Cameroon's cocoa farmers intensify and expand production yet retain shade trees: evidence from two decades

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Introduction

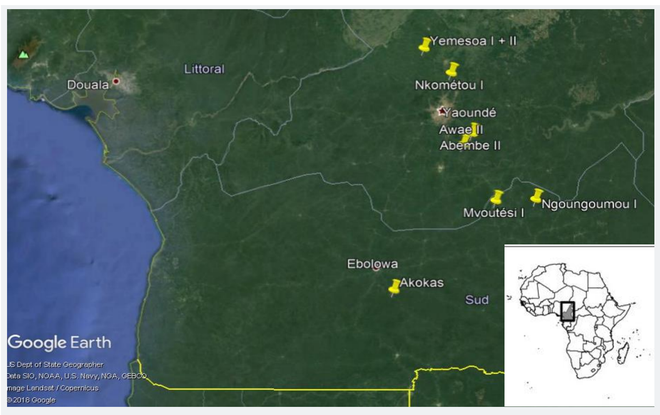
- >80% of world's cocoa is grown in West Africa, traditionally in thinned forest with timber, fruit, or nut trees retained (Fig. 1a)
- Nowadays, farmers, particularly in Côte d'Ivoire, are reportedly shifting to "full-sun" cocoa
- Cameroon is world's 5th largest producer; cocoa is grown by 70% of farmers in the humid south
- Yields are low, constrained by blackpod disease, mainly the "new encounter" *Phytophthora megakarya,* managed with fungicide (Fig. 1b,c)

Fig 1. a) Shaded cocoa in Cameroon, b) with fungicide spraying to control c) *Phytophthora megakarya*

Objective & Hypothesis

- Assess management changes in cocoa in central and southern Cameroon between 2001 and 2018 and how these have impacted yields
- We hypothesised that shade trees had been removed and intensification has occurred fuelled by increased inputs

Methods



In 2001, we conducted surveys in seven villages (Fig 2) with 210 farmers, then again in 2018 with 126 farmers

Fig 2. Locations of seven villages In central & southern Cameroon

Conclusion

- **Bucking the regional trend, central and southern Cameroon's cocoa farmers still cultivate traditional, carbon-rich agroforestry systems albeit yet with intensification by increasing chemical inputs**
- **Yields have increased by 50%**
- **Full-sun systems remain a rarity**

Acknowledgement, Affiliations

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Results

1. Expansion /rehabilitation of farms farther afield

- In 2018, 69% of farmers said that they had extended their cocoa fields, compared with 28% in 2001. In 2018, 54% of farmers had a nursery compared with 25% in 2001
- A higher % of fields were harvested in 2018 than in 2001, suggesting that farmers were rehabilitating previously abandoned fields (Fig. 3)
- Walking time to the field more than doubled between 2001-2018 (Fig 4)
- More farms had been established or rehabilitated after partial clearance of secondary forest than after short fallow

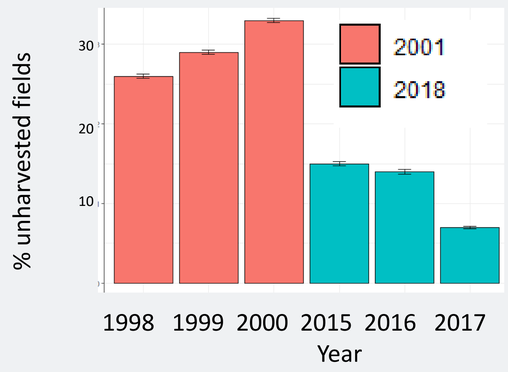

Fig 3. % of unharvested fields reported in 2001 & 2018. Lines denote s.e. mean here and elsewhere

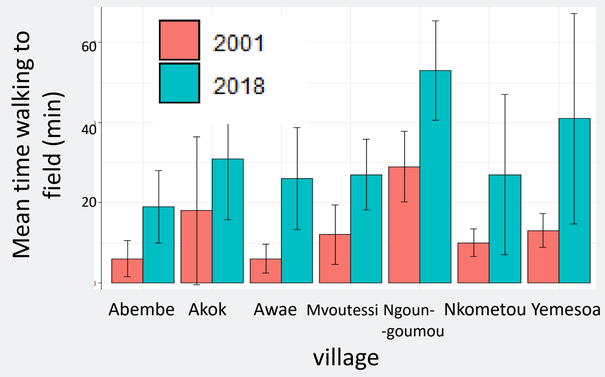

Fig 4. Mean reported walking distance (min) to the field in 2001 & 2018

2. Increased inputs yet shade retained

- Fungicides remained the most used pesticide with 65% of farmers using them in 2001 compared with 86% in 2018 (Fig. 5)
- In 2001, no farmer used herbicide or fertiliser whereas by 2018 this had increased to 9% for both products (Fig. 5)
- Number of farmers using insecticides quadrupled from 18% in 2001 to 69% in 2018 (Fig. 5)
- Fewer farmers in 2018 indicated they used full-sun systems and more reported using higher shade levels (Fig. 6)

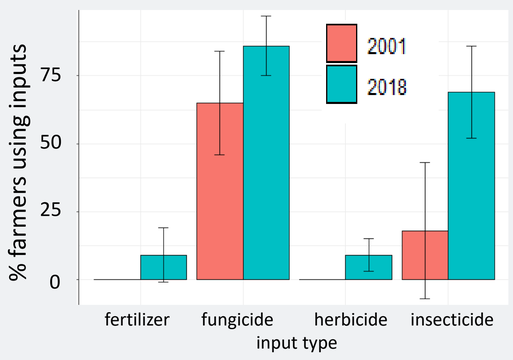

Fig 5. Reported input use by cocoa farmers in seven villages in southern Cameroon in 2001 & 2018

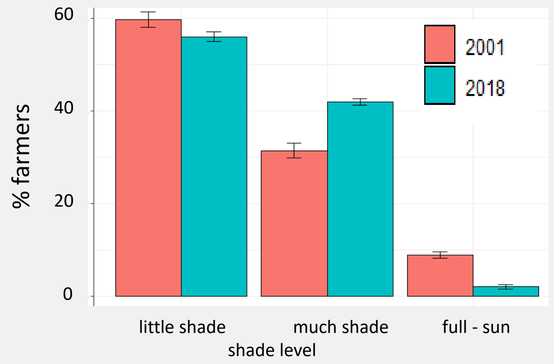

Fig 6. Reported shade level used by cocoa farmers in seven villages in southern Cameroon in 2001 & 2018

3. Higher yields

- In 2018, 61% of farmers said that cocoa sales were their largest revenue source, compared with 40% in 2001
- Reported yields were higher in 2018 (176 kg ha^{-1}) than 2001 (115 kg ha^{-1}; Fig. 7), were positively correlated with total costs & labour invested, yet negatively correlated with total area of cocoa holding

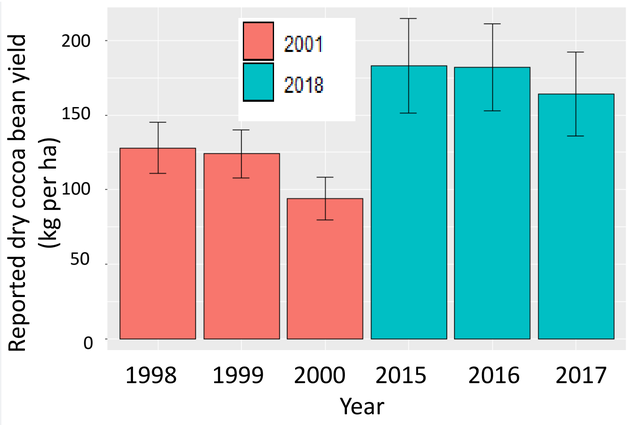

Fig 7. Reported cocoa yieldS in seven villages in Cameroon in 2001 & 2018