Case Study: Hybrid Maize Production and Climate Change in Zambia

"Sustainable intensification in Africa"

Kurt Waldman

Green revolution

- As a result of high demand for food
- Input intensive agriculture
- Works if: a) soil is good, b) rainfall is consistent

Improved seeds + fertilizer

Green revolution (2)

- Focus on “intensification”
- But doesn’t address social and environmental issues
- Intensive agriculture can lead to land degradation, land conversion, and exacerbating climate change

Unsustainable agriculture

- Land degradation leads to pressure on hillsides and erosion

- Deforestation through “extensification”

- may also reduce total soil carbon stocks, and increase emission of greenhouse gases

Sustainable intensification

"Using sustainable practices to meet rising human needs while contributing to resilience and sustainability of landscapes, the biosphere, and the Earth system to sustain the future viability of agriculture".

(Rockstrom et al., 2017).

Sustainable intensification

- Production of more food, feed, fiber, and/or fuel per unit of land, labor, and/or capital used;
- Maintained and or improved natural resource base, including enhanced ecosystems services;
- Resilience to shocks and stresses, include climate change
- Reduce agricultural encroachment into forests, preserving biodiversity and soil carbon stocks

(Pretty et al., 2011).

Sustainable intensification (SI)

In practice SI is an increase in agricultural productivity by:

- Using ecological processes
  - nitrogen fixation, integrated pest management
- Maintaining and improving soils
- Minimizing environmental hazards

Sustainable intensification (2)

Examples:

- Intercropping
  - Doubled up maize-legumes
- Evergreen agriculture
- Push-pull weed/pest management

Source: Africarising