



Disaster risk reduction in Mongolia



Information Research Institute of Meteorology,
Hydrology and Environmental

N.Baljinnyam
Jaipur , India
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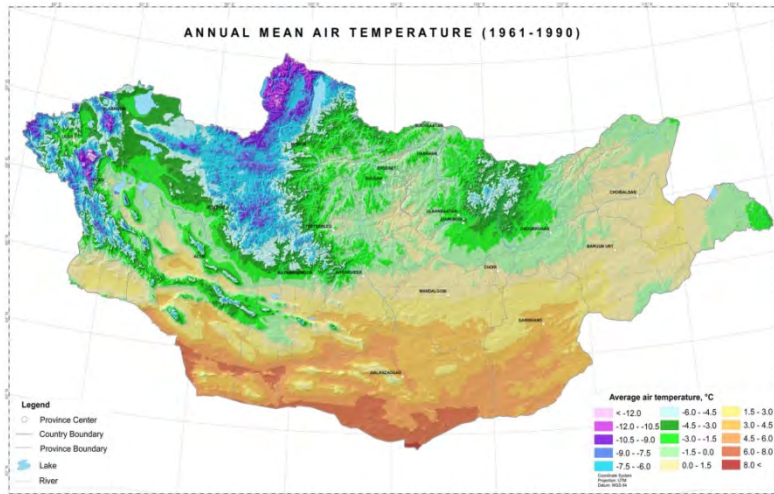


Outline

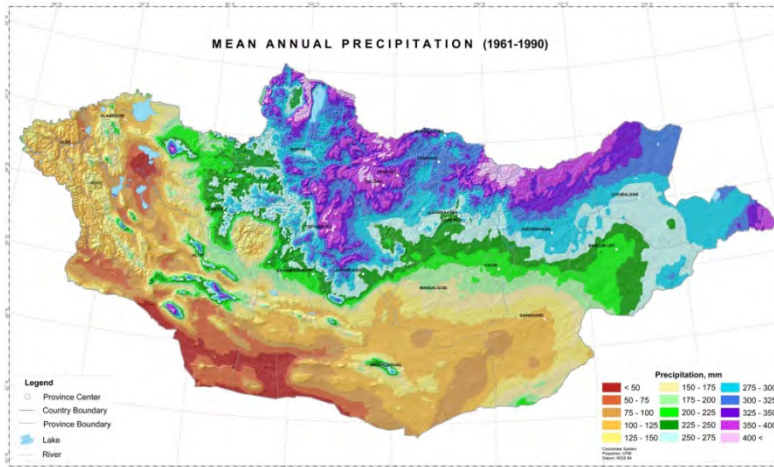
- ☐ Climate regime of Mongolia
- ☐ Present Climate change
- ☐ Climate Extreme /heat wave and cold event/
- ☐ Desertification and land degradation
- ☐ Natural disasters
- ☐ Reduction actions



Climate regime of Mongolia:



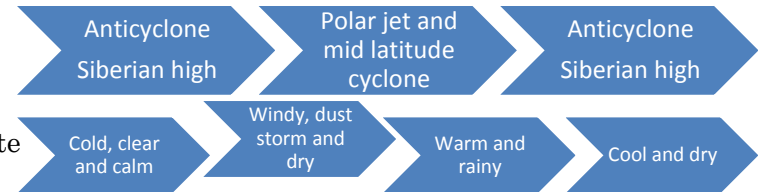
Annual mean temperature , 1961-1990



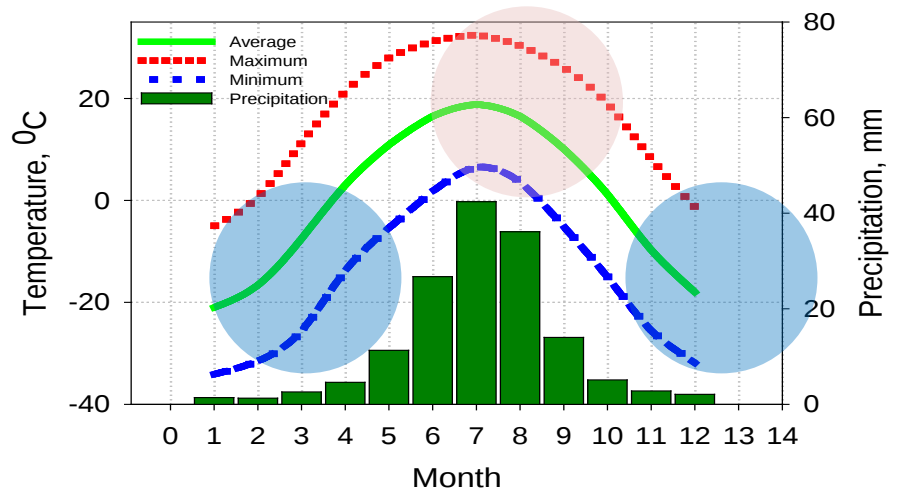
Annual precipitation amount , 1961-1990

- o Mongolia has harsh continental climate due to its geographic location in the central Eurasian continent, landlocked; surrounded by high mountain with an average of 1.5km.
- o Generally climate is dry and cold continental which is consisted of semi arid and desert.
- o Annual mean temperature varies from 8 to -10°C.
- o Precipitation falls from 50 to 500mm in year

General circulation



Weather, Climate

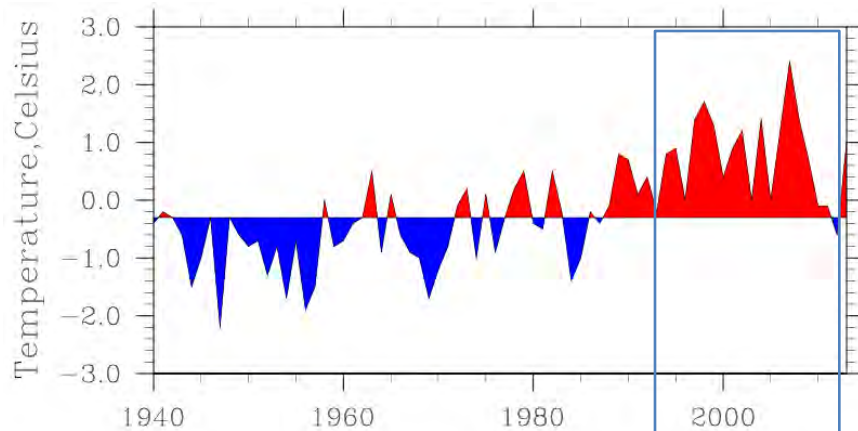


Source: Climate section, IRIMHE

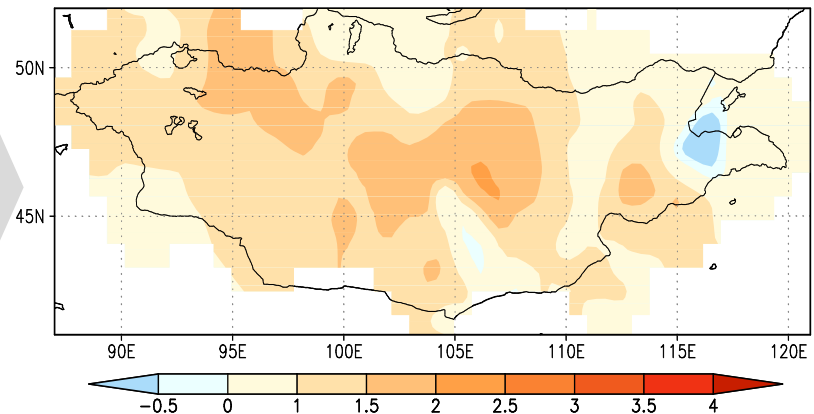


Present climate change: Present change, 1940-2015

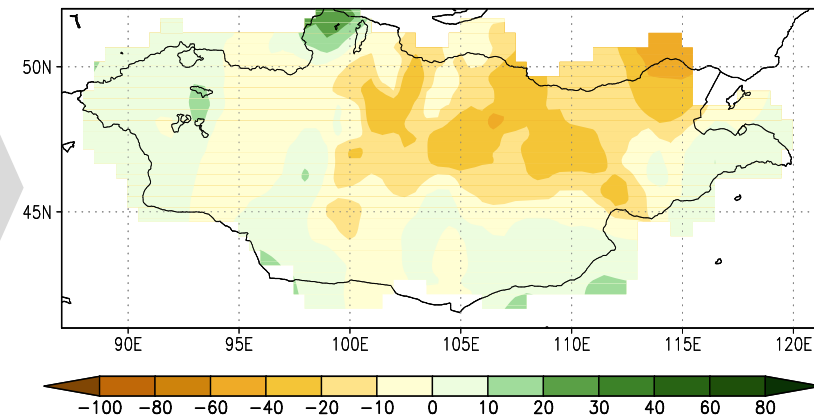
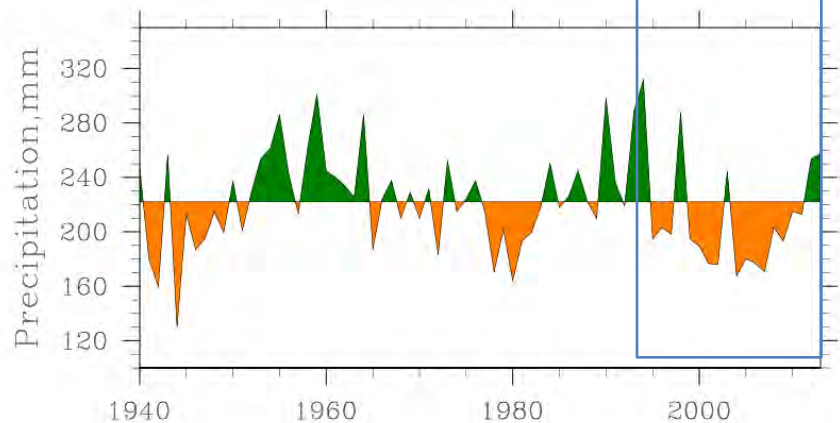
Annual mean temperature including 40 meteorological stations



Spatial pattern



Annual precipitation including 40 meteorological stations



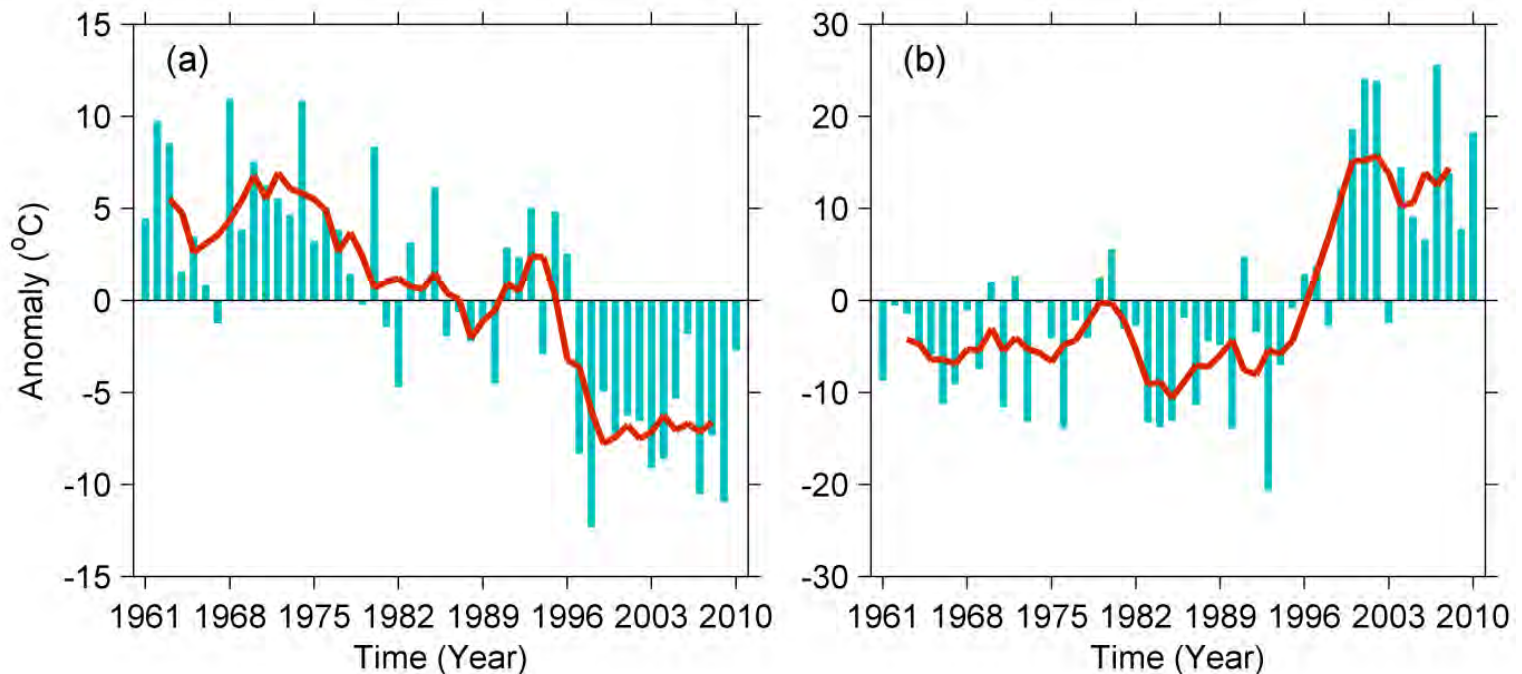
- Annual mean temperature is increased by 2.1 °C (+2.6 °C in winter and +1.4 °C in summer)
- Annual precipitation is decreased by 10% (+24% in winter and -7% in summer)
- Convective precipitation is getting more dominant

/P. Gomboluudev, 2015/



Climate extreme

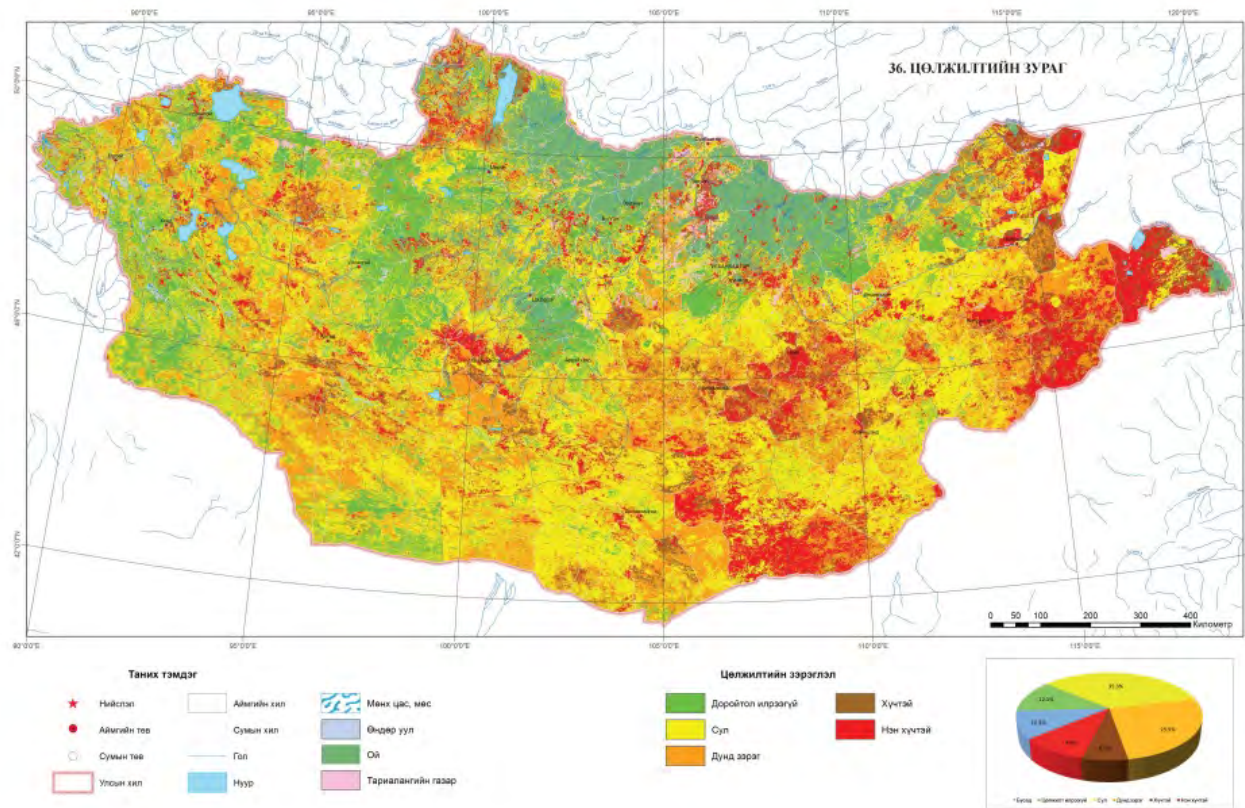
- The lowest absolute temperature was -55.3°C (Dec 1976 in Zuungobi,Uvs)
- The highest absolute temperature was 44°C (24 July 1999 in Darkhan-Uul)
- The largest daily precipitation was 138mm (5 August 1956 in Dalanzadgad)



Anomalies of the country –averaged annual (a) frost days (FD0), (b) summer days (SU25) over Mongolia, 1961-2010. Anomalies are relative to 1971-2000 mean values. The red curves are 5-years running means.



Desertification of Mongolia



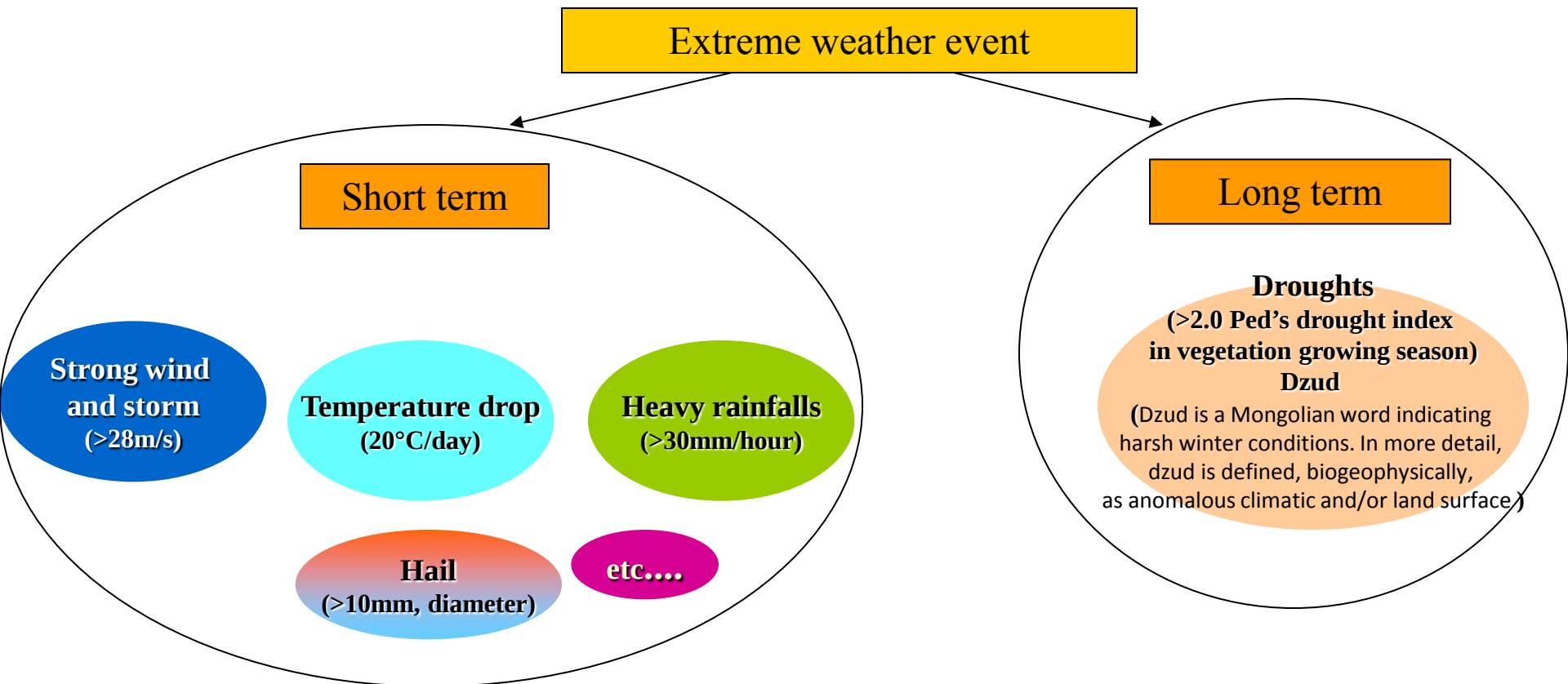
Land degradation and desertification in Mongolia for 2010

As result of this reasearch it was reported that 77.8 % of total territory by degradation, of which 35.3% was defined as slightly degraded, 6.7% severely degraded and 9.9% extremely degraded.[MARCC-2014]



Extreme weather events in Mongolia

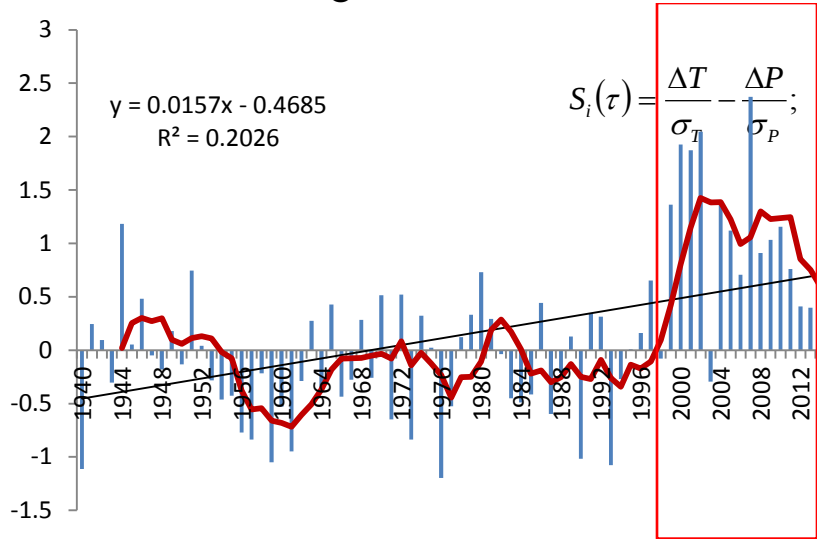
Extreme weather events (EWE) are special type of natural disasters caused by atmospheric phenomena such as windstorms, drought, dzud, heavy rainfall, flood, and heavy snow etc.





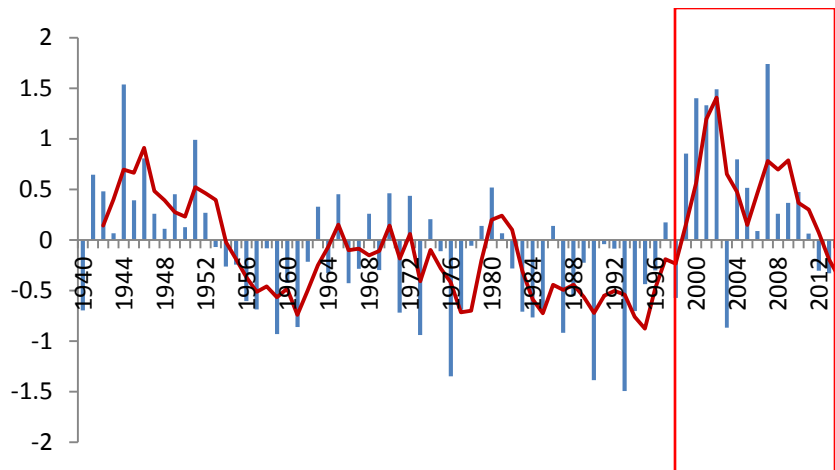
The main climate disasters are drought and zud in terms of pastoral livestock in Mongolia

Trend of Drought index



Year of 1940-2002 $S_{\text{sum}} : \Delta N, R = 0.54$

Distance from trendline (drought index)

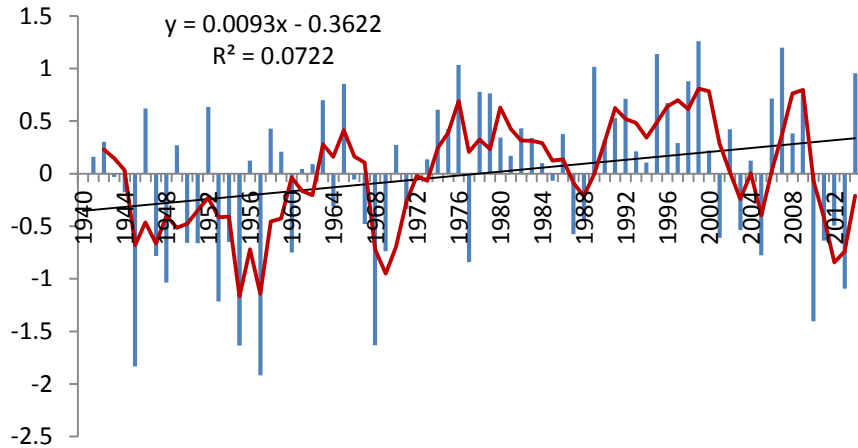


Year 1940-2002 $S_{\text{sum nor}} : \Delta N, R = 0.69$

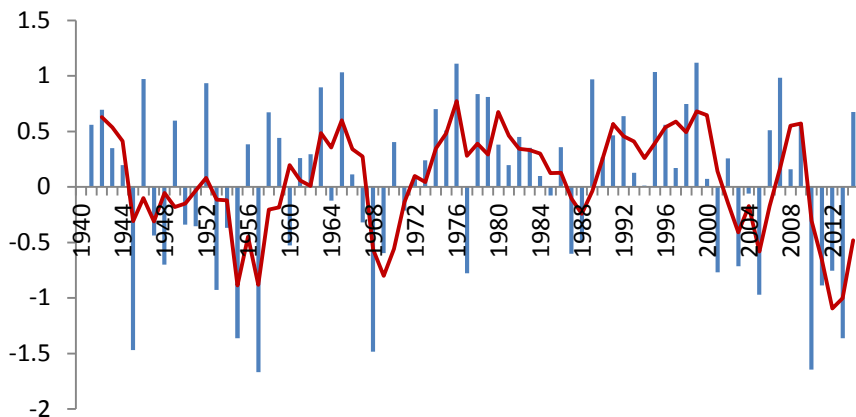
Year 1940-2013 $S_{\text{sum nor}} : \Delta N, R = 0.52$

The main climate disasters are drought and zud in terms of pastoral livestock in Mongolia

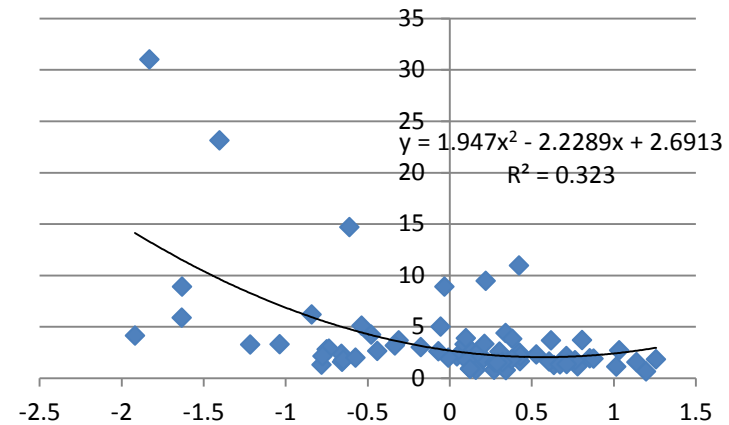
Winter index



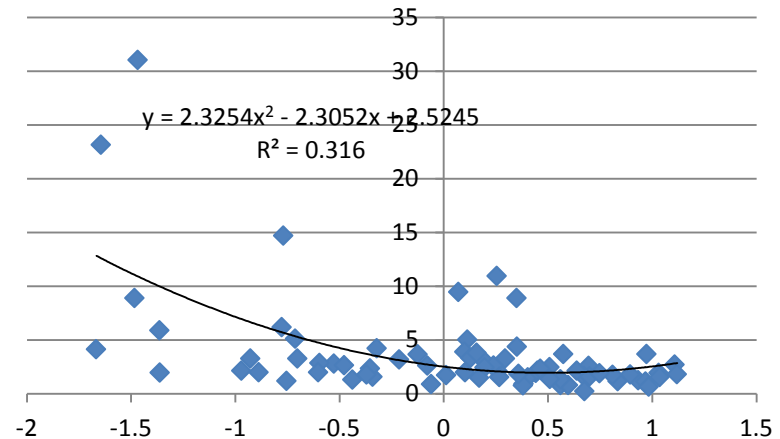
Distance from trendline (winter index)



1940-1941 to 2009-2010, S_{win} , ΔN , $R = 0.57$
 From 1940-1941 to 2013-2014 oH, S_{win} , ΔN , $R = 0.55$

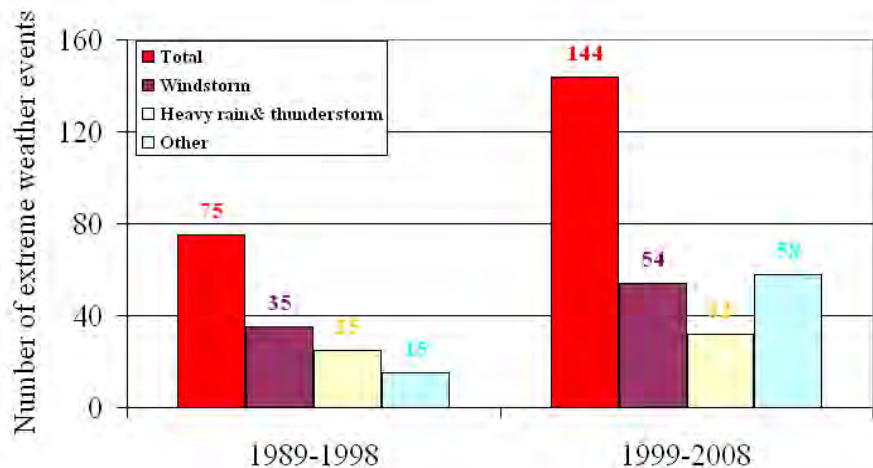


From 1940-1941 to 2009-2010 oH, S_{win} , ΔN , $R = 0.62$
 From 1940-1941 to 2013-2014 oH, S_{win} , ΔN , $R = 0.56$

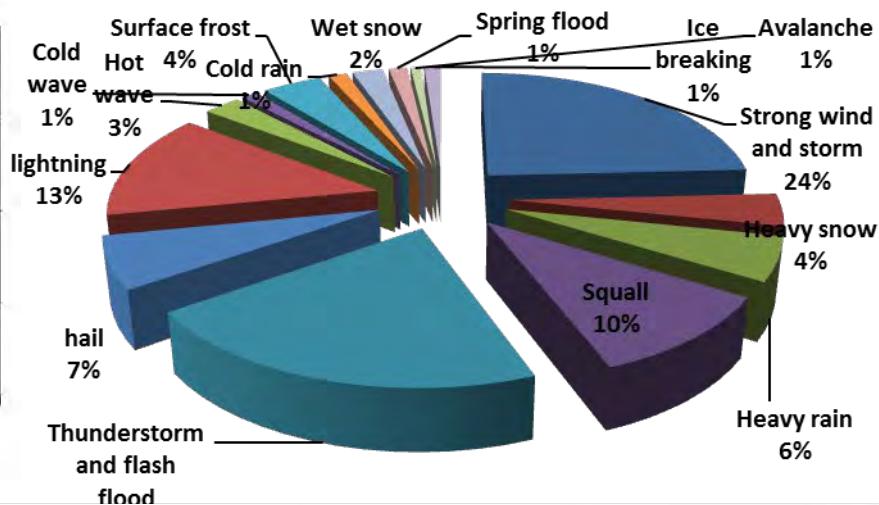




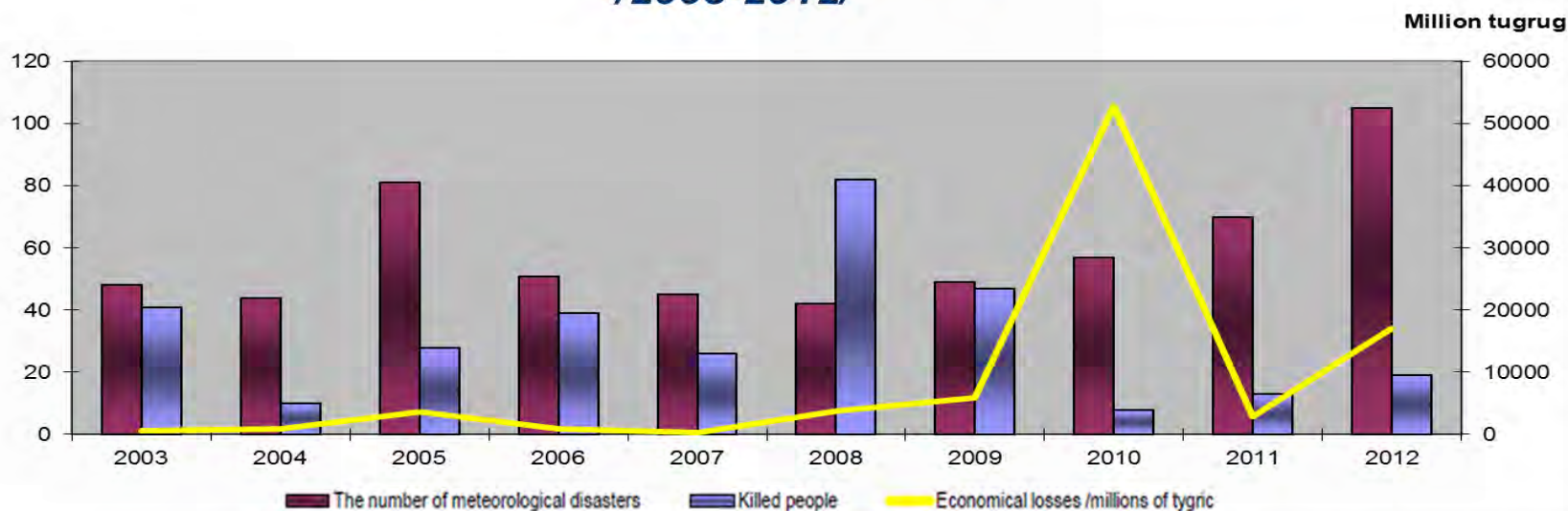
Frequency of all EWE in the last two decades



The percentage of type of extreme weather events



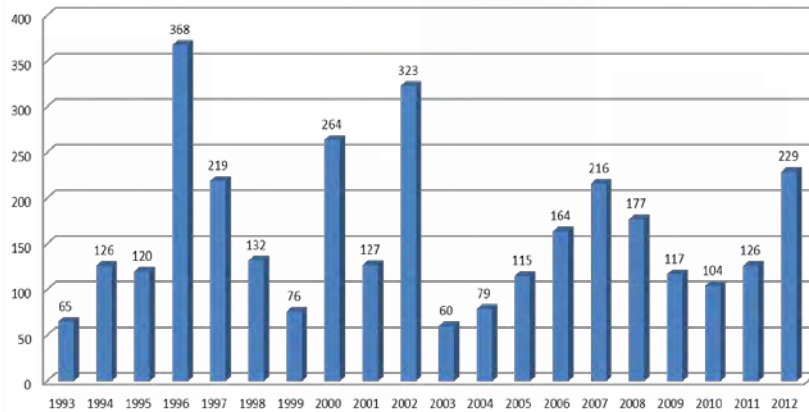
Losses of meteorological and hydrological disasters /2003-2012/



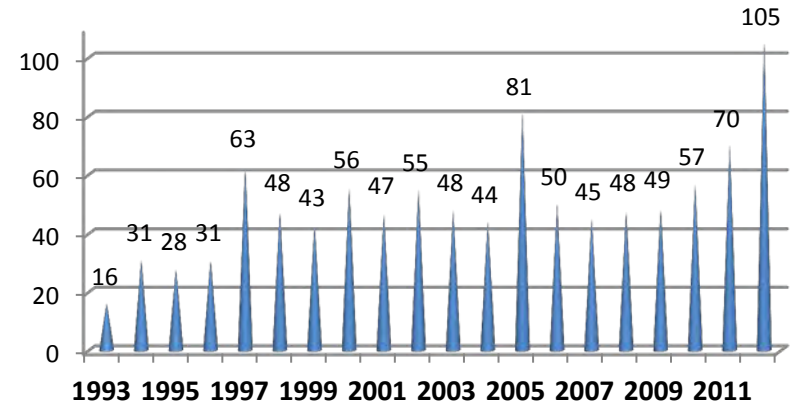
Source: M.Doljinsuren,2014



The frequency of forest and wildfire



The number of Meteorological and



The sever thunderstorm with hail events reported on 4 July 2013 in Tushig sum Of Selenge province. During heavy rainfall, 61.3 mm of rain fell within one hour and half. This convective related extreme event caused \$250.000 losses.



Disaster risk reduction

Our organization has taken the following action to reduce the risk of natural disasters:

- ❑ Forecasting disaster events
- ❑ Warning alert
- ❑ Early warning system
- ❑ Weather Modification
- ❑ Climate project and research

Weather Modification Services



Weather Modification Center
“Khuryn Shim” was established
in 1991.

Purposes:

- ✓to protect agricultural crops from hail,
- ✓to increase precipitation amount,
- ✓to distinguish forest and steppe fire,
- ✓to support environmental conditions as weather modification.

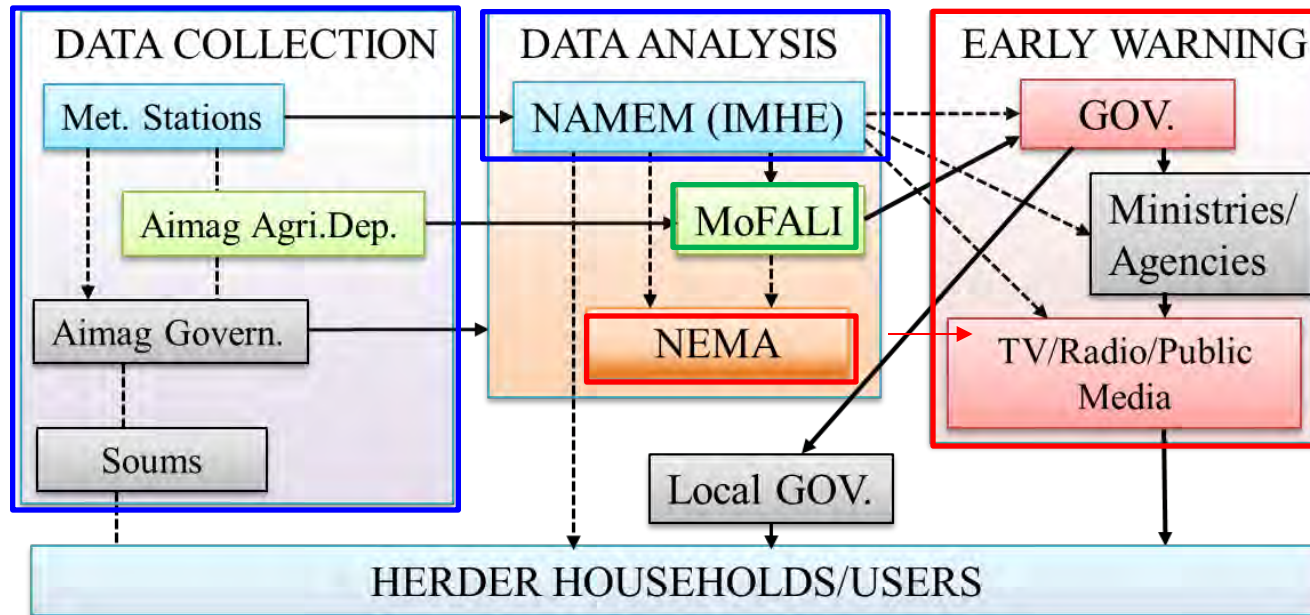


Weather modification
expedition: 35,
Land generator: 10+6



Mongolian institutions take part to the preparation of winter, and to the dissemination of early warning messages

Structure of Early Warning



- Drought
- Pasture carrying capacity
- Prediction of possible dzud

Field of livestock (as assigning amounts of hay/fodder to be prepared by local authorities)

In case of a forthcoming dzud, NEMA (National Emergency Management Agency): Responsible for the dissemination of early warning messages



Thank you for you attention