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Groups at Work: A Social Identity Analysis of Gender-Differentiated Social Capital and Collective Action in Community-based Natural Resource Management

Authors: **Biswajit Ray**, Assistant Professor, Department of Economics, University of Calcutta, Kolkata.
Email: biswajit_roy1002@yahoo.com

Promita Mukherjee (Presenter),
Department of Economics, University of Calcutta, Kolkata
Email: Promita7777@gmail.com

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Introduction

Community-based natural resource management (CBNRM) is fundamentally premised on collective action. Because it promotes the livelihood of local people through managing natural resources, over the past few decades CBNRM has become a popular development strategy of most development organizations. Most donors granting development projects under CBNRM have been encouraging the locals to work in groups. Almost 0.50 million groups have emerged in the 1990s in Africa, Latin America and Asia (Pretty and Ward, 2001). The overall benefits of working in groups and collective management range from risk minimization to access to markets. Despite its growing importance, one of the limitations of CBNRM is the biases ingrained in community norms and expectations that exclude certain groups of people such as women, who usually confront significant constraints in their attempts to participate in collective action. Thus, women's participation in most of the co-management programs is yet to be empowering (Agarwal, 2001). As a result, collective action projects may promote inequitable participation and benefit distribution in favor of the already well-off, while perpetuating the poverty of marginalized groups. Therefore, CBNRM has been subject to controversy over issues such as the real extent of women's participation (Locke, 1999). Emphasis is now being given to understand gender differences in various development issues that promote cooperation. In this

paper we deal with one such issue, namely the gendered differences in social capital or networks and collective action in Indian forest co-management.

Development studies have just begun to understand the interrelationships among gender, social capital and environmental collective action. Group-based studies (Agarwal, 2000; Adkins, 2005) or social capital literature (Molyneux, 2002; Westerman et al., 2005) argues that gender differences in cooperation and collective management arise because of gendered social networks. The women, environment and development literature, by contrast, suggests the sexual division of labor creates gender differences in collective action (Leach and Green, 1995; Jackson, 1998). Because women are inherently closer to nature, these workers consider them the 'most appropriate participants' in co-management. However, these studies do not clearly deal with what account for gender differences in social capital and collective action; rather they build on the assumption that inclusion of women in development activities would promote collective action and gender relations. However, this assumption was unfound in many studies (see Mayoux, 1993; Baden, 1999).

Further, our knowledge about the implications of gender differences in social capital and, therefore, how to shape programs to build social capital is incomplete (Krishna, 2000). While Westermann et al. (2005) and Molyneux (2002) show that gender differences may lead to differences in creating social capital; Gotschi et al. (2009) confirm that distribution of social capital benefits is even more gender-sensitive. From the literature, it remains unclear, however, whether these gendered differences would increase or reduce when an actor's identity is activated. Since social capital is broadly understood as a social resource based on which people follow different livelihood strategies requiring coordination and collective action (Scoones, 1998, p. 8), integrating a social identity perspective in the analysis of gender differences in

collective action is imperative because institutions themselves are gendered. Moreover, gender may also act as an organizing principle for collective action; i.e. an identity around which women (or men) may organize in response to constraints within the household and the broader social environment. Women may therefore mobilize gender as one source of identity at local, national and transnational levels (Pandolfelli et al., 2008).

Although gender often influences people's participation in collective action, there has been little research on the links between gender as a social identity and collective action. Drawing on the social identity theory this paper rigorously shows that gender differences in social capital and collective action are nested in a broader social context such as actors' social or group identity. Specifically, based on the data collected from 341 households from seven Indian co-managed forests during June- December 2010 this study examines how various forms of social identity– naturally occurring identities such as actor's gender and group identity such as actor's collective identity– influence the stock and usage of social capital, and above all, long-run implication for collective action. Group identity in co-management is defined as collective when shared interests rather than self-interest shape the behaviors of resource users (Berkes et al., 1989; Ostrom, 1990; Araral, 2009). The shared interests define and strengthen the actions of the members who act for the collective. Thus, social identity can be considered as a precursor that promotes or impedes collective action in the use of community resources (Polletta and Jasper, 2001; Snow, 2001).

Motivation for studying the effect of social identity on gender-differentiated collective action lies in that development policies and programs are indeed identity-driven; policymakers often assume, a priori, that the marginalized groups will want to participate in collective action because such programs meet their needs, and a better understanding of women's and men's

motivations for joining such groups would help policymakers assess the success of their programs. While the issue of social identity in co-management is expected to improve our understanding of the implications of the gender-based differences in social capital and collective action, neglect of actor's social identity might mislead policymakers in implementing optimal intervention strategies in reducing the gender gap in co-management.

The rest of the paper is organized as follows. The theory of social identity is described in section two. In section three, we deal with the link between social identity and collective action and the related hypotheses. Multidisciplinary views on gender and social capital are presented in section four. Methods of data collection, measurement of the study variables are detailed in section five. Results and discussions follow in section six. The final section concludes.

Social Identity Link with Social Capital and Collective Action

Social Identity Theory

Social identity commonly refers to a person's sense of self derived from perceived membership in social groups (Tajfel, 1969). When we belong to a group, we often derive some sense of identity from that group. As a result, social identity is also referred to as group identity. Although Sen (1997) first conceptualized social identity through commitment, the systematic introduction of the concept into economics starts with Akerlof and Kranton (2000) and others recognize its importance in promoting social capital and cooperation (Solow and Kirkwood, 2002; Eckel and Grossman, 2005; Basu, 2006; Bénabou and Tirole, 2006; Chen and Li, 2009, Christoforou, 2012).

Social identity has three major components: categorization, identification, and comparison. Through categorization we put people, including ourselves, into categories, while identification helps us to associate ourselves with certain groups. The groups we identify with

are referred to as in-groups, while out-groups are the ones we do not belong to. Finally, we compare our groups with other groups. The simplest measure of social identity is group membership, where membership criteria may range from art preferences (e.g., Chen and Li, 2009) or manipulated status through trivia quiz (Solow and Kirkwood, 2002) to social attributes such as affluence and gender (Sell, 1997). As group identity affects individual behavior, most experiments assess whether and to what extent people interact with in-group and out-group members differently and confirm Tajfel's finding that people favor in-groups.

The theory is based on the concept of common fate introduced by Campbell (1958). It refers to a situation of implicit interdependence among group members to make salient a group/collective identity that encompasses all the individuals in a group *(collective identity* condition); when common fate is weak, an individual-level identity among the members overrides collective identity and differentiates among them *(individual identity* condition). Using the concept some experiments have examined the role of social identity on cooperation in social dilemma (e.g., Kramer and Brewer, 1984; Brewer and Kramer, 1986; Sell, 1997).

Social identity literature suggests that gender identity acts as an important social identity and this is more the case for women than for men precisely because women are marginalized and have lower status than men. Evidence abounds. Quisumbing et al. (2001) find high poverty measures for females and female-headed households in developing countries. Women and girls in developing countries often receive fewer resources within households. In south Asia, inequitable restrictions keep women at a disadvantage, and women's property rights are actually much less than in the legal code (Agarwal, 1994). From a participatory perspective, women are more deprived than men when deprivation includes, *inter alia*, excessive workload and reduced decision-making authority (Shaffer, 1998; Agarwal, 2001). Moreover, the costs borne by women

working outside of the domain of the family are significant; and custom or social norms often limit the ability of women to accept paid employment (Mammen and Paxson, 2000). In India, women and female children of poor rural households bear an excessively high share of the burden of poverty, especially in the intra-household distribution of food and health care (Agarwal, 1986). Moreover, regulations and social norms prevent Indian women from retaining ownership and control of land (Mearns, 1999).

Given these status differences leading to different degree of collective interdependence/common fate among the actors, the core idea of the theory is that individuals' self-identity is based on social categories, group membership, or roles. When the group membership is highly relevant, individuals respond as members of the group. The theory conveys that the high-status individuals such as men, rich and the higher-caste households perceive that success is more likely to be attributed to their unique individual identity element such as their capability (Sell, 1997). As a result, the element of common fate is less strong among them and, consequently, the group of high-status people will be reluctant to act as a collective. By contrast, the low-status people– women, lower-caste households and the poor– believe that the status category is an important determinant of outcomes. In public good situations, low-status people remain as a collective to minimize risk arising out of conflict and discrimination. Hence they usually hold collective identity. Further, when these persons interact with other low-status individuals, there is no high-status person in the group to influence their decision-making. This makes them feel like empowered and their activated group identity becomes even more collective. In short, social identity theory suggests that: (1) women hold collective identity while men hold individual-level identity and (2) people with greater collective interdependence cooperate more in social dilemmas than the less dependent ones.

Many experimental studies confirm this view (Brewer and Kramer, 1986; Dawes et al., 1988). Contrasting evidence also exists (Sell, 1997). The importance of the theory lies in that while standard economic analysis mainly emphasizes individual-level incentives in decision making, group identity has become an important concept in resolving ethnic and racial conflicts, and understanding discrimination, political campaigns, the formation of human capital (Coleman, 1961), and the resilience of environmental collective action (Mosimane et al., 2012).

Gender and social capital: multidisciplinary views

Social capital reflects the access to social resources that are embedded in networks and may provide various benefits, such as information, influence, and control. Social capital seems to be far from homogenous because some forms of social capital may be good for some people and not for others (Putnam, 2001). Accordingly, social networks may allocate resources differently and thus may result in different outcomes for the group. Further, it is reasonable to suspect that men and women may specialize in the creation of different types of social capital. This argument of Putnam may be useful to explain gender differences in the creation of social capital.

There are two ways to explain gender differences in social capital creation. The first approach referred to as gender socialization literature relates gender differences in social capital to gender identity. Gender identity, the theory argues, gets activated due to gender-specific socialization experiences. Since the masculine role endorses more instrumental qualities and the feminine role endorses more communal and socio-emotional traits (Bem, 1974), men's attitudes are more instrumental while women disclose emotions more easily and therefore hold emotionally responsive attitudes (Ogus et al., 1990). Therefore, women are apparently more sensitive to others, place more value on everyday interpersonal relationships of trust, reciprocity, fairness and altruism and seek an informal social support network for a greater extent as

compared to men (van Emmerik, 2006). Thus, women's networks are more socio-emotional (More, 1990) and limited with opportunities to mobilize valued resources compared to the formal networks of men (van Emmerik, 2006).

The second approach– gender-based co-management and development literature– deals with the nature of women's works and conveys that in many societies, the social norms that define gender roles place certain types of networks more within women's domain. For example, women are often the main actors in complex gift-exchanges, and in some communities also in forging marriage-alliances (Sharma, 1980). Differences also arise from the gender division of labor, both domestic and extra-domestic. The greater shift of men than women to non-farm activities also underlies these gender differences (Agarwal, 1998). Further, in the absence of substantial assets or financial resources in their control, 'friendships among women are . . . often cemented by small acts of cooperation and mutual aid' (Sharma, 1980, p. 190). This involves more commonly non-monetary help, such as sharing surplus home produce; helping to cook for guests during weddings and birth ceremonies; lending utensils to one another; and so on. More generally, women as friends, kin, or neighbors characteristically cooperate in domestic and ritual matters (Sharma, 1980). In many rural cultures, this everyday accumulation of social capital falls especially in the domain of women, while market linkages are more typical among men (Agarwal, 2000).

Social identity and social capital

The social identity approach to social capital treats social capital as collective resource and seeks the conditions under which members of a collective are willing to engage in those behaviors that help create and sustain the reservoir of social capital available to them depending on the nature and context of the network. For example, within a network of forest patrolling

villagers working at night to protect the local forest from illegal tree-cutters, the reservoir of social capital depends upon the members' willingness to help maintain an informal communication system alerting other villagers to risks from timber mafias and attacks by stray animals. Unless individuals identify themselves with others, such networks are not likely to build. Thus, once created, such social capital is never ''the private property of any of the persons who benefit from it'' (Putnam, 1993a: 170) but a collectively owned and accessible resource (Coleman 1990). This feature of social capital gives rise to the familiar free rider problem (Olson, 1965; Hardin 1968) because ''some of the benefit from an investment in social capital goes to bystanders... '' (Putnam, 2000: 20).

When framed in terms of this basic choice dilemma, the problem of how to create social capital can be approached from the perspective of identifying with others that bind social actors together (Grannovetter 1985; Nahapiet and Ghoshal 1998). Three distinct forms of identification are relevant for understanding an individual's willingness to contribute to the creation of social capital within a particular organization (Kramer, 2006). These are the individuals' personal identities within the organization, their subgroup or in-group identities, and their collective identities. Individuals' personal identities correspond to how they think of themselves as unique, separate members. For example, a local leader in a forest management organization might consider her as unique because she may be the only person with leadership quality. By contrast, individuals' in-group identities reflect those important primary groupings within the organization to which an individual belongs. Thus, this same leader might think of herself as a member of the executive committee of that forest management organization. Finally, individuals' collective identities correspond to the largest relevant organizational aggregate. In the present example, our

leader enjoys a common or shared identity with other members of the forestry organization he belongs to.

Further, these identity differences lead individuals to construe the social capital that is available to them accordingly in three different ways. The first is in terms of the individual-level or personal social capital their investments generate. A second level is in terms of what Putnam (2000) characterized as bonding social capital, which he defined at the in-group level. It is the kind of network between the members of a group (e.g., women's informal network of forest patrolling that mainly collects and shares information with EC members). Finally, there is a third level, which Putnam characterized as bridging social capital (e.g., network between different communities within a forestry organization), which he defined as a form of social capital that is more inclusive of people across social distinctions and cleavages.

According to Kramer (2006), social identity affects social capital creation through cognitive, motivational, and hedonic transformations of human behavior. Cognitive transformations take place through self-categorization and social categorization respectively (Turner 1987). Women, for example, often categorize themselves in terms of collective identities compared to men because they usually think in terms of those characteristics such as emotions and solidarity that they have in common with the collective as a whole. These are often the characteristics of informal networks. Motivational orientation refers to the subjective utility that individuals assign to their outcomes versus the outcomes afforded to others in situations of outcome interdependence (Kelley 1979). In a group of people with collective identity motivational orientation tends to be defined at the collective level, with concerns expressed by actors on how individual actions affect the collective welfare. In the context of hedonic transformation, individuals with collective identities will anticipate that socially defecting

choices on their part lead to negative hedonic outcomes (e.g., feelings of guilt, shame, or fear of being labeled free rider and fear of social sanction). The reason is that collective identities can engender a form of moralistic trust—trust construed as a duty or obligation on the part of individuals to engage in trustworthy actions (Rotter, 1980). Such trust is predicated upon and tied to individuals' beliefs regarding what it means to be a loyal and contributing member of a group. Consistent with this argument, Kramer (2006) finds that moralistic trust is stronger in individuals with collective identification. ''In larger, more complex settings, a more impersonal or indirect form of trust is required'' (Putnam, 1993a, p. 171). Identity-based trust is such an impersonal and indirect form of trust (Kramer, 2006). Such trust facilitates collective behavior because it is conferred simply on the basis of recognition of their shared membership in a group, and individuals may thus perceive less of a need to verify or negotiate trust before engaging in exchanges with other members. These usually happen in informal networks.

Social identity and collective action

In conceptualizing the link between social identity and collective action scholars have given relatively more attention to commons dilemma situations (see Dawes, 1980; Edney, 1980; Ostrom, 1990). The influence of social identity on collective action manifests through its moderating the effect of group size on commons management (Kramer and Brewer, 1984) and redefining self-interest (Coleman, 1961). In his influential book, *The Logic of Collective Action,* Olson (1965) argued that "the larger a group is, the farther it will fall short of providing an optimal supply of any collective good.. . . in short, the larger the group, the less it will further common interests" (p. 65). While theorizing the detrimental effects of group size on collective outcomes, researchers implicitly assume that the individual decision maker is the basic unit of interest. Thus group size is defined in terms of the number of individuals in the

organization/group. Social identity researchers (e.g., Tajfel & Turner, 1986), however, demonstrate that self-interest may not always be defined at the individual level. As Coleman (1961) noted,

> "Classic economic theory always assumes that the individual will act in "his" interest; but it never examined carefully the entity to which "his" refers.... in many situations men act as if the "his" refers to some entity larger than themselves. That is, they appear to act in terms, not of their own interest, but in the interests of a collectivity (p. 24)."

Brewer (1979) argued that collective identity may result in the formation of a common social boundary that acts to reduce social distance among group members, thereby making the distinction between their own and others' welfare blurred. Thus whether individuals respond prosocially to a social dilemma may depend on whether they think of themselves as single and autonomous individuals or whether, by contrast, they regard themselves as sharing membership in and identification with a larger aggregate or social unit. Thus, while personal identity propels a self-interested individual to maximize her utility/payoffs, even when this causes a reduction in the payoffs to others, social identity is a "group resource that is critical to the ability of the group to mobilize collective action among its members….." (Brewer and Silver, 2000:154).

Evidence supports this view (Kramer & Brewer 1984; Brewer & Kramer 1986; Kollock, 1998). In a renewable resource-use dilemma, Kramer and Brewer (1984), for example, found that individuals with a collective identity were more likely to exercise cooperative restraint. In a similar setting Brewer and Kramer (1986) note that when a group has a strong collective identity, group size does not matter in cooperation. These findings suggest that when the choice problem is framed as a commons dilemma, the lack of collective action even in a large group may be overridden when the collective identity of the group is high.

Regarding how social identity influences women's participation in collective action, we assume that women's presence in a group and identification with significant others transforms women's self-interest into collective interest such that the welfare of the group becomes more important to women that in turn motivates them to evaluate the costs and benefits of intended actions and potential outcomes from the group's perspective (Brewer and Silver, 2000). Since women build their social networks more on an informal relational basis (Kollock, 1998), they are more likely to promote collective action in a group compared to men.

FIGURE 1 ABOUT HERE

The social identity-social capital-collective action link discussed in the above sections leads to a set of hypotheses that are denoted by H1-H5 and presented schematically in figure 1. It should be noted that H2-H4 are more generalized hypotheses as they deal with social identity as a whole, while H1 and H5 are more specific and related to gender identity. If H2-H4 holds, then we would expect H1 and H5 to hold. In other words, we would then expect gender differences in social capital to be nested in actor's identity differences.

However, a couple of issues remain unclear from these approaches. While gender-socialization approach does not examine whether women derive more benefits than men, the social identity approach also fails to identify whether people with collective identity are more benefited or not. The gender-based co-management and development approach points out that it may be difficult to understand who benefits more from social networks- men or women, because women's networks may be inherently distinct from men's networks because of women's nature of work. However, these three approaches hold a consensus that because men and women hold different identities; social capital benefits are also gendered.

Social Capital in India: Relevance for conservation and development

Since social capital exists ‘‘in the relations among persons’’ (Coleman, 1988, pp. S100–101), in this study we focus on those activities that a particular culture considers best undertaken collectively and are more likely to create social capital and shared identity (Krishna, 2004) in the context of India’s forest co-management.

Social structures are an important source of social capital in rural India (D’Silva and Pai, 2003). Generally, tribal villages have a simple and cohesive social structure in the absence of traditional hierarchies and fewer divisions due to homogeneity in education, income, and lifestyles. Based upon traditional laws and customs, institutions in these villages promote joint functioning and resource conservation. By contrast, non-tribal villages are more heterogeneous. Moreover, dominant caste/class groups often capture most of the benefits of developmental programs, which destroy trust and reciprocity in Indian villages (D’Silva and Pai, 2003). On the other hand, religious and secular-based participation has developed social cohesion and community-identity, which often form mutual trust for collective action.

The integrated rural development agencies also foster social capital through Self help groups (SHGs) who execute various conservation activities under the technical guidance of government staff. This system provides villagers with new forms of livelihood through savings and employment and a sense of common identity, and involvement in resource conservation. All these promote mutual trust, trustworthiness, and pro-developmental norms.

In villages where the relationship between Forest officials and the local people is not so close, levels of social capital and collective identity have reached the floor (D’Silva and Pai, 2003). In such a situation, the forest department and other development agencies often intervene to encourage the local people to build social capital.

Political parties also promote social networks of their supporters. These networks together with the forest and other agency officers and the local influential persons help in village development (D'Silva and Pai, 2003). However, such associational activity has not always been conducive to conservation (Mosse, 2006).

Krishna (2004) noticed a number of sources of social capital and shared identity in India such as labor groups. Because they have a history of self-help movements by local people to preserve forests, some states such as Orissa and Uttaranchal have successfully built social networks. Moreover, a village may possess a high level of solidarity if it can tackle collectively issues like crop disease and natural calamity that require immediate help from the locals as well as government. Leadership quality also fosters shared identity and solidarity among villagers.

In the context of joint forest management (JFM) in West Bengal, social capital is often found to be related to productivity, equity, and sustainability of co-management (Mukherjee, 2005). Informal cooperation in rural communities of West Bengal typically reflects the norms of solidarity and reciprocity that have built a social safety net to address human-animal conflicts, and chronic or seasonal shortages in labor and food. On the other hand, illegal poaching and other timber harvesting activities represent lack of stocks of cognitive social capital such as conservation-friendly attitudes of a community. Most common forms of social capital in rural West Bengal include: (1) the existence of systems of mutual assistance, gift-exchange, marriage-alliance and respect for reciprocal norms in women's everyday work (Agrawal, 2000), (2) savings and credit arrangements through microfinance programs of women-led Self Help Groups (Sanyal, 2009), (2) rotating silvicutural work schemes based on reciprocity, (3) labor groups under National Rural Employment Guarantee Scheme, and (4) NGO-led informal cooperation

through various activities such as vegetation monitoring and a number of development projects and additional support activities to bolster the participatory social capital.

Data collection

The analysis draws on a field study that focused on how actors' identity influences gender differences in social capital and collective action in seven forests located in West Midnapore and Jalpaiguri districts of West Bengal, India during June-December 2010. The choice of the two districts does not undermine the problems of forest management in the other districts/regions. Moreover, the sheer magnitude of the problem and extent of national and international interventions for co-management in West Midnapore and Jalpaiguri also prompted the choice of the study areas. At the same time, as the two districts vary considerably in terms of biophysical and socioeconomic characteristics, this selection of the study sites was considered likely to yield more information on co-management for a minimum level of study resources than a truly random selection of districts would have.

As a first step, we had extensive discussions with the local people, forestry experts and the local foresters of both the areas about the state of collective initiatives for forest conservation in their respective jurisdictions. The focus of the fieldwork was to evaluate the contribution of gender-differentiated social capital to the household economy and assess the distributional implications of social capital benefits on the maturity of the local forest management organizations with reference to the social identity of the household surveyed and group identity of the organizations. The following criteria were considered to select JFMCs from the two districts under consideration: (1) apparent degree of success of the organization; (2) JFMCs representing different identity groups; (3) different group size (number of members of the

JFMCs), (4) existence of various forms of social capital such as networks; and (4) different degree of women's involvement in co-management.

To measure the degree of success of a JFMC, we relied on two criteria: forest conditions (*ecological criterion*) and equity in forest benefits/access (*economic criterion*). Like Varughese and Ostrom (2001), forest conditions were measured by two parameters: the state of the forest stock and the trend of the stock over time. Our comparison was based on two time periods– the time when the local JFMCs started managing the local forests, and the time of our survey. We used a crown density index to evaluate forest stock. If the value of the index was above (below) 0.50, the stock of a forest was treated as *above average (below average).* For the state of crown density, the relative abundance of forest products, disappearance of tree species and changes in forest area we relied on the narratives of the locals, the foresters' evaluations and authentication of the same by the forestry experts. We considered a trend in forest condition as improving/stable/declining if vegetation (tree species) and forest cover thus assessed were expanding/unchanged/degrading. If the stock of local forest was *above average* and/or forest trend had been *improving* or remained *stable* over time, forest condition was defined as *better*. Otherwise, it was *worse*. We also discussed with the foresters and key informants about the intensity of forest use and the extent of access to forest products. If at least 75% of the members of a JFMC had access to the local forest, the concerned JFMC was treated as maintaining *equity* in resource benefits. We considered a JFMC as *successful* if its forest condition was *better* and it enforced *equity* in forest resource use. After characterizing these variables, a list of 17 *successful* and 24 *unsuccessful* JFMCs was prepared using purposive sampling technique. However, some JFMCs could not be categorized due to lack of data. To gain insights on issues of people's identity and its impact on gender differences in social capital and cooperation, we followed a

random sampling technique without replacement. First, we selected a *successful* JFMC from the list of successful JFMCs, and then we selected an *unsuccessful* JFMC from the list of unsuccessful JFMCs, and again a successful JFMC from the successful list and so on. In this way, we selected seven JFMCs out of 41 for our final survey- Panialguri, Kalkut-Cheko, and Poro-Basti from North Bengal and Salbani, Chharadhan, Mahuldanga and Bansachati from South Bengal respectively.

Household surveys were confined to members of JFMCs and an adult representative person (> 18 years) was interviewed in the local Bangla language from every third household of the relatively large JFMCs with more than 50 member households (like Panialguri and Poro-Basti of BTR); otherwise, we did complete enumeration.

Household questionnaires were designed to elicit information from the respondent households on various forms of social identity such as gender and organizational identity in terms of their organizational commitment, informal and formal social networks they are connected with, their investment in and benefit from such networks and collective activities for forest management. The questionnaire was pre-tested in two randomly selected villages outside the sample frame and the revisions of questions relevant to the local context were made. We adopted a quantitative-qualitative triangulation method for data collection (Creswell, 2002) and collected data on only those forms of networks which are considered to have significant impacts on collective action. We did not collect data on any forms of personal social capital as they are supposed to be linked more to individual's gains than co-management.

To complement the quantitative data we extracted some qualitative information through interviews and chats with the experts and the key informants and also consulted several published and unpublished documents regarding the various official action plans, policies and

programs to understand the phases of collective action- the collapse, reorganization and success of collective action of the organization. 42 out of the 383 household questionnaires were incomplete and so the final analysis builds on 341 questionnaires. Each interview took around 50 minutes to complete. Interviewees were not offered any compensation. Less than five percent of those approached refused to be interviewed.

Study variables: description, importance and measurement

Organizational commitment and collective Identity of JFMCs

We measure respondents' collective identity by extracting information on their organizational commitment (OC) because it is generally defined as the relative strength of an individual's identification with and involvement in a particular organization (Mowday et al., 1982, p. 27). We used a set of statements to measure OC of respondents (Appendix A) adopted from the popular OC Questionnaire (Mowday et al., 1979; Mowday and Steers, 1979; Balfour and Wechsler, 1996), while other statements were constructed using participatory rural appraisal technique (PRA) from the study sites. We considered those statements that emphasize a member's likelihood to expend extra effort, take pride in her organizational membership, and experience overall affection for the organization, as well as other similar items that fit closely with the theoretical thrust of collective identity in the context of Joint forest management committee(s) of the study sites.

In line with OC literature we use a five point Likert-type format with the response categories for each statement/item ranging from strongly agree (5) to strongly disagree (1), the responses for each item were standardized and then summed, and an average OC score was calculated. Respondents with above average (below average) score were defined as having high (low) organizational commitment. At the organization-level, a JFMC is defined to have a

collective/individual-level identity if at least 75% of its members are found to have *high/low* commitment. If this figure is in between 50-<75%, then the identity of the JFMC is referred to as *moderately collective*.

To check the consistency of respondents' stated attitudes there is no statistical test in the scaling literature. We usually calculate a Cronbach's alpha (Cronbach, 1951) for a scale. It is defined as the proportion of true score variance to observed score variance (Netemeyer et al., 2003). Here true scores reflect the respondents' true attitudinal position, while observed scores are their stated attitudes. The rule of thumb is that if alpha exceeds 0.71 for a scale, the attitudes of respondents are considered as consistent and the scale is treated as reliable. The OC scale in this paper is found to be reliable for capturing OC of the respondents as Cronbach's alpha is 0.85 (for a detail discussion of alpha coefficient see Netemeyer et al., 2003).

Women's presence

We measure women's presence in co-management through their participation in the Executive Committee (EC) meetings of the JFMC following the typology of participation developed by Agarwal (2001, 2010) ranging from *nominal* to *interactive (empowering)*. When woman are just the members of the EC and do not participate in any other activities, their participation is defined as *nominal.* When the EC women are "…informed of the decision *ex post facto;* or attending meetings and listening in on decision-making, without speaking up", they have a *passive participation. Consultative participation* occurs when an EC women is "…asked an opinion in specific matters without guarantee of influencing decisions". Despite this, they may also have an *activity-specific participation* describing a situation of "being asked to (or volunteering to) undertake specific tasks". If one "expresses opinions, whether or not solicited, or takes initiatives of other sorts", she is assigned to have an *active participation. Interactive (empowering)*

participation takes place when one has "...voice or influence in the group's decisions, holding positions as office bearers".

Stock and usage of social capital

In this study, we could identify mutual aid, gift-exchange, marriage alliance, membership of non-forestry organization such as a self-help group and other groups, friendship/kinship, connections with the local power structure such as those with the self governmental and traditional leaders, and market-related connections as the dominant forms of social networks. We consider social network creation as an outcome of continuous investment of time and resources by households (Narayan, 1998). Accordingly, we have constructed an index of social capital investment by summing the number of times a household has invested time and resources in the above-mentioned networks: number of times a household has helped others and given credit, made in-kind contribution such as giving others surplus home produce as seen in women's networks (Agarwal, 2000), involved in forging marriage alliances, number of friends a household has and the number of times it has invited others, number of influential contacts it has established with key local actors such as governmental leaders, traditional leaders, NGO/projects-related personnel etc and number of times it has contributed to conflict resolution. The minimum and maximum values of the investment index at the household level are 20 and 74 respectively.

The benefits of these networks include access to help-in-need (food, sickness, labor, counselling, and other forms of help), credit, institutions (local self government, market, agricultural input/tools, etc.), source of information (family, community members, other communities, local market and other sources), and cross-cultural access that includes, for example, receiving an invitation from and spending time with the people of other religion and

culture and, more importantly, number of problems faced (due to differences in social status, gender, religion, culture, and other problems such as those between JFMC and forest department). Because they are usually qualitative, social capital benefits variables are treated here as dichotomous. A household earns for each type of benefit a score of 1 if it has access to that benefit and 0 otherwise. The scoring pattern was reversed in the case of number of problems because it represents lack of social capital. The index of social capital benefits of a household is the sum of these access scores minus the problem scores.

A high investment index indicates that an individual possesses a high stock of social capital or is connected with a network that promotes more intense relation between actors, while a high benefit index indicates a greater usage of social capital by the individual. At the JFMC level, these indices represent the stock and usage of social capital of the organization. We expect a JFMC with high stock or higher usage of social capital or both to achieve high collective action.

Collective action

Measurement and types of collective action vary across studies. Varughese and Ostrom (2001) applying their subjective judgment, construct a qualitative index of collective action for community forestry in Nepal. Somanathan et al. (2007) consider the number of Van Panchayat (forest councils) meetings held during the previous year and whether a community hired a watchman for its forest as two measures of collective action in northern India. We construct a quantitative index to measure the collective action of the local JFMCs using a scoring rule based on Mukherjee (2011). The measure considers the following four important components of collective action.

Scoring rules.

Rule compliance:

(i) Award 10 points to the JFMC where more than 60% of the JFMC members are well aware of the CPR rules and abide by them accordingly,

(ii) Award 0 points to the JFMC, where majority users (> 60%) do not know and follow operational rules of the JFMC;

(iii) Award 5 points to the JFMC where the situation is intermediate of (i) and (ii), that is, 40%-60% of the members know the conservation rules and adhere to them accordingly.

Rule infractions:

(iv) Award 10 points to the JFMC where rules infractions are rare (that is, on average, less than once every year in the last five years) and penalties are imposed strictly (that is, defectors have to pay fines within stipulated time/date in the event of non-compliance).

(v) Award 0 points to the JFMC where rules infractions are frequent (that is, on average, more than once every year in the last five years) and violators are not penalized oftentimes or they can go unnoticed in the event of non-compliance.

(vi) Award 5 points to the JFMCs where situations are intermediate of (v) and (VI).

Participation:

(vii) Award 10 points to the JFMCs where more than 60 % of the members attend every Conservation-related (General Body) meeting.

(viii) Award 0 points to the JFMCs where participation in community meeting is poor (i.e., > 60% of the members do not attend the JFMC meeting regularly).

(ix) Award 5 points to the JFMCs which are experiencing the intermediate situation regarding participation.

Spillover of Knowledge about the Joint Forest Management:

(x) Award 10 points to the JFMCs where more than 60% of the members are aware of the definition, objectives and main benefits of joint forest management;

(xi) Award 0 point if a majority (> 60 %) of the JFMC members does not have this much knowledge about JFM;

(xii) Award 5 points if the situation of the JFMCs is intermediate of (xi) and (xii).

This measure of collective action is based on not only participation as found elsewhere (Somanathan et al., 2007; Ray and Bhattacharya, 2011) but also on other dimensions of co-management such as rules violations and the spill-over of knowledge; the latter, according to Ostrom (1990), is also an important indicator of collective action. More importantly, this quantitative index does not suffer from subjectivity as compared to the perception-based measures of collective action developed by Varughese and Ostrom (2001).

In this scheme a JFMC can obtain a maximum of 40 points and a minimum of 0 points. Since the results may be influenced by scoring pattern, we also tested the robustness of our scoring method by calculating the correlation coefficient between scores under our scheme of awarding points and that of Ray and Bhattacharya (2011). Pearson's correlation coefficient of absolute scores of different JFMCs is 0.93 ($p < 0.01$) and the rank correlation (Kendall's Tau) is 0.81 ($p < 0.02$). Thus, in the two awarding schemes relative positions of the JFMCs remain unchanged and there is also no significant change in the absolute positions of these organizations.

Group maturity

Group maturity is defined as the group's potential for self-defining and self-sustaining activity (Pretty and Ward, 2001, p. 209). Scholars have developed models to understand the stages

through which groups or organizations progress towards maturity (see Quinn and Cameron (1983) for an overview of maturity and life cycles of organizations). Mooney and Reiley's (1931) five stages of group life-cycles include emergence, growth, maturity, decline and death. Greiner (1972) considers entrepreneurial, collectivity, delegation, formalization, and collaboration as the stages of evolution and revolution as organizations grow. While some authors conceptualize group maturity as organizational learning (Argyris and Schön, 1978; Lawrence, 1999) through the stages of forming to performing of groups (Handy, 1985), others see these closely related with members' participation (Pretty, 1995). It implies that group maturity is linked with the nature of the wider development process through initiation, co-management, accompaniment and autonomy (e.g., World Neighbors, 1999 cited in Pretty and Ward, 2001). These models convey that organizations in higher or later stages are more resilient (capable of resisting shocks and stresses), and more adaptive (capable of innovating), and, as a result, have lower probability of decline. They relate some measures of group maturity to performance and outcomes, with high or later stages being associated with greater maturity.

In the context of natural resource co-management Pretty and Ward (2001, table 3, p. 218) have operationalized the concept based on a series of criteria which can be found at three levels of organizational development termed reactive dependence, realization independence, and awareness interdependence. Westerman et al. (2005, p. 1787) have measured these stages of maturity on the basis of seven criteria: (1) group objectives concerning natural resource management which reflect whether the group is reactive, regenerative or innovative; (2) the group's views on change (whether the group avoids change, adjusts to change, or creates new opportunities); (3) whether the group monitors and evaluates its own progress; (4) the degree of external dependence to solve problems; (5) collective or individual planning and testing; (6) the

importance of external aid for group formation; and (7) resilience of the group (capacity to survive external disturbances that tend to break up the group). They argue that the potential for self-defining and self-sustaining collective activity is mainly reflected in terms of supportive values and attitudes toward self-organizing collective action. Moreover, studies like Ray and Bhattacharya (in press) demonstrate that women hold supportive attitudes towards co-management. As suggested in social identity literature, social capital refers to collective resources that strengthen internal group relations and women as a social category are more collective. Then we expect group maturity to be positively related to women's participation, the collective identity of the group and the availability of social capital locally.

In this paper, we have calculated group maturity scores for the sampled JFMCs using ten criteria (see Appendix B) based on the literature on organizational life cycle and group maturity (cited above). We award a JFMC a score of 1-3 for each criterion if it is in the stage 1-3 under that criterion. Thus, the maturity score varies in between 10 and 30. The high score of a JFMC indicates that it has reached a later stage of maturity.

Results and Discussions

Gender differences in social networks

——Table 1 about here——

Table 1 reports different forms of social networks in the context of joint forest management– the first four constitute different forms of informal network and the remaining three are kinds of formal network. Westerman et al (2005) define social relations or networks as a set of people (or organizations or other social entities) linked by a set of social relationships (such as kinship, friendship, labor groups) that enable the flow of resources and information through them. Table 1 reports a number of observations that are apparently pertinent to the

queries posed above. First, participants with collective identity are connected more with informal networks, mainly through gift-exchange, mutual aid and friendship/kinship. By contrast, participants with individual identity are connected in formal networks, especially with the local power structure and market. Second, while women are involved mostly in gift-exchange and mutual aid, connection with markets is the most dominant form of men's network. Thus, both gender as a naturally occurring social identity, and participants' collective identity matter in social network. Interestingly, gender differences in social networks are most significant between males with individual identity and females with collective identity. Thus, when men and women are motivated by their identity, their social networks appear to be more distinct in nature and quality. Finally, we note that females with high social status such as those in the Executive Committees of JFMCs- denoted by EC females- are more connected with the local market and in the local power structure than the general female members of their JFMC. Thus, women's stock of social capital also depends on their identity among other factors.

The findings from this study reinforce empirical evidence on gender differences in social network from a social identity perspective. Agarwal (2000) and Westerman et al (2005) posit that women and men depend on different types of social relations or networks based on everyday forms of collaboration. Women usually collect fuel wood, fetch water and bring up a child. Such informal networks provide women with access to household resources like water and firewood. By contrast, men are often engaged in more formal networks, such as community councils that improve access to economic resources and decision making (or power) (Agrawal, 2000). At the same time, women usually reveal more relational and altruistic behavior due to their role and responsibility for reproduction (Folbre, 1994; Sharma, 1980; White, 1992), and are less motivated by egoistic behaviors (Molyneux, 2002), while men are more individualistic and more

engaged in formal collaboration, decision making and organized power structures. Moreover, Rowley (1999) shows that socioeconomic identity often determines the nature and quality of social connectedness in rural society. The implication is that women and men may value collaboration differently not only based on reciprocal relationships and a higher dependence on social relations as stated by scholars (Agrawal, 2000; Cleaver, 1998), but also on their identity differences. Thus, we suggest that differences in gender identity rather than gender itself may, in fact, lead to more obvious differences in the creation of social capital.

Distribution of social capital benefits

——Table 2 about here——

Group benefits of social capital across countries are well documented in Pretty and Ward (2001, Table 1, p. 213). Here benefits from social capital include increasing the likelihood to receive support in case of need, access to information and so on using one's supportive social networks. Table 2 shows that men are more successful in obtaining these benefits, such as having significantly more people who help or provide credit in need, more contacts and greater likelihood of accessing different institutions or information. Similarly, men have reported experiencing and suffering from problems significantly less often than women. They also have greater cross-cultural access such as having friends and attending invitations parties of another culture, communities and religions, while women are apparently culturally more restrictive (Table 2). This confirms the eco-feminist assumption that men are closer to culture (Agarwal, 1992).

Women in general have significantly less access to credit (40%), help in need (56%), influential persons (28%), institutions (42%) and source of information (37%) as compared to

men (Table 2). Furthermore, women in leadership positions (i.e., EC females) can improve their social capital benefits, as they do partly catch up with males in terms of accessing institutions and help, but it remains more likely for male members than female leaders to obtain credit (73.63%). Although all the female leaders derive benefits from their access to help in need, they lag behind male leaders (EC males) in tapping other benefits. In short, like Gotschi et al (2009), the distribution of social capital benefits is highly skewed in favor of males– both leaders and non-leaders– as compared to women– both leaders and non-leaders.

On the other hand, households with individual identity build up formal networks (see table 1) and enjoy greater access to credit, institutions, influential persons, and, as a result, a majority of them (72%) report fewer problems compared to those with collective identity (table 2). Interestingly, males with individual identity capture social capital benefits significantly more than females with collective identity. Similar situation is found in the smallholding farmers' communities in Mozambique, where females in invest more in the creation of structural social capital such as community works but derive less benefit than male farmers who had a more individual identity due to their strong connections with the local power structure (Gotschi et al., 2009).

The findings described above raise some serious concerns about co-management. First, although co-management aims to achieve conservation with community development, this study shows that weaker sections such as females invest more time and resources in the creation of social networks (table 1) that do not ultimately give them any significant benefits. Rather, women confront more problems than men (table 2). Second, since social capital benefits are identity-determined, actors' identity differences create inequitable distribution of these benefits. For example, households with individual identity, who are generally of higher status, are

deriving all kinds of social capital benefits and confronting fewer problems than people with collective identity (table 2). This casts doubt on whether co-management has meaningfully served the resource dependent community.

The practical implication is that differences in gender identity and differences in group identity are also reflected in distinct social networks of men and women that reproduce power relations and determine access to various institutions. Patterns of power relations between men and women at the household level get translated into gendered group relations. For example, the fact that men represent the household and women have to ask their permission to engage in extra-household activities often results in dominance of men talking in group discussions and restricts women from expressing their own opinions. This shows that the creation of women-only groups only addresses a part of the 'gender problem' (Gotschi et al., 2009) because mixed groups– not the all-women groups– are most cooperative in natural resource co-management (Agarwal, 2010). Though mixed groups perpetuate female subordination and restrict female participation in leadership positions, women in mixed groups may enter masculine social spaces and establish contacts, and capture some of the male resources that help them to access information and help in need as compared to the all-women groups (Gotschi et al., 2009). This may reduce gender differences in the stock and usage of social capital and encourage high collective action.

The impact of collective identity on collective action and survival of forestry organizations

Table 3 about here

Table 3 reports that Chharadhan and Panialguri are the only two out of the seven JFMCs that hold collective identities with more committed members, and this commitment surprisingly does not depend on their group size (see correlation matrix in Appendix C). Although Chharadhan and Panialguri are the smallest and largest JFMCs in the study sites, both have

obtained the highest score of group maturity. This indicates that they have already reached the stage of *awareness interdependence* with greater resilience. Thus, collective identity if activated within a group moderates the negative effect of group size on collective action. In congruence with (Agarwal (2000) and Pretty and Ward (2001) Table 3 suggests that reasons may lie in the higher stock and usage of social capital or active participation of women in both the JFMCs or both.

However, Poteete and Ostrom (2004) suggest the most interesting explanation of identity-induced collective action. They reason that income effect may explain this unexpected phenomenon. When a forest resource is a non-rival and normal collective good (as in Chamberlin, 1974), and group size is small (for example, Banschati), a higher per capita contribution by the members is required to conserve a forest. This may discourage the members from cooperating as a collective. As a consequence, the transaction costs of cooperation become higher. The converse experience (for example, Panialguri JFMC) is also true. Olson (1965) emphasizes the influence of group size on the costs of collective provision; transaction costs increase with group size, and raise the costs of initiating collective action. Larger groups are expected to bear higher transaction costs due to heterogeneous choices and constraints of the stakeholders in resource conservation. However, the present study shows that the largest JFMC (Panialguri) is successful in progressing towards maturity. We note that in Panialguri the local people value the local forest significantly for its environmental and climatic benefits (52.17%), in-situ features (60.62%) and sustained flow of resource benefits meeting local subsistence needs (88%). This might imply that they treat the local forest as a normal good. Whenever their contributions to forest management, which Poteete and Ostrom (2004) consider as incomes, increase; they claim more of such benefits from the local forest. This might make the locals more

collective. Hence, while Chamberlin's (1974) position seems to work in Panialguri JFMC, Olson's proposition holds only under certain restrictive conditions. Poteete and Ostrom (2004: 440) observe:

> The Olsonian expectation of an inverse relationship between collective provision and group size is guaranteed to hold only if either the elasticity of individual effort is zero, or the elasticity of individual effort is between 0 and 1 and the good has no public attributes.

By contrast, in organizations such as Poro-Basti and Banschati JFMC, where individual identity outweighs collective identity, free-riding ruins trust among actors and therefore prevents them from progressing towards maturity (Pretty and Ward, 2001). These organizations confront various socio-cultural obstacles to development such as the nominal representation of women in the decision-making body due to strong patriarchy. Also, the benefits of social networks in these organizations do not percolate down to all households, who invest in building social networks. This is manifest in the low scores of social capital benefits of Poro-Basti and Banschati. As a result, both JFMCs have higher transaction costs and poor maturity (Ray and Bhattacharya, 2011). These organizations are likely to be at an early stage of *reactive dependence* in the sense of Pretty and Ward (2001).

Gotschi et al (2009) contend that despite having high social capital a system may not achieve sustainable cooperation if social capital benefits are low or some individuals reap most of these benefits. We confront a similar situation in the study areas when we compare Kalkut-Cheko and Mahuldanga JFMC.

Most importantly, women's participation does matter in promoting group maturity and collective action. Table 3 shows that where women's level of participation is higher, collective action is also higher. Moreover, evidence from Mahuldanga and Salbani JMFCs suggests that moderately collective organizations may also achieve high group maturity if their female

members participate actively in various co-management activities. However, some small organizations (e.g., Banschati) do not significantly progress towards maturity because women's participation in these organizations is either nominal or passive and members are also less collective.

Although joint forest management is being practiced in the study areas over the past two decades, we observe that women in all the seven JFMCs are yet to be *empowering* and that none of these organizations have achieved the maximum score of maturity (i.e., 30). Thus, there is still room for improving gender relation and maturity of these organizations. From a social identity perspective, we suggest that because women hold collective identity, community organizations should ensure women's interactive participation in development programs for successful management of community resources.

Conclusions

This study builds on the social identity perspective of the different and complementary roles of women and men in the cost-benefits of social capital formation and the potential consequences of such differences for the collective natural resource management groups in India. We are guided by the main proposition of the study that gender differences in social capital formation are more identity-based; and that organization with better representation of women would achieve greater progress towards maturity and resilience. Generally, women report more commitment to their organizations than men (Mathieu & Zajac, 1990) because women have to overcome more barriers and hence make an extra effort than men do to gain empowerment in an organization (Grusky, 1966). This extra effort may be reflected in a higher commitment by females. We encounter the same situation in this study also.

Our study has established a number of hypotheses. On the one hand, the hypotheses relating to gender differences in social capital are valid because women tend to have a more collective identity as compared to men and such identity relates them with informal networks. Another set of hypotheses relates women's presence with cooperation through identity. The study finds that maturity and collective action of a co-management organization improve with a higher degree of women's participation, which is consistent with other studies (e.g., Molinas, 1998). Thus, gender differences in cooperation are indeed nested in their identity differences. A related finding is that organizations, where actors are not collective, may have less progress towards maturity. Such proposition is not surprising because social relations are often identity-driven (Kramer, 2006) and collectivism rather than group size of an organization matters more in sustaining cooperation. As a result, we find no definite relationship between group size and the collective action.

In summary, perhaps norms of reciprocity operate in groups where women are actively present such as in decision-making and that this may be the result of women's tendency to remain as a collective that sustains their frequent collaboration through informal social networks. Consequently, we recommend that interventions to improve collective action for natural resource management should directly address the gender composition and identity of a co-management organization because women are more collective than men, and, in particular, the groups' relational and instrumental social capital, and any norms, rules, or networks that exclude women from participation and decision making. Women should also be able to comprehend their patterns of interdependence so as to influence and facilitate gender relations and dynamics in collective action groups. Most importantly, the meaning of participation and common fate to women and men should be assessed to better understand the dynamics and processes of how they

use collective action resources in gender-differentiated groups. To do so, it is critical to understand the complex social identities such as gender identities in which men and women experience both shared and divided interests that determine gender differences in environmental relations and management (Jackson, 1998, p. 315).

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Table 1. Gendered differences in social networks differentiated by social identity

Actors' Identity	Forms of social network[a]							
	Obs.	Gift-exchange	Mutual aid	Marriage alliance	Kinship /friendship	Formal membership (non-forestry)	Connection with local power structure	Connections with market
Male	182	14.29	14.29	8.24	12.09	36.81	48.90	71.43
Female	159	67.30	67.30	44.03	60.38	37.11	16.35	16.35
Individual	177	23.16	19.21	13.56	11.30	24.86	42.37	51.98
Collective	164	59.76	65.24	40.24	65.24	52.44	22.56	37.20
Male individual	122	8.20	5.74	5.74	2.46	28.69	51.64	68.85
Male collective	60	28.33	35.00	13.33	35.00	56.67	43.33	78.33
Female individual	55	52.73	47.27	29.09	29.09	18.18	23.64	18.18
Female collective	104	76.92	80.77	53.85	80.77	50.00	11.54	15.38
EC Males	18	22.22	22.22	11.11	22.22	55.56	22.22	22.22
EC females	10	90.00	60.00	60.00	60.00	40.00	40.00	40.00
Total	341	39.00	39.00	24.93	34.90	36.95	33.72	45.45

a: Figures are in percents.

Table 2. Gendered differences in social capital benefits differentiated by social identity

Participants	Access to social-capital-benefits							
	Credit	Help-in-need	Institutions	Influential persons	Source of information	Number of problems	Cross-cultural access	Number of invitation
Male	73.63	71.43	63.19	71.43	65.38	66.48	71.43	73.63
Female	39.62	55.97	41.51	27.67	37.11	76.73	65.41	65.41
Individual	87.01	84.75	72.32	70.06	57.63	55.93	72.32	72.32
Collective	45.12	62.80	50.00	47.56	50.00	65.24	52.44	54.88
Male individual	63.11	63.11	59.84	54.10	59.84	59.84	59.84	68.85
Male collective	55.00	71.67	50.00	75.00	61.67	31.67	83.33	66.67
Female individual	21.82	58.18	23.64	47.27	52.73	30.91	36.36	40.00
Female collective	34.62	61.54	46.15	34.62	42.31	19.23	34.62	38.46
EC Males	83.33	83.33	77.78	88.89	83.33	83.33	61.11	72.22
EC Females	60.00	100.00	60.00	40.00	30.00	40.00	40.00	40.00
Total	57.77	64.22	53.08	51.03	52.20	75.07	68.62	69.79

Table 3. Linking collective identity and women's presence with group maturity

Forest Protection Committees	Identity of JFMC	Women's participation	Stock of social capital (average score)	Social capital benefits (average score)	Group size (no of members in the JFMC)	Group maturity index	Collective action score
Chharadhan	collective	activity-specific	55	60	31	23	40
Panialguri	collective	active	60	70	381	23	35
Salbani	moderately collective	active	62	55	96	21	30
Kalkut-Cheko	moderately collective	passive	55	30	119	17	25
Mahuldanga	moderately collective	activity-specific	45	55	75	19	20
Poro-Basti	individual	nominal	50	20	184	15	15
Banschati	individual	nominal	35	10	52	11	10

Appendix A. Statements used to measure organizational commitment

Organization commitment	Scale used in the study
There's not much to be gained by sticking with this organization indefinitely (reversed). (Mowday et al., 1979).	
I treat any failure of the local JFMC/group as my own (PRA).	
My livelihood is dependent on how we, as the members of the local JFMC, perform (PRA).	
I stand by any member of my JFMC when there is any conflict with other JFMCs for whatever the reason (PRA).	
If not allowed to speak up in a group meeting, I, as a member, still adhere to the group decision (PRA).	
I find that my values and the organization's values are very similar (Mowday and Steers, 1979)	
I am willing to put in a great deal of effort beyond that normally expected in order to help this organization to be successful (Mowday et al., 1979).	
Had I not been a member of the local JFMC, I would not be able to extract forest resources as sustainably as I do it now (PRA).	
I feel a strong sense of belonging to this organization (Balfour and Wechsler, 1996).	
I feel like "part of the family" at this organization (Balfour and Wechsler, 1996).	
I am proud to tell others that I am part of this organization (Mowday et al., 1979).	
I really care about the fate of this organization. (Mowday et al., 1979).	
To know that my own work had made a contribution to the good of the organization would please me. (Cook and Wall, 1980, p. 51).	

Organization in the statements implies JFMCs in the study areas.

Appendix B. Three-stage model of group maturity

Criteria	*Stage 1* *Reactive dependence*	*Stage 2* *Realisation independence*	*Stage 3* *Awareness interdependence*
Group formation	–Initiated by external agency or emerging	Because one or more of its members took the initiative and there was external agency support to help it form	Because one of more of the members took the initiative to form the group without external support
Group objective	To conserve resources from further degradation, or to restore resources to a previous state, defensive	To adjust to new realities and regenerate forest resources, reactive	To create new opportunities in managing a natural resources –integrating conservation with livelihood development
Rules and norms	–Externally imposed or derived	–Development of own rules and norms	–Evolution and strengthening of rules and norms
Attitudes	–No significant change in attitudes, beliefs and values – backward-looking group– making sense of old Realities	–Realization of new capacities –inward-looking group–making sense of new Reality	–Conceptualisation of new insights –forward-looking group– shaping reality
Views of change	–Fear of change	–Adjusting to change in a reactive way	–Creating change for new opportunities in pro-active manner
Management and learning	–Eco-efficiency-reducing costs and damage	–Collective planning for experimentation – Regeneration– adoption of regenerative technology for sustainable use of natural capital	–Redesign according to basic ecological principles– innovation for developing new system of management
External links and networks	–Few or no links with other groups, link from above to below	–Links with other groups – send information upward or realizes information can flow upward	–Capable of promoting spread and initiating new groups– strong link with external agencies
Collective activities	–Relies on external facilitators to sustain group activities	–Tries to self-promote collective action before seeking external help for conflict resolution	–Facilitators no longer needed
Recognition of group value	–Some recognition that group has value to achieve something new	–Members increasingly willing to invest in group itself	–Group likely to express social value of group
Resilience	–Breakdown possible before achieving group objectives	–Breakdown possible after achievement of initial goals	–Unlikely to breakdown- passed a threshold–objectives redefined after achieving initial goals

Appendix C. Correlation matrix on different attributes of forest management organizations

	Collective action score	Identity of JFMC	Women's participation	Group size (no of members in the JFMC)	Stock of Social capital	Usage of social capital	Group maturity index
Collective action score	1						
Identity of JFMC	.945***	1					
Women's participation	.783**	.806**	1				
Group size	.227	.300	.263	1			
Stock of social capital	.801**	.656*	.677*	.440	1		
Usage of social capital	.850***	.899***	.961***	.338	.684*	1	
Group maturity index	.941***	.922***	.904***	.310	.809**	.964***	1

* and ** and *** represent level of significance at 10, 5 and 1% respectively (one-tailed).

Figure 1. Schematic design of hypotheses on the social identity link with social capital and collective action