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## 1. INTRODUCTION AND RESEARCH QUESTIONS

### 1.1 A few pillars of Kenyan agricultural policies:

- Insufficient harvests
- Soil infertility as a risk
- Climatic challenges
- Up-scaling high productive strategies

### 1.2 Principles of Conservation Agriculture (CA)

Minimum or no-tillage | Crop rotation | Soil cover

- Overcome food insecurity and soil degradation (Corbeels et al. 2014);
- Acceptable profits with high and sustained production levels (Thiombiano and Meshack 2009).

Pictured as a **win-win** approach

### 1.3 Forms of knowledge: production, transmission and hierarchy

Local knowledge has been represented in opposition to modern knowledge. However, knowledge is not monolithic nor culturally bound and knowledge frontiers are blurred (Nygren 1999).

In contexts of resettlement, as the one in Laikipia (Kenya), people integrate but also produce knowledge (Mudege 2007).

### 1.4 Research goals:

- Local understandings about soil fertility, rainfall and other factors limiting productivity;
- Farmers' views about Conservation Agriculture (CA).

## 2. STUDY AREA AND RESEARCH METHODS

April-June 2015 | Locations of Ethi and Umande (Laikipia East, Kenya).



- Visits to CA, non-CA and mixed farms;
- 53 Semi-structured interviews (~80 min each), 4 in-depth interviews and informal conversations with farmers with CA experience, farmers with no CA experience, extensions officers, employees of the ministry of agriculture, employees of non-governmental organisations (NGOs), service providers, input providers.
- Archive research.

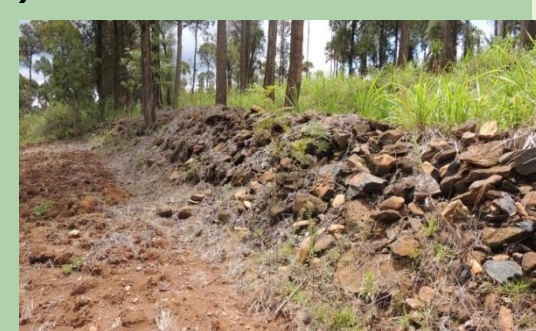
Data was coded and analysed in Atlas.ti.

64 people interviewed: **50 farmers (21 women, 29 men).**

# LOCAL UNDERSTANDINGS OF SOIL FERTILITY, RAINFALL AND CONSERVATION AGRICULTURE IN LAIKIPIA, KENYA: A QUALITATIVE ANALYSIS

## 3. RESULTS: SOIL, RAIN, CONSERVATION AGRICULTURE

### 3.1 Laikipia region timeline (from interviews and archive research)



Tillage was introduced during colonialism as a high-technological method to increase production. In Laikipia, soil erosion has been a concern after the independence of Kenya (1964).

### SOIL

### 3.2 Classification of soil fertility by farmers in Laikipia

Soil erosion, *momonhoco* (Kiswahili) "the agricultural officer brought that word in 1965 or so". [F10]

"Arable land" versus "eroded areas" (not suitable for farming). Already present at resettlement (1970-80s).



### Types of soil

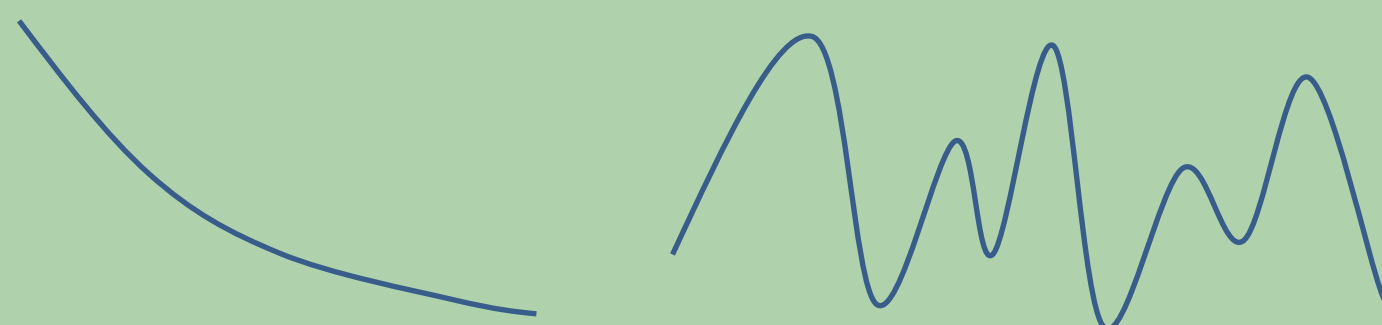
**Unoru watiri** | fat soil "with a lot inside"  
**Muhengu watiri** | "soil that can't give expectations, doesn't have enough food for the plants"  
**Mutumia ne munor** | fat soil  
**Mutumia ne mechuke** | thin soil.  
**Tūri muture** | red soil, traps the rain, easy to work  
**Mguthiru** | black-cotton soil, hard to work, does not handle intense rains  
**Gudheru** | black soil  
**Muthanga** | sandy soil.

### Fighting the "tiredness of the soil":

- manure from dung or trees;
- inorganic fertilizer;
- fallowing sections of the farm;
- crop rotation;
- leaving barriers of napier grass;
- furrows to prevent soil carriages by the rain;
- slashing the weeds and leaving them in the farm;
- mulching plus tillage for producing manure;
- weeding and mixing the weeds with the soil;
- minimum tillage (only among CA farmers).

### RAIN

### 3.3 Portrayals of change in rainfall: decreasing, cyclic and/or longstanding:



Insufficient rainfall is a major concern in crop production. Water ponds and tanks are not sufficient for irrigation. Sometimes it is difficult to ensure water for domestic consumption.

An elder woman recalls: "Men were going there for praying for *Mgai* (God). (...) There, they slaughtered a goat of only one colour. [...] When there was lack of rain, or no peace in the country".



### CA

### 3.4 What is Conservation Agriculture?

Principle most recognised is minimum tillage: CA is to "not disturb the soil" [M8].

Crop rotation is used by several CA and non-CA farmers. Mulching is rarely, if ever, achieved.

Minimum tillage ✓  
Crop rotation ✓  
Mulching or Cover crops ✗

CA in Kiswahili is *Kulima na dawa* or "farming with chemicals". "It is a way of planting without ploughing, you only put herbicides" [M26]. "For ploughing we use machines — a tractor, or chemicals — herbicides" [M21].

### Resistance to drought

About the 2014 drought: "There's a bit I got from the CA but not from the farmer's practice" [F02]. "There was no maize in the *shamba*, we planted but we didn't harvest, only small, small, but harvesting no. Even in our *shamba* of CA" [F13].

### Pre-emergence herbicides



## 5. LITERATURE

Corbeels, Marc, Jan de Graaff, Tim Hycenth Ndah, Eric Penot, Frederic Baudron, Krishna Naudin, Nadine Andrieu, et al. 2014. 'Understanding the Impact and Adoption of Conservation Agriculture in Africa: A Multi-Scale Analysis'. Agriculture Ecosystems & Environment 187 (April): 155–70. doi:10.1016/j.agee.2013.10.011.

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Nygren, Anja. 1999. 'Local Knowledge in the Environment-Development Discourse From Dichotomies to Situated Knowledges'. Critique of Anthropology 19 (3): 267–88. doi:10.1177/0308275X9901900304.

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## 4. CONCLUDING THOUGHTS

CA principles are individually conjugated with others in a mix-strategies approach.

Farmers discern soil condition and use several methods to improve soil fertility. Trouble of drought is portrayed as a long standing threat with disputable trends. Lack of irrigation systems is the main constraint to crop production.

Both CA and non-CA farmers added a feature to their understandings of CA — herbicides' use, which is not clearly stated in CA literature.

Local people produce, integrate and transfer knowledge (Nygren 1999) as they also challenge others' conceptual paradigms, like the CA's definition.

CA maybe recognised to provide slightly better yields than non-CA but it is not resistant to severe drought.

There are ethical, environmental and health issues to be discussed regarding the introduction of pre-seeding herbicides in Laikipia through CA promotion. Alternatives to managing weeds should be carefully researched.

More attention should be given to strategies that guarantee soil cover. Otherwise the success of CA in Laikipia will be limited.

## 6. ACKNOWLEDGEMENTS

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