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Defining and promoting agroforestry cocoa for Cameroon and Central Africa

Authors: Guillaume Lescuyer, Louise Gentils, Elvis Mouyakan Moumbock, Omer Malédy, Simon Bassanaga, Jean-Michel Harmand, Denis Sonwa, Michel Ndoumbè Keng, Marius Oyono, Chloé Tankam, Sylvestre Prosper Essono

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The global quest for sustainable cocoa

In recent years, the cocoa sector has undergone significant change worldwide, with pressure to produce sustainable and deforestation-free cocoa. Several international initiatives have been launched or supported to achieve this goal. One is the African Regional Standard (ARS) 1000, enacted in 2021 to set the requirements for sustainable cocoa. It subsequently received ISO approval (34101 series). This general standard is currently broken down into national standards in the countries concerned.

More recently, in June 2023, the European Union published its own Regulation on Deforestation-free products (EUDR). It imposes several traceability, geolocation and legality requirements on cocoa exported to European markets, in order to minimize the risk of deforestation from cocoa cultivation. The EUDR will come into effect in 2025.

Additionally, the latest 20 years have seen sustainability certification standards applying to several tropical commodities including cocoa. These standards may be private (e.g. Rainforest Alliance, Fairtrade, etc.) or public (organic agriculture). These sustainability standards are gaining market share every year. This is not only in response to consumer expectations (especially by Western consumers), but also in anticipation of application of the EUDR, which will probably build on these standards, at least during the initial years of its implementation.

These different standards and initiatives to promote sustainable cocoa share a point in common: they draw on practices and policies observed in West Africa, as Côte d'Ivoire and Ghana alone represent two thirds of global cocoa production. However, this pragmatic approach can be problematic when these standards are perceived as global in scope and, consequently, easily applicable to all cocoa-producing countries. This is particularly worrying for the case for cocoa-based agroforestry, if we consider that about 80% of forest cover has disappeared in Côte d'Ivoire and Ghana in recent decades, very often due to the expansion of cocoa farming. In these various public or private standards, agroforestry is defined by a limited number of variables with low

1	Geographical scale: region, department, district, agroecological zone		
2	Age of the cocoa farm	10	Number of fruit trees per ha
3	Annual yield	11	Number of associated trees per ha
4	Number of interventions per year	12	Number of woody species per 1/4 ha
5	Total cost of phytosanitary products per year	13	Basal cover of cocoa trees per ha
6	Use of tree-derived products	14	Basal cover of associated trees per ha
7	Number of forest species planted per ha	15	Total basal cover per ha
8	Number of cocoa trees per ha	16	Shannon index
9	Number of forest trees per ha	17	Simpson index

threshold values: low level of tree cover, minimal number of trees, and practically no consideration of biodiversity, to name a few. While such agroforestry systems involve production methods that do combine agricultural crops and trees, they are very simplified systems which poorly reflect the potential of these production systems to provide environmentally, economically and socially sustainable cocoa. Complex cocoa-based agroforestry systems exist in many cocoa-producing countries, but their characteristics and benefits are not well known. The forthcoming revision of the EUDR as well as ongoing change in private certification standards offer opportunities to highlight the value of these complex agroforestry systems.

How to describe the complexity of cocoa agroforestry systems in Central Africa

The countries bordering the Congo Basin have retained much of their forest cover, partly due to the predominance of complex agroforestry systems. These production methods maintain the forest cover or degrade it only to a very limited extent. They provide a number of advantages, such as improving the resilience of agricultural systems to climate change, boosting food security, providing substantial and diversified income for small-scale producers, and conserving the bulk of biodiversity. On the other hand, their cocoa bean yield is average and usually lower than in agricultural systems that maximize the number of cocoa trees per hectare.

It is possible to describe and analyse these cocoa-based agroforestry systems despite their complexity. A literature review shows that 77 scientific or technical publications have been produced on these agroforestry systems in Cameroon. These publications have identified some 40 variables to describe these cocoa farms. However, we can narrow these down to 17 frequently used variables which appear to be the most relevant for describing cocoa-based agroforestry systems.

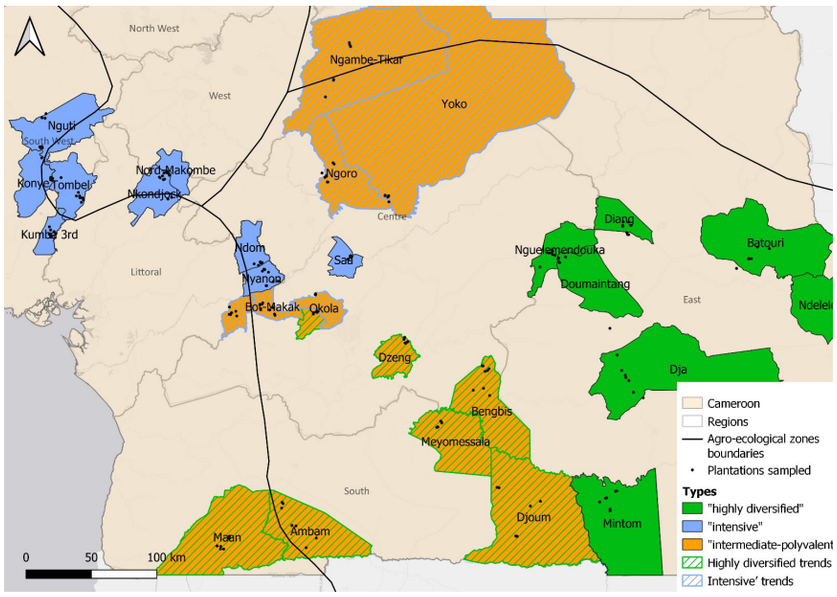
There are many ways to choose and to combine these variables to describe a complex agroforestry system. To attempt to characterize cocoa-based agroforestry in Cameroon, we estimated these 17 variables in a broad sample of production areas, i.e. 223 plantations in 29 districts and 13 departments belonging to the 3 different agroecological zones, and whose minimum forest cover was 30% (according to the Global Forest Watch tool).

Three cocoa-based agroforestry systems in Cameroon

Through statistical processing of cocoa farm classification using the 17 variables used, we can define three main types of cocoa-based agroforestry systems:

1. A **'highly diversified' type** makes up 25% of the sample and consists of cocoa farms with the highest densities and diversity of associated forest trees. They are located in the zone with the heaviest forest cover. This type is located in all the sampled districts of the East region and of the district of Mintom in the South region, which belong to the humid forest zone with a bimodal rainfall regime (agroecological zone 5).
2. An **'intensive' type** makes up 35% of the sample and consists of cocoa trees with the highest age, yield, cocoa tree basal coverage area, and degree of labour and input intensification. This type is based in zones where cocoa farming is predominant and has been established for several decades. The cocoa farms are located in all the sampled districts of the Littoral and Southwest regions and in the Lekié department in the Centre region. They can be found in the three agroecological zones but mainly in the highlands zone (agroecological zone 3).
3. A **'multipurpose' type** makes up 40% of the sample and consists of cocoa trees with important functions related to cocoa farming, i.e. with large numbers both of fruit trees per hectare and of uses of associated forest species. The values of the other variables measured in the cocoa farms of this type are in between those of the two previous types. The farms are mainly located in the sampled districts of the South and Centre regions and belong to the humid forest areas with a unimodal or bimodal rainfall regime (agroecological zones 4 and 5).

	Criteria	"diversified" (25%)			"intensive" (35%)			"multipurpose" (40%)		
		Minimum	Median	Average	Minimum	Median	Average	Minimum	Median	Average
1	Age of cocoa farm (years)	5	12	15	**13,5**	**38**	**40**	6	13	19
2	Yield/year (kg)	123	180	234	**571**	**774**	**700**	226	434	443
3	Phytosanitary costs (CFA francs/ha/yr.)	5.000	7.917	6.242	**40.000**	**60.000**	**78.575**	8.500	31.667	34.996
4	Number of interventions	2	5	5	**7**	**8**	**10**	5	9	9
5	Number of uses of forest species	6	8	9	7	9	9	**8**	**15**	**14**
6	Number of cocoa trees/ha	588	750	759	**675**	**913**	**944**	675	900	963
7	Number of fruit trees/ha	2	23	19	2	13	16	**6**	**21**	**23**
8	Number of forest trees/ha	79	117	116	33	38	41	29	71	66
9	Number of associated trees/ha	**127**	**138**	**149**	50	54	59	66	87	89
10	Number of associated species per ¼ ha	**30**	**33**	**36**	12	13	14	16	21	21
11	Basal cover of cocoa trees (m^2/ha)	1,44	5,12	5,11	**8,86**	**16,76**	**15,09**	2,79	6,83	8,76
12	Basal cover of fruit trees (m^2/ha)	0,01	0,63	0,77	0,2	0,38	0,64	**0,09**	**0,93**	**1,26**
13	Basal cover of cocoa trees (m^2/ha)	**9,23**	**22,45**	**20,03**	3,39	9,7	11,53	5,89	11,36	13,59
14	Basal cover of associated trees (m^2/ha)	**20,51**	**24,36**	**24,47**	3,76	10,42	11,53	6,84	12,25	13,92
15	Total basal cover (m^2/ha)	**27,4**	**29,57**	**30,41**	16,56	**35,24**	29,38	10,67	20,77	22,17
16	Shannon index	**2,45**	**2,59**	**2,59**	1,87	1,92	1,99	1,95	2,29	2,24



Agroforestry cocoa from Central Africa well above the thresholds of international standards

These three archetypes of agroforestry cocoa in Cameroon seem to be common in Central Africa; for example, we can find the 'highly diversified' model in the northern departments of the Republic of the Congo and the 'intensive' model in several provinces of eastern DRC. These complex cocoa-based agroforestry systems have characteristics that far exceed the thresholds established in West Africa, which we have summarized in the following table.

Whether it be the density of associated trees, the number of forest tree species or the basal area, the average values of agroforestry systems in Central Africa are two or five times higher than those set in West Africa. Similarly, tree cover is never less than 30%, and there are always three plant strata.

These findings support the need to create new and adapted 'agroforestry cocoa' standards that enhance cocoa growing in Cameroon and, by extension, in Central Africa. Preservation of agroforestry systems cannot be guaranteed by applying of the current standards. Application of these standards may even lead to calls for their simplification and degradation.

Variables	Average values of the study	GISCO entry level	GISCO basic level	GISCO advanced level	30-year DAF HALBA/GISCO	Conseil Café Cacao Côte d'Ivoire	Rainforest Alliance	SAF-ART Nitidae	Cargill	CEMOI	ETG Beyond Beans	Tony's Chocolonely	Touton
Number of cocoa trees/ha	947				832	800							
Number of forest trees/ha	78				130								
Number of fruit trees/ha	23				144								
Number of associated trees/ ha	102	16				25 à 40		20	100	18 à 70	20 à 60	18	80
Number of associated forest trees	11 per 1/4 hectare	3/ha	5/ha	12/ha	12/ha		5/ha				3/ha	6/ha	
Basal cover of associated trees (m^2/ha)	16.81							8					
Number of strata	always 3			2	3								
Minimum height of associated trees (m)	always above 20m			15m									
Percentage of shaded cover			40%	40%			40%					30%	40%
Percentage of spontaneous plant cover				15%									
Percentage of spontaneous trees								20%					

Towards an agroforestry cocoa standard for Central Africa

Some 60 experts gathered in Yaoundé in January 2024 to clarify what would be a single standard for agroforestry cocoa in Central Africa based on the three archetypes explained for Cameroon. The four criteria agreed upon could be key to establishing a standard for sustainable cocoa derived from complex agroforestry systems:

1. The maximum density of cocoa trees, which should not exceed 850 cocoa trees per hectare
2. The minimum number of associated trees per hectare, which could be set at between 42 and 60 (non-cocoa) trees per hectare
3. The minimum basal area of associated trees per hectare, from 10 m^2 per hectare
4. The presence of three plant layers in the cocoa farm

The thresholds for these four variables, as well as the possible addition of new variables to supplement the specific criteria for agroforestry cocoa in Cameroon, still need to be discussed and approved. The final setting of these variables and thresholds depends on the strategic and commercial choices of public and private stakeholders in the sector.

For example, in Cameroon, the National Cocoa and Coffee Board and Ministry of Trade must draft the Sustainable Cocoa Directive in 2024, by transposing the ARS 1000 standard. They will be faced with two choices. On the one hand, while they could set low thresholds for agroforestry cocoa to include a maximum number of producers, this choice would run the risk of their following the agroforestry models promoted in West Africa. On the other, they could choose an agroforestry cocoa standard based on high levels of criteria. While this would lead to a real comparative advantage on the world market, it would concern only a portion of Cameroonian cocoa farmers and be only partially compatible with the goal of doubling of national cocoa production by 2030.

An alternative to establishing a national standard would be to develop relations with the Rainforest Alliance certification standard with the goal of seeing whether this standard could evolve towards recognition of agroforestry cocoa in Central Africa.

Finally, the private sector could be convinced to promote Central African agroforestry cocoa. There is clearly a market niche for chocolate produced from rich, complex agroforestry systems which can be part of forest ecosystems and that would

be different from agroforestry systems of West Africa and Latin America, whose environmental and socio-economic functions are much poorer.

Whatever the options for development chosen, the uniformity of cocoa-based agroforestry systems in Central Africa suggests that a dynamic process is possible on a Congo-Basin scale. The establishment and recognition of an agroforestry cocoa standard for Central Africa would put the countries of the Congo Basin in a favourable position when it comes to contributing to the EUDR's revision of the definition of agroforestry, with the goal of considering complex agroforestry systems as part of forests and of preserving their multiple benefits.

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