

## Poverty and forest degradation: introduction to the special issue

GERALD E. SHIVELY<sup>1</sup>

*Department of Agricultural Economics, Purdue University, West Lafayette, IN 47907 USA. E-mail: shivelyg@purdue.edu*

### Introduction

This special issue focuses on the poor and their role in forest degradation. The idea that the poor are both agents of forest degradation and victims of forest loss is not new. Neither is the observation that unsustainable rates of forest use by smallholder farmers arises as a result of a complex interplay of incentives, constraints, and institutional forces. For researchers and policy makers concerned with natural resource use in low-income settings, theory is often useful, but rarely adequate to explain behavioural patterns. Unambiguous theoretical findings tend to flow only from substantial sets of simplifying assumptions, and such assumptions, measured against the observed facts of smallholder agriculture, seem largely untenable. Unfortunately much empirical research on the topic suffers from an opposite problem. In settings where, at any point in time, everything matters and nothing is held constant, econometric findings are frequently weak. The combination of heterogeneity of circumstance, homogeneity of market signals, and limitations on smallholder response generally overwhelms the statistical power of small data sets, often collected with different purposes in mind.

And so we come to this special issue, which brings together a related collection of empirical studies utilizing carefully collected cross-section and panel datasets, all of them assembled with the express purpose of examining how the poor impact forests. Each study represents painstaking

<sup>1</sup> I acknowledge the important role played by a number of colleagues working on this topic, not all of whom are represented in this volume. I have especially benefited from useful conversations and collaborations with Arild Angelsen, Ian Coxhead, Sisira Jayasuriya, Will Masters, and participants at the special paper session entitled *The Microeconomics of Deforestation* held at the 2nd World Congress of Environmental and Resource Economists in Monterey, California. The careful work of reviewers for this volume, the interest and patience of the editor, and the generosity of the Economics Department and Asian Economics Centre at the University of Melbourne are also gratefully acknowledged. I received support from the National Science Foundation and US Agency for International Development under the SANREM CRSP. Opinions expressed are not necessarily those of sponsoring agencies.

efforts in the field and countless hours of analysis. Equally important, these studies are among the first that allow us to disentangle cause and effect, control for unobserved heterogeneity, and examine how economic and environmental shocks influence forest-impacting behaviours. Despite their acknowledged limitations, these studies represent the current state of the art and thereby contribute to ongoing debates regarding the existence and shape of household-level environmental Kuznet's curves, the policies that separate agricultural intensification from area expansion, and the role of income growth in shaping subsequent land and labour allocation patterns.

### **The papers**

This special issue consists of six papers, several of which have their origins in a special paper session entitled *The Microeconomics of Deforestation* that was held at the 2nd World Congress of Environmental and Resource Economists in Monterey, California in the summer of 2002. In terms of geographic coverage three papers report research from Latin America, two focus on Southeast Asia, and one highlights findings from sub-Saharan Africa.

The first paper of the volume, by Monica Fisher, documents in detail the extent to which rural agricultural households in Southern Malawi rely on local forests for their livelihoods. Using detailed labour and income data collected at monthly intervals among farm households, Fisher shows that forest activities are nearly ubiquitous in the sample. More than three-quarters of farm households engaged in forest activities and households in the sample earned about one-third of their income, on average, from forests. Collection of fuelwood is a driving force in the phenomena examined. Fisher uses Gini decompositions to illustrate how access to low-return forest activities tends to reduce income inequality at the village level and argues, on the basis of results from regression analysis, that there are few barriers to entry into high-return forest activities. Whether such high-return forest activities can be made sustainable, however, remains uncertain. The study points to potentially acute tradeoffs between forest protection and poverty alleviation. Fisher's policy conclusions foreshadow some of those in later papers. Avoiding economy–environment tradeoffs may require policies that improve access to non-forest-based wage work and help to improve local capacity to establish and enforce rules regarding forest access on customary land.

The second paper of the series, by Subhrendu Pattanayak, Erin Sills, and Randall Kramer, continues the theme of examining fuelwood use as a way of understanding the poor's impacts on forests. They rely for their analysis on data from a sample of nearly 500 households in the buffer zone of Ruteng National Park in Indonesia. Using a model in which they carefully control for the endogeneity of both fuel choice and travel time, they are able to value the welfare gain from access to forests and show how better access to schooling, roads, and wage opportunities reduces reliance on forest-based fuels. To the extent Fisher's study provides a snapshot of forest reliance among the extremely poor, Pattanayak and his colleagues show the benefits that can arise when credible alternatives to forest-use begin to emerge in a rural community.

The next three papers in the volume report findings from Latin America, and shift the empirical focus from fuelwood to agricultural production. Jill Caviglia-Harris uses panel data to explore the land-use choices of small-scale, mostly migrant agricultural producers in Rondônia, Brazil. The econometric framework controls for the endogeneity of forest-clearing decisions and also clearly accounts for farmer specialization by distinguishing between crop production (an undertaking which requires access to credit) and dairy production (which relies predominantly upon household wealth). Findings point toward dairy production as the more forest-intensive activity, highlighting the role of market, rather than subsistence forces in determining high deforestation rates in the sample.

The contribution by Yoshito Takasaki, Brad Barham, and Oliver Coomes provides a rich empirical description and analysis of how riverine peasant households in the Peruvian Amazon respond to covariate and idiosyncratic shocks. Using a statistical model of activity choice, their analysis focuses on the ways in which geographical endowments, wealth holdings, and family labour endowments (along with demographics) generate variation in coping strategies across households and locales. Their findings support the connection often made between poverty and the environment, namely that hard times for households translate into hard times for forests. But outcomes are shown to be highly specific to the local economic and environmental context in which households operate. The analysis identifies a clear hierarchy of labour supply responses to cope with negative income shocks. These include increases in cropping, fishing, and collection of non-timber forest products. In addition to highlighting the need for non-forest employment to alleviate pressure on forest resources, the authors conclude that policies should aim to enhance the accumulation of liquid assets to help the poor cope with idiosyncratic and covariate income shocks.

The final paper focusing on Latin America, by Jorge Rodríguez-Meza, Doug Southgate, and Claudio González-Vega, examines factors influencing agricultural land use in El Salvador. These authors rely on panel data from four biennial surveys of a nationally representative sample of rural households. The analysis points toward two patterns: first, a precautionary demand for land that diminishes as incomes rise; and, second, a positive correlation between income and farming capacity. These findings support the view that the relationship between forest clearing and per-capita income exhibits an inverted-U shape. Using regression analysis, they trace beneficial shifts in their derived empirical Environmental Kuznets Curve (EKC) relationship to several factors, including access to non-agricultural jobs, access to chemical inputs, and a household's stock of human capital.

In the final paper of the volume Stefano Pagiola and I report findings from three rounds of panel data collected in Palawan, a frontier farming area of the Philippines. We focus on two distinct but connected groups of farmers: a lowland community of labour-hiring households and an upland community of labour-selling (and forest-using) households. Our findings support the contentions made by other contributors to the volume, namely that off-farm opportunities reduce incentives for forest use. We illustrate how improvements in lowland farming brought about by irrigation development created spillover benefits for upland farmers and reduced

pressure on adjacent forests. Using a series of jointly estimated regression models for labour-hiring decisions in the lowlands, and labour allocation, investment, and fertilizer use decisions in the uplands, we further document both indirect and lagged effects from off-farm employment opportunities: upland household members who were employed on lowland farms reduced their use of forests, and they also invested in measures that, by increasing agricultural productivity, reduced forest clearing in subsequent periods.

Taken together, the papers in this special issue highlight the important – but not necessarily immutable – relationship between poverty and forest use. All of the studies included here underscore that the poor are agents of forest degradation – sometimes in a struggle to subsist, sometimes in an effort to prosper, and sometimes in response to temporary misfortune. But the studies also reveal the importance of opportunity as a conditioning factor in forest-use decisions. The poor are rational economic agents, and for this reason policy makers must be attuned to the economic context in which smallholders make forest-use decisions. Where given reasonable and economically viable alternatives, smallholders respond. For this reason, policy makers must remain mindful that solutions to mitigate problems of poverty and forest degradation are likely to be found in economic opportunities that arise away from the forest edge.