the delicate grasslands, their family herds based home grown/produced food has been identified as one of the fundamental remedies to ensure food security among the herders and the poor section of the society who are having lower purchasing power. They can also overcome the situation of acute food crisis situations with home grown/produced food for which they are certainly not dependent on cash economy. The situation straightforwardly hypothesized that, the 'environmental sustainability and food security are dependent on traditional practices of livestock rearing in Mongolia'. By this hypotheses, it is justifying to say that the situation faced by Mongolia after the transformation of the agricultural system deeply impacted its food security. Food security in Mongolia is certainly not just about the seasonality of food availability, but more and more about the restrictions faced by the herders and the poor population to access food because of the low purchasing power and much lower food affordability.

7.2 Research Findings

Having discussed and analyzed the transformation of agricultural system in Mongolia and worldwide in previous chapters, we come across some sensitive research findings,

specifically regarding its impact on the food security and dynamic facets attached to it, which are given below:

- **Market System acted as one of the biggest obstacle in providing Food Security to the Poor: High Dependence on Cash Income for Maintaining Family Food Security**

Market system is not always feasible to apply on every sector, and for ensuring food security to the poor population. It has acted as one of the biggest obstacles, just like in the case of environmental pollution, a negative externality, the market fails as there is an absence of demand for the goods or services. Similarly, market system has nothing to do with the well-being of masses, even if food is available in the market in plenty. Then also it is not accessible to those who cannot afford to pay the food price. It has nothing to do with the economic or social status. It just maintains its demand and supply curve and the principle of the maximization of profit.

It is indicated that it is essential to keep the basic need commodities like food into the non-market system, out of the purview of market system, and to ensure the food accessibility to the poor based on the well-being principle for the society. On one hand, food wastage is a huge problem in the market system as food is a perishable good, while the low purchasing power of the poor section of the society makes it really impossible to ensure food accessibility. Ironically, the market system allows the food to waste, but not to make it accessible for the poor section of the society in order to maximize the profit at the cost of human lives. In a market system which fails to recognize the importance of human life, it can be argued if it is really working well for everyone or it is controlled by few who are earning huge profit at the cost of these human and non-human lives and livelihood. The market system is really not perfect for everyone and seriously needs an overhaul. On the other hand, the farming and the herders class suffers a major setback in terms of market price for their food articles, as it not even covers their cost of cultivation, which means they are producing food in access. Yet they have to bear the losses as the net profit is too low and most of the profit earned goes straight into the hands of agro-corporate giants in the form of the cost of cultivation.

Hence, it is clearly understood that neither the producers like farmers or herders, nor the consumers are benefited with this market economy system. It is only the corporate world which earns the benefit of the maximized profits. The market system can be easily misguided and controlled in the direction where the real motive is not to ensure human well beings, but to earn the profit at any cost. The demand for toxic pesticides and costly agricultural technologies are created by the corporate world for the profit maximization without communicating the lethal impact of such technological transformation on the agricultural sustainability and on the human society.

There existed a huge communication gap and missing flow of environmental awareness within these technological transformations in the local food and agricultural system. This research thesis challenges the relevance of market economy system in ensuring the food security for the poor. Time has come to abolish the market economy system with the non-market economy system, at least for some fundamental goods and services, namely, food and agricultural system. To ensure food security, it is the human well beings that must be given priority and not the principles of the profit maximization in a cash economy.

A new economic model, where the local food and agricultural system, a family farm system and the home grown foods are together taken into consideration for uprooting the fundamental cause of food insecurity among the small farmers, herders and the poor section of the society.

In case of Mongolia, market economy devastated the family based herding system which ensures food security among the herder's households. The high dependence on cash economy and increased influence of the international market fluctuations made it more difficult for the herders to maintain their herd in such an atmosphere of economic turbulence. Sudden surge in the cashmere demand in the international market had also impacted the herder's preference for certain animal species within their herd. This had brought radical change in the herder's attitude towards their herds, in their herding practices as well as in maintaining the age-old herd composition ratios for the five animal species in Mongolia.

- **Family Food Security is Dependent on Stronger Kinship Based Social Networks, Social Exchanges and Mobility in Mongolia's Nomadic Culture**

The fundamental role of social networks and social exchanges in maintaining herder's family food security in vulnerable period has been identified as one of the most important causes behind the nomadic movements and the development of trade routes in the ancient past. Nomads have never been remained food secure, but their mobile pastoral production system always supported them to even sustain the extreme events of food crisis. The mobile food resources in the form of their family herds, have always strengthened the food security system and were remained as the fundamental reason behind the invincible military supremacy of the Mongolian nomads.

Social networks not just remained an important part of the trade and cultural exchange between different parts of the world, but have also deeply influenced the lives and livelihood of nomads. In studies it was assessed that nomadic herders immensely on these social networks in terms of ensuring their family food security, particularly during adverse periods. The kinship based social networks assisted in maintaining their food supplies through distant family's gatherings and sharing their food in abundance with each other and also giving special support to families in crisis.

The silk route legacy in Mongolia not just admired for its significance in strengthening trade as well as cultural exchanges, but also, it had long favored in maintaining the food and agricultural sustainability and ensuring family food security at the community level. These social networks helped the nomads of Mongolia to expand their trade, but simultaneously fulfilling their basic needs of food, clothes, medicines etc., apart from the luxury good.

In a narrative interview with Prof. Honeychurch (2017), Department of Anthropology of Yale University, particular emphasis was given on the role of social networks and mobility in maintaining the sustainability of nomadic pastoral production system as well as its relevance in assisting in the family food security of herders. According to him, the nomads of Mongolia had never remained completely self-sufficient or food secure and they deeply relied on these social networks to escape from the situation of acute food crisis or hunger in harsh weather or unseasonal extreme events or sudden environmental shifts. Seasonality of food availability and demarcated 'hunger period'

during late winters and early springs, is observed as an important feature contributing in food insecurity. The large number of animals based food, remained integral part of domestic nomadic culture in Mongolia.

The stronger kinship bonds and marriages alliance between two families living at a greater distance were favored in comparison to those living at a shorter distance. These long distance marriage alliances provided both social as well as economic security to the newly married couple, specifically to sustain the period of food crisis during extreme weather conditions. According to Prof. Honeychurch (2017), people who lived in northern Mongolia would favour to make a marriage alliance with the families living in the southern part of Mongolia. Basically these long distance marriages had remained intrinsic part of Mongolian nomadic culture and favored in building up of strong social networks.

Hence, stronger the social networks, stronger will be the family and community level food security system, specifically to escape the extreme weather events of '*dzud*'. In today's context, this Mongolian herder's reliance on social networks and exchanges have become much more important with the increasing desertification, land degradation and water scarcity due to uncontrolled pollution from mining activities, all together further aggravated the vulnerability and food insecurity among the Mongolian herders.

- **Seasonality of Food Availability was Identified as an Important Feature in Herders Family Food Security**

In Mongolia, seasonality in food availability has been observed as an important feature which needs to be carefully understood for addressing the food security situation within the country. Both the rural and urban areas are deeply impacted by the marked seasonality in the food availability, particularly during the period of harsh winter weather conditions. More meat products are consumed in the winter season, whereas more dairy products are consumed during summer. Both the situations reflect the availability of food, which is dependent on the seasonality.

In urban areas, availability of imported food and better access to the market, resulted in more diversified diet among the people living in urban areas. But only for those who can afford them, who are having good purchasing power to access these foods

from the urban markets. For specifically the urban poor's, the food insecurity is more pronounced in comparison to the rural Mongolia. Urban poor are purely dependent on seasonal labour experience, and during winters, the working opportunities are less and less available, which seriously reduces the family income. On the other hand, winters are also equated with more spending on heating appliances, which further reduces the net income, and worsen the financial situation to a much lower purchasing power. The fluctuation in the food prices and rising food inflation, also sensitive areas which deeply impact the food security of the population having low purchasing power and limited food accessibility.

Seasonality in food availability is a remarkable feature of the food security situation in Mongolia, and which require much effort to be put into so that better ways are found to deal with such a sensitive and serious issue which had identified as one of the major obstacle in ensuring food security to everyone, in all seasons. There lies a huge gap in terms of systematic data on seasonality in food availability, due to which limited work had been done till so far. For assessing the characteristic features about the possible impact of seasonality on the food security at different scale and at diverse levels like regional, sub-regional or household levels it is essential to have proper data for getting into the core of the matter. Even international organization like Food and Agriculture Organization of United Nations (FAO 2007, 17) had shown disprage for the lack of government effort and availability of systematic data to curb this huge gap for ensuring food security in Mongolia.

Seasonality in food availability deeply influences not just the availability of food, but also directly influence the food consumption pattern and diversity in diet. The identification of the 'period of hunger' by the herding community can provide major breakthroughs in dealing with the real issues of food insecurity within Mongolia. In winter, the stock of dairy products as well as meat are mainly consumed, but major problem regarding food availability starts with early spring season, when all the winter food stock was totally consumed and exhausted. Whereas, the pastures are also not regenerated and causes immense stress on livestock, this period was recognized as 'hunger period in rural areas', a hard time in terms of securing food for specifically the herder's households (FAO 2007,17).

The seasonality of the food availability has impacted primarily the rural population of Mongolia, and specifically to those involved in herding, and are considered as one of the most vulnerable and food insecure group as they primarily depend on agricultural activities for their livelihood. The next most vulnerable group and food insecure group includes the urban poorhouseholds, who are living in cities and are highly dependent on their cash income to sustain themselves and their livelihood.

The 'limited cash income' is identified as the most prominent factor or feature behind the high vulnerability and food insecurity among the herders as well as the urban poor (FAO 2007, 25). The 'limited cash income' means lower purchasing power, which reduces the ability to access food from the market. Secondly, the less developed market chains in rural areas further made it difficult for herders to sell their plentiful household based produce like milk or meat, as both are highly perishable. This transformation of agricultural system and transition to market economy jeopardize the fate of Mongolian herders, as on one hand, this had led to the devastation and erosion of the traditional Mongolian pastoral system knowledge and practices. On the other hand, the lopsided development of the rural and urban Mongolia made it really difficult for the herders to well accustomed to this transformation of agricultural technologies in the absence of proper inputs. The absence of market chains in the rural Mongolia led to neither the modernization of agricultural technologies, nor the transition to market economy remained advantageous for the majority of population of herders, as the technological dissemination stayed highly concentrated and restricted to certain groups or industries and the high level of corruption further reduced the access to such benefits to the masses. Actually, it is true to say that the transformation of the agricultural system was not meant for the well-being of masses, but more and more concentrated to the market theory of profit maximization, at any cost.

The limited availability of cash income from herding profession, lower purchasing power and the underdeveloped rural market chains and connectivity to the urban markets, altogether have contributed in increasing the food insecurity level among the poor herders. Specifically, during the early spring season, the 'temporary food security' was prominent among the poor herders and found to be purely associated with the sensitive feature of seasonality in food availability in the rural Mongolia.

- **Human world and Non-Human World Co-exist and are Purely Symbiotic: A State of Living Together**

In the case of Mongolian pastoral production system, herding is not just an economic profession, it represents a way of life and livelihood to the Mongolian nomads. It is importantly a system in which both the human and non-human world finds their existence and purely share an interdependent relationship that had grown with ages, family lineage, branding of herd animals, their social interaction, social networks as well as the mobility of the pastoral production system. In studies by Fijn (2011, 29-30), it is observed that the branding of symbols on herds was not just remained a vital part of their pastoral production system, their social networking but have also played in-depth role in preserving their nomadic identity, their family lineage, and also their deep association with the non-human world.

The symbol on their herds reflects clearly that whether a herding family belongs to important lineage, namely, khanate, or associated with lamanist temples. This practice of banding symbols to family herds, functioned as, a ‘visible mark’ according to Fijn (2011, 29-30), a clear family identity, which enable anyone to identify any herd and their association to a specific family, as well as the genealogy, and lineage of the family, and even label a family’s role in any community.

The separation of animals from local agricultural system, and concentrating them on fixed and highly industrialized alien farms of livestock production system, had taken a huge toll on the local agricultural production system. The reduced availability of nutritious crop fodder like alfalfa, leguminous crops etc., resulted in the deterioration of soil quality due to the lack of the availability of animal dung, which long available or served as a natural fertilizer for improving soil quality and its fertility. With the transformation of the agricultural system, these practices had led to severe energy imbalance and had completely altered the sustainability of the entire food and agricultural system of any local geographical space.

Similarly, replacing the native animal species with the hybrid animals, performed well in terms of the productivity and production, but failed to accustom to the harsh Mongolian weather events and resulted in catastrophic levels of livestock mortality. This again has impacted the food security of the Mongolian herders as well as the

entire country, and time to time gravely contributed in economic downturn in Mongolia.

Traditional Mongolian pastoralism knowledge and practices has truly been recognized the value of symbiotic relation shared by the human and non-human world for the sustainability of the Mongolian grasslands. The growing disassociation of the humans with the non-human world captures the real cause behind the growing food insecurity among the Mongolian herders, specifically at the household level. It is being painful to observe the way transformation of agricultural system led to the erosion of the five animal's concept and herd composition ratio, which actually means the loss of social, economic, cultural and the environmental stability of the region.

- **Prehistory and the Agricultural Geographic Space Play Significant role in the Rejuvenation of Food and Agricultural System**

Any policy or programme concerning food security and agricultural sustainability must take into consideration the Pre-historical and the agricultural geography of that particular natural space. Its association, its interconnect, its linkage and its interdependence on each and every component within its natural space, all should be deeply assessed for a successful effort. We cannot study or identify any policy or programme related to food security in isolation, as it is intrinsically associated and is a part of the entire food and agricultural system is standing. If one fails, all fails, just like pyramid made from cards, it falls altogether just by the displacement of single card. Both the energy source and its sink are similar in natural space and very much part of the same system.

It has been very well recorded in the pre-history and constitutes an important part of the traditional knowledge system and sustainability of the entire system that exists in a local natural space. One of the important ways to curb food insecurity among the poorer households, who spends major part of their income on food and are much more vulnerable to food insecurity due to the rising of food commodity prices and the cost of cultivation in the international market, which directly impact the local markets as well. It is suggested as a policy measure to promote small scale farming at family level for which poorer household should provide support to continue farming at domestic level so that their daily household food requirement.

7.3 Concluding Points of the Research Study

The concluding points of this research study are as follows:

- **Mobility and Social Networks are fundamental for the Economic Security, Social Security as well as Food Security for Mongolian Herders**

The frequency and the seasonal flexibility add high mobility to the nomadic life and the livestock production system which forms the core of the survival system of the highly delicate steppe grassland ecosystem. This research clearly indicates that mobility adds life to the nomadic life and their livelihood and is the reason behind the grassland ecological survival system. One cannot isolate mobility from the Mongolian grassland ecosystem; it is well intertwined with the everyday life and livelihood of the local survival system.

The Government of Mongolia should have included mobility factor as the central feature of its sustainable agriculture and food security programmes. The sensitivity of the mobile livestock production system should be taken into consideration before initiating or implementing any food and agricultural system related programmes and policies to make it successful in achieving its goal of household level food security, specifically among herder households.

- **High Dependence on Cash Income for Maintaining Food Security made the Herder Households more vulnerable**

High dependence on cash income for maintaining food security has made the herder households more vulnerable due to highly fluctuating commodity prices and the volatile market conditions. Peasant economy strongly gives explanation about the emerging flows in the global food and agricultural system and agricultural sustainability.

In peasant economy, family plays pivotal role in not just maintaining agricultural economy, but also being central to sustaining the life and livelihood of farmworkers and their families. Similarly, in the case of herders, the family acts as a vital unit which entirely get involved in the agricultural production system and become core component of the economy. Herder family has enacted as a vital economic link of the

dynamically interwoven and deeply interconnected local food and agricultural production system.

Food and agricultural system is a separate system which before being part of the international market system has uniformly been applied everywhere, it is a part of its local natural geographic space. In market economy system, there is uniformity, it fails to recognize the 'localness' of any food and agricultural system and same rules and regulations are applied to all, despite numerous flaws in its functioning and derogatory laws, like patent laws specifically which is unethical to the grower communities and have limited access and say in these rules and regulations formulation and implementation. Food and agricultural system is in basic unit must be identified as a system which belongs to its local geographical space first, and then to any other level.

In place of market economy system, the peasant economy system appears to be far better in recognizing the sensitivity of the food and agricultural system of a geographical space and its in-depth association with the family farm based production system. In fact, both are part of the same system which is interdependent on each other. Failing to understand and acknowledge these sensitive links between the food and agricultural system and the family farm production system of the grower communities in the market economy is identified as the major cause behind this great agrarian crisis and unrest among the grower communities in every corner of the world. Thus, we can say that this transformation of agricultural system clearly indicates the unethical facet of the meaningless, mindless, and merciless development models, which have failed to identify the real issues of the wellbeing of both the human and the non-human world.

- **Treating Food as a Commercial Entity is the Biggest Folly of Mankind**

Food is not just a commercial entity; food represents a culture too, that has been barely recognized. In India '*Anna*(food)is *Braham* (God)', a supreme form of god and those who consume food without sharing or donating it are believed to be 'consumed by the food itself', in the form of life threatening diseases. Lack of connectedness of food with its local natural space, its soil, its grower community, as well as its culture,

resulted in a sense of meaninglessness which had degraded the intrinsic value associated with food.

In essence, food is a reflection of local culture, and preserves the localness of a geographical space as well as its society or its grower community. For achieving food security in real sense, we must start respecting and honoring food, and treat it like a supreme form of life, a life giver, which belongs to a culture, which has an identity, which represents the environment of its local natural space, all together is the food that we eat. The composition of folk songs, dances, festivals and almost every celebration revolves around food.

Food is not dead, or just a commercial entity, or a lifeless thing. In actual sense, it is the giver and very essence of every life. Food is a unique transformation of sun's energy, heavenly rain and breathing soil, which reflects every form of nature. In every stage, food has always remained part of natural world full of life, present in the form of sun's rays, rain, soil and gives the food its local identity. This in-depth interaction with its local natural space and most importantly with its grower community, and food cannot and can never be separated from it. Food is perishable and has a certain lifespan, one can never provide security or guard food. We can increase its shelf life by applying preservatives, or modifying its genetic make-up, but it represents the body of food and not its soul. We cannot provide security or guard the soul of food as it is perishable, it is only the dead body of food that is guarded in huge cold-storage houses, just like human body in a mausoleum. Food loses its content, quality and nutrition with time, moment after separating it from its natural system, where life flows. A community or a society can never be food secure unless we stop looking food as commercial entity. Hence, it clearly appears to be the biggest folly of mankind to treat essence of life as purely a moneymaking commodity.

- **Food Insecurity is Rooted in the Erosion of Localness of Food and Agricultural System: The Unethical 'Theft of Geographical Space'**

No community can be food secure unless we start recognizing the importance of localness of every food and agricultural system. Today local food and agricultural systems are facing acute crisis as they are forced to make way for the global food and

agricultural system. For securing food for every community and culture, it is important to concentrate on the revival of the localness of every food system.

The amalgamation of the local agricultural system with its geographical space and its environmental resources get altered when alien food and agricultural systems are forced on the local food and agricultural system in the form of abrupt transformation of agricultural system, a rhythm has to be reset, rebuilt, resurrected to revive the localness of food and agricultural system and only then any community or society can achieve food security, most importantly at the family level and at the community level.

Commercialization of food will give way to food insecurity among poor people and unnaturalness of that food which doesn't belong to any culture, community and geographical space results in environmental shifts and disasters. Consuming such food may lead to undiagnosed, and variety of diseases. Hence such food which represents no culture, but just profit – is going to yield only one thing – ‘nothingness’, ‘emptiness’, ‘meaninglessness’, and a growing feeling of alienation among the grower or herder community.

This thesis strongly supports the concept of the ‘theft of geographical space’ as the ultimate cause behind the increasing food insecurity among the farm communities or the herder’s communities. It is the ‘theft of local geographical space’ and not purely the Climate Change, making the pastoral nomadism and Mongolian grasslands more vulnerable to environmental events, such as *dzud*. Transforming ‘localness’ of the food and agricultural system with single coded ‘universal’ food and agricultural system of production, intensely promotes the concept of ‘Theft of Geographical Space’.

The separation and deep rooted alienation of the non-human world with the human world is one of the most catastrophic outcomes of the unethical transformation of the localness of the food and agricultural system with the single coded universal food and agricultural system, which is vocal in every corner of the world. This has resulted in deep disassociation of the family farm animals with their local agricultural space and has been immensely contributed in the transformation of the local food and

agricultural system, its sustainability and the survival of the entire local production system.

It specifically facilitated in aggravating the process of alienation from its localness. The unique 'localness' of a food and agricultural system get replaced and transformed with a uniform and single coded global food and agricultural system. It has been observed that it deeply impacted the food and agricultural geography of any natural local space and disassociated it with its system generated, age-old spatial relations, with both the human and the non-human world. It is observed as one of the main reason behind the speeding-up of the climate change process and is strongly supported as the notion of the 'theft of the geographical space'.

This research study strongly argues and identifies the fundamental cause behind the phenomena of climate change as the 'theft of geographical space' which has diluted the geographic barriers, which have robust potential to resist the phenomena of climate change. These changes have immensely altered the local spatial equation and its relation with the natural component, both in the form of human and the non-human components of a local space. It is argued that this transformation could be termed as the most significant cause behind the unexpected climatic events of Mongolian Dzud, degradation and desertification of the fragile and exquisite Mongolian grasslands, and its ecological network system.

- **Mongolian Pastoral Production System and Traditional Practices Preserve the Identity of Mongolia and Maintains the Dignity of Mongolian Herders**

Traditional Mongolian pastoral system preserves the nomadic identity of Mongols and herder's dignity. In essence, the Mongolianness of Mongolia is preserved by its nomadic pastoral production system, otherwise Mongolia will lose its rootedness and its very identity. Here food security and survival system depend on the success of nomadic pastoralism. Nomadism and nomadic livestock production system not just preserves their identity but forms the basis of food security and survival system. Everything is so well connected with every other thing that it is difficult to imagine the food security of the nomadic herders without nomadic pastoral production system. Dietary diversification is limited but nomadic herders consume the rich and costliest

food, which are rich in nutritious food items constituted of animal protein, such as milk and dairy products, and animal meat products.

Traditional Mongolian pastoral production system and its practices associated with pastoral system mobility is fundamental for maintaining the sustainability of food and agricultural system of Mongolian herders and their grasslands as well as gives them a feeling of pride for their community knowledge system, their herding skills, and practices. The self-reliance gives them a feeling of pleasure and pride, which remains fundamental to the success of food and agricultural system of any geographical space. A ‘Mongol had never remained hungry or food insecure’ (Jrgasaikhan 2016), with this pride and a smile, I got my answer in the narratives of nomads and from those who belong to the land of Mongolian nomads. This is the pride that I want to see in the Indian farmers, for their traditional agricultural knowledge, their farming skills and practices, which have unfortunately been lost somewhere.

- **Home Grown Food and Family Food Production System Hold the Key to the Food Security Among the Mongolian Herders**

Lastly, it could well be concluded with this research study that the home grown or home produced food products in the family farm or herd based production system remained one of the central feature in the Mongolian nomadic pastoral production system in maintaining the food security of herder at household level. Family played as the basic unit in the pastoral production system with which food security could remarkably be targeted at the community level.

Rebuilding the local domestic family farm production system holds the key to the sustainable agriculture and food security. The seasonality in food availability which was identified as main cause of ‘temporary food insecurity’ during the early spring season mostly in the rural areas, yet the rural Mongolia’s performance in terms of food security and quality of intake of the nutritious food, constituting mainly of animal’s protein, is observed to be far better when compared to the urban areas. This certainly uncover the underlying truth regarding the contribution of the home grown food in ensuring food security, even in the situation of low purchasing power and volatile food price condition, which has become a prominent feature in the market economy.

The system of food production is purely rooted in the family farm principle, where every family maintains a level of food production so that they can safeguard family food security to a sustainable level. The best part of the home grown food is that they are accessible and affordable even in the case of low purchasing power, which is missing in the case of urban Mongolia, as poor herders in urban areas have limited animals which they keep according to the market demand, and to earn cash income with it. The poor herders in urban areas are far more food insecure and belongs to the most vulnerable group because they purely rely on cash income to access food from the market, which many times remained out of the reach and their affordability levels. This purely reflects the value of home grown food in maintaining the food security of vulnerable groups of the society.

Even in the situation of the absence of flow of cash income, lower affordability level, as well as lower net income, a poor household spend a major portion of their income on food. But in the case of home grow food based healthy family farm production system, a poor family can maintain their family food requirement without spending much on the purchasing of food from the market. Hence, it is concluded that family farm production system has led to self-reliance among the grower community in terms of food availability, food accessibility as well as high level of nutrition in food as they are fresh.

7.4 Suggestions

- **Food is Alive, it Reflects a Culture, it has Meaning in Every Culture, it Represents a Geographical Space, it has its Own Identity, a Sign, a Symbol, and a Language too, through which it Communicates**

An in-depth understanding regarding food dynamics and different facets attached to them is necessary for understanding the cultural roots and designing a new food programme and policies for any community and for any geographical space. This is because food programmes and policies have failed to recognize the other facets attached to the food and its local geographical space. They only recognize the food as a commodity for sale in the market economy. Only the economic meaning is safeguarded with these food programs but the real issues of providing food security has remained untouched.

- **Herders Knowledge, Herding Skills and Understanding of their Local Geographical Space must be Acquired, Documented and Acknowledged**

It is a responsibility of the government and every community that their community level in-depth knowledge must be incorporated before designing any community level programme or national level policies with a potential for the transformation of food and agricultural system.

- **‘Food Security’ must be Replaced with a New Word - ‘Food Treasure’**

The concept of ‘food security’ must be replaced with something more thoughtful, a word or a concept which reflects some humane touch, a sense of belonging, a feeling of togetherness, and a culture of sharing, where both the human and non-human world reunites again. Food connects us all, and in essence it is the real representation of God for believers and representation of humanity for the non-believers.

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