The structure of complex cocoa agroforestry systems is the key of their resilience. Study case of Central Cameroon

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Abstract

In the humid tropics, while the world cocoa demand increases, the sustainability of cocoa production is the subject of debate because of its environmental impact, particularly in terms of disappearance of forest land. However, some of the world’s cocoa cultivation is based on complex agroforestry systems where cocoa is associated with numerous forest and fruit tree species. This is the case in Central Cameroon, an old cocoa production area where cocoa agroforests are characterized by their longevity and their stability in space and time. We assume that the maintenance of these old cocoa agroforests, always cultivated, over time is largely linked to their agroforestry structure which gives them flexibility in terms of technical management. This flexibility allows farmers alterations, adaptations and changes from the different stands (cocoa and associated trees) already set up. To test this hypothesis, we conducted a research on twenty old cocoa agroforestry located in central Cameroon. From surveys and observations, we reconstructed the structure trajectories of these cocoa agroforests, also their technical trajectories, and we researched their determinants. Our results showed that the life of cocoa agroforests can be divided into different phases: ongoing maintenance, semi-abandonment, recovery and rehabilitation, or major technical reorientation. The succession of these different phases leads to trajectories that are often discontinuous over time. These trajectories are the result of changes and/or modifications of the cocoa agroforests structure. They are linked firstly to the evolutions of the socio-economic context of the cocoa supply chain (cocoa price fluctuations, introduction of new technologies by farmers, development of agricultural knowledge and technical advice), and secondly to farmers’ history, the cocoa plots from one manager to another over the succession of generations. Such changes and adaptations are possible through the forest environment where are cocoa trees. Cocoa stands can withstand a few years abandonment as well as technical interventions that modify the architecture of cocoa trees and/or their density. After a period of abandonment and recovery, our results showed that it is possible to regain a cocoa yield similar to that which prevailed before, as well as in the context of a major technical shift that changes the structure of cocoa agroforests and leads to a significant increase of the cocoa yield. Finally, our results enable us to put forward some proposals for developing a new technical model for cocoa agroforestry systems.
cocoa growing, based on the management of different tree species that interact. This new model could be both more environmentally friendly and providing farmers more flexibility for the management of their cocoa agroforestry systems compared with the conventional model.

**Keywords:** Key words: complex adaptive system, sustainability, management, long term dynamics