Suitable fuelwood and cost-effective for earth salt production in villages surrounding the Bezà Mahafaly Special Reserve

Joelisoa Ratsirarson, Mikoja M. Rambinintsoa, Zovelosoa Raharinavalomanana
Doctoral School of Natural Resources Management and Development - University of Antananarivo, Madagascar
Contact: ratsirarson@gmail.com

Introduction

Producing earth salt (*siratany*) is one of the main income-generating activities for women inhabitants around the Bezà Mahafaly Special Reserve.
→ Earth salt: having a very important medicinal value
→Its production requires a significant amount of firewood.
Increased threats and pressures to forest are related to increased fuelwood needs:

Goal: To identify the most suitable and cost effective **fuelwood species** and **technics** for **producing earth salt**, to **maximize yield** and **minimize wood usage**.

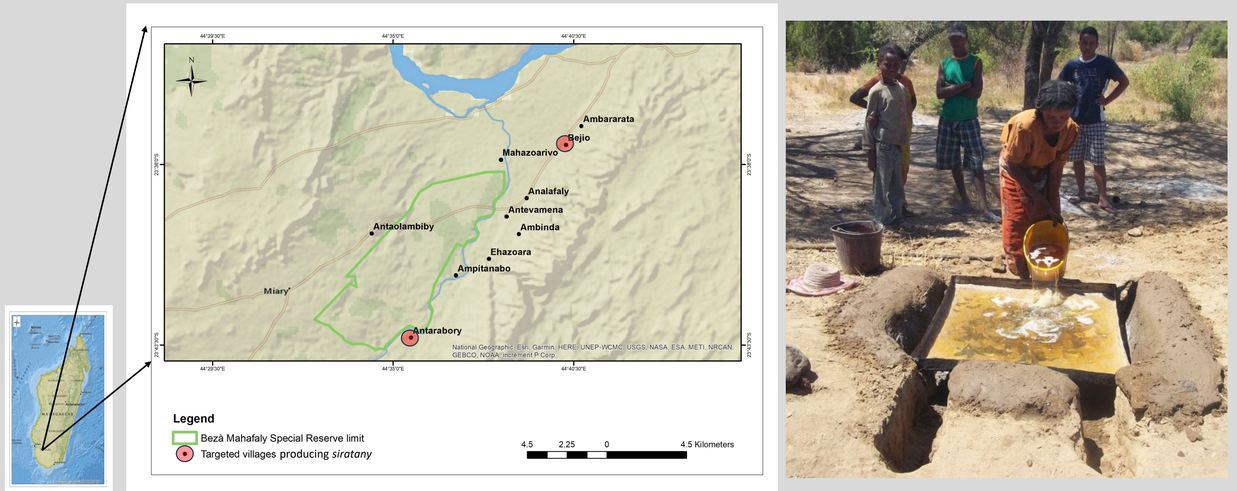

Figure 1: Location of Bezà Mahafaly Special Reserve, southwestern Madagascar and the villages producing earth salt (*siratany)*

Material and methods

Measure of wood density (12%) related to calorific value

Collect of 1 to 5 samples of 9 species (mostly used by producers): *Cedrelopsis grevei*, *Dalbergia sp.*, *Rhopalocarpus lucidus*, *Terminalia fatrae*, *Commiphora aprevalii*, *Syregada chauvetiae*, *Tamarindus indica*, *Grewia grevei*, and *Phyllanthes decoryanus*.

- Cutting to obtain 2 cm edge cubes (1)
- Measure of wood density (12%) of sapwood and heartwood using climatic chamber (65% humidity, 20◦C temperature) (2), precision balance (3), distilled water, to have the weight (g) and the volume (cm^3) based on Archimedes principle.

Figure 2: Steps to measure wood density at 12% of 9 wood species

Cooking experimentation using fuel-efficient stoves

Cooking experimentation of 50 producers of fuel-efficient stoves → Comparison of the quantity of woods needed to cook a pan of salt, using traditional stove and fuel-efficient stove.

Results and discussions

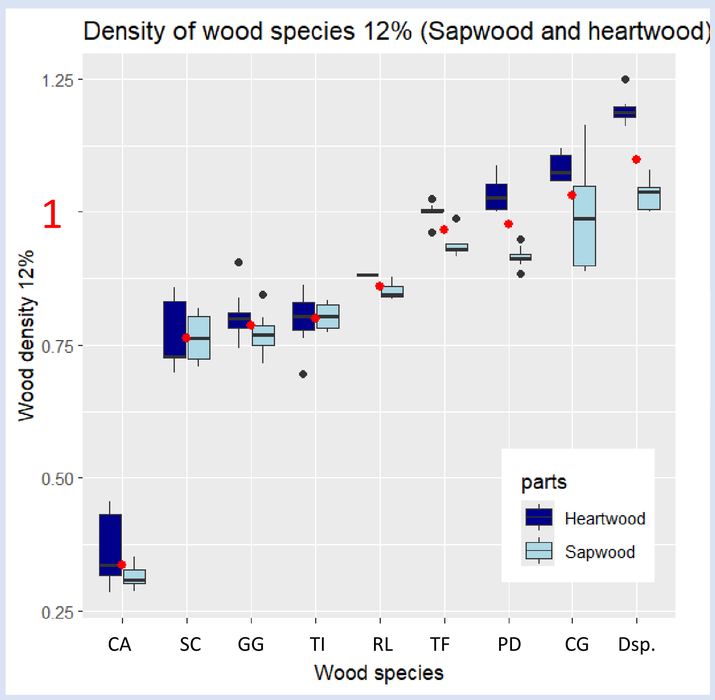

Figure 3: Density of wood species at 12% of humidity (sapwood and heartwood)
Commiphora aprevalii (CA), *Syregada chauvetiae* (SC), *Grewia grevei* (GG), *Tamarindus indica* (TI), *Rhopalocarpus lucidus* (RL), *Terminalia fatrae* (TF), *Phyllanthes decoryanus* (PD), *Cedrelopsis grevei* (CG), *Dalbergia sp.* (Dsp.)

FT → 0.97 (0.94 - 0.99)
HM → 0.98 (0.91 - 1.03)
KF → 1.03 (0.99 - 1.08)
MR → 1.09 (1.03 - 1.19)

Terminalia fatrae (Fatra), *Phyllanthes decoryanus* (Hazomena), *Cedrelopsis grevei* (Katrafay), *Dalbergia sp.* (Magnary)
→ Very high density
→Last longer
→Economical and cost-effective

Figure 3: Traditional stove compared to improved stove used by associations around the Beza Mahafaly Reserve

Before, a cart of wood (~ 50 wooden sticks) to cook one pan.
→Improved stove: 8 wooden sticks are enough to cook one pan
→ Decrease of 84% in the fuelwood needed

Conclusion

- Choosing wood species with high density (*Terminalia fatrae*, *Phyllanthes decoryanus, Cedrelopsis grevei*, *Dalbergia sp.*), could reduce the amount of fuelwood used to cook earth salt
- Applying fuel-efficient stove reduce significantly the amount of wood needed and the time to cook.
- This study also helps guiding species selection to be used for future reforestation project.

Acknowledgements

- Liz Claiborne & Art Ortenberg Foundation (LCAOF)
- ESSA Bezà Mahafaly with all the team on the ground
- UFR Bois team, ESSA Forestry and Environment Department
- Madagascar National Parks-Bezà Mahafaly
- Yale Anthropology Department, USA
- Earth salt producers around Bezà Mahafaly Special Reserve