



**BAOQUALITY  
PROJECT**



**ZANKHALANGO  
ASSOCIATION**



# Instruction Manual for Baobab Cultivation

-  
Based on Experiences in  
Mangochi, Malawi



With support from



Federal Ministry  
of Food  
and Agriculture

by decision of the  
German Bundestag

# Instruction Manual for Baobab Cultivation - Based on Experiences in Mangochi, Malawi

## **Nele Hansohm and Lennart Jansen**

B.Sc. Students of Sustainable Agriculture, Rhine-Waal University of Applied Sciences (HSRW), Kleve, Germany

## **Kennedy Mandala**

Forestry Specialist, Welthungerhilfe, Mangochi, Malawi

## **Peter Kandiado**

Programme Manager, Zankhalango Association, Mangochi, Malawi

## **Kathrin Meinhold**

M.Sc. Sustainable Resource Management and Nutritional Science, Project Coordinator BAOQUALITY, Rhine-Waal University of Applied Sciences (HSRW), Kleve, Germany

## **Dr. Dietrich Darr**

Professor for Agribusiness, Project Lead BAOQUALITY, Rhine-Waal University of Applied Sciences (HSRW), Kleve, Germany

## **Dr. Florian Wichern**

Professor for Soil Sciences and Plant Nutrition, Rhine-Waal University of Applied Sciences (HSRW), Kleve, Germany

## **Dr. Jens Gebauer**

Professor for Sustainable Agricultural Production Systems with special focus on Horticulture and Head of Tropical Greenhouse with Study and Showpiece Gardens, Rhine-Waal University of Applied Sciences (HSRW), Kleve, Germany

This project is supported by funds of the Federal Ministry of Education and Agriculture (BMEL) based on a decision of the parliament of the Federal Republic of Germany via the Federal Office for Agriculture and Food (BLE) within the collaborative research project BAOQUALITY, grant number 2816PROC17.

Photos by Nele Hansohm, Lennart Jansen and Jens Gebauer

Rhine-Waal University of Applied Sciences



First edition  
Kleve 2020

# Opportunities from baobab cultivation



## Sustainability

- Utilization of local resources
- Utilization of excess seeds



## Nutrition

- Leafy vegetable
- Water-rich tubers



## Cultivation

- Dual-purpose cultivation (leaves and tubers)
- Easily manageable



## Products

- Marketable
- Home consumption

# Seed pretreatment

## Why?

Baobab seeds have a very **low germination rate!**

## Solution?

1. Use **fresh** seedstock (not older than 1 year)
2. Treat the seeds with **nicking**
3. Use **double to triple amount** of seeds for each plant you plan to harvest



# Seed pretreatment

## Steps:

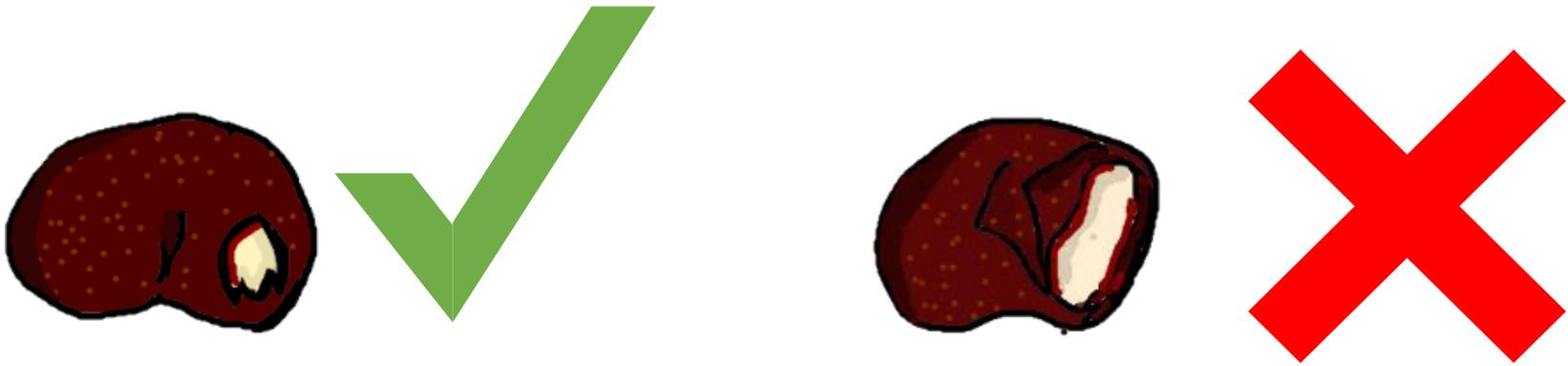
1. Put seeds in water to identify and remove nonviable ones
2. File down seed coat using a rough surface (e.g. sand paper, stone) or nick seed with knife, secateurs



# Seed pretreatment II

## Steps:

3. Stop when you see the inner white part – a small hole is enough!



Germination rate: **20-40%**

Alternative methods as described elsewhere (see page 19) are currently being tested.

# Field preparation

## 1. Clearing & Tillage

### Aim

- Removal of plants
- Loosen soil

### Material

- Hoe



# Field preparation

## 2. Fencing

### Aim

- Protection from livestock

### Materials

- Wooden poles, stems, branches
- Rubber band (“rinja”)
- Machete



# Field preparation

## 3. Preparing the seedbed

- Form ridges and furrows

### Aim

- Easier planting and harvest
- More effective irrigation

### Material

- Hoe



# Field preparation

## 4. **Mulching** (after sowing!)

- On ridges and in furrows

### Aim

- Suppressing weeds
- Reducing evaporation

### Materials

- Machete
- Wildgrass (“udzu”)

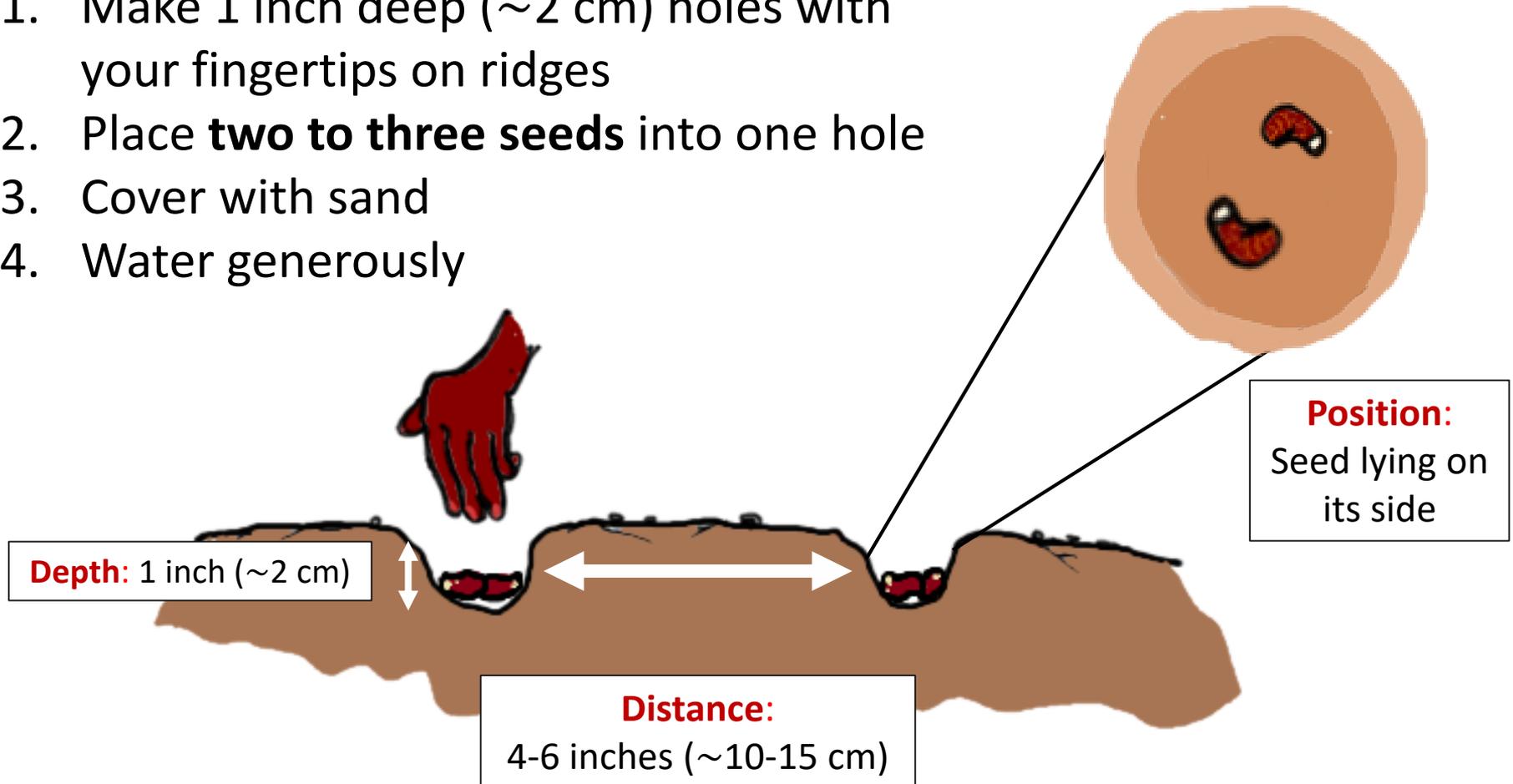


# Sowing

## Steps:

1. Make 1 inch deep (~2 cm) holes with your fingertips on ridges
2. Place **two to three seeds** into one hole
3. Cover with sand
4. Water generously

**After germination:**  
Leave one best-looking seedling per hole, remove any others that have germinated.



# Irrigation



- Regularly water when soil is dry
- Avoid waterlogging
- Use fresh water
- Proper watering times reduce evaporation and risk of sunburn:

**Mornings:** before 9 am

**Evenings:** after 4 pm

## Example irrigation plan

### KATHILIRIDWE KA MBEU ZA MLAMBE

TSIKU/DATE	NTCHITO/ ACTIVITY	NTHAWI/TIME
01-Jun	kuthirira (To be watered)	Madzulo 4:00pm
02-Jun	kuthirira	Mmawa 8:00pm
03-Jun	Osathirira	
04-Jun	kuthirira	Mmawa 7:00am
05-Jun	kuthirira	Madzulo 4:00pm
06-Jun	Osathirira	
07-Jun	kuthirira	Mmawa 7:00am
08-Jun	kuthirira	Madzulo 4:00pm
09-Jun	Osathirira	

# Pests

**Important:**  
Always protect  
the seedlings from  
livestock with a fence!



## **Aphids:**

Green or black, on underside of leaves or inside curled new leaves, ants are indicators, curled leaves are symptoms

### **Control method**

- Manual removal
- Wash off with jet of water
- Apply neem-water mixture (see pages 14-15)



## **Mealybugs:**

White spots on leaves, often together with aphids

### **Control method**

- Manual removal
- Wash off with jet of water
- Apply neem-water mixture (see pages 14-15)



## **Red cotton stainer:**

Red bugs with white stripes and black spots on the back

### **Control method**

- Manual removal when abundant

# Neem-water Application

## Steps:

1. Grind neem leaves and mix them with water (**1:1** volume ratio)
2. Let the mixture stand for two days in a bucket and cover with a lid



# Neem-water Application

## Steps:

3. Sieve the mixture to get rid of leaf particles
4. Spray the solution on both sides of the leaves



# Harvest

Harvest date: **4 to 5 months** after sowing

## HOW?

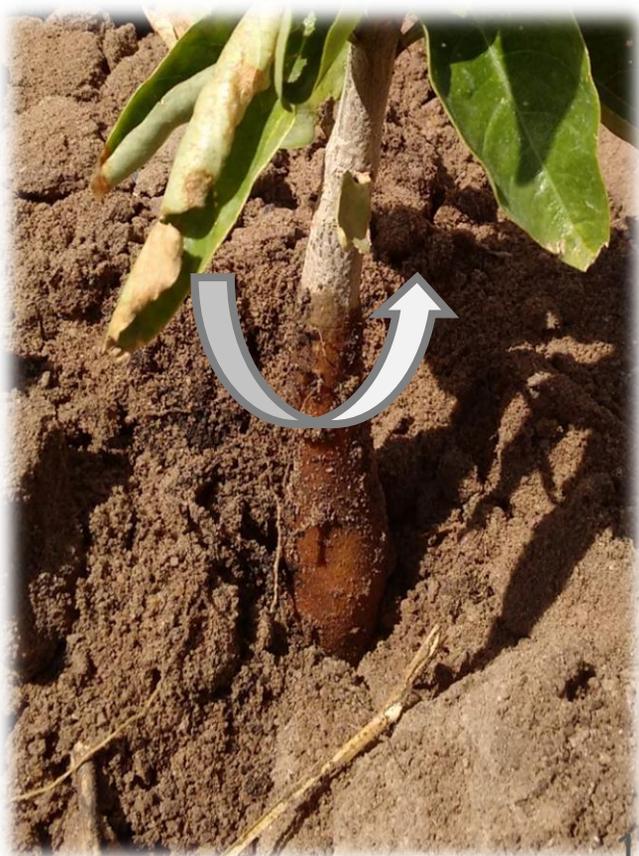
**Important:** Be careful when pulling out the seedling!

### Step 1

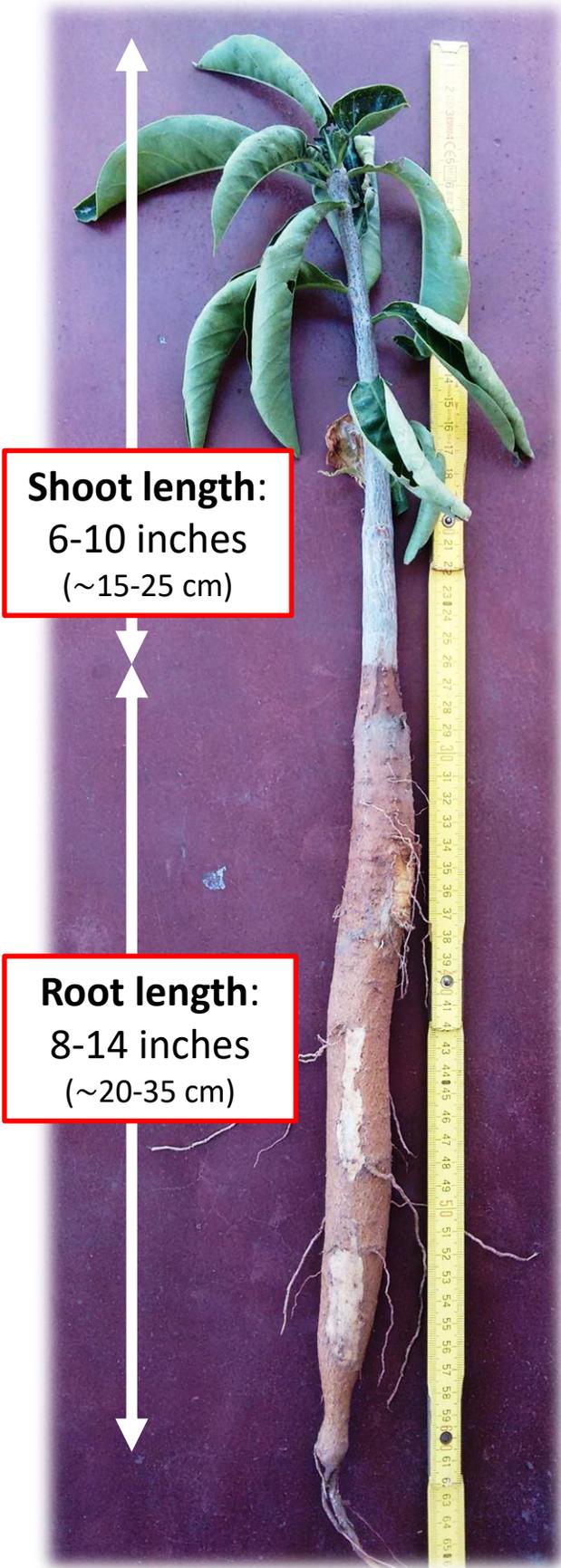
- Dig around seedling and remove the surrounding soil.
- Be careful to not damage the tuber!

### Step 2

- Grab seedling at stem-root junction and move around gently until it comes out easily.



# Harvested Products



**Shoot length:**  
6-10 inches  
(~15-25 cm)

**Root length:**  
8-14 inches  
(~20-35 cm)

## Baobab leaves

- Can be used fresh, dried or cooked
- Are high in minerals and protein
- Can be consumed as salad, spinach or relish

## Baobab tubers

- Can be eaten fresh as snack or in salad
- High water content (ca. 90%)
- High variability in size and shape

# Storage

## Fresh leaves

- Do not separate shoot and root part, until direct consumption/sale
- Avoid direct sunlight



## Dried leaves

- Separate fresh leaves from shoot
- Place them in a dry place
- Protect from livestock and other animals



## Tubers

- Leave whole until consumption/sale
- Store in cool, dark place



# Further information

## Seed pretreatment – Soaking & Peeling Method:



[https://www.youtube.com/watch?v= BW5O9GsuHE](https://www.youtube.com/watch?v=BW5O9GsuHE)



<https://www.youtube.com/watch?v=PUkyq8CL2Ko&t=3s>

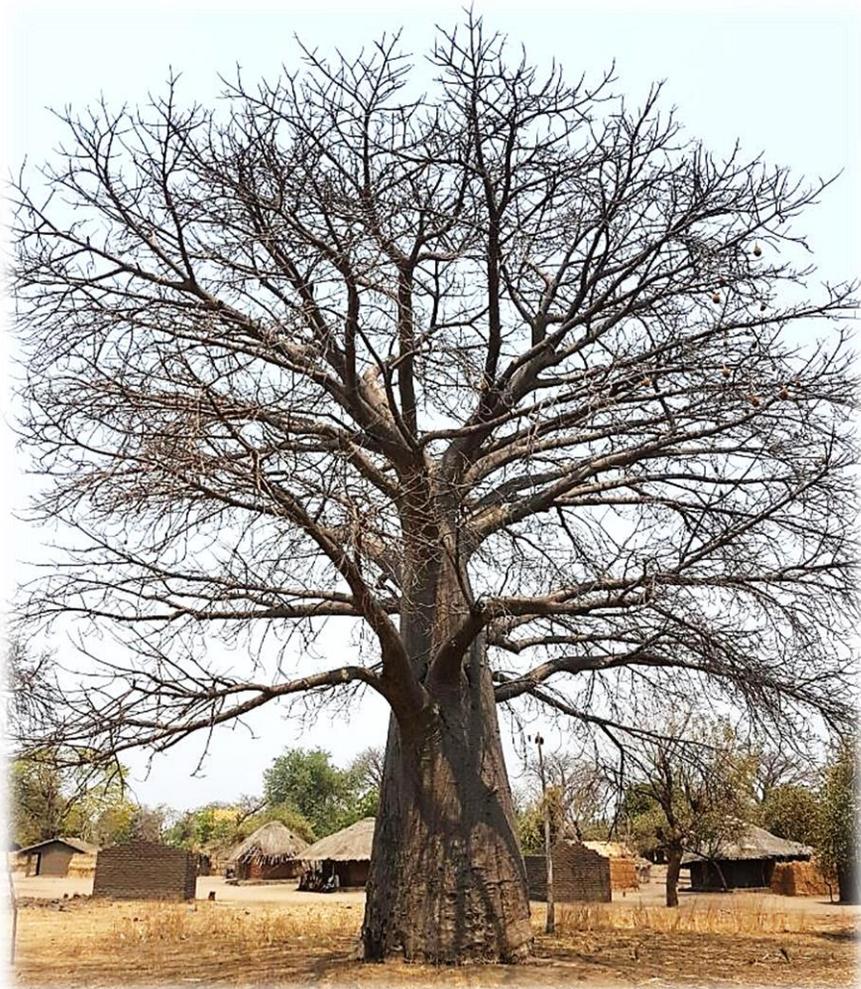
## Baobab growth – Timelapse:



[https://www.youtube.com/watch?v=uCOdIT\\_p3Z0](https://www.youtube.com/watch?v=uCOdIT_p3Z0)

# BAOQUALITY project brief

- **Duration:** 2019-2022 (3 years)
- **Budget:** approx. 1.4m €
- **Study area:** Malawi, Kenya, Sudan
- Conducted in collaboration with **research institutions, NGOs and industry** in Germany, Malawi, Kenya and Sudan



Baobab (*Adansonia digitata* L.) in Mangochi, Malawi

# Project Consortium

