The cheers and challenges of Conservation Agriculture programs implemented with small-scale farmers

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Current conditions

- Declining soil fertility
- Heavy tillage
- Changing weather patterns
- Drought/floods
- Declining yields
- Little to no fallow
- Lack of crop diversity
- Poor adherence to good agronomic practices

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What is Conservation Agriculture?

Conservation Agriculture (CA) is an approach to managing agro-ecosystems for improved and sustained productivity, increased profits and food security, while preserving and enhancing the resource base and the environment. CA is characterized by three linked principles, namely:

1. Continuous minimum mechanical soil disturbance
2. Permanent organic soil cover
3. Diversification of crop species grown in rotation and/or associations

-FAO, 2015

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CA Principles and Practices

Principles (*Why*)

1. Minimize Tillage

Practices (*How*)

- Planting basins, permanent ridges, ox and ripper, machines

Minimize tillage

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CA Principles and Practices

Principles

1. Minimize Tillage
2. Maximize Soil Cover

Practices

- Planting basins, permanent ridges, ox and ripper, machines
- Import mulch, crop residues
- Green manure/cover crops

Soil cover (30-100%)

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CA Principles and Practices

Principles

1. Minimize Tillage
2. Maximize Soil Cover
3. Diversify-Crop Associations and Rotations

Practices

- Planting basins, permanent ridges, ox and ripper, machines
- Import mulch, crop residues
- Green manure/cover crops
- Traditional crop rotation, cereal/legume inter-planting
- Many more practices associated with the three principles

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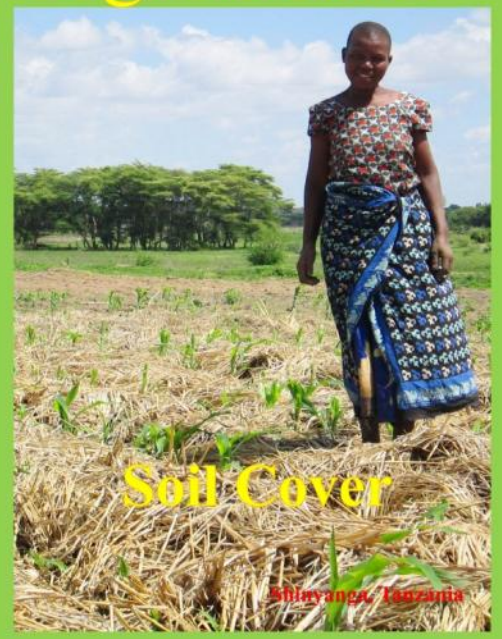
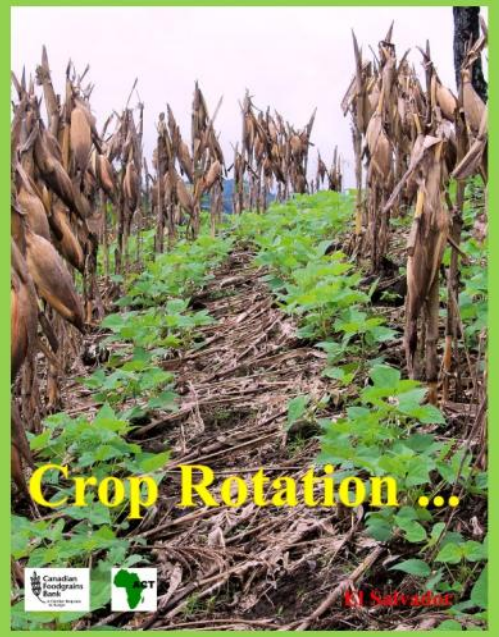
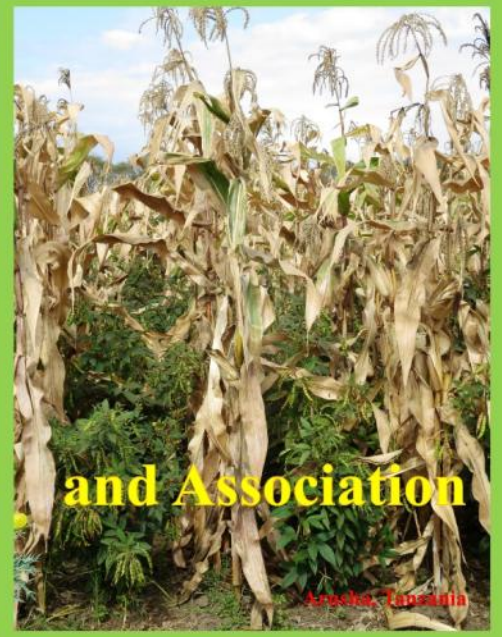
Crop association/crop rotation

Conservation Agriculture







Farming God's Way and Conservation Ag

Farming God's Way

- Focus on 6 Biblical Keys
- Prescribed set of CA practices
  - God's blanket (importing mulch-100% cover)
  - Hoe based (planting basins)
  - Crop rotation (no inter-planting)
  - Rigid plant spacing
  - Generally 'organic'

Conservation Agriculture

- Focus on 3 CA principles
- No prescribed set of practices
- Encourages farmer experimentation, innovation/adaptation of practices to each farm context
- Wide variety of technologies promoted (including fertilizer and herbicide)

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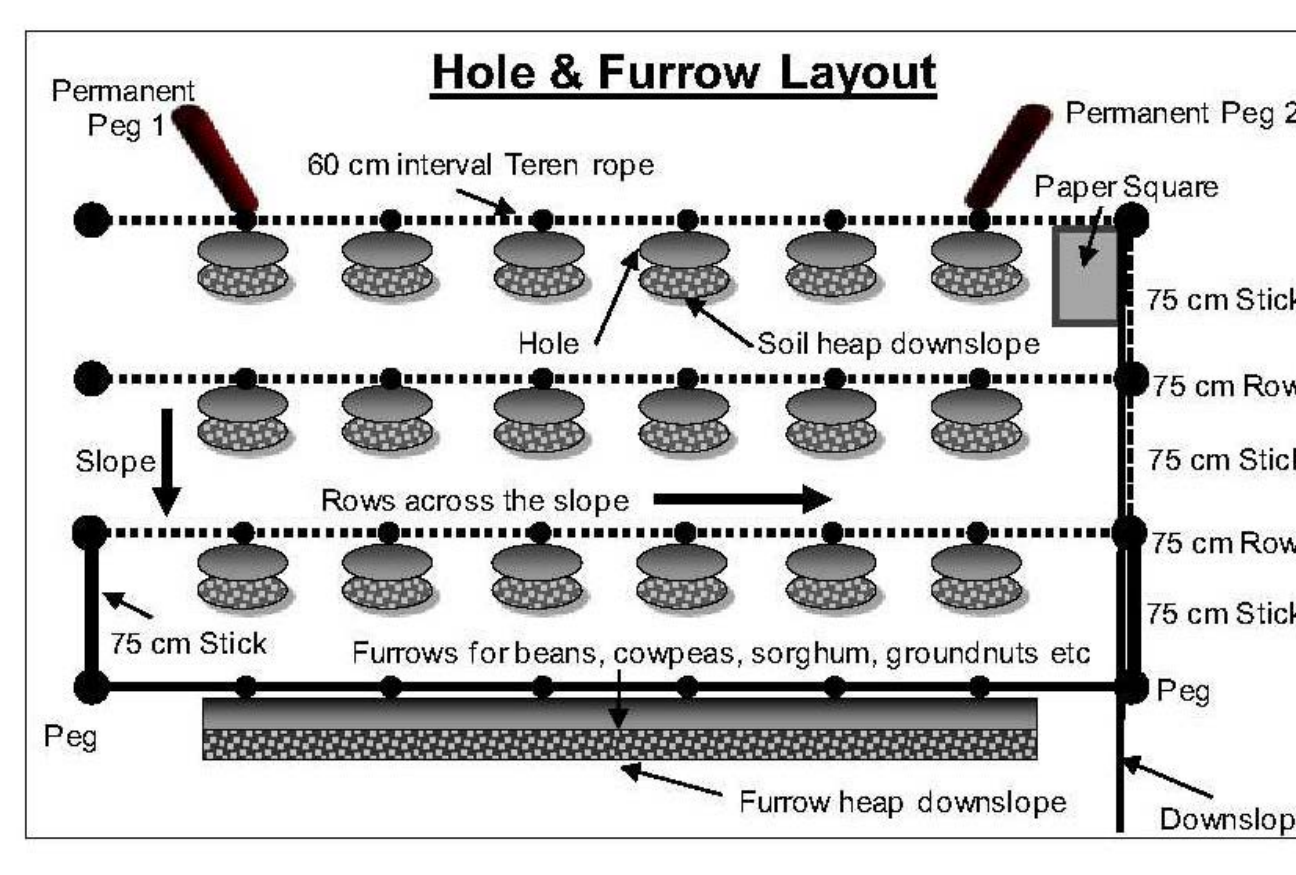
Farming God's Way is CA

- FGW taught as a set of practices that follows the three CA principles
- FGW provides a good starting point for small holder farmers
- Biblical principles of FGW and Creation Care can be integrated into programs that promote CA



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Conservation Ag in Eastern Zambia

- Low rainfall, poor soils, recurring drought
- Started with FGW, hoe-based
- Partner focus on organic production (discouraged chemical fertilizer)
- Low adoption and generally no more than a quarter acre under FGW

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- Constraints to CA adoption
  - Lack of manure limited scale up beyond a quarter acre
  - Labor constraints when using a hoe
  - Burning and livestock pressure on mulch
  - Weed pressure
- Drivers of adoption
  - Increased yield and soil moisture
  - CA technology (chakka hoe and ripper)
  - Supportive policy environment
  - Multiple organizations promoting CA

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Increased application of CA by:

- Encouraging farmer innovation and experimentation
- Lead farmer model
- Encouraging manure/compost and fertilizer
- Training on the use of the ripper
- Promoting intercropping
- Training on use of green manure/cover crops
- Herbicide use

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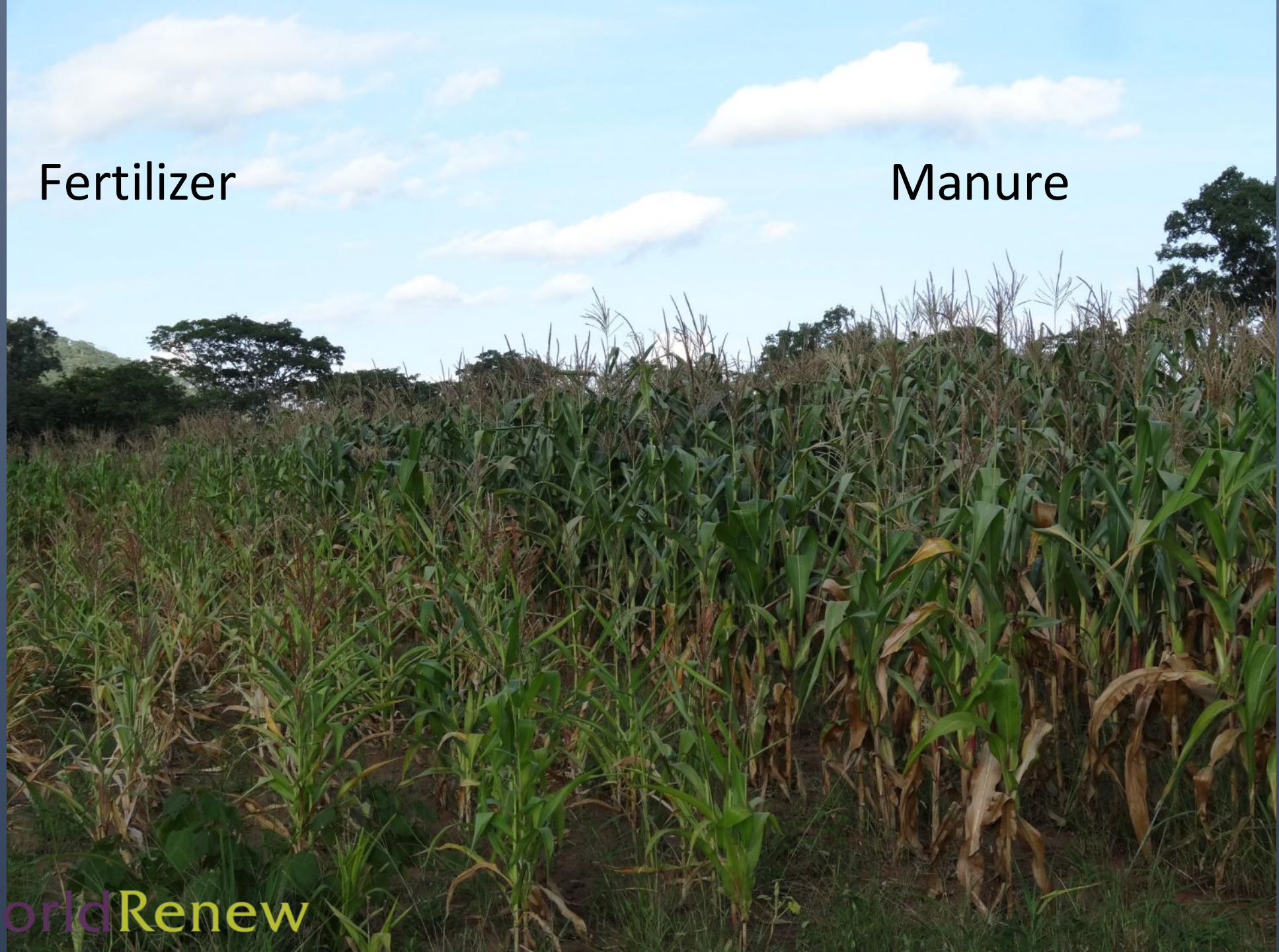

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Mozambique – Niassa Province

- Good rainfall but poor soil fertility
- Improper spacing/density
- Started with FGW – basins flooded
- Strong tradition of ridging and intercropping (Indigenous legume intercropping - pigeon pea, mucuna, cowpea)
- Fear that mulch=termites

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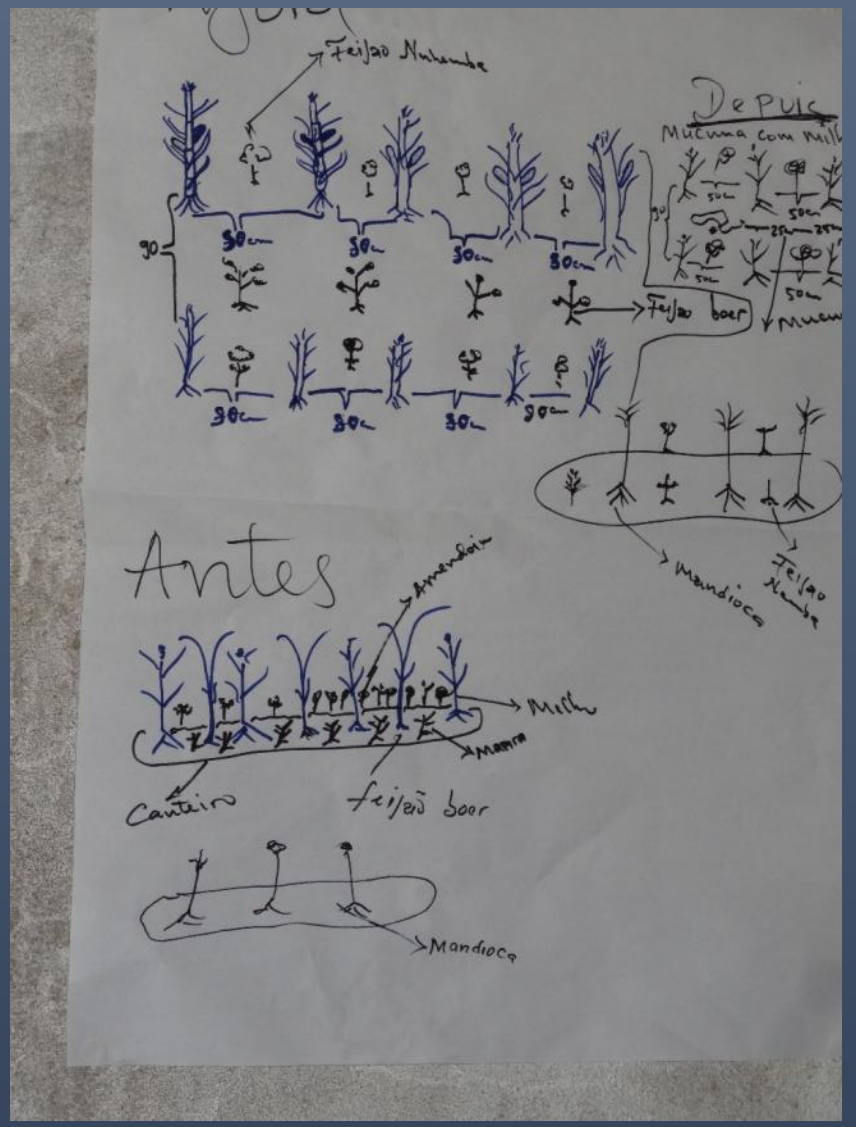
Mozambique Program strategy

- Emphasis on *WHY* rather than *HOW*
- Farmer-groups designed experiments
- Focus on good agronomic practice, spacing, plant density, GMCC
- Building on traditional systems with incorporation of minimizing tillage



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Some Lessons Learned in Conservation Agriculture in Kenya during the last 4 years

Stephan Lutz

Program Consultant

World Renew Kenya

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WHAT'S THE CHALLENGE?

Recurrent drought/flooding

Low crop yields/Degraded environment/Poverty

Chronic food insecurity

Emergency food relief/Dependency

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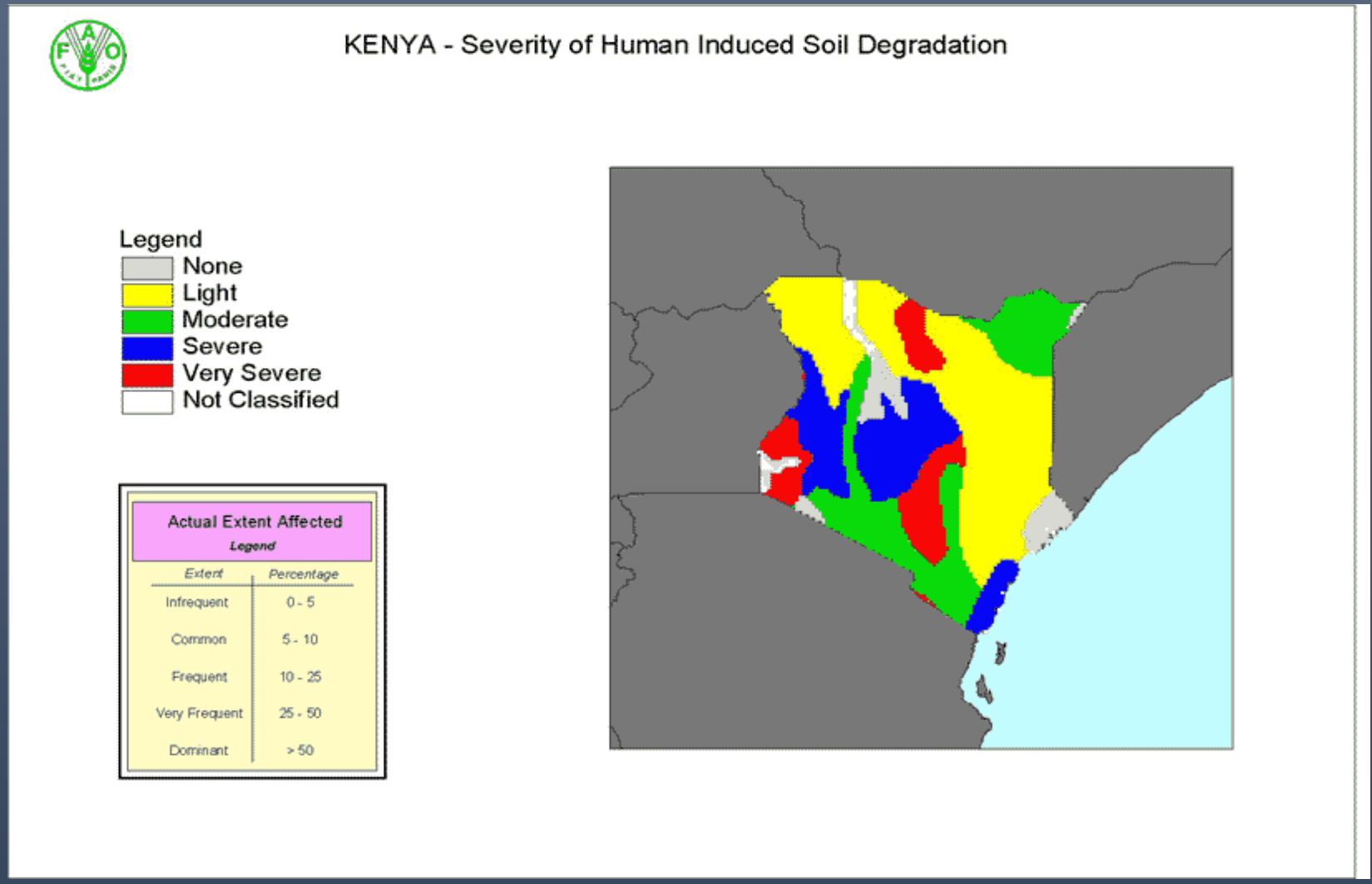
Extreme Weather Patterns

Increasing Occurrences of Drought and Floods

Extent of Human-induced soil degradation in Kenya

- **93% of land is degraded:**
- Light 41%;
- Moderate 22%;
- Severe 19%,
- Very severe 11%



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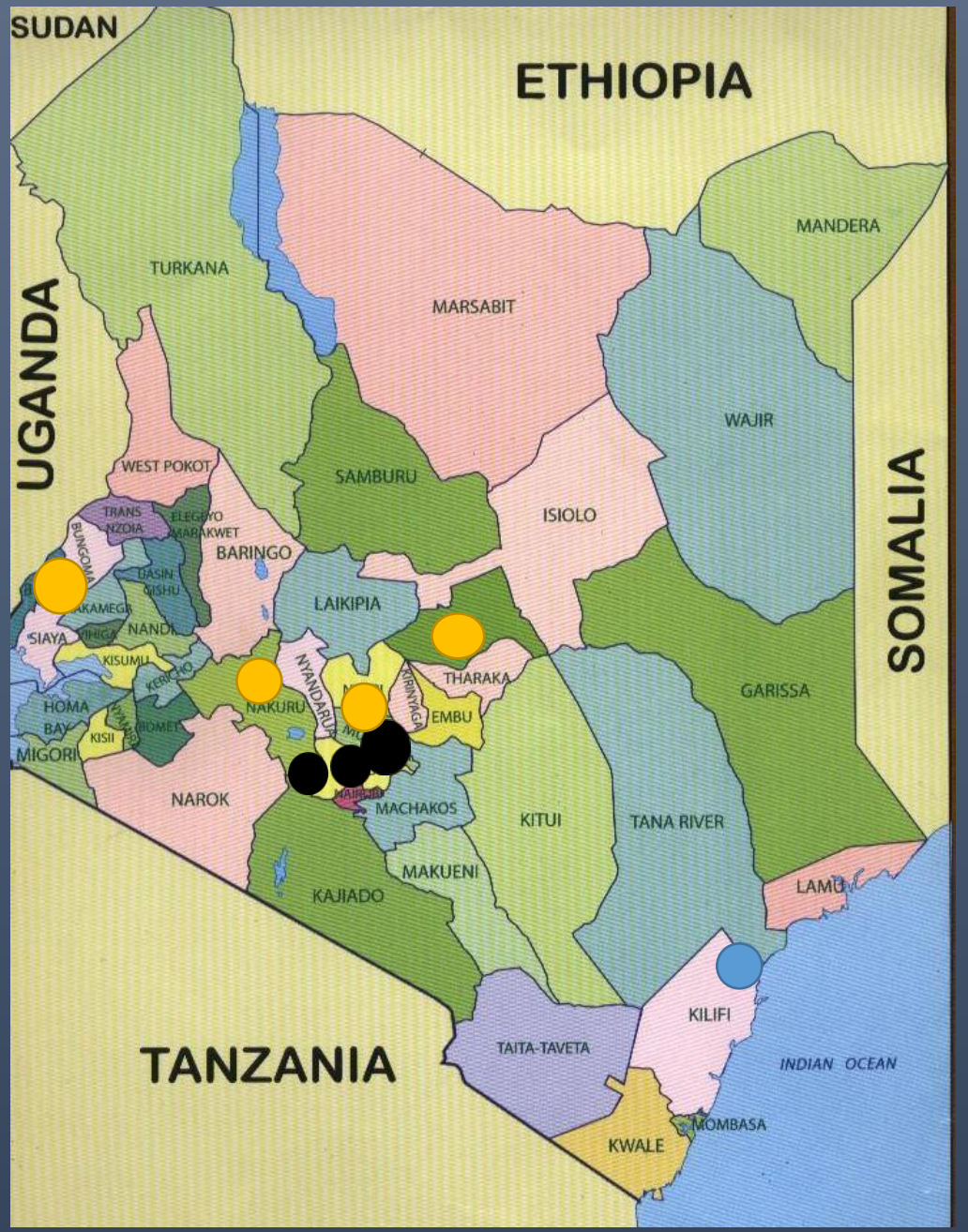
Current and near future World Renew “Conservation Agriculture” interventions in Kenya since 2012



Current

Near Future

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World Renew works globally through church partnerships. In Kenya, we partner with the Anglican Development Services (ADS), the relief and development arm of the Anglican Church of Kenya.

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CA farmer plot in Muranga County, Central Kenya

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Champion Farmer Couple in Ndeiya, Central Kenya who experimented with growing potatoes in their **traditional** way (left) and using **CA methodology** (right)

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Some observations from of an “Empowered Community”

- Bring out their issues without fear and implement what they have learned
- Identify, mobilize, and utilize their local resources to their fullest extent
- Organize themselves and work together to achieve their own community plans
- Confidence to speak out against injustice wherever they are encountered
- Holding themselves and stakeholders involved mutually accountable

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Through a participatory appraisal process (PRA), a farmer group in Western Kenya identifies the crops they grow and prioritizes them according to use, yield, taste, market and other criteria they have identified themselves.

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Having a Focus Group Discussion (FGD) with a women's group in coastal Kenya about issues ranging from community needs to gender inequality to local politics. These discussions help outsiders understand the local context better and at the same time give an opportunity for community members to express themselves.

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Community members excavating their own water retention pans in coastal Kenya

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Cheers and Challenges observed in implementing CA programs in Kenya

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Cheers:

- CA plots are most likely to produce some harvest especially in erratic rainfall seasons compared to traditionally planted plots
- CA plots produce better yield and quality of crops (especially noticeable in potatoes) which fetch a better price on the market and therefore higher income
- CA saves time and farmers are able to use that time to do other things such as raise animals, do value addition or even go for a temporary job
- CA uses local resources and is in general profitable (when combined with some form of irrigation) attracting youth back into farming
- When used with cover crop systems (especially lablab in Kenya), CA can provide sufficient ground cover and improve soil fertility over time

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Challenges:

- Adopting CA requires a behavior change- especially not tilling the soil and keeping the ground covered all the time
- Mulch material needed for CA is a limiting factor in expanding CA plots - the mulch also often competes with animal feed in especially drier agro-pastoralist areas
- There is a lack of overall technical CA support available for expanding CA work in Kenya (equipment, research, advocacy, etc..)

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Complimentary interventions and recommendations:

- **Animal husbandry-** especially keeping indigenous poultry, goats, rabbits and bees
- **Water and irrigation-** accessing water for household and small plot irrigation for higher value crops (vegetables and fruits)
- **Community participation, ownership and adoption of the technology**- share this excitement with other communities and stakeholders (including local Government)

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Farmer exposure visits and practical on-farm trainings have been important components in promoting CA in Kenya

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Using home made compost and cover crops like lablab bean increases soil cover and soil fertility

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Green Manure and Cover Crop species that have been tested in Kenya according to their soil fertilizing potential and the elevation at which they are grown (courtesy Roland Bunch)

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Therefore……

- Start small plots and expand from there (20m X 20m)
- Adapt CA technology to local farming systems
- Pay attention to fertility needs of crops
- Don’t introduce too many things at once
- Identify good green manure crops that benefit the soil and that people and animals can eat
- Use farmers to train other farmers
- Take into account the needs of livestock- not just crops

Adapted from a Trip Report to the Makuyu CA program in Central Kenya by Neil Miller, January 2014

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Rather than being a fixed technology to be adopted in blueprint-like fashion, CA should be seen as a set of sound agricultural principles and practices that can be applied either individually or together, based on resource availability and other factors. For this reason, farmers are encouraged to experiment with the methods and to evaluate the results for themselves.

http://conservationagriculture.mannlib.cornell.edu/pages/about ca/advantages.html

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Thank You.
Please come continue the conversation about conservation agriculture with us during our afternoon "Meet the speaker(s)" session

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