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Agricultural sustainability in Uganda

CASE STUDY ON CONSERVATION AGRICULTURE

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CDR - CENTRE FOR DEVELOPMENT RESEARCH

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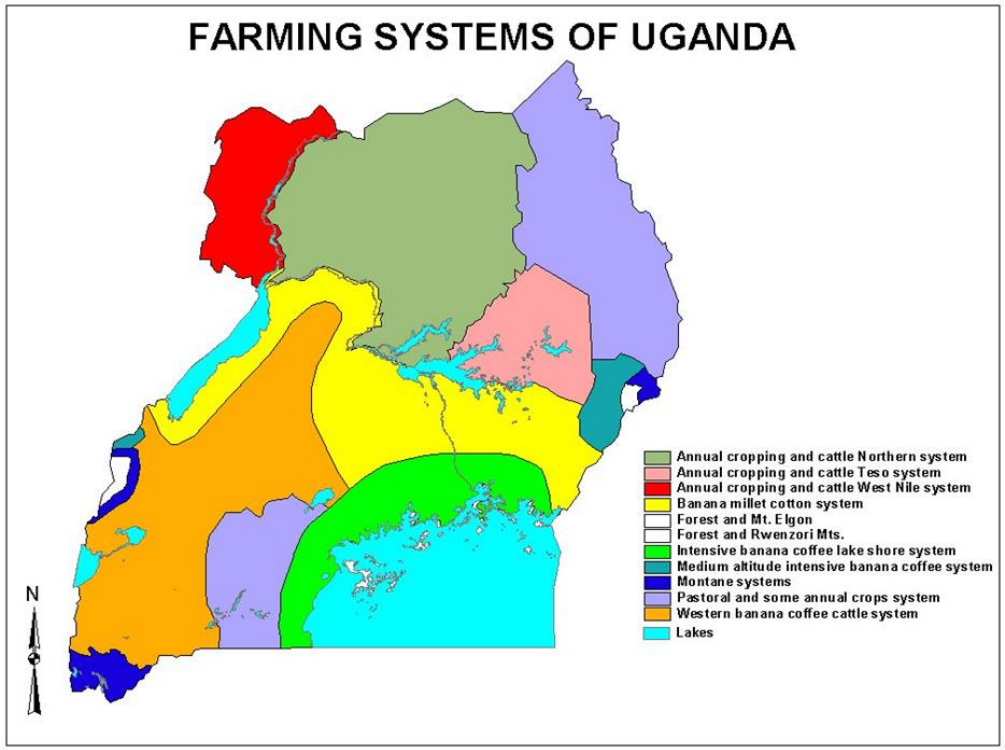
Agriculture in Uganda

- Employs 72% of the total labour force
- accounts for 54% of total exports
- Main enterprises (Cotton, Coffee,Tea, Maize, Rice, Cassava, Beans, Fish, Beef, Milk, Citrus & Bananas)
- generates 24.6% of GDP
- Av. Land holding 0.4- 3Ha per HH
- GHG emissions per capita, ~1.39 Tons CO_2

SOIL Issues

  - Nutrient depletion (farming practices)
  - climate change impacts
  - Population pressure



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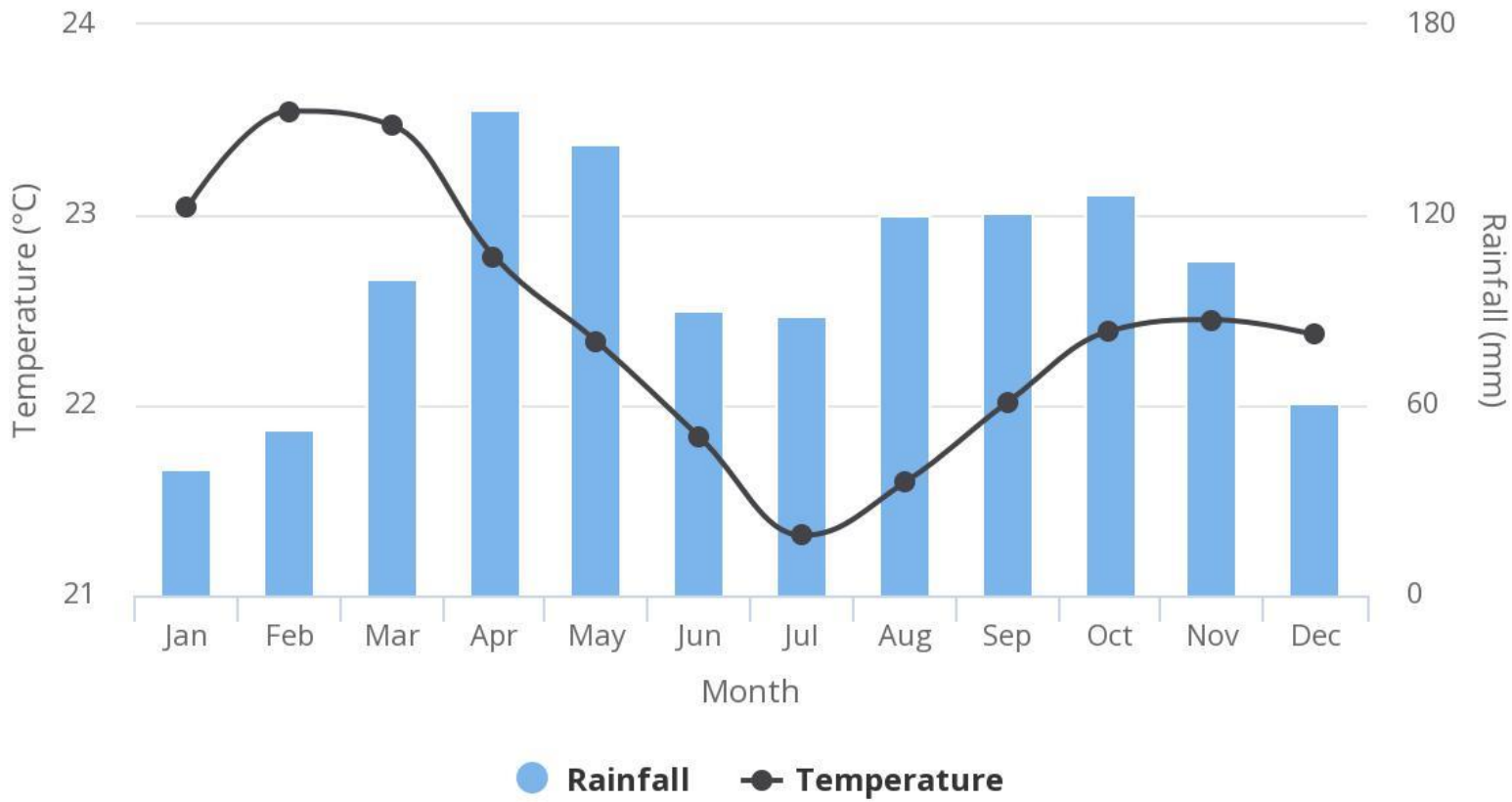
Average Monthly Temperature and Rainfall in Uganda from 1901-2016



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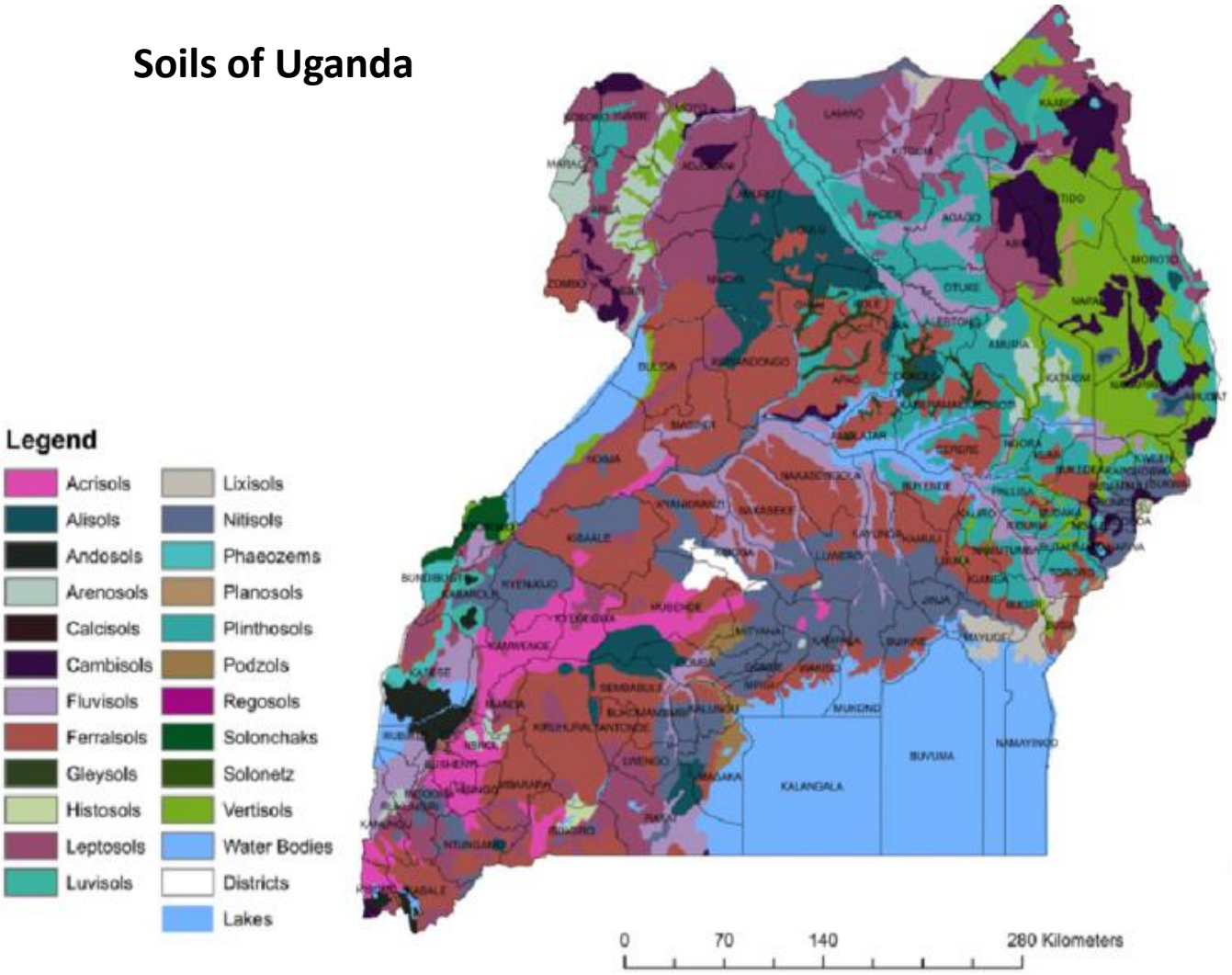
Soils of Uganda



Notes

- an av. altitude of 1 200 m
- world's oldest rocks mainly **ferrallitic soils,** and to a lesser extent **ferruginous soils**
- Soil profile; a thin (20-30 cm) topsoil & a deep (5-10 m) subsoil.
- Soil texture: clay loam to sandy loam
- red clay loam tends to predominate in the wetter regions
- 30% degradation

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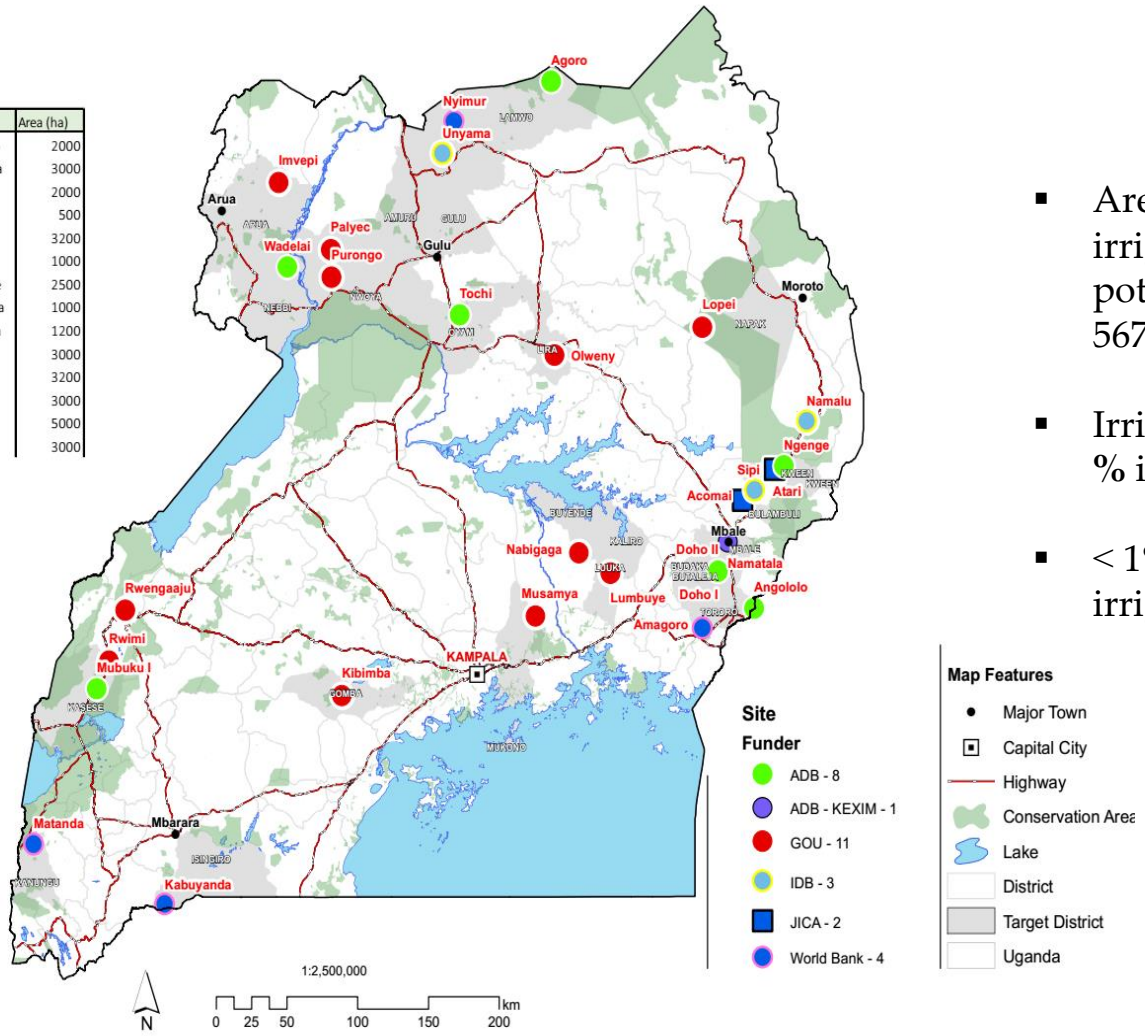
IRRIGATION SCHEMES IN UGANDA

Categorized Under Funder

No.	Scheme	Area (ha)	No.	Scheme	Area (ha)
1	Doho I	1000	16	Angololo	2000
2	Mubuku I	560	17	Namatala	3000
3	Agoro	600	18	Namalu	2000
4	Olweny	650	19	Sipi	500
5	Doho II	1178	20	Unyama	3200
6	Mubuku II	480	21	Kibimba	1000
7	Ngenge	880	22	Lumbuye	2500
8	Wadelai	1000	23	Musamya	1000
9	Tochi	500	24	Nabigaga	1200
10	Acomai	2000	25	Palyec	3000
11	Atari	800	26	Purongo	3200
12	Amagoro	5000	27	Rwimi	3000
13	Kabuyanda	2000	28	Lopei	5000
14	Matanda	5000	29	Imvepi	3000
15	Nyimur	3000			



- Area equipped for irrigation <3% of the total potential irrigable area est. 567,000 ha (MWE 2011)
- Irrigated land = **0.0734** % in 2013 (WB)
- < 1% of HH practice irrigation

General Soil Conditions

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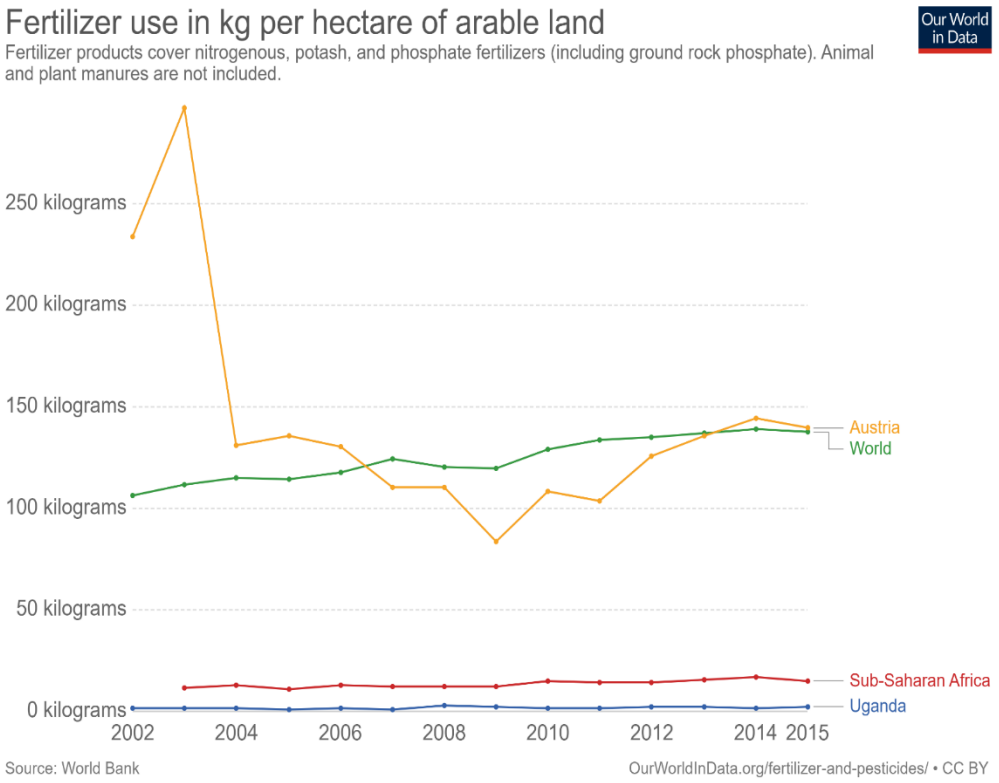
- low soil fertility
- compacted soils
- moisture stress
- low nutrient- and water-use efficiency

Effects / impact

- major contributing factor to yield gap
- **Others;** biophysical & socio-economic factors

Example

Av. maize & bean grain yields < 30% of their est. potential range 3.8 - 8.0 t ha^{-1} and 2.0 t ha^{-1} respectively



Conservation Agriculture

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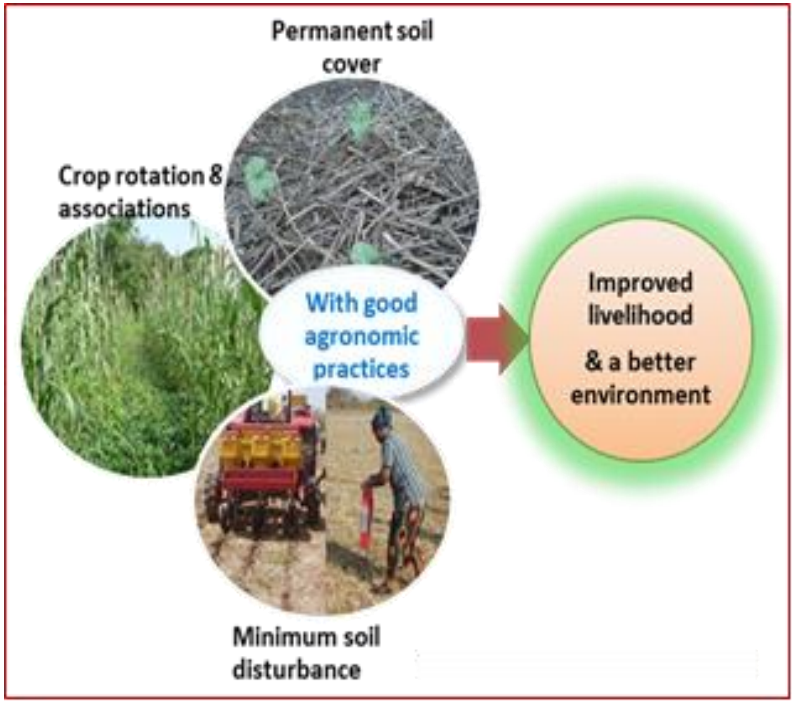
Parameter	Stat
CA Cropland Area (ha)	7800
CA Area under small holders or scale <5 ha	5800
No. of small-holder farmers (on average 0.5ha)	11000
Large-scale farmers (400-1600ha)	20
Medium scale 5-100 ha	0
CA Area under Large scale >100 ha	2000
CA area as % of total cropland	0.11

Table 2: Statistics on CA in Uganda, (year of CA data 2016)



Source: http://catoolbox.act-africa.org/

Notes

- CA yields increase up to 25% for sorghum & millet, up to 35% for rice & up to 50% for cassava
- CA increased the bean grain yield by 41% in PPBs and 43% in rip lines & by 78% for maize (Mubiru et al., 2017)

The Study

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Objective : Determine extent of adoption of CA

Study site

- Rain-fed agriculture
- Annual cropping & animal farming system
- Crop production: cassava, maize, sorghum, field & pigeon peas, groundnuts, soya beans & sim sim, (UBOS, 2016)
- Unimodal rainfall, 800-1200 mm p.a.
- CC vulnerability E.g. rainfall variability, long dry spells, droughts & floods (Ssentongo et al. 2018)
- high levels of inequality & poverty E.g. 44%,c.f 19.7% (UBOS, 2016; NPA, 2015)

Fig. 2: Map of Uganda showing Northern Uganda

Some Results

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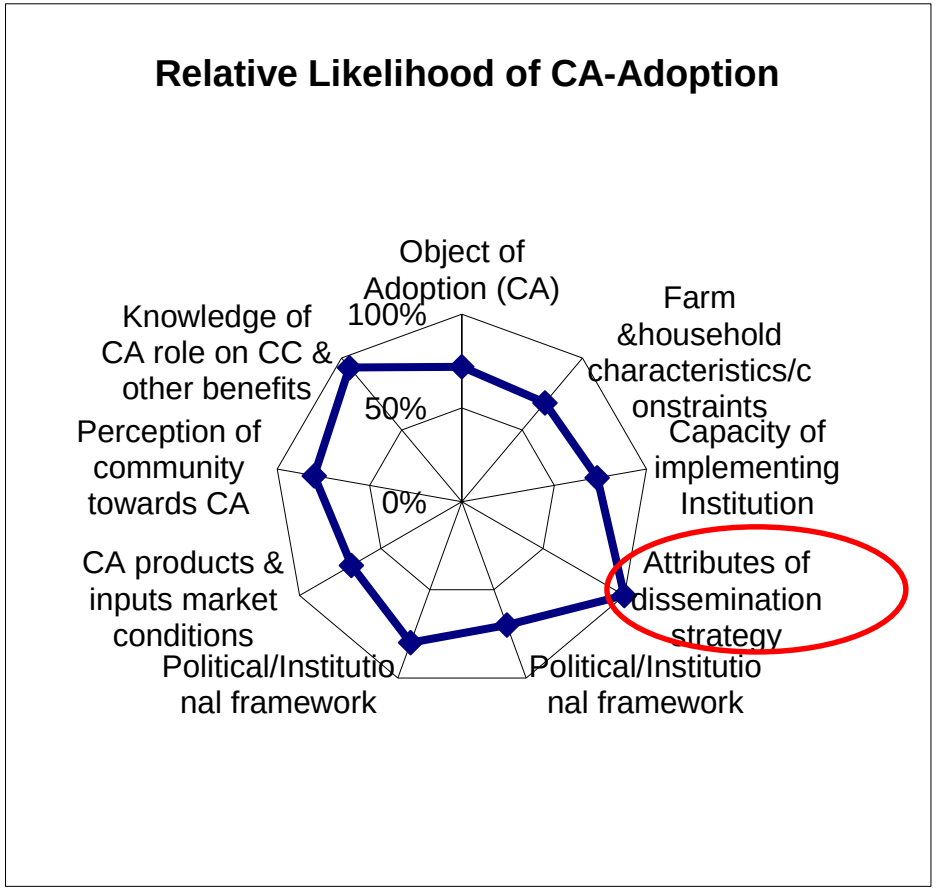

Photo of CA field showing two CA practices

Results

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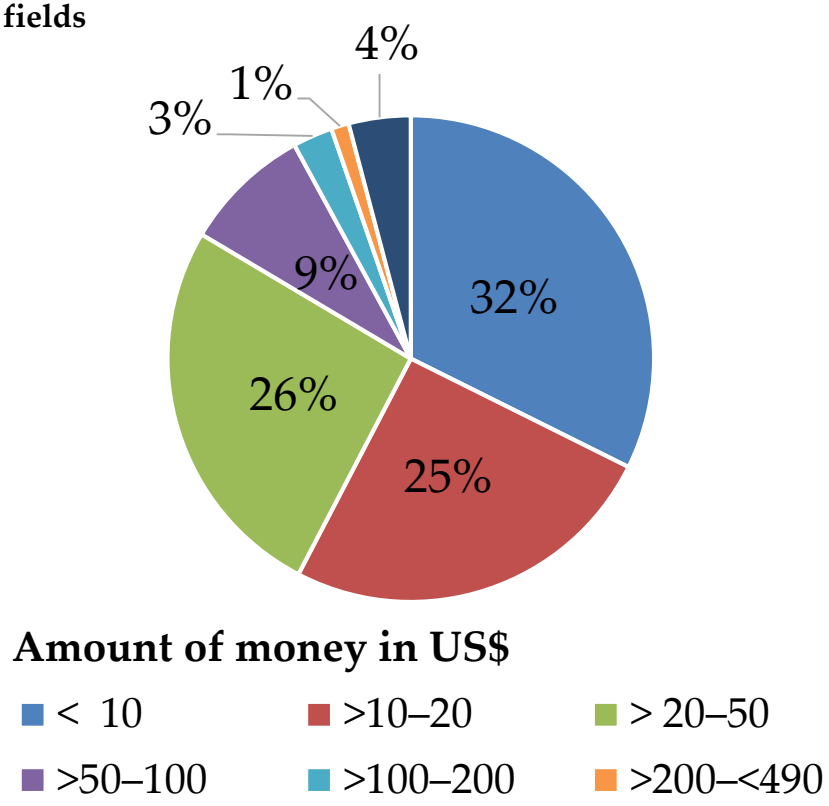
Fig. 8: Financial investment made on CA fields



- >70% used own savings to finance their farming activities
- >80% invested >US$50 per season for seeds or hiring labour
- Nearly all relied on village loans & saving schemes as the main financial institution

Proposal

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Possible Activities

- Genuine and affordable agricultural inputs
- Boost Village Savings and Loans Association (VSLA) Scheme for micro-credit access
- Appropriate machinery for the soil , women & youth
- More knowledge, information, understanding of appropriate farming practices, extension services & smart technologies
- Partnerships that take advantage of technologies and eventually scale up led by the farmer groups

a- d; seeders
e; 2WT ripper

References

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- Kassam, A., Mkomwa, S., and Friedrich, T. (2017). Conservation Agriculture for Africa: Building Resilient Farming Systems in a Changing Climate. CAB International, Wallingford, UK.
- Kaweesa, S.; Mkomwa, S.; Loiskandl, W. Adoption of Conservation Agriculture in Uganda: A Case Study of the Lango Subregion. *Sustainability* **2018**, *10*, 3375.
- Mubiru, D. N., Namakula, J., Lwasa, J., Otim, G. A., Kashagama, J., Nakafeero, M., … Coyne, M. S. (2017). Conservation farming and changing climate: More beneficial than conventional methods for degraded Ugandan soils. *Sustainability (Switzerland)*, *9*(7), 1–14. http://doi.org/10.3390/su9071084
- Sebuwufu, G.; Mazur, R.; Westgate, M.; Ugen, M. Improving the Yield and Quality of Common Beans in Uganda. Available online: www.soc.iastate.edu/staff/.../CRSP (accessed on 9 September 2014).
- https://climateknowledgeportal.worldbank.org/country/uganda/adaptation
- http://www.fao.org/nr/water/aquastat/countries_regions/uga/print1.stm
- https://agra.org/wp-content/uploads/2016/04/africa-agriculture-status-report-2014.pdf