

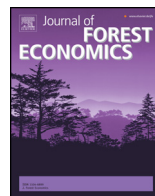


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# Community forest management, gender and fuelwood collection in rural Nepal



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### ABSTRACT

This paper investigates how Forest User Group (FUG) management of community forests and household characteristics influence household allocation of male and female labor to fuelwood collection in rural Nepal. FUG collection bans are found to displace both landed and landless female fuelwood collection labor to other forests that are typically further away, but lower restrictions do not. A higher female FUG executive committee share has both conservation and equity enhancing effects by lowering the likelihoods that landless, *Dalit*, landed and non-*Dalit* women collect in other forests, and increasing the likelihood landless males collect in the FUG forest.

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## Introduction

In rural Nepal over 90% of households use fuelwood, primarily as a cooking fuel (CBS, 2011). Most of this fuelwood is self-collected by households with labor as the primary input. Who in the household collects fuelwood and where are both pertinent household decisions. Though women are typically considered the primary fuelwood collectors in Nepal, and indeed in much of South Asia, many men are also involved. The hours involved in collection by both genders can be substantial. For example,

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Köhlin and Amacher (2005) report that on average men and women spend 460 and 810 h per year respectively collecting fuelwood from natural forest areas in Orissa, India.

In Nepal household fuelwood collection decisions are often influenced by management of local forest areas. The Nepal Forest Act of 1993 allowed communities to form Forest User Groups (FUGs) and gain formal use rights and management responsibility for local community forest areas. By 2011 there were 17,685 FUGs registered which included 1.45 million households or 35% of Nepal's population (Government of Nepal, 2012). The initial impetus behind promoting community forestry was largely to improve forest conditions that had declined under state management (Bhattarai et al., 2009; Pandit and Bevilacqua, 2011). In order to allow forest conditions to improve FUGs often restrict the collection of fuelwood and other forest products (Edmonds, 2002; Ohja, 2009; Agarwal, 2009a,b). However, restrictions on extraction can stay in place long after forests regenerate (Agarwal, 2001).

Households may respond to restrictions on collection in local forest areas in a variety of ways. Where households collect and what happens to the labor burden of women when restrictions are tighter are questions of particular interest. It is often assumed that households without land will turn to collection in other forests, and households with land will collect more fuelwood from private property (e.g., Agarwal, 2001; Bhattarai et al., 2009; Chakraborty, 2001; Pandit and Bevilacqua, 2011). Relatedly, there is concern that women in particular will have to spend more time collecting fuelwood from sources that are further away (Agarwal, 2001; Naidu, 2011). Yet there is little econometric analysis of household behavior that tests these possible results while taking into account the influence of multiple factors.

Using household data from both the Hill and Tarai regions of Nepal, this paper investigates how FUG management conditions and household characteristics influence whether males and females engage in fuelwood collection, how much they collect, and the amount of time they spend collecting. As such it contributes to better understanding of how these factors are influencing gender roles in collection of an important forest resource that has been typically associated with women. The paper also examines how household and FUG factors influence where men and women collect fuelwood considering collection from FUG forest, private property, and other forest areas such as government forests. It would be troubling for overall forest conservation efforts as well as for collection labor burdens if FUG restrictions led to leakage of collection activity to other forest areas that are further away. Finally, the paper analyzes whether men and women in landless and *Dalit* households are influenced by FUG management characteristics in the same way as those in landed or non-*Dalit* households.<sup>1</sup> Landless and *Dalit* households are both traditionally disadvantaged groups in rural Nepal and may have more difficulty adapting to FUG restrictions than landed, higher caste households.

The rest of the paper is organized as follows. The second section reviews the economics literature on fuelwood collection, while the economic problem is modeled in the third section. The fourth section describes the data and econometric strategy. Empirical results are discussed in the fifth section and the sixth section draws conclusions.

## Fuelwood collection and community forestry

Household labor allocation responses to increases in fuelwood scarcity have been the subject of a small but growing economics literature. Several studies have found that household time spent collecting fuelwood increases with market price, shadow price or time per collected unit measures of fuelwood scarcity (Amacher et al., 1996; Cooke, 1998; Palmer and MacGregor, 2009; Damte et al., 2012). This increase does not always come from women. Amacher et al. (2004) find in Ethiopia that an increase in fuelwood price or in the distance to the closest fuelwood collection site both increase male time collecting fuelwood but not female time. Cooke (2000) finds in Nepal that household aggregate time spent collecting several environmental goods including fuelwood does not increase with fuelwood scarcity, the time spent by men and women both increase but the time of youths does not, and

<sup>1</sup> Untouchable or occupational caste are alternative terms for *Dalit*. *Dalits* are the lowest caste households in Nepal's illegal but still influential hierarchical caste system. See Adhikari and Di Falco (2009) for a discussion of caste and Forest User Groups in Nepal.

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