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Heterogeneity and Collective Management: Evidence from Common Forests in Himachal Pradesh, India

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Summary. — This paper conducts a statistical investigation into the impact of differences in economic benefits, wealth, and social classes within the community on collective management of forests. There are two key results. First, social parochialism is not a pre-requisite for collective management of forests. Moderate levels of social diversity are associated with low collective management, but at high levels of social diversity, collective management is high. Second, moderate wealth heterogeneity is beneficial; however, at high levels and in the presence of benefit heterogeneity, it decreases collective management. Similarly, benefit heterogeneity reduces collective management if wealth heterogeneity also exists. These results run counter to the dominant understanding of heterogeneity but may be seen as alternate explanations under a specific socioeconomic context.

Key words — collective action and institutions, community-based management, cooperation, heterogeneity, South Asia, India

1. INTRODUCTION

Development and environment policies are increasingly incorporating the concept of communities, and adopting participatory approaches to fulfill the objectives of social welfare and natural resource conservation. While the unrealistic assumption of an undifferentiated community with shared social institutions and culture is no longer shared by all (see Leach, Mearns, & Scoones, 1999), there is still an incomplete understanding of how heterogeneous communities use and manage their natural resources.

Some theoretical papers and case studies have argued that under certain conditions, the provision of collective goods is higher when private wealth is differentially distributed within the community or group (e.g., Baland & Platteau, 1996, 1999; Bardhan & Dayton-Johnson, 2000; Marwell & Oliver, 1993; Olson, 1965; Wade, 1988). Others have suggested that heterogeneity can increase discrimination against certain social and wealth classes (Agarwal, 2001; Agrawal, 1999; Bowles & Gintis, 2002), and create diverse and conflictual values, interests, and resource priorities that may be lead to low levels of collective action and cooperation, and increase environmental degradation (Boyce, 1994; Boyce, Klemer, Templet, & Willis, 1999; Kant, 2000; Leach, 1994; Watts, 1991).

The disagreement on the role of heterogeneity is also reflected in cross-sectional statistical analyses that have been undertaken more recently (e.g., Agrawal & Chhatre, 2006; Baland, Bardhan, Das, Mookherjee, & Sarkar, 2007; Bardhan, 2000; Bardhan & Dayton-Johnson, 2007; Dayton-Johnson, 2000; Gebremedhin, Pender, & Tesfay, 2004; Molinas, 1998; Perez-Cirera & Lovett, 2006; Somanathan, Prabhakar, & Mehta, 2007). The seemingly contradictory results arise due to differences in the measurement of explanatory and dependent variables, and the context in which the phenomena are assumed to occur (Baland & Platteau, 2007). Moreover, heterogeneity is multi-dimensional; without appropriate controls, it may be difficult to ascertain the impact of individual dimensions of heterogeneity on collective action.

With a view to contribute to this literature, this paper decomposes heterogeneity [1] into social diversity, wealth heterogeneity, and benefit heterogeneity (i.e., heterogeneity in economic interests). Statistical analysis is utilized to discuss the effects of these three dimensions of heterogeneity on an index of collective action that measures contributions by the community to collective infrastructure. The sample is drawn from forest communities that undertake collective forest management and those that do not—this aspect of sampling design is different from previous studies. Such an analysis extends our understanding of the impact of social structure on collective action, and informs policies on resource management and conservation.

The key findings of this study are that wealth and social heterogeneity exhibit non-linear effects on collective management. Moreover, the interaction of heterogeneity in wealth and economic benefits introduces an additional qualification to the hypothesis that increasing wealth heterogeneity increases cooperation. In the presence of benefit heterogeneity, an increase in wealth heterogeneity reduces the extent of collective management. Similarly, when wealth heterogeneity is greater than zero, as benefit heterogeneity rises, there is a decrease in the extent of collective management. The results, therefore, suggest that wealth heterogeneity is not necessarily beneficial, nor is social diversity always deterimental. Additionally, the ability to contribute to collective management may diverge from economic benefits and incentive to contribute. In the next section, the study area and key variables in this analysis are described. The third section presents the statistical analysis, and the paper concludes with a discussion of the results.

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2. SAMPLE AND DATA FROM THE MIDDLE HILLS OF HIMACHAL PRADESH

The study area lies in the western Himalayan region in northern India, in the state of Himachal Pradesh. While classified forests are state property, rural households in this region have retained traditional usufruct forest rights (Chhatre, 2003; Gadgil & Guha, 1995). Since the aim is to comment on group or social outcomes, the "community" is the unit of observation. Fieldwork was carried out in 2004 in four purposively selected sub-watershed regions in the districts of Mandi and Kangra, where forest rights are vested with the community rather than the individual (see Chhatre, 2003; Morrison, n.d.). This allows for an analysis of differences in collective management across communities with comparable rights to the forest commons (Poteete & Ostrom, 2003).

With the aid of local NGOs, and Forest department officials, a list was drawn up of communities, which are: (a) situated in the Middle Hill region (1000–2200 m above mean sea level), (b) not engaged in commerical extraction of forest resources, (c) not engaged in conflict with outside agents,[2] and (d) situated within two kilometers of a forest. This was done in order to focus attention on social dynamics within the community, and the relationship between the community and forests; moreover, this sample design allowed controlling for geographical diversity. From this list, a random sample of 56 communities was drawn. The sample includes both communities that engage in collective management of forests, and those that do not.

The community is defined based on the local conception of a "community". While this takes into account cultural and social norms, it does not address a potential problem of exclusion of certain groups from the community. However, as is explained below, there is sufficient variation in levels of collective management, caste and wealth classes, and benefits from forests (the key variables in this study), and hence I assume that either exclusion is not severe or that it does not affect the variables of interest.

Semi-structured group interviews were used as the survey instrument. These interviews included general members of the community, as well as members of the local administrative body (*panchayat*), or the executive body of the forest institution, or the women's council (*mahila mandal*).[3] Questions were posed to the group and after discussion by group members, a final answer was recorded. This method offered an efficient way of collecting data that was closest to the "truth" in the least possible time.[4] The resulting data exhibit sufficient variability in the dependent and the explanatory variables to permit application of statistical techniques. While a combination of convenience and random sampling techniques were used, there was no explicit selection bias. Hence, I expect that the data, at the very least, are capable of testing theoretical assertions about group heterogeneity and its implications (also see Molinas, 1998). In the remaining part of this section, I describe collective forest management and heterogeneity as observed in the sample and briefly discuss their theoretical underpinnings.

(a) *Collective forest management*

Collective action can have various interpretations and may involve a complex set of nested rules and institutions (see Ostrom, 1990) which may be a result of specific historical, ecological, and other structural processes. However, following Baland and Platteau (2007), in this paper, I interpret collective action as contributions to collective infrastructure, which manages, regulates and invests in forest management (also see Baland, Bardhan, & Bowles, 2007).

Community members in the sample contribute to collective management mainly in terms of labor time,[5] by attending meetings to discuss forest-related issues, engaging in planting trees and fencing parts of the forests (maintenance activities), meeting with forest officials and NGO employees (administrative activities), preventing and fighting forest fires (forest protection activities), and monitoring use of the forest (monitoring activities). Thirty two percent of communities in the sample have participated in at least one of these activities for more than 15 years, 22% has never engaged in any form of collective management, and the remaining 46% have undertaken collective management for less than 15 years (see Appendix A). These contributions represent investments in the management and upkeep of the forests and may sometimes be a bigger problem than overuse (Wallace, 1981, cited in Gautam, Shivakoti, & Webb, 2004).

While data on institutional longevity and the proportion of households that attend meetings were obtained relatively easily, the constraints of the study did not permit calculation of labor time spent on other management activities. Hence, data on maintenance, protection, monitoring and administrative activities are dichotomous variables that take the value "1" if collectively undertaken at the time of data collection, and "0" otherwise. Since participation in these activities require labor time that are neither substitutable nor freely traded (due to imperfect labor markets), if the activity takes the value "1", it can be assumed that a significant proportion of community members have contributed (Baland & Platteau, 2003). This also points to non-convexities associated with collective management.

Institutional longevity, proportion of households that attend meetings, and maintenance, administrative, forest protection, and monitoring activities describe collective management, however, individually they do not capture the extent of contributions by the community. For example, communities with a long history of collective management may not hold meetings since rules are well-established; they may also not feel the need for maintenance activities if the forest is healthy. In this case, institutional longevity better reflects the contributions made by the community over the years. On the other hand, more recent management efforts would not score high on institutional longevity, but may engage in a higher number of activities to ensure upkeep and well-being of the common forests.[6] Thus, using principal components analysis (PCA),[7] an index is created such that it incorporates all the described characteristics of collective management.

The first principal component explains 0.53 of the total variation in the data and is used as the dependent variable; it represents the extent of collective management undertaken by the community. The statistical procedure standardizes the variable around the mean. The final construct, *coll_mmt*, takes a value between −1.41 and 1.51, with a mean of zero and a standard deviation of one. This is used as the dependent variable.

(b) *Economy and social composition*

Social life in the study area is stratified based on the caste system. The various castes can be broadly classified into upper caste, middle caste, and lower caste. Though the highest proportion of households in a community belongs to the upper caste, exclusion of other caste groups is not an endemic problem (see Appendix B); there is variation in the degree of social diversity across communities.