Potential impacts of increased Napier cultivation in Lushoto, Tanzania

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Livestock feeding and trade-offs

- 22 million cattle (2% crossbred dairy, the rest Tanzania Short Horn Zebu) are reared by around 4.6 million smallholder farmers in Tanzania
- Inadequate quality and quantity of feed cause low livestock productivity. Improved forage technologies have been promoted in Tanzania for sustainable intensification (Fig 1)
- However, there is a lack of research that quantifies the potential impacts of these technologies on livelihoods of smallholder farmers

Figure 1. Bihusi (left) and her husband Twahilu (right) are members of the Mbuzii Innovation Platform[1]. They feed their three cattle with naturally occurring grasses as well as Napier and *Brachiaria* grasses and *Desmodium*. Pictures Georgina Smith/CIAT

Study site, materials and methods

- Study site is Lushoto, located in the Usambara Highlands of north-eastern Tanzania, Tanga district. It is one of the most important dairy regions in Tanzania (Fig 2)
- Household surveys, feed and milk measurements, and soil sampling were conducted on 20 farms in Ubiri village; a participatory scenario development workshop identified the preferred livestock feeding strategies (Fig 2)
- The whole farm simulation model FarmDESIGN[2] was used to compare bio-economic performance, trade-offs and synergies of baseline to forage intensification scenario for one representative farm

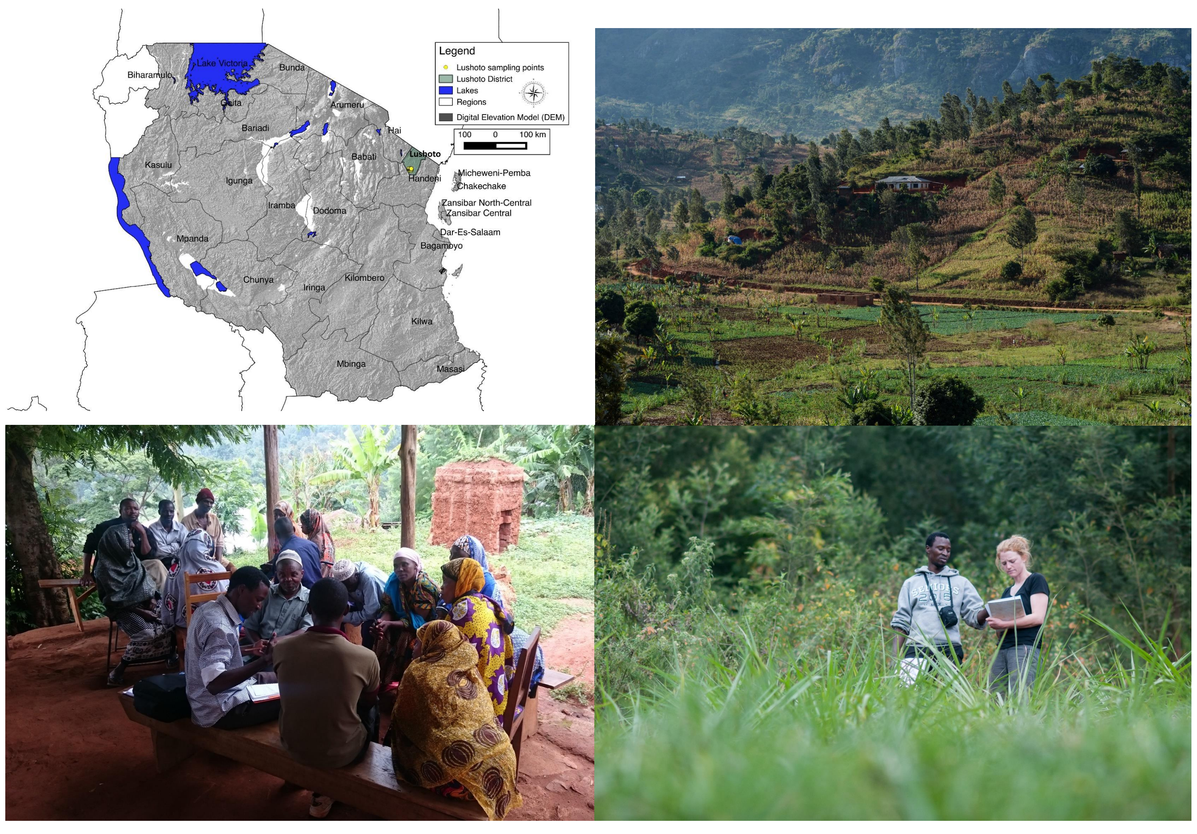

Figure 2. Map of the study site Lushoto (upper left). Typical landscape with irrigated horticulture in the valley bottom and cereals and Eucalyptus on the hillsides. Napier grass is occasionally planted as contour or on terraces to reduce erosion and increase forage availability (upper right, Georgina Smith/CIAT). Hilly landscape in Lushoto is planted with Napier grass on terraces and contours to combat soil erosion and increase livestock fodder production (right; picture Georgina Smith, CIAT). Data collection during the workshop (lower left, Birthe Paul/CIAT) and in a forage field (lower right, Georgina Smith/CIAT)

Preliminary results and discussion

- Farmers were found to only feed on average half of the recommended quantity, the diversity of the feed basket was high, and only one farmer provided drinking water to livestock (Fig 3)

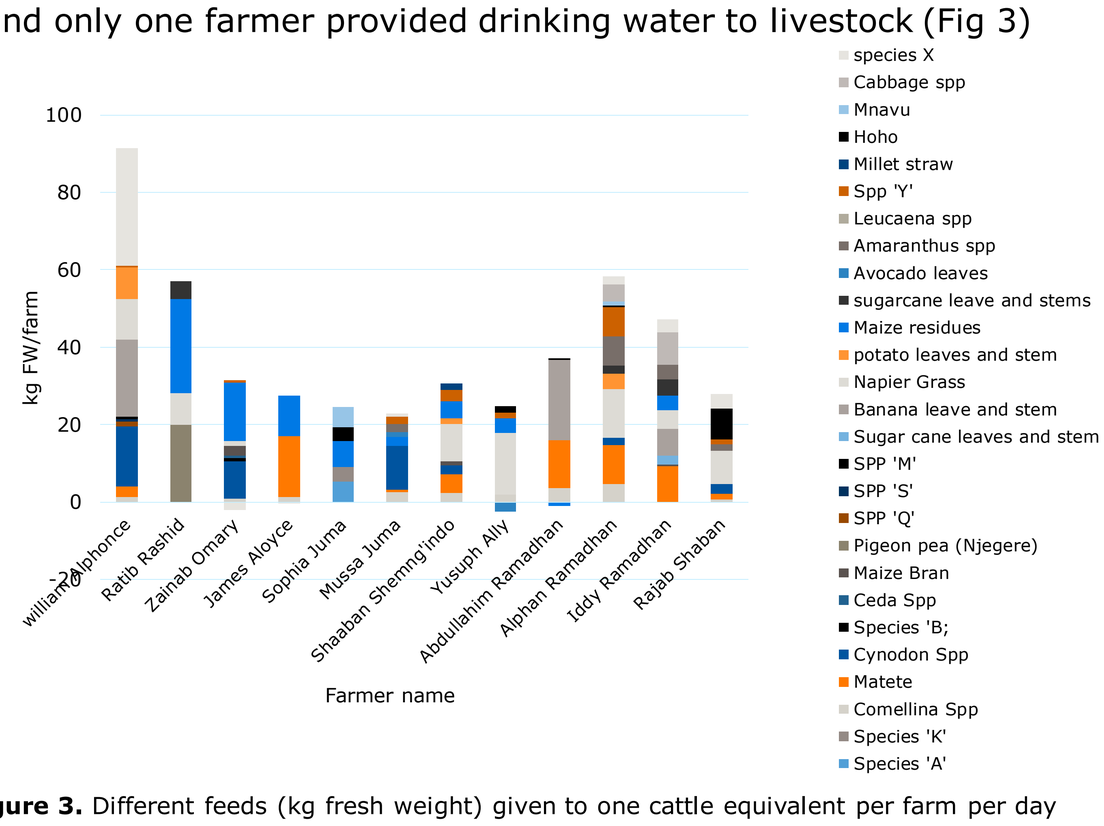

Figure 3. Different feeds (kg fresh weight) given to one cattle equivalent per farm per day

- Average daily milk production was low with an average of 4.8 liters per cow (Fig 4)
- 31% of all on-farm work is used for feeding, especially for fetching forages from far-away natural pastures
- Total average annual income was US$618 per year
- Farmers' favorite livestock feeding scenario: increased Napier growing on homestead fields (1/4 of their area)
- Comparison scenario vs baseline: labor demand decreased by 3%, milk production increased by 103%, gross total income per year went up by 88%. This confirms findings from another study from the same area[3]
- However, there are potential draw-backs: nutrient mining, decreased initial income due to long forage establishment period, increased input expenditure, and higher risk due to lower food self-sufficiency

Figure 4. Map of the study farms and their plots (left). Milk is stored in buckets in front of the homestead in the morning (upper right), waiting for pick-up to go to the milk collection center (lower right, pictures Georgina Smith, CIAT).

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