



Project Title: Valuing Trees: Farmer Perceptions of Forest Trees within the Cultivated Cocoa and Coffee Landscape

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Summary

Throughout the forest zones of Ghana and Ethiopia, cocoa and coffee farmers clear secondary or primary forest to establish new farms, capturing the capacity of nutrient rich forest soils to increase crop yields. Many farmers preserve remnant forest trees as an integral component of the agricultural landscape, making decisions about tree removal and retention based on a unique set of selection criteria. How they perceive trees plays a crucial role in management decisions at the micro level which in turn influence landscape patterns at the macro level. The central questions of this research consider: (1) how Ghanaian and Ethiopian farmers perceive forest trees within the cultivated cocoa and coffee landscape, (2) how well farmers understand the environmental and ecological benefits of trees within their farms and (3) what factors influence their decision to remove or retain individual tree species within their farms. The main objective of this research is to identify farmers perceptions (and misperceptions) of the environmental and ecological functions of trees within their farms and use this information to help agricultural extension agents develop programs that encourage farmers to retain trees within their farms.

The study findings suggest that farmers are fairly knowledgeable about the roles of forest trees within their farms. This knowledge is a product of a long period of practice supplemented by regular training provided by government extension agents. Farmers are largely in favor of retaining forest trees on their farms due to the perceived environmental and ecological benefits. However, there were some reported negative outcomes associated with specific species of forest trees. This study recommends that extension agents recommend appropriate species of forest trees to be retained and/or planted within cocoa and coffee farms, exploration of alternative uses of forest trees by farmers, and inclusion of indigenous knowledge in extension training programs. The results of this research have been shared with extension agents in Ghana (Cocoa Board of Ghana; COCOBOD) and Ethiopia (Jimma Agricultural Research Institute; JARC) and have been used to supplement current extension training programs to more effectively educate cocoa and coffee farmers about the economic and environmental benefits of growing their crops within a forested agricultural landscape. The research results are currently being developed into a paper for publication in the peer reviewed journal World Development.

Project background and approach

Throughout the forest zones of Ghana and Ethiopia, cocoa and coffee farmers clear secondary or primary forest to establish new farms, capturing the capacity of nutrient rich forest soils to increase crop yields. Cocoa cultivation accounts for the primary source of income for 11% of Ghana's population while coffee cultivation in Ethiopia provides income to 16% of the population. Throughout a series of political and economic programs, cocoa and coffee cultivation has remained in the hands of smallholder farmers in both countries, many of whom are women. Many cocoa and coffee farmers preserve remnant forest trees on existing farms as an integral and necessary component of the production landscape, making decisions about tree removal and tree retention based on a unique set of selection criteria.

In addition to traditional cocoa and coffee agroforestry which occurs under the canopy of secondary forests, some farmers in Ghana and Ethiopia have begun planting sun-tolerant varieties of cocoa and coffee trees. This trend can be attributed to the fact that it takes approximately 5-7 years after planting within a forested landscape before a cocoa or coffee tree can be harvested. In contrast, sun tolerant varieties can be harvested within 2-3 years of planting. Perhaps more importantly, rather than being planted under the canopy of a secondary forest, sun-tolerant cocoa and coffee seedlings can be planted in open sunlight, which encourages farmers to clear their land of all forest trees prior to planting. Shorter times to harvest are now the primary driver of deforestation within the cocoa and coffee growing regions of Ghana and Ethiopia.

The consequent environmental degradation resulting from the shift towards sun-tolerant cocoa and coffee varieties is significant, including deforestation, increased erosion and reduced soil fertility. In addition, the loss of the canopy cover of the secondary forest leaves the young trees exposed to the punishing rains that occur during the rainy season. Finally, it turns out that the sun-tolerant cocoa and coffee trees are less resistant to insect and fungal attack.

Recent exploratory research suggests that farmers often have misperceptions regarding the environmental and ecological benefits derived from growing cocoa and coffee under the protective canopy of a secondary forest. Working with researchers from the Kwame Nkrumah University of Science and Technology in Ghana and Addis Ababa University in Ethiopia, in collaboration with the Cocoa Board of Ghana (COCOBOD) and the Jimma Agricultural Research Institute (JARC) this project will conduct surveys of cocoa and coffee farmers to identify farmer's perception (and misperceptions) of the environmental and ecological functions of trees within the agricultural landscape. This information will form the foundation for improving the effectiveness of agricultural extension programs in both countries.

Findings

On the factors farmers consider in retaining or removing forest trees, the survey results show that while a number of factors are considered, most farmers generally retain forest trees on their farms. This general positive attitude towards forest tree retention is largely due to the regular training farmers receive from government institutions on the need to ensure best farming practices, which to them, is to retain forest trees. Other factors farmers consider in retaining forest trees include (i) farmers long years of experience of the protective cover forest trees provide for cocoa and coffee trees; and (ii) the geographical location of the farm, as forest trees are normally retained on farmland with hilly or undulating topography to avoid or reduce the rate of erosion. The ecological and environmental benefits of forest trees in the study communities in Ghana were perhaps less recognized because the local farmers have not explored other uses of forest trees. For instance, our research shows that cocoa farmers are generally unaware of the

income generating potential of planting or retaining forest trees within their farms. Hence, few of the farmers in Ghana have made conscious efforts to cultivate forest trees within their cocoa farms to provide revenue.

Some farmers reported having removed forest trees from their farms based on: (i) the threat the forest trees pose to cocoa or coffee trees in terms of competition for nutrients and water resources, (ii) the risk of forest trees falling and destroying cocoa or coffee trees, (iii) the role of forest trees in providing habitat for birds which damage coffee trees (Ethiopia) and (iv) the danger of forest trees spreading insects and pests within cocoa and coffee farms. There are other minor factors some farmers mentioned such as (i) clearing the forest trees to make way for sunshine to reach the cocoa and coffee trees; and (ii) felling forest trees for fuel wood.

Generally, cocoa and coffee farmers in the study communities were aware of the importance of forest trees in their farms, although caveats exist. Most farmers, regardless of the benefits and challenges associated with having forest trees in cocoa and coffee farms, expressed support for retaining and planting forest trees within their farms. However, it is important to consider interventions designed to address the negative impacts of forest trees within cocoa and coffee farms.

Outputs

The final project reports for both Ghana and Ethiopia will be submitted individually along with this final project report. The survey results were presented to extension agents within both collaborating organizations, COCOBOD and JARC. Representatives of both organizations indicated that they would use the research results to supplement current extension materials and programs. The results would be used to highlight the environmental, ecological and economic value of forest trees within cocoa and coffee farms as well as to identify potential strategies to offset the perceived negative impacts of some forest trees within the agricultural landscape. The project cooperators are currently in the process of integrating the final drafts of the cocoa and coffee project reports into a single document that will be submitted for publication in the peer reviewed journal *World Development*.

Outcomes

Outcome 1: Relationship building. This project provided the foundation for researchers at the University of Michigan to develop strong research relationships with researchers at the Kwame Nkrumah University of Science and Technology in Ghana and Addis Ababa University in Ethiopia.

Outcome 2: Data collection to address knowledge gaps. The results of this project helped to identify cocoa and coffee farmer's perceptions of the benefits and problems associated with retaining and planting forests trees within their farms. The results provide a foundation for modifying existing extension materials to more effectively address farmers concerns regarding forest trees within their farms.

Objective 3: Data collection to refine and focus a collaborative project. Several of the researchers are currently assessing the potential for submitting a research proposal to evaluate farmer's perceptions of forest trees across a wider geographic region in Ghana and Ethiopia. **Objective 4: Publication of research results.** The researchers are currently engaged in summarizing the research results from the two studies into a comparative study of farmer's perceptions of forest trees within cocoa farms in Ghana and coffee farms in Ethiopia. Once completed, the manuscript will be submitted for publication to the peer reviewed journal *World Development*.

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