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# Scaling complex agroforestry: Constrained by labour demand?

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**Abstract**

More complex agricultural systems such as agroforestry can increase much needed soil-based ecosystem services, but it is often postulated that agroforestry requires higher labour demand. As farmers are experiencing increasing labour shortages, it is important to assess whether agroforestry complexity indeed increases labour demand. We used ten case-study systems that represent a complexity gradient in south-eastern Brazil to assess total labour demand, as well as labour inputs for fertilisation, weeding, pest control, crop management, biomass management and harvesting. We also compared labour requirements to reference monocultures and surveyed farmers on challenges regarding the scaling of their agroforestry systems. Our results confirm that in general, higher agroforestry complexity indeed correlates to higher labour demands and to higher ecosystem service provision. However, our results also show more intricate relationships: the trade-off between complexity and labour requirements was particularly evident in successional agroforestry systems, which had highest structural complexity levels; in less complex multistrata agroforestry systems, which are still more complex than monocultures, total labour demand was found to be lower than in reference monocultures. In successional systems, substantially more time was invested on *in situ* biomass management and less time was spent on pest control and weeding than in monocultural systems. Furthermore, farmers of more complex successional agroforestry perceived challenges at field and farm scale, such as access to adapted machinery and pruning at height, as more difficult than less complex multistrata agroforestry farmers. Both groups of farmers perceived challenges at regional to national scale as particularly severe, such as access to subsidies and competing with conventional products in the market. These findings suggest that increasing complexity in itself does not by definition lead to increased labour demands (e.g. multistrata), but rather that it is the purposeful maximisation of ecosystem service delivery that requires labour intensive management (e.g. pruning & mulching).

**Keywords:** Ecosystem services, labour demand, successional agroforestry

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