

Domestication of dioecious NTFPs, *Allanblackia stuhlmannii* in Tanzania and *Daemonorops* spp. in Indonesia

Objectives of study: Examine the biological and socioeconomic barriers to domestication of two potentially lucrative NTFPs from two dioecious species

Specific for *Allanblackia stuhlmannii*

- ◆ Examine innate sex ratio and how it may change during cultivation
- ◆ Examine possible pollination limitation in farmland

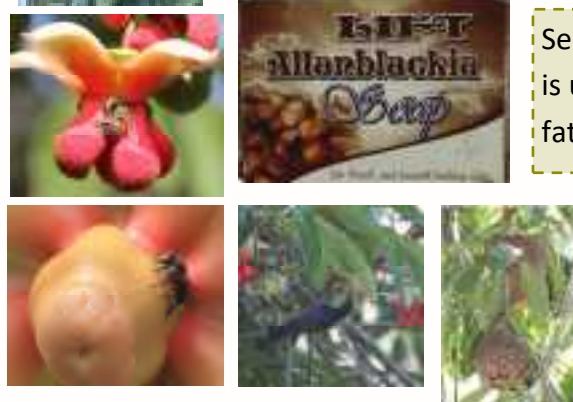
Specific for *Daemonorops* species (Jernang)

- Examine innate sex ratio and flowering and fruiting of planted jernang
- Examine specific cultivation obstacles and compatibility in agroforestry



Methods
Pollination experiment
Transects and gene bank monitoring
Fruit and seed counts
Farmland survey and preference study

Seeds of *A. stuhlmannii*, are sun dried and the oil is used for the manufacture of soap and cooking fat



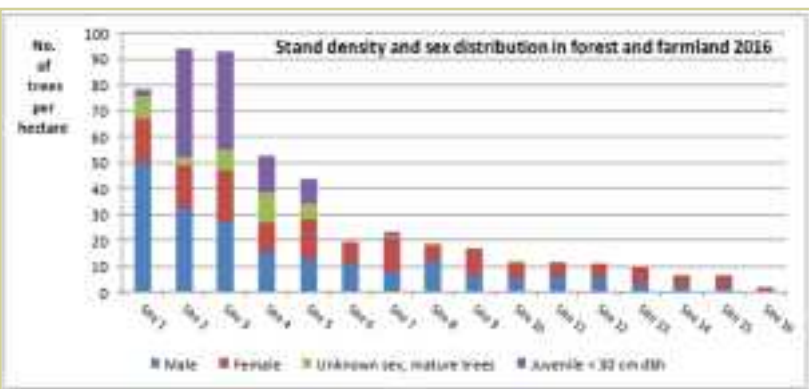
A. stuhlmannii flowers are pollinated by honeybees, stingless bees and sunbirds. Flower bud isolation showed that the insect pollinators are effective pollinators



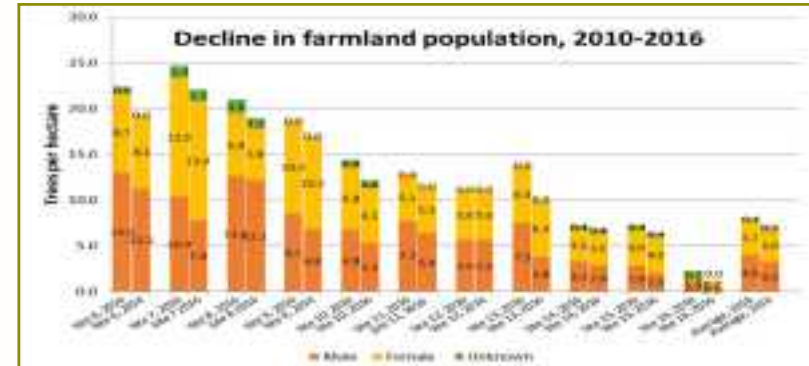
Methods
◆ Local monitoring of phenology
◆ Farmers adoptability survey



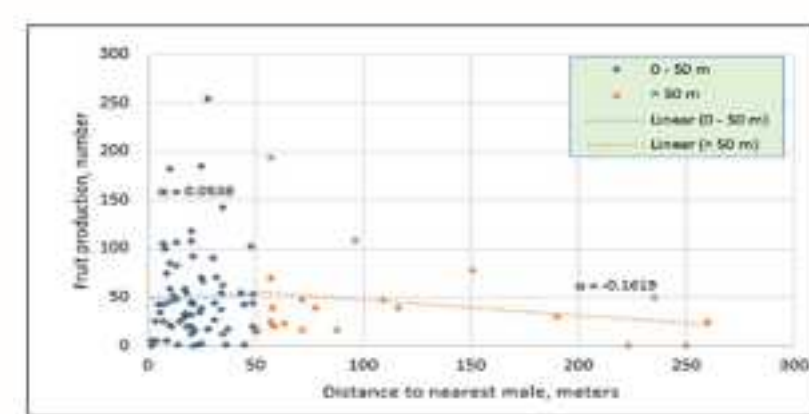
The wax covering immature fruits of jernang are extracted, and processed to medicine and cosmetic products in e.g. China



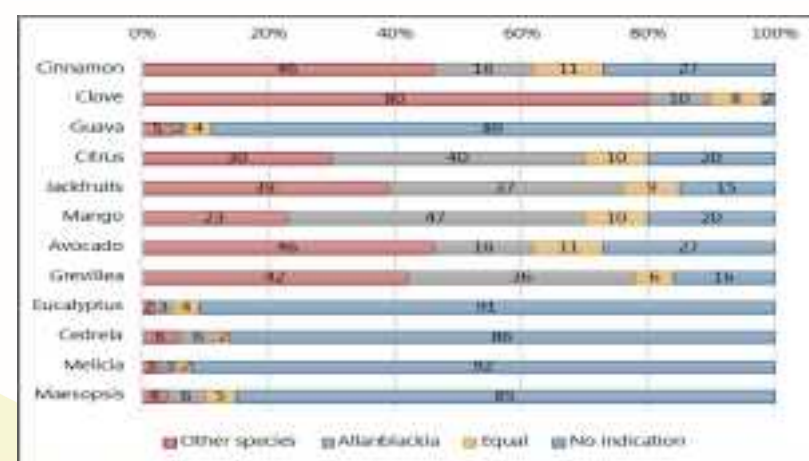
Natural stands (site 1-5) have up to 78 mature trees per hectare. Most farmland (site 6-16) have less than 20 trees/ha, are mostly female biased.



Trees are continuously removed from farmland. Most removed trees are male trees.



Some female trees of *Allanblackia* growing close to male trees produce a large number of fruits, but many also have few fruits. Female trees with long distance to males often have few fruits.



Preference of *A. stuhlmannii* compared to other species. Most farmers in the East Usambara prefer clove, cinnamon and exotic trees for *Allanblackia*

| Sex | Number of clusters | Total number of stems | Number of flowering / fruiting stems | Total number of inflorescences | Total number of infructescences |
|--------------|--------------------|-----------------------|--------------------------------------|--------------------------------|---------------------------------|
| Male | 26 | 328 | 80 | 176 | |
| Female | 25 | 441 | 90 | 148 | 72 |
| Unknown | 13 | 147 | 0 | 0 | |
| Total | 64 | 769 | 170 | 324 | 72 |

Sex ratio of *Daemonorops* is approximately 1:1. Despite a lower number of stems in the study, males produced significantly more inflorescences than females. Farmers often cut some of the stems of male clusters.

East Usambara, Allanblackia
Incentives for domestication
Tradeable product
Good storability
Open resources becoming restricted
Disincentives
Unpredictable sex (large waste of resources)
Shortage of land
More attractive / profitable tree crops available (e.g. clove)
Long juvenile stage
Unpredictable long-term market
Strong competition with other crops
Modest profit

Southern Sumatra, Jernang
Incentives for domestication
Tradeable product
Good storability
Open resources becoming restricted
Supplementary to rubber
Compatibility with rubber
Present rubber production crises, - looking for new profitable crops
Disincentives
Unpredictable sex
Land shortage for Batin Sembilan
Palm oil is more reliable, profitable and less labour demanding than rubber
Suspected theft of products

As a large canopy, and late fruiting species, *A. stuhlmannii* is not very suitable for smallholder production. Most farmers prefer species with faster return to land, primarily clove. *Daemonorops* species fit well into the present rubber agroforestry system. The unpredictability of sex is a minor problem for *Daemonorops*, because surplus individual male stems are cut down.

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