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Government
Cabinet Secretariat

LESSONS LEARNT FROM THE DZUD 1999-2000

EXECUTIVE SUMMARY

Project MON/00/302

National Agency for
Meteorology, Hydrology
and Environment Monitoring

JEMR Consulting

Ulaanbaatar
2000 - 12 - 15

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PROJECT OBJECTIVE AND SURVEY METHODOLOGY

Traditional pastoral livestock sector of Mongolia produces 40 percent of Gross Domestic Product and over 90 percent of agricultural product, provides the population with food and consumer products. Therefore, it is a key economic sector of the country that feeds and clothes the population.

One third of the entire population or 190 thousand households with 33.5 million heads of livestock are engaged in livestock sector, living as nomads, they raise livestock and ensure balanced utilization of the pasture. Animal husbandry is a risky business due to its vulnerability to drought and shortage of hay in summer and possible losses due to dzud disaster in winter. A loss of significant number of livestock due to the shortage of pasture and water caused by heavy snowfall and severe cold in winter and spring is called Dzud by herders.

Statistical data indicates that over the last five decades due to drought and dzud disasters total of 32 million head of livestock were lost, of which 23 million were grown up and 9 million were young animals.

In the winter of 1999-2000 Dund-Gobi, Uvurkhangai, Zavkhan, Uvs and Bayankhongor aimags were hit by the worst Dzud in the past five decades. Many thousands of herder families were left with very few animals or without any at all, increasing unemployment and contributing to poverty in rural areas.

Local administration and herders themselves play a key role and specialized agencies jointly with domestic and foreign donors are assisting in implementing Government policy towards mitigating Dzud consequences.

Study objective: Major objective of "1999-2000 Dzud Lessons" MON /00/302 study project initiated and implemented by the UNDP is to develop recommendations related to last year's Dzud, in particular measures to overcome the Dzud, make an assessment of the aid received and identify follow-up steps. To accomplish afore-mentioned objective a scope of the study and focal points were identified as follows:

- Livestock sector was considered not in terms of a key sector of the economy but as a major source of livelihood and income for the majority of Mongolia's population who are engaged in pastoral animal husbandry.
- In studying drought and Dzud consequences emphasis was laid not on the loss incurred to the national economy but it was focused on identifying the damage it inflicted on the livelihood of rural population, the burden and poverty among the herders as a result of the natural calamity and suggesting the responses to mitigate and decrease its impacts.
- Personal experiences and the life of those who suffered directly from the hardships of natural disasters as drought and Dzud, their thoughts and ideas are reflected in the study, rather than the findings of many years of research reports and findings of academicians on livestock sector and Government policy papers and documents.

Study Methodology: Following "Participatory Approach" the study team worked in the field interviewing citizens, herders, soum and bag administration and gathering information with further processing and evaluation. Lessons to be drawn were summarized and recommendations on follow-up measures were

made. Drought and Dzud risks of animal husbandry were studied in conjunction with the evolution of ecological system, its trends, social requirement and values. An attempt was made to conduct a quantitative assessment of Dzud.

Report include the most details of the study that will provide readers to get information, make their own conclusion and to draw their own lessons.

Review of the study and its outcomes: 3 seminars were held to review the progress of the study, its interim outcome and to discuss it with the participation of representatives of experts in different fields. The findings of the study were discussed at the National seminar. The 1999-2000 Dzud disaster, its consequences, lessons learnt and relevant recommendations were discussed in details and approved at the National seminar attended by representatives of the Parliament, Government, UNDP and agencies, professional organizations, foreign embassies, international organizations, local and foreign NGO's, private sector, Bayankhongor, Bulgan, Dundgovi, Uvurkhangai, Uvs and Zavkhan aimags. More than 208 participants attended the seminars. The findings and conclusions of these discussions were included in the outcome of the project.

The beneficiaries of the Study: Central and local administrations, herders, professional authorities, NGOs, UNDP, other international development organizations, donor countries, foreign representatives, bilateral and multilateral aid and charity organizations and etc.

STUDY OUTCOME

Dzud Disaster: The 1999-2000 winter and spring Dzud disaster that struck over 70 percent of the total territory of Mongolia inflicted serious damage to the key economic sector of the country- animal husbandry. The main cause of the Dzud disaster in affected areas had been a combination of the following factors: The livestock which was exhausted due to **black dzud** (lack of precipitation which leaves livestock without any water supply) and **white dzud** (the snowfall is too deep for the livestock to reach the grass below) of 1998 winter and 1999 severe spring had to face the 1999 summer **drought**, and could not get fattened which contributed to the weakness of the livestock. The situation was further aggravated by poor pasture and lack of hay.Heavy snowfall in November and December was followed by its melting and icing, leading to the so-called **iron dzud** (an impenetrable ice-cover forms over the pasture that makes grazing impossible). In late December the snow cover became much thicker making it impossible for the livestock to graze on pasture (**white dzud**). Due to the extreme coldness in January and February and insufficient bodyweight many thousands of livestock died from starvation and freezing.

Dzud Losses: In 1999-2000, about 190 thousand households with 33.5 million heads of livestock were spending the winter in the country. 80.9 households with 452.0 thousand people and 7 million heads of livestock were affected by Dzud disaster throughout the winter and spring. The disaster affected 13 aimags and 157 soums of Dundgobi, Zavkhan, Khovd, Uvurkhangai and Tuv aimags. As of 1 June, 2000, about 2399.2 thousand heads of livestock were lost an equivalent of 91.7 billion tugrugs according to local market prices.

On top of 2369 households which have lost the entire livestock due to the Dzud, over 10 thousand households were left with less than 100 heads of livestock. Living standard of rural people rapidly plummeted contributing to increase of unemployment and poverty in rural areas.

Though the Dzud of 1999-2000 was a consequence of a natural "force major", the factors of human activity influenced the severity of its consequences and mitigation efforts in social and economic terms. On the other hand, Dzud disaster is not an issue of a given one or two winter and summer seasons. It is closely related to the several previous years weather conditions and present level of the country's development, it also has a direct bearing on situation in coming 5-15 years.

Root causes of Dzud: The Dzud occurred as a combination of natural, economic and social factors. Mongolia as whole, including the herders have low capacity to combat natural disaster.

Lessons: Prevention measures, the best experience, effective actions and relief efforts of those who involved to overcome Dzud disaster, and all success and mistakes are to be the lessons in future.

Recommendation: The recommendation for reduction of the Dzud loss is developed supporting the lessons learnt from the Dzud, its conclusions, cooperation between Government and herders, responsibility establishment and traditional methods of pastoral livestock husbandry. Extensive explanation is given associated with implementation of the recommendation.

Proposals: The suggestions for carrying out and finalizing the methodology of Dzud assessment, which need to realize the study, studying the reason of the Dzud Risk and way of decreasing it and implementation of the recommendation, are presented.

Mitigation of Dzud Consequences and Aid: By the decision of the Government 5860 tons of hay, 480 tons of fodder, 200 tons of diesel fuel, food and consumer goods worth of 374.5 million tugrugs were allocated from the State Emergency Fund to Dzud affected aimags.

The State Emergency Commission carried out activities to follow-up forecast summer and winter weather conditions, prepare for the winter, keep the Parliament and the Government informed about the situation, make proposals, take timely measures to mitigate dzud consequences, provide the local administrations with professional guidelines and collect information on dzud losses and aid distribution.

On the request of the Mongolian Government, the Office of the UNDP Resident Representative and the Natural Disaster Management Team worked efficiently together to assess the actual state of affaires, prepared relevant report and issued timely appeal for assistance. The alarming message came out from these findings played a key role in attracting the attention of the world community to the Mongolian Dzud issue and increasing the amount of aid.

According to incomplete information, the total amount of aid received from multilateral institutions, bilateral governments, NGOs and individuals was 18.2 million US Dollars.

Aid Disbursement Results: The aid was disbursed for food and

clothing, medicines for people and animal, vitamins, medical supply and fuel procurement, to cover transport cost, to repair wells and meet other essential needs of the people and the livestock.

The aid made available by the Government, foreign and local organizations and individuals was utilized to provide with annual consumption of flour and rice for 6300 households affected by dzud for those who lost entirely or partially their livestock. Another 1549 households were involved in restocking project, each household receiving in average 54 heads of livestock worth of 808.6 thousand tugrugs. This was of crucial importance in boosting the herders' moral and redressing their losses in kind, and, in particular, supporting and improving their living standard.

Mitigating Dzud Consequences: It is of vital importance that the State and the Government take necessary measures in a timely manner to mitigate dzud losses in a short period of time through alleviating rural poverty, carrying out restocking of households those who lost their entire livestock or those who were left with insufficient number of animals.

Decreasing Dzud Risk: At present, infra-structure in rural areas is poorly developed, access to social services for the population in general, and in particular, for the rural population including herders, is extremely limited. Local administrations are incapable to be independent both economically or financially. Since, animal husbandry in Mongolia is not capable to withstand, on its own, natural calamities, it is a highly risky venture. Dzud disaster risk reduction efforts should not be restricted by temporary measures to prevent natural disasters, such as, preparation of hay and fodder, drilling of wells etc. More importantly, it should be the issue of development policy that incorporates preventive measures. Policy formulation and implementation are not only a responsibility of line ministry, agencies and organizations of agricultural sector. Participation and support of these efforts by all other sectors of the economy, including infrastructure, health, social welfare, trade and industry are of crucial importance.

Socio-economic situation of herders: Under the project activity, socio-economic situation of herders was studied in Khovd and Zavkhan aimags. For herders the monetary exchange service is actually stopped and instead of it, they use natural livestock money exchange in equivalence of sheep. The management system for provision of normal operation of livestock husbandry production in market economy is not set up. Economic capacity of most herders is still weak and unsustainable. Due to dzud many herders stayed without any livestock or their income lowered below the lowest rate of living standard and they became poor households and their economic and social position had been lost. Medical equipment and medicines are not sufficient Public services for bag and herders are unavailable, sanitary service like hairdressing and bathhouse does not exist. Herders are suffering from cultural and information services. Operative exchange of information is limited. Due to livestock privatization and lack of public service in local areas, women are working hardly.

Winter and spring of 2000-2001: Spring and summer of 2000 was dry and more than 60% of country territory was under drought condition.

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Particularly, pasture in Gobi and steppe area, and the most sums of Dundgobi, Dornogobi, Umnugobi aimags have poor vegetation and animals did not get strenght and fatness sufficient for well wintering.

Hydrometeorological service, local governors and herders did assessments as to the possibility of the coming 2000-2001 winter being as difficult as last 1999-2000 winter. It is recognised the summer 2000 drought in Dundgovi, Dornogovi, Umnogobi, Sukhbaatar aimags, along with the effect of the Brandt voles destroyed a great deal of the pasture.

In the beginning of winter above-normal snowfall is expected along Mongol-Altai mountain, Khangai mountain, Bulnai pass, Khuvusgul and Khentei mountains. In January 2001 relatively low snowfall is expected over the most part of the country's territory. The winter could be difficult for livestock in three Eastern aimags. In February higher than normal snowfall and 1-2^{0}C colder than normal weather is predicted over the most part territory of the country. Livestock may face difficulties in areas where higher than usual snowfall is expected. In March 2001 higher than normal snowfall is predicted in Altai and Khuvusgul mountains, the northern part of Khangai mountain, the eastern part of Dornod Mongolian steppe, Dundgobi aimag, the western part of Dornogobi aimag, the northern part of Umnugobi aimag and the southern part of Uvurkhangai aimag. In general in March and April severe snow and dust storms rage all over the country and cause serious problems to economy, in particular, animal husbandry and life of herders.

The Ministry of Food and Agriculture has assessed that there will be about 31 million livestock in 190 thousand households being wintered this year. Over 7 thousand households with 2.4 million livestock will move to other aimags, and 4.2 million livestock will move to other soums of their own aimag to overcome coming harsh winter.

The Government having the last year lesson issued the statement No. 125 on some measure for winter preparation such as the additional allocation of finance for increasing of state fodder resource by 30%, for creation of aimag's fodder resource and for construction and rehabilitation of water points.

By the 30 November, 2000 70% of the country territory was covered snow. Particularly, Zavkhan, Khuvsgul, Gobi-Altai aimags have deep snow cover. Depth of snow cover is 60-70cm in the mountain areas, 15-20 cm in the steppe areas.The air temperature reached 25-30^{0}C in this area, roads are blocked off by deep snow and the dzud condition is already hanging over the area.

Public Relation: National seminar was advertised through mass media. Report of the study and its executive summary written both in Mongol and English and will be published for general public. Set of brochures with lessons and recommendations is going to be published for herders and local governors.

CONCLUSION

1. Dzud disaster

The Dzud of 1999-2000 winter and spring, covering 70% of the country's territory, had caused serious damages to animal husbandry – the nation's main economic branch. Main reasons of the Dzud occurrence:

- Livestock, suffered from 1998-1999 winter **black and white dzud**, was faced with the harsh spring of 1999 and summer **drought** and had no chance of getting fattened, the pasture productivity was also very low.
- After heavy snowfall in autumn there was a warm spell in November and December which resulted the melting of snow and pasture was covered by icy crust (**iron dzud**).
- From the end of December the depth of snow increased blocking grazing the livestock at pasture (**white dzud**).
- Due to the **extreme cold weather** in January and February, a substantial number of livestock perished from starvation and exhaustion as well as from cold.

2. Loss from the Dzud

In total, 33.5 million heads of livestock of about 190 thousand households were winter camping in 1999-2000 throughout the country, from which 80.9 thousand households,452.0 thousand people, and 7 million livestock were in disaster condition.

The disaster affected 13 aimags and 157 soums of Dundgovi, Zavkhan, Khovd, Uvurkhangai and Tuv aimags. As of June 1, 2000, about 2399.2 thousand heads of livestock were lost an equivalent of 91.7 billion tugrugs according to local market prices.

On top of 2369 households which have lost the entire livestock due to the Dzud, over 10 thousand households were left with less than 100 heads of livestock. Living standard of rural people rapidly plummeted contributing to increase of unemployment and poverty in rural areas.

3. Factors increasing Dzud impact

- The Mongolian Government made budget allocations for prevention of dzud disaster and a provision of winter preparedness in October. However, organizational measures for its implementation had been sluggish, local authorities and herders had not paid enough attention to the issue of winter and spring season camping. Moreover, they had not used the winter forecasting (October-March) provided by Hydro-Meteorological Agency and lost time pending the arrival of the first snowfall. At the end, they had to move from one frozen winter campgrounds to another and weakened further the livestock.
- There was a shortage of water points and warm winter campgrounds with enclosure and shelter over otor (migration) area.

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- Due to improper management for otor, the herders had migrated following each other that resulted **hoof dzud** (trampling of pasture) occurrence.
- Insemination and mating of the animals were not arranged with due account of possible dzud occurrence, therefore many weak pregnant livestock had been lost.
- Since it was clear that additional fodder can not be provided to insufficiently fattened animals, slaughter and sale of those animals should have been organized.
- Livestock had not been fully covered by veterinary service (inoculation, purgation, washing and etc.).
- Young generation of herders have insufficient knowledge and experience to combat natural disaster.

3. Factors for mitigation of Dzud loss

- Knowledge and skill of herders who combat with Dzud disaster succesfully.
- The UNDP Resident Representative and the Disaster Management Team, upon receiving the Mongolian Government request, had worked efficiently, assessed the circumstances, collected the necessary information and prepared a situational report. The appeal for assistance issued by the UNDP to the international community played a pivotal role in attracting worldwide attention to the dzud disaster in Mongolia.
- Donations and aid from the Government, national and international organizations were allocated to 6300 herder households left without any livestock or lost most of it and whose living standard had deteriorated or had fallen below the poverty line had been provided with flour and rice equivalent to their annual consumption. 1549 households had been covered by restocking project and on average 54 heads of livestock valued at 808.6 thousand tugrugs had been provided to each household. This was an important moral and material help to the dzud victims and helped to redress their loss, particularly, to support their livelihood.

Prevention measures, the best experience, effective actions and relief efforts of those who involved to overcome Dzud disaster, and all success and mistakes are to be the lessons in future.

ROOT CAUSES OF DZUD

The Dzud occurred as a combination of natural, economic and social factors. Mongolia as whole, including the herders have low capacity to combat natural disaster.

Global climate change causes increase of natural disasters frequency and intensity. During last 2-3 years solar intensification reached to its peak and probablity of occurence of drought, dzud, diseases and epidemic events increased. It is confirmed by occurrence of human and animal diseases (cholera, plague and etc) and weather abnormal phenomena, which amazed the mass in Mongolia.

Natural causes:

1. Since autumn 1998 there was a shortage of water supply due to rare snowfall over the most parts of Khovd, Gobi-Altai, Arkhangai and Uvurkhangai aimags and southern soums of Bayankhongor and Sukhbaatar aimags and western and southern soums of Umnigobi aimag. Livestock were getting weak and since mid of December they started to die in some soums of Zavkhan, Bayankhongor, Dundgobi and Umnigobi aimags. In Dundgobi aimag, the livestock, weakened during 1998-1999 black dzud, met the 1999 drought and could not get sufficiently fattened.
2. The territory, affected by 1999-2000 winter dzud, was hit by drought in summer. The poor growth of grass and vegetation did not provide sufficient fodder for winter and spring season. After heavy snowfall in autumn, there was a warm spell in November and December the snow cover started to melt. However, in January severe cold weather once again gripped over the country, thus the conditions for the shortage of pasture and weakening of the livestock were ripe.
3. Field voles had spread over 40 million hectare areas in 16 aimags including Dundgobi, Uvurkhangai, Bayankhongor, Tuv, Khentii and Zavkhan aimags and had severe impact on deterioration of pasture productivity over 2 billion hectare areas.

Combined causes:

4. Due to above-mentioned reasons, the preparation of haymaking and hand-made fodder in aimags and soums had been limited. Livestock could not get sufficiently fattened and strong during summer and spring. Therefore, their ability to survive the cold winter was weakened.

   Moreover, the situation was exacerbated by the deficit of warm shelters and enclosures in the otor places for the livestock.
5. Due to improper management of migration, a substantial number of livestock were gathered in Undurshil soum of Dundgobi aimag, Tsogt-Ovoo soum of Umnugobi aimag, western part of Zavkhan aimag and steppe region of Tuv aimag that caused hoof dzud in these places.

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Socio-economic causes:

6. Management and coordination on the part of state and government authorities were inadequate in provinces. Herders, took guaranteed the favorable weather conditions of past few years, had not ensured through their own efforts the required sufficiency for winter preparedness but took an attitude of relying on outside assistance.
7. In August, the Government of Mongolia had issued a resolution on intensification of winter-spring preparedness activities, however, its implementation was delayed until the January- February 2000. There was a shortage of budget for preparation and transportation of hay and fodder in the country. In particular, provinces and herders experienced acute shortage of financial sources.
8. There is no accepted rules or regulations relating to the Dzud situation. Such as, clear Dzud criteria, guidelines on how to manage the disaster, what actions should be taken in this situation, coordination and management of assistance efforts and public awareness, legal environment for managing dzud was not set up. All these factors influenced the increase of dzud loss.

Lesson 1: Dzud risk mitigation

Approach to dzud risk mitigation should be based on the state development policy correlated with issues of infrastructure development, social services, economic provision, nature and environment conditions. Namely:

a. Infrastructure development
- Energy
- Communication and information
- Road and transportation

b. Social services
- Medical
- Educational
- Cultural
- Public service

c. Economic provision
- Banking and financial services
- Insurance
- Loans, aid and donation fund

d. Nature and environment
- Water
- Pasture
- Soil

Lesson 2: Dzud assessment

Develop a methodology for objective assessment of dzud risk, its possible loss and use it for making decision at all levels.

Lesson 3: Dzud disaster mitigation

- In case of possible occurance of dzud disaster proved by relevant professional agencies it requires to make timely decision and efficient implementation taking into account the priority importance of animal husbandry in the society.
- Root causes of agricultural risks in general, the pastoral animal husbandry in particular, should be reformulated and the risk mitigation methodology should be implemented effectively adjusting to the new economic and social conditions of the country.
- Change the existing Disaster Management and Information Management systems which is too weak to respond adequately in emergency situation and create an effective and advanced system of Management.
- Improve herders' knowledge and skill for combating with disaster

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- Ensure complete veterinary services
- Organize migration and movement in time based on proper survey and preparedness.
- Prepare water points, winter and spring campgrounds
- Take proper measures for livestock mating
- Adjust the number of livestock with pasture capacity and avaibility of additional fodder resource and prevent losses utilizing the market economy mechanism
- Create a system for identifying the need, time and location of donations and aids, and delivering, disseminating information and assessment.
- Address to and make contact with aid agencies and charity organizations during the emergency situation
- Create employment – give life guarantee to households which lost all their livestock or having an income lower than living standard rate due to dzud disaster through restocking with the principle of hard stock or providing loan without any interest within a short period of time.

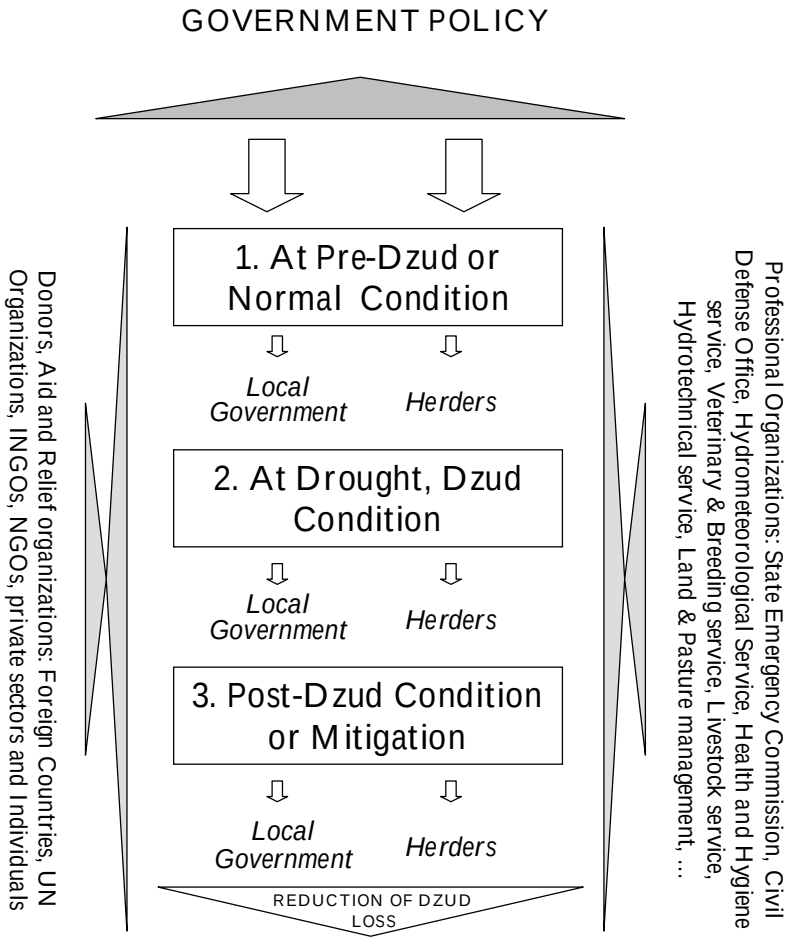
RECOMMENDATIONS

Recomendations were formulated on the basis of cooperation and system of obligation and responsibilities of the State, Government and herders, aimed at reduction of dzud damage and traditional methods of pastoral animal husbandry. The structure is shown in the following scheme. The development strategy of animal husbandry is defined by the State Policy and the rural Governors and herders play the leading role in its implementation. Professional or specialized agencies, foreign and national sponsors, donors and aid agencies make contributions to this cause. Participation of professional agencies, foreign and national sponsors, donors and aid agencies must be regulated by state legal regulations and rules.

Detailed description for the recommendations are given on pages 46-55.

LESSONS LEARNT FROM DZUD

RECOMMENDATION STRUCTURE



GOVERNMENT POLICY :

MITIGATION OF DZUD LOSS

STATE and CENTRAL GOVERNMENT

1. To create legal environment for mitigation of natural disaster (drought and dzud) risks
2. To manage possession and utilization of pastureland, water and other pasture resources within regions
3. To set up a functional System for delivering information on disaster situation and losses to international organizations, foreign governments and requests for relief assistance
4. To establish a system for State protection of livestock
5. To include the issue on disaster risks in a **CONCEPT** of Sustainable development of pastoral husbandry in market economy
6. To renew a criterion for definition, evaluation and awareness of drought, dzud and other natural disaster
7. To use national resources during disaster situation and to identify foreign aids in accordance to disaster types

1 PRE-DZUD or NORMAL CONDITION

In order to improve efficiency and feedback of actions to be undertaken by local government and herders it is recommended to take attention to following issues.

Local Government	*Herders*
1.1 Provision with communication and service of environmental, meteorological and other information	• Improve capability to receive information and feedback
1.2 Study and awareness of best traditional herding experience	• To accumulate and share herding experience, to train young generation of herders
1.3 Land and Pasture management	• Fatten the livestock on the pasture
1.4 Building and maintenance of wells with engineering construction and water source exploration	• Excavate wells by hand, maintain and use water points regularly
1.5 Creation of fodder reserves and hayland management	• Prepare sufficient amount of hay and fodder, create produced fodder resource and protest haymaking field
1.6 Management of winter and spring pasture	• Maintain and insulate animals' enclosures, shelters and animal bedding, and avoid non-seasonal utilization
1.7 Improvement of Veterinary and breeding services	• Protect animals from chronic and parasite diseases and interrupt disease origination
1.8 Protection, efficient use and improvement of livestock pedigree fund	• Protect and breed productive animals and improve herd quality
1.9 Protection of pasture from rodents and insects	• Provide with distribution information and help for their destruction
1.10 Undertaking of livestock census	• Ensure proper census
1.11 Implementation of Tax policy	• Fulfill duty of tax payment consciously

2 AT DZUD CONDITION

Addition to actions to be undertaken in normal condition based on evaluation of disaster intensification, coverage and current and future consequences

Based on Dzud Monitoring and Assessment

Local Government	*Herders*
2.1 Predict dzud condition, intensification and proposed losses. Issue a regulation for information delivering to herders.	• Manage animal mating. Estimate amount of further breeding animals and sale others, and breed animals on contract basis.
2.2 Negotiate, regulate, manage otor (pasture) area in other aimag and soum, repair access roads, bridges, and mountain passes	• Migrate animals to recommended otor area, by directed road and camp at allocated winter area
2.3 Improve and regulate water supply in otor area, assist in accessing to pasture and managing reserve pasture	• Water animals regularly, following appropriate watering regime, leave wells to next owner and use efficiently as required
2.4 Establish and distribute local and central fodder resources	• Get hay and fodder in own expense and use efficiently
2.5 Share best herding experience and instruct on safe herding	• Repair and maintain enclosures and shelters, keep animal bedding non-frozen, provide appropriate feeding
2.6 Ensure in-situ medical service (drugs, vitamins & etc.)	• Be covered under medical services and treat animals
2.7 Resolve the issue to provide medical and veterinary services to herders in otor	• Be in communication regularly with local government and herders in otor
2.8 To collect information on dzud impacts	• Provide with reliable information
2.7 Use existing and possible resources efficiently and use aids in its designation	• Use own resources and aids efficiently

3 POST DZUD CONDITION
MITIGATION OF DZUD IMPACT

Refer to households affected by Dzud and its income dropped below the Living Standard (LS) and use HARD STOCK Principe.

Local Government	*Herders*
3.1 To review the applications for restocking and to size up finances and assistance requirement	• To utilize all possibilities to increase income
3.2 To make implementation plan of restocking project, to apply for financing (to bag, sum, aimag, and central government)	• If self sustain capacity is not sufficient to reach LS, apply for restocking project
3.3 To implement on contract basis restocking project under community control	• To report on implementation, to repay loan in time
3.4 To evaluate contract on yearly basis	• Pay the credit in time

1. **Development of methodology for dzud assessment**

   Continuing the started actions under “Lessons from Dzud” Project execute author’ testing of the first alternative of dzud quantitative assessment on the example of 2000-2001 dzud and improve it. It may ensure its practical implementation by August 2001. Within this arrangement the detail methodology for collection of dzud related information, where and at what stage, what type of information shall be gathered and its transmission and application.

2. **Detail investigation of dzud risk**

   It is required to analyse and estimate current level, development policy and concept of economy and society of Mongolia from the viewpoint of dzud risk. It would allow the development of detail methodology for creation of immunity against dzud disaster or self-charging mechanism in Mongolia.

3. **Action plan for implementation of recommendation “LESSONS FROM DZUD” and its monitoring**

   If relevant agencies would develop an action plan for implementation of recommendation “Lessons from Dzud” in their competent functions in detail and pay attention on its implementation then the Project feedback would find its efficiency. As at the present there is no its integrated coordination system the recommendation’s implementation would be monitored through public awareness.

   In order to deliver thematic information regarding the activities being taken by the Government, government agencies, local authorities, herders, relevant and aid organizations towards provision of livestock passing the winter and spring of 2000-2001, its negative consequences and natural disaster survival, from January 2001 shall be tested the possibility of monitoring through provision of serial information “Overview on livestock passing the winter and spring” (bulletin, computer database and Web pages).

1.1 DZUD WEATHER CONDITION

a) Pre-Dzud condtion: Drought

In the first decade of May rainfall was extremely rare over the most part of the country's territory and in June there was very little rainfall in all western aimags as well as in Huvusgul, Selenge, Dornod and Sukhbaatar aimags. By June 30 summer was good in 50% of the country's territory, while 40% of the territory remained under semi-drought condition and 10% of the territory or major parts of Uvs and Umnigobi aimags, south-western part of Dundgobi aimag and eastern part of Dornogobi aimag were affected by drought.

By the beginning of July the condition in Arkhangai aimag, eartern part of Zavkhan and northern part of Bayankhongor and Uvurkhangai aimags was slightly better due to rainfall. However, from 13- 25 July the air temperature in Orkhon and Selenge river basin reached 37-43 oC, over territory of gobi aimags it ranged from 36to 41oC and on the other territories it recorded 30-38oC. The temperature exceeded its highest value recorded at meteorological stations over western, central and gobi regions since 1960s. Due to these weather conditions the grassland throught the country's terrrtory dried up /figure 1/ and the condition persisted until 10 August further aggravating the situation.

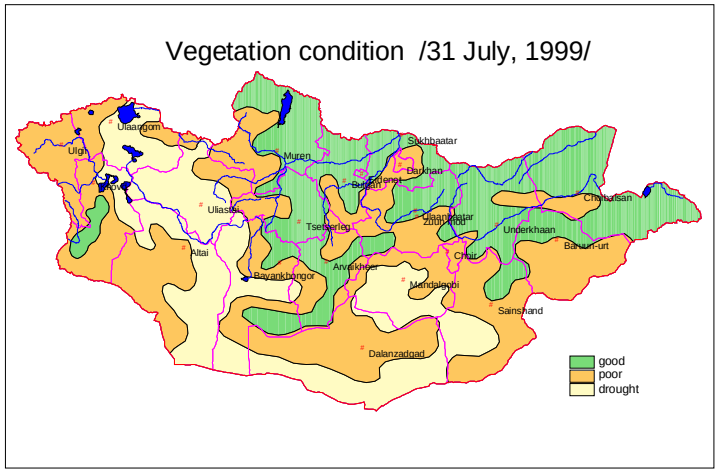


Figure 1. Vegetation cover, July 31, 1999

The outburst of Brand's Voles in Erdenedalai, Adaatsag, Deren, Delgertsogt, Tsagaandelger and Gobi-Ugtaal soums of Dundgobi aimag, Tubshinshiree, Uulbayan and Khalzan soums of Suchbaatar aimag had destroyed substantial part of the pasture.

b) Dzud condition

In the second decade of September depth of snow cover along the Khnagai mountain regions of Zavkhan, Bayanhongor, Arkhangai and Uverkhangai aimahs was 10-3- cm, in Bogd soum of Uvurkhangai aimag 25 cm, in Bulgan soum of Umnugobi aimag 16 cm, in Tsogt, Erdene,

Chandmani, Delger, Tseel, Tugrig, Bugat, Tonkhil and Darvi soums of Gobi-Altai aimag 30-40 cm and in some places it reached 70-80 cm, livestock was unable to go out on pasture for 4-6 days.

Heavy snowfall exceeding many year's average was recorded over major parts of Bayan-Ulgii, Uvs, Gobi-Altai, Selenge, Tuv, Dundgobi and Dornogobi aimags in October, over some soums of Khuvusgul, Dundgobi, Uvs, Uverkhangai, Khentei, Dornod and Dornogobi aimags, in November the heavy snowfall was observed in the hollow of Darhad mountain, Khan Khukhii and Khentei mountains, southern side of Khangai mountain, Khalkh river basin, Menen steppe and in December Arts Bogd valley. The territory of Zag, Jargalant and Gurvanbulag soums of Bayanhongor aimag were affected worst by the snowfall, by 20 November the snow there depth reached 20-26 cm with density of 0.20-0.24 g/cm^3 thus it completely blocked livestock pasturing. Moreover, a warming in November by 1.7-3.5^{0}C above the normal was observed over whole territory of the country, in December it was warmer by 4.5-6.5^{0}C in Uvs and Khovd aimags, by 0.5-1.8^{0}C in Bayanhongor, Zavhan and Uverkhangai aimags and by 2.0-3.4^{0}C over rest of the territory. It resulted snow cover compaction and ice cover formation.

By 30 November 50% of the total territory of the country was covered by snow and snow depth reached up to 10-27 cm along Altai mountain region, major parts of Uvs and Zavhan aimags, northern part of Bayankhongor aimag and western part of Dundgobi aimag
(Figure 2).

In January the absolute minimum air temperature dropped down reaching -30:-38^{0}C over the major part of the country and -26:-29^{0}C in southern part of Gobi and Altai mountain, -40:-50^{0}C over Uvs Lake and the Darkhad hollow, Tes and Khalkh River valleys and the condition persisted until the end of February. There was an abundant snowfall over major parts of Uvs, Arkhangai, Tuv and Umnugobi aimags and southern part of Zavhan aimag in December and over Great Lake Depression and Gobi regions in January. By 31 January over 80% of total territory were under snow cover and the snow depth increased up to 24-46 cm in Zag, Jargalant, Gurvanbulag and Galuut soums of Bayankhongor aimag, 10-25 cm over major part of Uvs, Zavkhan and Dundgobi aimags, northern part of Uvurkhangai aimag, Delgerkhaan, Undershireet and Bayan-Unjuul soums of Tuv aimag, Sumber soum of Dornod aimag and Tsogt-Ovoo soum of Umnugobi aimag. Snow density counted 0.16-0.37 g/cm^3 (Figure 3).

In the first decade of January air absolute minimum temperature was around its normal over most part of western aimags, warmer by 1.7-5.4^{0}C in Great Lakes Depression and colder by 1.1-8.3^{0}C over all other territories, in the second decade of the month it was above the normal by 1.2-4.9^{0}C in bordering areas of Bayan-Ulgii, Khovd and Uvs aimags and below the hormal by 1.2-5.0^{o}C over all other territories. In the third decade of January there became colder accounting by 0-2^{0}C below the normal over whole terrirory of the country. According to monthly average value the northern part of Khovd aimag and north-western part of Gobi-Altai aimag was warm by 0-2^{0}C, Bayan-Ulgii and Uvs aimag, western part of Gobi-Altai aimag were colder by 0-2^{0}C and the other territory had temperature below the normal by 2-6^{0}C (Figure 4).

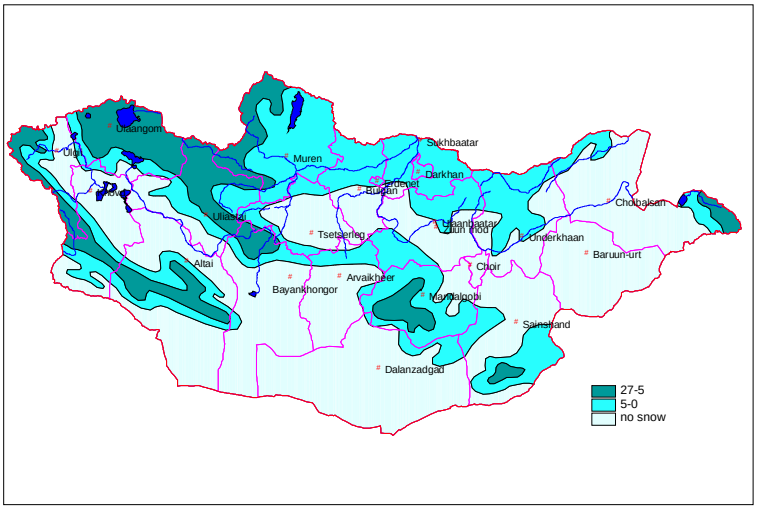


Figure 2. Snow coverage (cm) on 30 November 1999

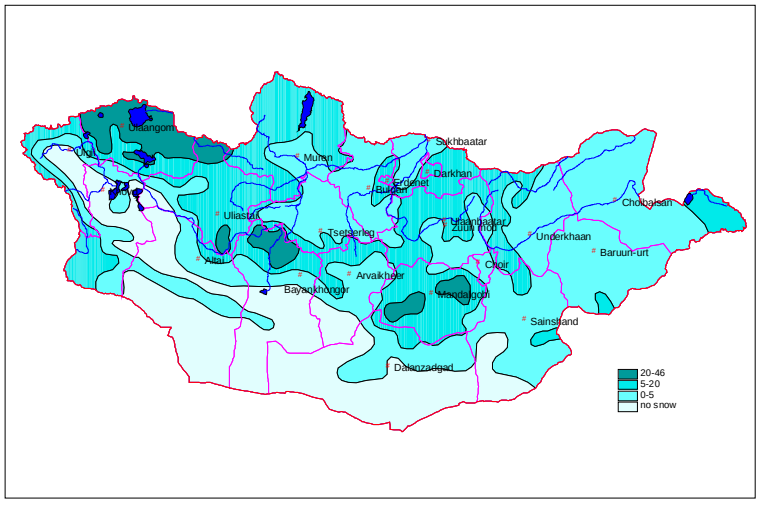


Figure 3. Snow coverage (cm) on 31 January 2000

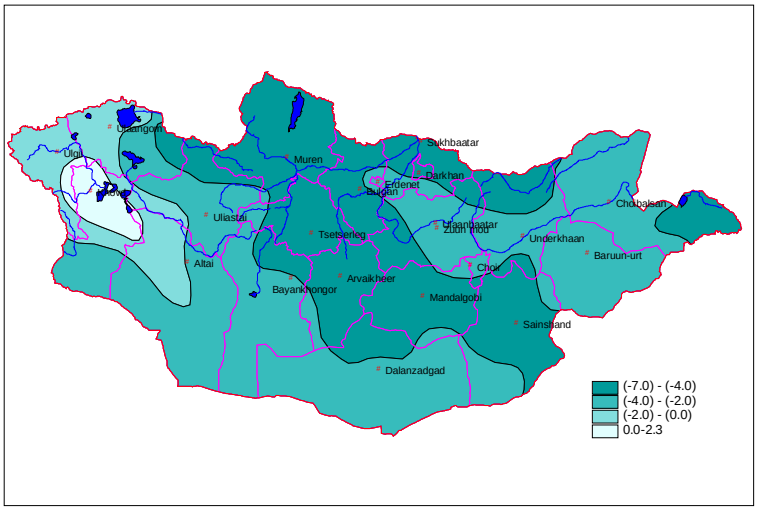


Figure 4. Monthly air temperature anomaly on January 2000

Since autumn in 1999 there was a shortage of water supply due to rare snowfall over most parts of Khovd, Gobi-Altai, Arkhangai and Uvurkhangai aimags and southern soums of Bayankhongor and Sukhbaatar aimags and western and southern soums of Umnigobi aimag, and as result the livestock were getting weak and since the mid of December they started to die in some soums of Zavkhan, Bayankhongor, Dundgobi and Umnigobi aimags. In Dundgobi aimag the livestock, weakened during 1998-1999 black dzud, met the 1999 drought and could not get sufficiently fattened.

As is evidenced form the above in 1999-2000 **White Dzud** had occured over most of the territory the country and **Black Dzud** in the Gobi region. The improper pasture management led to unplanned concentration of a great number of livestock in the area which was not affected by natural disaster such as Undershil soum of Dundgobi aimag, Tsogt-Ovoo soum of Umnugobi aimag and some part of Zavkhan and Tuv aimags and that caused **Hoof dzud**. In winter of 1998-1999 there was heavy snowfall and white dzud in Tuv aimag.

c) Weather forecasting

According to weather forecast issued on April 1999 by the Institute of Meteorology and Hydrology it was expected that there would be above-normal warming in July below-normal rainfall in June and August over whole territory of the country. The winter weather forecast, made on August, outlined the expected above-normal snowfall over some territory of the country at the beginning of winter, above-normal warning over whole territory in December and March and below-normal coldness in January over the whole territory. The predicted weather conditions were confirmed in practice.

The weather forecast included expected snowfall exceeding its normal amount and extreme cold in January, and the warning on possible serious difficulties in livestock herding during the winter.

1.2 1999-2000 DZUD

a) Dzud disaster

Due to insurmountable natural phenomena of winter and spring 1999-2000 there was white dzud over whole territory of the country and black dzud over Gobi region. As was reported by State Emergency Commission a total of 190 thousand households and 33.5 million heads of livestock of the nation were winter camping and out of which 80.9 thousand households with 452.0 thousand people and 7 million animals were under difficult natural conditions throughout the winter and spring. The dzud, covered territory of 13 aimags including Dundgobi, Zavkhan, Khovd and Uvurkhangai and 157 soums or 70% of whole territory of the country, had afflicted the main economic branch of the country - the livestock husbandary and caused serious damages. Livestock loss, its monthly dynamic and examples of migration routes are shown in Figures 5-10 and Table 1.

b) Loss from 1999-2000 dzud

By 1 June total of 2399.2 thousands of livestock were lost and according to local market rate it is valued at 91.7 billion tugrugs. Four persons were frozen to death and two persons died due to the lack of medical help.

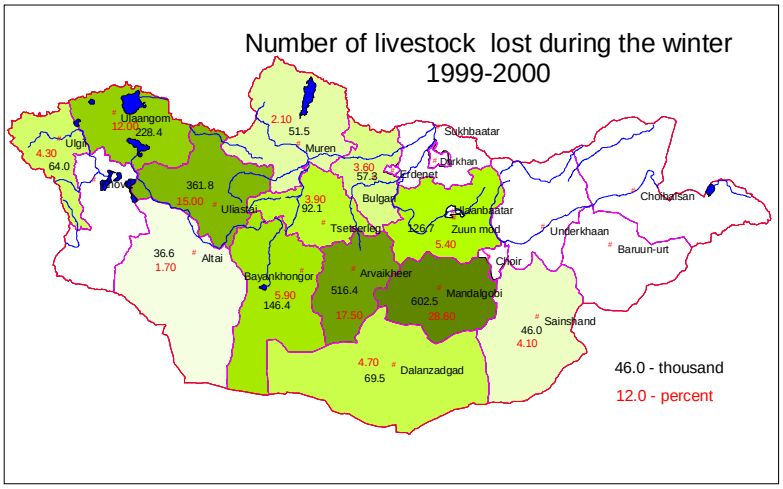


Figure 5. Loss animals in winter 1999-2000

The Dzud left 2369 households without livestock, over 10 thousand households were left with less than 100 heads of livestock and their living conditions deteriorated drastically.

5.7-28.6% of total livestock of affected aimags such as Dundgobi, Zavkhan, Uvs, Bayankhongor, Tuv aimags were lost and the loss of these aimags makes 84.4%, among it the loss of Dundgobi, Uvurkhangai and Zavkhan aimags makes 61.7% of total loss throughout the nation.

Mass movement of herders, who had lost their livestock and left without livelihood because of the dzud, to aimag center and major cities increased drastically and it, in turn, caused serious problems in designated capacity and allocated budget for schools, kindergartens and hospitals.

1.3 SUNSPOT INTENSIFICATION AND DROUGH, DZUD

Due to global climate change the frequence and magnitude of natural disaster are increasing.

For the last 2-3 years intensification of Sunspot is near to its peak and the probability of drought, dzud, outbreak of epidemic diseases has increased. It is confirmed by the outbreak of human and animal diseases (cholera, plague and etc) and abnormal weather phenomena (extreme hot, extreme cold, heavy snowfall, flood, drought, dzud and etc.), which alarmed the Mongolia public.

From 13 to 25 July 1999 it was extremely hot over the whole territory of Mongolia and during these 13 days air temperature was above 30^0C and the heat continued for 10-13 days in Orkhon and Selenge river valley, southern Gobi of Altai mountain, Dundgobi, Umnugobi and Dornogobi aimag, for less than 5 days in Altai, Khangai and Khuvsgul mountains and for 5-10 days in other places. Particularly, the temperature rose up to 37-43^0C in Orkhon-Selenge, 36-41^0C in Gobi aimags, 30-38^0C in remaining places. Comparison of this hot spell with meteorological records since 1961 showed that it exceeded the absolute maximum value in western, central and Gobi regions.

Aimags	Loss, by 1000	Loss, mil. tugrig
Dundgobi	602.5	21 233
Uverkhangai	516.4	19 248
Zavhan	361.8	13 649
Uvs	228.4	8 392
Tuv	126.7	7 228
Bayanhongor	146.4	5 242
Arkhangai	92.1	4 205
Bulgan	57.3	2 732
Khuvusgul	51.5	2609
Bayan-Ulgii	64.0	2 288
Umnigobi	69.5	2 063
Dornogobi	46.0	1 580
Gobi-Altai	36.6	1 203
Total	2399	91 673

Table 1. Livestock loss in winter and spring 1999-2000

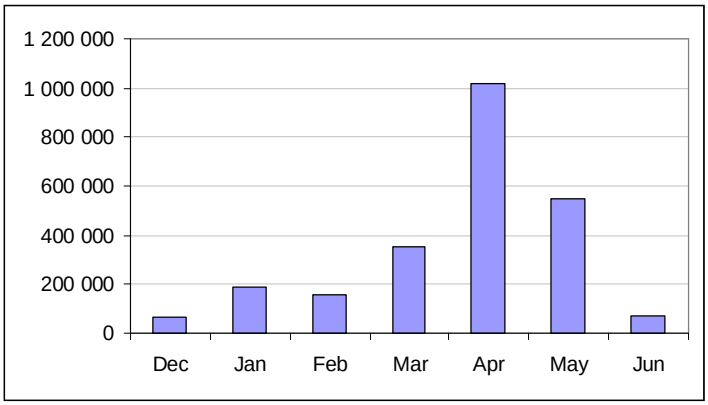


Figure 6. Total livestock loss, by month

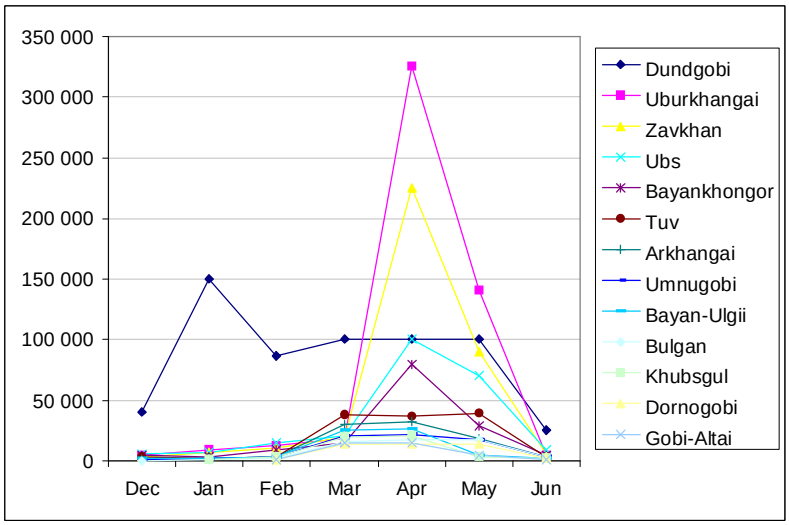


Figure 7. Livestock loss in every aimag, by month

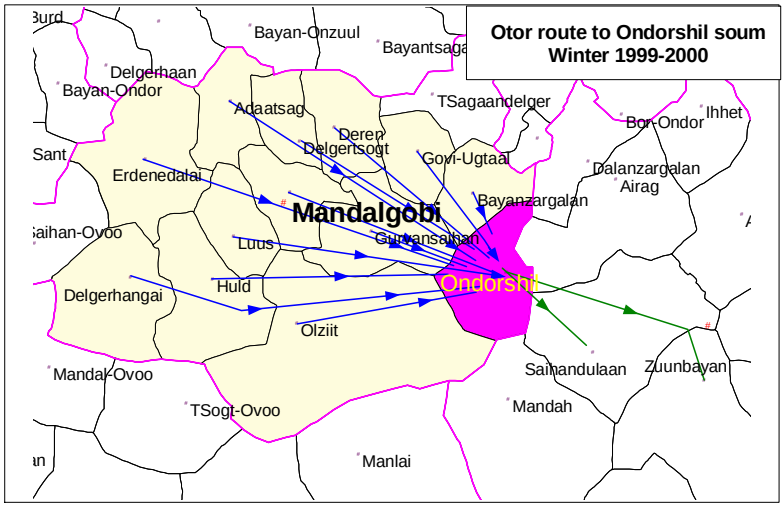


Figure 8. Otor route to Ondorshil soum, Winter 1999-2000

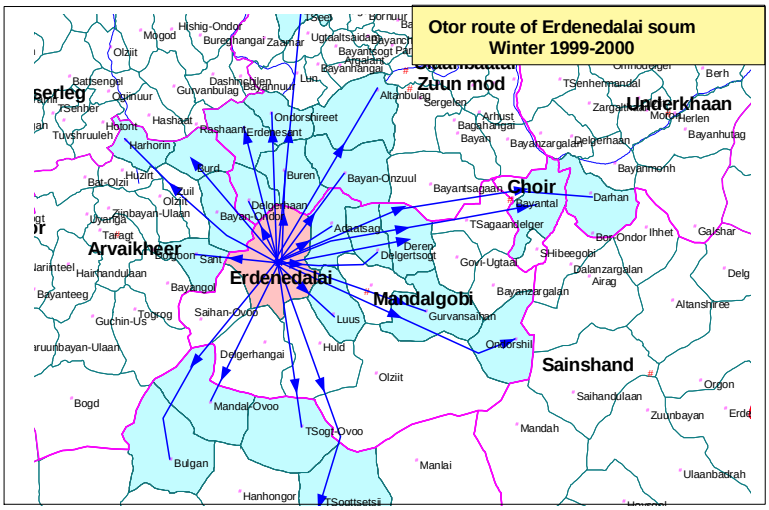


Figure 9. Otor route of Erdenedalai soum, Winter 1999-2000

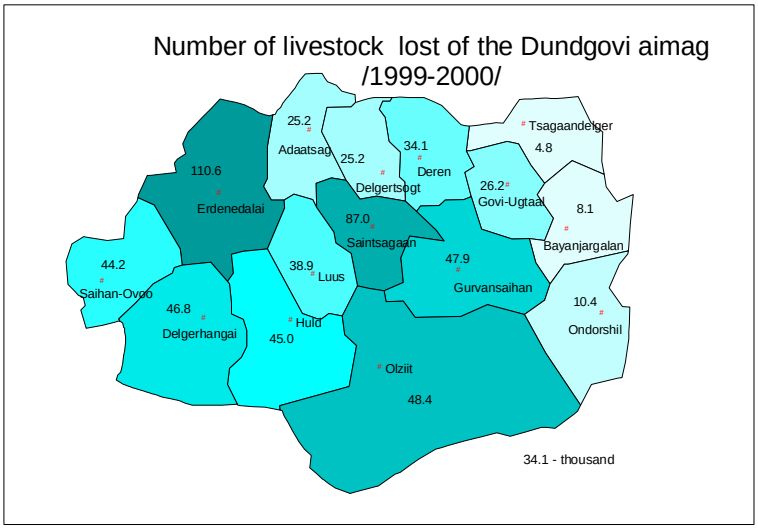


Figure 10. Loss animals in Erdenedalai soum of Dundgobi aimag

Study result shows high probability of drought and dzud occurrence in the years when Volf index – the main characteristics of intensification of Sunspot is near its maximum and minimum value.

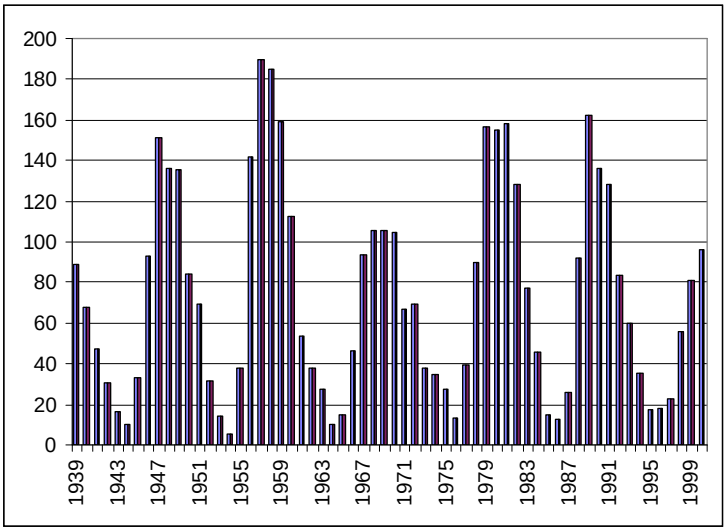


Figure 11. Annual mean value of Volf index

1.4 DZUD ASSESSMENT

Analysing this year's and previous years' dzud we had developed a methodology for **Dzud Assessment**. Using this methodology the pre-dzud condition is estimated by previous summer condition and the dzud intensity is estimated by the amount of snowfall, number of livestock lost and the extent of affected area. In order to estimate dzud on the basis of this methodology the followings shall be required:

1. Receiving summer condition map by 31 August from Institute of Meteorology and Hydrology
2. Receiving map of monthly precipitation (snowfall) departure from normal on the end of every month (beginning 31 October) from Institute of Meteorology and Hydrology
3. Receiving number of livestock loss for aimags, soums and the country, from National Statistics Agency

If you convert the above estimation on to figure (Figure 12) then you could see what is the situation which negatively impacted on the livestock husbandry and was preconditioned by the past summer and current winter condition.

On the figure dzud is classified as weak, medium and strong, and they are assigned scores. On the other hand, by using the information on what percentage of a given territory is covered by snow and how long the snow cover persists the dzud intensity is adjusted and reflected on the figure. Then in relation with dzud intensity it would be clear that what power of dzud is continued for what period of time over what area of the territory.

The correlation of number of livestock lost and dzud intensity (Figure 13) illustrates where did the dzud occurred and how powerful it was and the size of loss from the dzud. The figure also shows that on the basis of the current winter weather condition and the number of livestock lost it is possible to figure out the intensity dzud and the magnitude of losses in certain area and make management decisions on actions to be taken in order to eliminate its consequences.

Assessment 1999-2000 dzud made using the above methodology shows that the methodology estimated the white dzud pattern (intensity) correctly (Figure 14 and 15).

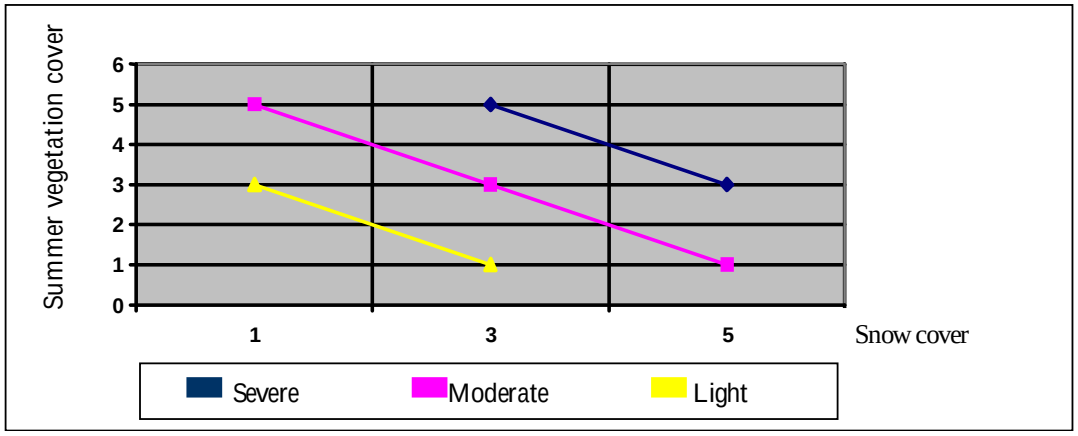


Figure 12. Correlation between summer vegetation and snow cover

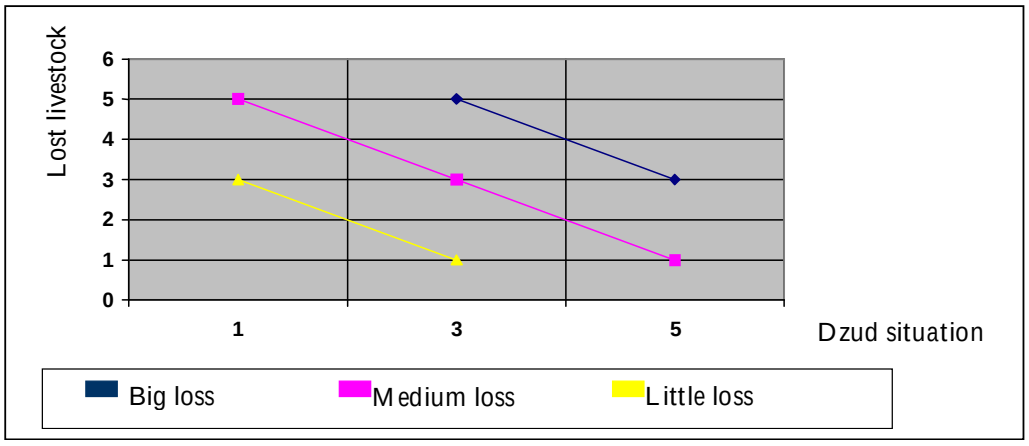


Figure 13. Dzud intensity and its losses

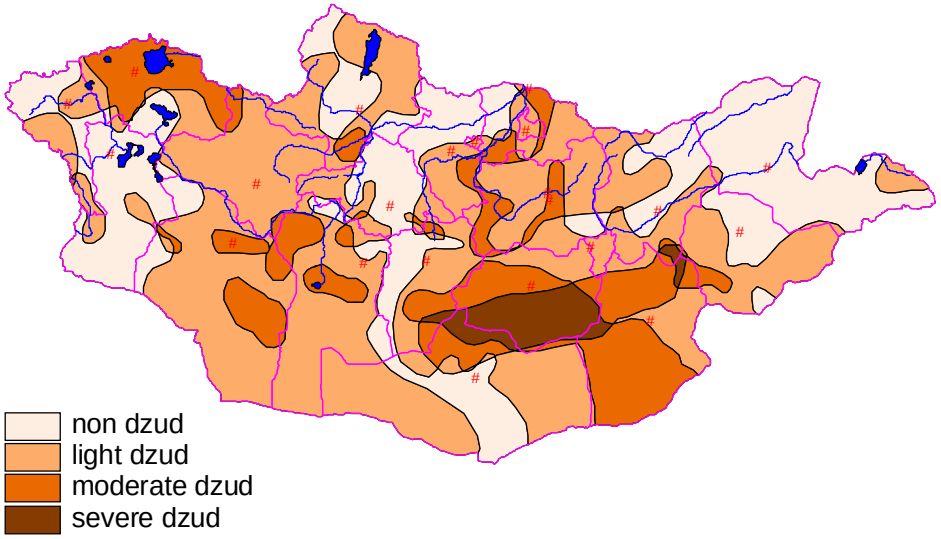


Figure 14. Assessment of the dzud 1999- 2000 for beggining winter

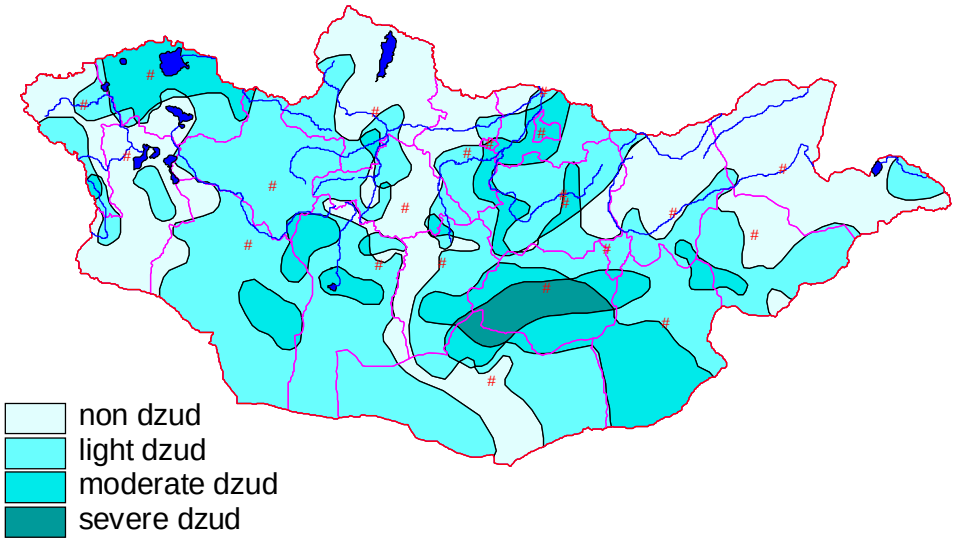


Figure15. Assessment of the dzud 1999- 2000 for whole winter

1.5 DZUD IMPACT

1999-2000 dzud impact is as the following:

Impact on herders	
Negative impact	***Positive impact***
Vulnerable groups like women, children and old people suffered more. Some herders lost financial source for medical treatment and medicines. It become difficult to herders to provide with food their schoolchildren, pay for training fee and supply with training materials that directly influenced to children's emotion like worsening their learning and leaving the school. Except livestock loss there were a lot of unproductive expenses for purchasing of fodder, movement and migration. Due to considerable loss of goats cash income reduced in straightway. Because of significant loss of horses and caws the kumiss, milk and milk products were in deficit. It negatively influenced to herders' food supply. Also fuel problem were raised due to deficiency of argal (dry droppings of cattle which are used for fuel). It was impossible to use the livestock origin row materials.	It was the lesson and gained experience on care of livestock, provision of winter preparedness, selection of place for passing the winter, movement and migration approach. It contributed in revival and strengthening of thought to combat to natural disaster jointly. Privatizing their livestock people were thinking only of themselves but the disaster helped them to understand that the requirement of the government assistance and joint work for safe of their livestock. It was the criterion for herders' recognition of each other and understanding of strengths and weakness of their bag, soum and aimag management. It discovered experienced herders having a support to their native land and advice to young herders. People understood that property wealth especially, livestock wealth will not resolve every thing but possession of knowledge and skill is more important. It was understood the importance of livestock improvement in quality based on pasture and fodder resources of the land rather then increase of livestock amount.

Impact on residents of city and resettlement
Living conditions of resettlement areas' teachers, medical doctors, budgetary officials and low-income people who were supplied their meat and milk demands from their a few livestock stayed in countryside relatives, were fallen down. Mass movement of herders deprived of their livestock, local teachers, medical doctors, budgetary officials and low-income people to city and resettlement areas caused a mechanic growth of population in the capital city, big towns, aimag centers and central zone. Therefore service agencies like hospital, school and etc. was overloaded. Also number of unemployed and poor people increased. Last one year over 7000 households registered their movement to the capital city only. Moreover the relevant officials consider that there are many unregistered households, families and people. Following the extreme population concentration, unemployment and poverty it might be increased crimes and other negative social evident.

Impact on Nature and Environment	
Negative impact	***Positive impact***
Considerable number of livestock carrion was taken in place and measures for cleaning of it was not arranged properly. Hence it pollutes the nature and environment. Due to large amount of caw death which caused a deficit of apral, many herders used nearby trees and bushes for fuel. It negatively impacts to the nature and environment. Migration of many livestock in one place intensified pasture degradation. Furthermore it effects on loss of soil and vegetation natural behaviours and intensification of desertification.	Field vole disappeared in the places where dzud occurred. The pasture was released and recreation of nature became possible in the areas where dzud occurred and number of livestock dead
Impact on Society and Economy	
Negative impact	***Positive impact***
· It resulted in 2.6 million livestock deaths and losses of Tg 85.9 billion through whole nation. Totally 2369 households remained without livestock and lost their living source. · Due to reduction of goats the amount of cashmere export decreases, consequently income from custom tax of export decreases. It would negatively influence on state budget and row material supply in national cashmere industry. · Reduction of herder population and number of livestock would impact to development of husbandry, which is the national wealth, and national security. · It is required significant amount of financial source for rehabilitation relief of natural, social and economic losses. · Increase of unemployment and poverty causes additional pressure and problem in society and economy, and it delays development of the country.	· It was approved the weakness of existing Disaster Management System during widespread disaster. Also it was a great lesson for further improvement of disaster management. · It was the natural selection of livestock by which the weak ones dead out while the strong ones are flourishing and multiplyin. · Young herders gained experience to manage during dzud. · The specificity of nature, society and economy of Mongolia, among it the specificity of pasture husbandry has been introduced to the World. · It showed principle, nature, strength and weakness of positive market economy · It was a lesson on management, efficient use and delivering of aids in disaster situation.

Who makes gain in dzud?

It is said that “During dzud only dogs get fat” and “The wolfs take advantage in the rain” in a similar way some entities and individuals make profit from dzud disaster. They are:

- Those who take advantage of the scarcity of supply and sell bad quality hay and fodder to herders and State Fodder Fund.
- Livestock thieves who around up animals lost in snowstorm or weakened during dzud.
- Those interested making personal gains from distribution and delivering of national and international voluntary aids goods by targeting them to their locals and, personal friends or use it for election campaign.
- Those who buy the valuables of impoverished herders for nothing.

1.6 DROUGHT, DZUD AND RISK OF ANIMAL HUSBANDRY

a) Livestock Husbandry and Ecosystem

Domestic animals as community living mammal animals are the component of ecosystem and have the following stages of development:

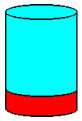
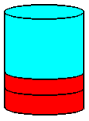
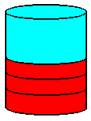
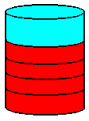
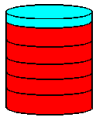
Ecosystem	Natural ecosystem	Semi natural ecosystem		Created or managing ecosystem	
Development	Wild animals	Dressed animals	Domestic animals	Semi industrial husbandry	Industrial husbandry
Responsibi--lity	Food	Reserve food	Income source	Income and profit source	Profit source
Nature of ecosystem and its capacity	Indepen-dent natured ecosystem	Young unnatured semiformed ecosystem	Ecosystem lacking the posibility of independent, development in stage of its formation and seminatural ecosystem	Deeply effected by human activity, almost incapable of independent development, young and man made ecosystem	Completely Man made ecosystem

Development period for Mongolian nationality:

Direction of social develop-ment	Primitive community period	Tribe people period	State formation ferіod	Economic period of centrelized planning (Cooperation movement: centralized, specialized, settled, industrilized)	Market economy period (private herders)

b) Social needs and assessment

Livestock needs and social assessment comes changed in historical development period.

Period	Period before 50s			During 70-80s	Since 90
Needs livestock		Hunting income + adding food	food + exchange and selling tool	Sitizen, cooperative and state income source	Herder's private income source
Social assessment	Life support tool			State economical main branch	Profit tool
Herd, management	Hunting	Livestock pasturing	Herd of livestock	Livestock husbandry coordination	Herd of livestock and Livestock husbandry management
Risk					
Herd expenditure					

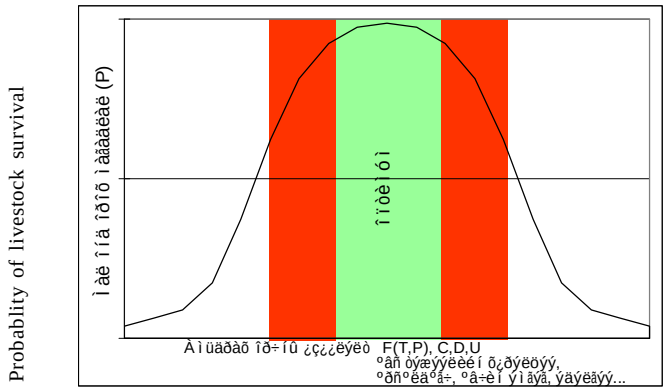
Economical relation, form	Centrelized planning economy *Cooperative and state forms*	Market economy *Private herders*
Responsibility	Economical branch	Life support tool, income source
Centralization	Veterinary, breeding, use of wool and milk, animal raise etc	Wells, water points, market, 1000 animal owner herder goal so on
Specialization	Small and big cattle (sheep, cattle, horse so on) to suit to the pasture	To raise goat and horses for market needs, so on
Settlement	Intensive husbandry	Around town and wintering place
Industrialization	Aim for improving to process raw materials of livestock	Go back and stop
Private sector	-	Insufficient (income is low, unsupported, limitted market)

c) Risk

Items	Risk <--- 90 --->	
Ecosystem	Young ecosystem	Young ecosystem
	Husbandry managing expense (fences, well water grass, fodder prepare veterinary, selection service)	Livestock is protecting Fences were destroyed Wells were broken Grass, fodder price became expensive Selection work has not help Veterinary was expensive
Herders social problems	Hospital, school, culture, communal service	Hospital, school budget was unsufficient Communal service was stopped
Products market	All types of wool, skin, leader, meat	Products market was ultra centrilized Search became in one direction, Standard request is high
Industrialization	Food factory, line, meat, wool semi or full processing factory	Rural high quality animal raw material processing factories stopped. market, search born newly, processing factory and line are out practically

Does risk exist as a rule ?

Some part of Mongolia's habitants will provide pasture or semisettled husbandry then risk must follow it .



Characteristics of living environmen:
sufficiency of hay and fodder, competitor, illness, utility, ...

Figure 16. Correlation curve of Probablity of livestock survival and environment

The following function expresses correlation between probability of livestock survival and required expenses for risk mitigation.

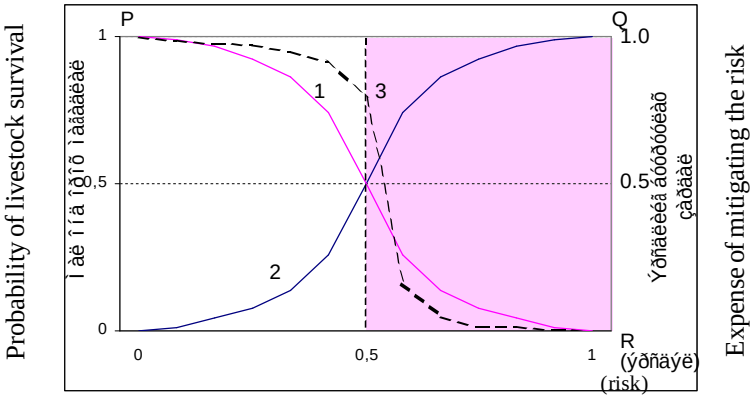


Figure 17.Curve of probability of livestock survival, risk and expenses

1 - Curve of livestock survival probability (P) and risk (R)

2 - Expense (Q) curve mitigating the risk (R) and livestock survival probability (P)

3 - Curve of livestock survival probability (P) in case of reducing the risk (R) up to 0.5 based on preventive and emergency relief and leaving the overcame risk as non-overcome factor

Instead of significant amount of expenses against overpower factor to keep livestock number the money could be reserved for restocking and other actions of disaster mitigation afterwards.

d) How to Mitigate risk ?

Considering the livestock husbandry as **lining and income source of tenants** the risk mitigation methods are as following:

Short term measures:

1. **Prevention method:** Government agencies, professional institutions and private sectors (all dealing with medical, cultural and other services related to people and livestock)
2. **Emergency method:** managed by the Government (SEC, Department of Civil Defense), originated by tenants (cooperatives, non-government, voluntary, aids organisations and others)
3. **Rehabilitation method:** relivestocking through insurance, loan, credit and etc.

Long term measures:

1. Combating natural disaster, in other words, is not limited to seasonal measures like preparation of hay and fodder, construction of wells but more importantly it is **an issue of development policy** which comprehensively embraces also preventive actions.

   In order to ensure planning and implementation of the policy, not only the agricultural or related ministries, agencies and institutions but also all other branches such as infrastructure, health, welfare,

trade, industry and etc. should be involved not simply as a supporting agencies but as key players.

2. The important task is not just the prevention of livestock loss but to sustain the livelihood of the herders and their income level stable is the issue in question.
3. To expand the notion of livestock care to the level of animal husbandry management.
4. Access to the industrial, commercial, educational, cultural, medical and public services will be improved in rural areas through the use of market economic incentives and with the assistance of international and national support.

Ways and approaches to resolve the above issues include:

- **Energy:** Use of solar, wind and water energy, mobile high-energy fuel, natural gas and etc.
- **Production:** Development of small scale industries and work shops engaged in primary and advanced processing of meat, milk, wool, hides and skins (By encouraging national and international investment)
- **Public service:** By restoring and restructuring the old public services (such as hairdressing, photo service, tailoring, various repair and etc.) in anew way to create new sources of income, and provide unemployed in soum centers and rural areas with new work places.
- **Medical service, education and information:** Through modern communications and information technology to introduce distance diagnosis and training, and ensure the availability of information services equally both in cities and rural areas.

As result additional factors for risk mitigation would emerge.

a) Balanced use of land, water and pasture and prevent them from degradation
b) More efficient use of pasture, haymaking potential and water resources
c) Coordinate livestock number in light of the pasture capacity, possible and foreseeable natural calamity, market demands and sale conditions, to devise alternative income sources.
d) To stop mass movement to the markets and town areas

Conclusion:

Use aids, credits and loans, provided by international organizations, donor countries and other development agencies, only just for risk reduction actions based on above approaches, particularly, but create a system of drought survival and dzud disaster with least possible loss and elimination of disaster losses efficiently within short period with aids and contributions.

Thus it is necessary to create a self-charging (self-sustained) mechanism, based on integrated development policy, in the society and an immunity for mitigation and elimination of drought and dzud risks.

2. DZUD RELIEF

2.1 GOVERNMENT:

Based on assessment results of the summer conditions and in accordance with State Emergency Commission (SEC) the Government of Mongolia have taken relevant measures to ensure and intensify winter preparedness actions from August 1999.

According to the Government decision 5860 tons of hay, 480 tons of fodder, 200 tons of diesel fuel, food and other stuffs worth 374. 5 million tugrugs were distributed from the State Reserve Fund.

Also 524.908.1 thousand tugrug worth aid was delivered directly from the national organizations and individuals.

State Emergency Commission

The SEC had been responsible for and executed investigation of summer and winter conditions, provision of winter preparedness, delivering of information and comments to the Government Agencies, implementation of emergency relief and providing local agencies by professional guidelines and recommendations.

The SEC appointed a Commission for receiving and distribution of goods contributed by government and semi-government entities, agencies and individuals in accordance with President appeal. This Commission had received Tg 101.2 million of hay, fodder, food and stuffs from national organisations, Tg 538.3 million and Tg 131.1 million of food, clothes and other necessary goods from international organisations and foreign countries. They had organised distribution of these goods to 13 affected aimags. The aids' had been distributed under the supervision of the Government Control Agency and controlled by local government agencies.

A documentary film on Lesson from 1999-2000 dzud had been made in collaboration with Mongol Cinema Production.

Information relating to the dzud current situation, losses and aids had been summarised. For instance, it includes Registration of dzud losses, information on aids distributed through by SEC, aids directly delivered to affected soums by national organisations and individuals, cost information of projects implemented to reduce dzud disaster and distribution information of cash contributions from international organisations and foreign countries.

As information provided by SEC is official information on dzud in Mongolia it had been used as a base for dzud study and had been included in relevant chapters of the report.

Ministry of Agriculture and Industry

Ministry of Agriculture and Industry had appointed Disaster Evaluation Team to the dzud affected areas for drawing conclusions and coordinating of hay and fodder distribution. In January-March according to the Decrees issued by Prime Minister of Mongolia distribution of 2980 tons of hay, 480 tons of fodder, millets, dried milk and other goods from state emergency resource had been organised and delivered to 9 affected aimags.

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In March-April through the Mongolian radio, 12 training sessions were conducted on methods of feeding animals and on livestock husbandry by scientists. Experts also published a manual on livestock feeding, how to care for weak livestock and the care of recovering livestock. These were distributed to herders.

According to the Ministry of Agriculture Resolution A/160 1999, to establish a store of hay and fodder USAID distributed: 280 tons of hay to Bayanhongor, 300 tons of hay to Zavkhan, 80 tons hay to Uvs, 46 tonnes hay and 45 tonnes bran fodder to Bayan-Uglii aimag, 280 tons bran to Dundgobi, 100 tons hay to Hovd. In total 800 tons of hay and 345 tons of fodder to 6 aimags.

Distribution was organised of 250 tons of rice to the herders of 52 sums of 6 aimags from Japanese grant aid KR-1.

Ministry of Health and Welfare

In December 1999 for the prevention of disease and the protection of the health of people in dzud affected areas, Tg 100 million worth of medicine was distributed. In February an assessment was made of medical resources for emergency aid. It was decided to give medical service to herders who had migrated from their usual locations. In Zavkhan and Khuvsgul aimags medicine equivalent to Tg 440,000 was distributed. In March 2000, 8 medical doctors worked in 4 sums of Uvurkhangai aimag, examined 3,415 people and distributed medicine equivalent to Tg 2.1 million. In April 2000, ambulances were distributed to 8 sums in Uvs, Zavkhan and Bayanhongor jointly with the UNICEF and temporary designated doctors to 19 soums.

2.2 UN AIDS

The Government of Mongolia addressed to UN Agencies on February 11, 2000 with an official appeal for worldwide distribution on dzud information and international aids to overcome the natural disaster. Accepting the request foreign countries had sent their representatives to Mongolia for investigation of current situation and had organised aids.

Disaster Management Team visited affected aimags and met aimag Governors to identify the areas of need and to obtain lists of potential recipients from soum and bag Governors.

UNDP contributed US$ 100 thousand to support the Government actions for combating the dzud efeccts. World Health Organisation (WHO) provided US$ 5 thousand to Ministry of Health and Social Welfare for medical aid. UNFPA provided US$ 26 thousand. UNOCHA jointly with Governments of Great Britain and Norway provided US$ 90 thousand. Also Regional Disaster Coordinator of Asia had been delegated to Mongolia to assist Disaster Working Group. Proposal for intended disbursement of US$ 30 thousand furnished from Denmark had been developed and submitted.

UNICEF provided $US50 000 relief to support women and children. Clothing for children and training on proper nutrition and health and hygiene were also given. Information and booklets were produced.

UNFPA continue to monitor health aspect of the dzud effects, including the psychological impact.

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UNDP worked closely with the SEC, Government agencies and NGOs, analysed current situation and resolved required issues. Weekly meetings were held with NGOs and INGOs. Later, the government also called weekly meetings to discuss the distribution process.

The Scout Movement and UN Volunteers assisted so that the process was efficient and properly targeted. UNDP Resident Representative established a Web site within DZUD 2000 Programme and detailed information about dzud loss, actions taken, aids provided by national and international organisations were prepared in collaboration with Great Khural of Mongolia and distributed throughout the world.

At the beginning of October **ONE WORLD** Conference was held and the issues on nature and environment including natural disaster had been discussed and relevant decisions were taken.

2.3 INTERNATIONAL AID

According to incomplete information the total aid from the International organisations, INGO, NGO and individuals amounted to about US$ 6.3 million US $. Information about aids had been collected from SEC, UNDP, International Federation of Red Cross, Red Crescent, Mongolian Red Cross Society and Web site and it is included in Annexes.

Many International organisations and donors operating in Mongolia provided aids for combating dzud effects. Some of them is listed below:

USAID: Provided US$ 830,000 of hay, fodder and humanitarian aid. It was distributed through Ministry of Food and Agriculture, IFRC, Red Crescent and MRCS.

German Development/Technical Cooperation (GTZ): The relief aid was in kind, in the agricultural and health sector, to the value of Tg 480 thousand to Uvs and Zavkhan aimags. The aid for the agricultural sector consisted of seeds, veterinary drugs and services implemented through local NGOs. The health sector aid consisted of high energy, high protein biscuits for children of dzud affected households, essential drugs and supplies for soum and bag health teams. Transport was provided for the health teams to reach the more isolated affected families.

IFRC and Red Crescent: As the devastating effects of winter 1999/2000 became apparent, in close cooperation with the Mongolian Red Cross (MRCS), the IFRC launched an initial appeal on the devastating snowfalls in Mongolia on 22 February 2000. This was an appeal to provide support for 30,000 recipients over a 3 months period.

By 29 August 2000, the IFRC had received 4,1 million Swiss francs worth of clothing and food assistance for those affected by the dzud. The IFRC also sent an experienced Relief delegate to Mongolia to assist the MRCS in developing a support programme as the situation continued to deteriorate.

As the situation continued a revised appeal was launched in March and as result of its distribution to donors and their national societies Tg 2.7 billion of aids had been received. They jointly with MRCS also implemented the **"Dzud 2000"** Programme. March-September 2000 involved 3 distributions of wheat flour and rice to 6,300 households. Food aid would be continued until end of the first quarter of 2001.

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"Kyokyshuzan Development Fund" and "Peace Winds", Japan: Implemented "Dzud" and "Wells" projects and provided food, diesel fuel, medicines and other goods in Tg 187 million to 41 soums of 5 aimags. Also US$ 100 thousand were contributed for rehabilitation of 57 wells in 24 soums.

ADRA: Provided US$ 286 thousand worth of food, clothes, medical equipment to 31 soums of 4 aimags.

World Vision: Hong Kong Government and World Vision in Korea provided US$ 128 thousand and US$ 50 thousand respectively. Assistance to 12500 persons in 30 soums of 6 aimags was financed from this fund.

JCS International: Between March-October 2000 JCS provided clothes and livestock fodder worth of US$ 350 thousand to 3 aimags. JCS distributed seeds free of charge and carried out a survey on vegetable growing and fodder plantation, coupled with training courses. JCS also assisted in inoculation and providing access to veterinary services of the livestock of 500 households in 2 aimags.

Save the Children Fund (UK) (SCF): Provided 4 month supply food, boots and heating materials to 389 most vulnerable households (2200 people) in Bayankhongor aimag. Multivitamins were provided to 3000 children under 5 years of age, 2000 pregnant and nursing mothers, and to all the children living in school dormitories in the 6 severely affected sums. A variety of vegetable seeds were distributed to 18 institutions in the 6 soums to prove that vegetables can be grown despite the short vegetation periods.

Canadian Fund: Flour and livestock fodder worth of US$ 10 thousand were provided to Dundgobi aimag.

MRCS: Mongolian Red Cross Society worked with State Emergency Commission and informed IRCS and International Red Crescent Society (IRCrS) and foreign embassies. Projects funded with US$ 126.8 thousand or an equivalent of Tg 137.6 million were implemented in Dundgovi, Uvurkhangai, Bayankhongor, Zavkhan, Uvs, Bayan-Ulgii aimags.

In response to the appeal by the members of MRCS to national NGOs Tg. 11.7 million of aids were provided from 30 agencies, economic entities and individual members of the society. For instance, over 10 organisations such as Mongolian Women Association, Mongolian soft tennis Society, Mongolian Shagai Society, Donors Society, Red Cross Society branch in some aimags and city districts provided Tg 1 474 830 of over 10 types of goods including cloths, food, candle, match. and battery.

The MRCS also intends to provide additional food supplies and warm winter boots to the 35,000 beneficiaries. In order to identify the needy people the MRCS undertaken a survey on affected people in aimags (It is shown in following table 2).

2.4 EFFECTIVENESS OF THE RELIEF:

Due to the absence of the complete information to assess the actual assistance results the following formulation on the total amount of assistance was made based on the information contained in the State Emergency Commission, Mongolian Red Cross Society, UNDP and other organizations information collected during the survey and information broadcast on the Internet.

- The international assistance and support responded to the needs of affected herders and served the purpose of giving the necessary material and emotional support to the herders.
- The assistance effectively reached the needy people, foodstuff, flour, rice timely delivered to the herders who had no other sources of income were extremely useful.
- The list of families and households in need was requested within 2-3 days, as an urgent task, while it was almost impossible task to achieve, it caused some confusion. It also affected the choice of the right people, thus causing disputes among the herders.
- Of the dzud damage reduction assistance the restocking project has brought conclusive results by providing the herders with a source of income and livelihood. Restocking of the herders was a necessary measure to ensure the stability of their livelihood. However, the present criteria and indicators used in restocking project did not embrace all households, who lost their livestock from the dzud and the source of their living. Surely, it would have been an impossible task.
- The main thrust of Dzud assistance had been to boost up the morals of the herders. It did not and could not make substantial contribution to the solution of the financial issues related to dzud prevention measures or to the winter preparedness.

Description	Qty	Description	Qty
Affected households	80884	Affected adults	220 thousand
Affected population	452152	Among them: Pregnant women	5 thousand
Affected children and yong people :		above 55 aged women	23 thousand
0-5 ages	80 thousand	above 60 aged men	13.7 thousand
6-7 ages	40 thousand	single father or mother with over 5 children of above 16 ages	3154
8-18 ages	110 thousand		

Table 2. Outcome of the study according to MRCS

3. WINTER PREPAREDNESS IN YEARS 2000-2001

5.1 WINTER PREPAREDNESS YEARS 2000-2001

Government is taking the following measures:

1. To allocate, in second half of the year, an additional Tg 452 million to increase the state fodder reserve by 30%, Tg 40 million to Umnugobi and Tg 30 million to Dornogobi for creation of the aimags' own fodder reserve and Tg 142 million for construction of new and rehabilitation of old water points in regular and temporary winter pastures.
2. On the requests received from aimags, a provision was made for 220 thousand heads of livestock belonging to 548 households in 18 soums of Umnugobi, Sukhbaatar, Dornogobi and Gobi-Altai aimags to pass the winter in the state border areas and 165 thousand head of livestock of 329 households from Umnugobi, Sukhbaatar, Gobi-Altai and Bayankhongor in the protected zones.

On the national scale: Out of the planned 768.2 thousand tonnes of natural hay and 13.1 thousand tonnes of fodder, by 2 October 455.6 thousand tonnes of natural hay and 2.8 thousand tonnes of fodder had been prepared.

Government has invested Tg 260.0 million for rehabilitation and renovation of 157 wells of engineering constrcution and water points in 81 soums of 18 aimags.

In Provinces: 1 366 636 heads of livestock will pass the coming winter in Dundgovi aimag and it was estimated that 1723566 cubic meter of water will be required during November-April. 38 percent of the required water would be supplied from the wells.

In Zavkhan aimag the plan was to prepare 28.9 thousand tonnes of hay, by 20 October 15 thousand tonnes were prepared or 53.2% . It was proposed to prepare 230 tonnes of hay for State Reserve Fund, however, only 10.6 thousand tonnes of hay or 4.6% were put in reserve.

From International organizations: To reduce the impact of drought and dzud disaster the Government of Japan had provided US$ 10 million. The Government of Holland contributed grant aid of US$ 115 thousands to assist the areas affected by difficult winter and spring condition in Dundgobi, Dornogobi, Umnigobi, Khentei, Uvurkhangai, Gobi-Altai and Tuv aimags. The money is being spent for rehabilitation of water points and wells.

No further information is available regarding the assistance provided by other countries and international organisations.

3.2 MONTHLY WEATHER FORECAST FOR 2000-2001 WINTER

(Issued in August)

In October to November 2000 above-normal snowfall is expected over

the most part of Gobi region, Southern Gobi area of Altai mountains, Khuvusgul, Bulnai and Khentei mountains and northern side of Khangai mountain.

In December 2000 above-normal precipitation is forecast along Mongol-Altai mountain, below-normal precipitation over Great lakes depression, Khuvusgul mountain, northern part of Khentei mountain, Orkhon and Selenge rivers valley and Gobi region and warming by 1.1-2.5^{0}C above normal over whole territory of the country. Therefore, inset of "Black dzud" and water shortage is expected.

In January 2001 Relatively low snowfall is expected over the most part of the country's territory. In Dornod Mongolian steppe it would be warmer by 1.1-1.5^{0}C and above-normal precipitation is expected in the northern parts of Khentii and Dornod aimags. The winter could be difficult for livestock in three Eastern aimags.

In February 2001 Higher than normal snowfall and 1-2^{0}C colder than normal weather is predicted over the most part territory of the country. Livestock may face difficulties in areas where higher than usual snowfall is expected.

In March 2001 Higher than normal snowfall is predicted in Altai and Khuvusgul mountains, the northern part of Khangai mountain, the eastern part of Dornod Mongolian steppe, Dundgobi aimag, the western part of Dornogobi aimag, the northern part of Umnugobi aimag and the southern part of Uvurkhangai aimag.

In general in March and April severe snow and dust storms rage all over the country and cause serious problems to economy, in particular, animal husbandry and life of herders.

3.3 ASSESSMENT OF LOSS FROM THE DSUD

Quantifying livestock biopotential, animal husbandry winter management and dzud risk of livestock loss amount could be estimated by following

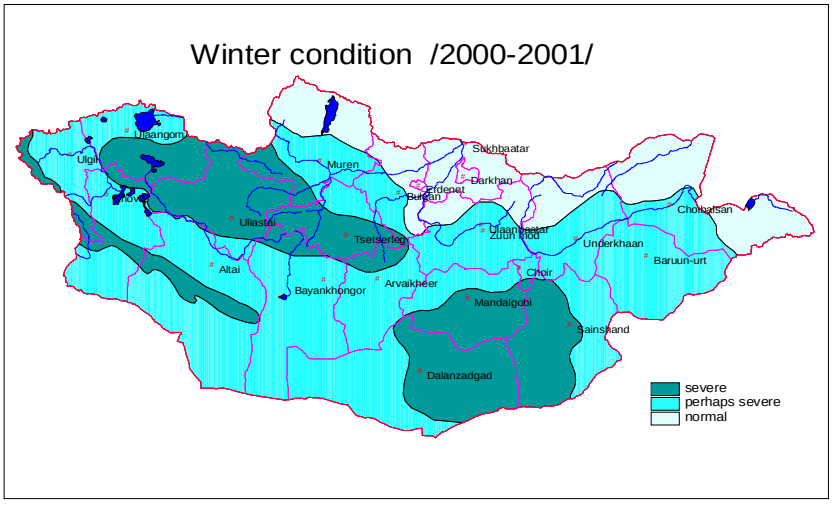

Fig 18. Winter weather condition 2000-2001

equation:

$$Q_1 = (Q_0 - K\,Q) - K^1\,Q_0\,R \qquad (1)$$

Where: $\mathbf{Q_0}$ – number of livestock at the beginning of the year, $\mathbf{Q_1}$ - expected number of livestock at the end of the year, **K** – livestokc loss coefficient. It could be taken as 2.5 assuming normal loss is 3% in Mongolia. $\mathbf{K^1}$ – coefficient of maximal livestock loss. Maximum livestock loss was during winter dzud in 1944-1945 and at that time one third of total livestock in Mongolia were lost. Last year one third of total livestock of Dundgobi aimag alone were lost. In the soum which suffered maximum loss, it lost 40% of its total livestock last year. Therefore K^1 could be taken as 1/3 (K^1 = 1/3). R is risk and it is defined as below:

$$R = aRw + bRp + cRm \qquad (2)$$

Where: **Rw** – weather condition (dzud) risk, Rp - biopothential risk, **Rm –** management risk, **a, b** and **c** – coefficients of risks. The above coefficients are different for all risk factors. The risk of interesting issue (dzud) in relation with current weather condition is maximum or a=0.5. In this case b=0.3 and c=0.2. Considering above explanation equation (1) could be expressed as following:

$$Q_1 = (Q_0 - 0.25\,Q_0) - 1/3\,Q_0\,(aRw + bRp + cRm) \qquad (3)$$

Using above methodology and equation, possible livestock loss has been estimated on the example of Umnugobi and Uvs aimags, where, weather condition in coming winter is expected to be difficult. In the equation the expected number of livestock and confirmed number of last year's livestock loss and this year's new young livestock were taken into account.

Alternative 1: It is assumed that the dzud will be extremely severe, livestock is fattened well, the management is also good.

Alternative 2: It is assumed the dzud is severe, livestock is not fat enough for the winter and management is poor.

Alternative 3: It is assumed that the dzud is severe, moderate fatness of livestock and management.

Using the equation, the loss and number of animals may be estimated.

But a subjective factors associated with choosing the score, staff's skill and the data used may cause deviation in assessment.

3.4 CURRENT WEATHER CONDITION

In the spring and summer of 2000, more than 60% of territory of the country had suffered from drought or semi drought conditions. In the Gobi and steppe regions, in particular, and in most soums of Dundgobi, Dornogobi, Umnogobi, Sukhebaatar aimags during the spring and summer there was very little precipitation. It almost did not rain until August, which badly affected vegetation cover and livestock was unable to gain sufficient weight to pass the winter season.

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Aimag	Number of livestock at the end of year (million)	Number of loss (million)		
		Alternative 1	Alternative 2	Alternative 3
Uvs	1.7	290	570	430
Umnigobi	1.4	240	330	350

Table 3. Expected number of lost livestock in winter and spring 2000-2001

According to the meteorological information above the average heavy snowfall is expected in Altai mountain region, in the southern part of Khangai mountain region.

In January 2001 less or below average snowfall is predicted, but from February 2001 heavy snow fall is expected over most part of the country's territory and it will be extremely cold except in the trans Altai mountain range gobi region and the probability of severe dzud is extremely high.

This year 190.000 herder's households with 31 million livestock and will be spend the winter. 7000 household with 2.4 millions livestock will have be move to the territories of other 8 aimags and soum. 4.2 million livestock of 10 aimag will move distant pastures within the territory of their own aimags.

All Mongolian aimags were supposed to prepare during this summer and autumn 764800 tons of hay, 13100 tons of fodder. However, only 582 thousand tons of hay, 2800 tons of fodder have so far been prepared by herders. The State Reserve Agency has 4000 tons of hay and each aimag has a reserve of 10 tons of hay.

Therefore, learning from the last dzud lessons meant for all levels of government to be prepared for the coming winter by implementing concrete measures. Cabinet Ministry had discussed the situation and issued resolution No 125 on measures to be taken to prepare for winter.

By 30 November, 2000, most of the territory of the soums of Uvs, Zavkhan, Khovsgol, Gobi-Altai aimags was under the snow. Depth of snow cover is 60-70cm in the mountains and 15-20 cm in the steppes. The air temperature dropped to 25-30C below zero in these areas, roads are blocked by deep snow and the dzud condition is already hanging over the area.

The Government allowed 790 herders households with 512 thousands livestock to migrate to the state border areas, 1600 herders household, 430 thousand livestock are migrating to the special protected zones.

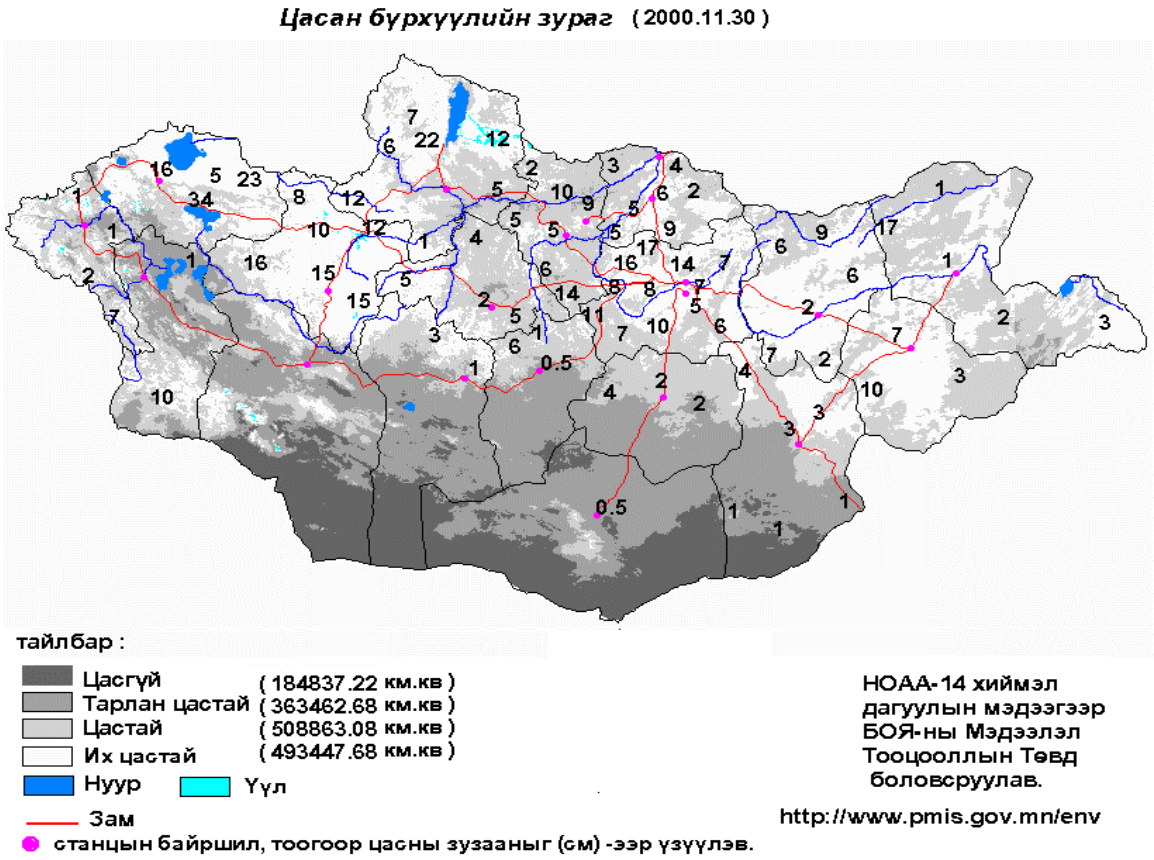

Figure 19. Snow coverage image. (200.11.30)

4. SOCIO-ECONOMIC CONDITIONS OF HERDERS

Within the framework of the project, a survey was conducted on the socio-economic condition of herders in Khovd and Zavkhan aimags. Following are the results :

Economic condition of herders: For herders the monetary exchange service is actually stopped and it is replaced by natural livestock money exchange in equivalence of sheep. Therefore, a term "skin money" is being used. The most profitable business – the export of goat raw cashmere was prohibited, therefore herders sell it with very low price or mostly exchange it on barter basis to peddling sellers. As the skin of dzud affected livestock gets too thin and looses its wool it does not meet the required standard for sale. Therefore , in most cases it is thrown out .

In Khovd aimag , the income of herders with low income is 2.9 times lower than herders' with high income and 1.2 times lower than with medium income herders.

According to statistics of 6 soums in Zavkhan aimag , the average number of livestock is 205-230 per household, , 45-53 per person; and the number of households with more than 1000 livestock is 3-6 per soum and only 2 households have more than 2000 livestock per soum..

At average soum level there are 93-105 vehicles, 5-18 tractors, 35-93 motorcycles, 95-137 TV, 21-36 power generators, 253-280 radios and many herders possess gold and silver jeweleries, snuff bottles made of precious and semi-precious stone. Annual income of herders ranges from 100 000 to 1.5 million tugrugs and its average is 500 000-700 000 tugrugs. It means that low-income herders have an income 2.4 times lower than high-income herders and over one time lower than medium-income herders.

Services of State and Government agencies:

Services and activities carried out by these agencies include: propagandizement of state laws, regulations and government decisions; delivery of pension and subsidies; organization of restocking activities within Poverty Mitigation Programme; define the land boundary for autumn, spring and summer encampment; distribution of winter otor pasture and encampment, wells and water points, issuance of permission for timber preparation, utilization of natural resources and hunting; information on weather forecast in emergency situation; assistance in dzud and difficult weather conditions, and acceptance herders' requests and submission them to relevant agencies for further decision.

Service on education:

Although efforts have been made to enroll all school-age children in school in local areas, the number of school- drop outs does not decrease due to herders living conditions. 5-10% of herders' children are provided with school dormitory. The number of illiterate adults is increasing. Financial resources are scarce for herders children to study at universities, higher educational institutions and colleges .

Soum medical service. Herders are covered in preventive medical check-up once or twice annually and given advise on health care. The elderly, pregnant women and mothers with birth complications, persons with chronic illness are taken under medical control and given necessary services as much as possible. Although the household doctors work in bags, they lack of medicines and medical materials. Due to shortage of medical doctors some bags do not have households doctor. Pre-school children are covered in vaccination and school children, living in school dormitory are provided by medical services. Hospitals are in shortage of beds, medicines, medical materials, financial resources and well equipped medical vehicle in particular. Pre-and post natal resting houses are no longer in existence. Doctors can not reach some isolated otor areas.

Public service: Public service is almost unavailable. Hairdressing, photograph service and bath houses are not in regular operation. Public services, such as ateliers for making ger and ger furniture, other household utensils, shoe makers, dressmakers are much needed. Repair services for radio, player and watch do not exist at all. Specialists for such services and spare parts of those items are in deficit in rural areas.

Communication service: Results of study carried out in Khovd aimag indicate that only 63% of herder households have radio, 5.6% have TV, 1.6% -subscribe news papers, repair service for radio is not available and batteries are in deficit. Diesel power station does not supply electricity regularly, communication branches in soums do not operate normally due to deficit of fuels. Delivery of mail and newspapers are delayed on the way from soum to bag, from bag to herders. Herders use horse and camel for communication with bag, it is possible only in normal weather conditions, however it is difficult when dzud and flood are in place.

Newspaper subscribtion by herders and local people is decreasing due to delay and inefficient delivery services as well as the lack of cash .

Transportation service: Herders use traditional means of transportation for moving from place to place , for looking after their animals and preparing hay and fodder. As significant number of camel and horses were dead during the last dzud, the herders are in shortage of animals for transportation. Tractors and trucks with high capacity and good performance are required for transportation of hay, fodder and aid goods during the dzud, however, they are in deficit or most of them are privatized.

Conclusions:

- The management system to provide the normal operation of livestock production in market economy has not been set up. Economic potential of most herders is still weak and unsustainable. Due to dzud, many herders stayed without any livestock or their income lowered below the lowest rate of living standard and they became poor households and their economic and social position had been lost.
- Medical equipment and medicines are not sufficient.

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- Public services for bags and herders are not available, public services such as, hairdressing and bathhouse do not exist. Herders are suffering from the lack of cultural and information services. Operative exchange of information is limited.
- As a result of livestock privatization and lack of public service in local areas, women have more burden. They have to do all domestic works themselves, taking care of the family, milking animals, cooking, sewing and doing many other domestic chores.
- Weak social enthusiasm, lack of initiative for using the existing resources and low level of cooperation give negative impact on the live of herders.

5 DETAILED DESCRIPTION OF THE RECOMMENDATIONS

CENTRAL GOVERNMENT

1. To create a legal environment and set up a system for natural disaster risk reduction

   There is a need to set up a system to coordinate relations between the participants of natural disasters (pastureland, wells, livestock, herders, administrative and professional organizations, loan, assistance, aid etc.), which occur very often and bring much harm to the animal husbandry in Mongolia.

   Although the tolls of a possible dzud can be reduced by a good winter and spring preparedness, there is no system, which determines the rights and responsibilities, obligations of participants for dzud prevent ion action.

   Risk reduction should not only be limited by preparing hay, forage, digging or building wells when disaster occurs, but it needs to be a **development policy,** comprising disaster prevention measures.

   In planning and implementing of this policy , an important role should be played not only by the ministry, departments, organizations related to agriculture and animal husbandry, but ministries, departments, organizations for infrastructure, health, social security, trade, industry and all other branches of economy.

   The state development policy on natural disaster reduction should comprise issues of infrastructure development, social security, economic provision, and environment as a system.

2. To regulate the ownership and utilization of pasture, hay, water and other pastureland resources within the regions

   When the issue of regional economic development gets final approval, it would be possible to regulate and manage the livestock number, structure of herds, availability of pasture and water, **roaming** for fresh pastures, forage and pastureland reserve issues in the region without waiting for directives from the center. For example, by establashing a meat processing factory and cold storage facilities in rural area, extra meat from the herders' consumption and from slaughtering animals when they are fat enough, which may die in dzud conditions, can be exported to meet the local and foreign meat consumption needs.

3. To establish a national network, which informs governments of foreign countries, international organizations and aid agencies about the scale, tolls and damage caused by the natural disaster and appeals for assistance and coordinates activities of receiving and distributing the aid.

   It is necessary to establish a system, which can timely provide foreign countries and international organizations with up to date information about the disaster occurrence. It is appropriate, in case of natural disasters, to address the international organizations, aid

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agencies of donor countries which support sustainable development and poverty reduction programs as well as emergency relief organizations which organize and manage relief programs. They have an extensive experience on the emergency relief. By explaining the pecularities of drought and dzud that occur in Mongolia and their negative impact on our economy, we should strive to prepare reserves for natural disaster using grants and loans of these organizations.

ABOUT GRANTS AND AID

It would be appropriate to establish a system for the effective utilization of grants and aid assistance of donor and charity organizations and individuals to mitigate the damages of the disaster in a short period, and to overcome the dzud and drought disaster with minimal losses. Grants and aid of international organizations, donor countries, and other development organizations should be used to reduce the damages and to recover from losses.

A long-term plan for measures to be taken during the disaster would serve as an useful information base for organization and management of assistance and help the donors to choose regions for implementing their activities or address concrete problems.

Donors would be able:

- *To plan at a certain level and know in advance where and to whom to provide assistance*
- To improve its *monitoring, assessment and management activities when aid program is concentrated on specific region, soum or baga.*
- *To establish a long-term beneficial contacts with locals*
- *To assess outcome of short and long term activities together with the beneficiaries*
- *It helps to achieve better results by receiving feedback information from the locals and regulating and coordinating their activities.*

4. To establish a system of the state protection of livestock

Although it is indicated in the Constitution that the livestock should be under the state protection, measures taken by the state to implement this provision are not sufficient enough for herders and the public. Measures on supplying water to pastures, preventive actions against livestock epidemic diseases, such as disinfecting washes, vaccinations, purgation do not cover all of the livestock and there are no measures implemented on improving animals' gene pool. In other words, there is no system to take the livestock under the state protection. And it needs to be established urgently. On the other hand, the issue of the state and government participation in reducing the losses during the disaster and recovery after the disaster should be addressed within this system.

A policy aimed at increasing cash flow to the hands of herders should be implemented in order to protect their livestock from losses and for other purposes.

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Within this system, the issue of protection and enrichment of the Mongolian traditional livestock gene pool should be regarded.

5. To include the disaster issue separately in the concept of sustainable development of the pastoral animal husbandry in conditions of the market economy.

   The ancestors of Mongols from the stone ages have tamed and domesticated wild animals and developed it to pastoral animal husbandry and accumulated experience of many thousands years. But from 1960-s Mongols have attempted to force the conversion of the pastoral animal husbandry into a settled form of farming, but had not acquired the desired results. It is necessary to reestablish the concept of developing the Mongolian traditional pastoral animal husbandry by adapting it to the present world development tendency and market economy conditions.

   The concept of sustainable development of the pastoral animal husbandry in market economy should first, answer the following questions:

   - Do we *continue to develop the traditional pastoral animal husbandry or the intensified farming of animals? What form of co-operatives should herders have?*
   - H*ow to use the natural and climate conditions and resources in developing the animal husbandry?*

6. To renew criteria for identifying, assessing and announcing about the occurance of drought, dzud and other natural disasters

7. To mobilize and use local resources and identify needs for foreign aid by the disaster type

LOCAL GOVERNMENT AND HERDERS

IN NORMAL or PRE - DZUD CONDITION

1.1 To improve communication and serve herders with information on nature, climate, meteorology and others

- To pay particular attention to provide herders with actual and cognitive information, to modernize the public information and postal services for delivering news and letters to herders and shorten the pick-up period for letter and parcel from herders. For that reason to study possibilities of grouping families roaming for fresh pastures and bringing them into an unofficial management structure for neighboring households and “khot ail”,
- To strengthen the local press and information capacity
- To collect and process information on animal husbandry, climate, hydro, meteorological and plant growth phenomenon in a complex way, create a methodology, establish a system for delivering the above information to local people and herders
- To get a long-term weather forecasts from the Institute of Hydrology and Meteorology in accordance with rules specified, and enrich the information based on the peculiarities of the area and experienced herders’ prognosis. Take measures on issues of

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livestock breeding and winter encampment at the regional level by concluding what the winter and summer are going to be like and introducing it to herders.

- To provide herders with small radio transmitters, to establish a system to broadcast the weather forecast periodically on one of the radio frequencies, and to have disaster warning voice signals on before their occurrence. And solve this issue along with the issue of providing the herders with mobile communication systems.
- To study and learn about the signs, indications of the local area on determining and predicting the future weather conditions, about animal herding techniques from the experience of the senior herders of the area. Especially to learn from the rich traditions of our ancestors on how to choose the wintering place, and preventing damages of natural disasters from happening, learn to apply the weather forecast information from the public media usefully.

1.2 To study and advertise the traditional methods and experience of pastoral animal husbandry

- The local administration should study the methods and technology of pastoral animal husbandry from the experienced herders and take measures to pass on to the young herders
- To work towards inheriting the skills of livestock breeding and pasturing to own children and relatives

1.3 Allocation and management of pastures

- To take measures on using and protecting the pastures with proper allocation at the level of local citizen representatives' committee and the governor of the area.
- Herders should learn to roam for fresh pastures in summer and autumn without any pressure from anybody and study and learn about the plants and water supply in the area. Local administration should take organizational measures related to the otor area, paths for roaming and period of roaming.

1.4 To build a new, repair the old and maintain the artesian wells, to conduct field water research

1.5 On the basis of resolving the management of pasture utilization to elaborate a plan, in consultation of herders, to repair and maintain old artesian wells and decide the location of new wells and introduce it to the organizations concerned. To build new wells using the local resources.

Herders should be able to protect, clean and maintain, on their own, the privately owned wells.

1.6 Set up hay and forage reserve fund, allocation of harvest and hay field

- To allocate the hay areas to herders families and households using the local resources and mobilize local manpower and technical equipment for making hay. And when it is not possible to make hay on its own territory, to conclude agreements with neighboring aimags to prepare fodder on their territory.

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- Herders should prepare hay and fodder themselves using the available local resources.

1.7 Management of pastures and areas for winter and spring encampment

- Although the herders do have permanent places for winter and spring encampment, it is necessary to make an additional allocation, taking into consideration of the carrying capacity of the pasture and water supply, to ensure the correct management of the livestock wintering.
- To make herders to realize that it is their own responsibility to utilize properly their winter and spring encampment places, by repairing and maintaining it to protect livestock against cold during winter and spring.

1.8 To improve the quality of veterinary services

- To organize works of the rural veterinary services and take necessary measures to improve the relation between herders and veterinarians
- Herders should be able to cure ordinary herd diseases, to disinfect the wintering area, animal shelters and to wash animals according to the set rules, and take preventive measures against the diseases that are characteristic to certain areas.

1.9 To protect, improve and utilize appropriately the genetic fund of animals

- To help the herders to own good quality animals, to organize regular works (seminars) for the herders to obtain necessary information on that.
- Quality and the gene pool of the herd depend on the choice of the breeder animal. Although the traditional selective method existed, many herders today do not know or even heard of it. There are Mongolian sayings, such as “a breeder animal equals to half of a herd”, “a stallion should be brought over from other places”, which indicate the extensive experience that Mongols once had and we ought to revive it.
- There was a tradition that the herders would decide the best time for breeding and mating period for animals, knowing in advance about the characteristics of the coming winter and spring by making observation of signs and indications of summer and autumn weather. It is important to revive this tradition along with the scientific findings and technology.

1.10 To protect pastures from rodents and pests

- To collect information about the distribution and spread of rodents, such as Brandt’s Vole, and all types of grasshoppers, locusts that are harmful for pastureland and to inform organizations concerned to take timely measures on destroying them.
- Herders should fight against the pests by their own means using bio-technical method (to increase the number of foxes, and prepare seating places for owls etc.)

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1.11 To make the livestock census more efficient and advanced

- Herders should know that giving the actual number of livestock for census is important for the state to plan and take effective measures to help the herders' households and protect their livestock.
- To improve and up- date the content, structure and model of livestock counting information and make detailed information available for different studies and research works.

1.12 Implementation of the taxation policy

- To organize advocacy works about the new legal documents on taxation and insurance issues ensuring the full participation of herders.
- In implementing the tax policy it should be guided by the principle to **encourage the participation and support the initiative and effort, taking into consideration** the size of the tax paid by the herder and loan and support provided by the state. The tax paid by herders should be linked to the social services, aid, and assistance for mitigation of the dzud losses provided by the state to herders. Then the principle of "favor for a favor", "if want to take, be willing to give" will be realized between the herders and the state.

IN THE DZUD CONDITIONS

Natural disaster (dzud, drought) assessment

Every April the Institute for Hydrology and Meteorology issues the summer forecasts and every August the winter forecasts. In this forecast the pasture growth, water supply, livestock fattening, diseases were calculated systematically. The institute calculates /computes/ the possible winter and spring conditions on the basis of the scientifically developed dzud assessment methodology. And based on this assessment the areas, which will endure the severe weather conditions, encounter difficulties in their livestock wintering and springing should take the following measures.

Dzud relief and information exchange model in the dzud condition are shown by a scheme. Local governments are responsible to collect the objective information on dzud situation and distribution of aid and items necessary for herders. Aids and donations by international and national organizations should be distributed by the local government to dzud affected households (Fig. 20).

2.1. Dzud condition, its intensity and possible losses will be forecasted. A system for delivering the information to herders needs to be established.

2.2. To come into agreement and coordinate the otor area and pastureland with other aimags and soums authorities, to restore and improve the otor roads and passages

- When a disaster is eminent, the local administration should consult with the neighboring administrative units on certain issues for the sake of protecting the livestock in aimag and soum territory, or when such a situation occurs to the neighboring areas

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to take all possible measures to help them.

- The Local administration conclude an agreement and make arrangement with other aimag, soum's administration about the otor pasture area, water supply, wells, wintering and springing places, sheds for animals, number of livestock pasturing, and households roaming, duration, and otor roads and passages.
- Herders should effectively implement decisions taken by the administration in time of disaster, otherwise both sides will encounter difficulties
- Herders should fulfill their obligations taken by the agreement to pasture their livestock in the allocated areas, use the wintering and springing places for the set time, to follow a set course to move to the allocated pasture. Herders should take care of the pastureland, water supply, sheds, and shelters as their own and hand them over to local administration or the owner intact.
- Principles to adhere in otor pasturing during the dzud:
  - Allocation of pasturelands by local administrations, or get pastures through acquaintance
  - Know the location and condition of place for otor before moving
  - Choose the pasture areas for otor which has similar climate and weather conditions to your own area
  - To reach the chosen otor place early in autumn
  - Not to overcrowd in one place causing "Tuurain dzud" to happen
  - To protect and keep clean the wintering and springing places from cold
  - To follow strictly the regime for additional forage and watering

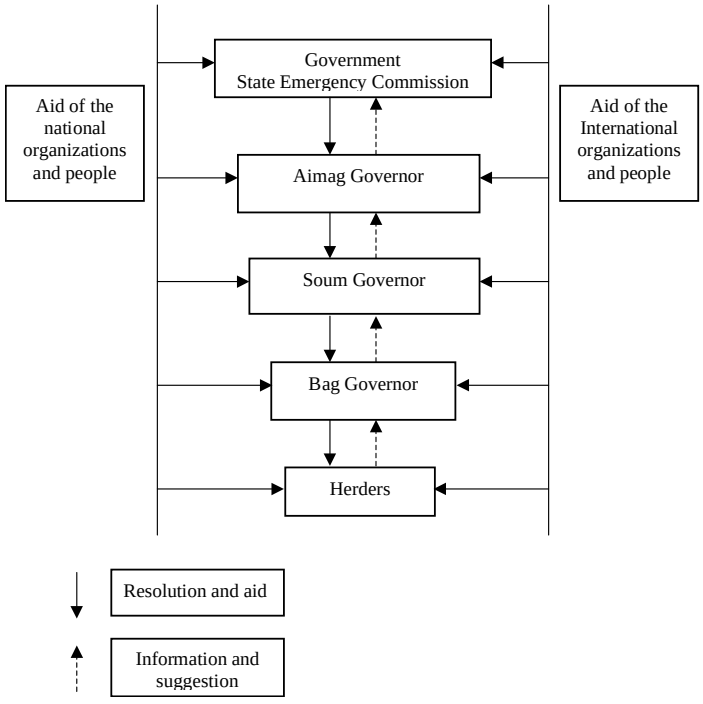

Figure 20. Dzud relief and information network

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- When make decision on giving out some pasture for herders that had been subjected to dzud, the locals should remember that dzud might come around their household and they would face same problem to search for places to pasture their animals.

2.3. Improvement and management of water supply in otor area

- It is important to solve the water supply issue with a special care as the water deficit causes the decrease of pasture capacity, which can lead to “kharyn dzud” and “tuurain dzud” occurrence. When that happens the pastures degrade because of overgrazing and that area becomes a core of desertification, and pasture conditions in these areas would not recover for years.
- After having used, turn the wells over to the local administration of the owners.

2.4. Form local and central reserves of forage funds

- Forage and fodder making and preparation should be completed by November
- As the present system of preparing forage and fodder from the state budget is not bringing the desired results, the local administrations should release financial source using their own potentials and capabilities. During the disasters forage and fodder prices go up, thus putting additional strain on the state budget or the herders that loan or buy forage at those prices, which should be prevented from happening.

2.5 To advertise experiences and skills and techniques for looking after and feeding the animals in conditions of dzud

- To protect livestock, wintering places and shelters from snowstorms, to keep the places dry and feed animals with additional food, such as strong tea, bone soup to strengthen them. To educate and inform young herders about experiences and skills to look after the animals through organizing civil defense training courses and public media.

2.6 To provide medical and veterinary services

- To plan and implement additional measures for organizing a medical and veterinary services in otor area
- To increase production of substitute products for milk, medication and bio-preparations for weak animals

2.7 To take measures for provision of herders roaming for pastures with necessary public services

2.8 To receive, combine and assess the dzud damage and loss information

- It is important to pay a special attention to collecting objective information at different levels as such information would facilitate the organization of emergency relief and dzud combating measures. It is necessary to set information indices and form for disaster damage and losses.

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- Do not forget that objective information on dzud losses would help to take effective measure to combat disaster.

2.9 To mobilize and use economically the existing and newly acquired resources and to utilize foreign aid for designed purpose.

AFTER DZUD CONDITIONS OR MITIGATION OF DZUD LOSSES

The herders' household, whose income has gone lower than the set minimum due to dzud, will be restocked or will be given credit with no interest rate.

The life experience showed that the present system of giving loans and assistance to all herders without differentiating the level of their losses has its negative impact. In terms of mitigating the damages of dzud, the restocking of herders, who suffered to the extent of having their income lower than the assured living minimum, is the most efficient way. It is indicated in the new government's program that the restocking will be implemented as a loan without interest

- If it is decided to take animals(instead of cash) for livestock tax in spring, then it would be possible to buy animals from herders at prices much cheaper than the autumn market rates and give to other herders for restocking.
- Loan and assistance for dzud damages mitigation for herders with the minimum living standards can be set differently for different areas.

3.1 To consider the herders' request for dzud mitigation assistance and decide the amount of help needed.

- It is a responsibility of that particular administrative unit to resolve the issue of restocking (type of animals, structure of the herd, number etc.) taking due consideration of requests made by herders, whose income has gone lower than the set minimum living standard. The administrative policy should be directed to provide assistance, loans, and other sources for restocking of the households that have been subjected to dzud.
- Herders, whose income has gone lower than the set minimum living standard, because of their own fault, or because of the conditions of nature that could not have been overcome, should not wait for a hand out from the state, but try and use own resources as possible.

3.2 Plan and submit proposals at appropriate levels (baga, soum, aimag, state) the financial resources for restocking and ways of its implementation

- To organize meetings on restocking of the households that have suffered in dzud conditions at citizens' and administrative levels and the decisions could be submitted to the organizations concerned for implementation.

3.3 Loans and assistance for restocking should be based on agreements and be implemented under the public supervision.

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- When the issue of finding for restocking is solved it would be necessary to conclude an agreement, including certain conditions that are reflected in the law, with herder, requesting the assistance. Providing assistance proved to be a difficult task and therefore the public monitoring and supervision is essential .

3.4 Annual implementation assessment of the agreement

- When restocking households using the “Hard stock” principle to calculate income needs of the receiving households to determine the duration and number of livestock to be returned back, considering that the number of livestock on the completion of the agreement should equal the number of the “Hard stock”. The agreement implementation results should be assessed on annual basis.