ECONOMIC DEVELOPMENT & INSTITUTIONS

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POLICY BRIEF

November 2021

Community Forestry Management: Mechanisms behind a success story in Nepal

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Introduction

Over the past 25 years, the government of Nepal implemented one of the most ambitious and comprehensive programs of decentralization of forest management in the world. This major institutional change resulted in the transfer of the management of almost 50% of Nepal forests to no less than 18 000 Community Forest User Groups (CFUG). More than a third of the Nepalese population are directly involved in the management of forests, a key natural resource in everyday life. They provide not only firewood or timber, but also fodder for livestock, fruits, nuts and medicinal plants. The success of the program has been widely advertised and received a lot of international attention, for instance by UNEP (Sukhdev and Nuttall, 2010).

Despite this overall consensus, evidence on large programs of decentralized management of forest is more mixed in economics literature. Using propensity score matching on a broad sample of community forests in Nepal, Bluffstone et al. (2018) finds that formal CFUGs do not sequester more carbon than forests under informal community management. Oldekop et al. (2019) compares changes in forest cover and poverty in relation with the creation of community forest user groups between 2001 and 2011. It finds that subdistricts

that are otherwise similar at baseline tend to experience reductions in deforestation and in poverty. On a more limited scale (in the Arun Valley at early stages of the program), Edmonds (2002) finds that the creation of CFUGs reduces firewood collections at the household level. In the Indian Himalayas, Somanathan et al. (2009) finds that community forestry does not do worse than government management in terms of forest cover but achieves this stability at lower costs. Baland et al. (2010) uses ground level measurement of forest quality to argue that community forests in Uttaranchal reduce lopping and eventually spur forest restoration. However, some programs have average negative effects on forests conditions. In Madagascar, for instance, Desbureaux (2017) finds a reduction in forest cover in areas where decentralization of forest management takes place and collective action at the local level is strong.

Methodology

To evaluate the impact of the community forestry program in Nepal, we leverage multiple data sources. We construct our main explanatory variable, the share of a "village development committee"[1] (VDC) area managed by community forest user groups (CFUG), based on the national census of CFUG. In the first part of the analysis, we combine this data with yearly village level information on tree cover (Verger et. al, 2014) and land use (Friedl, 2012) derived from remote sensing as well as a broad set of controls. We therefore follow the 2 252 VDCs of the Hills and the Mountains[2] over 13 years. In the second part of the analysis, we merge data about CFUG with household level information coming from the last two waves of the Nepal Living Standard Survey. The Nepal Central Bureau of Statistics, in collaboration with the World Bank, interviewed 1 474 households in the Hills and Mountains region in 2003-04 and 2 116 in 2010-11 about several aspects or their production and consumption activities. The surveys cover 123 villages in 2003-04 and 178 villages in 2010-11, selected randomly with a probability proportional to their population.

Results

We first show that the CFUG program contributed to substantial increases in tree cover and forest area in the Hills and the Mountains of Nepal. The estimated effect using quasi-experimental methods, i.e. an instrumental variable approach exogenously predicting the creation of CFUGs, reveals much larger contribution of community forestry than estimations relying on the pure observation of the change in tree cover in municipalities affected by this institutional change. Indeed, CFUGs have typically been created in more degraded or less valuable forests, in places closer to human settlements and urban centres. We extensively discuss that neglecting this selection bias leads to an underestimation of the importance of community forestry for forest restoration.

We then investigate potential mechanisms underlying these positive changes and distinguish the ones related to changes in the biomass supply from channels related to changes in the demand for biomass. On the supply side, forest area increases at the expense of agricultural land and shrubs. We also find suggestive evidence of potential replanting efforts, as needle tree forests and mixed forests increase while broadleaf forest area remains stable, a feature in contrast with the baseline characteristics of forests that are mostly broadleaf (70%). On the demand side, CFUGs impact household energy demand, one of the drivers of forest degradation in Nepal (see Baland et al. 2018 for more details).

We find a reduction in firewood collection of households living nearby community forests, but this effect is fully driven by the younger community forests. This short- and medium-term reduction in collections goes hand in hand with an increase of the reported collection time per unit of firewood collected, an evidence that is consistent with the idea that CFUGs first start by imposing restrictions on firewood collection. In the long run, as forests conditions improve, they tend to supply more forest products to the villagers, in particular firewood

[1] "Village Development Committee" roughly corresponds to municipalities and group several villages and hamlets. For clarity, we use the word "village" in the remaining part of the brief.
[2] We exclude the Terai, the lowlands of Nepal that stretch over the Southern border of Nepal.

and collection time per unit of firewood goes back to a level on par with the collection reported by households who do not live close to community forests. This is typically consistent with field insights indicating that old CFUGs can supply forest products, including timber and firewood, in a sustainable manner and at higher yields than at the time of management decentralization. If households collect less firewood, they still need energy for cooking and heating purposes. We show that the presence of CFUGs induce a shift in household energy demand towards alternative sources of energy, including home produced biogas, LPG or kerosene purchased on markets; It may also include higher reliance of firewood purchased from markets and potentially coming from further away.

Discussion and policy implications

Our study yields several policy implications in the broader framework of the decentralization of natural resource management. First, it is crucial to analyse the potential effects of such programs in the short- and in the long-run. The long-term success of CFUGs has been eased up by the short-term availability of alternative energy sources channelled through markets. The availability of substitutes, such as biogas, LPG, kerosene or even firewood coming from further away allows CFUGs to credibly implement short-term restrictions on the forest they manage. In the long-run, as forests get denser, sustainable harvest may actually yield more forest products than at CFUG creation and the role of short-term buffers may go unnoticed. More broadly, developing a community forestry program with the goal of restoring forests should go hand in hand with a proper understanding of the main uses of forests. Based on that, well-designed policies should allow for temporary solutions to compensate users who benefit from degraded forests between the onset of local management to the moment where users will again be able to reap direct benefits from the resource, i.e. when the forest will be dense enough to provide more ecosystem services. Not accounting for that may just displace the pressure from forests managed by communities to adjacent forests and have no positive effect at the local level.

Second, our study calls for analysing forest decentralization programs at the landscape level and not exclusively by looking at those plots of which management has been transferred. Indeed, reducing the pressure on one piece of land may induce an increase of harvesting in nearby areas. By estimating the effect of our treatment as a function of its intensity over a broader geographical area, we focus on the net effects of decentralization forest management on the forests of Nepal and not just in the treated forests. This is important for policy makers, for instance, when their objective is to increase forest cover and store carbon. In the Nepali context, we show that community forestry increases carbon sequestration at the local landscape level. However, our study probably overestimates this contribution as some of the temporary reduction in local firewood collection is compensated by the use of other sources of energy. If alternative energy sources come from biogas, this is all the more beneficial from a climate perspective. If alternative energy sources come from the market, such as firewood collected further away, LPG or kerosene, then the contribution of CFUG to climate change mitigation is lower than the pure local effect on forest restoration.

While this study is able to measure some average benefits of community forestry on forest conditions at the local level, it is not the whole story either. Our field insights do point to a list of issues that sound policies designs should also integrate. For instance, an increase in ecosystem services may also mean that the population of wild animals may increase, extending crop damages in nearby cultivated plots. The distribution of benefits may also change as a consequence of community forests. For instance, a typical claim of women is that men leading CFUGs decide to plant pine trees that can be sold as timber for construction while women would prefer to have more broadleaf trees as they are often in charge of fetching firewood and fodder. It is therefore important to make sure that local communities do benefit from increased carbon sequestration, in the short- and the long-run, keeping in mind that the distribution of benefits and costs may not be homogenous within the group of beneficiaries.

Still, community forestry in Nepal is a game changer at the local level. This institutional innovation empowers local communities, restores degraded forests, and may help remote villages to get out of a poverty-environment vicious circle while contributing to a global public good.

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