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The contribution of forests and trees to food production in the tropics: a systematic review

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Despite an exponential rise in research related to the broad topic of ecosystem services over the past three decades, in-depth understanding of the contribution of forests and trees to food production remains limited. This review attempts to assess and synthesize the current evidence base examining the contribution of forest and trees to agricultural production in tropical landscapes. Using systematic review methodology, three specialist bibliographic databases were searched for relevant publications using a predefined search strategy combining terms relating to forests, agroforestry, ecosystem services and agriculture. Further searches were also conducted in Google Scholar and relevant research institutional websites to measure the comprehensiveness of the original searches. Pre-determined inclusion criteria and screening strategy were employed to filter studies for relevance. The review identified 58 relevant publications investigating the effect of forest or tree-based ecosystem service provision on a range of outcomes such as crop yield, biomass, soil fertility and income. Preliminary results suggest that the majority of studies were conducted over short temporal and small spatial scales. Wide variation in results were reported. These included, improved soil fertility but depressed crop yield. However, instances of reduced crop yields were often sufficiently compensated for through gains in overall biomass and subsequent associated income from sales of timber, food, or resins from associated tree species. Overall, proximate forest or tree presence was reported to have a net positive effect in 32 of the 58 studies sampled. Evidence from our review indicates gaps in the current knowledge that demonstrate a need for larger-scale, longer term research to better understand forest and tree-based ecosystem services and their associated impacts on food production.