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STOVE THE FOREST AWAKENS WARS

Differences in forest structure in relation to energy-efficient cookstoves in the Kakamega forest, Kenya

INTRODUCTION

The Kakamega forest, western Kenya, provide local people with multiple forest resources daily and is essential for poor peoples' survival. The forest's main threat is collection of firewood used for cooking in the local homes. Energy-efficient cookstoves have almost 50 % lower demand for firewood compared to traditional 3-stone-stoves. These stoves have been installed by Eco2librium during their project Stoves for Life to ease the pressure on the forest.

The present study evaluates the effect of utilizing energy-efficient cookstoves on forest structure of the Kakamega forest, Kenya.



METHODS



The three subplots

Each of the 59 plot locations included three subplots (5, 14 & 20 m radius) and the sampling of the dependent variables was distributed within them.

The dependent variables were tested against the three independent variables, **number of stoves** and **houses**, and **stove age** in a series of Multiple Linear Regressions.

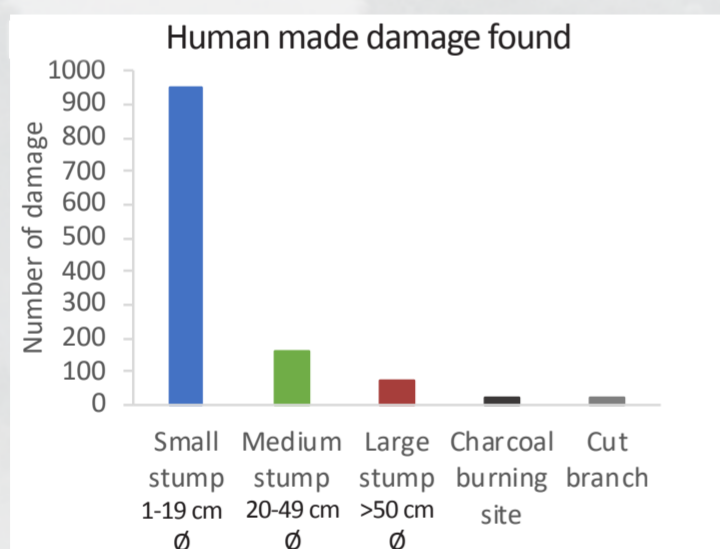
DEPENDENT VARIABLE	UNIT
Tree Diameter at Breast Height	cm
Identification of tree species	Species
Occurance of human made damage Stumps, cut branches, charcoal burning sites	n
Foliage coverage of structural layers	%
Vines, ferns, and lianas	n
No. and diameter of woody debris	n, cm
Density of understory vegetation	n

Pioneer type species are usually fast-growing, early successional, and are shade-intolerant

Climax type species are usually late-successional, indicates forest maturation, and are shade-tolerant

RESULTS

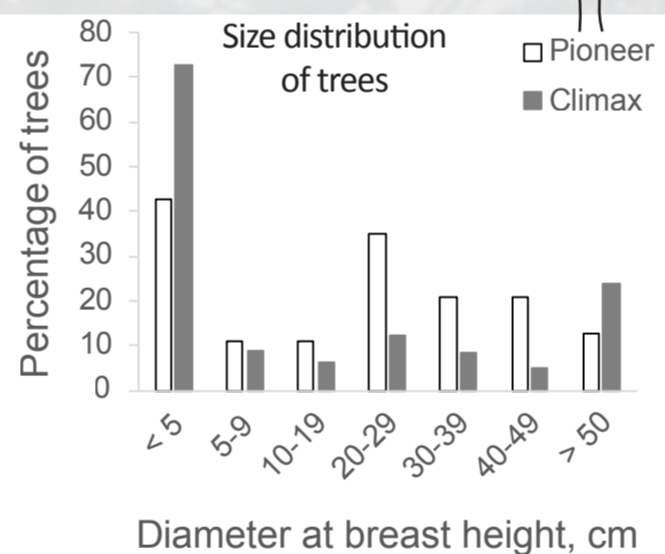
Firewood preferences



Firewood preferences found during my study are:

- Stems and logs <20 cm in diameter and
- Trees of climax succession type

Consequences



The preference might cause the low abundance of the preferred size and type of trees shown in the general pattern of tree size. The amount of woody debris of the preferred size also seems to decrease. The low abundance of pioneer trees of the preferred size gives indication that these types of trees also are cut.

Effects of increased number of stoves

NUMBER OF STOVES



Indicates a decreased number of new damages made on climax trees.



Significant increased proportion of living pioneer trees. Likely recruiting trees of <5 cm and trees at 20-29 cm in diameter.



Indicates an increased number of woody debris in total (10-15 cm Ø in particular).

STOVE AGE



The number of herbaceous vines increased significantly with stove age.

DISCUSSION

The stoves seem to lower the amount of firewood collected in the forest. Fast-growing pioneers of the preferred size might therefore survive and **grow into a larger size** class (20-29 cm in diameter). That might create a climate suitable for **shade-tolerant, climax type trees** to sprout and establish recruiting trees (<5 cm in diameter).

Utilization of energy-efficient cookstoves **preserve woody debris** found on the forest floor. This is an important structural component in a forest on many levels. However, the **increased number of herbaceous vines** shown due to stove age is a sign that the forest is still experiencing human pressure creating gaps in the forest canopy.

CONCLUSION

My study states five main findings. Utilization of the stoves seem to:

- 1) promote sprouting of both pioneer and climax trees.
 - 2) increase survival among fast-growing pioneer trees.
 - 3) ease the pressure on preferred group of species to use as firewood.
 - 4) preserve important structural components such as woody debris found on the forest floor.
- Additionally:
- 5) the growth of pioneer trees is potentially creating a climate suitable for later successional species to establish, leading to forest maturation.

The structure of the Kakamega forest show some signs of maturing thanks to usage of energy-efficient cookstoves. Though, future comparative studies are essential to be able to properly assess the cookstoves efficiency regarding forest structure.