

Sticky business - why do beekeepers keep bees and what determines their success in sub-Saharan Africa?

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Introduction:

Beekeeping is considered a suitable development activity by many governments and development agencies due to low initial economic investment and modest equipment, land and training requirements. Its potential for income generation, whilst contributing to food security and providing medicinal benefits to the rural poor, is thought to increase resilience of rural populations creating incentives for forest and tree resource conservation. However, the estimated yield and income potential from the apiculture sector in Africa remains unmet, due in part to a lack of training in appropriate beekeeping techniques. Most beekeeping interventions in sub-Saharan Africa comprise some form of training. However, this type of training often delivers techniques which are too advanced for the training time frame with insufficient follow-up support. Additionally, the trainings tend to be delivered to groups of beekeepers rather than to individuals, to maximize economies of scale. Attrition of participants following project implementation is consequentially substantial. There is little evidence to suggest that beekeeping interventions target the most suitable beneficiaries, or that training length and content are adequate to sustainably promote beekeeping. For the first time to our knowledge, this study identified key drivers and barriers influencing beekeeping uptake. The study also assessed whether and what type of support and training influenced success as a beekeeper in rural East Africa. All these criteria may be critical to the design of future beekeeping development programmes.

Materials and methods:

We applied a mixed methods approach to collect both, quantitative and qualitative data in four case-study communities in the central Tanzanian regions of Dodoma and Singida. Initial focus group discussions with beekeepers and non-beekeepers informed the development of a household survey. Approximately equal numbers of beekeepers

and non-beekeepers from each village in each community were selected for the survey through a stratified random sampling approach. Of the 318 survey participants 45 were invited to attend semi-structured interviews to elicit more detailed information. Semi-structured interviews were also held with ten beekeeping support organizations active in the study communities. Our analysis explored several potential predictors hypothesized to have significant associations with beekeeping adoption. Factors, which were found to be significantly different between beekeepers and non-beekeepers, were analysed using an ordinary binary logit model. For the analysis of beekeeping success, we applied a two-part binary and fractional regression modelling approach whereby the discrete components (determining whether values were equal to 0 or not) were modelled as binary logit models and the continuous components (determining actual levels where values were not equal to 0) as fractional regression models. Interview and focus group transcripts were coded both deductively and inductively according to the main research questions and extracting additional themes as they occurred.

Results:

Our results identified income and food provision as the main drivers for beekeeping adoption, but the effects of these were moderated by the respondents' cultural background and the perceived human health risks posed by African bees. We found beekeepers came from backgrounds of considerably higher forest ownership, honey hunters, parental beekeeping and livestock farming when compared with non-beekeepers. We also found that land ownership, technical knowledge, initial capital inputs and hive theft were important constraints to adopting or continuing beekeeping. Beekeepers trained by a government organization were more likely to have a zero-harvest in the preceding 12 months than those trained by family or community members. This suggests that the quality of governmental training provided was lower than training provided by family and neighbours. The variation of harvest quantities larger than zero was significantly positively affected by area of forests owned and engagement in livestock keeping. Farmers currently engaged in beekeeping recalled having received external technical beekeeping training from a governmental or non-governmental organization mainly on the topics of honey harvesting and processing, hive placement, construction of modern hives, proper hive inspection and other beehive product processing.

Discussion:

We suggest that tradition is a key factor in the uptake of beekeeping. Support organizations may wish to consider this when deciding on beneficiary selection criteria

for beekeeping projects to avoid working against cultural preferences. We recommend that planners of beekeeping projects consider respondents' land access and tenure as an integral component of participant recruitment. We argue that if organisations continue to ignore the issue of theft, they risk undermining their own project outcomes and failing to augment recruits to their programmes. We further propose that beekeeping training as currently provided by most of the development agencies is inadequate to address the technical capacity requirements of local beekeepers, particularly in the context of the challenges presented by changing weather patterns. We also suggest that the requirement to form associations to access project benefits creates divisions in communities and recommend handling this issue with more care. Lastly, when beekeeping is promoted as a livelihood activity with a view towards incentivizing conservation, we suggest considering that beekeeping is often just one part of rural livelihood portfolios, of which not all necessarily provide these desired incentives.

Keywords: honey, alternative livelihood projects, rural development, capacity building, beneficiary selection, producer organisations