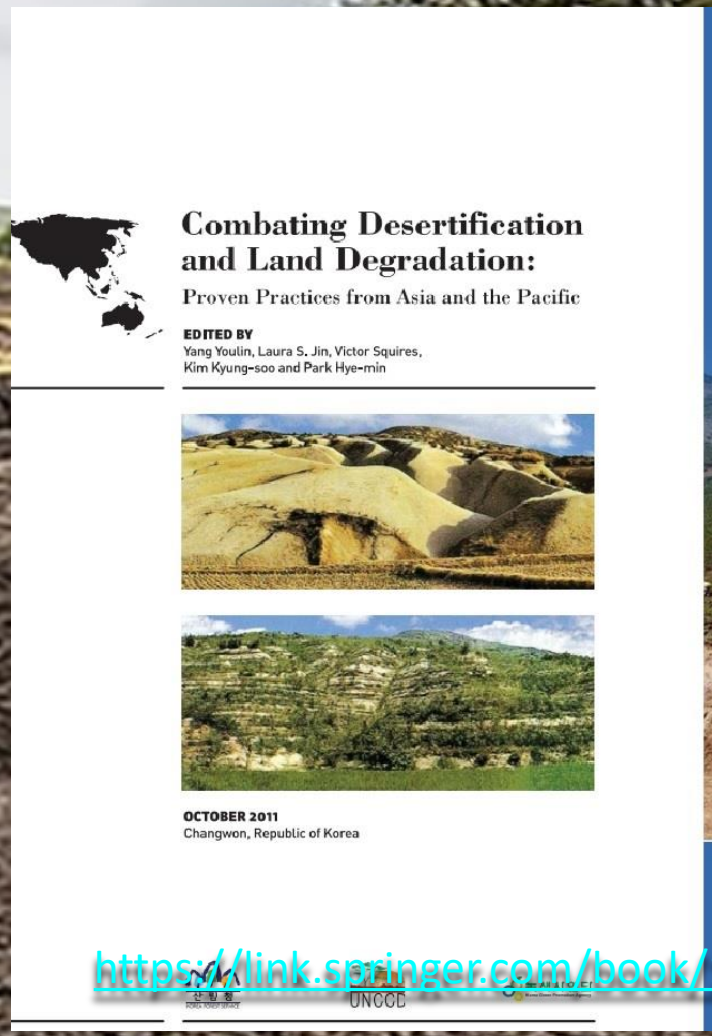
How can the next land degradation episode be prevented?

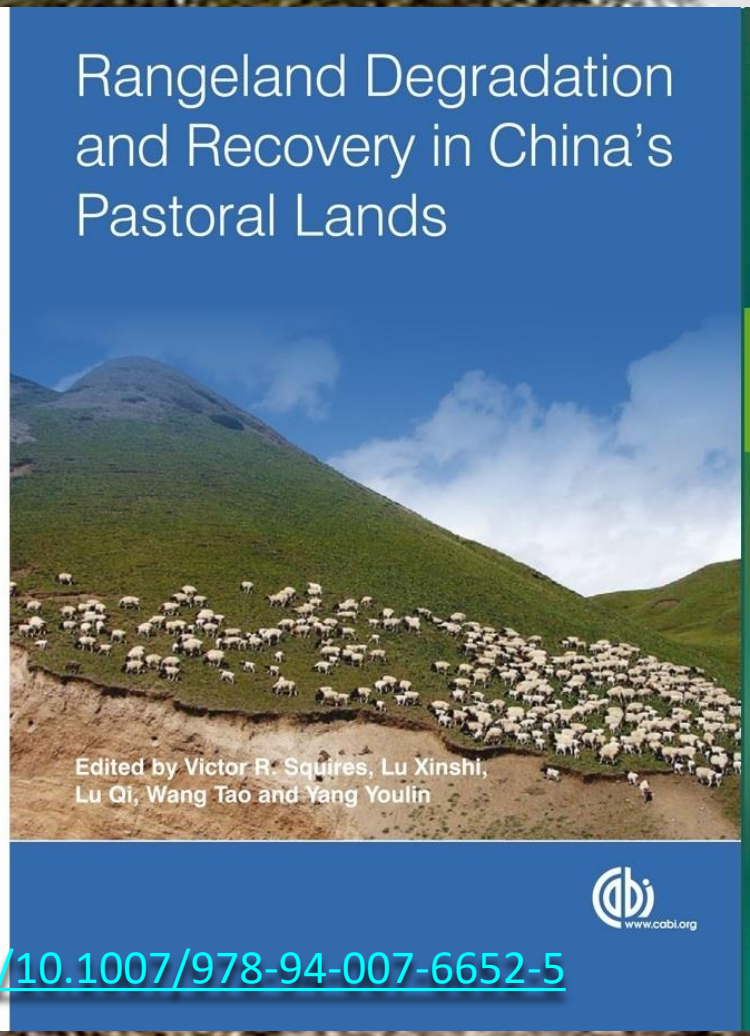
Dr Professor Victor R. Squires

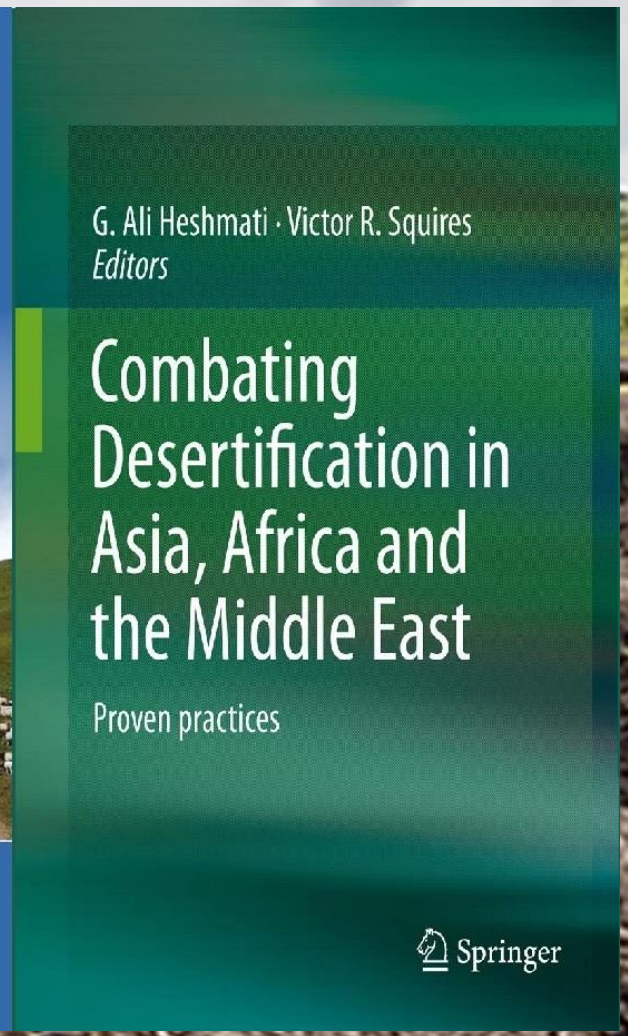
Formerly, University of Adelaide

AUSTRALIA

dryland1812@internode.on.net







https://link.springer.com/book/10.1007/978-94-007-6652-5

Land degradation (LD) - an undesirable change from sustainability.

Sustainability: The long term maintenance of ecosystem services on which people and livestock depend.

LD is - a fundamental change in land use and land cover leading to a loss of landscape function:

Deteriorated and degraded rangeland environments;

- reduced capacity to absorb rainfall;
- increased runoff;
- greater land-surface disturbance;
- greater patchiness;
- loss of surface soil nutrients;
- overall poorer nutrient availability.

Key tasks: Rehabilitation & Restoration of degraded rangeland:

- Rehabilitation of degraded rangeland productivity
- Restoring its ecological function.

Recovery depends on **arresting** and **reversing** these losses.

Important first step: What Physical, sociological and economic processes led to the land degradation?

Relevance of Ecological History to Environmental Management :

Without the history – *disaster!*

Essential:

- Simple description of the environment involving

  Observing environmental variables (monitoring, observation and experiment) over a few years
  - inadequate for detecting rate, directions and magnitude of change.
  - highly complex & dynamic biophysical and socioeconomic systems.

The Challenge of predicting outcomes: complex interactions between processes (and the patterns they create) have changed over time.

- Give much more attention to non-technical aspects.

Coping with an Uncertain Future from a Little-known Past :

Technical aspects:

- Widespread remediation - NE Asia
- Difficulties in documenting
  - What was done?
  - Where?
  - Objectives of the treatments?
  - Experiments poorly documented, multiple agencies involved, inadequate record-keeping;
  - Inadequate evaluation;
  - Policy false starts;
  - Unintended consequences!

A Review of Available Desertification Control Technologies in North China

	Technique / Methods	Sites Where Applicable	Limitations / Benefits	Relative Cost Effectiveness	Overall Rating[1]
	Biological Methods				
1	Shelterbelt networks to protect farmland	- Within farmland - Along banks of canal	- Only a few tree species suitable - Long-horned beetle damaged - High consumption of water - Good protection results - Making micro-climate for crops - Supplying timber	- Relatively expensive - Simple management - Resulting in yield reduction in the marginal field.	4 Effectiveness 4 Durability 4 Maintenance
2	Sand fixation forest for fixing mobile send dunes	2/3 of leeward side of mobile dunes from bottom	- Hard condition for shrubs to survive - Labor demanding	- Cheap - Relatively easy to Maintenance	4 Effectiveness 4 Durability 3 Maintenance

A Review of Available Desertification Control Technologies (Part 2)

3	Wind break forest	Between farmland and sand dunes	- Labor demanding - High consumption of water - Good ecological & economic benefits	- Relatively Cheap - More effort to maintain	4 Effectiveness 4 Durability 2 Maintenance
4	Enclosure for grazing land and forest	Desert grassland Forest area	- Increasing biodiversity - Less labor demanding	- Cheap - Easy to Maintenance	4 Effectiveness 4 Maintenance

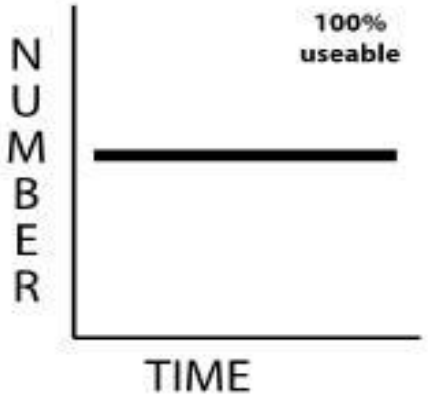
Historical insights to plan for the future :

Learning from History:

- Policy environment - unintended consequences
- Policy implications not fully comprehended.
- The legacy of past mistakes: to be ***learned from*** – ***not repeated***
- each piece of land more than one user:
  - farmer, herder, miner, urban dweller, etc).
  - Creating a better livelihood for one may be detrimental to another

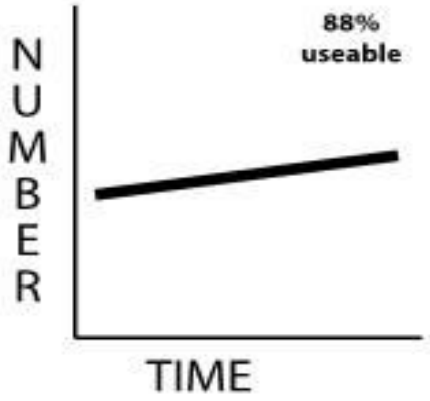
Stage 1. Vast area of undivided rangeland although tribes and later, communes were superimposed.

Notes; *livestock numbers more or less stable and feed balance between forage and livestock was* **Positive**



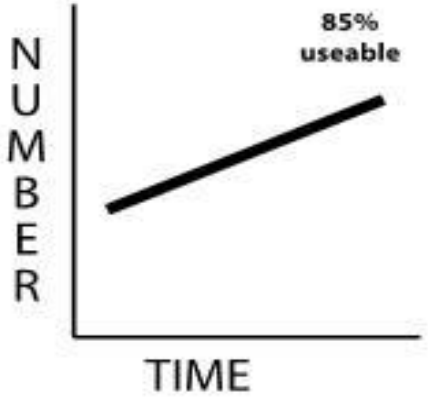
Stage 2. Total area shrinks as infrastructure (roads, railway, pipelines etc, industry and mines excised land).

Notes; *livestock numbers more or less stable under state farm or commune admistration. Feed balance* **Positive**



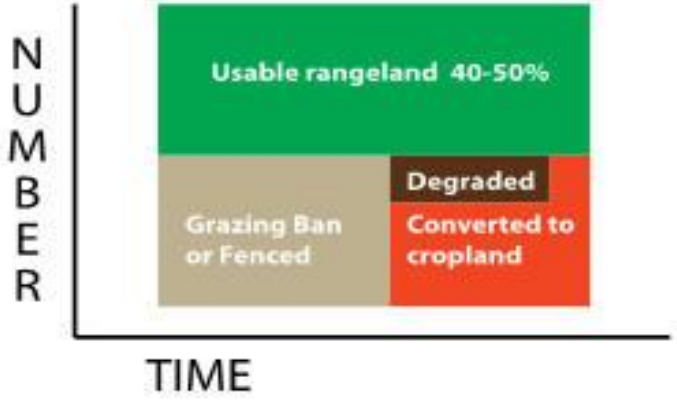
Stage 3 (early). HCRS implemented, HH allocated user rights to state-owned land to be grazed by privately owned livestock.

Notes; *Some fences erected to demarctae user rights. Livestock inventories rose rapidly as this was perceived as the quickest way to get rich. Feed balance was* **Positive**



Stage 3 (now). Grazing bans more widespread. Fencing under National project in place. Better rangeland plowed to grow fodder. More degradation, low grade rangeland remains.

Notes; *Livestock numbers continue to rise, degradation accelerates or toxic plants increase. Feed balance* **Negative**



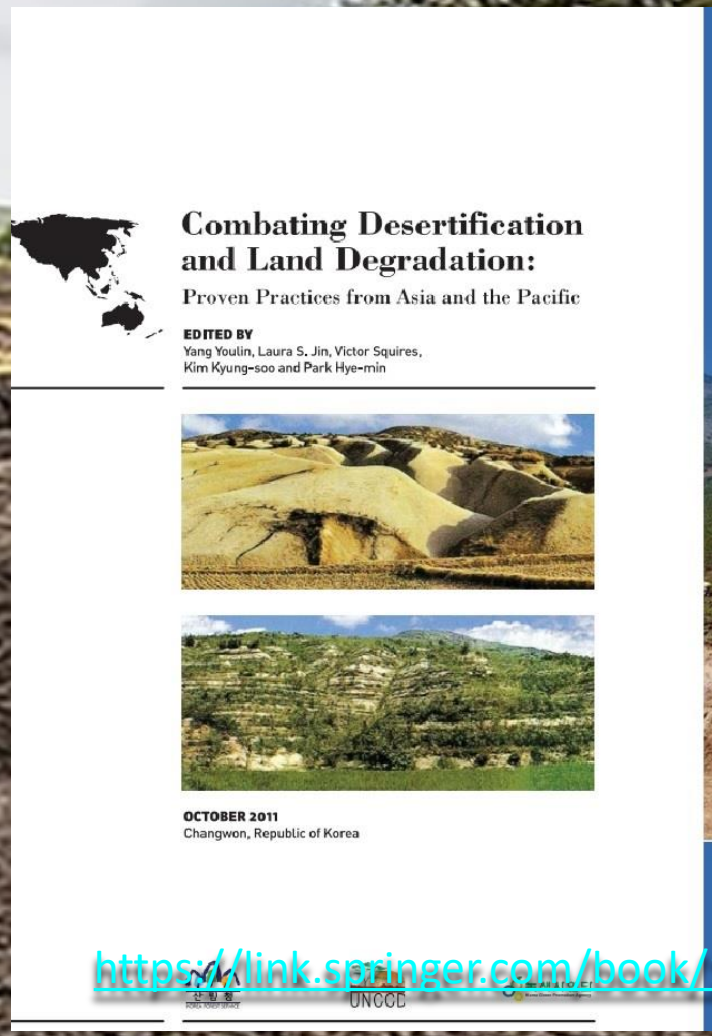
- Revisit and amend present-day policies that are counterproductive / devastating before it is too late!
- Analyse conditions leading to the devastating degradation episodes. Commonalties?
- Observe repetition, commonalities, to reduce future impacts.

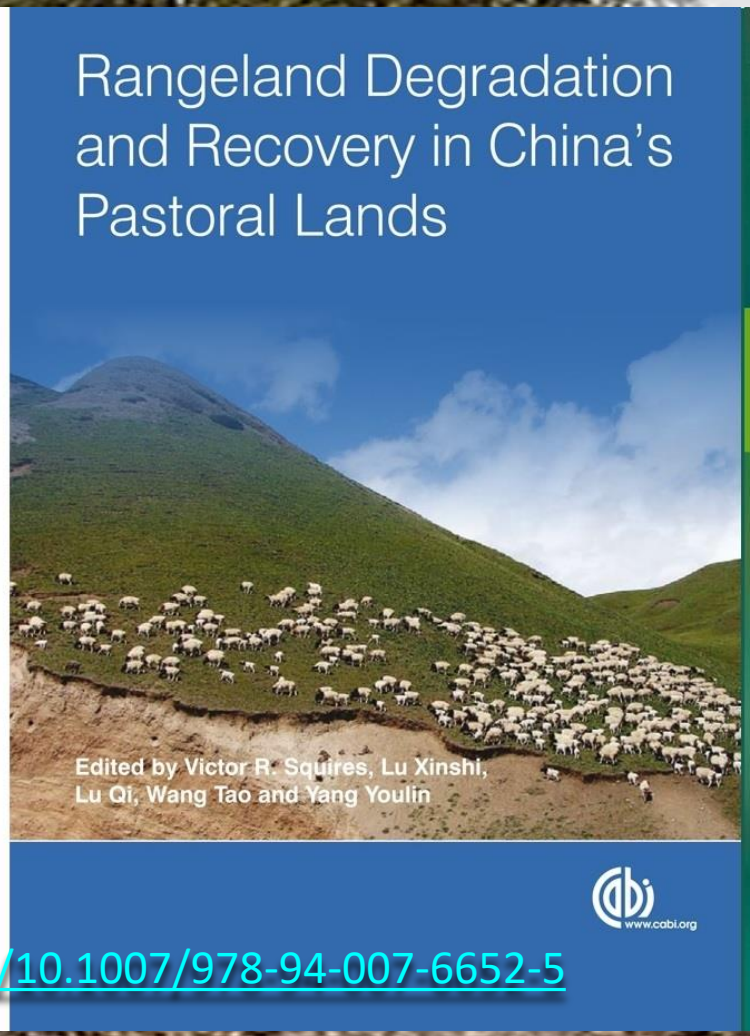
The two most important ‘take-home’ messages are:

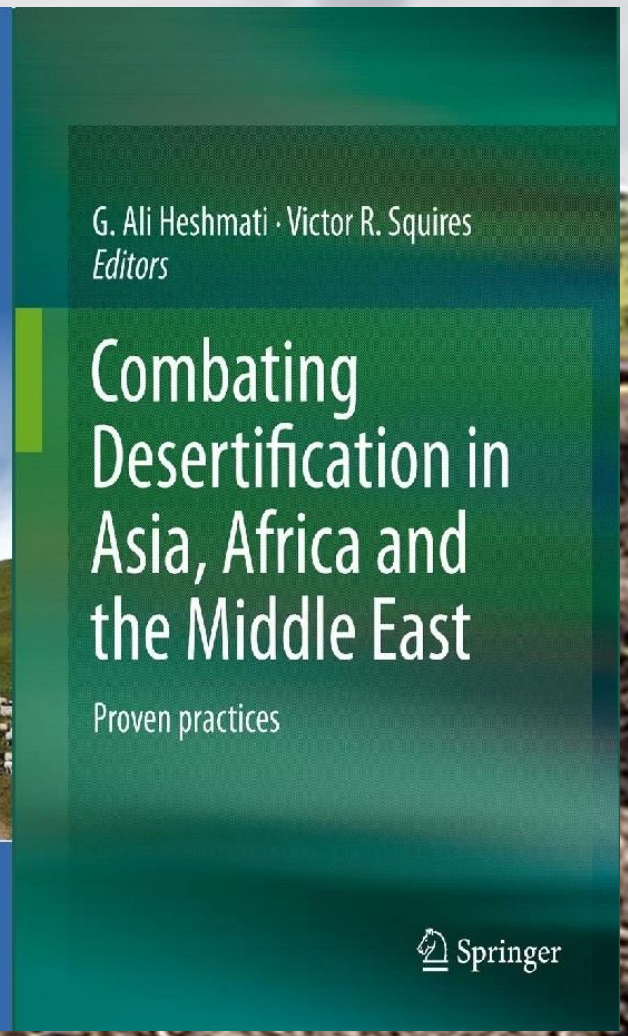
— Land degradation – has biophysical and socio-economic dimensions. We need to focusing on both!

— *Prevention* of LD is better, more cost-effective than *remediation* after the Land Degradation has occurred).

— Final plea: Engage more rural development sociologists –give emphasis to land users as people







https://link.springer.com/book/10.1007/978-94-007-6652-5

THANK YOU FOR YOUR ATTENTION

Prepared by Dr Victor Squires for
NE Asian Consultative Group Meeting Ulaanbaatar,
Mongolia June 19-20 2023