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Woody Plants in Smallholders’ Farm Systems in the Central Highlands of Ethiopia: A Decision and Behaviour Modelling

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Abstract

Various strategies towards poverty reduction have been followed in rural areas of the Ethiopian highlands. In this context the contribution of woody plants to the livelihoods of farm households has widely been recognised. So, the contemporary depletion of natural forests and deforestation due to the massive use of tree produce and agricultural land expansion drives research on deliberate tree growing on-farm.

Farmers’ perceptions of the utility and the constraints of locally available woody species were assumed to influence the decision making and the behaviour of tree integration into current land-use types. Accordingly, the objectives of this study have been **(1)** to analyse farmers’ decisions in making use of woody plants under perceived constraints and **(2)** to analyse influencing factors that determine the deliberate tree growing behaviour.

The methodology of this study based on the approaches of the ‘Farming Systems’ and the ‘Behavioural Decision-Making’. Influence diagrams were constructed incorporating the perceived utility and decision determinants of deliberately grown woody plants. The ‘Discriminant Analytical Approach’ served to model farmers’ tree adoption behaviour referring to external and internal influencing factors. Two villages were selected in the central highlands to contrast **(i)** two agro-ecological zones and **(ii)** different access to markets for tree produce. A standardised questionnaire constituted the major tool for surveying 130 systematic-randomly selected and ex-post stratified households.

Results from the decision modelling revealed that woody plants are grown on-farm according to the perceived utility of species, predominantly fuelwood and timber-based produce, followed by cash-generation. Service functions pertaining to the protection of land gain secondary importance to tree produce. Major decision determinants comprise resource-based factors, e.g. the shortage of land and seedlings, over stochastic-environmental factors. The competition with agricultural crops for resources is decisive to consider woody species not disturbing the agricultural production. Results of the ‘Discriminant Analysis’ confirmed that the adoption of trees is characterised by the available resource base, the access to infrastructure and support services as well as by personal characteristics of the farmers. If access to the market is given, the deliberate growing of trees renders additional cash income and thus contributes to the liquidation of farms.

Keywords: Behavioural decision-making, discriminant analysis, farming systems, land-use pattern, non-competitive tree integration