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INTERNATIONAL
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Pathways to rehabilitation of degraded croplands

Shamie Zingore

Africa Program Director

International Plant Nutrition Institute (IPNI)

- Not-for-profit, science-based organization with a focus on agronomic education and research support.
- Began operations on January 1, 2007
- Evolved from PPI
- The mission of IPNI is to develop and promote scientific information about the responsible management of plant nutrition for the benefit of the human family.

Global Programs and Scientific Staff

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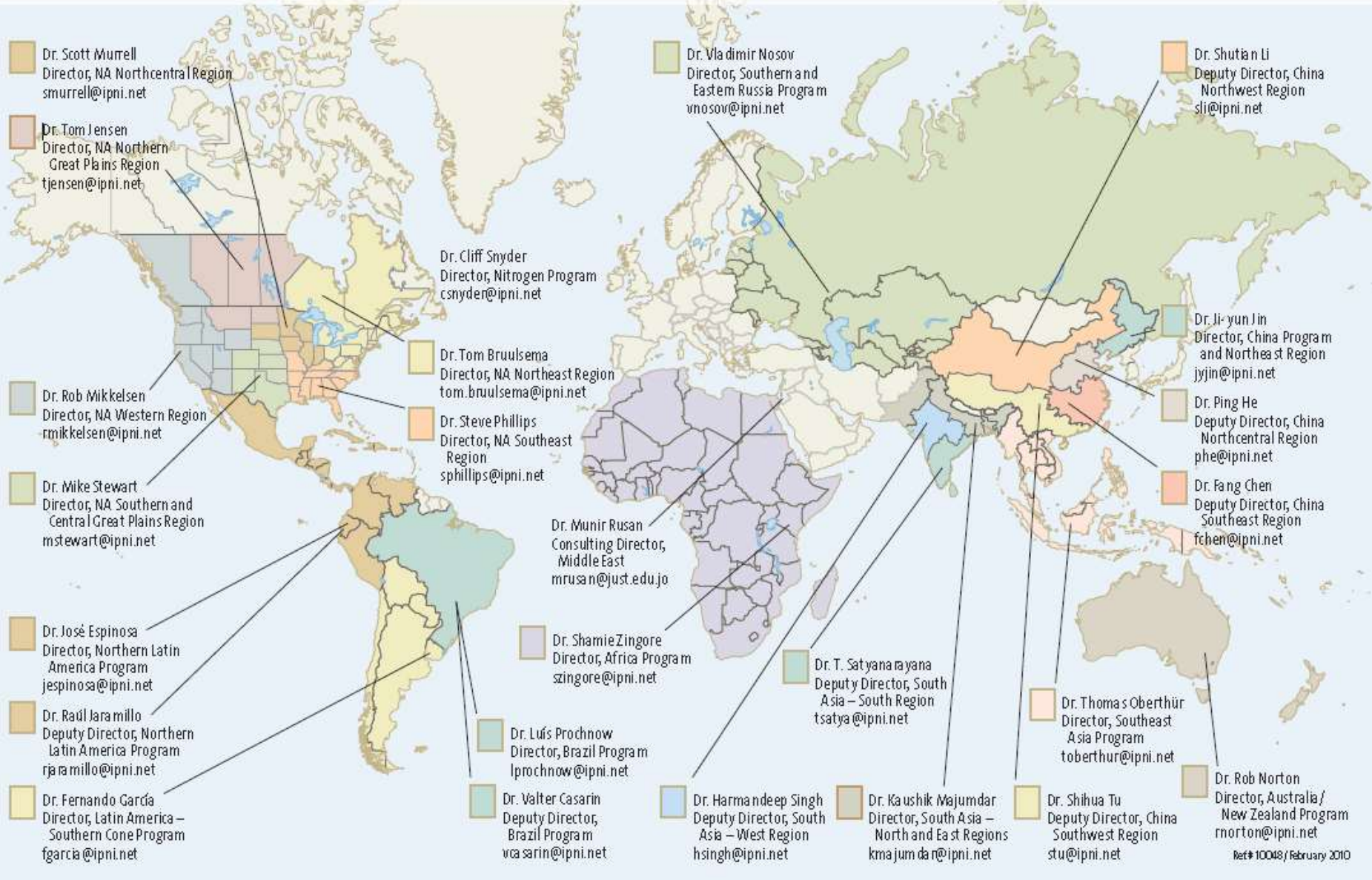

Dr. Terry Roberts
President
troberts@ipni.net

Dr. Paul Fixen
Senior Vice President,
Americas and Oceania Group,
and Director of Research
pfixen@ipni.net

Dr. Adrian Johnston
Vice President,
Asia and Africa Group
ajohnston@ipni.net

Dr. Svetlana Ivanova
Vice President,
Eastern Europe/Central Asia
and Middle East Group
Director, Central Russia
sivanova@ipni.net

Dr. Scott Murrell
Director, NA Northcentral Region
smurrell@ipni.net

Dr. Tom Jensen
Director, NA Northern
Great Plains Region
tjensen@ipni.net

Dr. Cliff Snyder
Director, Nitrogen Program
csnyder@ipni.net

Dr. Tom Bruulsema
Director, NA Northeast Region
tom.bruulsema@ipni.net

Dr. Steve Phillips
Director, NA Southeast
Region
sphillips@ipni.net

Dr. Rob Mikkelsen
Director, NA Western Region
rmikkelsen@ipni.net

Dr. Mike Stewart
Director, NA Southern and
Central Great Plains Region
mstewart@ipni.net

Dr. José Espinosa
Director, Northern Latin
America Program
jespinosa@ipni.net

Dr. Raúl Jaramillo
Deputy Director, Northern
Latin America Program
rjaramillo@ipni.net

Dr. Fernando García
Director, Latin America –
Southern Cone Program
fgarcia@ipni.net

Dr. Luís Prochnow
Director, Brazil Program
lprochnow@ipni.net

Dr. Valter Casarin
Deputy Director,
Brazil Program
vcasarin@ipni.net

Dr. Vladimir Nosov
Director, Southern and
Eastern Russia Program
vnosov@ipni.net

Dr. Munir Rusan
Consulting Director,
Middle East
mrusan@just.edu.jo

Dr. Shamie Zingore
Director, Africa Program
szingore@ipni.net

Dr. Harmandeep Singh
Deputy Director, South
Asia – West Region
hsingh@ipni.net

Dr. T. Satyanarayana
Deputy Director, South
Asia – South Region
tsatya@ipni.net

Dr. Kaushik Majumdar
Director, South Asia –
North and East Regions
kmajumdar@ipni.net

Dr. Shutian Li
Deputy Director, China
Northwest Region
sli@ipni.net

Dr. Ji-yun Jin
Director, China Program
and Northeast Region
jyjin@ipni.net

Dr. Ping He
Deputy Director, China
Northcentral Region
phe@ipni.net

Dr. Fang Chen
Deputy Director, China
Southeast Region
fchen@ipni.net

Dr. Thomas Oberthür
Director, Southeast
Asia Program
toberthur@ipni.net

Dr. Shihua Tu
Deputy Director, China
Southwest Region
stu@ipni.net

Dr. Rob Norton
Director, Australia/
New Zealand Program
rnorton@ipni.net

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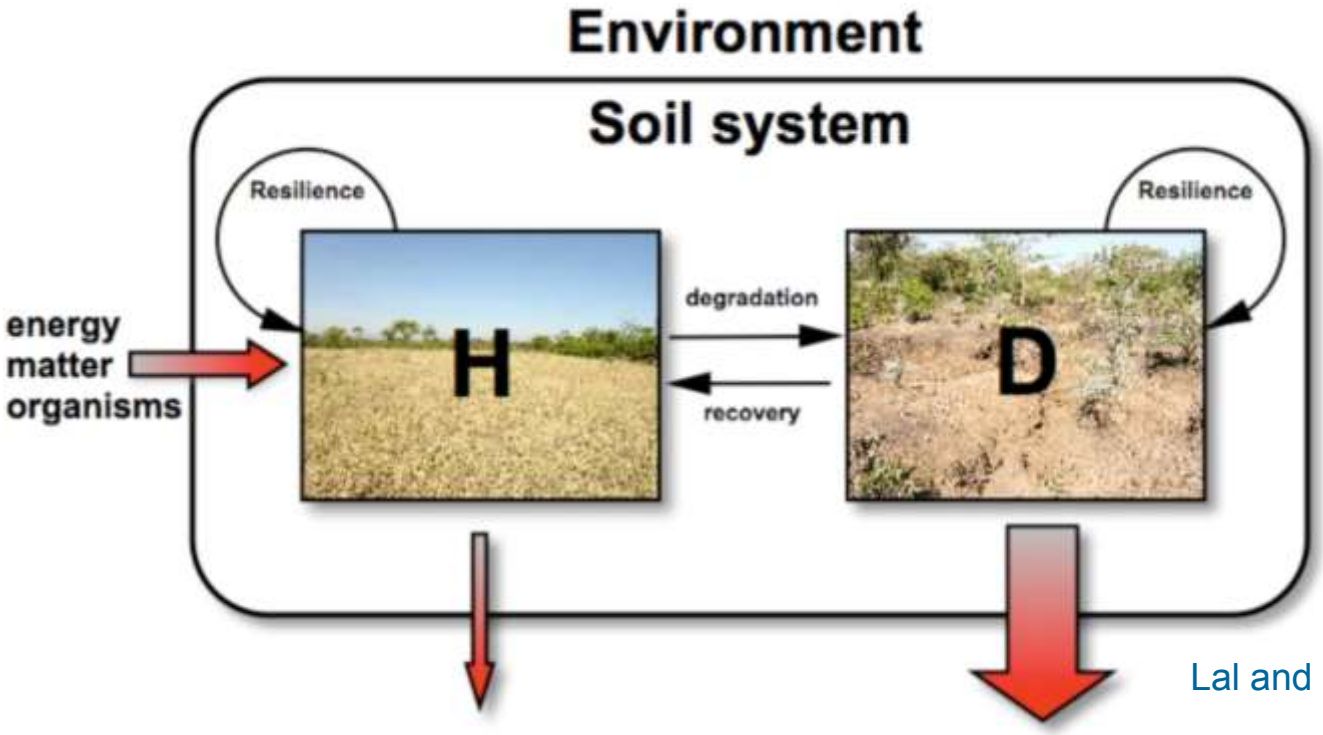
Land degradation



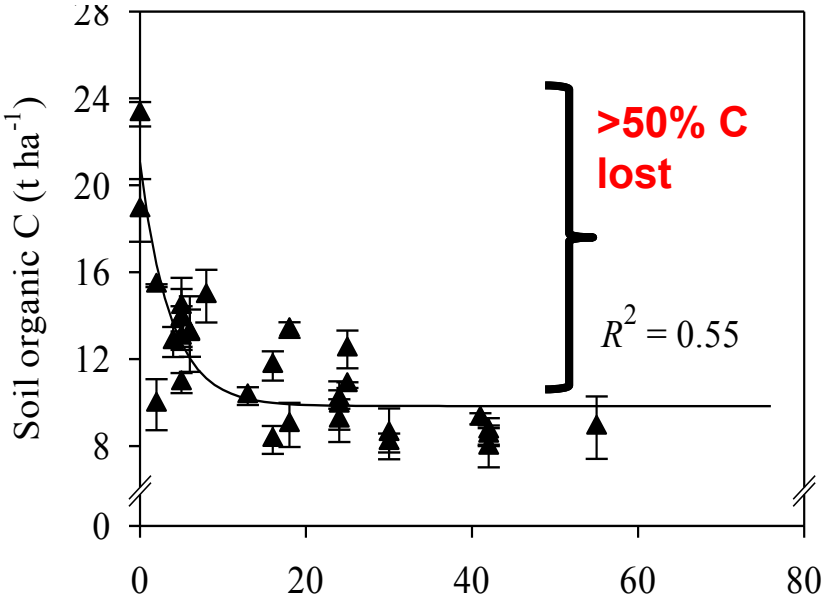
Lal and Stewart 2000

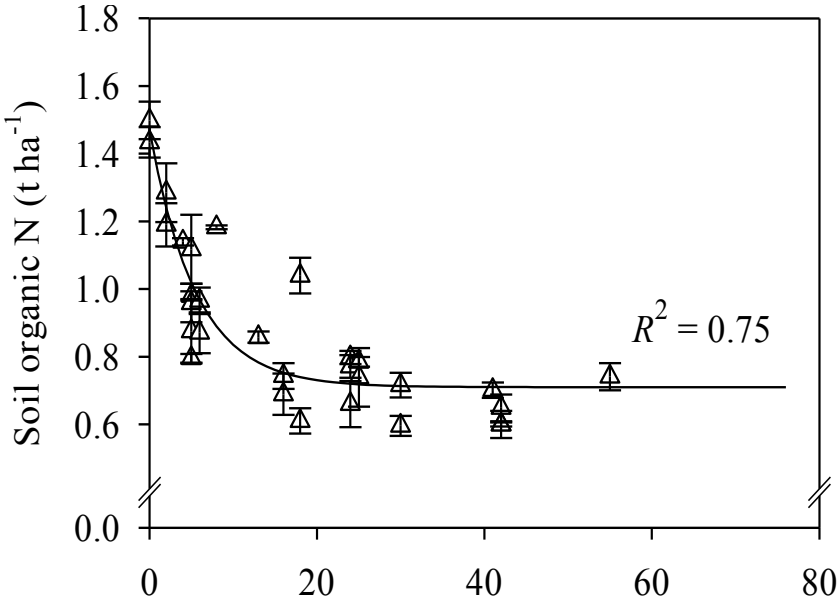
- “Pathological processes”
- accelerated soil erosion, nutrient depletion, soil organic matter depletion, soil pollution, salinization, sodification, acidification, deterioration of soil structure

- Soil degradation can be rapid due to reinforcing feedbacks
  - ✓management actions
  - ✓initial soil condition,
  - ✓vegetation response,
  - ✓external environmental conditions

- Threshold is reached after which soil collapse into a degraded state
- Livelihood options and production systems become unviable

Declining soil fertility a crisis in SSA

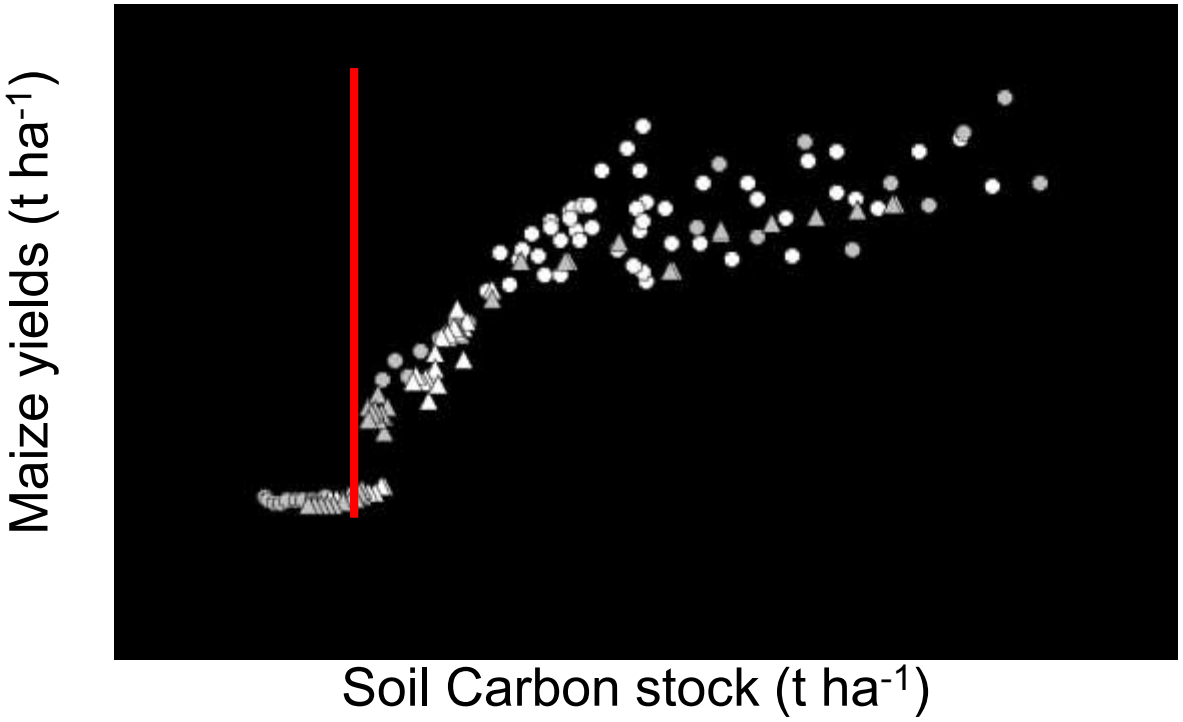




Zingore et al., 2005; Bostick et al., 2007

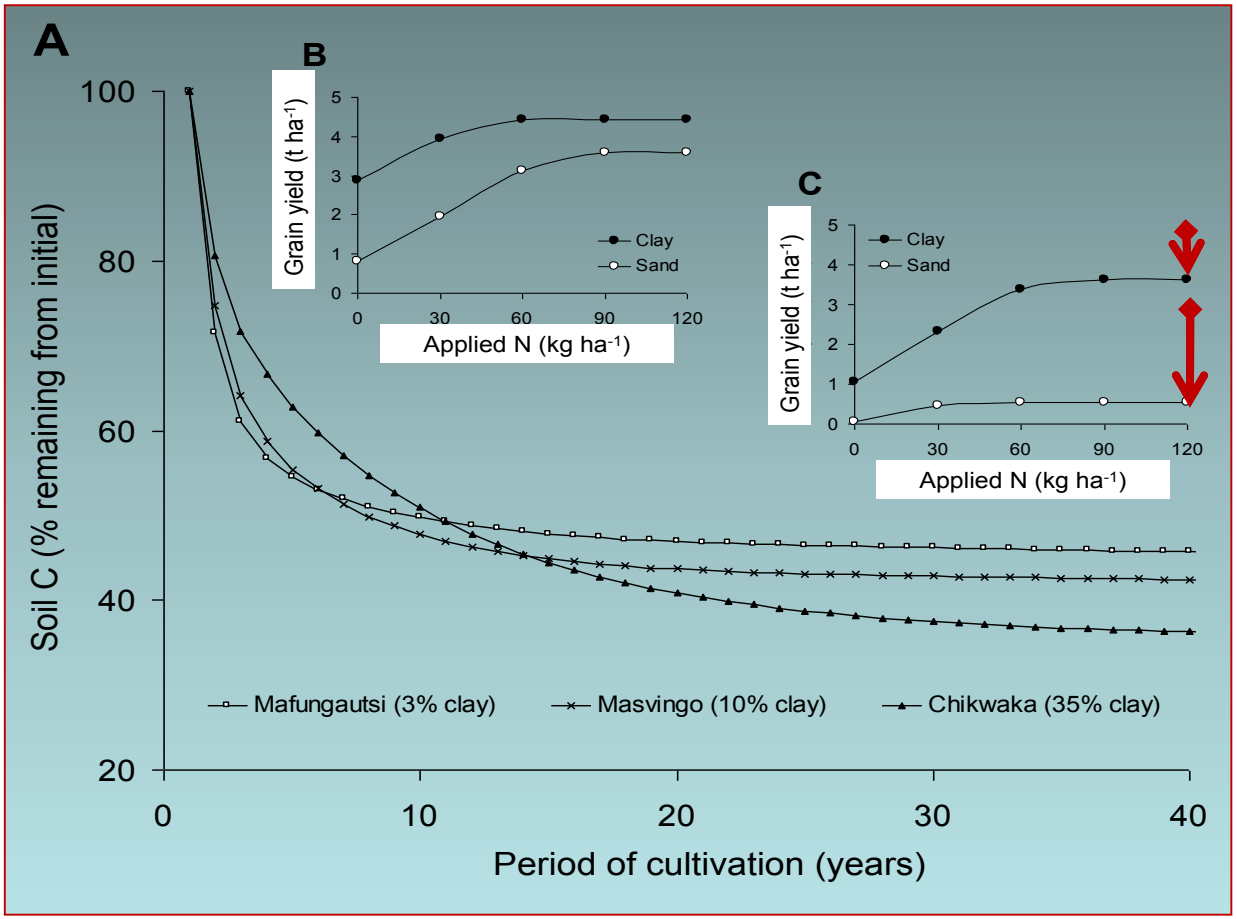
Land degradation

Maize yield response to organic and mineral nutrient resources



Rufino et al., 2008

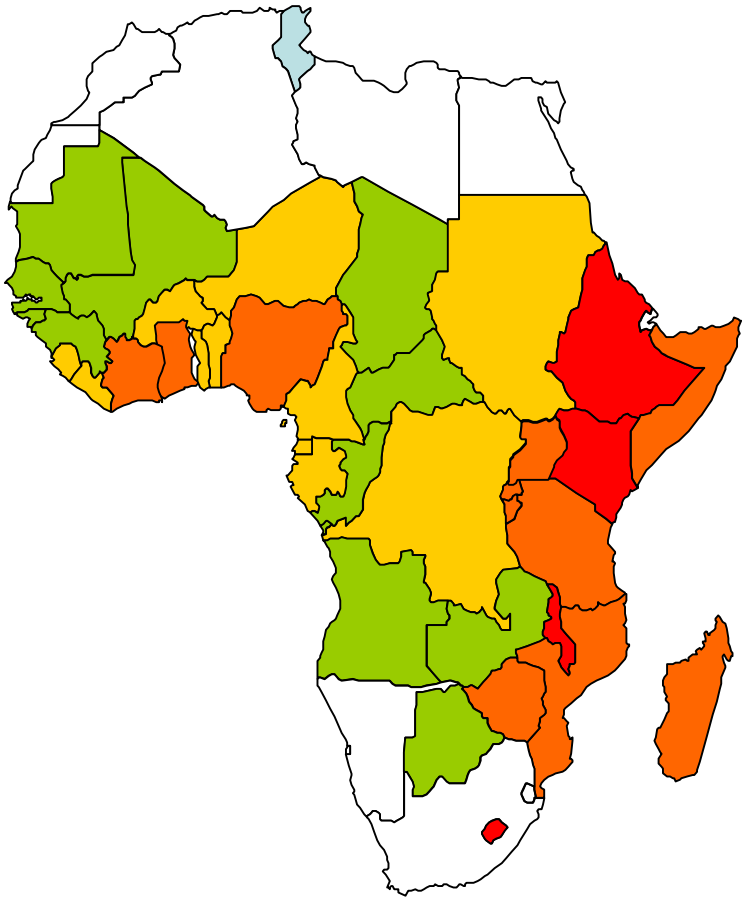
Crop productivity changes associated with land degradation



Declining soil fertility a crisis in SSA

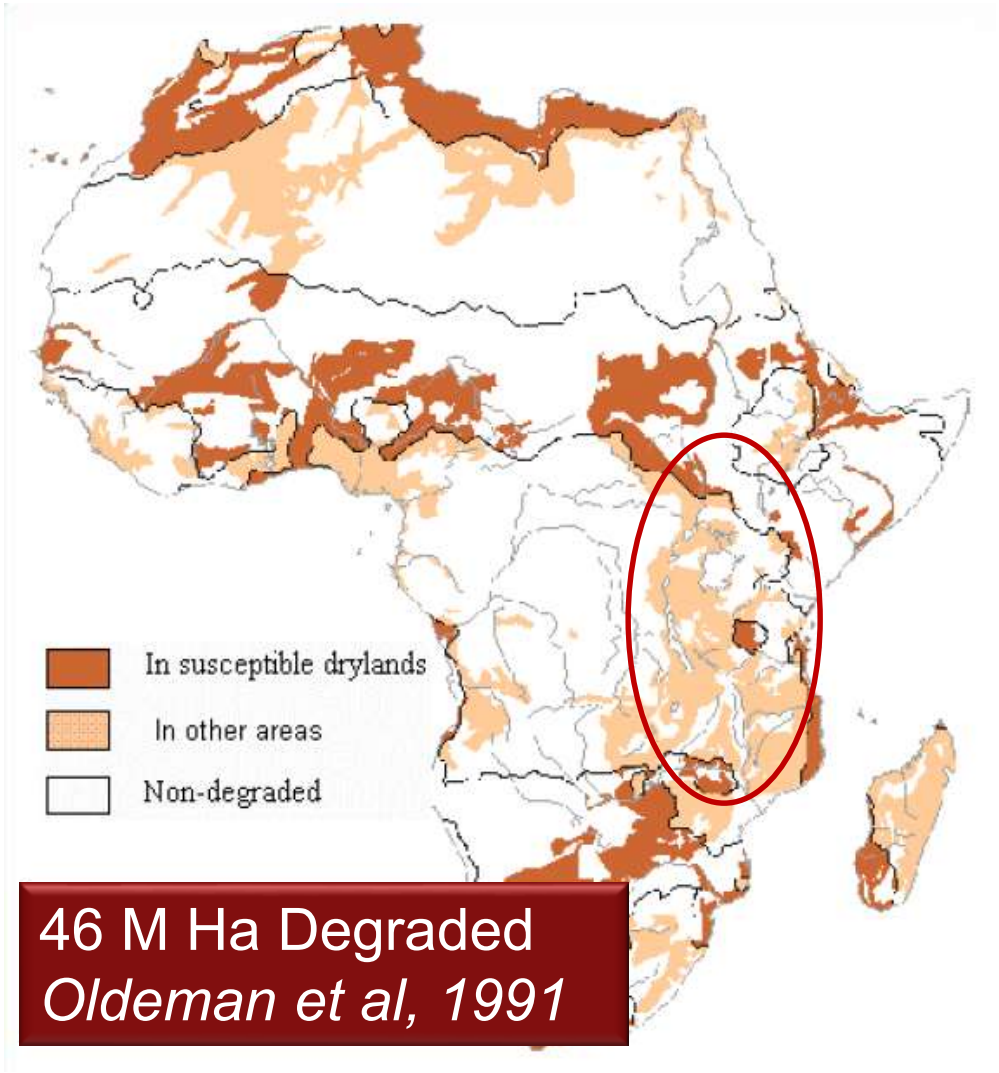
Nutrient balances

	N	P	K
Low	<10	<1.7	<8.3
Mod.	10-20	1.7-3.5	8.3-16.6
High	20-40	3.5-6.6	16.6-33.2
V. high	>40	>6.6	>33.2



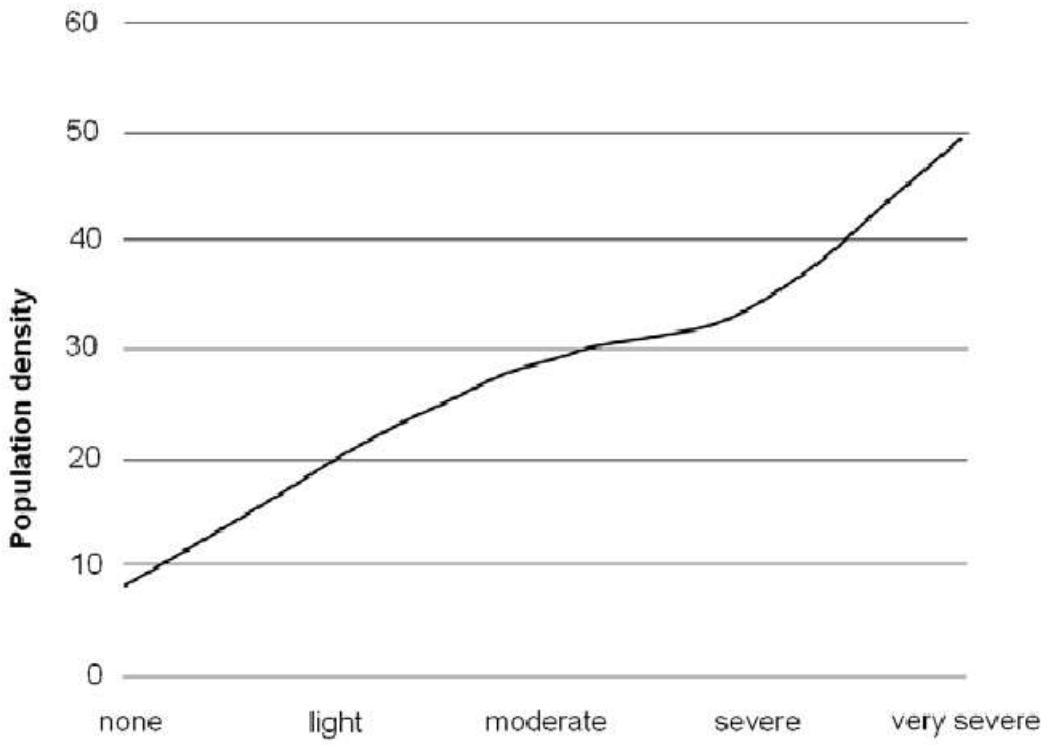
Smaling et al., 1997

Land degradation in SSA



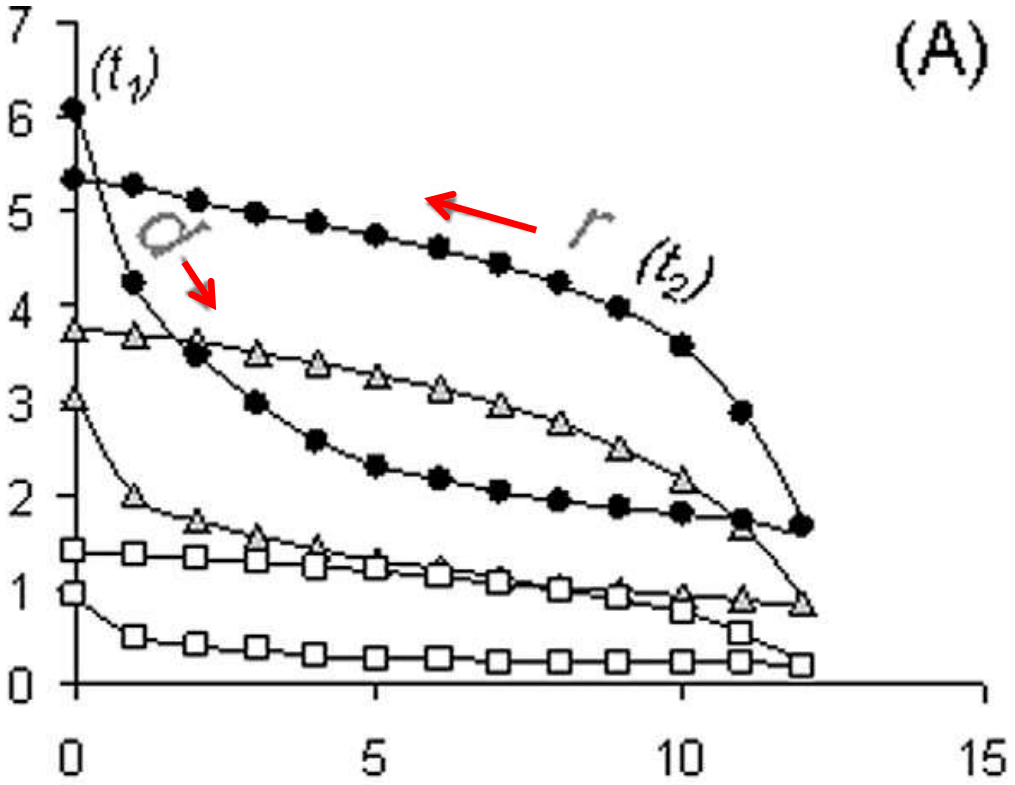
46 M Ha Degraded
Oldeman et al, 1991

Land degradation in SSA



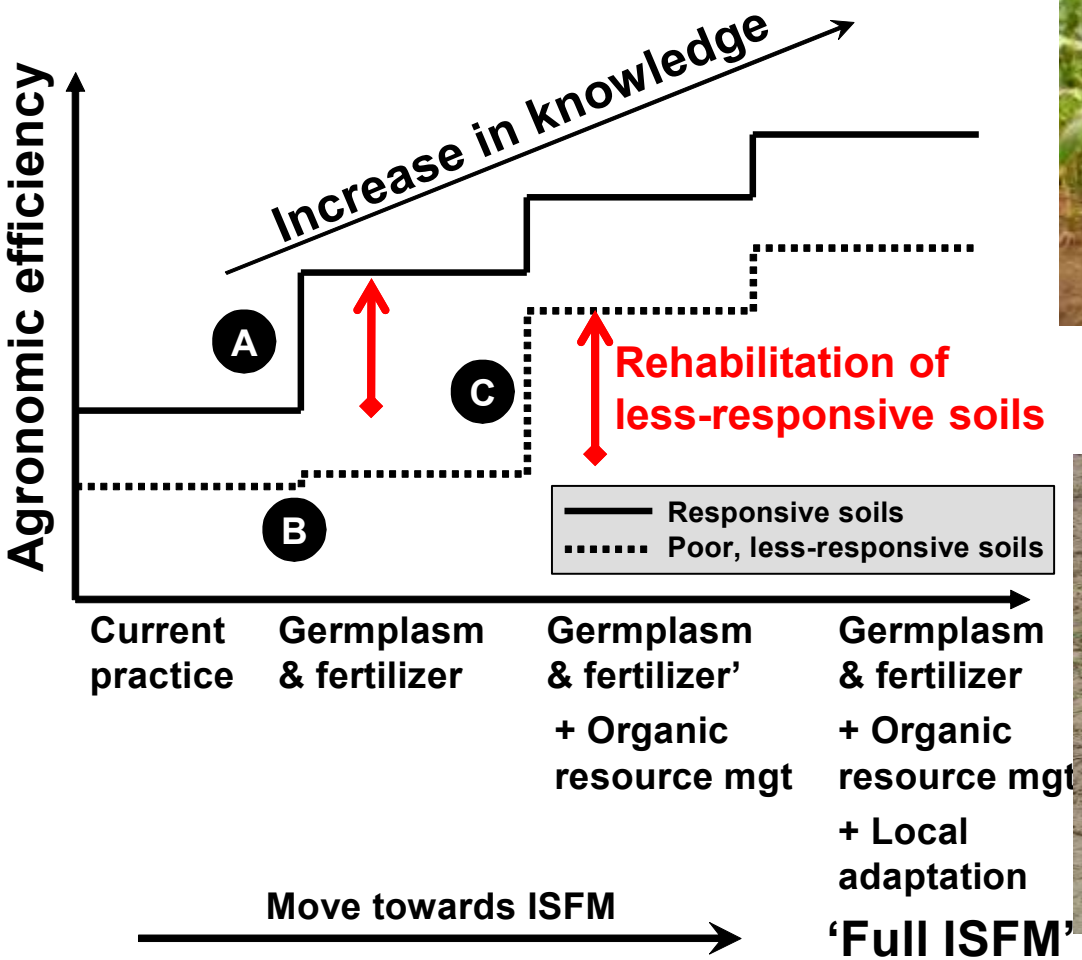
What can be done?

Hysteresis of land degradation and restoration



Tittonell et al, 2008

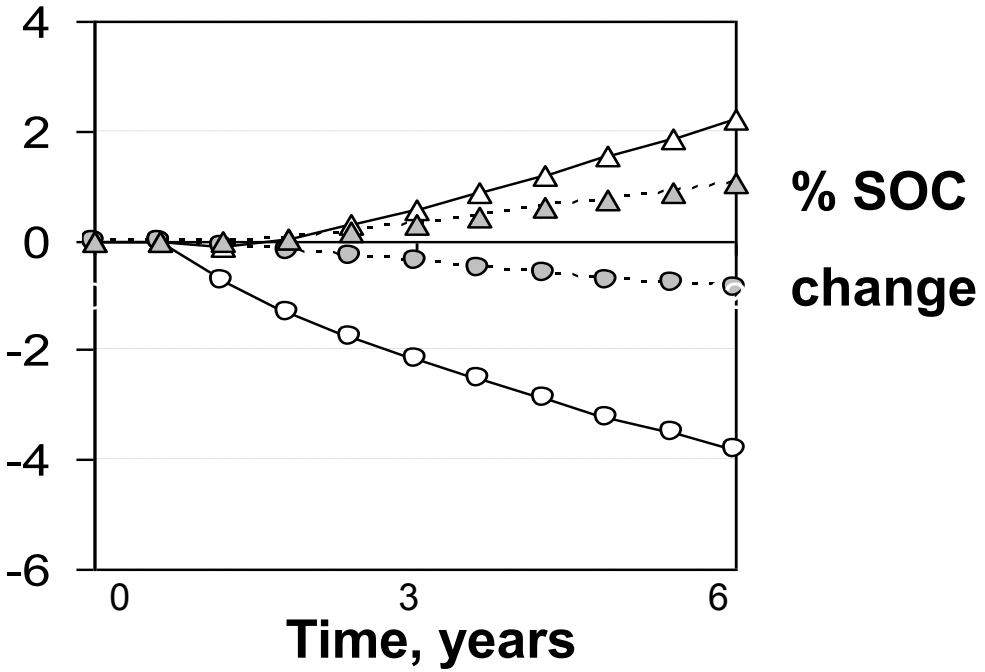
Integrated soil fertility management



Rehabilitating degraded soils

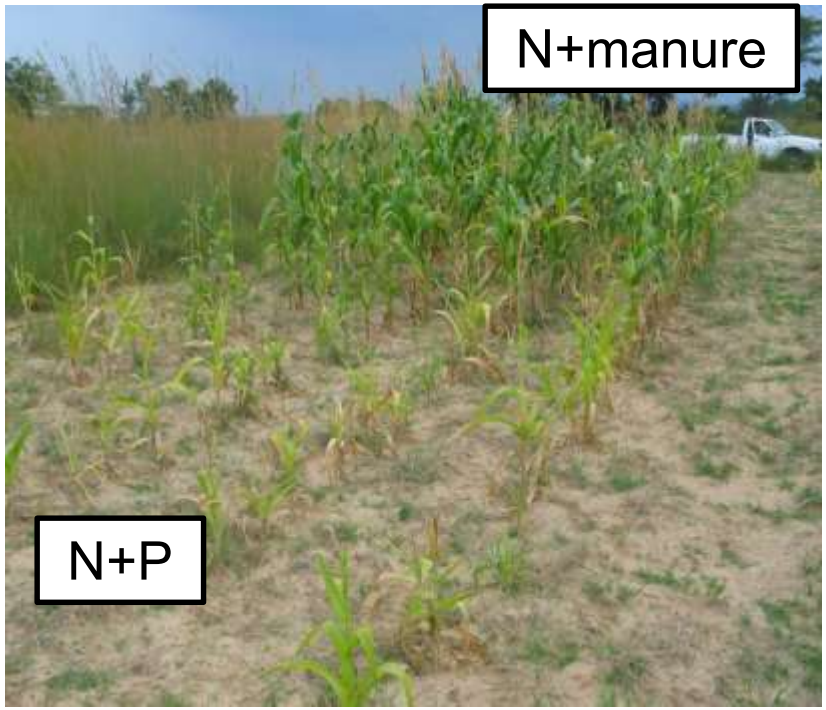
Appropriately addressing nutrient deficiencies

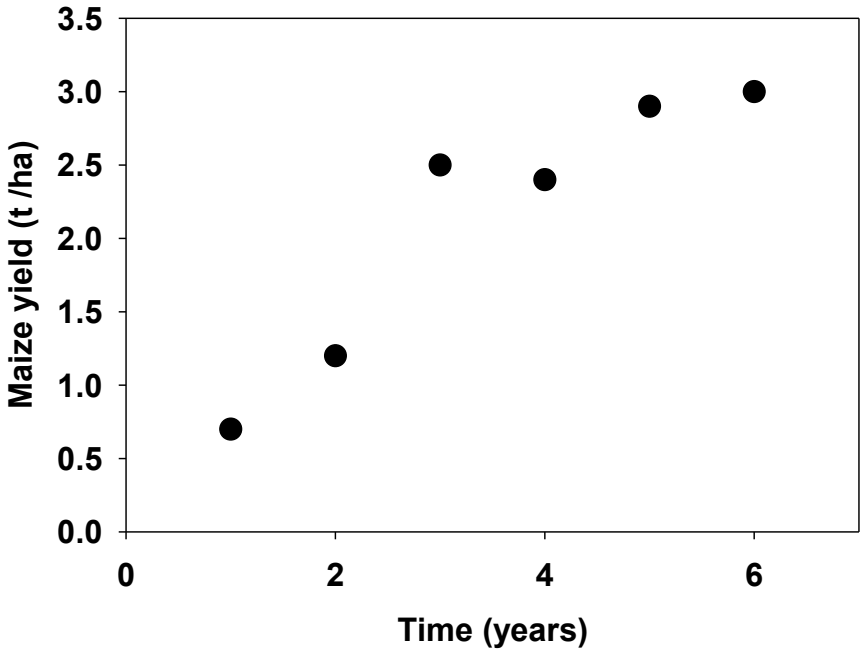
Rehabilitating degraded soils



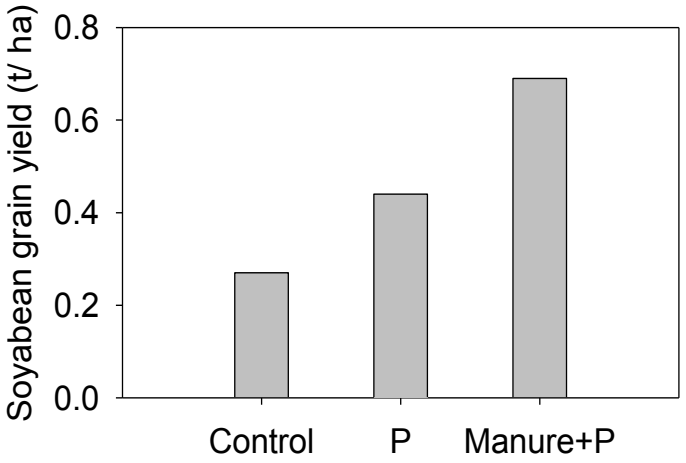
Balanced nutrient management and retention of crop residues

Rehabilitating degraded soils





Rehabilitating degraded soils



Adapted legume germplasm with P application

Rehabilitating degraded soils

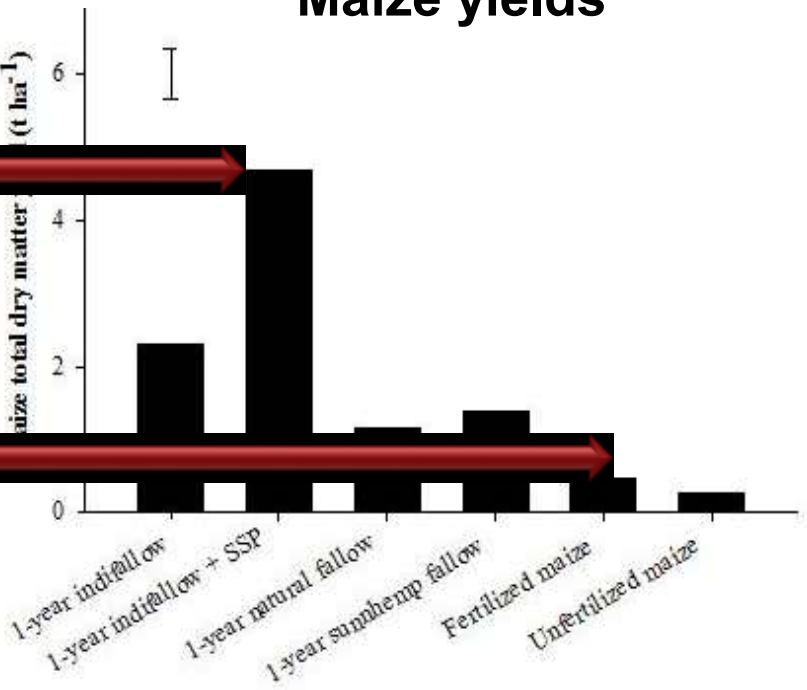
Conservation Agriculture

Rehabilitating degraded soils

Indi-fallows

Rehabilitating degraded soils

Maize yields

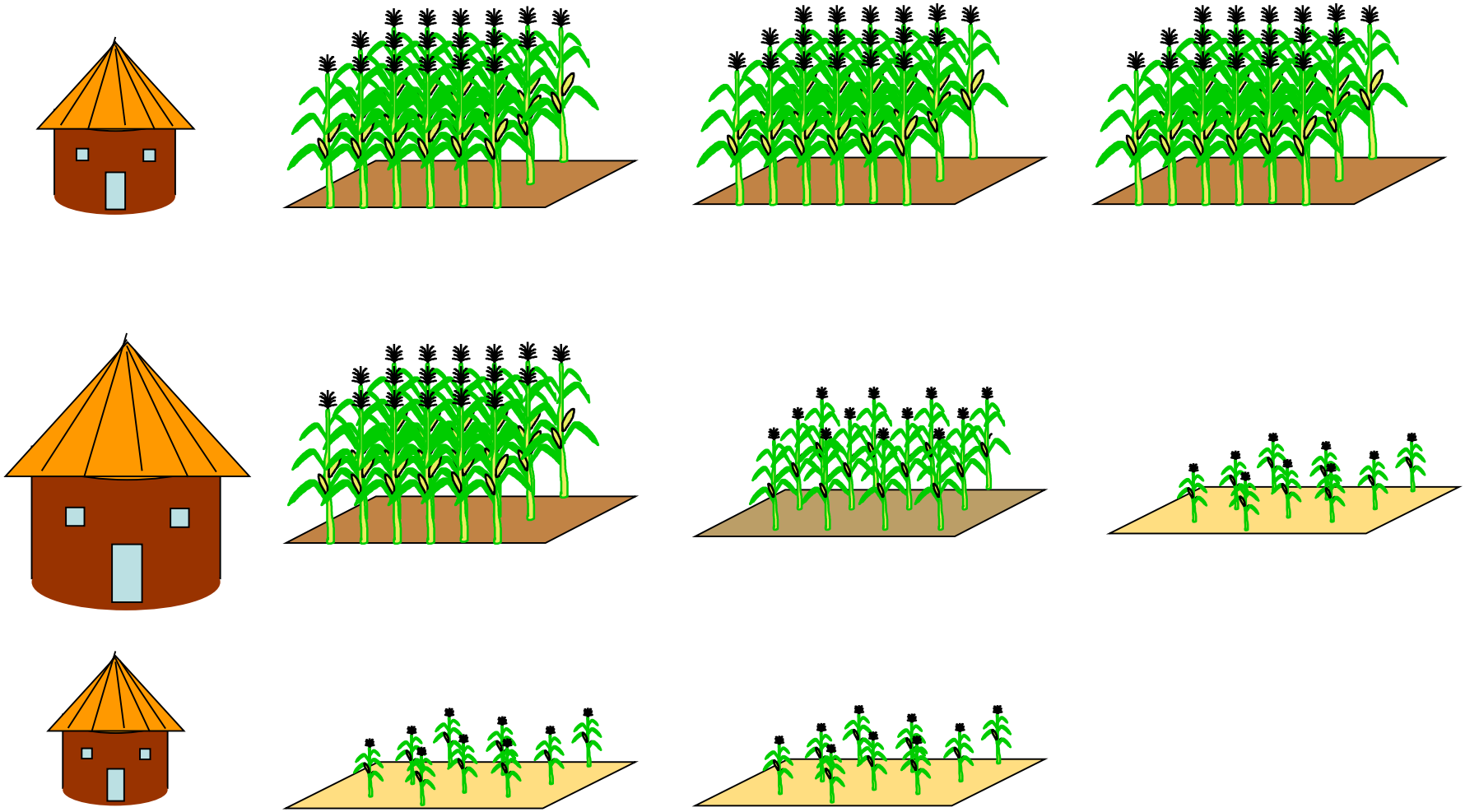


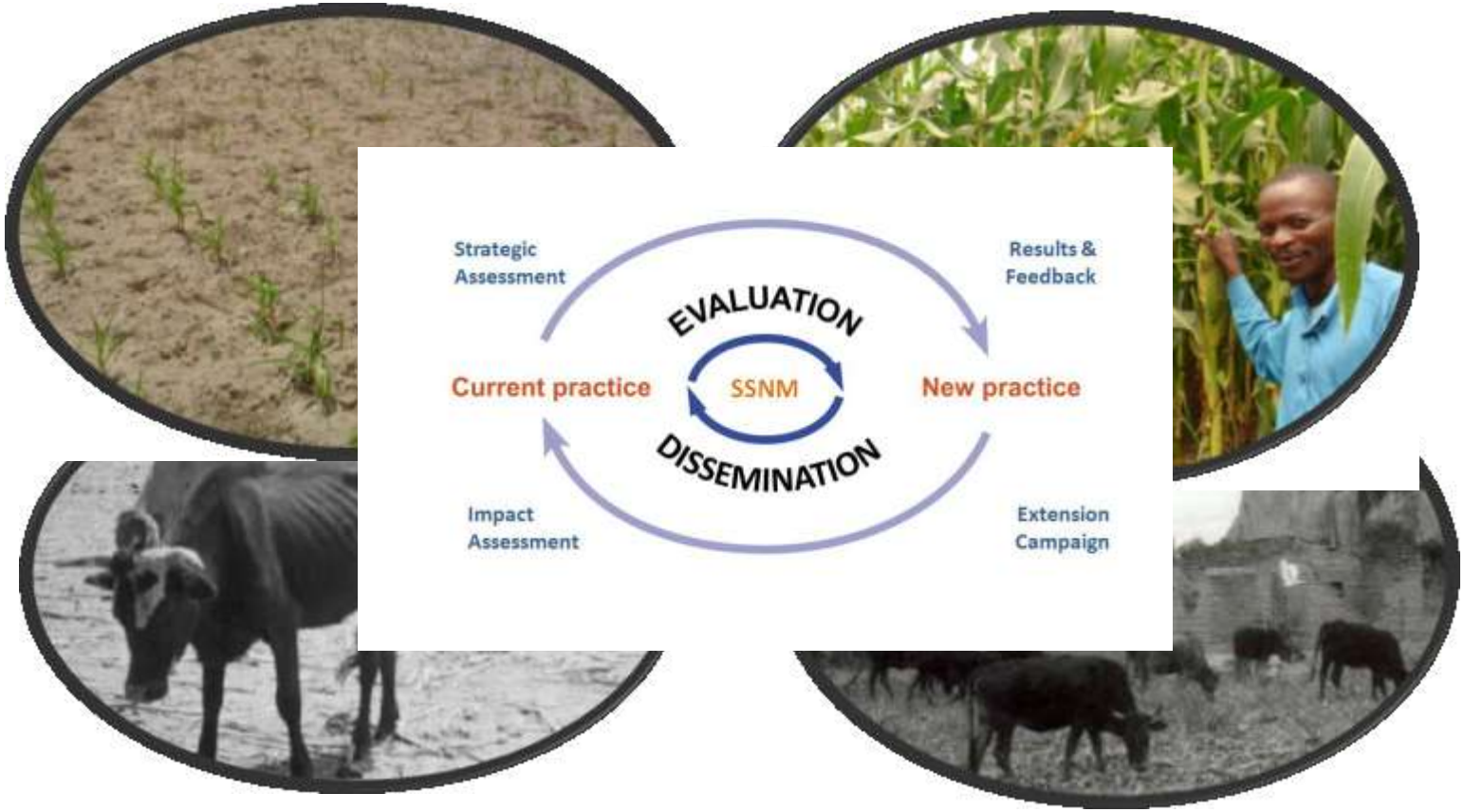
Indi-fallows

Rehabilitating degraded soils

Agroforestry

Rehabilitating degraded soils





- No ‘quick fix panacea’ to restoration of degraded cropland
- Integrated approaches necessary to develop effective interventions that recognize:
  - Nature and extend of degradation
  - Farmers’ biophysical and socio-economic conditions
  - Spatial and temporal dimension

Thank you

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