

AGROFORESTRY

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Partners



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ABOUT THE ILLUSTRATOR

Benjamin Baharanyi is an artist. His artistic approach is rooted in a deep appreciation of nature and its interaction with humanity. His art focuses primarily on trees, a living metaphor for current environmental challenges. Through detailed depictions of roots, bark, and leaves, Benjamin illustrates the essential symbiosis between humans and nature. His works question deforestation, encourage reforestation, and celebrate trees as a source of life.

AGROFORESTRY

Armel Lekeufack, Julie Hermesse and Gianni Malica ¹

Agroforestry is a practice that long predates its recent conceptualization and formal recognition as a scientific discipline. It is the practice of combining trees or other ligneous plants with crops and/or livestock on the same plot of land. The goal is to increase agricultural, environmental, and economic benefits. Agroforestry reflects the way things are done in a given area, as well as the way people, plants, and animals relate to each other.

Concept

Agroforestry encompasses all practices that integrate trees into agricultural production, including livestock. The term is a contraction of the prefix “agro”, which refers to agriculture, and “forestry”, which refers to forests and silvicultural systems, of which trees are the key element.

Trees may be planted alongside crops, or they may be planted in succession according to a predetermined rhythm (Luu & Bidault, 2022). For centuries, the agroforestry approach has been proven to enhance biodiversity, increase productivity, and improve the sustainability of agricultural systems in many parts of the world. Agronomists have long studied the practice, as evidenced by the wealth of literature on the subject (Awazi et al., 2022; Nair, 1993; Peltier & Matig, 1988; Raihan, 2024; and Sonwa et al., 2007).

¹ Artificial intelligence tools were used to simplify the terms used in our scientific texts, making them easier to understand.

The agroforestry approach has been recognized for centuries for reinforcing biodiversity, increasing productivity and improving the sustainability of agricultural systems in many regions of the world.

In Africa, Europe, and elsewhere, the integration of trees into agricultural landscapes is a practice that dates back to ancient times (Baets & Lebel, 2007; Dupraz & Liagre, 2008; Peltier & Matig, 1988; Raihan, 2024). However, the modernization of agriculture with its increased mechanization has contributed to the elimination of trees, shrubs, and hedges from the landscape (Luu & Bidault, 2022). For example, the implementation of the European Union's Common Agricultural Policy (CAP)

in 1962 encouraged land consolidation, meaning the expansion of land parcels. This trend led to a sharp decline in hedgerows and agroforestry features (Darrot, 2008). Almost 75% of hedgerows in Europe are thought to have disappeared during the 20th century (Bazin & Schmutz, 1994).

In the face of the environmental damage caused by conventional agriculture, the renewed interest in agroforestry by practitioners, activists, and scientists symbolizes a search for alternative methods and is part of a broader reflection on agroecology (Legras, 2015; Sachet, 2020; Stassart et al., 2012).

The systemic approach identifies three main types of agroforestry systems (Nair, 1985). First, agroforestry systems combine crop production with trees. Second, silvopastoral systems associate livestock production with trees. Third, agro-sylvo-pastoral systems combine crop and animal production under a tree canopy within the same farm. Typical examples of this type of system are agroforestry parks in Sahelian zones (Diatta et al., 2020; Toulouse, 2019).

De Foresta & Michon (1997) have developed another typology to classify agroforestry systems based on their complexity. They distinguish between simple systems – often monocultures

associated with trees, as in large industrial plantations – and more complex systems, such as agroforests. The structure of the latter most closely resembles that of natural forests, with diversified, stratified vegetation organized into multiple layers.

Simply put, agroforestry is the creation of forested fields where trees play a central role in the production system, with the aim of mimicking natural processes (Luu and Bidault, 2022). This system depends on human intervention for its design and maintenance, particularly through the regulation of ecological processes such as photosynthesis, control of crop exposure to the sun, carbon storage, and soil fertilization. Agroforestry is therefore more than simply planting trees in a field. It also involves the judicious selection of trees to be retained when a plot is established (Loubelo, 2012), reflecting an active and thoughtful management of the landscape. It therefore requires specific knowledge that includes not only the productive dimension, but also the symbolic dimension of the tree in the field and the relationship between farmers, their plants, and their land (Byl et al., 2023).

Initially studied by agronomists as simple production systems, agroforestry systems are now recognized for their multiple functions and their ability to provide numerous ecosystem services. The “rediscovery” of agroforestry in the field of agronomy has highlighted its potential as an effective means of protecting biodiversity and soils, while contributing to the fight against climate change and providing a range of economic, socio-cultural, and environmental services (Legras, 2015; Djiongo Boukeng, 2021). These “services” refer, for example, to soil protection, income diversification, and the production of woody and non-woody resources, particularly for food and medicine (Jagoret et al., 2014). The presence of

It [agroforestry] thus mobilizes specific knowledge, encompassing not only productive dimension, but also symbolic dimensions of trees in crop fields and the relationships between farmers, their plants and their land.

trees contributes to the creation of microclimates and shade for animals, plants, and humans (Dupraz & Liagre, 2008).

Beyond ecosystem services, there is also a strong socio-cultural dimension to agroforestry practices that cannot simply be reduced to the act of bringing elements together in a single production unit. For example, the creation of living hedges or tree parks serves to limit animal encroachment on agricultural plots, thereby reducing conflicts between farmers and herders (Djiongo Boukeng, 2015; Awazi & Avana-Tientcheu, 2020). This socio-cultural dimension is all the more present in tropical areas (Jagoret et al., 2014), as it is rejected by the productivist perspectives of a more “conventional” agroforestry based on yield optimization, as promoted by agroforestry science (Luu & Bidault, 2022; Sachet, 2020).

There is also a strong socio-cultural dimension to agroforestry practices that cannot simply be summarized as bringing together elements on the same production unit.

In Europe, this tension between different agroforestry models is quite clear. Some farmers see trees in the same light as the regulatory constraints associated with greening, which they resist. However, recent guidelines of the European Union’s Common Agricultural Policy encourage the development of hedgerows and the integration of trees in plantations (Sanson and Moret, 2020). At the same time, other practices are breaking away from the conventional agroforestry approach. They are now engaging in practices such as syntropic farming, or the diversification of agricultural production through complexification, as developed by Ernst Götsch in Latin America (Rousselet-Gardenne, 2004).

This “syntropic farming” introduces a multifunctional agricultural model that meets environmental, economic, and socio-cultural needs. It is similar to traditional agroforestry systems in which the same self-regulating farm can produce firewood, medicinal

plants, building materials, crops and other food products, and even products for cultural use (Théry, 2024).

In addition to ecological and productivity issues, the agroforestry model explicitly includes a socio-cultural dimension, placing it within the framework of sustainable development. However, this vision has been criticized by critics such as Chao (2022), who sees all plantations in the Anthropocene as rooted in human logics of domination, discipline, and mastery over the environment, and as useful only because they serve specific human purposes.

In the context of the *plantationocene* (in the words of Haraway et al. (2019)), agroforestry transcends its nature as a scientific discipline and becomes a dynamic concept that combines productivity, respect for the environment, and sustainability. Agroforestry is more than the production of goods; it is also a social system for managing space. For example, in the highlands of West Cameroon, trees, often organized in living hedges, have historically served to demarcate space and indicate ownership (Gautier et al., 2017).

Finally, agroforestry development is discussed in the context of current global changes, including climate change and the biodiversity crisis (Awazi, 2020; Awazi et al., 2022). Climate mitigation and adaptation policies, including the Reducing Emissions from Deforestation and forest Degradation (REDD+) framework, value agroforestry as a potentially effective and sustainable solution for atmospheric carbon sequestration (Awazi et al., 2022). However, agroforestry is not a one-size-fits-all solution and needs to be constantly reassessed and adapted to specific local conditions.

Agroforestry transcends its nature as a scientific discipline to become a dynamic concept that combines productivity, respect for the environment and sustainability. It is therefore not limited to the production of goods but is also a social system of land management.”

Case study

As a case study, we will examine the concept of agroforestry as practiced in the Ngoyla region of eastern Cameroon, in the forested region of the Congo Basin. According to the report on the state of forests in Central Africa (Eba'a Atyi et al., 2022), this region is undergoing rapid deforestation and degradation, mainly due to activities such as mining, agriculture, and especially timber exploitation. These factors exert strong pressure

The establishment of agroforestry areas can, for example, legitimize the exploitation of forest areas.

on the Ngoyla forests, where conservation and exploitation issues intersect. They therefore influence forest management policies and the promotion of agroforestry.

At the normative level, between agriculture and forestry, agroforestry in Cameroon is not governed by specific legislation. No institution is specifically responsible for agroforestry. It is dealt with in a cross-cutting manner by the institutions responsible for forestry, agriculture, the environment, and sustainable development. National and international NGOs also promote agroforestry as a component of reforestation and forest conservation strategies (CIFOR-ICRAF, 2021).

Interestingly, in some cases agroforestry has been implemented as an “accompanying measure” to offset or mitigate the negative impacts of large-scale forest or land use projects. For example, the establishment of agroforestry zones can justify the exploitation of forest areas that are state-owned under the Land Tenure Reform of 1974 (World Agroforestry Centre, 2011).

Agroforestry has also emerged in the context of creating protected areas, such as national parks and reserves, within the “buffer zones” established between these protected areas and areas inhabited by local communities. These zones are often referred to as vegetation strips (Djiongo Boukeng, 2021). However, these buffer zones were used by local people long before the adoption

of modern environmental policies. Agroforestry is therefore entering an area where it has been practiced in a “traditional” way for a much longer time. The formalization of these practices as functional systems tends to obscure the socio-cultural dimensions that historically motivated their implementation.

With regard to the emergence of agroforestry zones (or the reclaiming of spaces where this practice has traditionally developed), Cameroonian legislation has a significant impact on the economic rights of farmers, particularly as relates to tree ownership. According to Cameroon’s 1994 Land and Forestry Code, any tree planted or growing naturally on land without a land title legally belongs to the state. This situation is even more complicated in rural areas where few parcels of land have title deeds. In addition, legislation distinguishes between agricultural and non-timber forest products, creating ambiguity that complicates the classification of tree products (World Agroforestry Centre, 2011).

In practice, these regulations have a direct impact on agroforestry. In agroforestry areas, while farmers are allowed to harvest agricultural products, they are often not allowed to harvest timber. To circumvent these restrictions, local people tend to opt for fast-growing, high-yielding fruit trees, leaving behind slower-growing indigenous species. This shift has had a negative impact on reforestation efforts in Ngoyla. Indeed, although residents attend agroforestry training courses, they show little interest in slow-growing trees from which they cannot directly benefit. They are more attracted to safflower (*Dracryodes edulis*), mango (*Mangifera indica*), avocado (*Persea americana*) or cacao (*Theobroma cacao*), which produce fruit quickly but whose wood has less commercial value.

Agroforestry in Ngoyla is reinventing itself in line with local realities and the needs of communities, which are adapting their practices to maximize benefits while dealing with the imposed legal framework.

Agroforestry in Ngoyla is thus being reinvented according to local realities and the needs of communities, who are adapting their practices to maximize benefits while remaining within

The issue of agroforestry hybridization deserves special attention in order to fully emphasize how actors in the field adapt models to their own context according to the current political and social issues.

the legal framework. While the discourse describes agroforestry as a strategy for restoring agricultural biodiversity across time and space (Guillerme, 2012), the practice in Ngoyla challenges the direction of this conservation.

The question is whether it is about restoring what once existed, or whether it is about crossbreeding the existing (native species) with the new (introduced species). Agroforestry seems to be moving towards the latter possibility. Crossbreeding

is an issue that deserves special attention if we are to fully understand how actors in the field are adapting models to their own contexts in the light of current political and social issues.

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