Local plant nutrient recycling from anthropogenic waste - Sharing the experience from field plant experiment in Tanzania

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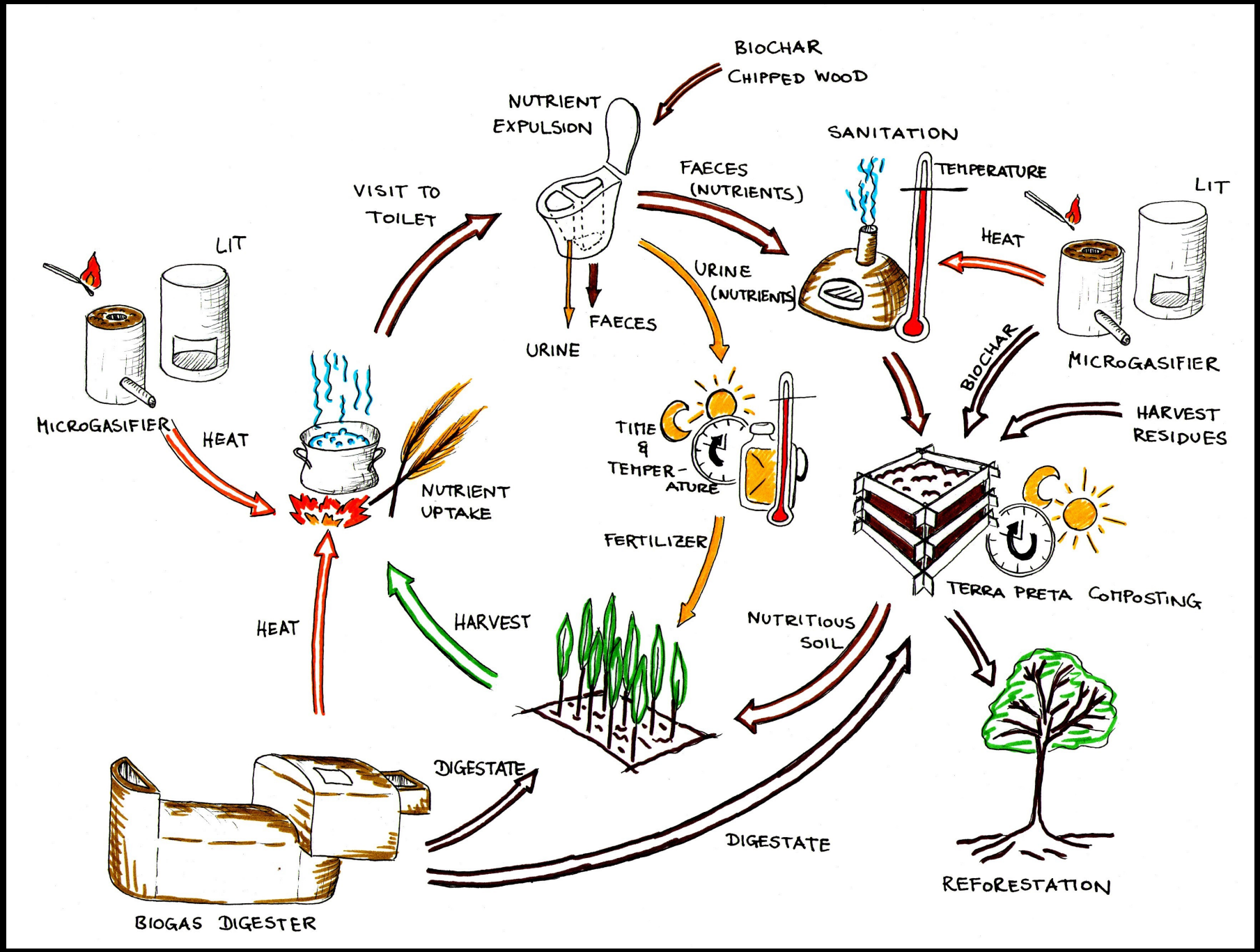
Aim of the project

- Resource protection by realizing
  - Sustainable (bio-)energy supply
  - Improvement of sanitation service
  - Improvement of soil quality

- By using & developing appropriate technology

- To ensure
  - Energy autonomy and
  - Long-term food sovereignty

CaSa concept

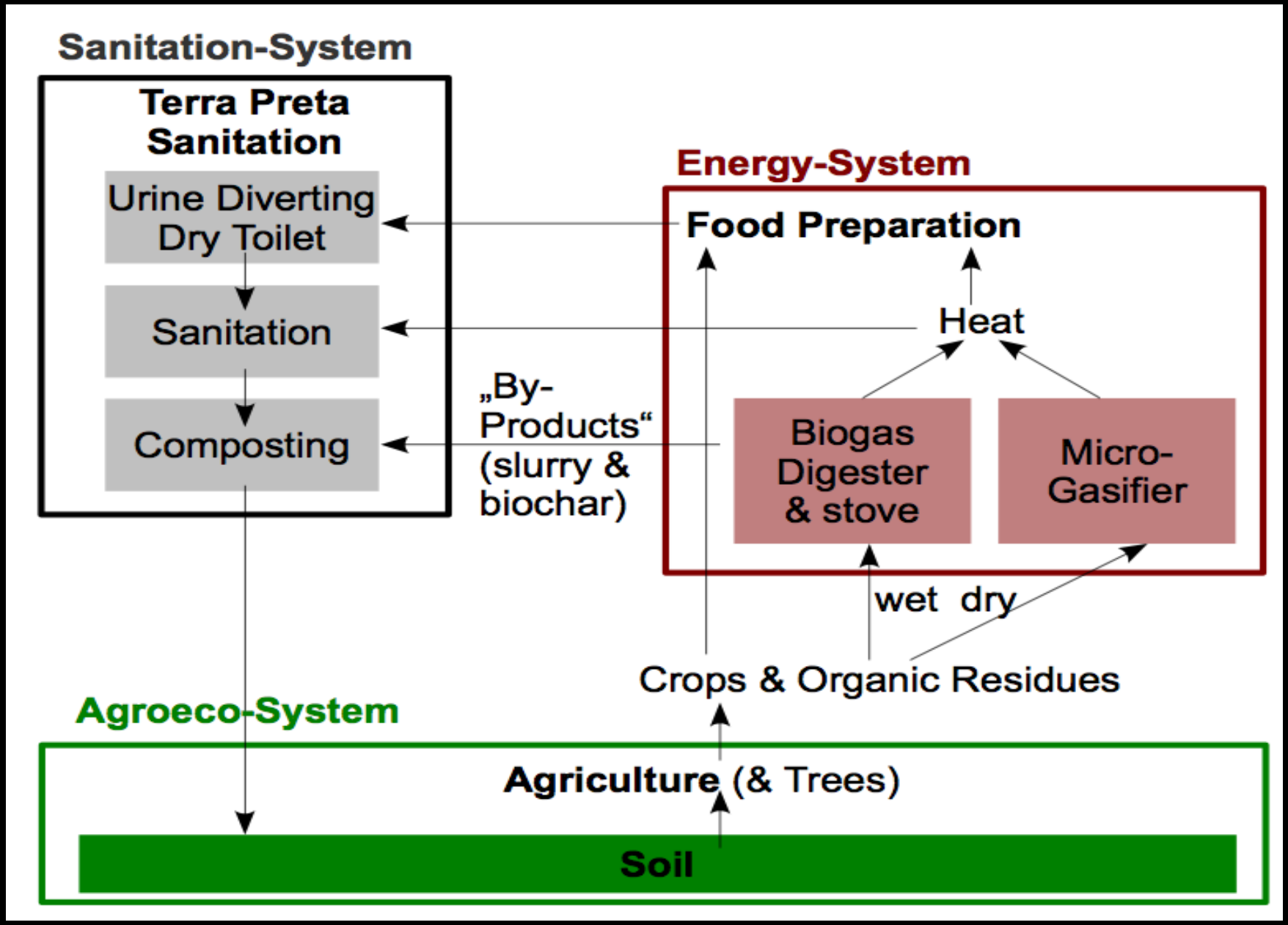


CaSa Pilote Project near Chonyonyo

Toilet & Oven

Compost

System


Sanitation-System
Terra Preta Sanitation
Urine Diverting Dry Toilet
Sanitation
Composting
„By-Products“ (slurry & biochar)
Energy-System
Food Preparation
Heat
Biogas Digester & stove
Micro-Gasifier
wet dry
Crops & Organic Residues
Agroeco-System
Agriculture (& Trees)
Soil

Aim of the Field Trial

Main aim is to demonstrate the possible advantages of biogas slurry and CaSa-compost on plant growth and to examine influence on soil conditions (e.g. changes in carbon content, nutrient and water holding capacity, pH).

No	Without	With Karagwe Compost	With Cowdung	With Casa Compost	With Biogas Slurry	With Casa Compost and Biogas Slurry	Boosting Manure
0	X						Karagwe
1		X					Karagwe
2			X				nothing
3				X			Karagwe
4					X		nothing
5						X	nothing
6	X						Urine
7		X					Urine
8			X				Cowdung
9				X			Urine
10					X		Slurry
11						X	Slurry

*** Differences substrates**
mixed with soil

*** „Boosting manure“**
during plant growth

Substrates

- Karagwe-Compost:

Mixture of dry grasses, fresh green cut and ash; also water is added to improve wetness of the mixture and topsoil is added to bring in microbes

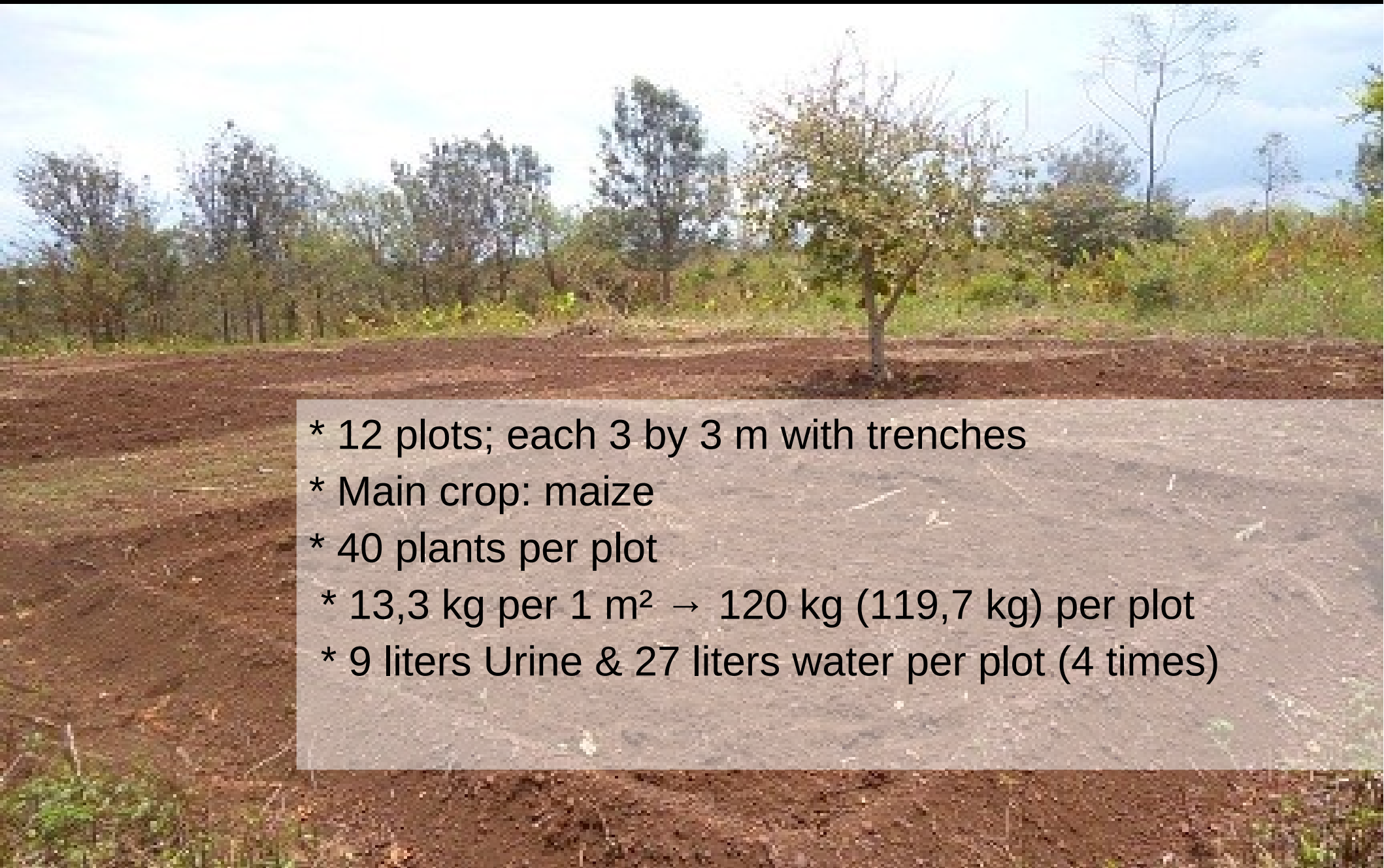
- CaSa-Compost:

Approx. 10 Vol% charcoal, 30 Vol% sanitized faeces, 45 Vol% organic matter (such as grasses, banana peels, coffee shells) and 15 Vol% anorganic material (such as ashes, dry loam soil and brick particels); after 6 weeks a mixture of 60 liters of urine + wood was added

- Biogas Slurry:

Residues from fermentation of banana stemps

1. Field Trials started in September 2012



* 12 plots; each 3 by 3 m with trenches
* Main crop: maize
* 40 plants per plot
  * 13,3 kg per 1 m² → 120 kg (119,7 kg) per plot
  * 9 liters Urine & 27 liters water per plot (4 times)

Expected results

- Observation of general appearance (*qualitative)*

DATA-COLLECTION *(quantitative, analytical)*

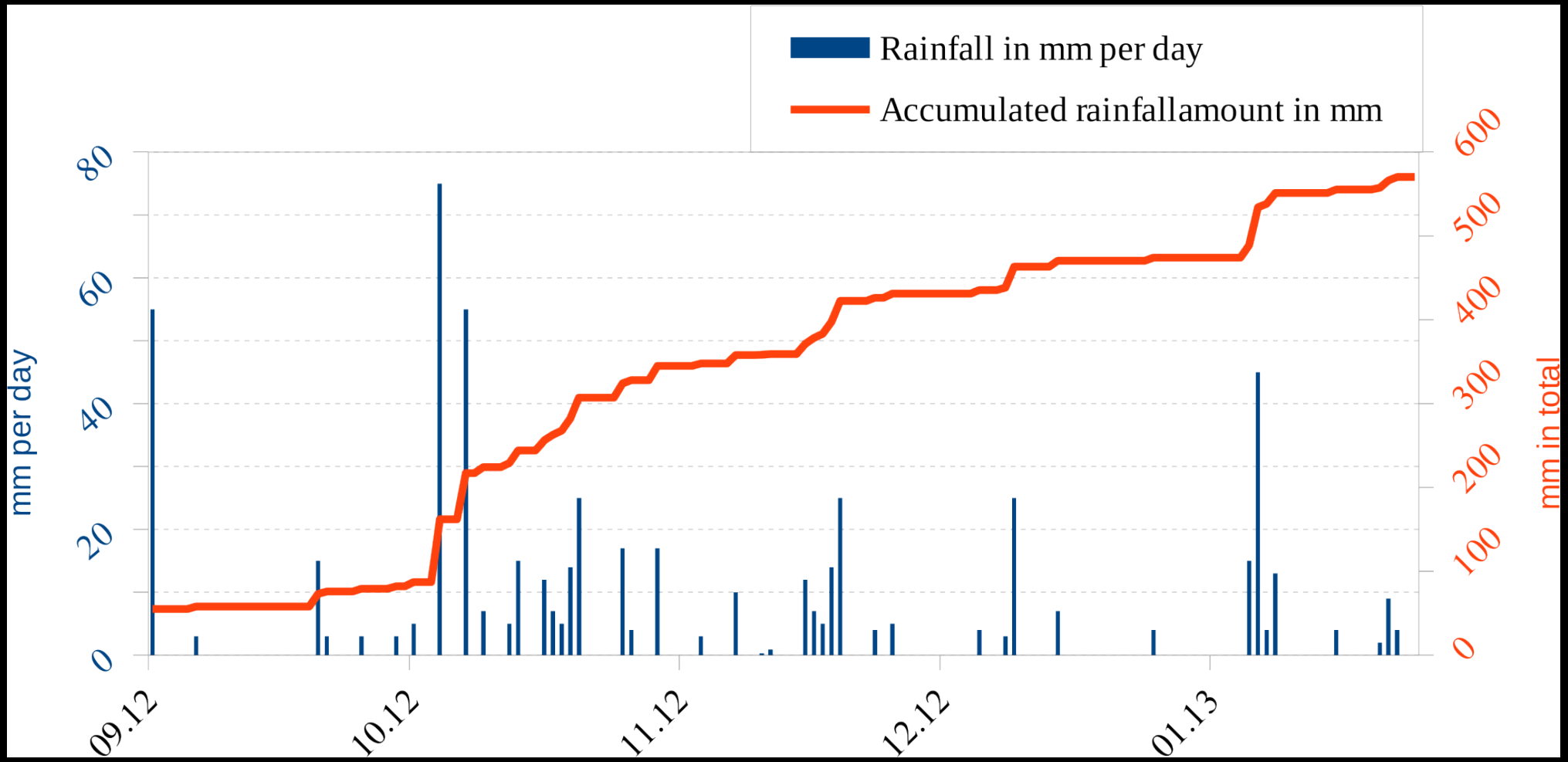
- Differences in height of the plants during growing period and at harvesting
- Differences in weight of the harvested crops

Later:

- Differences in health of the plant
- Differences in nutrition value of the crops

(still in planning, to be defined in cooperation with TU Berlin, IGZ Großbeeren).

Rainfall during plant growth



General Observation

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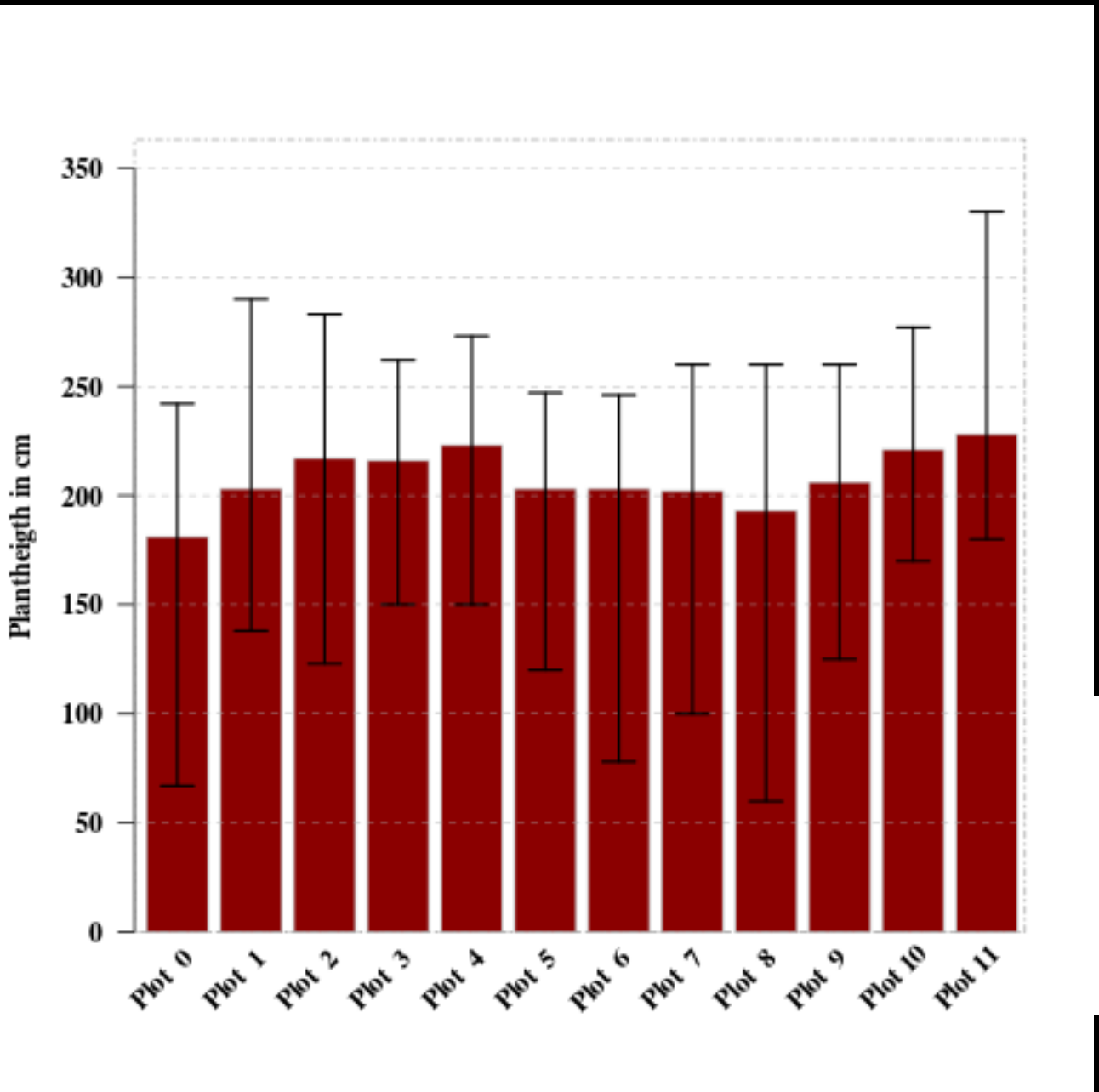
Feedback from farmers:

„The first result was Biogas manure, second was Casa mixed with biogas manure, third was Casa manure, fourth animal manure, 5th compost and lastly was compost manure.“

Height of the plant



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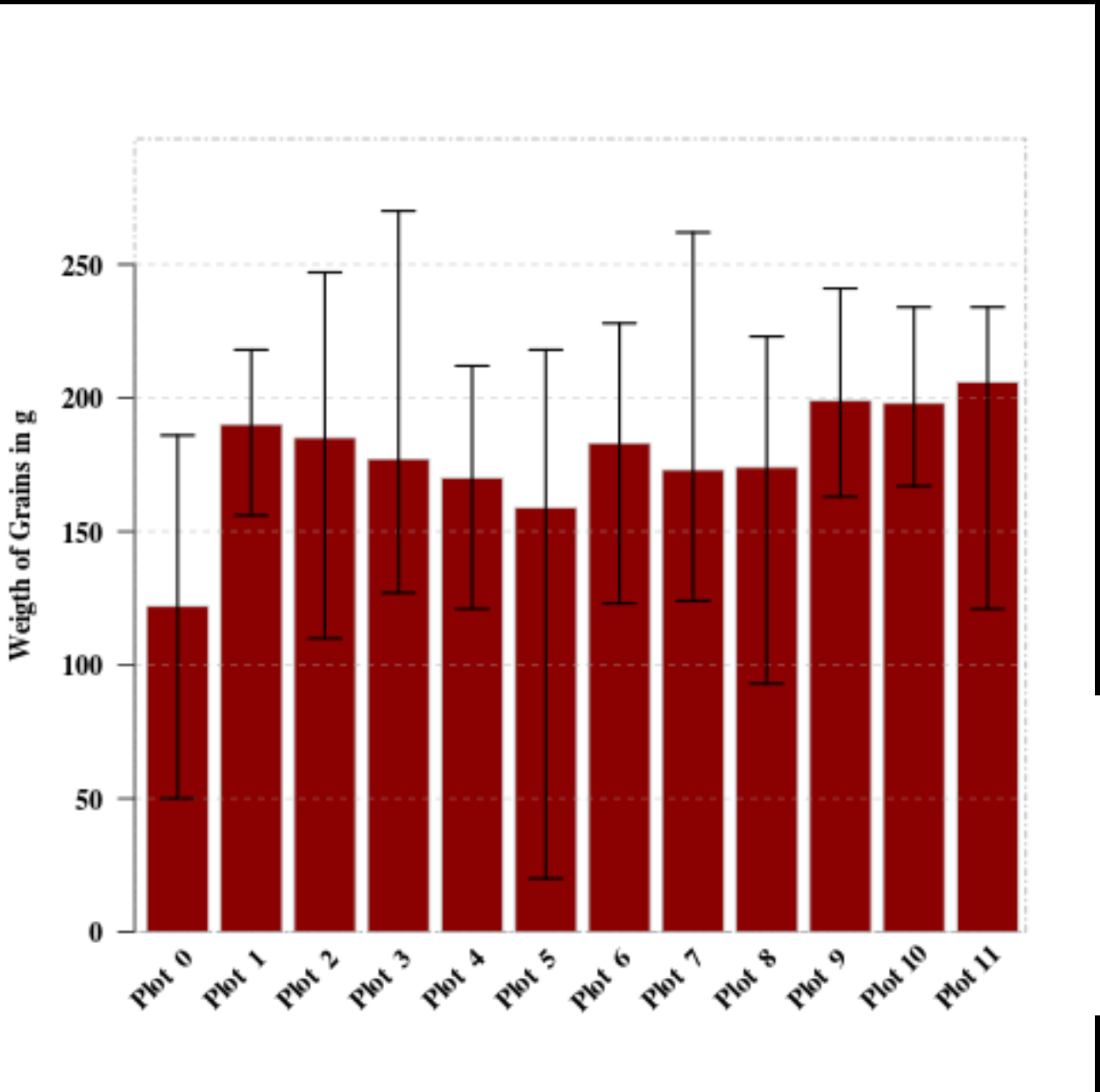
Weight of the grains



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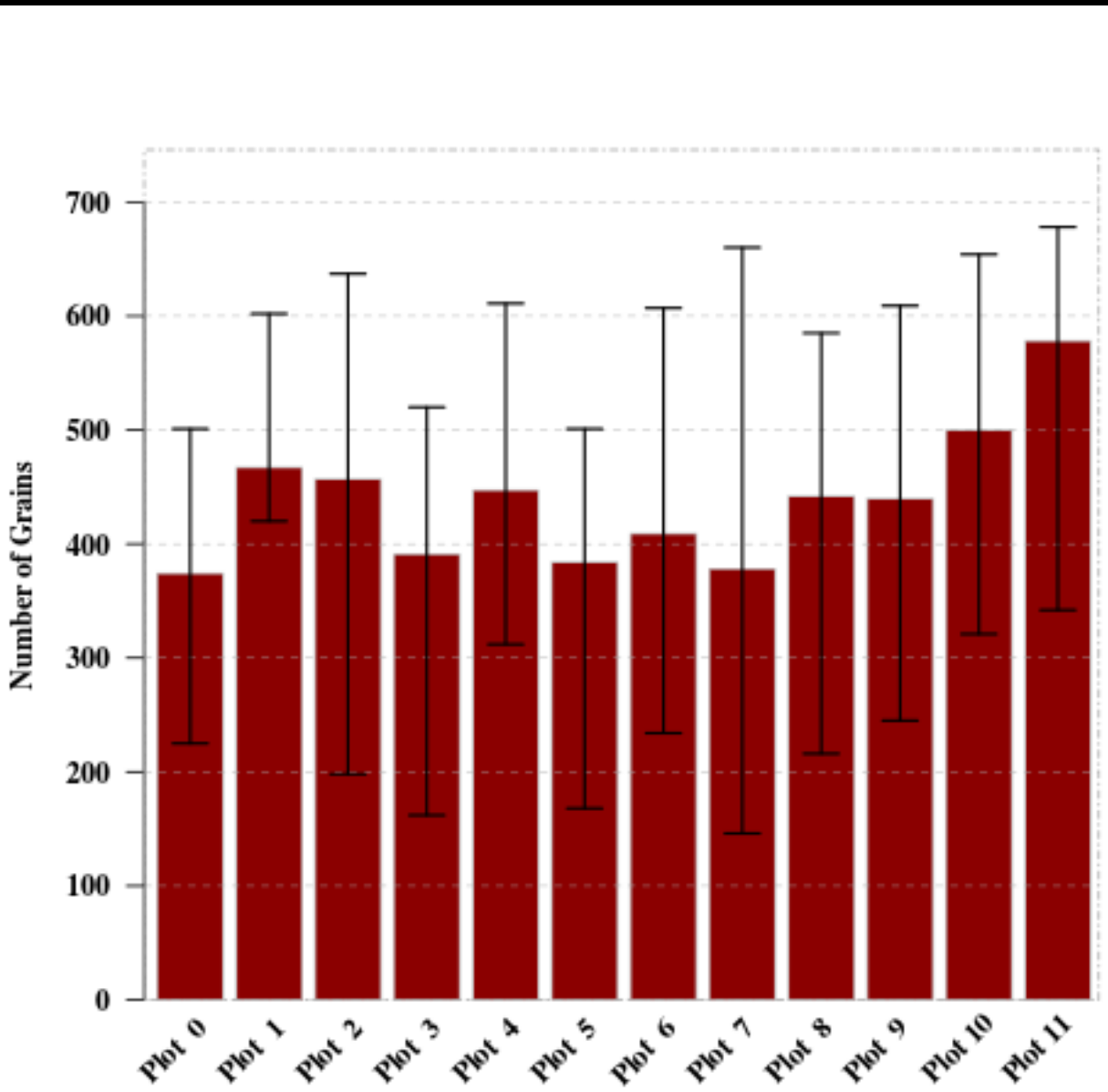

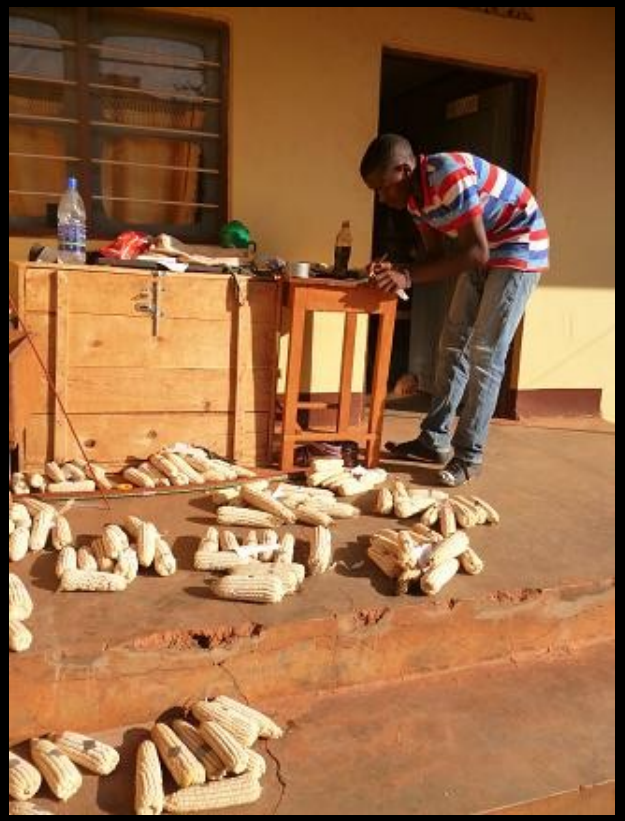

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Conclusions - so far & only examples

- General Observation:
  - During draught: Plants on plots with Biogas & CaSa looked stronger
  - Seeds (of maize and beans) looked healthier and were bigger (only at the fertilized plots)
  - Higher Productivity → added value needs to be defined
- Challenge: Protection from animals (esp. Cows)
- Data does not show:
  - Correlation between data and treatment
  - Significant differences between plots with different treatments
  - To get more evidence of the data → conducting more field trials

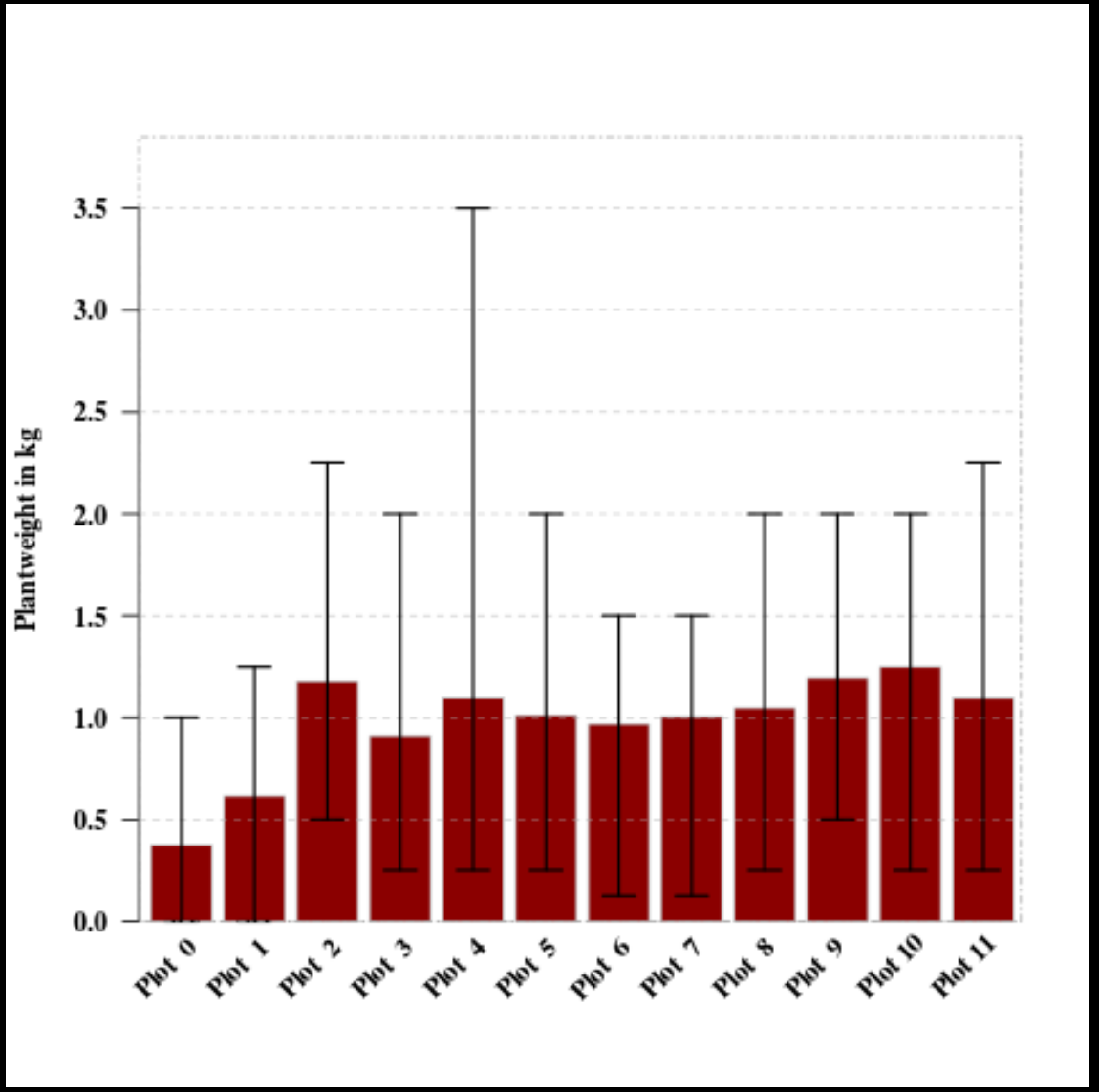
Thank You

Vielen Dank

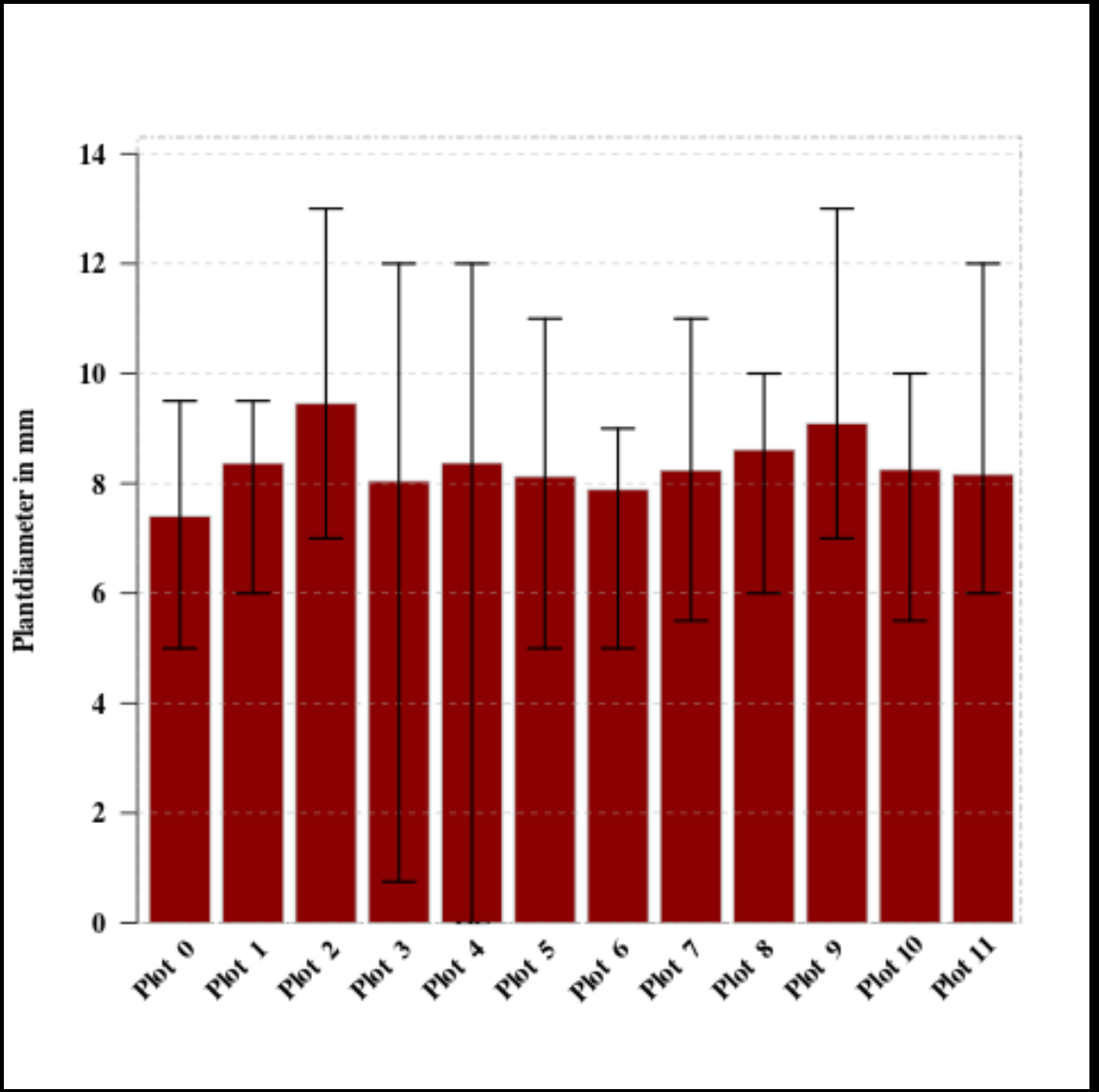
Asante Sana

BACKUP

Plant Weight



Plant-Diameter



Weight of the corncob