

Cocoa agroforestry as climate change adaptation along a climate gradient in lvory Coast – Farmers' perceptions and interventions

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1200 - 1300 1300 - 1400

1400 - 150

1500 - 1600 1600 - 1700

1700 - 1800 1800 - 1900

# BACKGROUND

# Agroforestry as adaptation to challenging climate?

- Ivory Coast biggest cocoa producing country with 33% of world production
- Production threatened by climate e.g. low rainfall and high temperatures

# **Cocoa agroforestry seen as adaptation measure to challenging climate**

- Study aim: role of agroforestry in farmers' adaptation to challenging climate  $\bullet$
- **Hypothesis**: Farmers use shade trees to adapt to production in dry climate

# Hypothesis

# Increasingly challenging climate

Increase: farmers' positive perception of shade trees

# **Farmer interviews**

Quantitative interviews

- General farm information (farmer information, yield, plantation age and history)
- Management practices, production constraints
- Perception shade trees & climatic challenges

# **Plantation structure**

• Plantation size (GPS measuring)

Cocoa specifications ✓ Cocoa tree planting density, ✓ Cocoa tree diameter (D30)







### Increase: shade coverage

medium dry

-			
-			

• 3 x sample plots 10 x 10m

Associated tree specifications

- ✓ Species, height, stem diameter (DBH)
- $\checkmark$  Crown size
- 1 x plot 20 x 50m



Three sites and individual sites along rainfall gradient in 100mm steps

# RESULTS

## Shade coverage

- Overall very low shade coverage
- Below 30% considered low

## In dry region further trend towards extremely low shade coverage

Contrary to expectation  $\bullet$ 



# Cocoa yield

Not differing across the regions

Despite low overall shading and precipitation differences

dry

# **Production area** (median)

Dry 1.5 (a), medium wet 3.7 (b), wet 1.4 (a)



# **Farmers' perception of shade trees**

### **Advantages**

Improved microclimate:

Other

Medicinal use

Improves cocoa

production

More frequently mentioned with increased precipitation

Improved

microclimate

100%

80%

60%

### Disadvantages

Negative effect on microclimate:

Frequently mentioned by farmers in dry region



Additional food

production

Additional sales of

fruits

Construction timber

Shade coverage, white circles show the medians. Small letters indicate
significant differences between median values. (for total sample, n = 60; and
per region, n = 20)

Cocoa yield, white circles show the medians. Small letters indicate significant differences between median values. (for total sample, n = 60; and per region, n = 20)

### Farmers perception: Do shade trees protect your cocoa against drought?

### Dry region:

• Increased skeptical perception to drought buffering effect of shade trees

### Wet and medium wet regions:

Mostly positive perception



Natural organic	Excessive shade	Negative effect on
fertilizer	reduces yield	microclimate
—Dry, Toumodi —Medium wet, Soubré —Wet, Aboisso	—Dry, Toumodi —Medium wet	z, Soubré 🗕 Wet, Aboisso

# CONCLUSIONS

## **Expected as hypothesized:**

- Increase of shade coverage towards dry regions **\*** Trending towards the inverse
- Farmers perceive shade trees as beneficial regarding challenging climate × In climatically challenged region, rather negative perception

# > Ivorian cocoa farmers do not adapt to climate change via agroforestry

## **Reasons:**

- Historic: precedent official recommendation to eradicate shade trees
- Legal: Logging practices, Land ownership, property rights
- Climatic: in dry region water competition effect of shade trees

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# CONTACT

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On the way to the plantation

Cocoa pods on tree

**Discussion with farmer** 

Location overview