Innovations and policies based on 20 years of findings from a coffee agroforestry trial

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Abstract

In 2000, CATIE began a long-term coffee agroforestry trial aiming to research complex interactions among climate, soil, shade trees, managements, and coffee varieties, useful for the development of systems that enhance soil ecological restoration, biodiversity, and ecosystem services. The trial consists of combinations of shade and managements: six types of shade from associations of legume and timber trees, and full-sun systems, combined with four managements (high conventional (AC), moderate conventional (MC), intensive organic (MO) and low organic (BO)), resulting in >20 types of systems, in which traditional and improved coffee varieties are also being tested. More than 30 research centers and universities have been involved to produce >30 scientific papers, >40 theses, and >20 technical documents. The revision of the main findings indicates that full sun systems (AC, MC) produce high yields but with a trade-off on ecosystem services provision; while agroforestry systems with legume trees, especially MO and MC, reached both good productivity and provisioning ecosystem services (improving soil quality, carbon sequestration, regulation of pests). Systems

with only timber trees and BO collapsed. The economic analysis shows that most agroforestry systems are profitable, including those with MO or BO, with important lessons to reduce production costs. The most successful innovations related to soil improvements, shade and pest regulation, silvicultural mechanization, and carbon storage derived from the trial, were used as inputs to environment-focus policies, design of research-development projects and programs such as NAMA coffee. The results have been disseminated to more than 40,000 producers and hundreds of students through projects and relevant platforms such as PCP-AGROFORESTA, PROMECAFE, RECIPROCAFE, the Alianza de Mujeres en Café, PROCAGICA-IICA-UE, and coffee courses/diplomas. Thus, it is being demonstrated that diversification and good practices can contribute to adaptation and mitigation strategies in the coffee sector on which millions of families and their food systems depend.

Keywords: sustainability, ecological restoration, adaptation

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