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GLOBAL LEARNING AND EVIDENCE EXCHANGE

CLIMATE-SMART AGRICULTURE

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Improving Food Security Through Restoration of Degraded Land to Build Climate Resilience

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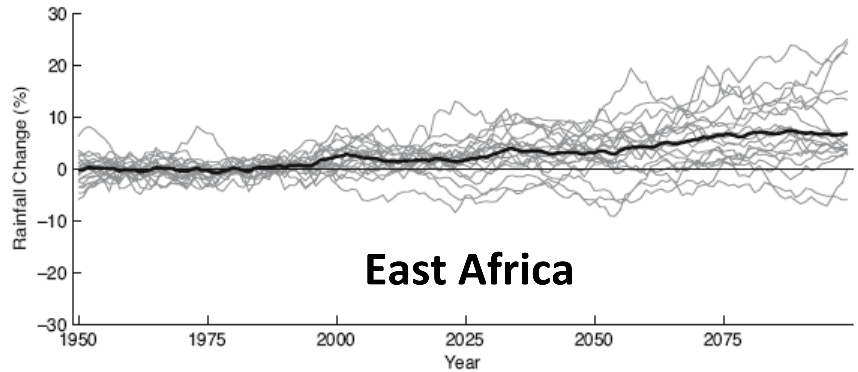
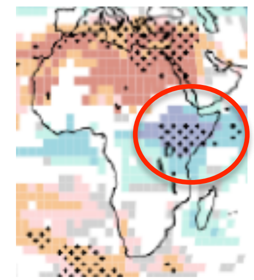
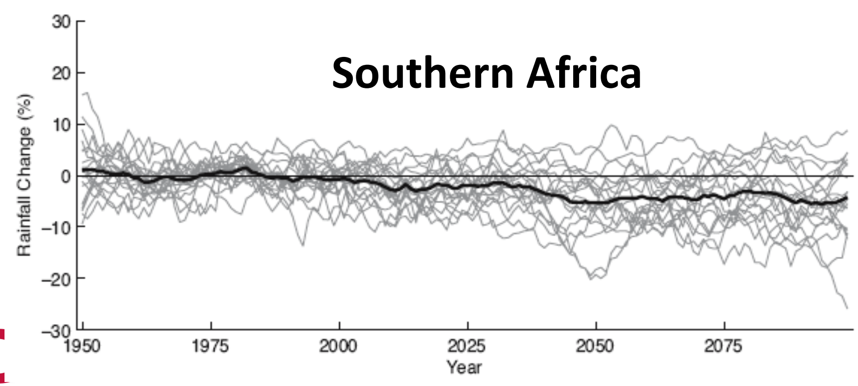
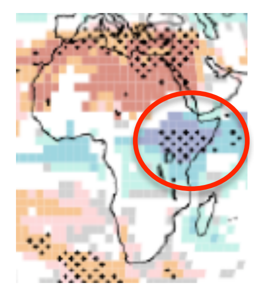
WE TYPICALLY APPROACH CLIMATE VULNERABILITY THROUGH DOWNSCALING GCMs





This is for large windows.
At local level uncertainties are much larger.





Giannini et al., 2007

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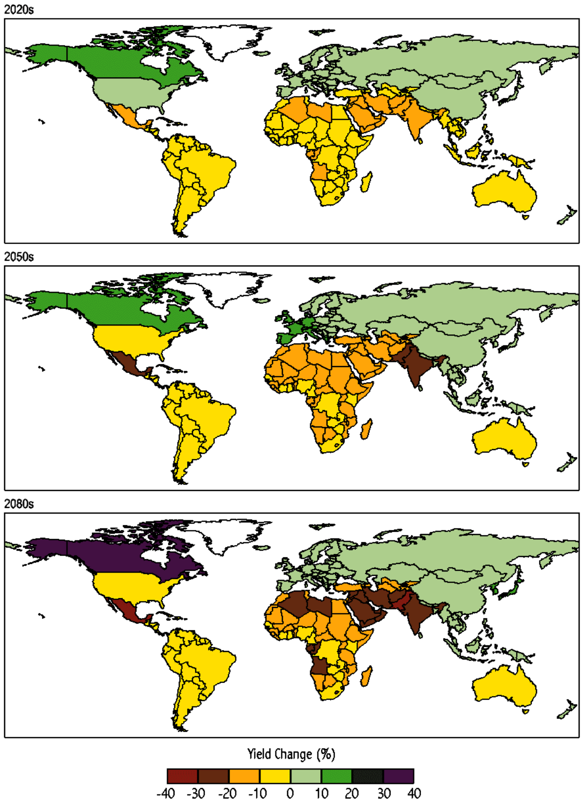
2020

2050

2080



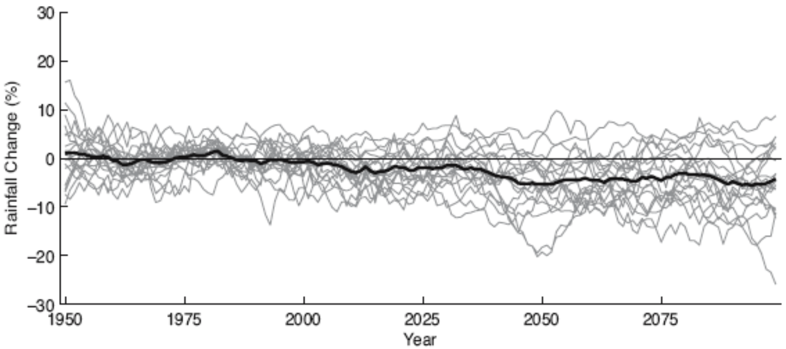
IPCC's objective was not to create scenarios for impact assessment

Percent change in crop yields for one climate change scenario and one model (HadCM2)

PROBLEM:

This is easily understood

Can be "erroneously" believed



Published articles with crop yield projections for 2020, 2050, 2080

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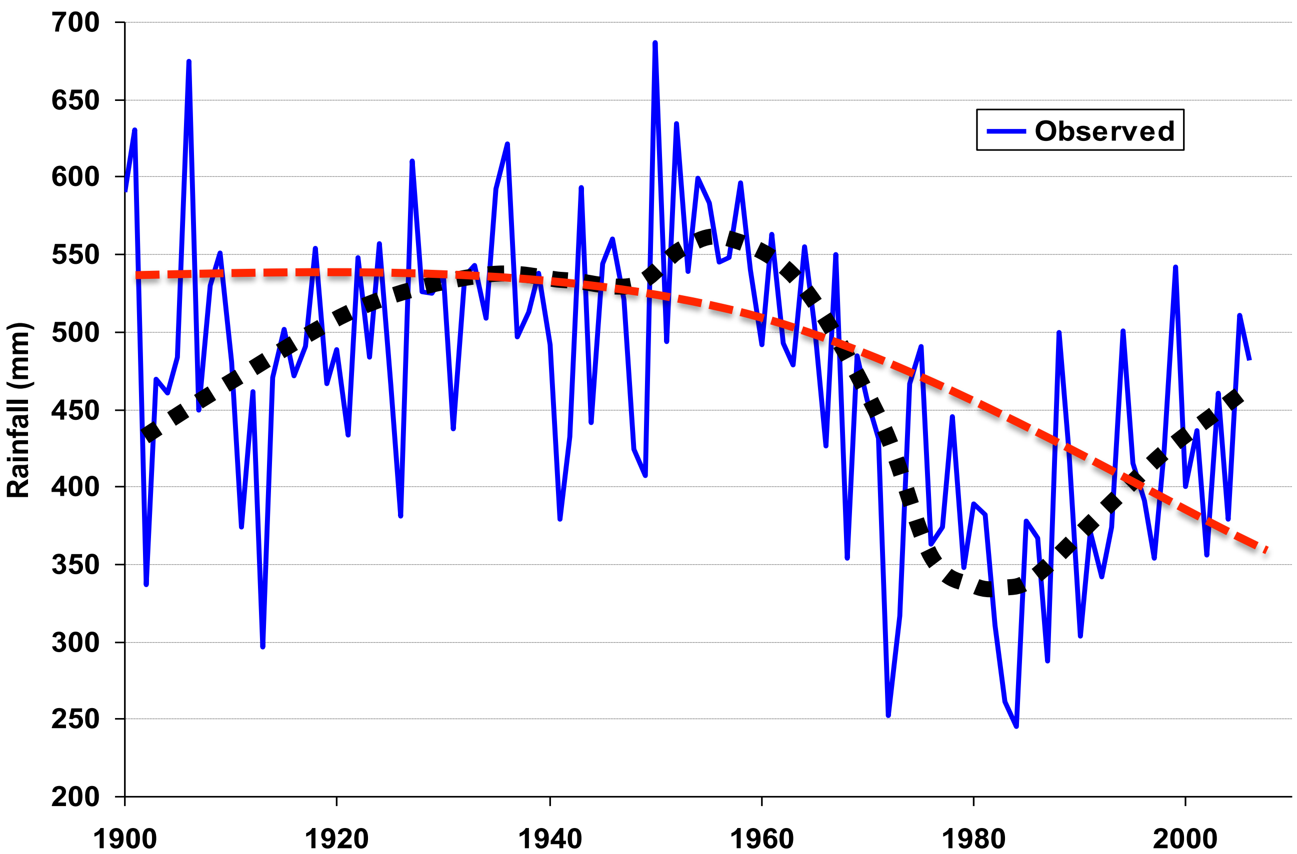
Uncertainty?

DIFFERENT TEMPORAL SCALES OF CLIMATE VARIABILITY ACROSS THE SAHEL



27% of total

"Decadal" Variability
250mm in 20 years

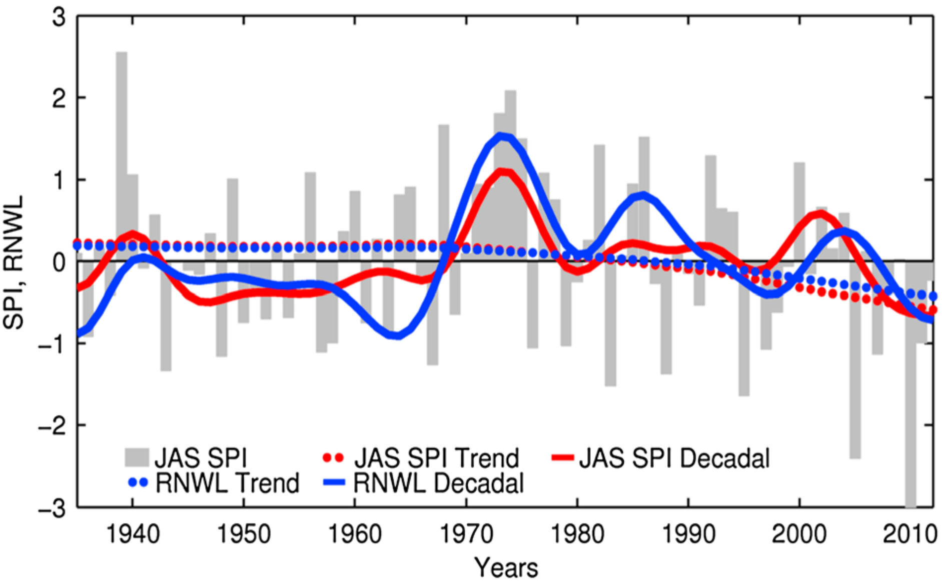
55% of total

Interannual Variability
380mm in 5 years
290mm from one year to next

18% of total

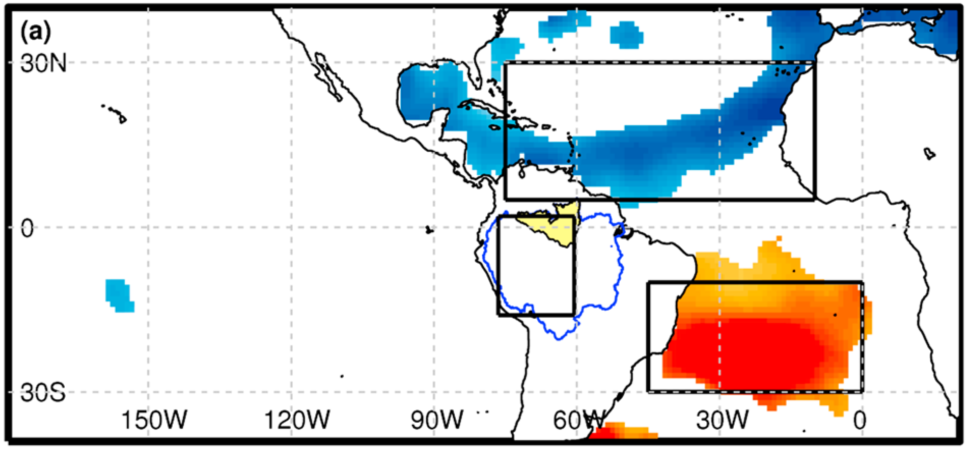
"Climate Change"
180mm in 100 years

MEDIUM TERM VARIATION IS BECOMING MORE PREDICTABLE

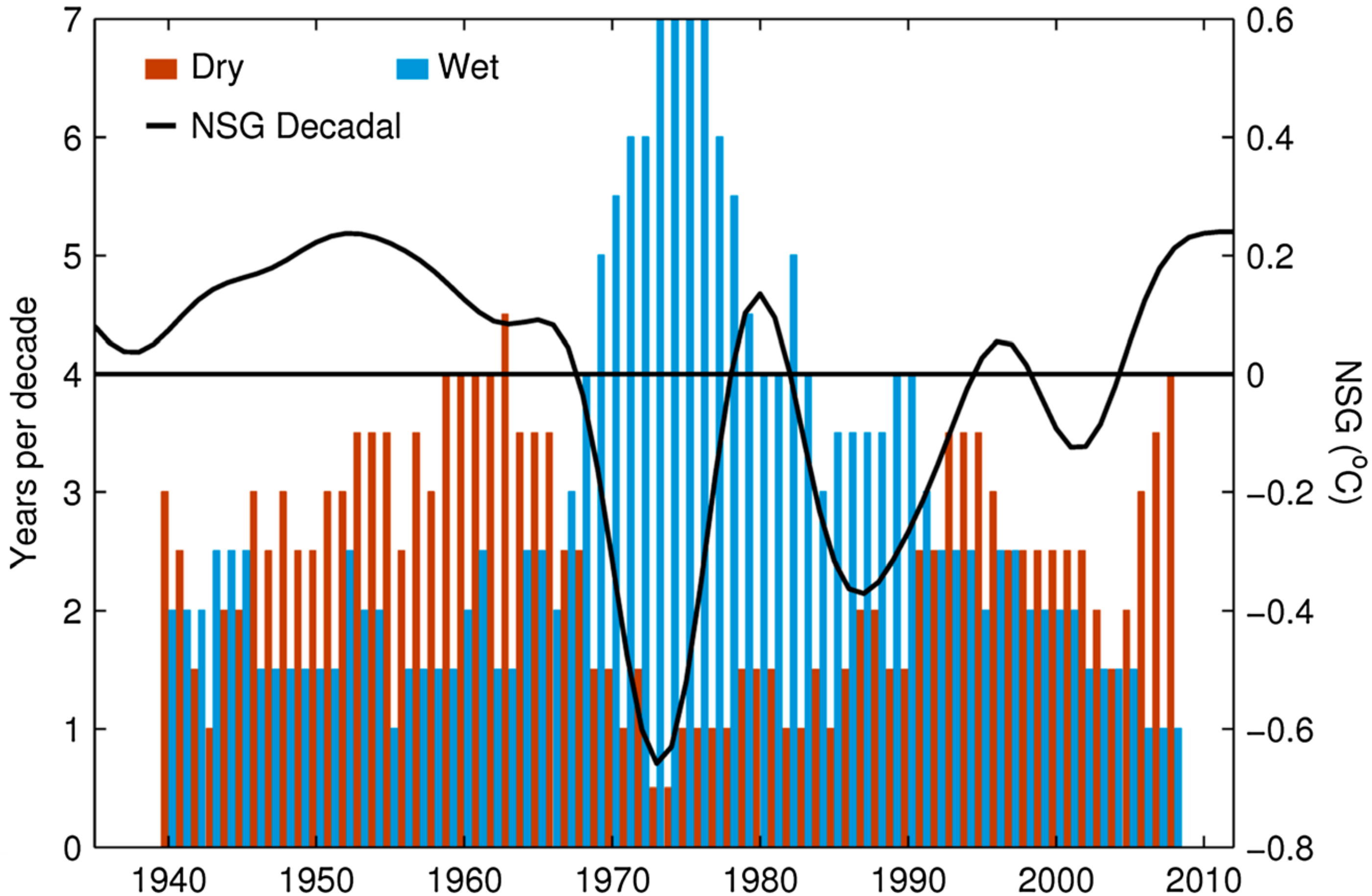


For the W. Amazon, we find good correlations between SST in the Atlantic and rainfall variability

Red = positive correlation
Blue = negative correlation



USING SST TO PREDICT DROUGHTS AND PLUVIALS



SOME MESSAGES

The majority of the total climate variability is found in the inter-annual temporal scale: much can be achieved **by improving adaptation to current climate variability**

Scenarios based exclusively on climate models are uncertain (worse for precipitation, worse at regional, even worse at local)

Scenarios focused only on “trends” (climate change) miss important information on climate variability (interannual, decadal, extreme events)

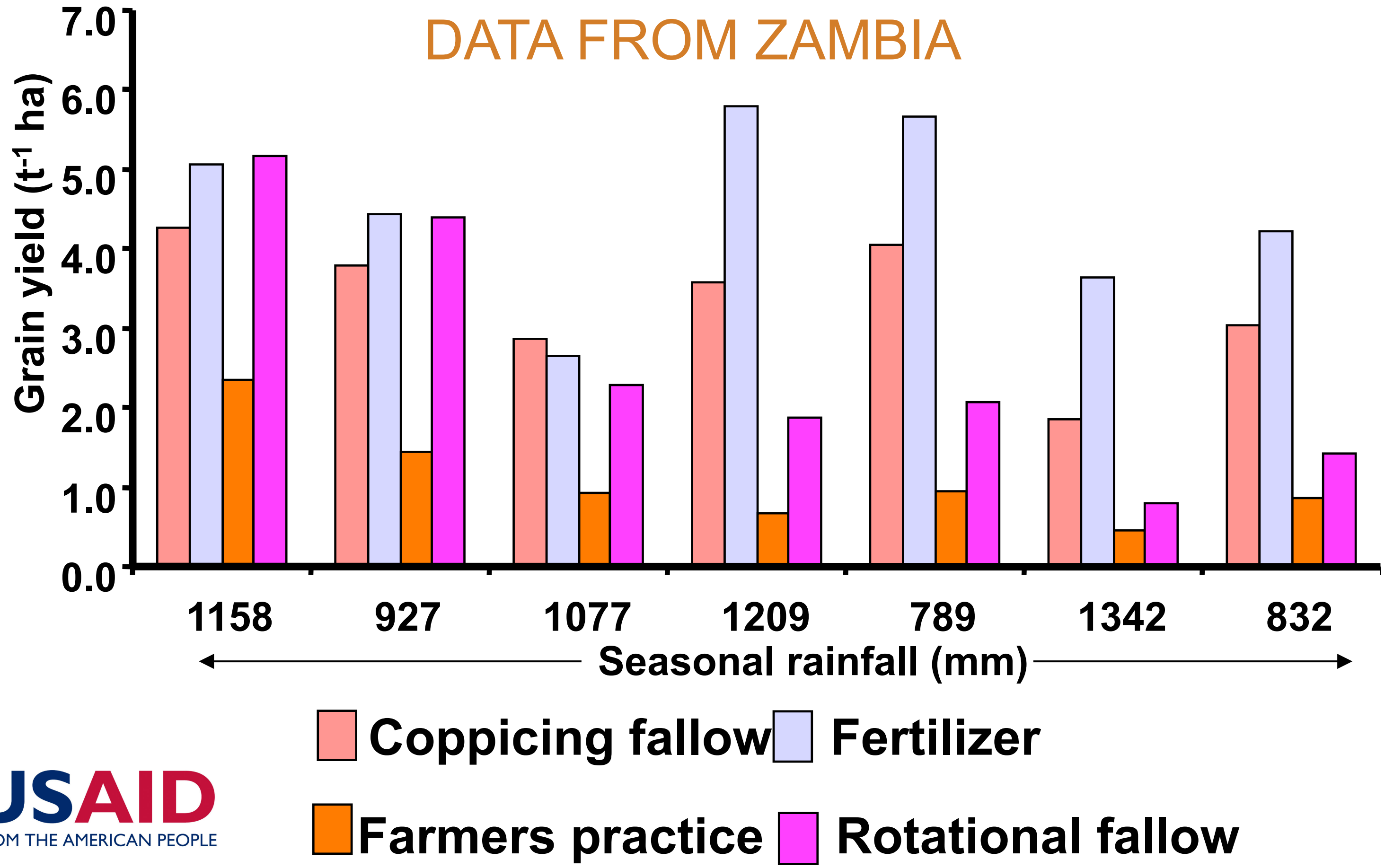
Climate models do not simulate well decadal variability (and it can be important in some regions of the world)

Degraded lands are often seen as a solution to land scarcity (e.g., solve tropical deforestation, bioenergy production).

Over the next 25 years, land degradation could reduce global food productivity by as much as 12%, leading to a 30% increase in world food prices.

RESTORING SOIL FERTILITY IS ONE GOOD WAY OF REDUCING THE IMPACTS OF INTERANNUAL RAINFALL VARIABILITY:

DATA FROM ZAMBIA



LANDSCAPE APPROACH: QUESUNGUAL AGROFORESTRY SYSTEMS IN C. AMERICA

Traditional Systems | **Quesungual AF System**

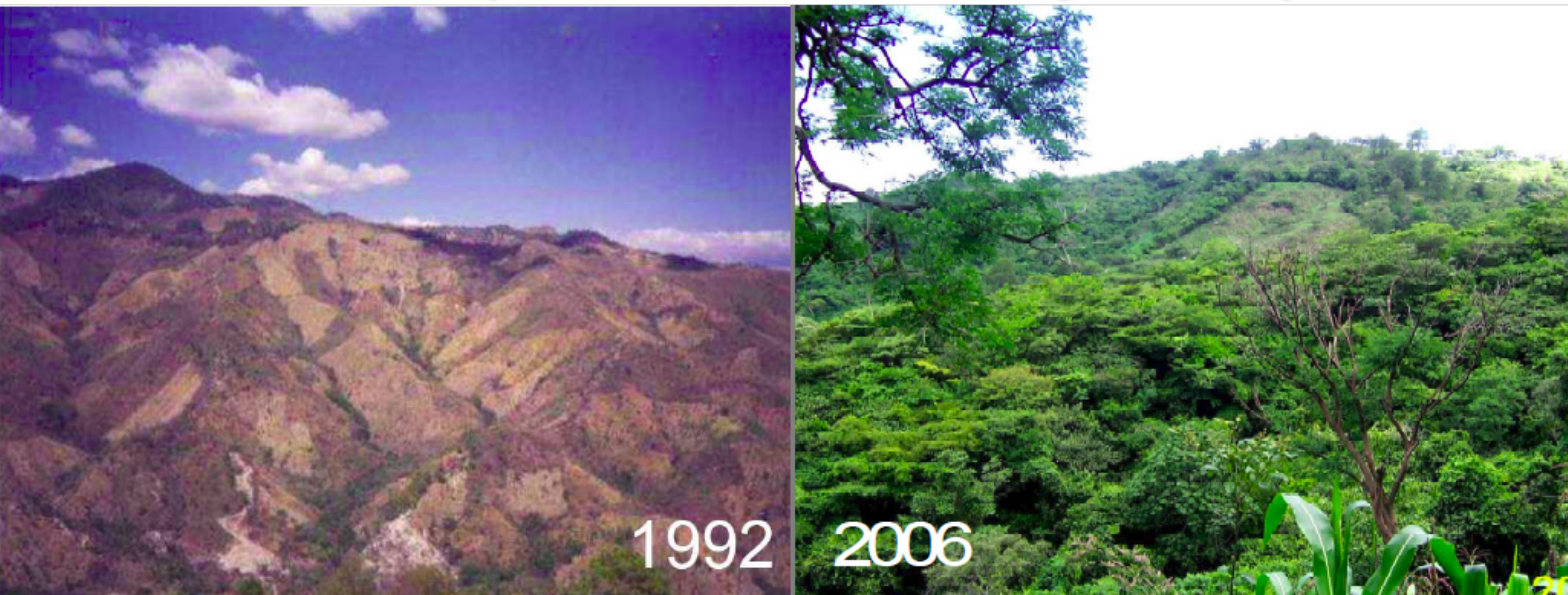
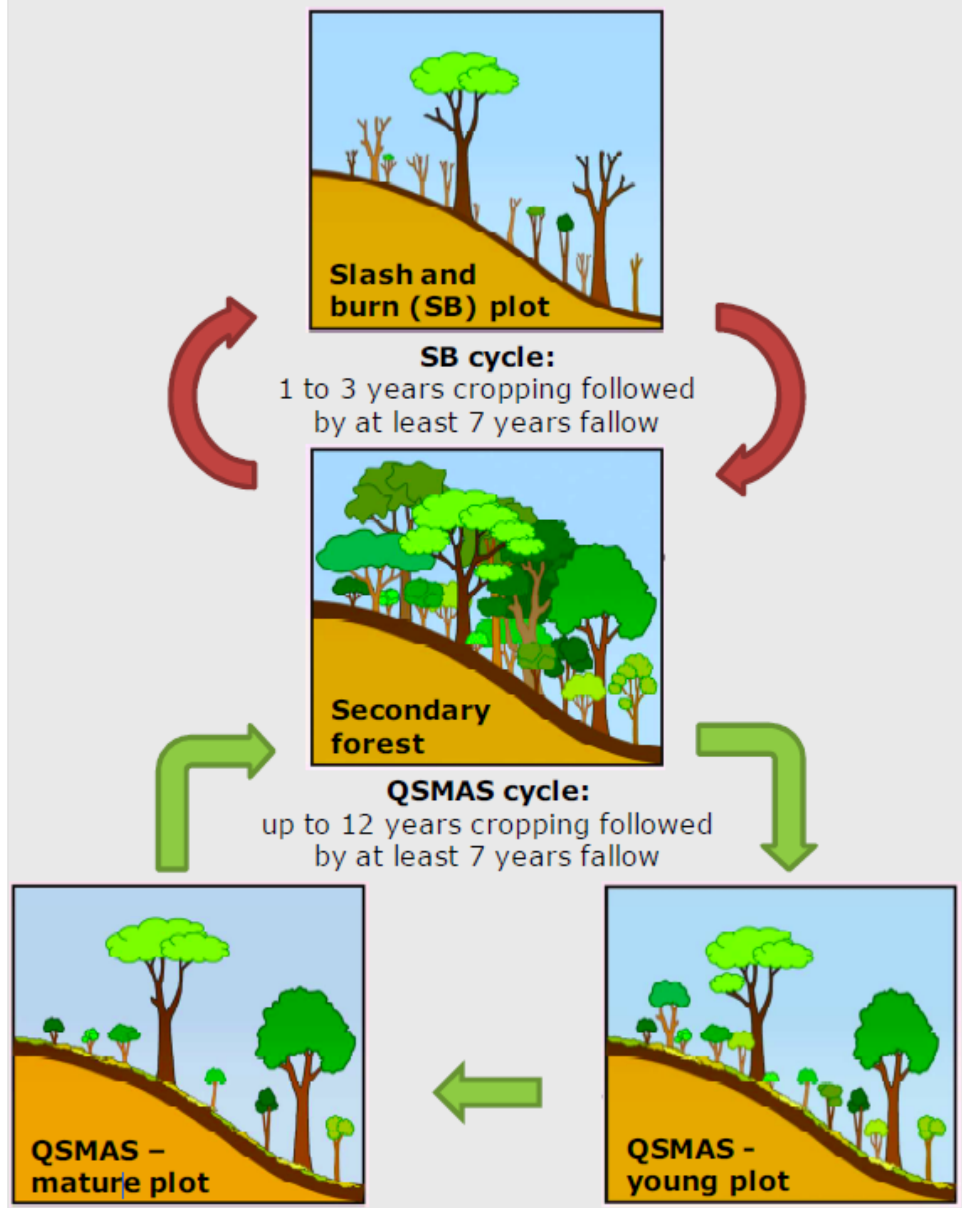


Figure I.1: Two pictures showing the contrast in the landscape attributed to the widespread adoption of QSMAS by small-scale farmers in Lempira, southwest Honduras (Source: FAO-Honduras).

CHARACTERISTICS OF THE SYSTEM

1. Slash and burn → Prune and mulch w/ natural 2º forest vegetation;
2. Permanent soil cover, through continuous deposition of biomass
3. Minimal disturbance of soil, through no tillage, direct seeding, and reduced soil disturbance during other agronomic practices; and
4. Efficient use of fertilizer, through appropriate application (timing, type, amount, location) of fertilizers.



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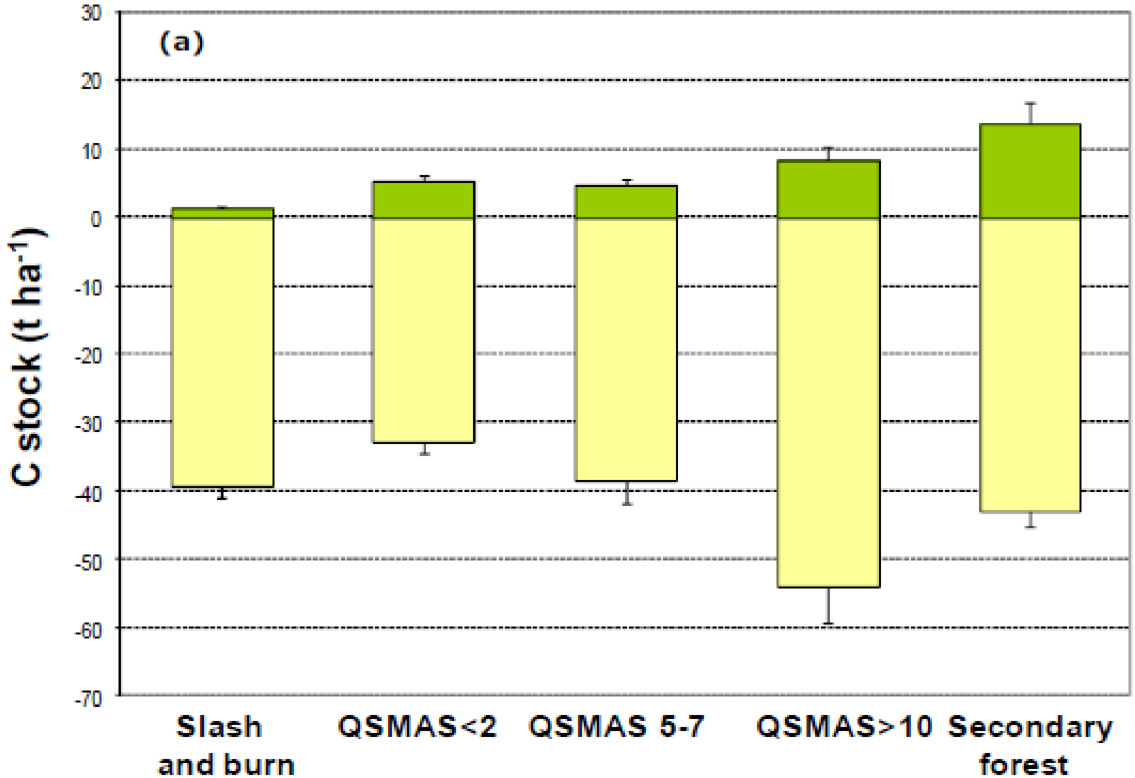
A MORE RESILIENT SYSTEM WITH IMPROVED SOIL QUALITY AND PLANT-WATER RELATIONSHIPS

The quesungual system moderately improves annual yields, but extends the time between fallows so fields are more productive

Fallows can also be extended because of longer production, recreating the mosaic landscape



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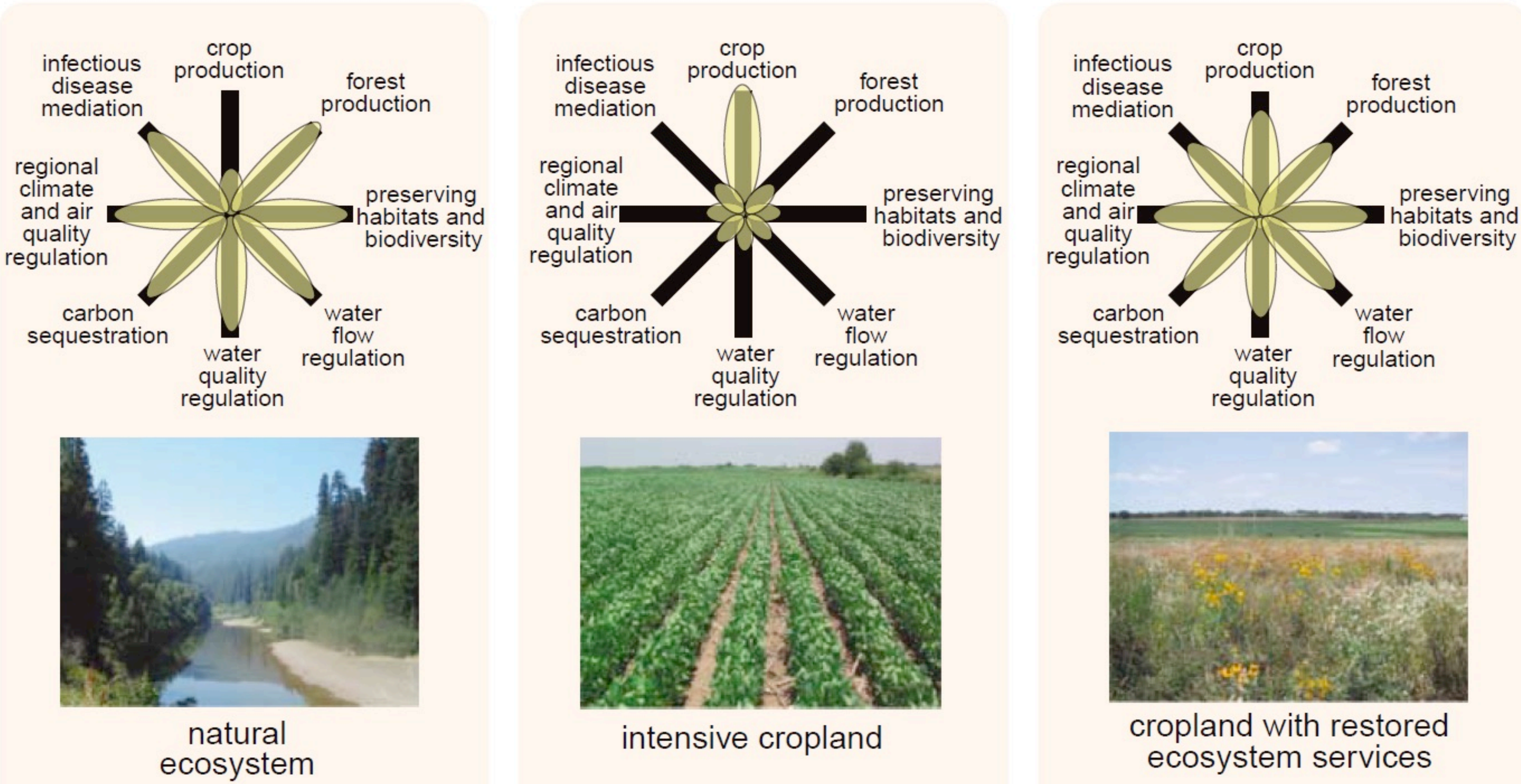
Restoration using a landscape approach seeks balance in ecosystem services



Foley et al 2005: The global consequences of land use

Learning to cope with **current climate variability** will lead to **less vulnerable societies** better prepared to confront possible scenarios of climate change. With this approach, actions are needed at a time scale that is relevant for policy makers

Restoration efforts aimed at supporting food security and economic development need to take a functional approach, with objectives for a wider range of ecosystem services

Work on **near-term climate change and restoration objectives** (10-30 years) Existing user demand: e.g. infrastructure, reservoirs, glaciers in the Andes, long-term business plans, development programs, etc.

We need to generate knowledge and evidence so that resources invested in restoration lead to **EFFECTIVE** outcomes, through **EFFICIENT** use of human and financial resources, and that produce **EQUITABLE** development outcomes

3E's

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