

Cocoa plant health, a comparison between Dynamic Agroforestry System and 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:

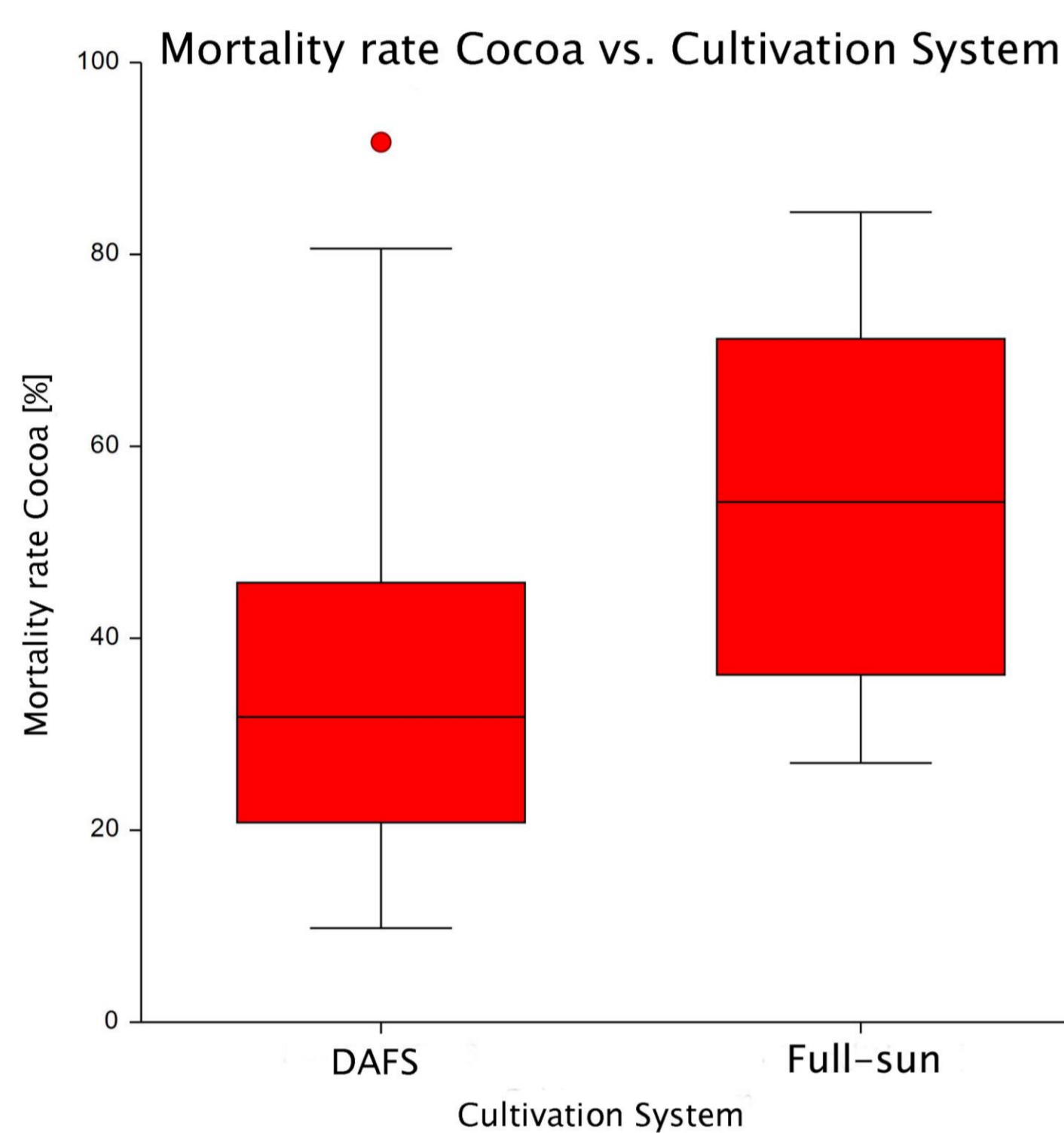
Cocoa growth rate

Cocoa mortality rate

Cocoa vigour

Field management

Results



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

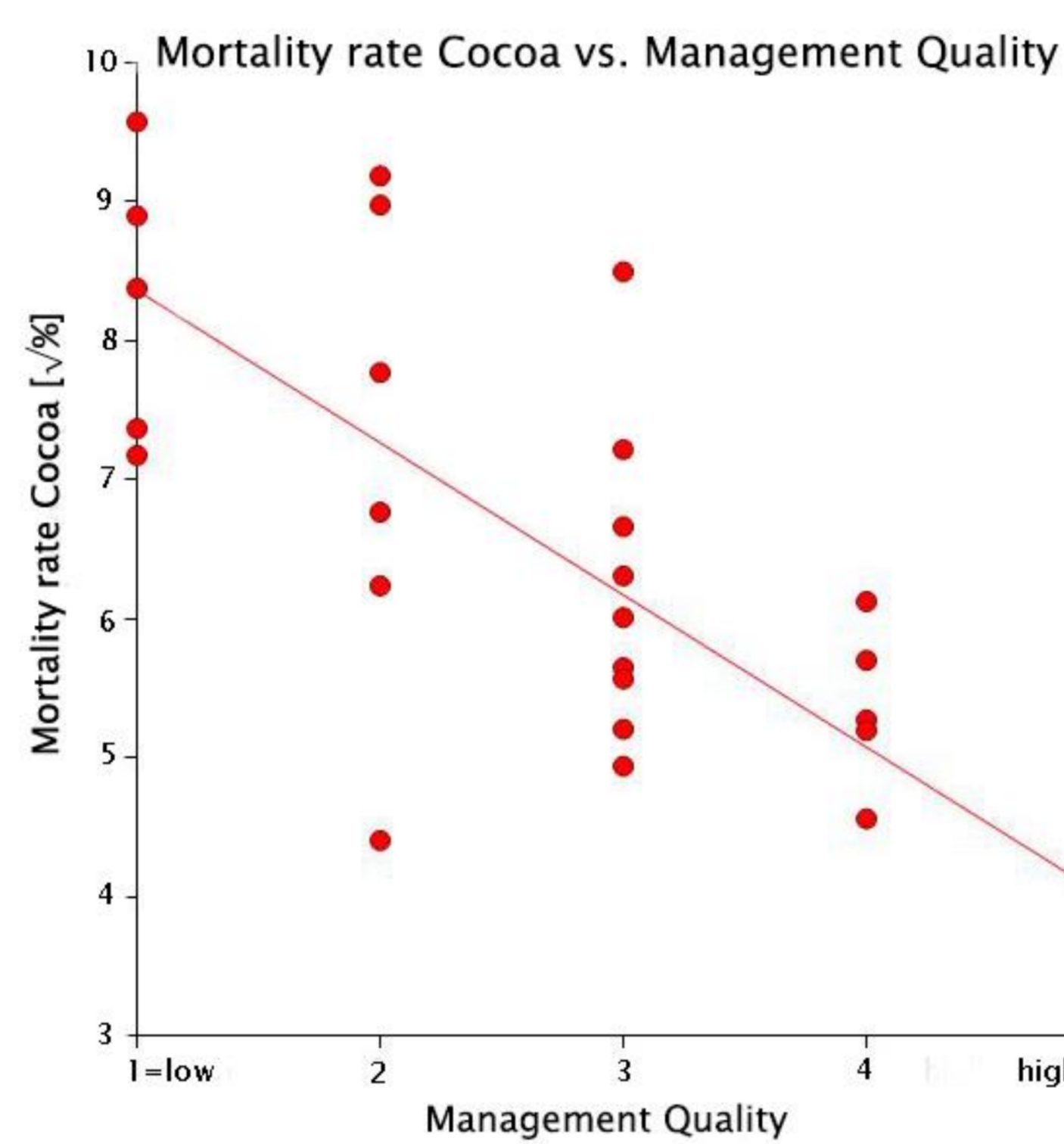
Mean mortality rate

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, $n=28$, $p\text{-value}<0.001$, $y=9.463-1.097x$, $R\text{-Squared: } 0.6053$)

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