Resilience in Mongolian rangelands

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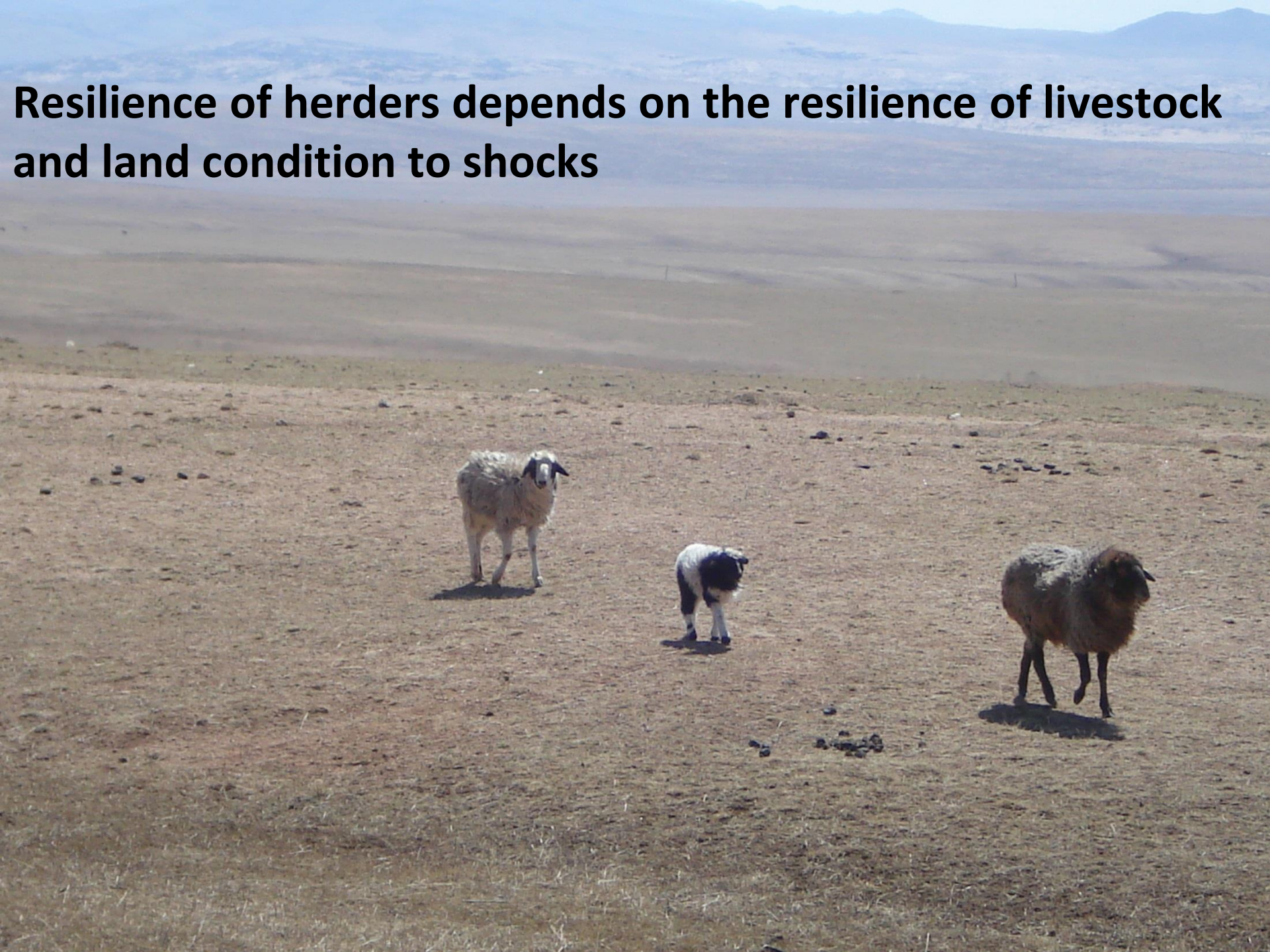
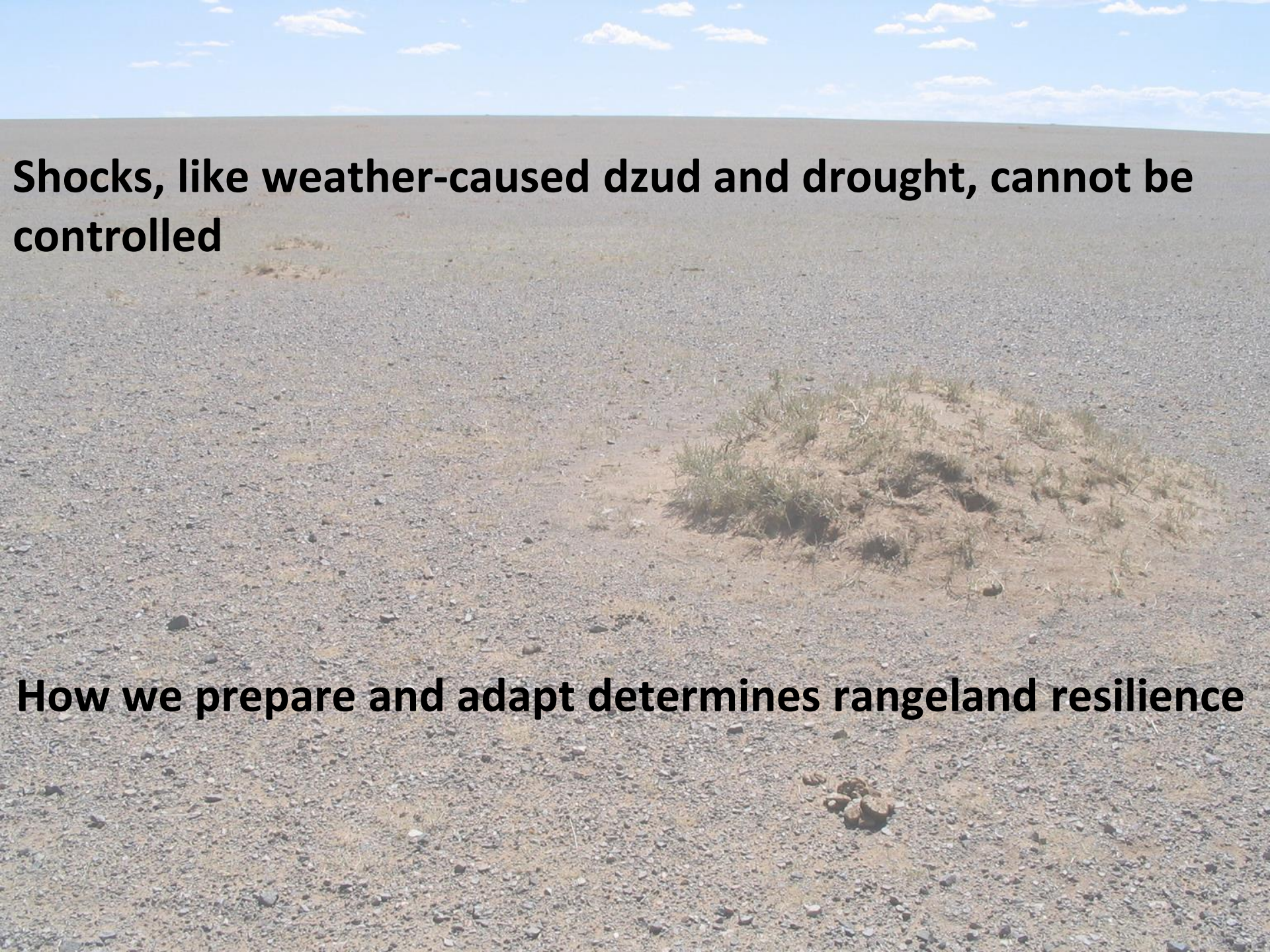
Resilience is the capacity of a system to tolerate shocks
and not change to different state

Resilience of herders depends on the resilience of livestock and land condition to shocks




Shocks, like weather-caused dzud and drought, cannot be controlled
How we prepare and adapt determines rangeland resilience

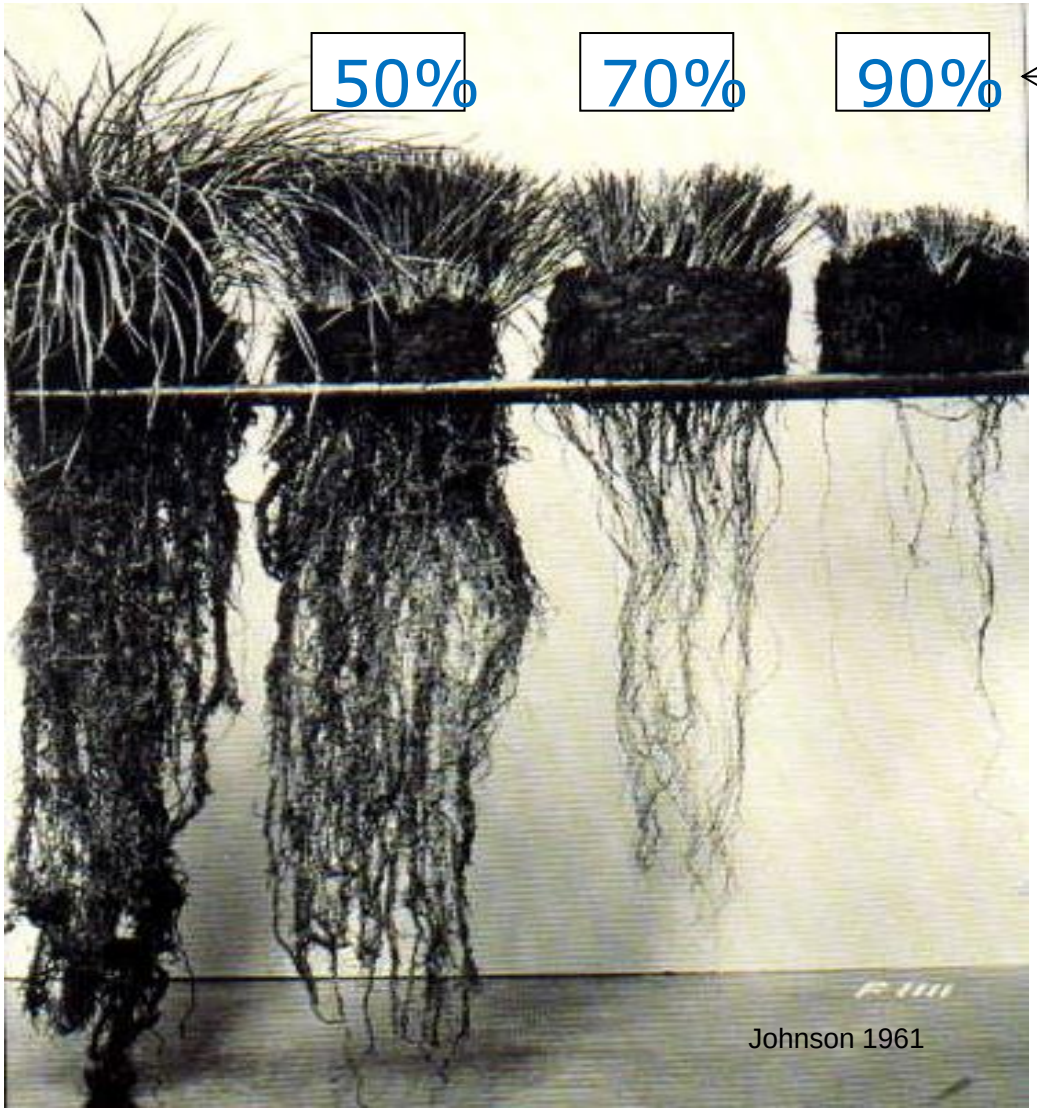

A healthy grassland state in the southwestern United States


A degraded grassland state
About two thirds of our grasslands have been degraded


Dominant grasses were lost due to overgrazing during multi-year droughts

How did this happen?

Repeated heavy defoliation reduces root mass over time



Level of Removal

Percent leaf volume removed	Percent root growth stopped
10%	0%
20%	0%
30%	0%
40%	0%
50%	2-4%
60%	50%
70%	78%
80%	100%
90%	100%

Reduced root mass can lead to reductions in soil organic matter inputs and water and nutrient retention in the soil

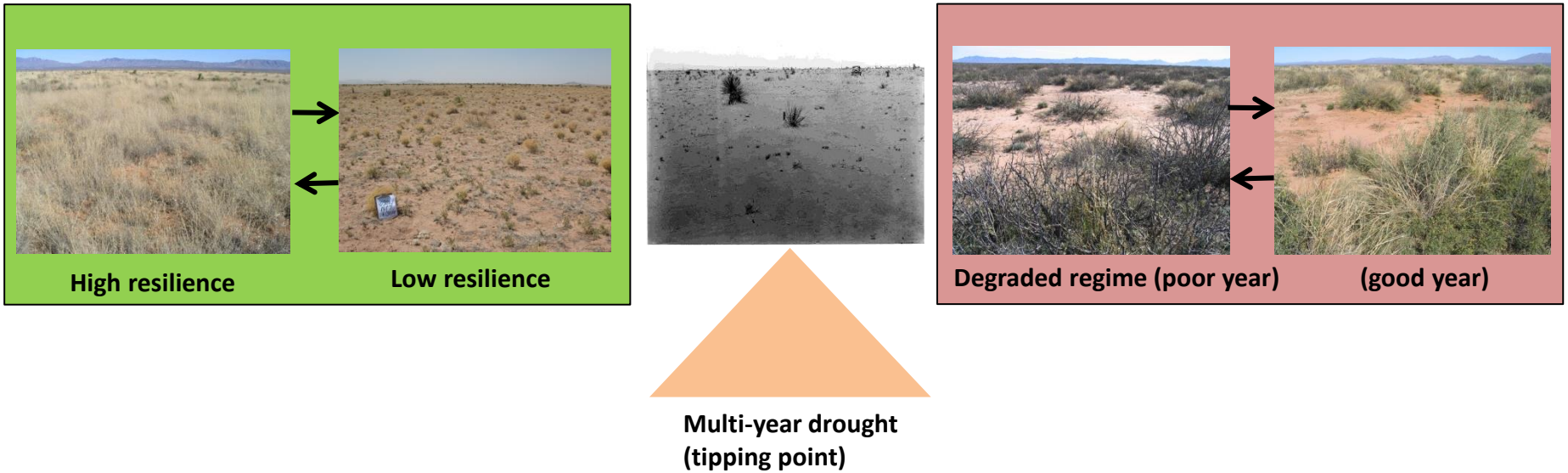
Grazing with rest periods

Continuous heavy grazing

Stan Boltz, NRCS,, South Dakota

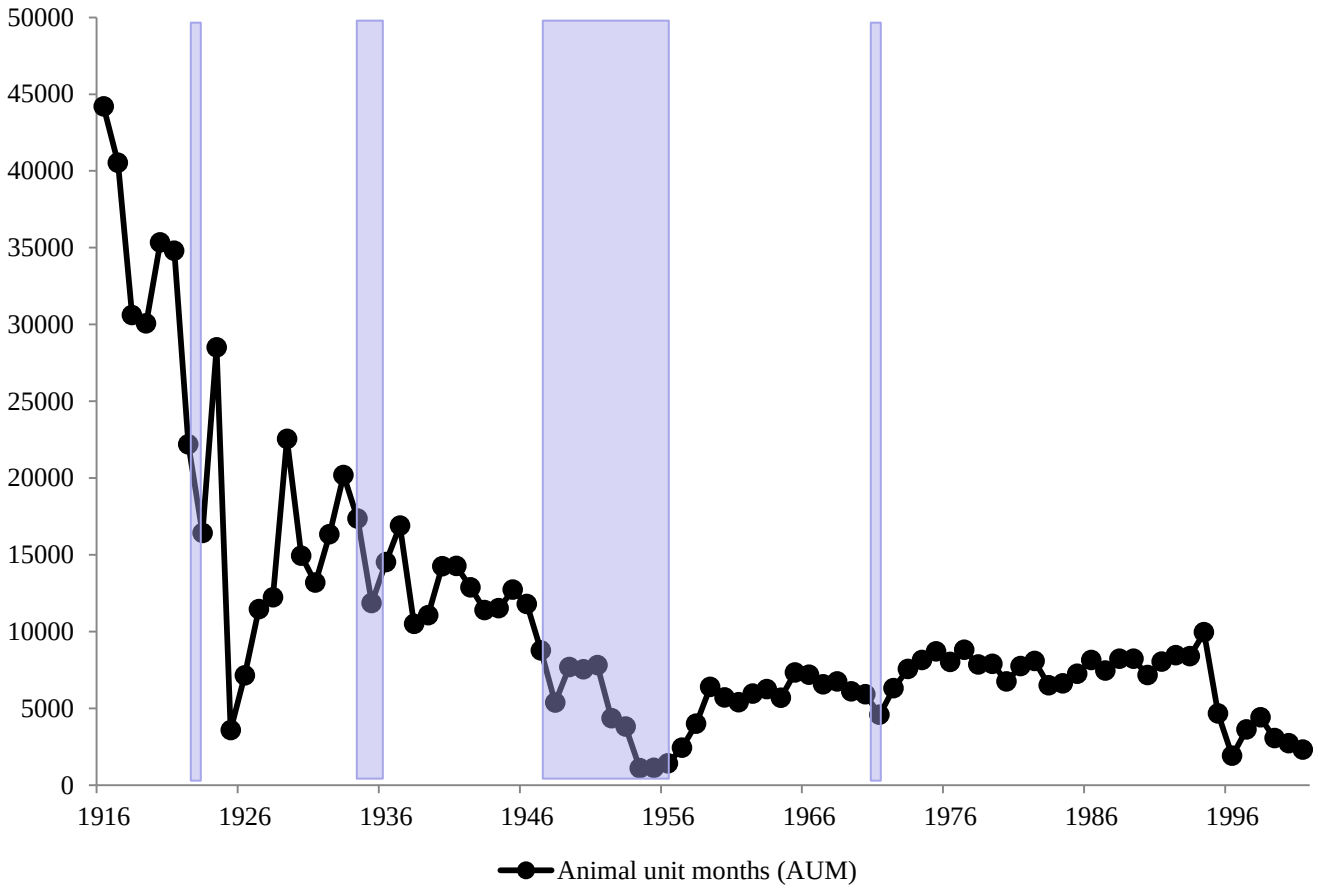
Reduced production and cover leads to greater water loss and erosion

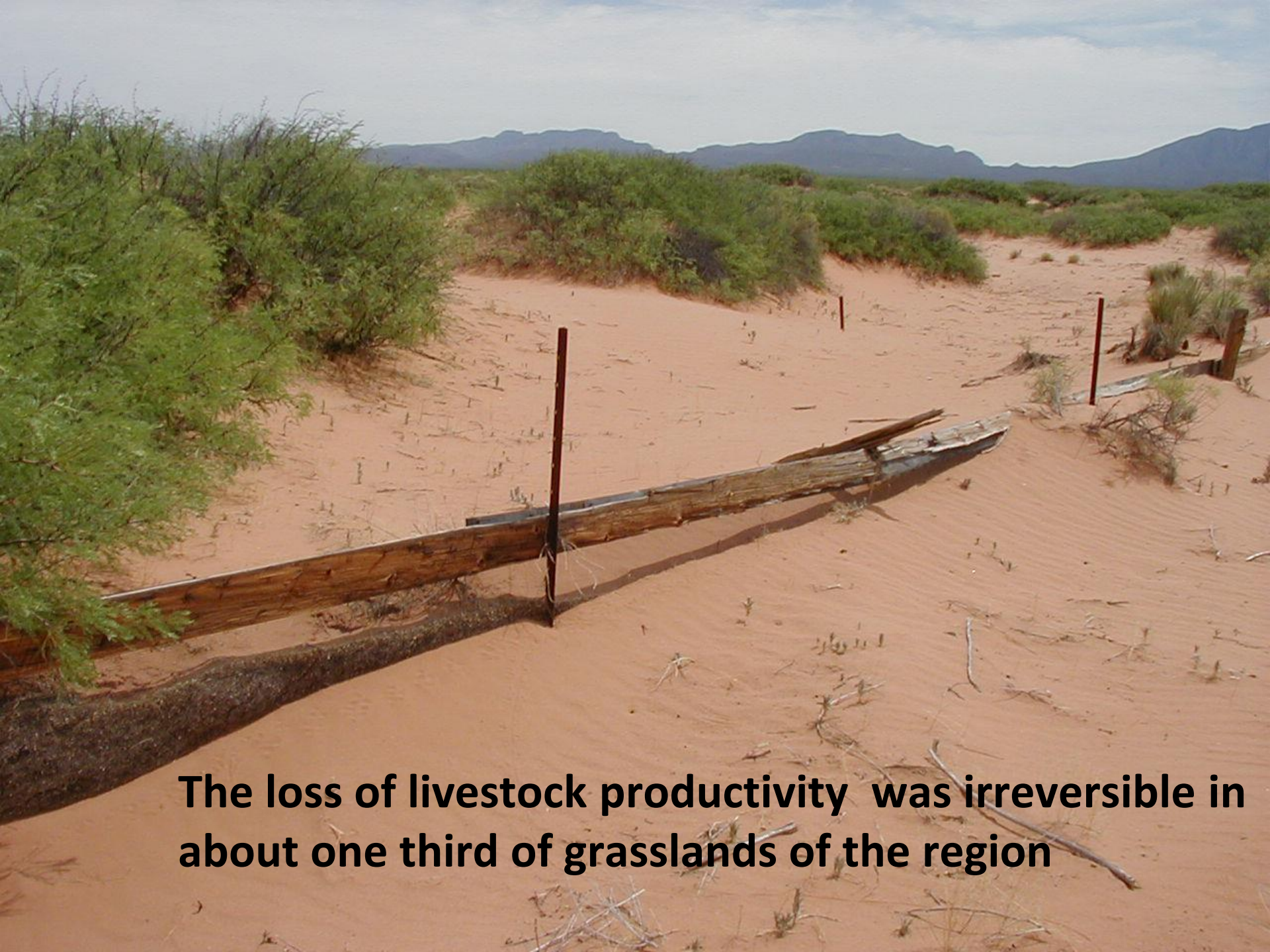
Especially during drought, weakened grasses die and unpalatable plants take their place



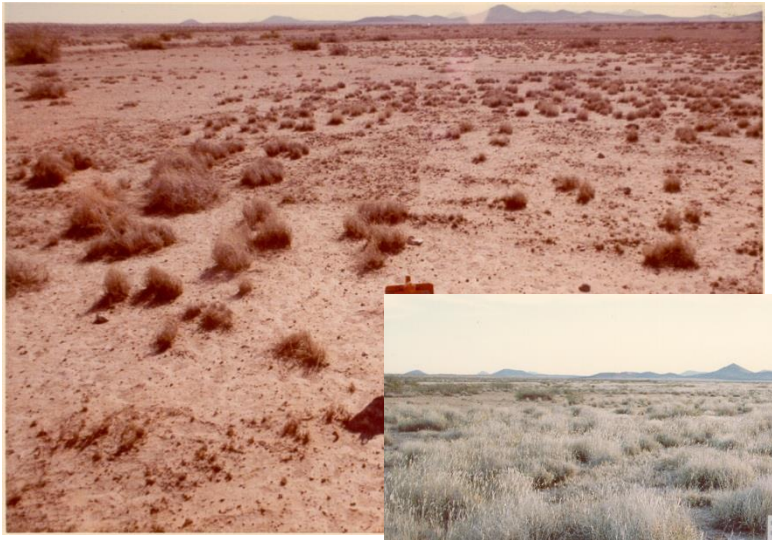
After the transition, the good years are not as good

On our research station, livestock numbers started very high in 1916, adjusting downward with successive droughts and degradation, and a realization of natural limits




The loss of livestock productivity was irreversible in
about one third of grasslands of the region

But many grasslands have improved, even through drought

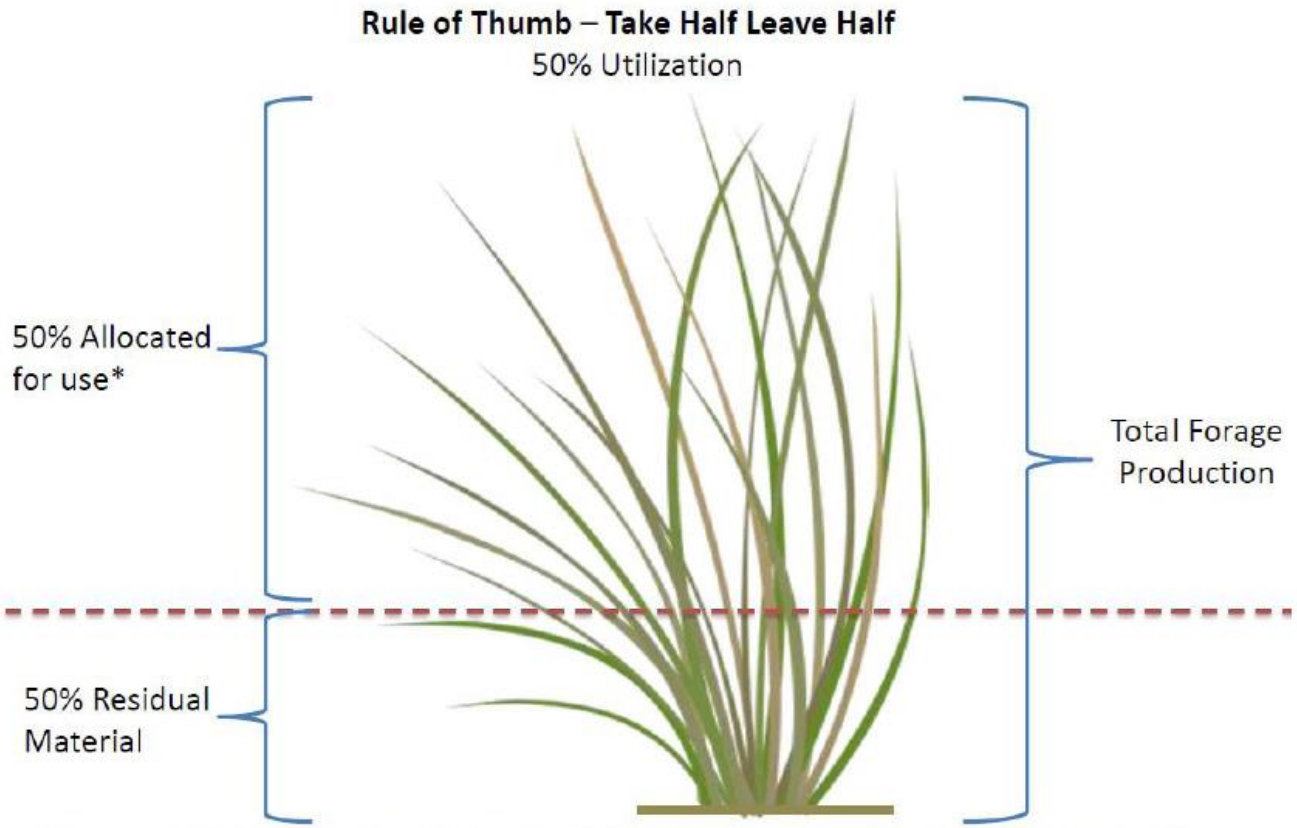


1970

1990

2014

How did we do this?



*Because of the lower parts of the plant are heavier than the upper parts, 50% of the weight equates to more than 50% of the plant height.

Set conservative stocking rates that allow for plant survival, reproduction, and recovery

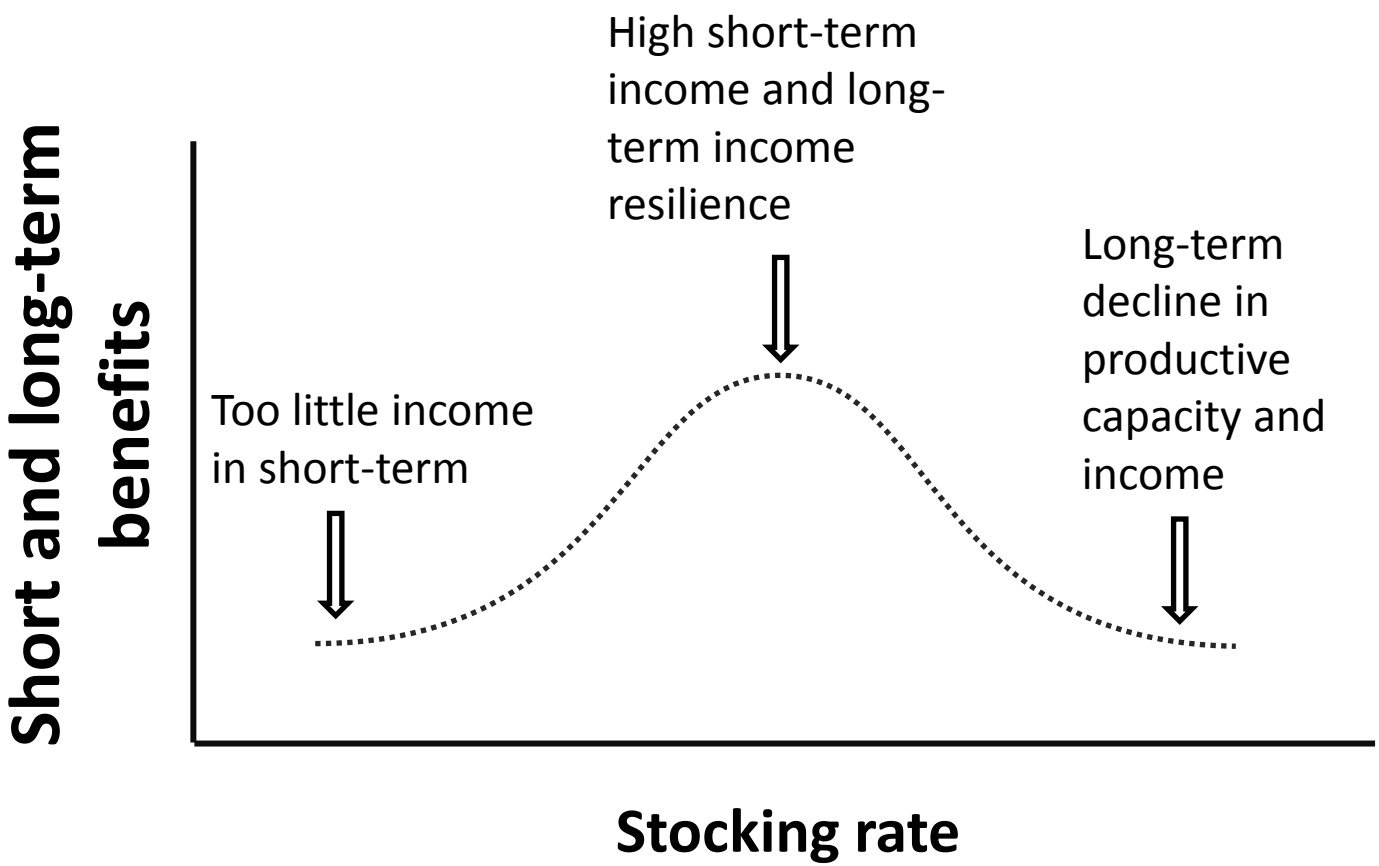
Benefits of conservative stocking matched to ecological site

- Improved forage quality and quantity
- Improved forage production in drought
- Increased livestock weight gain rate
- Improved animal condition going into dzud
- Improved soil quality
- Potential benefits for biodiversity

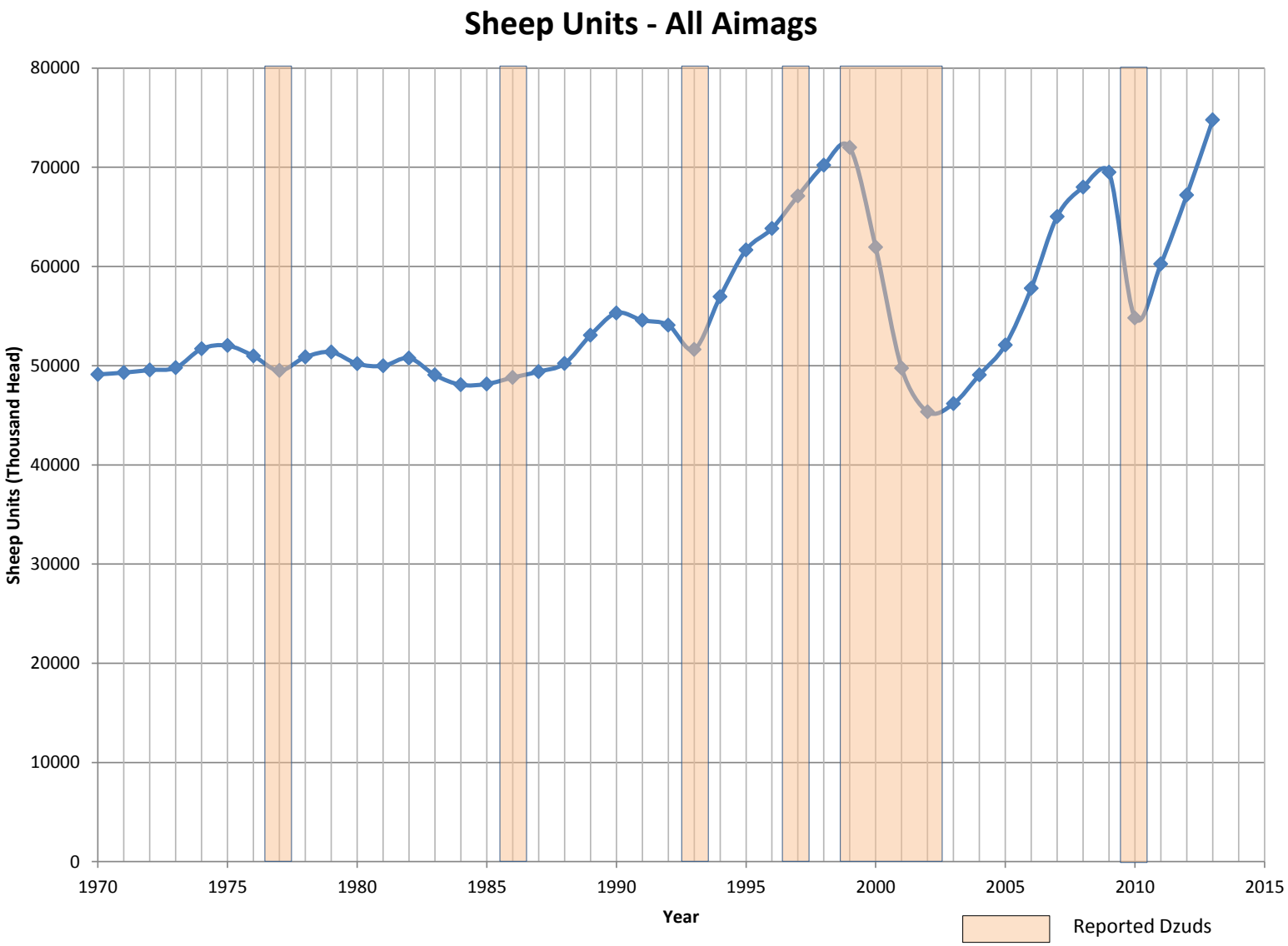
How was this supported by government?

- Set stocking rates on public land, ecological site descriptions, and monitor rangeland health
- Provide support for infrastructure to improve livestock distribution, disaster assistance, restoration
- Extension to work with ranchers in developing plans
- University training
- Professional development organizations (Society for Range Management)

Resilience requires a balance of short-term and long-term goals



Will Mongolian rangelands be resilient?



Courtesy Jay Angerer

Persistent degradation is occurring

Most changes in vegetation due to overgrazing can eventually be reversed with changes to grazing management and policy

1984 kg/ha—35% cover *Stipa krylovi*

Yearly, heavy summer grazing

Deferment and reduced stocking rates

1199 kg/ha—6% *Stipa krylovi*

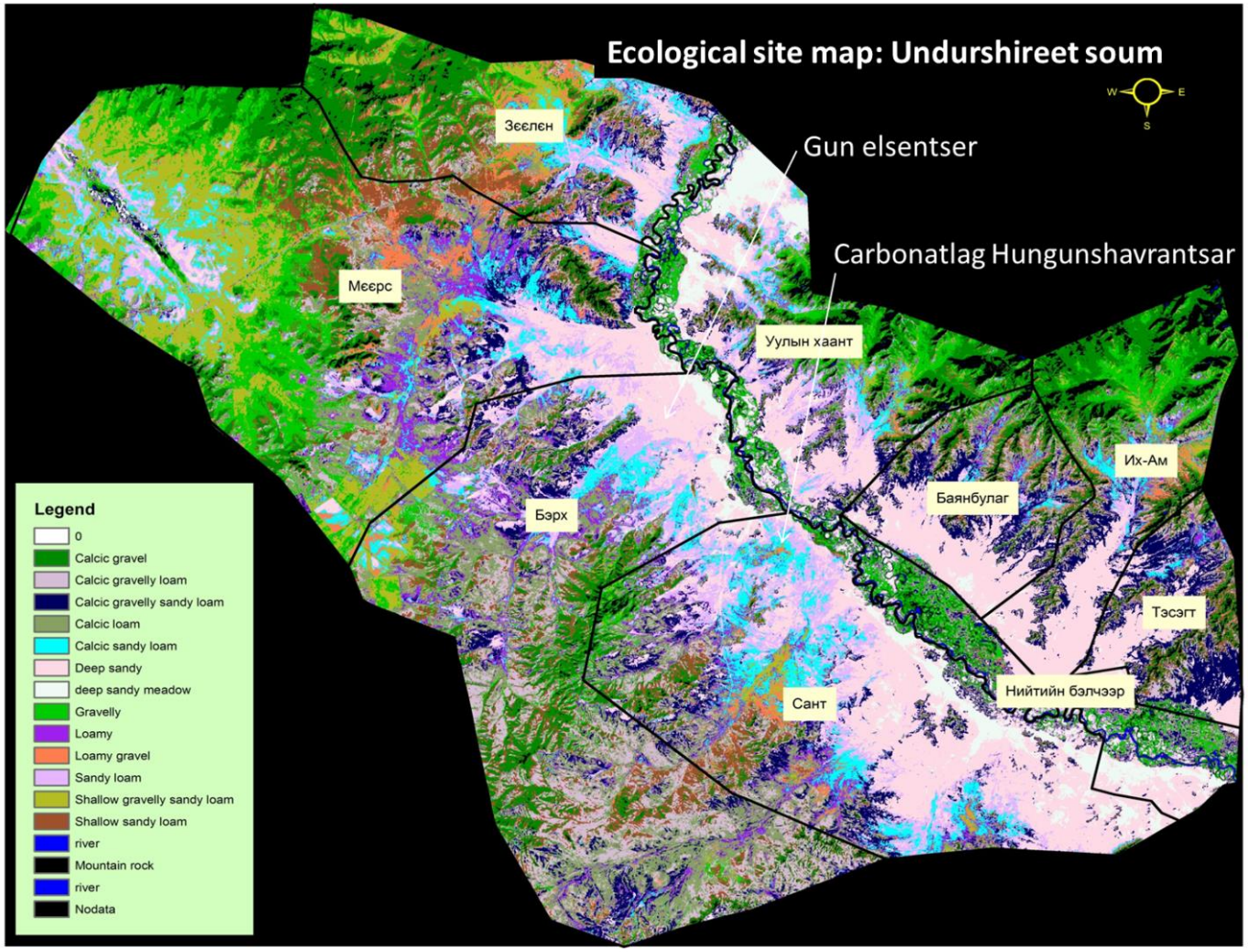
Heavy grazing

Decadal recovery, deferment with greatly reduced stocking rates

494 kg/ha—0% *Stipa krylovi* (mostly Carex)

The capacity to interpret rangeland health and monitor change exists

The technology to assist planning exists



The concern for the future and interest in management change exists

Evidence for the benefits of change exists

The next steps are up to you, let’s talk about them

A national report on rangeland conditions and management strategies

- NAMEM, ALAGCAC, NUM, MSUA
- Extensive field inventory dataset will be shared after publication of report
- National and international literature review and local experience
- New concepts for interpreting rangeland conditions adapted from international approaches
- Welcome feedback on interpretations and recommendations