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Too good to be true? Permanent Rubber Agroforestry Systems. Reality and challenges in Thailand

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Many of the socio-economic and environmental issues of rubber plantations are linked to their monocrop nature. Agroforestry systems (AFS) associating permanently crops or other trees to rubber are widely believed to offer a favourable alternative, not only able to diversify the source of income for farmers but also to limit the negative environmental impacts of plantations.
However, despite such good reputation, in Thailand, the first rubber producing country, rubber AFS are estimated to cover less than 5% of the surface area, mainly in the south zone. Within Heveadapt, a multidisciplinary project on the adaptation of rubber smallholders to global changes, we assessed the existing systems in a representative zone (Phattalung Province) of the main rubber producing area (South) and evaluated their actual impact on the farms economy and on soil quality.
Only few rubber farmers had permanent AFS and none of them in all their rubber plots. The 3 main systems in southern Thailand were fruit trees/rubber, vegetable/rubber, timber trees/rubber. Complex systems mixing several associated species also exist. The density of rubber trees was always the same as in the monocrop, safeguarding the latex yield. The fruit tree/rubber association provided the best trade-off between return to land and to labour. Timber provided a labour-saving alternative with high but late income. Simulations showed that, thanks to their flexibility and a higher gross margin, the AFS actually provided a higher resilience of the farms when the price of rubber fall.
The effects of AFS on soil biological and physico-chemical properties were not that clear. Actually, agricultural practices (weeding, fertilization) tended to vary more between farms than between the AFS and monocrop plots. Therefore, the heterogeneity was high within each system. The age of the plantation also had a greater effect than the kind of system. However, differences between systems increased with age and traits linked to carbon transformation indicated more active processes in fruit tree/rubber than in monocrop. Nevertheless, the actual vegetation soil cover was the most important factor influencing soil quality and weeds sometimes covered more the soil in monocrop plots than in AFS.
We showed that current AFS originated from individual pioneer initiatives that spread in a second step through farmers-to-farmers networks. Social motivations and family consumption prevailed at the beginning, but diversification of the source of income is now the main reason to adopt AFS. The change in the attitude of official institutions, mainly the Rubber Authority of Thailand, now promoting AFS, was also important. Such basis, with existing networks, knowledgeable leaders and institutional support, paves the way for the development of regional innovation platforms offering channels (meetings, social medias, trainings) to share the available information necessary to scale-up the rubber AFS from a marginal to a widespread system.

Keywords: Hevea, Sustainability, Diversification, Soil quality, Innovation.