



# Economic dependence on mangrove forest resources for livelihoods in the Sundarbans, Bangladesh



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## ABSTRACT

This study examines the importance of mangrove resources to the livelihoods of people living beside the world's largest contiguous mangrove forest. Median annual household income was USD 1122, based on household survey data from 264 households in six villages adjacent to the Sundarbans, in Khulna, Bangladesh. Forest income represented 74% and 48% of the total household income for the lower and middle income households respectively, but just 23% for higher income households. Although higher income households derived a larger absolute income from forest resources than the lower income households, the addition of forest income to household income reduces measured income inequality by 27% suggesting that forests offer a more egalitarian source of income than most other sources at the study sites. Thus reducing forest income as a result of reduced access to forest resources would greatly affect the livelihood outcomes for the rural poor and increase wealth discrepancies among households near the forest margins.

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## 1. Introduction

Over 1.6 billion people worldwide, mostly poor, are thought to depend on forests for their livelihoods (World Bank, 2004; WRI, 2005) with income from forest resources helping alleviate poverty among many rural households (Angelsen and Wunder, 2003; Cavendish, 2000; Fisher, 2004; Hogarth et al., 2013; Sunderlin et al., 2005; Sunderlin et al., 2008; Vedeld et al., 2007; Yemiru et al., 2010). Forest resources can also act as a safety net in times of income crisis (Fisher and Shivley, 2005; Heubach et al., 2011; Kamanga et al., 2009; McSweeney, 2005; Paumgarten, 2005). Levels of dependence on forest resources around the world among households with access to forests varies from 6 to 65% depending on the local circumstances (McSweeney, 2002; Ambrose-Oji, 2003; Fisher, 2004; Mamo et al., 2007; Shackleton et al., 2007; Illukpitiya and Yanagida, 2008; Mcelwee, 2008; Quang and Noriko, 2008; Kamanga et al., 2009; Babulo et al., 2009; Yemiru et al., 2010; Heubach et al., 2011; Bosma et al., 2012; Kar and Jacobson, 2012; Rayamajhi et al., 2012; Tieguhong and Nkamgnia, 2012; Hogarth et al., 2013; Angelsen et al., 2014).

Globally, the dependence on forests for livelihoods tends to be highest in areas with high forest cover and pervasive poverty (Sunderlin et al., 2008). Until recently most research on the economic

importance of forest resources has been undertaken in dry southern and eastern Africa but a global research programme recently contributed studies from Latin America and Asia as well as Africa (see Angelsen et al., 2014 for distribution of Poverty Environment Network (PEN) studies globally). However there are few examples from mangrove forests despite their productivity and the large number of people relying on their resources. On the east coast of India, Hussain and Badola (2010) calculated that the resources extracted from mangrove forests contributed to more than 14.5% of total household income but mangrove non-timber forest products contributed 79% of the average annual income of a collector's family in the Indian section of the Sundarbans (Singh et al., 2010). In Thailand, this proportion was even higher with mangrove-based income accounting for an average of 83% of all household income in one study (Barbier, 2007). These studies demonstrate that mangroves, as with other natural environments, contribute substantially to incomes of the poor but less is known about the role such resources play in the wider local economy. The aim of this study is to quantify the value of mangrove resources to local communities adjoining the Sundarbans in Bangladesh, and to understand the role they play in the local economy, particularly in poverty alleviation. This study follows the PEN framework and so fills a gap for mangrove forests in the global analysis described in Angelsen et al. (2014).

### 1.1. Livelihoods and the Sundarbans

The Sundarbans region spans coastal India and Bangladesh at the northern end of the Bay of Bengal. Of the 10,000 km<sup>2</sup> covered by mangroves, 62% is in Bangladesh and the remainder in India (Hussain and

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Acharya, 1994). The Sundarbans Reserved Forest (SRF) in Bangladesh forms the single largest contiguous mangrove forest in the world. It covers an area of about 6000 km<sup>2</sup> representing 4.1% of the total landmass of the country (Siddiqi, 2001). The mangrove forest has high biodiversity values, supporting over 1000 species of plant, crustaceans, fish, reptiles, birds and mammals including the only remaining tigers (*Panthera tigris*) in Bangladesh (Hussain and Acharya, 1994).

These rich resources, especially the marine and fish species, have long underpinned the livelihoods of people living on the edges of the SRF. There are five main mangrove resources collected from the Sundarbans – fish, crabs, honey, nipa leaves and timber – and there have been studies of the incomes of those who collect those resources (Getzner and Islam, 2013), problems faced concerning their health, sanitation, dependence on money lenders to fund fishing ventures (Sarker, 2011) and the principal value chains of products (aquatic resources, honey, nipa leaf, and mangrove timber; Islam, 2010). Islam and Chuenpagdee (2013) also examined how the fisher households cope with risk and shock, the factors they consider in negotiating risk and their implications for poverty alleviation. One coping strategy identified was diversification of income sources and alternative income generating activities fostered among fishers in two villages which have managed to negotiate small but significant reductions in dependence on fishing and local money-lenders (Akon, 2013). Such diversification, however, is often prohibited. For instance the harvest of non-timber forest products (NTFP) from Satkhira Range along the southwest border of the Sundarbans is heavily restricted by government regulations on forest access driving people to break the rules in order to meet their livelihood needs (Zohora, 2011).

What is lacking from these studies of livelihoods of SRF resource users is analysis of the dependence on forest resources within a range of income sources for people on the edge of the SRF across the full spectrum of incomes and occupation classes.

This paper aims to determine the level of dependence of people surrounding the Sundarbans Reserve Forest on mangrove resources. The study does this by 1) describing income across different socio-economic income groups 2) comparing income from mangrove forest and other sources, 3) determining the socio-economic factors that influence mangrove forest income dependency and 4) investigating the role of forest incomes in poverty alleviation and reducing income inequality.

## 2. Methods

### 2.1. Study area

The study was conducted in six villages in the Mongla Sub-district, located in Bagerhat District. The district is bounded by the Sundarbans and the Bay of Bengal to the south. Villages were selected based on their proximity to the Sundarbans forest (Fig. 1). Three of the villages, Joymony Ghol, Joymony Katakhal and Joymony Sankirchar, are within the administrative Chila Union and are close to the Passur River which enters the Bay of Bengal through the Sundarbans forest. The other three villages, Baiddomari, South Bashtola and Burburia, are in the Sundarban Union approximately 50–200 m from the Sundarbans Forest Area from which they are separated by the narrow Khorma canal. This canal was excavated by the Forest Department to mark the boundary

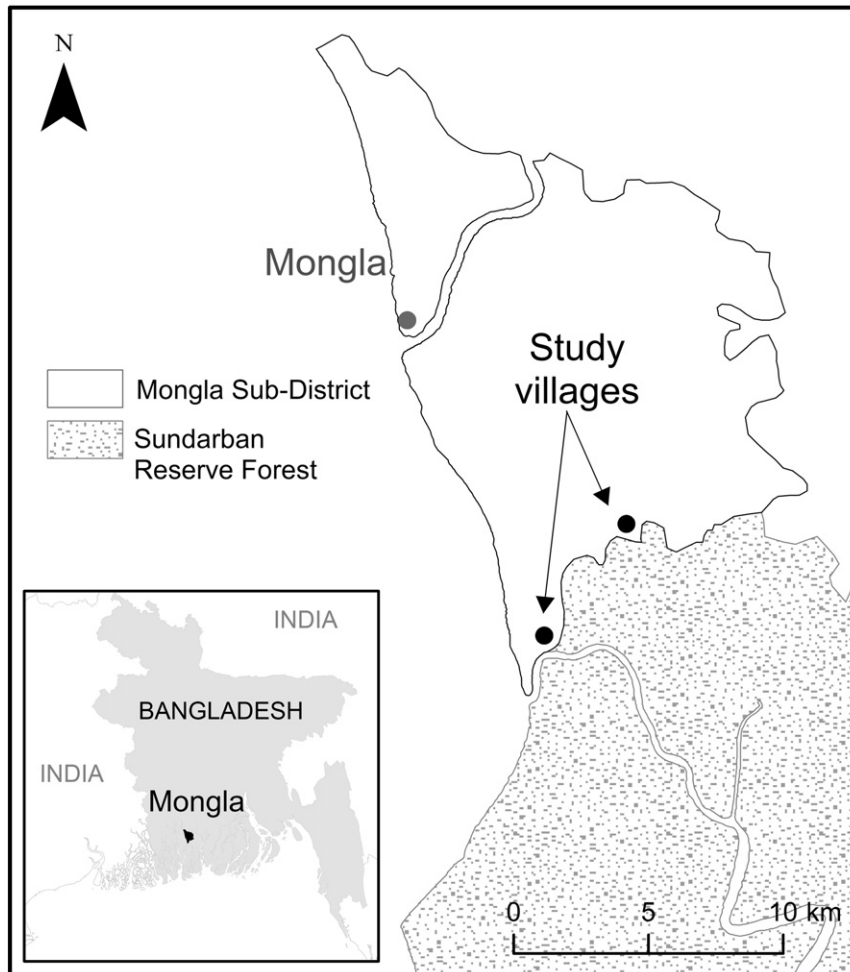


Fig. 1. Map of Mongla Sub-district showing the study villages.

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