Resource Use in Abaca (*Musa textilis*)
A Versatile Smallholder Fiber Crop

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Background

Abaca, also called manila hemp, is a close relative of the desert banana and plantain, indigenous to the Philippines. Abaca is grown for its fibers which are extracted from the plant's pseudostem. The extraction of the fibers consists of three steps: (1) Tuxying - the outer-layer of the leaf petioles are separated in a jerky, upward movement, resulting in the tuxi, (2) Stripping - the tuxi are pulled through a serrated knife, the plant tissue surrounding the fibers is scraped off and the result are clean, separate fibers, (3) Drying of the fibers. Abaca fibers are considered as the strongest natural fibers and are of economical importance especially for the specialty paper industry, where Abaca fibers are the major resource for the production of tea bag and coffee filter paper because of its properties. Abaca fibers find further use in the production of ship rope, as substitute for asbestos and in a huge range of handicrafts from rugs to clothes. Catanduanes, a small island in the North-East of the Philippines, is the world's biggest producer of Abaca fibers. Abaca is cultivated in the secondary forest on the steep slopes of the island's mountains by smallholders. The Abaca cropping system is characterized by no external input. Weeding and replanting is performed when the field is harvested, normally every 3 or 6 month depending on the farmer's preferences.

The study's objectives were:

1. to assess the Abaca cropping system in Catanduanes,
2. to understand the dynamics and loss of nutrients due to harvest processes and handling of crop residues,
3. to evaluate the impact of divergent field management practices on the nutrient abundance,
4. to appraise the spatial distribution of the nutrients in the Abaca cropping system.

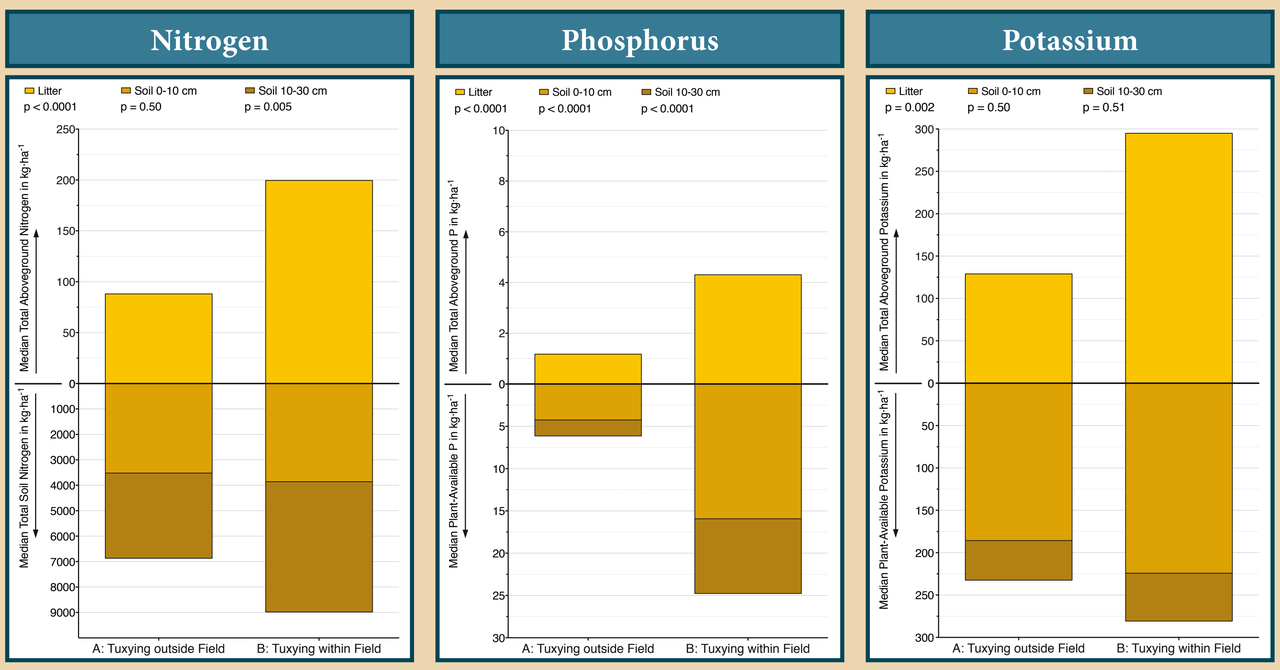
The farmers perform the tuxying either outside or directly in the field, depending on the topography and/or the distance between field and stripping area. We hypothesized that:

1. the location of the tuxying area outside of the field and the subsequent loss of the tuxi waste to the field litter fraction results in a depletion of the soil nutrients.
2. due to the steep slopes, the soil nutrients are reallocated to the bottom sections of the fields.

Harvesting Process in Abaca

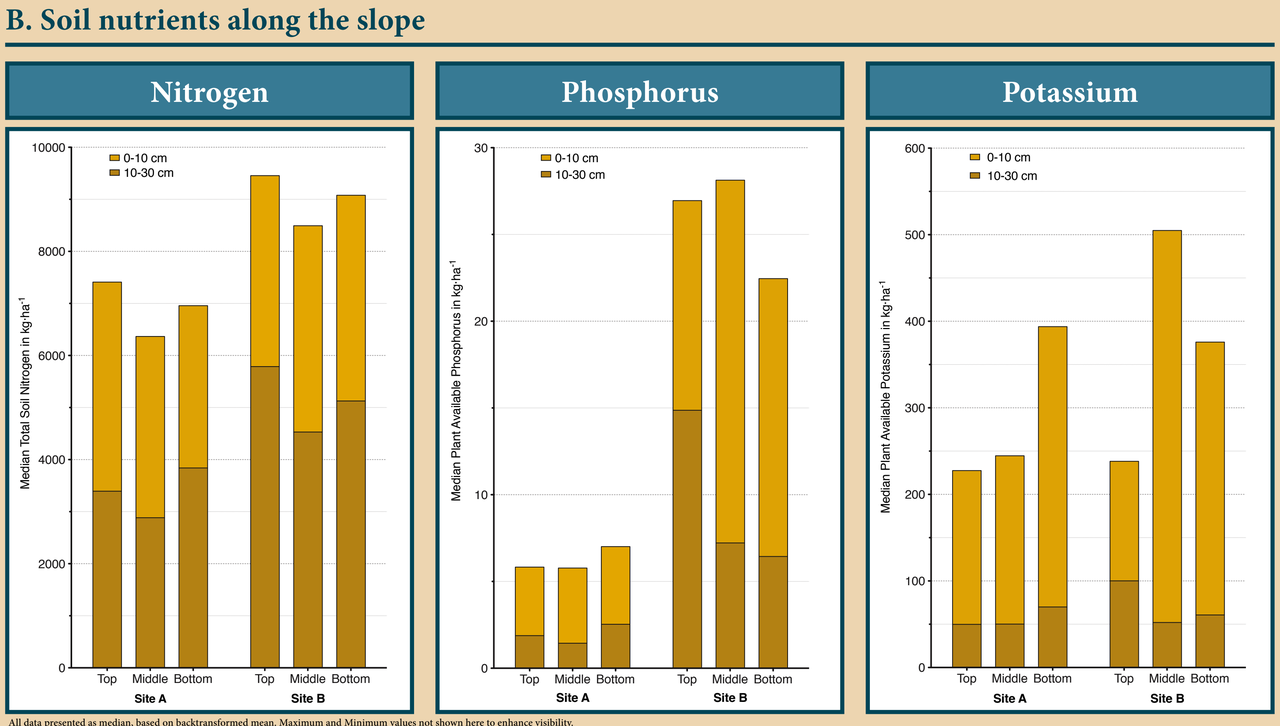
Results

A. Management of tuxi waste and soil nutrients



- Litter is mainly constituted by the tuxi waste - the leaves and the tuxied leaf petioles - around 86% of a stalk
- Litter dry biomass at Site A: 6.7 t/ha; at Site B: 13.8 t/ha
- Soil: Nitisol

B. Soil nutrients along the slope



All data presented as median, based on backtransformed mean. Maximum and Minimum values not shown here to enhance visibility.

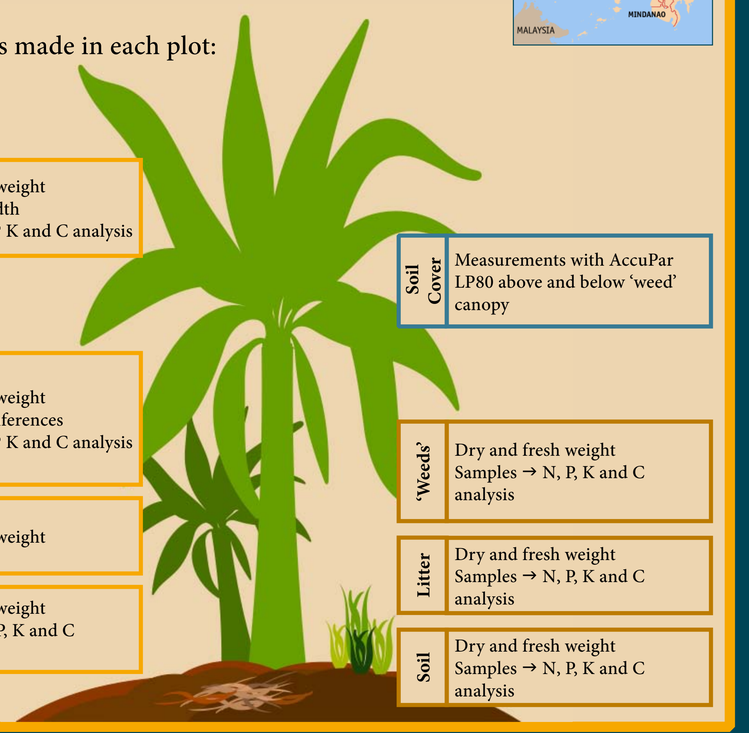
Conclusions

- The removal of the tuxi waste from the field reduces the soil nutrient availability
  - The impact is particularly high on phosphorus availability
- No clear trend along the slope, suggesting that erosion is minimized due to:
  - High soil cover → 85-98% of the soil are covered by natural vegetation and litter
  - Slopes between 46-65% (25-33°) → surface runoff increased, soil erosion limited
- It is recommended to leave and distribute the tuxi waste in the field's confines:
  - Reduced export of nutrients by harvest
  - Provision of soil cover after harvesting and weeding
  - Decrease in surface runoff and erosion
  - Positive influence on soil structure and soil organic matter

Materials and Methods

- Study area: Catanduanes, Bicol Region, The Philippines
- Two sites: Site A – tuxying outside the field; Site B – tuxying within the field.
- Each field was divided in three section: top of the field; middle of the field, bottom of the field. Each section was divided in 3 sampling plots.

- Measurements made in each plot:



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