

Addressing post-harvest losses during traditional banana fermentation for increased food security in Southwest Uganda

Cory W. Whitney^{1,2}, Edie Mukiibi^{3,4}, Carolyn Nakaketo⁴, Jens Gebauer², Anne Rietveld⁵, Katja Kehlenbeck^{2,6}

¹ University of Kassel, Faculty of Organic Agricultural Sciences, Witzenhausen, Germany. ² Rhine-Waal University of Applied Sciences, Faculty of Life Sciences, Kleve, Germany. ³ Slow Food International, Torino, Italy. ⁴ Slow Food Uganda, Mukono, Uganda. ⁵ Bioversity International, Kampala, Uganda. ⁶ World Agroforestry Centre (ICRAF), Nairobi, Kenya.



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Introduction: postharvest losses (PHL)

- PHL destroy 20-60% of all food produced in East Africa, exacerbating regional food insecurity.
- Fermentation of perishable foods such as fruits may reduce PHL, provide nutritional enrichment, improve shelf-life and food quality, and address seasonality in food supply.
- Fermented banana products have been refined and diversified in western Uganda over generations for efficient use of the local abundance of bananas.

Study aims: understanding PHL in traditional banana fermentation systems

Research methods: exploring traditional fermentation

Participatory explorations took place near the edge of the Kibale forest with 20 indigenous Lukiga brewers in six villages of Bugaaki Sub-County in Kyenjojo District (Fig. 1).

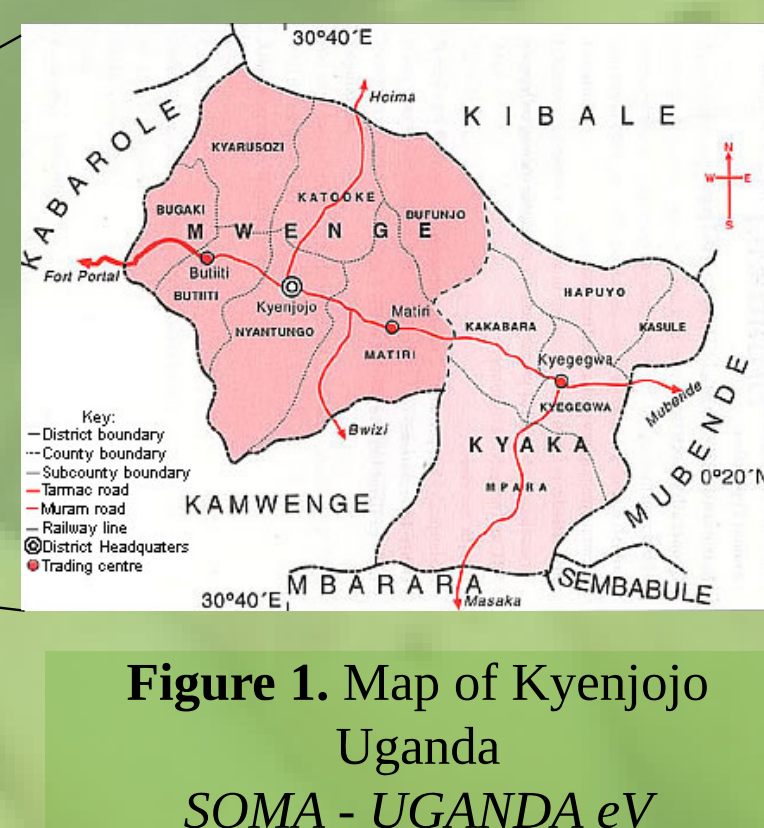


Figure 1. Map of Kyenjojo Uganda
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The study interviewed the brewers on techniques and losses. It sought to learn about the efficiency of traditional methods of banana beverage fermentation for three main products of *Musa* (AAA-EAHB) 'Mbide':

- banana juice** (lightly fermented beer with <1% alcohol content [n=20 brewers]),
- tonto** (turbid beer with ~4% alcohol [n=20]),
- amarwa** (smoky spirit with ~40% alcohol [n=20]).



Figure 2. Lukiga men with *amarwa* a. man with bottle of *amarwa* b. brewer at traditional *amarwa* distillery

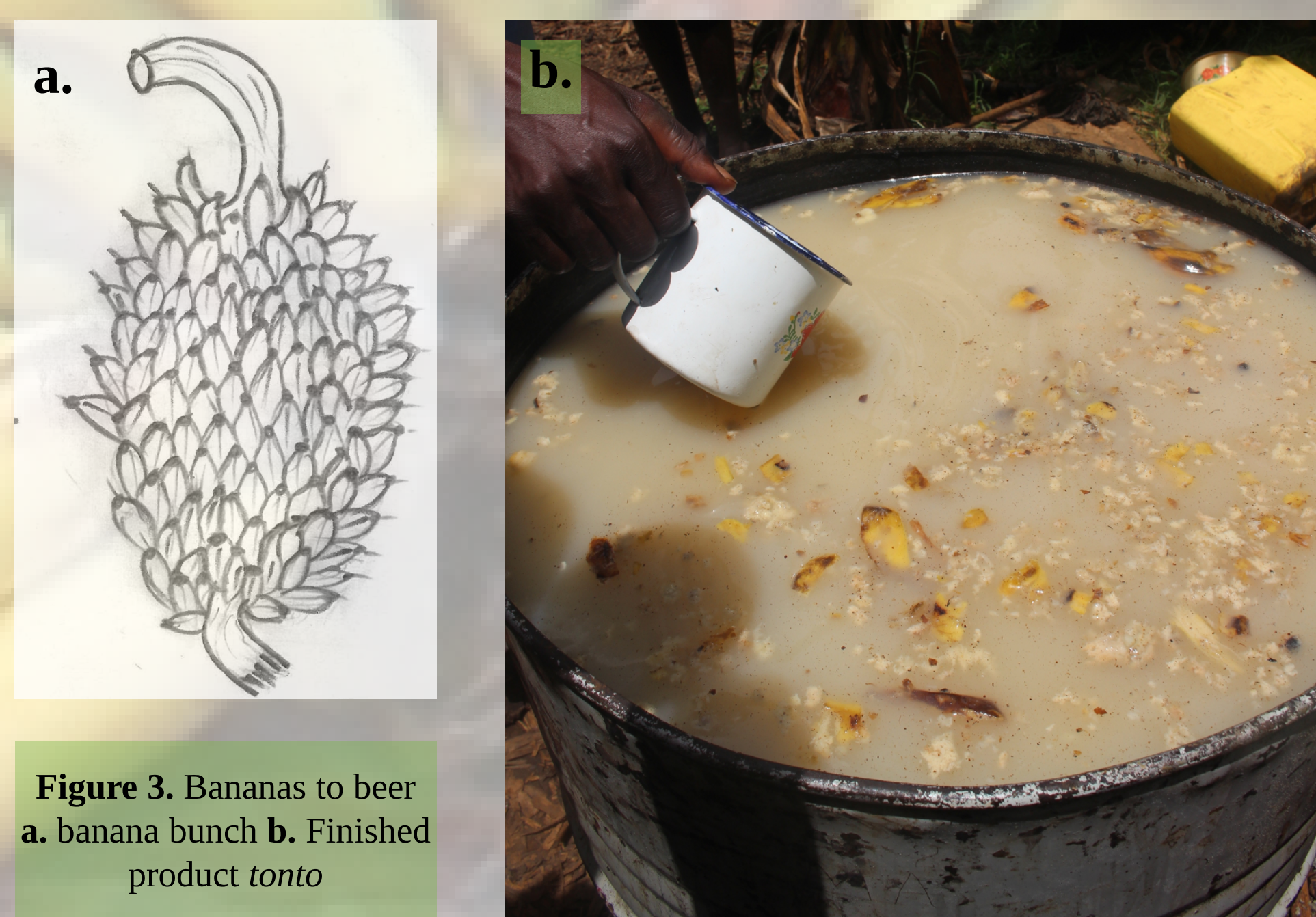


Figure 3. Bananas to beer
a. banana bunch b. Finished product *tonto*

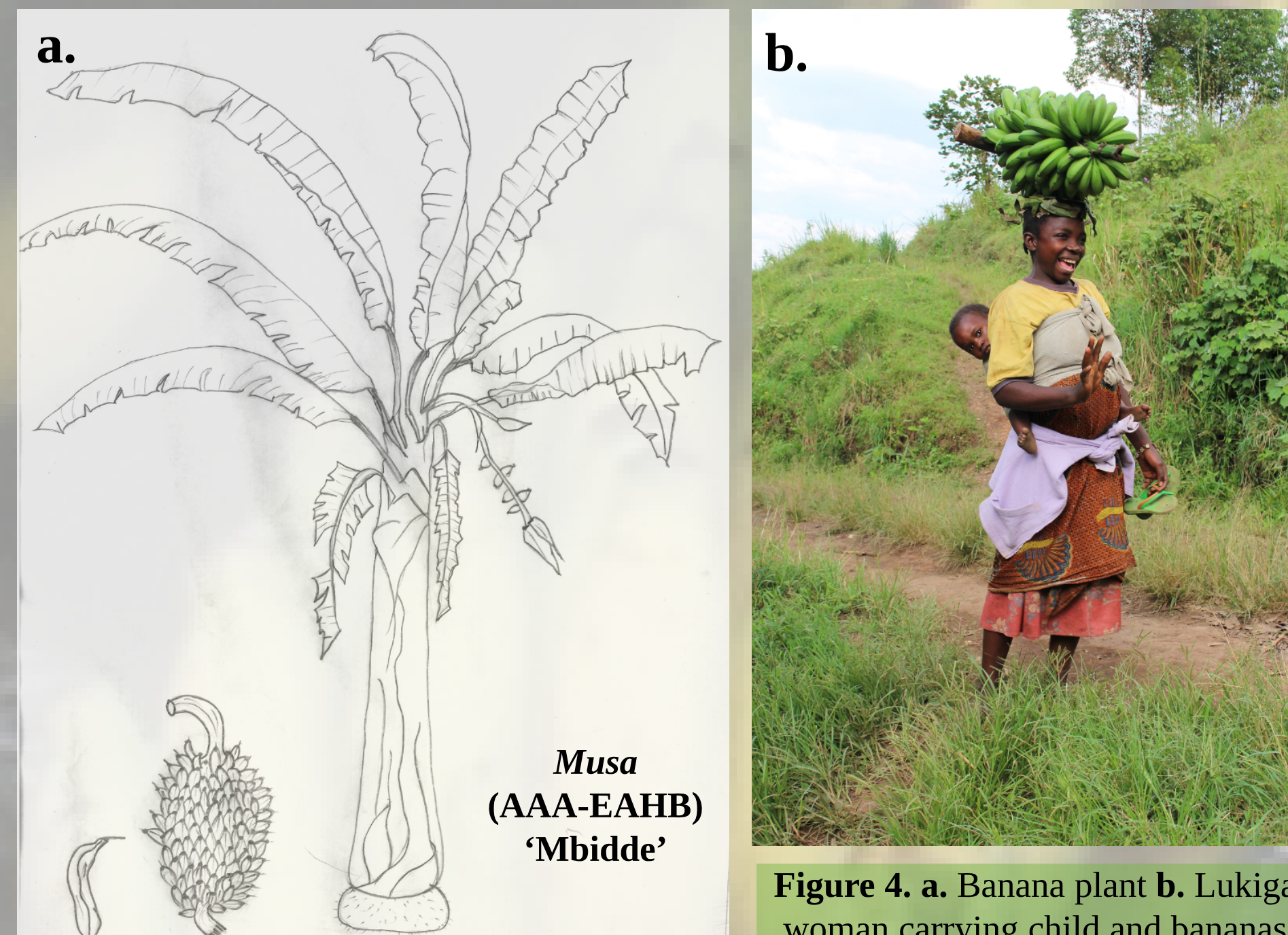
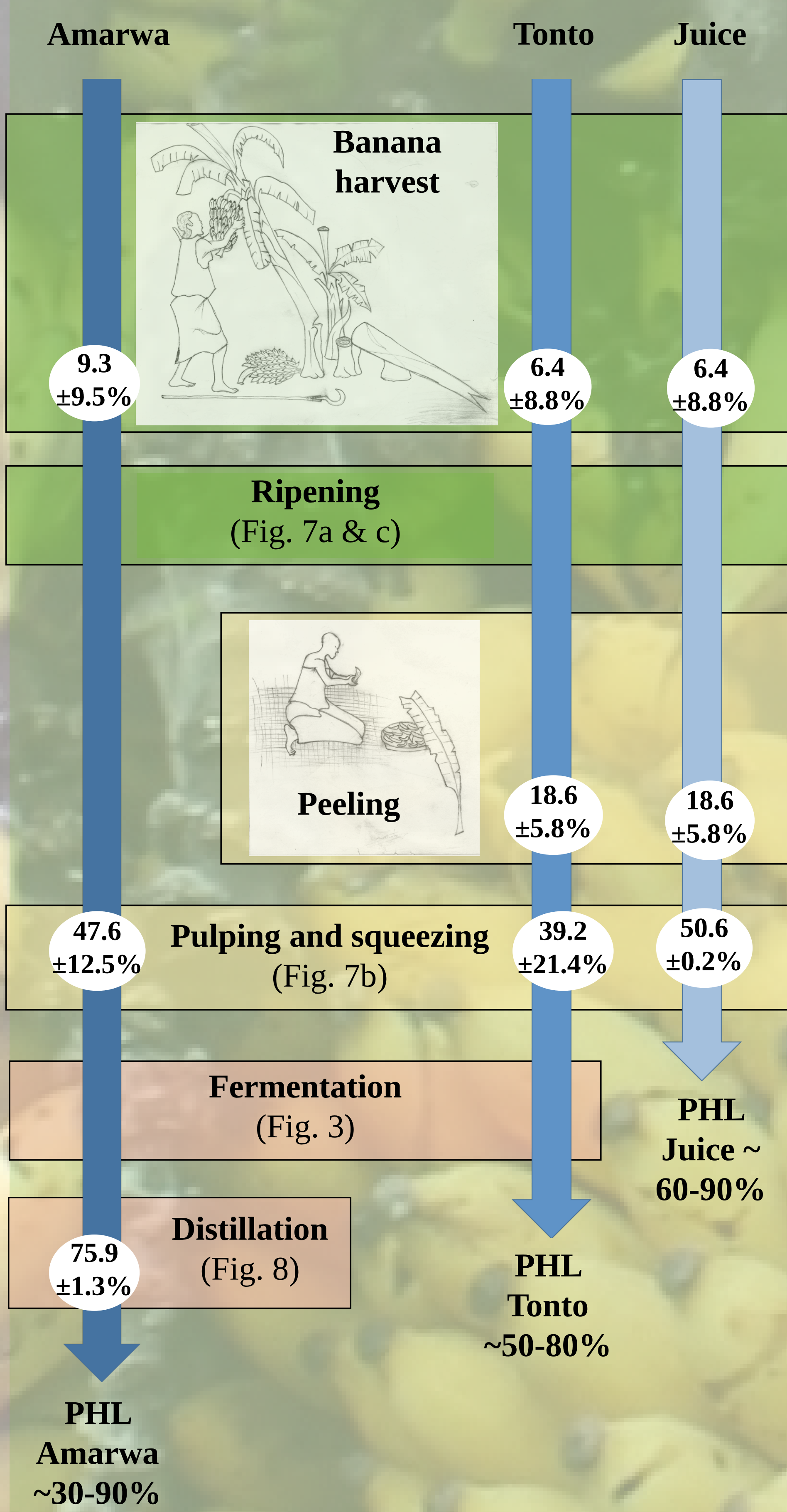


Figure 4. a. Banana plant b. Lukiga woman carrying child and bananas

Traditional banana fermentation

Figure 5. Processing flow chart



- Other non-PHL challenges mentioned by respondents included Banana Xanthomonas Wilt (BXW) and bad weather (up to 50% losses in the field)

Discussion: health implications

- Caretenoids are lypophylic (stick to fat in the banana residues) and much is disgarded (Fig. 7b)
- Alcoholism is common in the area (Fig. 2)
- High alcohol intake means lower bioavailability of nutrients e.g. iron, zinc
 - serious concern for daily drinkers
- Only a small 'fraction' of distilled *amarwa* is pure alcohol (Fig. 8)
 - first and last 'fractions' are high in methanol
 - villagers are likely drinking all 'fractions'

Potential for better systems

- Major portions of banana fruit are lost to PHL (Fig. 5).
- Reduction in PHL for efficient food systems and better food security
 - Better use of processing remains such as squeezed pulp (e.g. Fig. 6b)
- Optimize distillation for safer *amarwa* (Fig. 8)
 - draw only safe 'fractions' from distillation
 - investigate health implications of *amarwa*



Figure 6. Bananas to sweets a. Ankole man transporting bananas b. Popular *kabalagala* cake made from cassava flour and sweet bananas



Figure 7. Processing bananas a. Ripening bananas b. Pulping and squeezing juice c. Inspecting ripening bananas



Figure 8. Common Lukiga open air *amarwa* distillery

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