Population structure and tree densities of baobab (*Adansonia digitata* L.) in Kilifi County, Kenya

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1. Introduction

1. a) **Characteristics** of the baobab tree (*Adansonia digitata* L.):

- Wild fruit tree of the drier parts of sub-Saharan Africa (Fig. 1a)
- Fruit pulp (Fig. 1b) is highly nutritious (e.g. vitamin C, Ca, Fe), leaves (Fig. 3c) could be eaten as vegetable
- Sale of raw and processed products such as 'mabuyu' sweets contributes to cash income generation in Kenya, particularly for women (Fig. 1d, e)

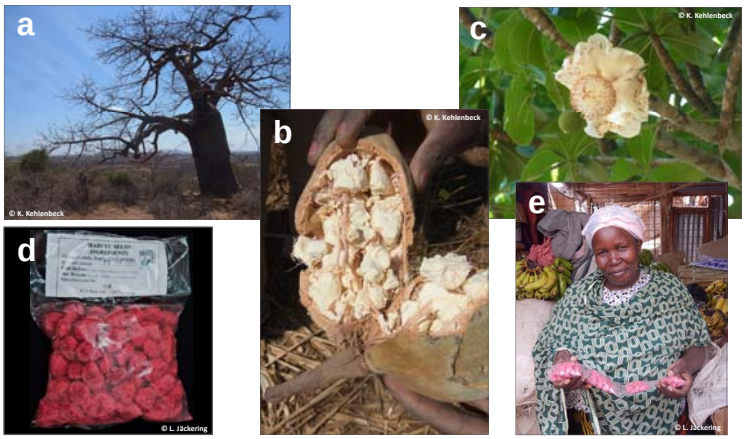

Figure 1: Baobab tree (a), opened fruit with pulp-covered seeds (b), flower and leaves (c), 'mabuyu' sweets ready for sale (d) and 'mabuyu' processor showing her product (e) in Kenya.

2. Material and methods

- Region with important baobab populations selected in Kilifi County, coastal Kenya (southwestern part) (Fig. 2)
- 14 quadrats of 500 x 3000 m randomly laid into research region along the road C 107 from Kilifi to Mariakani
- All baobabs within quadrats documented and recorded with height and stem diameter at breast height (DBH)
- Data collection finished in three out of 14 quadrats (Fig. 3)
- Densities of young (DBH<1 m) and mature (DBH≥1 m) (Fig. 4) baobabs calculated
- Size class distribution curves developed

3. Results and discussion

3.1 Mapping of baobab populations

- Total of 210 baobab trees documented in the three quadrats inventoried (total area 4.5 km^2)
- Relatively high baobab density: mean 0.47 trees per hectare
- DBH ranged from 0.16 to 4.97 m (mean 1.5 m)
- Tree height ranged from 3.4 to 22.5 m (mean 14.7 m)
- High density baobab stands identified south-west of Kilifi (Fig. 3)

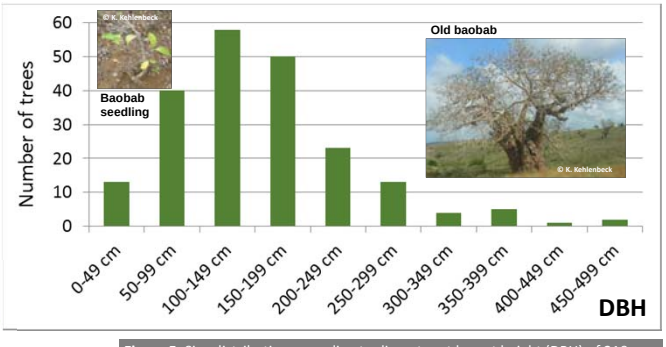

Figure 5: Size distribution according to diameter at breast height (DBH) of 210 baobab trees documented in three quadrats inventoried in Kilifi, Kenya.

1. b) **Challenges** regarding sustainable baobab production:

- Species is neglected in Kenya, little information available on the resource base and its use(Gebauer et al. 2016)
- All produce collected from wild trees → resource could be over-utilized, possibly unsustainable harvest practices
- Baobab pulp approved Novel Food in EU and USA and regarded as 'superfood' → increasing demand from international markets → threat to the natural resource base?

Objectives of the study:

→ To assess the resource base of baobab in Kilifi, Kenya

a) Population health: are there enough young baobabs for regeneration?

b) Tree densities: are there patches of dense baobab stands?

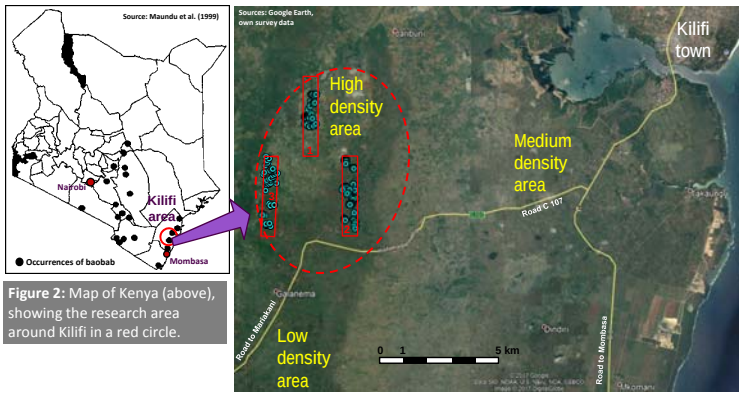

Figure 2: Map of Kenya (above), showing the research area around Kilifi in a red circle.

Figure 3: Map of the research area in Kilifi, Kenya, with estimated densities of baobab stands as well as marked sampling quadrats and baobab trees (blue circles) within the surveyed quadrats.

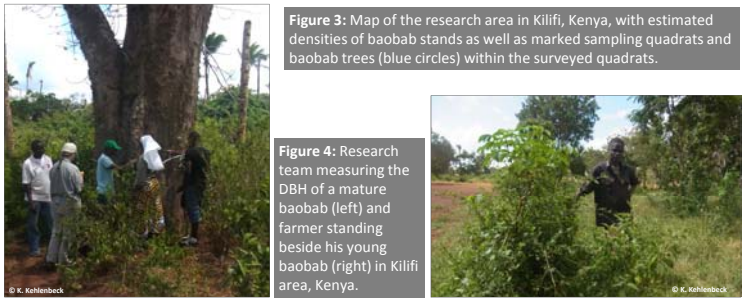

Figure 4: Research team measuring the DBH of a mature baobab (left) and farmer standing beside his young baobab (right) in Kilifi area, Kenya.

3.2 Population structure

- Lack of young trees: only 53 of the 210 documented trees were young (DBH<100 cm), while 108 trees were of intermediate age (DBH 100-199 cm) and 48 trees were old (DBH≥200 cm) (Fig. 5)
- Quadrat 3 had a higher proportion of young trees than quadrats 1 and 2 (36.1% versus 13.0 and 18.2%) (Fig. 6)
- Very young trees (<2 m tall) difficult to detect during inventory, help of farmers needed

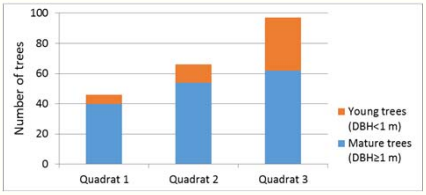

Figure 6: Number of young and mature trees per quadrat inventoried in Kilifi, Kenya.

4. Conclusions

→ Few high density areas of baobab populations around Kilifi.

→ Lack of rejuvenation may lead to instable populations (but more data needed from the remaining quadrats, reasons for differences in % of young trees among plots to be identified).

→ Results used to develop recommendations for sustainable resource management, which is a prerequisite for enhanced utilization and commercialisation of baobab in the region.

References: Gebauer J et al. (2016) Africa's wooden elephant: the baobab tree (*Adansonia digitata* L.) in Sudan and Kenya – a review. J Gen Resour Crop Evol 63: 377-399;
Maundu PM et al. (1999) Traditional Food Plants of Kenya. Nat. Museum of Kenya, Nairobi, Kenya.

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