

Cocoa plant health, a comparison between Dynamic Agroforestry System and Traditional full-sun System in Ghana



Objectives

- ▶ Comparison of cocoa plant health in Dynamic Agroforestry System (DAFS) and in full-sun monocultures during the establishment phase
- ▶ Assessment of influence of field management on young cocoa plant health

Material and methods

Data collection in Western Ghana April-July 2019

- ▶ 20 DAFS and 9 full-sun plots established between 2016 and 2018
- ▶ Interviews with 23 farmers

Analysed parameters:

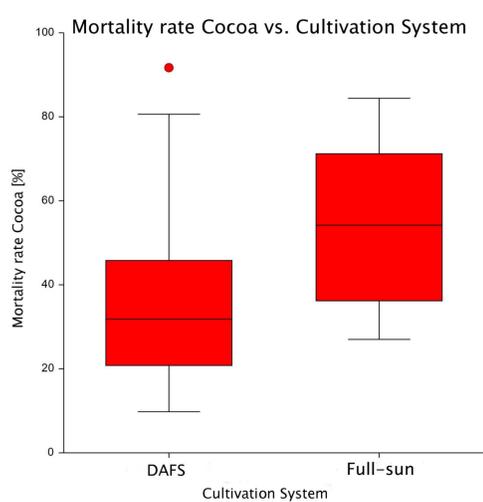
Cocoa growth rate

Cocoa mortality rate

Cocoa vigour

Field management

Results



(Mann-Whitney U Test, $n_1=19$, $n_2=9$, p -value=0.042)

Mean mortality rate

In DAFS: 38.2%
In full-sun: 54.8%

Other results

Growth rate higher in DAFS
Plant vigour does not differ between the two systems



(T-Test, $n=28$, p -value<0.001, $y=9.463-1.097x$, R -Squared: 0.6053)

Strong influence of field management quality on cocoa mortality rate

Other results

Management generally low in both cultivation systems.
Influence of field management quality on cocoa growth rate and on vigour.

Cocoa planting scheme

DAFS: in lines

Full-sun: random

In full-sun is more likely to cut accidentally cocoa seedlings because hidden in the high vegetation and the position is not known

Plant density in 25m x 25m plot

DAFS: 72 cocoa and 184 other tree species. Total: 256 permanent trees

Full-sun: Various. Mean of 103 cocoa trees



Conclusions

Variables with influence on cocoa health

Precision during weeding practices
Concurrence of herbaceous weeds
Planting scheme of the field

Variables with possible influence on cocoa health

Quality of seedlings
Root interactions
Cocoa planting density

Variables with no influence on cocoa health

Shade percentage
Times of weeding per year
Permanent trees density

- ▶ DAFS positively influences cocoa health during establishment phase
- ▶ Plant health is also strongly influenced by management practices that do not necessarily depend on cultivation system, such as weeding precision and planting scheme

Potential of Green Way App for data collection on crop economics in Myanmar

Aims

- ❖ Investigation on potentials and challenges of the Green Way app (Greenovator) for economic data collection
- ❖ Update of Cost-Benefit Analysis (2018) on rice and green gram production

Material and Methods

- ❖ Farmer survey with 59 households in the Gulf of Mottama
- ❖ Interviews and focus group discussions
- ❖ Data analysis on crop economics, information sources, app knowledge and use

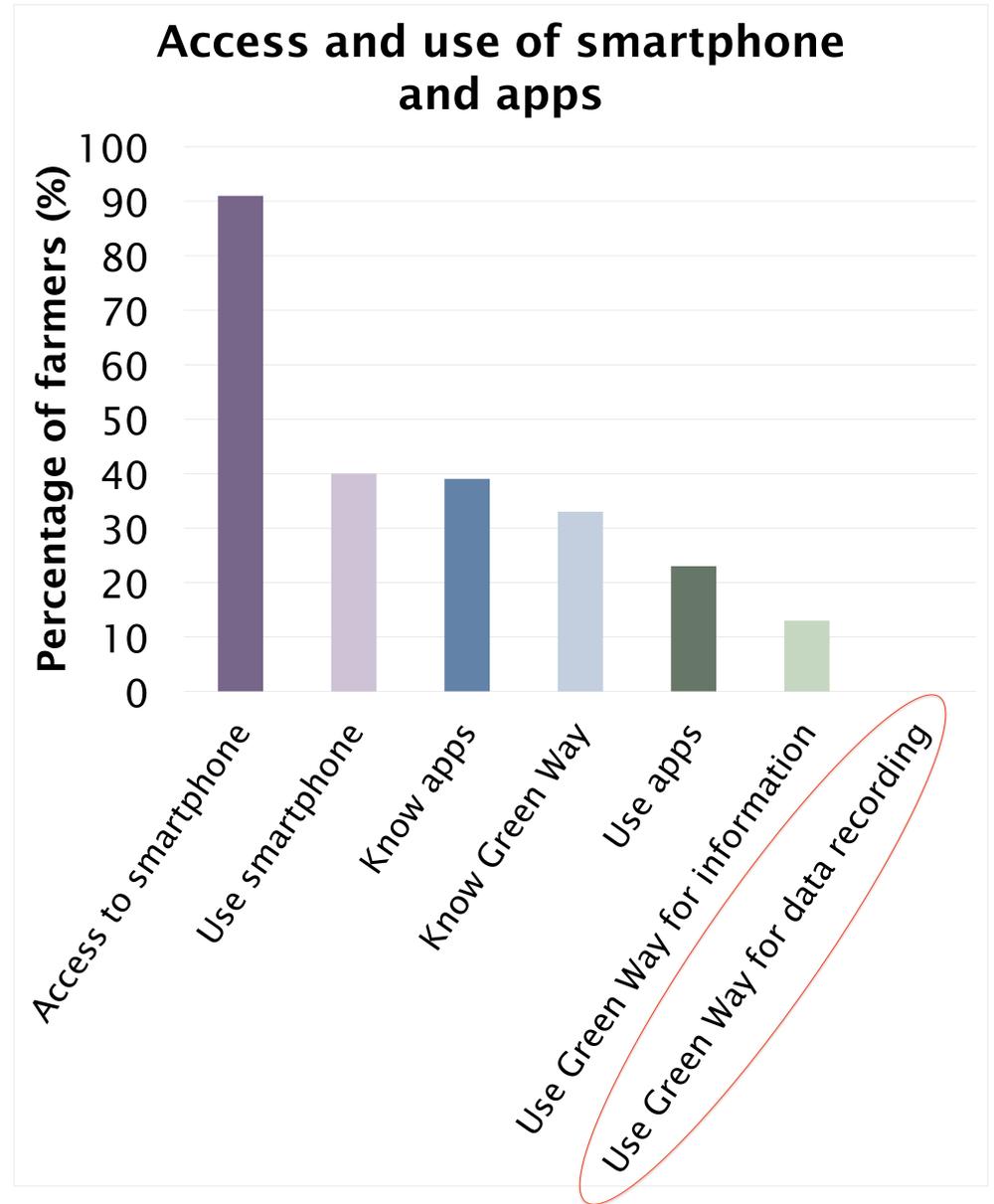


Selected Results

Paddy economics of trained* and non-trained farmers

Item	Average trained	Average non-trained	Significance
Yield (kg/acre)	949	794	Yes (p=0.047)
Production costs (MMK/acre)	198'850	185'931	No (p=0.375)
Seed costs (MMK/acre)	12'170	5'898	Yes (p=0.004)
Financial costs (MMK/acre)	14'567	10'678	Yes (p=0.045)
Income (MMK/acre)	225'808	101'854	Yes (p=0.008)

*Receive training on data recording through Green Way app



SWOT Green Way as tool for data collection

Strengths	Weaknesses
<ul style="list-style-type: none"> • Collects data in an easy and cheap way • Plans and reviews farm activities 	<ul style="list-style-type: none"> • Needs precise information from farmers • Requires basic understanding of math and economics
Opportunities	Threats
<p>Faces...</p> <ul style="list-style-type: none"> • increasing access to smartphone and network connection • increased access to certification standards 	<p>Faces...</p> <ul style="list-style-type: none"> • low rate of smartphone use • difficulty of recording and typing data

Conclusions

- ❖ **Training** is crucial in order to increase the rate of smartphone, app use and the quality of the collected data.
- ❖ For **future Cost-Benefit analyses of the project**, other ways of data collection need to be identified for farmers that are not able to record economic data on Green Way.
- ❖ The collection of data through mobile apps is in the launch and could become of **considerable importance** in Myanmar and other developing countries.

Assessment of three technologies to reduce aflatoxin contamination in groundnut production

Effectiveness and Attractiveness for farmers in northern Mozambique

Context

- Mozambique belongs to the Top-Ten groundnut producers worldwide. The majority of production originates from small-scale farmers who use traditional cultivation methods and hardly apply any agricultural practices to prevent or combat fungal infestation
- The risk of aflatoxin contamination which is produced by the saprophytic fungi *Aspergillus ssp.* is high
- Aflatoxin has severe, negative impacts on consumer health and impedes export to international markets due to stringent phytosanitary regulations set by importing countries

Objectives

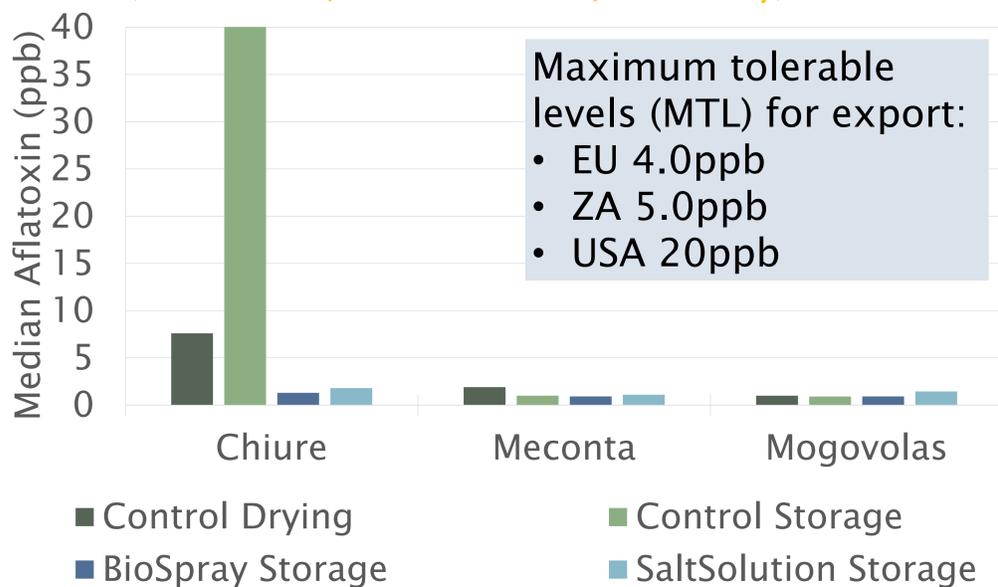
- Analysis of three organic technologies to reduce aflatoxin contamination in groundnut production
- Assessment of attractiveness, effectiveness, costs and benefits of the treatments for rural farmers
- Awareness-raising of farmers about aflatoxin and recommendation of the most adaptable solution

Methods

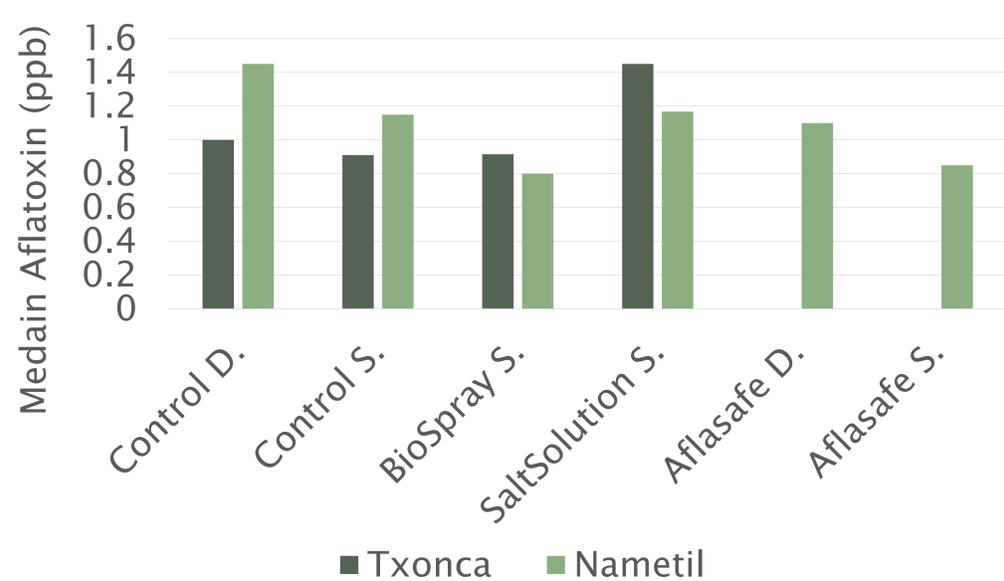
- Two interlinked field trials in three districts Chiure, Meconta and Mogovolas of northern Mozambique
- Laboratorial analysis of aflatoxin in samples treated with SaltSolution, BioSpray or Aflasafe
- On-farm interviews to capture farmers estimations regarding application of the technologies

Principal Results

Trial 1 (3 districts, 3 treatments, 1 variety)



Trial 2 (1 district, 4 treatments 2 varieties)

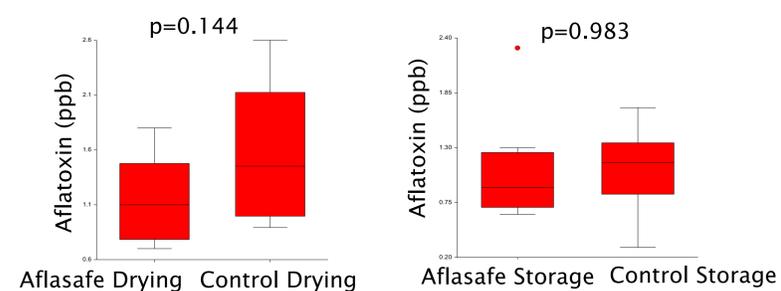


Key findings

- Aflasafe and BioSpray show a reducing effect on aflatoxin
- SaltSolution samples show higher aflatoxin contamination compared to other treatments and to the control group
- Positive correlations between insect damage ($p=0.005$; $r=0.249$), mechanical damage to pods ($p=0.179$; $r=0.121$) and the incidence of aflatoxin were found
- The newly introduced, resistant cultivar Nametil is not generally less contaminated than the local, susceptible variety Txonca

The effect of Aflasafe

- Aflasafe samples are less contaminated than the control group



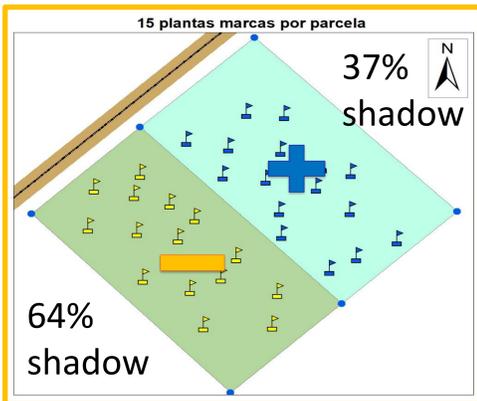
Conclusion

- Although Aflasafe is the most expensive treatment, it represents the most attractive option for farmers
- The content of aflatoxin decreases over time. This can be partially explained by decreasing moisture of the harvested groundnut. Hence, adequate post-harvest handling is crucial to keep the harvest dry
- No significant differences were measured regarding the influence of the varieties on the effect of the three treatments

Effects of pruning of shade trees on agroforestry cocoa production (*Theobroma cacao*) in Bolivia

Objectives

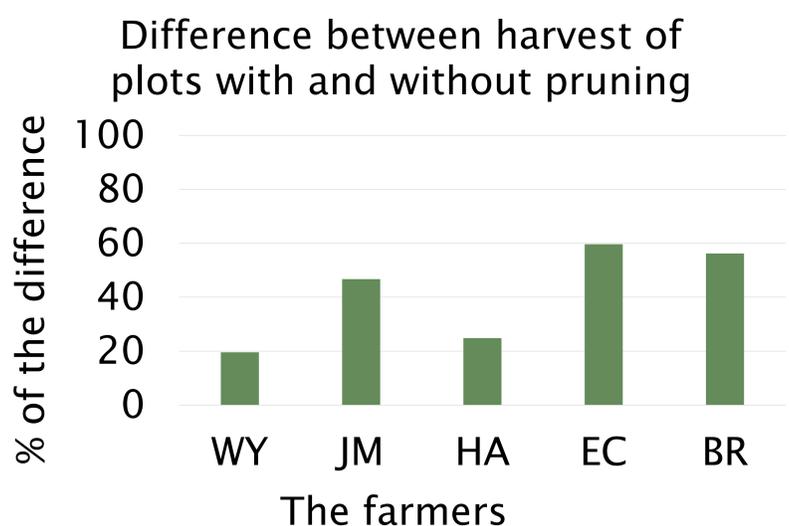
- Observation of effects on the cocoa tree caused by pruning the shade trees
- Assessment of limitations for the farmers to prune the shade trees
- Assessment if additional costs are covered by the increase in yield



Proceeding in the field

- 3 shadow estimations from May to August
- 7 farmers with 2 treatments (pruned/without)
- 15 cocoa trees per treatment
- 7 harvests every 2 weeks
- Interviews and economic calculations

Main factors observed:
Flowers, diseases, pests and yield



Shadow estimation

- Difference between pruned and not decreases until August
- Decrease of shadow cover in June and August

Statistical analysis

- Significant more on pruned site : yield, flowering, diseases
- No clear difference in pests

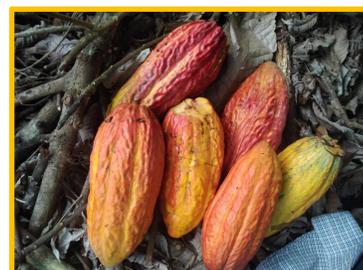
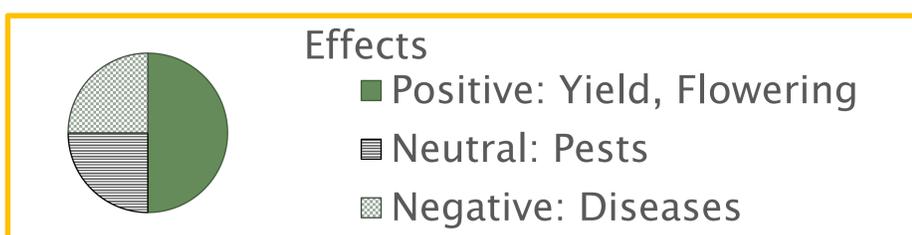
Interviews and economic calculation

- All farmers want to go on with the pruning of shade trees
- Limitations are: Their age, missing equipment and knowledge
- In the first year two producers had the costs covered
- In the second year the costs are covered for all of them

Comparison for one year - JM (1 quintal = 46 kg, 1 Boliviano (BS) ~ 7 CHF)			Total
Adicional costs + pruning / ha costs	746 BS	2'720 BS	3'466 BS
Income with increased yield	9.47 quintal/ha	1'200 BS	11'364 BS
Adicional income minus total adicional costs			7'898 BS



Conclusions



- It may be an idea to include more leaf-dropping trees in the agroforestry systems to lower the pruning necessity
- Farmers are convinced about advantages of having little shadow in their agroforestry systems
- They need to get aware of possible negative effects and therefore that an entire good management is necessary
- In case they can not find or pay an external service they will go on with cutting down shade trees