

Worked Examples of Concepts in Coupled Human-Environment Systems



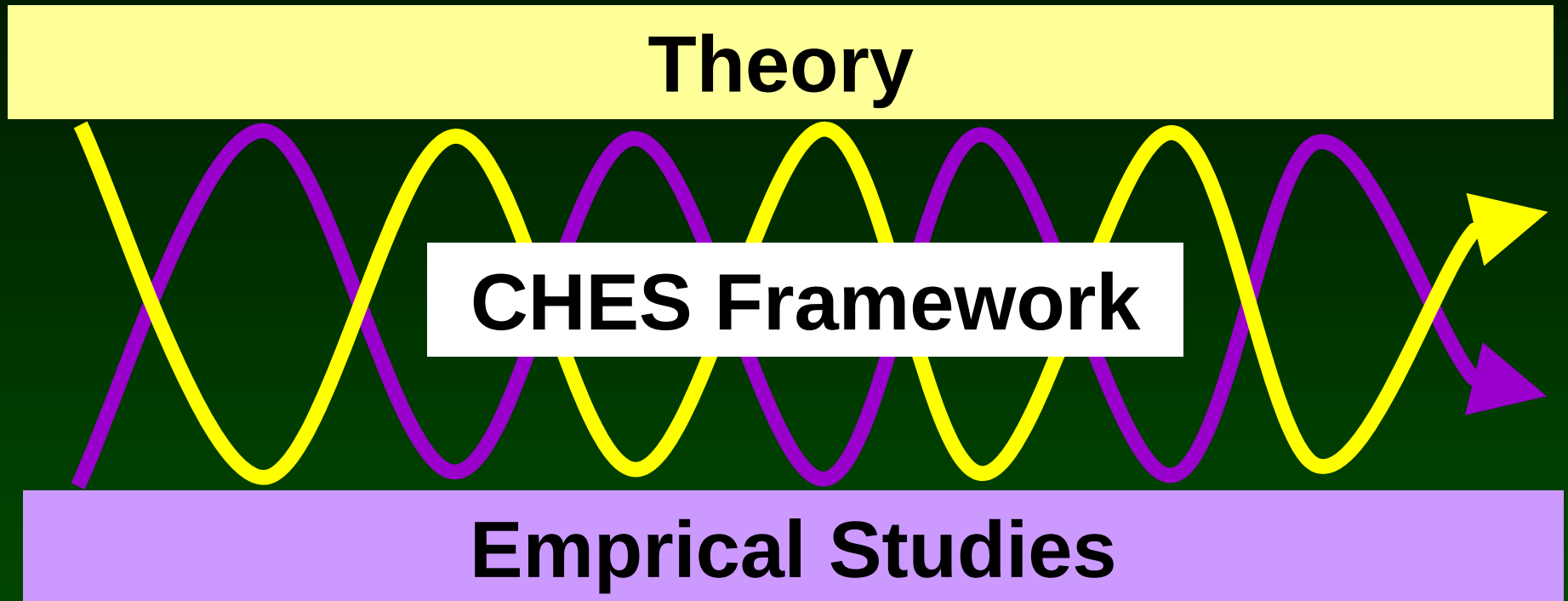
Elizabeth King – Princeton University

Discussants – Florida International University

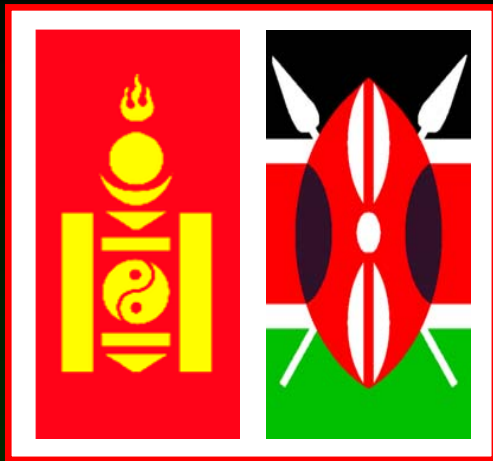
Moderator – Jeannine Cavender-Bares, UMN

Sustainability Science DGS – 15 November 2010

Sustainability Science



“Ground Up” Approach
Characteristics of CHES



From Mongolia to Maasailand:

A Comparative Assessment of Linkages
Between Pastoralist Land Rights
and Social-Ecological Sustainability

D. Rubenstein – Wildlife Ecology

J. Undarmaa – Vegetation Ecology

L. King – Restoration Ecology

R. Reid – Conservation, Land Use Change

M. Fernandez-Gimenez – Social-Ecological Systems

E. Fratkin – Anthropology

J. McPeak – Environmental Economics

D. Ole Nkedianye – Land Tenure, Land Use Change

M. Suvd – Land Rights, National Policy

J. Chantsalkham – Land Rights, Community Policy

C. Upton – Geography, Political Economics

Outline

Pastoralism

Characteristics of CHES:

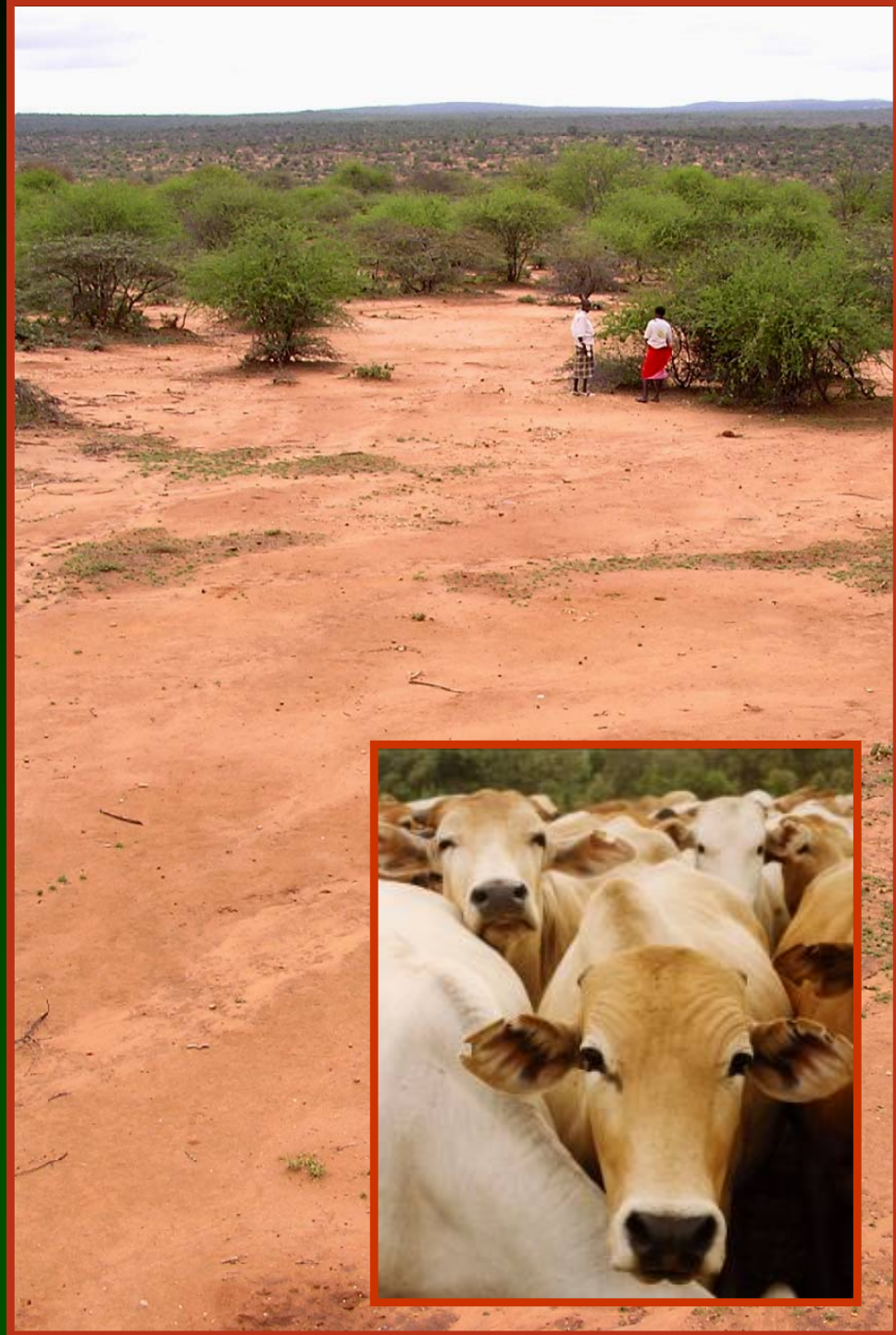
- 1. Transformation & Uncertainty**
- 2. Networks & Connectedness**

Final Thoughts

TRADITIONAL PASTORALISM

E: Low, variable rainfall
Kenya: 80% drylands

H: Livestock, subsistence
Highly adapted



Mobility



Social structure



Nutrition & health



Resource Management



Mobility



Photo: Trenton Franz

Social structure



Nutrition & health



Resource Management

<http://www.scidev.net/en/features/urban-planning-the-maasai-way.html>

1. Transformation & Unpredictability

- Broad, rapid transformation of
- Multiple H and E components
- And thus their interactions

Becomes unclear:

WHAT are we trying to develop?

WHAT are we trying to sustain?

The “non-computable”

1. Transformation & Unpredictability

Fratkin (2001): Pastoralists in Transition

Transformations:

Political change

Population density

Land rights

Displacement

Land degradation

Nutrition

Social stratification

Livelihood diversification

Changes in identity, boundaries, H-E interactions

Inclusive wealth: same natural capital has different values depending on who's using it & system config.

Self-determination: challenges idea of defining or prescribing sustainability.

1. Transformation & Unpredictability

- Warrants resilience-based approach
 - a. Social capital & adaptive capacity
 - b. Possible new configurations



1a. Social capital & adaptive capacity

Laikipia Maasai: Scarcity & social capital

Transformations:

resource base, social cohesion,
CPR institutions, education

Q. How do institutions and economic behaviors respond to resource scarcity?

Good news: More forgiving, flexible, & cooperative!

Eva Kaye-Zweibel & Lashipani



1a. Social capital & adaptive capacity:

Laikipia Maasai: Scarcity & social capital

Q. How do “development partners” affect norms of cooperation & perceptions of well-being?

Bad news: Decreased cooperation & sense of well-being.



James Ponoto explaining game

1b. Possible New Configurations

Laikipia Maasai: Sustainable Intensification

i. What options are ecologically feasible?



ii. Scenario planning

iii. Vulnerability & risk assessment

2. Networks & Connectedness

Even when specific interactions are not understood,
Network structure can be informative.

a. Risk Management

Tradeoffs between connectedness & modularity

Over-connected: buffers individual risk
increases system-wide risk

Under-connected: buffers system-wide risk
increases individual risk

2a. Risk Management

Santos & Barrett: Pastoralist Risk Mgmt.

Part of a BIG Project: “PARIMA”

H Subsystem

- Decision-making
- Perceptions
- Social networks
- Econometrics

E Context

- Ecology
- Climate
- Temporal
- Spatial

Risk Mgmt

- Strategies
- Strengths
- Weaknesses

2a. Risk Management

Informal Transfers:

Deeply embedded reciprocity

Expected to be adaptive: risk management

Poorest are excluded:

Gap in connectedness

Poverty trap (not everyone buffered)

System-wide buffering (no livestock “drain”)

Resilience & equity are different criteria for sustainability

2b. Networks for Adaptive Capacity

Laikipia Maasai: Social Capital for Pilot Project

Windows of opportunity: Collective will, Hope Club

Network scales: Reconciling 4000 residents & 50 ha

Network tiers: Elders & youth

Bonding: 2 years of meetings, learning, integrating ideas.

Bridging: gov'nance, exchange visits, trust & friendship.



2b. Networks for Adaptive Capacity

Grass field established...



2b. Networks for Adaptive Capacity

Grass field established...



...then window slammed shut!

Network tiers: Elders & youth, local elites.

Bonding: like superglue within groups.

Bridging: icy, tense, suspicious, corrupt.

Collective will: Totally redirected.



New Window?

3 Final thoughts

1. Characteristics & their implications:

Transformations:

Multiple changes create unpredictability:
Capacity to adapt is salient.

Networks:

Network structures tell us about system behavior.

- Individual/system risk tradeoffs
- Limits to adaptive capacity

3 Final thoughts

2. Sustainability of what, and for whom?

Transformations:

Different uses of natural & human capital
increase well-being of different groups.

Networks:

Network structures can indicate & explain
causes & consequences of inequity.

*Sustainability, equity & self-determination are
all different criteria for development (FIU group)*

3 Final thoughts

3. Knowledge to Action:

Ideas emerged from synthesis of empirical work.

Multiple disciplines, approaches, places.

All participants engage in ACTION, not just study.

