

# Towards Integrated Soil Fertility Management (ISFM) Practices to Increase Cocoa Productivity in Cameroon



U. Kenfack Essougong, L. Woittiez; P. Tata Ngome , W. Vanhove; P. Boudes; S. Mathe; M. Slingerland



---

# OUTLINE

- *Introduction*
- *Methodology*
- *Results*
- *Conclusion*

# INTRODUCTION

- Increasing cocoa demand;
- **Low yield** (300-400 kg/ha in CMR, potential >1000kg/ha (Wessel and Quist-wessel, 2015)) due to poor adoption of good cocoa farming practices, pest and diseases attacks, **ageing plantation** and, **Poor and decreasing soil fertility...;**
- Deforestation and forest degradation as a result of cocoa farm expansion;
- Implementation of practices enhancing soil fertility recommended to increase cocoa yield while maintaining low to zero level of deforestation or forest degradation;
- *Little research addressing the question of whether cocoa farmers consider soil fertility management an important issue.*

Wessel, M., & Quist-Wessel, P. M. F. (2015). Cocoa production in West Africa, a review and analysis of recent developments. *NJAS - Wageningen Journal of Life Sciences*, 74-75, 1-7. doi:10.1016/j.njas.2015.09.001

---

# INTRODUCTION

---

**Research aim:** Explore Cameroonian cocoa farmers perceptions and management of soil fertility

- (1) How do cocoa farmers judge actual soil fertility level?
- (2) What do cocoa farmers regard as indicators of a fertile soil?
- (3) How do cocoa farmers manage soil fertility?
- (4) What could prevent cocoa farmers from taking actions that enhance soil fertility?
- (5) Do cocoa farmers consider soil fertility management as equally important for high productivity compared to other good cocoa farming practices.

# METHODOLOGY

Table 1. Characteristics of the two division studied

	Mvila	Mbam-and-Inoubou
AEZ	Humid-forest	Forest-Savannah transition
Mean Temperature (°c)	24	25
Dominant Soils	Ferralitic yellow-brown to brown-red deriving from (gneiss and granite)	Ferric Acrisols (predominant), lateritic and hydromorphic
Rainfall (mm)	1650	1300*
Dominant Vegetation	Humid dense forest	Savannah, Gallery forest with low shrub savannah rich in <i>Imperata cylindrica</i> (dominant)
Climate	Hot and humid climate	Hot and humid climate

Source: (Ebela, 2017; Jiofack et al., 2013; Tendonkeng et al., 2013; Jagoret et al., 2012)

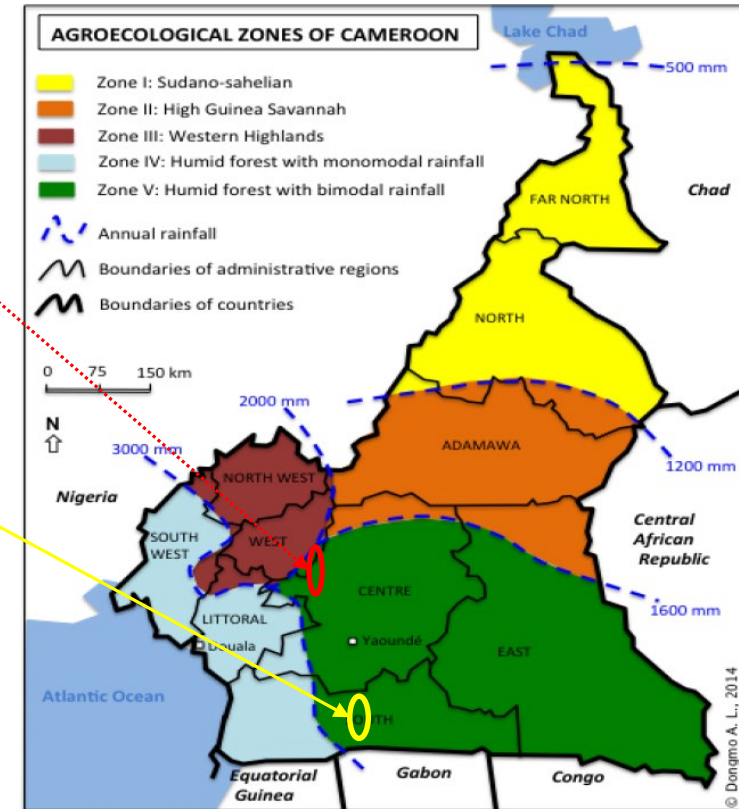


Figure 1: AEZ in Cameroon and identification of studied area

Two of the main and older cocoa production basin in the country

# METHODOLOGY

- Survey, N=120
- Purposeful sampling
  - ✓ Experience in cocoa farming
  - ✓ Age cocoa farm
  - ✓ Farm location (M&I)

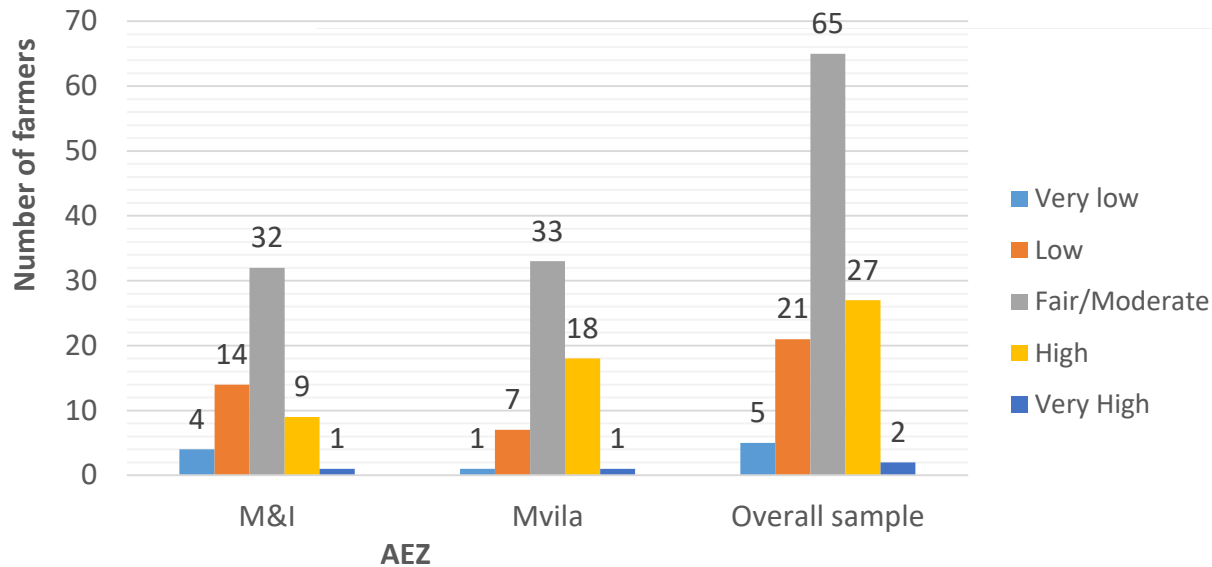
- Snowball technique

- 15 cocoa farming practices scored between 0 and 5, 0=Not important at all to 5 Extremely important
- 9 Soil fertility indicators assessed on a 4-Point Likert-Scale

Table 2. Respondents distribution per division and gender

Division	Gender		Total
	Female	Male	
<b>Mbam-and-Inoubou</b>	<i>17</i>	<i>43</i>	<b>60</b>
<b>Mvila</b>	<i>9</i>	<i>51</i>	<b>60</b>
<b>Total</b>	<b>26</b>	<b>94</b>	<b>120</b>

# Appraisal soil fertility and indicators of a fertile soil



2. Less than 25% of cocoa farmers consider soil fertility as low or very low

Higher satisfaction of farmers in Humid forest zone

Figure 2: Farmers viewpoints of soil fertility level

3. Yield, soil colour, texture, and flora composition and abundance are mostly considered as soil fertility indicators

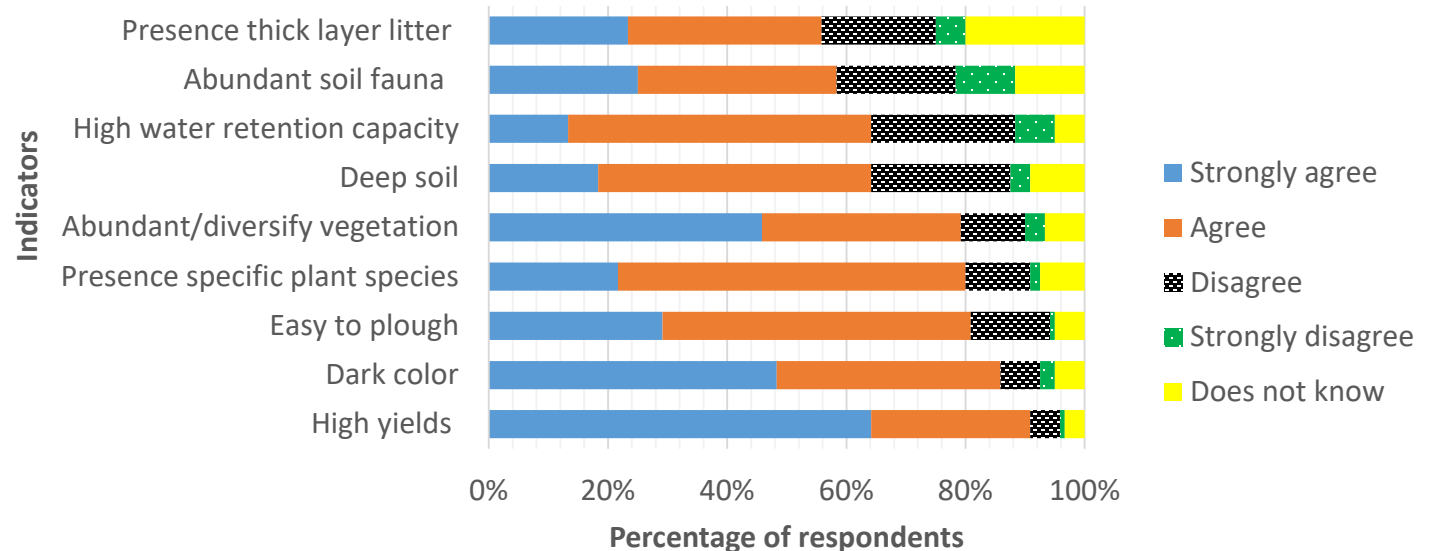


Figure 3: Farmers viewpoints on soil fertility indicators



# Strategies to enhance soil fertility

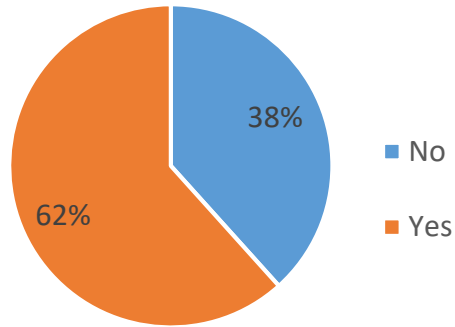


Figure 4: Farmers implementing actions to enhance soil fertility

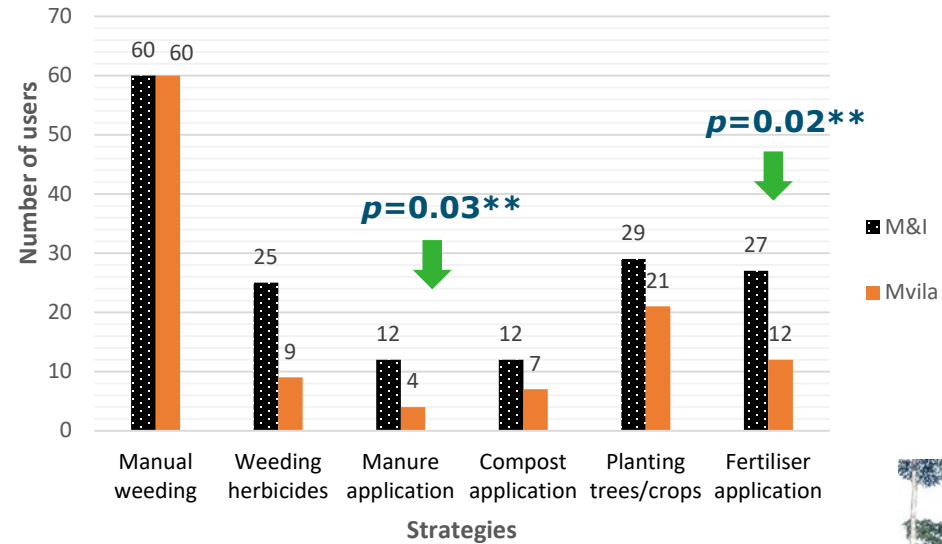


Figure 5: Strategies implemented to enhance soil fertility/number of users

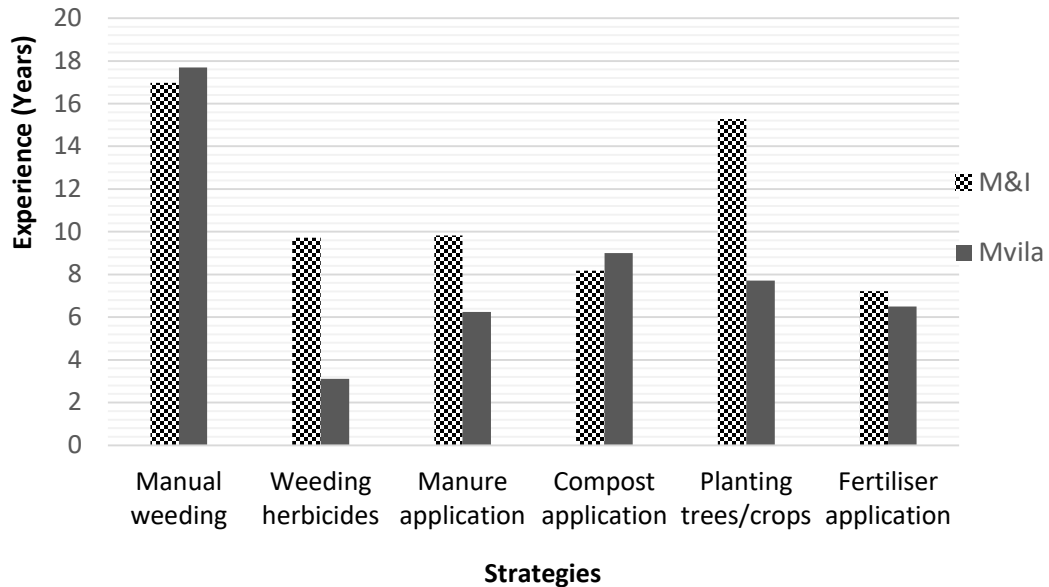


Figure 6: Farmers experience in implementing different strategies



Photo 1: Plant residues are left under cocoa canopy to provide soil nutrients



# Reasons preventing the implementation of strategies that enhance soil fertility

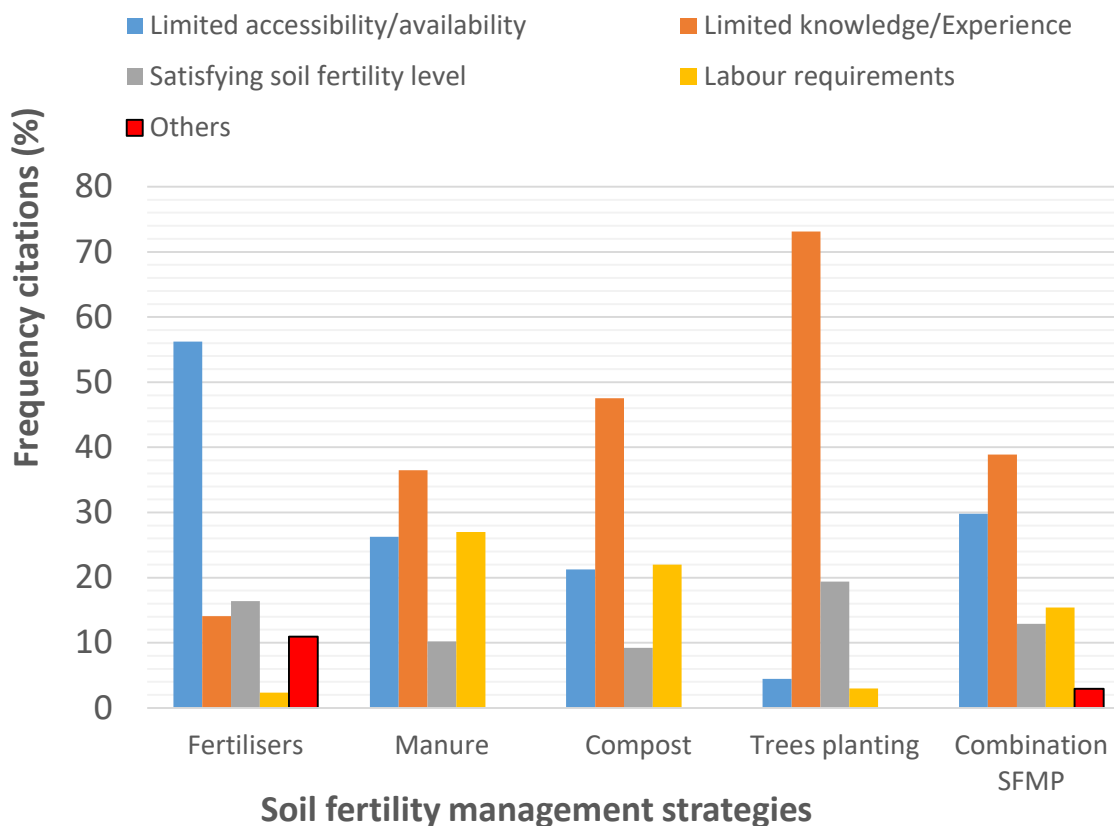


Figure 7: Distribution of reasons stated by farmers to justify the non implementation of actions that enhance soil fertility level

Table 3. List and frequency of reasons stated to justify the non implementation of actions that enhance soil fertility management

Reasons stated by farmers	Soil fertility management strategies				
	Fert	Man	Comp	TP	Comb
<b>Accessibility/Availability</b>					
Lack of capital	44	1	4	2	51
Unavailability (affordability + Accessibility)	28	35	26	1	90
<b>Satisfying soil fertility level</b>					
Soil already fertile	21	14	13	13	61
<b>Knowledge/Experience</b>					
Lack of knowledge on use	10	13	7	1	31
No previous experience	8	30	36	7	81
Unawareness utility for cocoa		7	7		14
Non-mastering production techniques			17		17
Lack of knowledge fertilising trees				41	41
<b>Labour requirements</b>					
Lack of labour/time	3	12	16	2	33
Arduousness		25	15		40
<b>Others</b>					
Destroy the soil	6				6
Fear of dependency	4				4
Promotion of organic agriculture	4				4

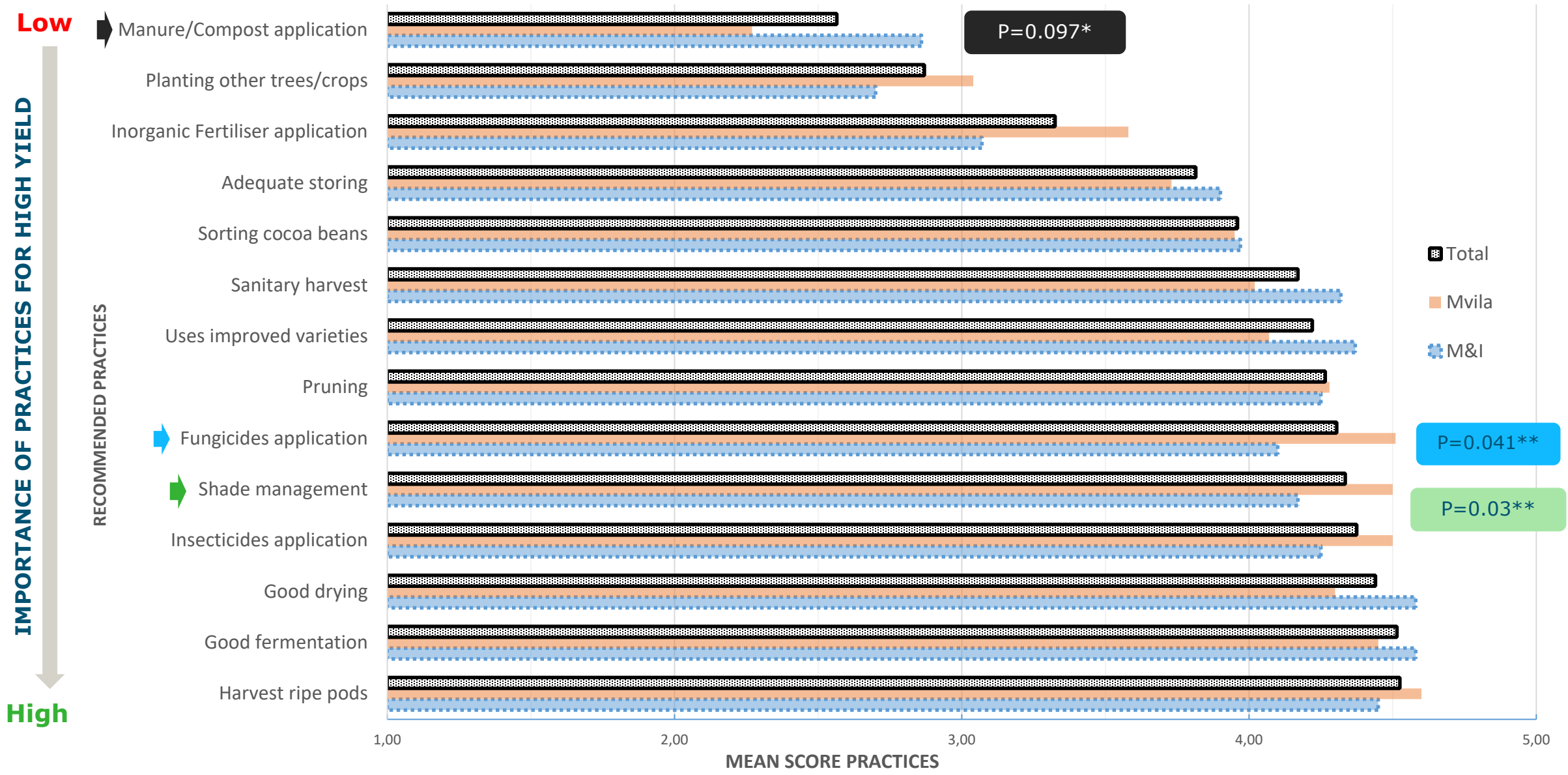


Figure 9: Farmers scoring of cocoa farming practices according to their importance for obtaining high yield

---

# CONCLUSION

1. Less than 25% of cocoa farmers consider current soil fertility level as low or very low. A significantly higher number of farmers in Mvila consider it high or very high;
  2. Indicators *visible at first sight* (Yield, soil colour, texture, and flora composition and abundance) are mostly considered as indicative of fertile soils;
  3. To enhance soil fertility, all farmers rely on crop residues; some apply mineral fertilisers or plant other trees with cocoa; and few apply manure and compost, with a significantly higher number of farmers in M&I applying both;
- 1,2,3, -> Need to contextualise interventions aiming at changing practices through tailored advices or site-specific recommendations

# CONCLUSION

4. Unavailability (mineral fertiliser/manure/compost) > perceptions current soil fertility level > lack of knowledge/previous experience (manure/compost/tree planting) are the main reasons mentioned for not applying SFM practices that enhance soil fertility

5. SFM are considered least important practices to increase yield in both AEZ

4,5 -> Need for awareness raising on the importance of feeding cocoa trees with external nutrients, and the potential economic returns from soil fertility technologies

The need for farmers to engage more in SFM like in the other cocoa farming practices calls for the development and dissemination of profitable Integrated Soil Fertility Management recommendations for cocoa, coupled with strategies that increases access to in(organic) fertilisers to address the low yield concern...

---

# Thanks for your attention



**More information:** Urcil Kenfack Essougong [urcil.kenfackessougong@wur.nl](mailto:urcil.kenfackessougong@wur.nl)

Wageningen University and Research, Plant Production System & Knowledge Technology and Innovation group

International Institute of Tropical Agriculture, Yaounde-Cameroon

