

Interdisciplinary Data Management: An Example from NSF's Dynamics of Coupled Natural and Human Systems Program

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with

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Dimensions of Natural Resources; Niah Venable,
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Dimensions of Natural Resources

Ontology

- Webster's
 - *“science of being, of the real nature of things”*
- Antoniou and Van Harmelen (2004)
 - *“tool for defining a shared conceptual schema”*
 - *“consist of a finite list of concepts”*
 - *“relationship between these concepts”*
- Janssen *et al.* (2009 Env Sci and Policy)
 - Shared concept, common understanding from different disciplines, relationship to other concepts

Our Project – the Players

- Maria Fernandez-Gimenez (Range Science)
 - 18 years social/ecological research in Mongolia
- Melinda Laituri (Watershed Science/NREL)
 - GIS expert focusing on physical/social interactions and the influence of boundaries
- Jessica Thompson (Human Dimensions)
 - Understanding the group dynamics of interdisciplinary problem solving
- Steven Fassnacht (Watershed Science)
 - Hydrology, climate change, hydrological modeling

Our Project – the Players (*cont'd*)

- Robin Reid (Center for Collaborative Conservation)
 - Ecology, working with herder groups in Africa
- Jay Angerer (Range Science, TAMU)
 - Remote sensing of ecological change
- Batbuyan Batjav (Institute of Geography, MN)
 - Social/Ecological research on nomadic peoples
- Batkhishig Baival (CSU/Green Gold, MN)
- Various other collaborators / advisors

Our Project – History

- 5-day Workshop in Mongolia, June 2008
- > 100 Mongolian scientists, herders, policy makers, NGO representatives and donors
- role of CRNRM, improve herders' livelihoods, support sustainable use of Mongolian grasslands

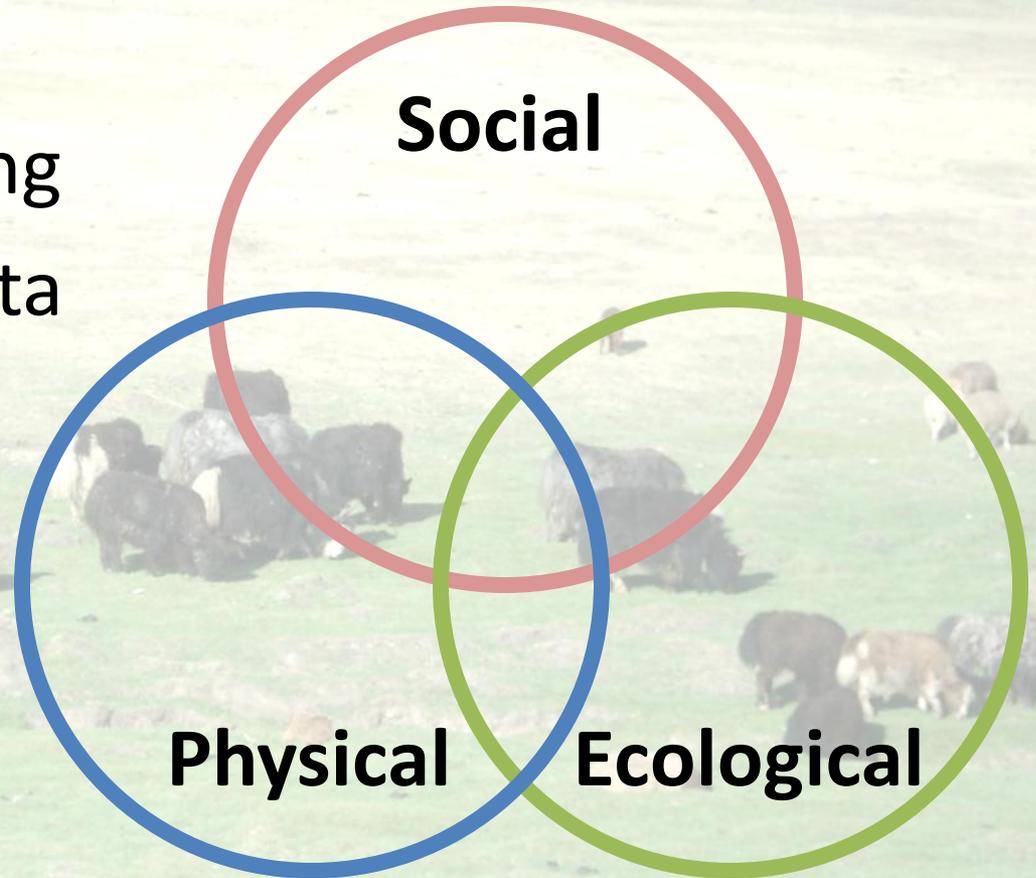


Our Project – History (*cont'd*)

- 2 Workshops in Beijing (April 2009, March 2010)
 - Poverty, Vulnerability and Resilience in North Asian Rangelands: Case Studies of Community-based Rangeland Management in China and Mongolia
- NSF CNH proposal (funded 2010)
 - Does Community-Based Rangeland Ecosystem Management Increase Coupled Systems' Resilience to Climate Change in Mongolia?

Data Requirements – Our Project

- Social Surveys
- Biological Sampling
- Hydro-climate Data



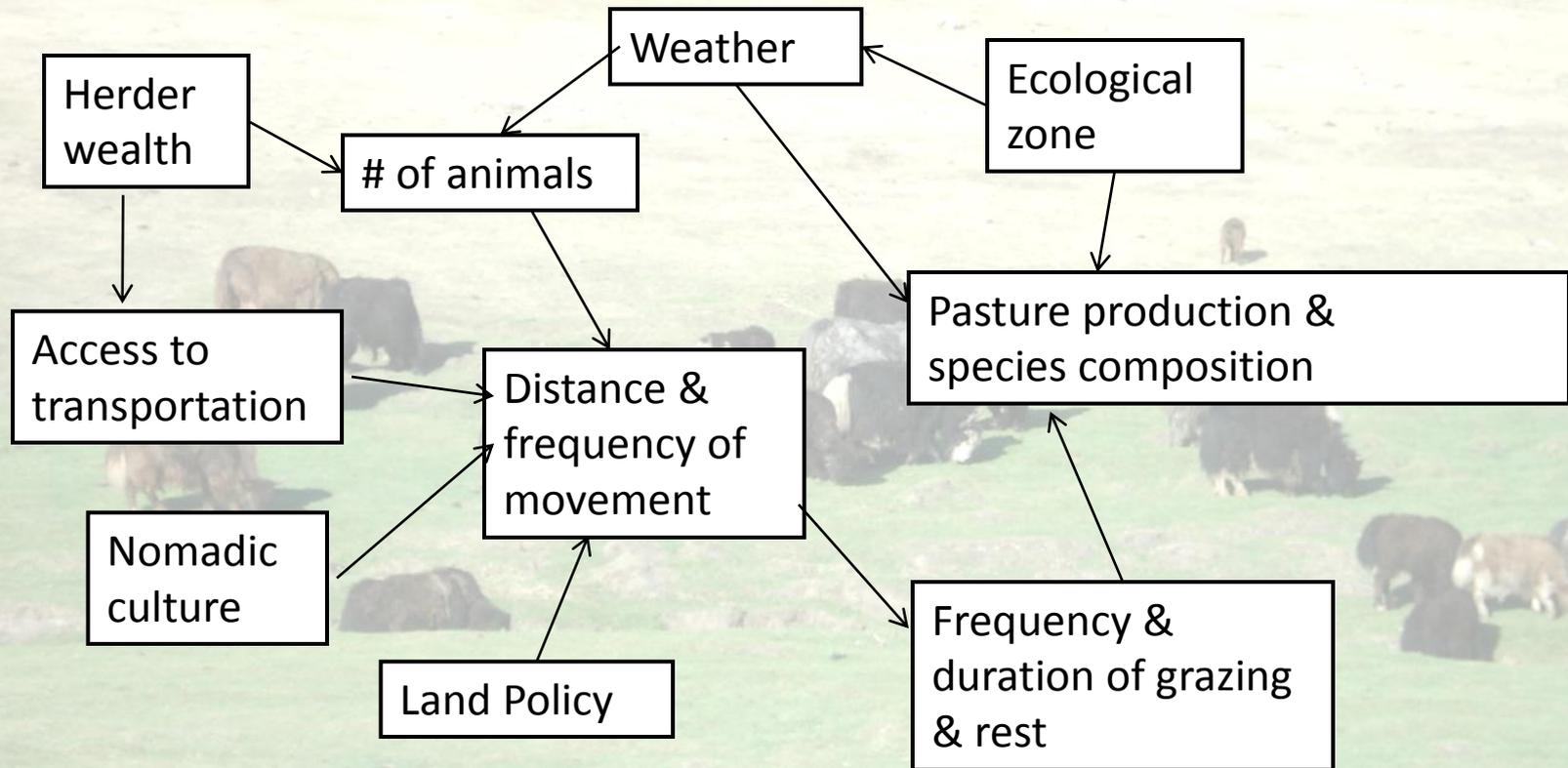
Data Requirements – NSF

- investigators will share with other researchers, at no more than incremental cost and within a reasonable time, the primary data, samples, physical collections and other supporting materials created or gathered in the course of work under NSF grants
- Data Management Plans “will be determined by the community of interest through the process of peer review and program management.”

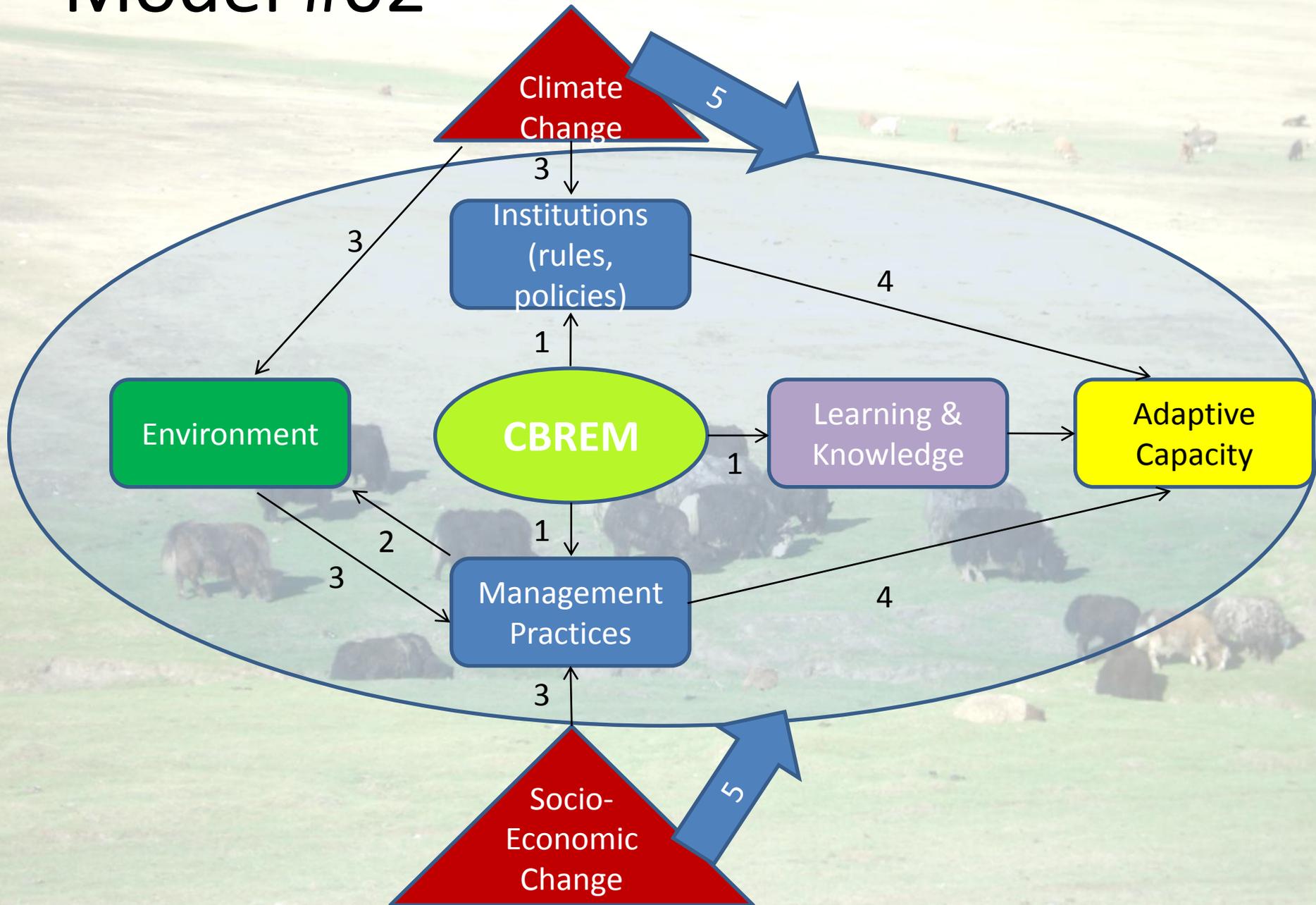
Questions for the Conceptual Model

- What are the
 - Boundaries of the system
 - Ecological elements of the system
 - biological and physical components
 - System processes and modifiers
 - Key aspects of the system that change in response to these processes
 - Key processes that act as “drivers” of the system
 - Key ecosystem services and resources used by and of concern to people in the area

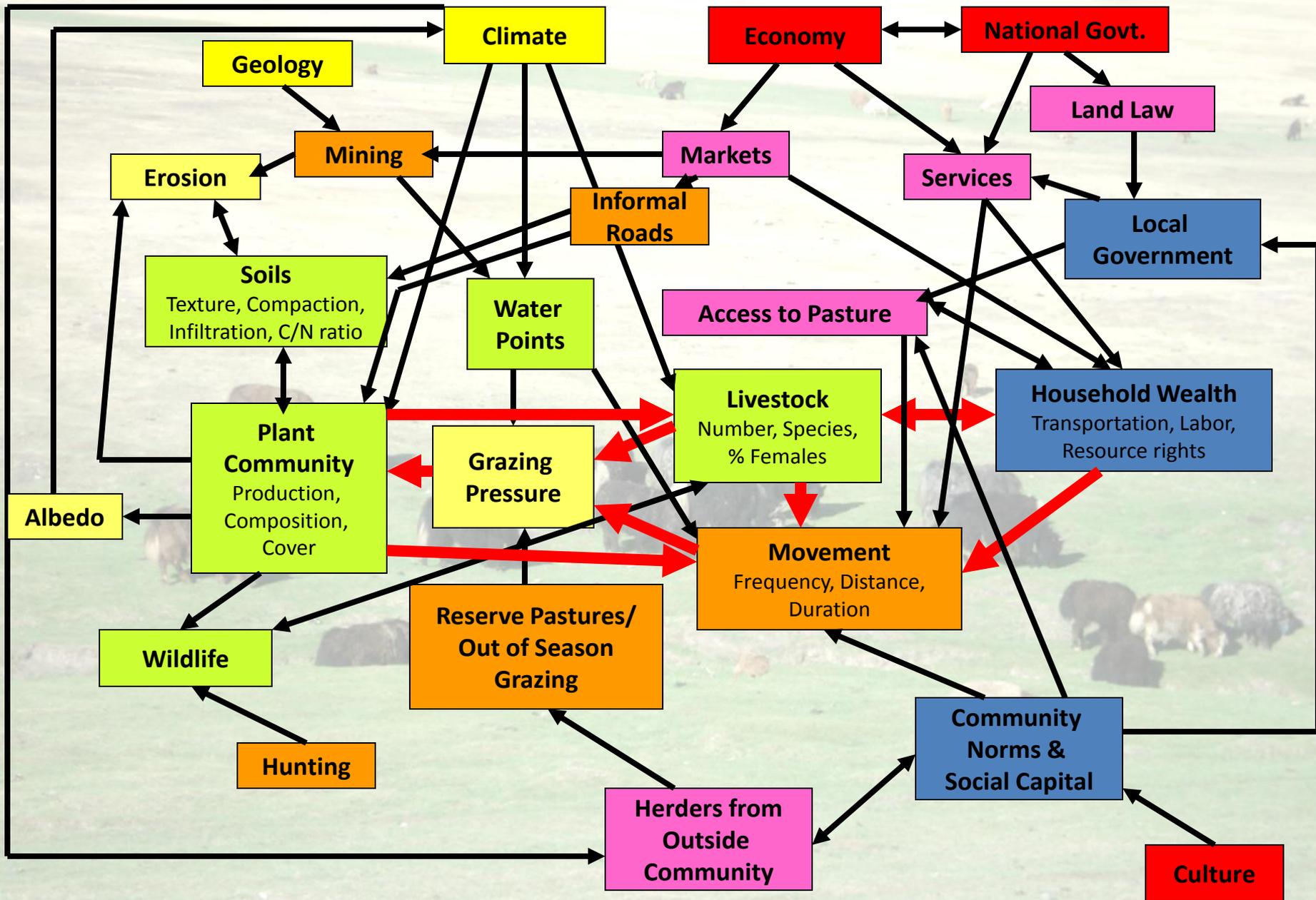
Example Conceptual Model #01



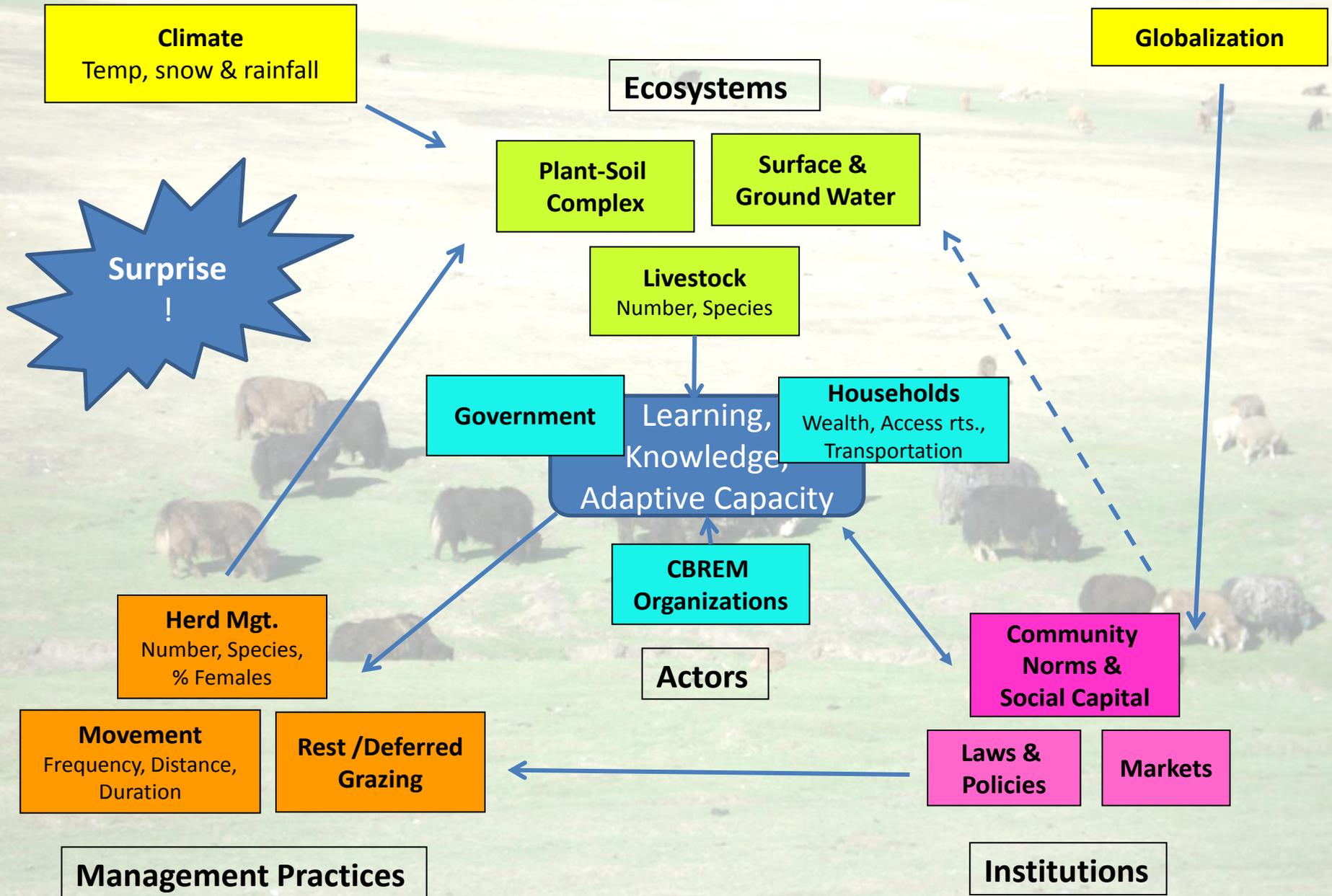
Model #02



Model #03



Model #04



Climate
Temp, snow & rainfall

Globalization

Ecosystems

Plant-Soil Complex

Surface & Ground Water

Surprise !

Livestock
Number, Species

Government

Learning, Knowledge, Adaptive Capacity

Households
Wealth, Access rts., Transportation

Herd Mgt.
Number, Species, % Females

CBREM Organizations

Actors

Community Norms & Social Capital

Movement
Frequency, Distance, Duration

Rest /Deferred Grazing

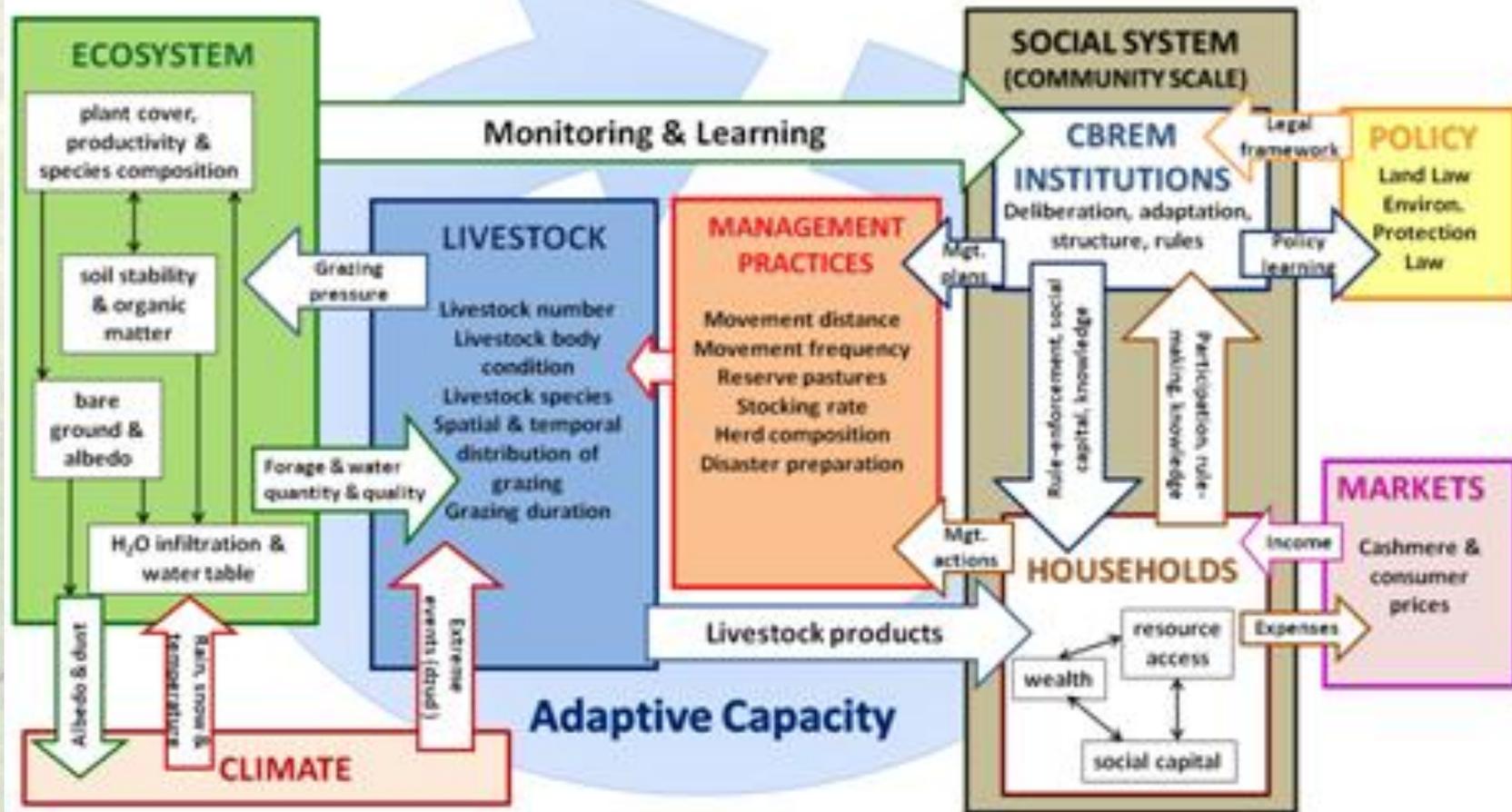
Laws & Policies

Markets

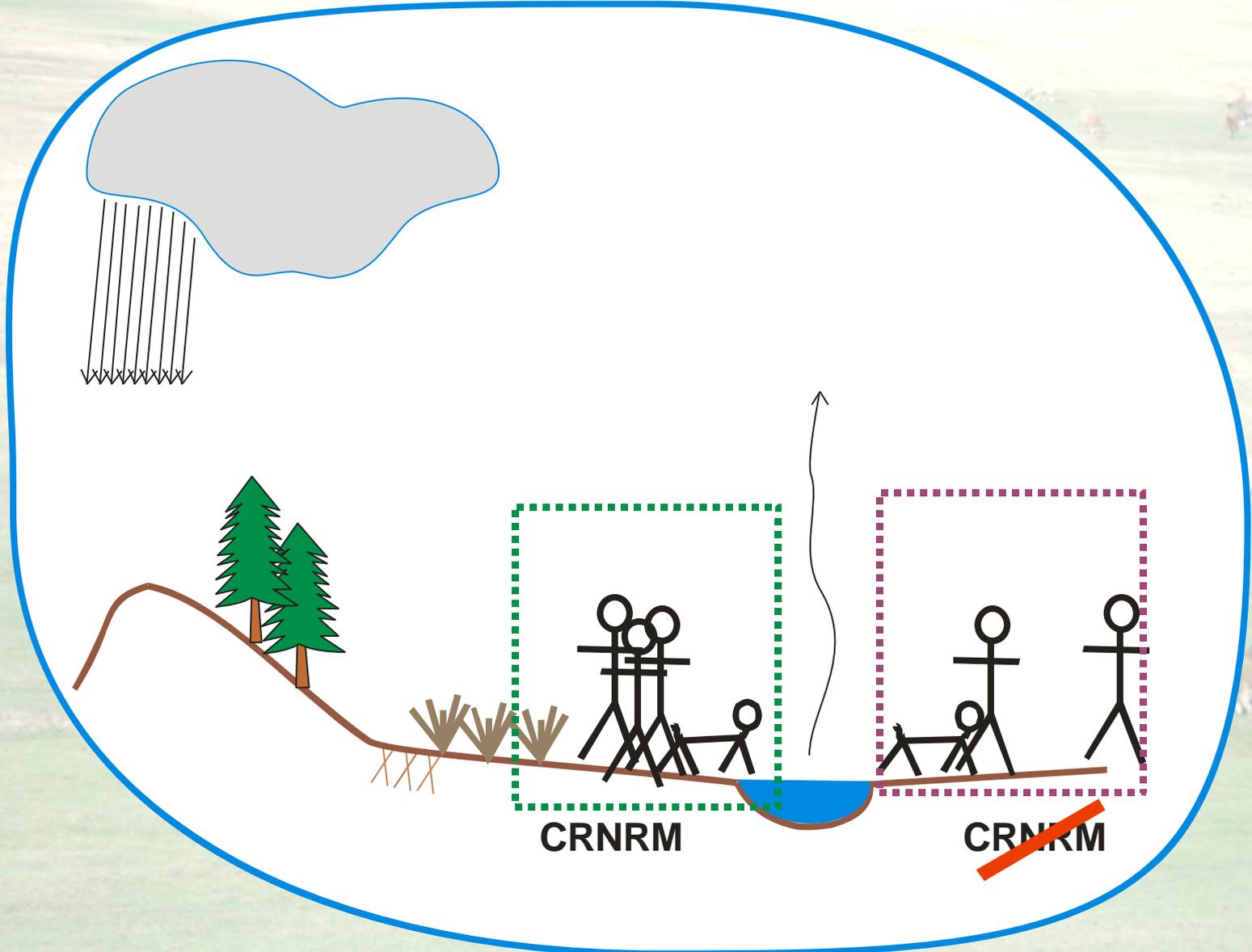
Management Practices

Institutions

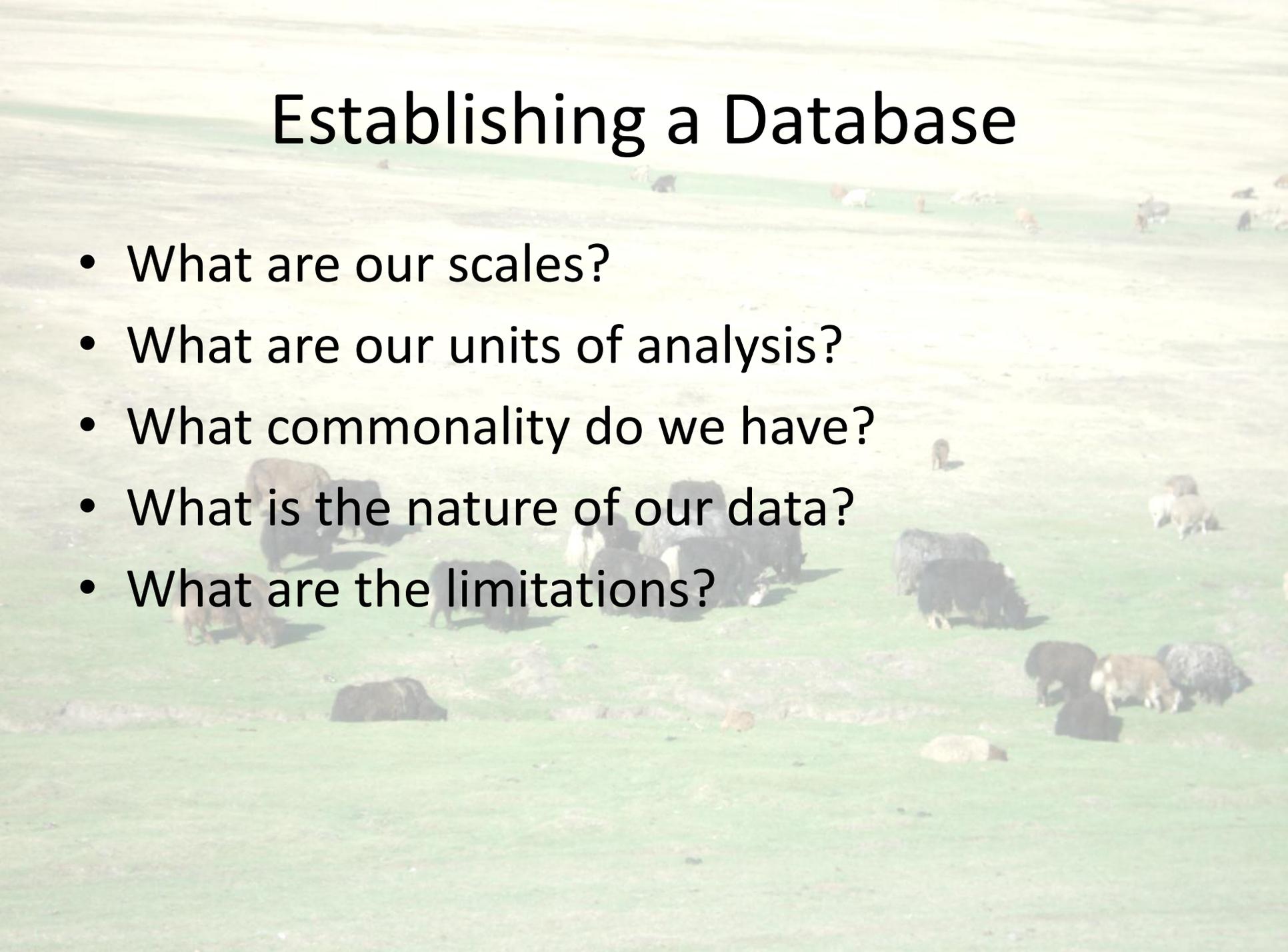
Model #05



Model #06



Establishing a Database

A background image of a vast, green, rolling landscape with a herd of sheep grazing. The sheep are scattered across the field, some standing and some lying down. The terrain is hilly and the sky is bright, suggesting a sunny day. The overall scene is peaceful and pastoral.

- What are our scales?
- What are our units of analysis?
- What commonality do we have?
- What is the nature of our data?
- What are the limitations?

Sampling

Spatial Scale/
Ecological & Physical
Levels of Organization

Country

Ecological Zone

Watershed

**Soum Administrative
Boundaries**

Grazing Territory

**Winter Camps &
Pastures**

Ecological Plots

Social Organization/
Governance

National Government

Aimag

Soum Government

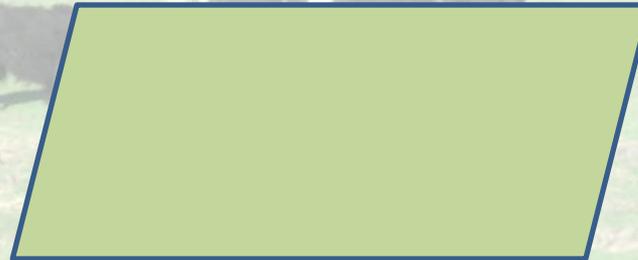
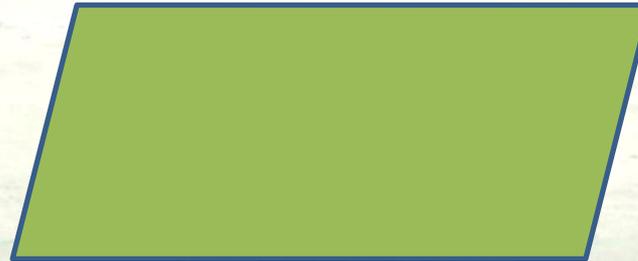
Bag

**CBRM Group or Traditional
"Neighborhood"**

Khot Ail

Household

Person



Questions?

