EDRI
EfD
Environment for Development
RESEARCH BRIEF

Households Consider Diversity of Attributes in Their Decisions to Plant Trees

BY ZENEBE GEBREEGZIABHER, ALEMU MEKONNEN, MENALE KASSIE, AND GUNNAR KÖHLIN, AUGUST 2012

EFD RESEARCH BRIEF SERIES 12-02

Trees play multiple roles for rural households, providing significant economic and ecological benefits. With trees, households can sell wood for fuel and construction materials, for example, or non-timber forest products such as honey from bee keeping, adhesives/gum, spices, and medicinal products. Trees also prevent soil degradation of their land. Planting trees is also an alternative crop and livelihood strategy, particularly in drier areas where drought is frequent, soils are poor, and use of fertilizers and improved seeds is risky and less profitable. Findings from Ethiopia suggest that households consider a diversity of attributes in their decisions to plant trees.

A host of factors affect a household's decision to plant trees or not. Identifying the tree attributes considered most important by households that plant trees, and to what extent each factor enters their decisions, is very important for policy. Using information from a study conducted on rural households in the Tigrai region of Ethiopia, we looked at what factors influence a household to plant trees and which purposes or attributes enhance the propensity to plant specific tree species. Exogenous income[1], educational level, age, and gender of head of household increased the propensity to plant trees and the number of trees grown. Availability of exogenous income enhances households' decision to plant trees but has no effect on the level or amount of trees planted. The more educated the head of household is, the more likely she/he is to plant trees and the more trees she/he plants. Older heads and male headed households are more likely to decide to plant trees than younger and female headed households, respectively. The former implies that farming experience (as captured by age of head of household) increases awareness of the benefits of planting trees and the latter indicates that tree planting is largely a male activity.

The size of the household farm and how many cattle a household owns also is associated with a higher likelihood of cultivating trees. This could be related to the fact that larger land size provides sufficient land for tree plantation besides crop cultivation. Households that own more cattle, however, will

Key Points

- Higher educational level, older age, male headed household, large farm size, less cattle-holding, and more tenure security contributed towards the decision to plant trees positively.
- The same factors plus exogenous income impact the extent or level of tree planting, i.e. how much is planted.
- The most important attributes/purposes of planting trees included shade, followed by farm implements, and fuel wood.
- Determinants of household tree planting could be region specific and contextual (e.g. more cattle-holding encouraged the decision to plant trees in the Amahra region, while the reverse is true in Tigrai).

[1] This refers to income that is not directly earned, such as remittances or gifts (donations), etc.

need more land for grazing and might not give priority to planting trees. Furthermore, secure land tenure positively impacts a household's decision to plant trees. The benefits from investing in trees accrue over time, hence, the importance of tenure security.

Location, i.e., the agro-ecology of a village, can also affect the decision to plant trees. Households residing in the middle and upper highlands are more likely to plant trees relative to those residing in the lower highlands. Shadow prices[2] of fuel wood and dung, and the number of male and female adults in a household, did not have any significant impact on either the decisions to plant tree or the number of trees to plant.

While secure land tenure may mean more tree planting in Tigrai, another similar study conducted in the Amhara region showed otherwise. Households that expected to lose their land in the next five years through periodical land redistribution by village leaders were more likely to grow or plant trees. This results from the need to make more use of land before it is taken away. This suggests that a perceived risk of land expropriation makes tree growing or planting more likely. However, this insecurity about land tenure does not influence how many trees the household will plant. Furthermore, households in Amhara with more livestock, unlike those in Tigrai, showed an inclination to plant trees. These differences may mean that factors influencing households to plant trees are region-specific or contextual, and further studies are necessary to explore why this is so.

What type of tree a household chooses to plant depends on what attributes a specific species offers. Of the 17 tree species examined, more than 75 percent had multiple purposes or attributes, including shade; materials for farm implements, house construction, and fences; fuel wood; soil conservation; fodder; and household utensils.

Table 1 Tree Species and Their Attributes

	Tree species	Purposes
1	*Rhus natalensis*	Fuelwood
2	*Shinus molle*	Shade
3	*Juniperus procera*	House construction
4	*Ficus ingens*	Fodder
5	Eucalyptus species	Fuelwood and farm implements
6	*Acacia ethbaica*	Fuelwood and shade
7	*Euclea shimperi*	Soil conservation, fuelwood and house construction material
8	*Olea europaea*	Farm implements and household utensils
9	*Acacia lihay*	Fuelwood, fencing and house construction
10	*Acacia seyal*	Farm implements, fencing and shade
11	*Balanites aegyptiaca*	Shade and farm implements
12	*Mytenus senegalensis*	Soil conservation, fencing and fuelwood
13	*Faidherbia albida*	Fodder and shade
14	*Melia azedarach*	Shade and farm implements
15	*Acacia saligna*	Shade and farm implements
16	*Euphorbia candelabrum*	House construction and fencing
17	*Croton macrostachys*	House construction, farm implements, and shade

[2] Shadow prices are measures of price for goods and services that do not have a market price. This gives an indication of the resources (time and energy) expended when collecting fuel wood and dung.

Households consider diversity of attributes in their decisions to plant trees

Conclusion and Policy Implications

Characteristics of household (exogenous income including farm size and number of cattle), characteristics of head of household (age, gender, education level), and village level factors (location or agro-ecology variables) determine household decisions to plant trees and the extent of tree planting. The same factors do not necessarily underlie two separate decisions: whether to plant trees and how much to plant.

The perception by household that they will be able to keep their land (or keep a certain amount), namely, tenure security, tends to be important in determining whether households decide to plant trees and the number of trees they plant. Our study suggests that interventions that enhance tenure security would encourage more households to plant trees. Promoting further education of the household head through easily available extension services or inducing to families to keep children (future household heads) in school longer should result in more households choosing trees as one of their crops. The findings are also indicative of which species should be focused on for various purposes, for instance, developing specific policies to address fuel wood scarcity.

ABOUT THIS BRIEF

This brief is based on results from Gebreegziabher, Z., Mekonen, A., Kassie, M. and Köhlin, G. 2010 ''Household Tree Planting in Tigrai, Northern Ethiopia: Tree Species, Purposes and Determinants,'' Discussion Paper Series EfD DP 10-01, Environment for Development (EfD), University of Gothenburg, Göteborg, Sweden.

FURTHER READING

Cooke, P., 1998, "The Effect of Environmental Good Scarcity on Own-Farm Labor Allocation: The Case of Agricultural Households in Rural Nepal," *Development and Environment Economics* 3: 443–69.

Mekonnen, A. 2009, "Tenure Security, Resource Endowments, and Tree Growing: Evidence from the Amhara Region of Ethiopia," *Land Economics* 85(2): 292–307.

Pender, J., F. Place, and S. Ehui, 2006, *Strategies for Sustainable Land Management in the East African Highlands*. Washington, DC: FPRI.

CONTACT

Zenebe Gebreegziabher (email) zenebeg2002@yahoo.com, (tel) + 251 914 70 01 95
Alemu Mekonnen (email) alemu_m2004@yahoo.com, (tel) +251 11 552 3564

EfD Center in Ethiopia, www.efdinitiative.org/centers/ethiopia
eepfe-edir@ethionet.eth, Phone 251 11 552 3564 /550-6066. Fax 251 11 550-5588, Environmental Economics, Policy Forum for Ethiopia, (EEPFE), Ethiopian, Development Research Institute (EDRI). Blue Building, Near National Stadium, Office Numbers 401-409, fourth floor, P.O.Box 2479, Addis Ababa, Ethiopia

EfD, Environment for Development initiative, www.environmentfordevelopment.org
EfD Secretariat: info@efdinitiative.org, Phone: +46-31-786 2595, Fax +46-31-786 10 43, www.efdinitiative.org./efd-initiative/organisation/secretariat, Department of Economics, University of Gothenburg , PO Box 640, SE 405 30 Gothenburg, Sweden