Using local knowledge to identify shade tree species that best suit farmer's needs in coffee farms in Western highlands of Cameroon

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Rationale: Until the 80's, arabica coffee was the main commodity crop in Western highlands of Cameroon, but the culture has been almost entirely abandoned after forty years of low coffee prices (Uwizeyimana, 2009). The H2020 BREEDCAFS project (https://www.breedcafs.eu) aims at reviving the coffee sector via the introduction of new F1 hybrid coffee varieties well-suited to agroforestry systems, high-yielding and producing a high cup quality. Within this project, this study supports the design of coffee-agroforestry systems matching farmers' needs and adapted to local conditions.

Methods: The study followed the Shade Tree Advice methodology, based on coffee farmers' local ecological knowledge of shade tree species (Van der Wolf et al 2016). Farmers' needs were identified through interviews. Associated shade tree species were listed through on-farm tree species inventories. Shade tree species performances were collected through interviews of farmers and rankings, of which 101 were assessed in five geographical divisions (Noun, Bamboutous, Menoua, Nde and Grand Mifi) of the West region of Cameroon. During those rankings, shade tree species were compared to coffee cultivated without shade to better interpret the results and upgrade the statistical analysis.

Key Result 1

The 10 most important criteria for shade tree species selection can be analyzed as follow:

5 economic services: 1) fruit production, 2) coffee-fertilizer saving , 3) timber production, 4) production of a third crop beneath shade trees and coffee, 5) impact on coffee yield.

3 ecosystem services: 1) reduction of coffee bi-annual production pattern, 2) protection of coffee from anthracnose, 3) shading that improves working conditions.

2 practices: 1) minimal need for pruning, 2) use in traditional medicine.

Key Result 2

35 species were identified in coffee farms and ranked by farmers for each of the ten criteria previously identified. 3 species were identified as best-suited for coffee cultivation, 2 of them being unused by local agronomists prior to this work.

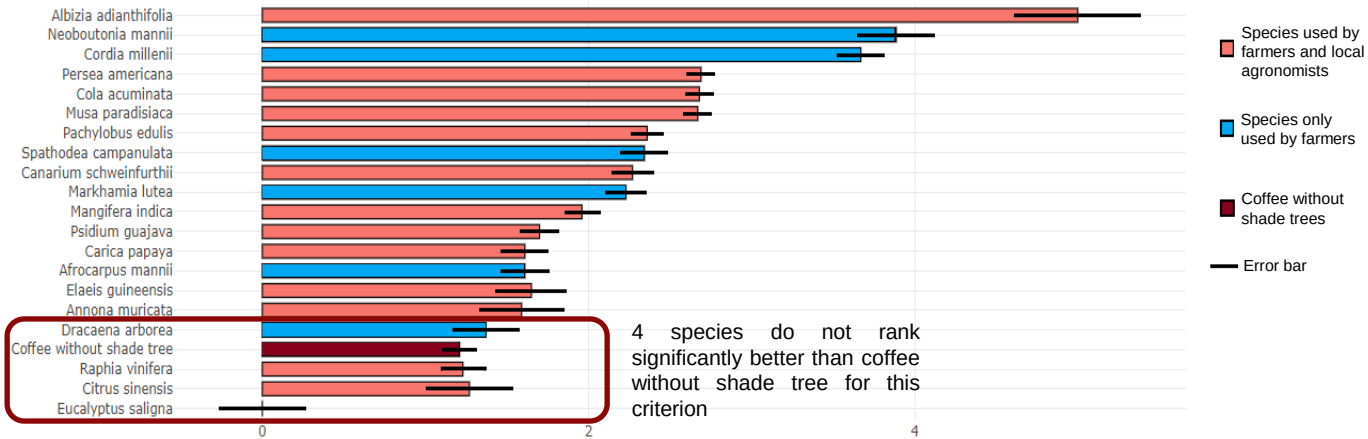

Figure 1 : Species scores when ranked by farmers for the quantity of coffee harvested underneath or around them.

Conclusions & perspectives: This study provides a user-friendly tool to support coffee farmers in their selection of shade tree species (Van der Wolf et al, 2016), available at https://www.shadetreeadvice.org/ . This tool will support efforts to revive the coffee sector in Western highlands of Cameroon through the development of sustainable agroforestry practices with the most performant Arabica varieties. Results suggest that shade species of new coffee plots should be a mix of different species. Banana trees (*Musa paradisiaca*) could be used as first shade and for short term rentability, while fertilizer trees (*Albizia adianthifolia, Neoboutonia mannii, Cordia millenii*) and food-producing trees (*Persea americana, Pachylobus edulis*) are growing. Food-producing trees should be carefully selected and maintained to ensure they do not become detrimental to coffee cultivation. Agronomic projects, such as the distribution of grafted *Persea americana*, will therefore be essential to create coffee plots matching farmers' needs and allowing the new Arabica varieties to thrive.

References:

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