Wetlands (2015) 35:487–499
DOI 10.1007/s13157-015-0635-5

ORIGINAL RESEARCH

Examining the Role of Social Capital in Community Collective Action for Sustainable Wetland Fisheries in Bangladesh

H. M. Tuihedur Rahman · Gordon M. Hickey · Swapan K. Sarker

Received: 21 May 2014 / Accepted: 22 January 2015 / Published online: 4 February 2015

Abstract Internationally, the decentralization of property rights is becoming an increasingly common policy intervention for sustainable natural resource management. In the context of decentralized wetland fisheries policy in Bangladesh, this paper examines the role that social capital plays in cooperation building and collective action among diverse households seeking to obtain fisheries property rights. It considers how some households are able to develop collective action in the form of a community-based organization to access wetland fisheries, and why other households are not. Using the Local Level Institution (LLI) study technique, our analysis highlights that the financial capacity of community members plays a crucial role in accessing resources when the government's decentralization policy also seeks to generate State revenue through fees. In this situation, information access and communication with external agencies were found to be prerequisites for earning the wetland fisheries property rights, with local leaders able to take advantage of their position to dictate collective decision making. This situation resulted in undemocratic decentralization and devolution of wetland fisheries rights, undermining transparency, accountability and the equitable distribution of natural resources.

Keywords Formal and informal institutions · Decentralization · Leadership · Sustainable natural resource management · Sustainable livelihoods

H. M. T. Rahman (✉) · G. M. Hickey
Department of Natural Resource Sciences, Faculty of Agricultural and Environmental Sciences, McGill University, Macdonald Campus, 21,111 Lakeshore Road, Ste-Anne-de-Bellevue H9X 3V9, Canada
e-mail: hm.rahman@mail.mcgill.ca

G. M. Hickey
e-mail: gordon.hickey@mcgill.ca

H. M. T. Rahman · S. K. Sarker
Department of Forestry and Environmental Science, School of Agriculture and Mineral Science, Shahjalal University of Science and Technology, Sylhet 3114, Bangladesh

S. K. Sarker
e-mail: s.sarker.1@research.gla.ac.uk

S. K. Sarker
e-mail: swapan-fes@sust.edu

S. K. Sarker
Institute of Biodiversity, Animal Health & Comparative Medicine (IBAHCM), College of Medical, Veterinary & Life Sciences, University of Glasgow, Graham Kerr Building, Glasgow G12 8QQ, UK

Introduction

Internationally, the decentralization of property rights is becoming an increasingly common policy intervention for sustainable natural resource management (Larson and Ribot 2004; Ribot et al. 2010; Rahman et al. 2012). In Bangladesh, the decentralization of wetland resource management has been occurring since 1986, when the first wetland fisheries management policy was developed to ensure community participation (Sultana and Thompson 2008). Subsequently, the process of decentralization has followed a formal hierarchal structure which encourages community participation through the development of community-based fisher organizations in order to formally obtain (temporary) wetland fisheries property rights (Rahman and Begum 2010; Rahman et al. 2012).

This decentralization process can be explained from both formal and informal institutional perspectives. To date, formal institutional decentralization in the governance of

Bangladeshi wetlands has been concerned with the organization and function of District *Jolmohal* (wetlands) Management Committees, *Upozila* (sub-district) *Jolmohal* Management Committees and Union *Parishod* (councils). Formal wetlands' management rights have subsequently been assigned across these institutions on the basis of wetland area, with wetlands >20 acres the responsibility of District Management Committees; between 3 and 20 acres the responsibility of *Upozila* Management Committees; <3 acres the responsibility of Union *Parishods* (Khan and Haque 2010). Figure 1 shows the indicative membership of each of these institutions.

Beyond the formal institutional structures governing wetland resources, informal institutional structures exist to manage the access of local resource users in the form of community-based fisher organizations. According to the formal wetland governing institutions, the lower membership limit of each of these fisher organizations needs to be 20 households, who then need to register with the District Cooperative Department of the government to be legally incorporated in wetland management processes. This involves the government monitoring the institutional, structural and operational arrangements of the organization while also working to ensure that the participants are actually resource–dependent members of the community (e.g., local fishermen). Once approved, the wetland property rights are then endowed to the organization for a period of 3 years, and, in return, the organization is required to pay a lease (e.g., 1,200,000 BDT per year for a wetland>44 acres) (Rahman et al. 2012).

Despite these structures, it has been identified that the existing administrative processes of decentralization will not necessarily ensure the equitable devolution of fisheries property rights in resource dependent communities (see Rahman et al. 2012). Challenges include the short-term nature of the property right endowment which can generate undesirable tension among community members and the often top-down management approaches which still tend to dominate the process (Khan and Haque 2010; Rahman et al. 2012). The existing processes also tend to favour local elites and financially powerful actors in the community, undermining the public policy objectives of community-based development and sustainable wetlands management (Mamun 2010; Rahman et al. 2012).

While previous research has explored the interactions between formal and informal institutional structures in the context of wetland management in Bangladesh (see for example, Sultana and Thompson 2008; Ahmed et al. 2008; Khan and Haque 2010; Mamun 2010; Rahman et al. 2012), the role of community collective action in supporting institutional development and the successful decentralization of natural resource management responsibilities has been less examined. Importantly, this is an area that has significant potential to inform public policy options for sustainable wetland management. Recognizing this knowledge gap, this paper examines the role that social capital plays in facilitating cooperation and collective action among diverse households that seek to obtain wetland fisheries property rights in Bangladesh. More specifically, our aim was to identify the prerequisites for developing a community-based fisher organization by assessing the relationships between collective action (dependent variable) and social capital variables (independent variables) among fishers in Barwal village, situated in the north-eastern district of Sylhet, Bangladesh.

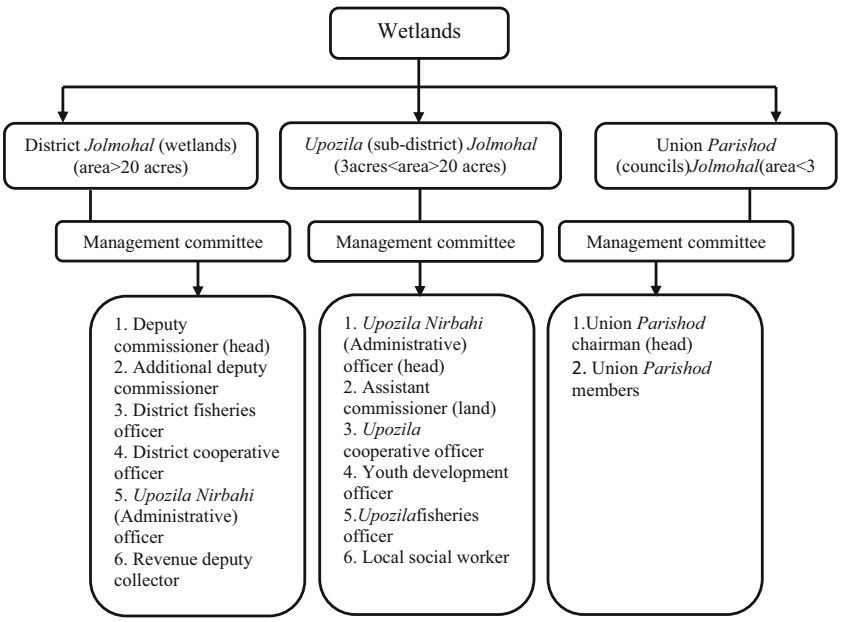

Fig. 1 Formal institutions that manage wetlands in Bangladesh

The Importance of Social Capital to Community Collective Action and Access Rights

According to Agrawal and Gupta (2005), it is important to recognize that in order for households to gain access to decentralized property rights, cooperation through the investment of capital assets is required, including human, physical, social and financial capitals (Fabricius and Collins 2007). Each of these capitals exists at the household level, with important implications for the collective action potential of a community (Cardenas 2005). Among the different capital assets owned by households, social capital deserves particular policy attention because of its diverse nature and its potential influence on the development of formal and informal cooperation (Ostrom 1994; Agrawal 2001; Casson et al. 2010; Rastogi et al. 2014). Numerous studies of natural resource management have identified that community cooperation and institutionalization is augmented when bonding (connecting like people in similar situations, such as family members, neighbours and friends), bridging (connecting like people in dissimilar situations, such as people in neighbouring communities) and linking (connecting people with the formal institutions beyond the community) social capital prevail simultaneously in a community (Dale and Sparkes 2007; Dale and Newman 2008). In these situations, higher levels of bonding social capital facilitates trust, reciprocity and altruistic behavior among community members which are necessary ingredients for cooperation, operational rule setting, enforcement, transparency and accountability (Ostrom 2009). Bridging and linking social capital work to assist with information generation and dispersal within a community, and are essential for collective action to achieve common goals.

Both social capital (invested asset) and collective action (operational management of that asset) are instrumental in accessing community-based resource property rights through decentralization policy. As noted by Agrawal and Ostrom (2001) the decentralization of property rights creates new groups of users and actors who possess management, withdrawal and exclusion rights. Recognizing that not everyone in a community will be able to access decentralized common property rights, and that this exclusion can be costly (Ostrom 2003), important policy questions include: who will be the users; who will bear the cost of exclusion; and who will be excluded? Social capital is central to each of these questions in a community-based organizational context because it facilitates the establishment of user groups through trust, reciprocal behaviour and connectedness with external agents (e.g., credit access, information providers, political groups etc.) (Pretty 2003). As a result, individuals with higher degree of social capital are more likely to participate in collective actions because they can access more information, develop linkages and engage in decision making processes (Agrawal and Ostrom 2001; Pretty and Ward 2001).

In many societies, bridging and linking social capital is maintained by community leaders who maintain communication with outside institutions (Krishna 2002, 2011). In these situations, the role of local leaders is crucial for the collective action of the community because they hold symbolic power in collective decision making (Ballet et al. 2007) and largely determine how informal institutions operate. Local leaders generally perform these activities by organizing and mobilizing collective actions, and also by voluntarily establishing linkages with external agents through their own efforts and personal networks (e.g., governmental officials, political groups and credit sources) on behalf of potential user groups (Bodin and Crona 2009). In an ideal democratic system, these leaders develop mutually agreed upon rules for selecting group members and managing resources (Dasgupta and Beard 2007), and as a consequence, exclusion mechanisms become clear. However, in the absence of democratic processes, the decision-making right can be captured by the leaders (Krishna 2003; Rahman et al. 2014; Rastogi et al. 2014) resulting in corruption and exploitation.

Methods

Study Area

This study was conducted in Baroal village, based on access to the Chilua Tindubi Jolmohal (wetland) of Fenchuganj Upozilla in Sylhat district (Fig. 2). This village is comprised of approximately 108 households, among which 58 households are Hindu and 50 are Muslim. Muslim community members are usually farmers while the Hindu community members are fishers. These members usually fish in the adjacent wetland and in the Kushiyara River during the inundation period of the area (June–January). For the rest of the year, the fishermen usually work as day labourers in the agricultural fields of the village. The village has poor infrastructure, with road access not possible during the rainy season. There is one primary school located in the village and the closest high school is located approximately 1.5 km away. The nearest medical centre, post office and police station are in Fenchuganj Sadar, located 6 km from the village. The per capita years of schooling is 7, and the per capita income is $738 USD per annum, which is just below the national average.

The Chilua Tindubi Jolmohal wetland is the largest wetland in the *upozila* (this is an administrative unit and can be called sub-districts), with an area of 44.68 acres. Similarly to other wetlands in Bangladesh, this wetland has a permanent inundation area (locally known as Beel) and other temporary peripheral inundation areas. Temporary inundation takes place during the rainy season, driven by the severe flooding of the

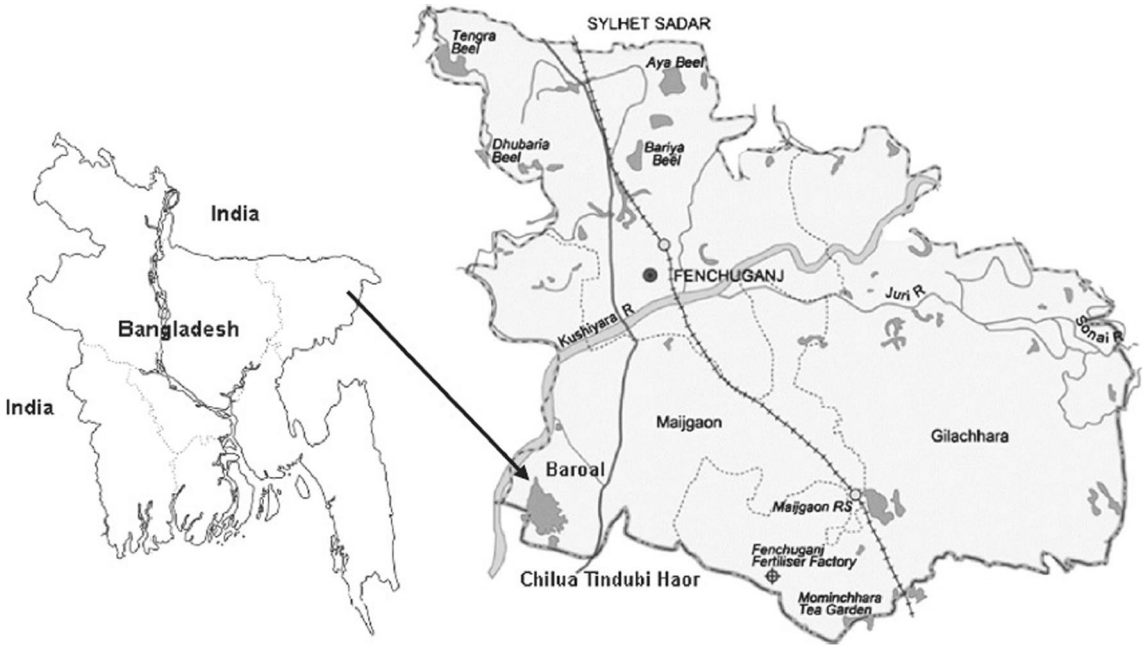

Fig. 2 Study area (Rahman et al. 2012)

Kushiyara River and other surface flow [nearly 80 % of the annual average rainfall (3334 mm) occurs between May and September].

Study Design

We used a case study research design because it allowed the "*intensive study of a single unit for the purpose of understanding a larger class of* (*similar*) *units*" (Gerring 2004). This approach allowed us to focus intensively on our research question (Yin 2003) while also enabling us to examine within-case co-variation (Gerring 2004) and multiple aspects of the research problem (Voss et al. 2002) within a defined context. Importantly, while the results from single case study research are not suitable for generalizing to populations (Flyvbjerg 2006; Voss et al. 2002), the results are useful for informing theory and provide novel insights which may warrant further research and policy consideration (Darke et al. 1998). Recognizing that our research sought to assess the role of social capital in collective action at a single point in space and time, the case study method provided us with the most appropriate framework for undertaking data collection and analysis (Gerring 2004). Baroal village was selected as our case study because of its geographic position which facilitated travel and data collection, its similarity to other surrounding fishing villages [particularly in terms of income levels, livelihood patterns and social structure (personal communication with local leaders)], the suitable number of study units which allowed complete data collection coverage, and the availability of local resources to facilitate the research.

We used the Local Level Institution (LLI) study technique to better understand the development of the community-based fisher organization in Baroal village using the concept of social capital (Grootaert et al. 1999). The LLI was first developed in 1998 (Davis 2004) by the Social Development Department of the World Bank. It combines qualitative and quantitative research techniques (Rao and Woolcock 2003) to capture a wide number of social capital and household characteristic-related variables (Swamy et al. 1999; Grootaert and Basetelaer 2002). The LLI technique has been applied to the study of decentralization, community-based development and relationships between social capital and collective action in diverse contexts (see Grootaert et al. 1999; Grootaert and Narayan 2000) to help explain the role of informal institutions in accessing services (The World Bank 1998).

Working within the case study method, we used the LLI technique to structure our data collection and analysis. Data were collected through semi-structured interviews with fisher households (quantitative) and through participatory focus groups and key-informant interviews (qualitative). This facilitated the assessment of reliability and the observational triangulation of our findings (Harwell 2011). Quantitative data focused on the relationships between eight social capital and seven household characteristic variables identified in the LLI technique, while qualitative data were used to explore issues of organization development and the role of leadership in the community. Taken together, these data provided a holistic

picture of the role of social capital and collective action in the development of a community-based fisher organization.

Variables of the Study

The variables used in the LLI technique are classified into two types: 1) social capital variables; and 2) control variables / household characteristic variables.

Social Capital Variables

We collected data on eight social capital variables in each fisher household:

Number of memberships: This is the measure of membership of household members in different social organizations. These organizations can be either formal or informal. This variable indicates household participation in different social activities.

Heterogeneity index: Estimates internal homogeneity of groups. In the LLI, this is measured by identifying the three most important groups for each household. Thus, the homogeneity of each group is calculated using a rating system which uses nine criteria: religion, economic status, occupation, age, kin group, neighbourhood, political orientation, gender and level of education. For this rating system, a scale has been constructed where the lowest scale value is 0 and the highest scale value is 9. Each criterion has a given value of 1, indicating that an organization's members are mostly from different groups of religion, economic status, gender etc. The scores of the studied groups are averaged and then rescaled from 0 to 100 where 100 represents the highest possible heterogeneity.

Meeting attendance: Indicates the frequency of group meeting attendance by household members in different social groups. In this study, a meeting attendance score was calculated for each year.

Index of participation: The number of memberships is not always a good indicator of the cooperative activities for a household. Hence, along with the number of memberships, an index has been developed to access the active participation of household members in the decision-making of groups. This was defined as an index of participation, scaled from 0, 1 and 2 which indicate 'not very active', 'somewhat active' and 'very active' membership in social organizations. These scores for each household were then rescaled from 0 to 100.

Informal organization: Social organizations can be developed either formally or informally. Previous research has observed that formally developed organizations are generally more active to attain their organizational objectives and are characterized by a higher degree of rule imposition (Uphoff 1993). However, some organizations may also develop informally and can contribute significantly to regulating natural resource use (Ostrom 1990). Our study therefore considered only the number of informal memberships for each member of a household because in this study area the organizations follow informal structures and approaches.

Community initiation: Generally, social groups are developed either by an external authority or by the community members. It has been observed that that the community-initiated organizations are often more likely to be successful at fulfilling collective choices (for example see, Becker and Ostrom 1995) because the transaction costs of adapting externally devised rules and norms are often high, and the result often fails to capture collective choices (Rahman et al. 2014). In our study, household members were asked about the origin of their different social groups and the numbers of such groups they were involved in.

Cash contribution score: For the development and maintenance of a social organization it is also necessary to invest financially. However, different social and economic reasons generally do not allow community members to make equal cash contributions. For our study, participants were asked about their household cash contributions to different social organizations.

Work contribution score: This is an estimation of working days contributed to group activities for each member of the household. Work contribution is a necessary indicator of participation, where an active group shows a higher work contribution score.

Control Variables or Household Characteristic Variables

Household control variables are both tangible and intangible features of a household. In terms of tangible features, we considered the manufactured or physical properties of a household (Uzawa 2005), including: (i) lowland owned by a household, (ii) highland owned by a household, (iii) number of fishing equipment owned by a household and (iv) number of cattle owned by a household.

The intangible features (Schultz 1961; Becker 1962) included: (i) years of education of household head (only the education of the household head was considered as they play the most important role in household decision making), (ii) age of the household head and its square (here, the age of the household head and its square have been used to capture the lifecycle of household welfare, e.g., experience, family formation, asset accumulation and inter-generational differences) (Islam and Shimeles 2007) and (iii) number of employed persons in each household. It is important to note that we excluded the household characteristic: 'women head of household' in our analysis because all of the surveyed households were male-headed.

Data Collection

Data were collected between April and May of 2011 as this was the early rainy season and the fisher organizations were starting their group activities after the long break of the dry season. Of the 57 fisher households in Baroal village, 20 households had formed a fisher group to obtain the temporary property fisheries rights to Chilua Tindubi Beel adjacent to the village. The remaining 37 households had not organized into a fisher organization. Data collection involved the use of structured interviews and questionnaires with each household head. Local leaders were interviewed using open ended questions related to the overall collective action behaviours of the community members. In addition, they were also asked about the development of the local community fisheries organization and whether there were any differences between the members and non-members of this organization. To increase the reliability of our findings, interview data were supplemented with focus group discussions, village walking and observation, and key informant interviews to triangulate our results (Yin 2003).

Each household interview took between 30 and 35 min. Three focus group discussions, each comprising 5–10 individuals, were also conducted, lasting approximately 1 to 1.5 h. Key informant interviews included governmental officials who were related to the wetland fisheries property right decentralization process and community organization development, local leaders, political leaders, village leaders and community organization leaders. Key informant interviews lasted between 1 and 1.5 h (Fig. 3).

Data Analysis

Data analysis sought to identify the impact of different capital asset variables on the overall collective action behaviour of the fisher households. This analysis was conducted on data from two groups of households: (i) households of fishers who had developed a fisheries organization; and (ii) households who had not developed a fisheries organization. We examined the overall collective action behaviour of these two groups to identify whether there were any differences, and, if so, the underlying factors that may be affecting their ability to take collective action to obtain wetland fisheries rights. Before analyzing the in-depth collective action variables, we conducted a hierarchal agglomerative polythetic cluster analysis, using the complete linkage method and Euclidean distance for group linkage and distance measurement respectively, based on the collective action of households. This was done to cross-check the expected and observed behaviour of collective action in the community. We then performed a factor analysis for the independent variables to reduce them to a smaller numbers of factors. Following this, we performed a linear regression following the ordinary least square method using the factor scores to determine the influence of the factors on the level of collective action for both groups in the field (Grootaert and Basetelaer 2002). Following the LLI technique, we used the following multiple linear regression model to identify the impact of social capital variables on household collective action (Grootaert et al. 1999):

$$CA_i = \alpha + \beta SC_i + \gamma HC_i + \varepsilon$$

Where:

CA_i	Collective action of household i
SC_i	Social capital of household i
HC_i	Household feature of household i
α	Intercept
ε	Error

The underlying assumption when using this regression model is that both social capital and household characteristic

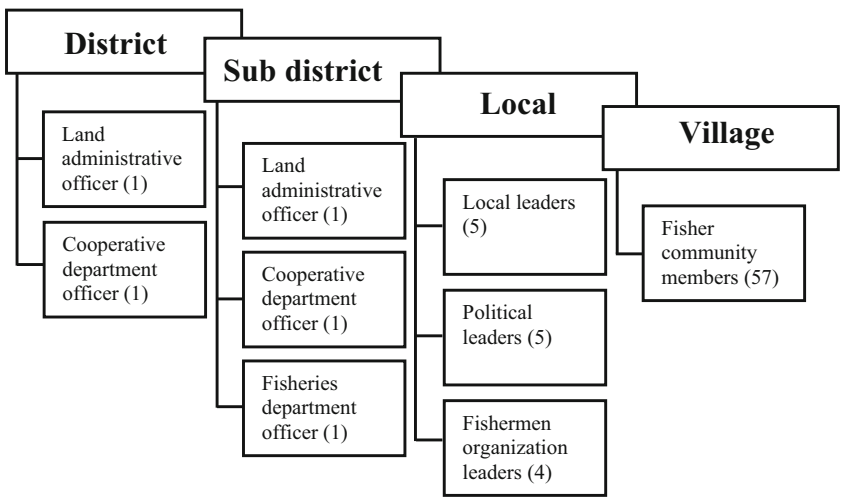

Fig. 3 Respondents of the research

variables are independent and the collective action variables are dependent (Grootaert and Basetelaer 2002). As all the variables have a cumulative impact upon the collective action ability of a household, it is reasonable to assume that the collective action ability of a household is the function of these variables (Swamy et al. 1999).

We used the constant comparison method (Boeije 2002) to analyze our qualitative data, resulting in categories that provide a structured view of the role of social capital in collective action (e.g., developing leadership, maintaining communication and symbolic power of decision making).

Results

Collective Action and Organization Development Behaviour

Using hierarchal cluster analysis we can observe that the fisher households in Baroal village grouped into three clusters on the basis of their collective action level (households with higher, medium and lower level of collective action). During our field observations, we identified two groups: (i) those that had developed a community fisheries organization to obtain wetland property rights, and (ii) those that had not. Interestingly, with few exceptions, the households represented by the cluster with higher collective action and one household in a cluster with medium collective action (see Fig. 4) formed the membership of the community fisheries organization, supporting our proposition that households with higher levels of collective action are better able to participate in community-based organizations.

Collective Action Behaviour of Members of the Community Fisheries Organization

Focussing on the 20 fisher households who were members of the community-based fisheries organization, we assessed the role that social capital had on collective action. Importantly, the minimum number of members required to establish a community fisheries organization is 20, suggesting that the organization tries to limit the number of members to the lowest number possible in order to optimize individual payoffs. This group formation behaviour imposes a constraint in our statistical analysis by reducing the sampling adequacy (Table 1). The results of the factor analysis show that all the variables, including social capital and household control variables, are

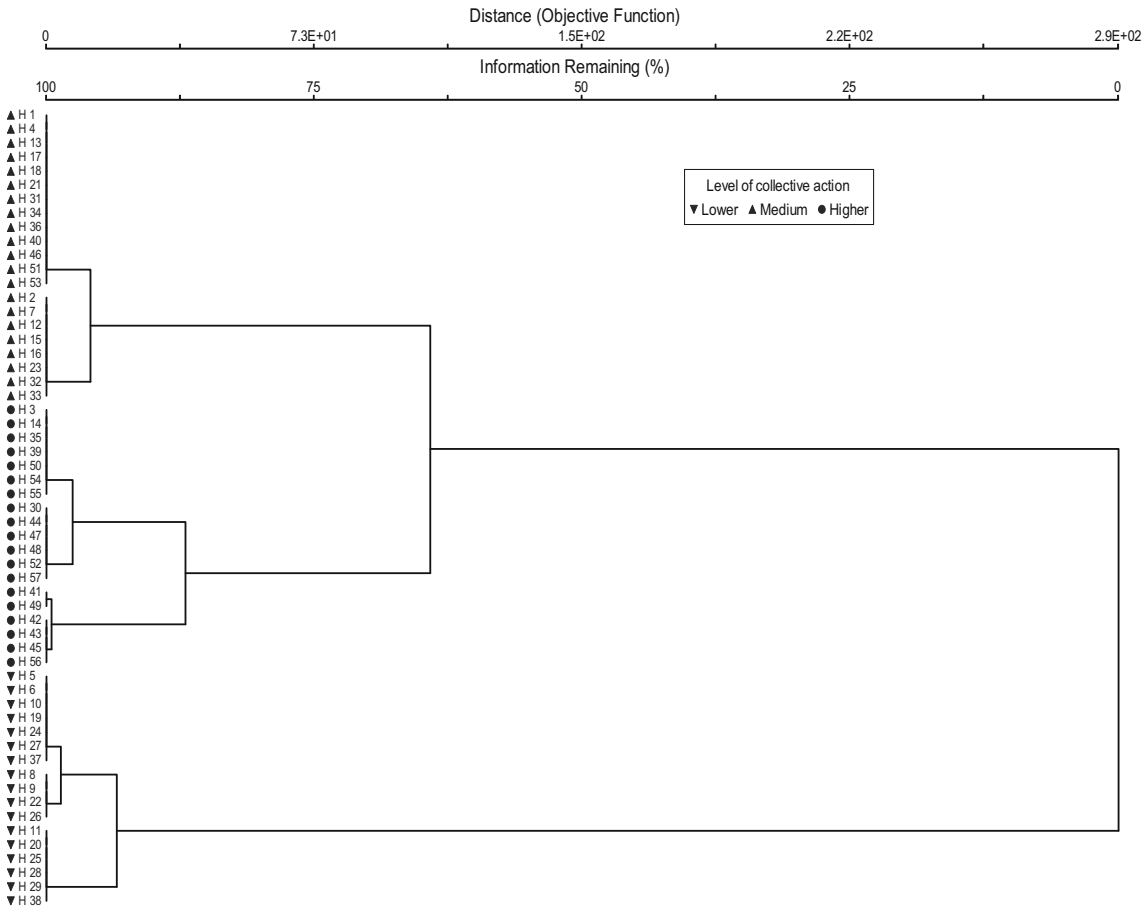

Fig. 4 Hierarchal cluster analysis of collective action for all village households

Table 1 Factor analysis of community fisheries organization

Factors	Factor loading	Eigen value	Explained variance	Reliability coefficient
Factor 1:		6.110	35.942 %	0.908
NM	0.869			
MA	0.752			
IO	0.748			
CI	0.673			
CCS	0.866			
WCS	0.707			
HS	0.779			
AHH	0.478			
NEP	0.721			
THI	0.632			
Factor 2:		2.847	16.747 %	0.358
YE	0.430			
LO	−0.653			
NCO	−0.766			
NFE	−0.534			
Factor 3:		1.585	9.322 %	0.283
HO	0.414			
Factor 4:		1.385	8.147 %	0.195
IP	−0.925			
Factor 5:		1.052	6.187 %	0.143
HI	0.534			
Total variance explained	76.346 %			

Extraction method: Principle component analysis

Rotation method: Varimax

KMO (Kaiser-Meyer-Olkin measure of sampling adequacy): 0.342

Bartlett's test of sphericity: statistically significant at 0.0001 level ($p<0.001$)

NM Number of membership; *MA* Meeting attendance; *IO* Informal organization; *CI* Community initiation; *CCS* Cash contribution score; *WCS* Work contribution score; *HS* Household size; *AHH* Age of head of household; *NEP* Number of employed person; *THI* Total household income; *YE* Tears of education; *LO* Low land owned; *NCO* Number of cattle owned; *NFE* Number of fishing equipments; *HO* Highland owned; *IP* Index of participation; *HI* Heterogeneity index

nested in five factors. Ten variables from both social capital and household control variables are grouped in the first factor, showing a higher reliability coefficient. These variables included features of information access and participation behaviour in community organizations, financial and working capability and household income level. The second and third factors comprise the variables related to human and physical assets. The fourth factor only includes the index of participation, a social capital variable, and this factor shows a low reliability coefficient. The fifth factor includes only the heterogeneity index and it has the lowest reliability coefficient. This is because the members of the fisheries organization had low levels of heterogeneity based on the criteria used in this study (e.g., religion, occupation, kinship, neighbourhood, political orientation, gender, education level, age and income group).

Taking the factor scores for each factor, the regression model revealed that the first and second factors had a positive influence on the collective action of the members of the fisheries organization. This implies that information access, financial capital investment ability and the availability of physical assets had a positive influence on collective action. In contrast, the third and fourth factors had a considerably negative influence on collective action. It is noticeable that the fishers in our study area were poor in terms of land ownership, with most not owning low (or arable) land, instead owning high land which is not suitable for agricultural production. Consequently, high land ownership had no positive influence on the collective action. The index of participation also had a negative influence on collective action because most of the decisions in the fisheries organization were taken by the community leaders. General members of the organization had negligible involvement in decision-making. Our results also reveal that high involvement of the organization members in decision making brought choice multiplicity raised from personal interests. Since group heterogeneity is not high in the fisheries organization, it had almost no influence (either positive or negative) on collective action (Table 2).

Collective Action Behaviour of Non-Members of the Community Fisheries Organization

While these households were not members of the community fisheries organization, they still exhibited some degree of collective action in the community through, for example, religious program organization and village infrastructure establishment (e.g., village roads, building of a temple). However, these kinds of collective action do not require extensive capital investment in order to participate. Most of the financial contributions are voluntary and largely depend upon the financial capacity of the community members. The factor analysis for

Table 2 Result of multiple linear regression describing the role of social capital and the household control variables on the collective action of fisheries organization members

Source	Value	Standard error	t	Pr>|t|
Intercept	6.842	0.188	36.387	<0.0001
Factor 1	0.950	0.187	5.082	0.000
Factor 2	0.547	0.190	2.886	0.013
Factor 3	−0.585	0.195	−2.991	0.010
Factor 4	−0.162	0.179	−0.901	0.384
Factor 5	−0.094	0.160	−0.591	0.565

R^2 =0.773; Adjusted R^2 =0.686

this group shows that the social capital variables, except the heterogeneity index, were nested in the first factor, while most of the household control variables were concentrated in second factor. These two factors showed higher reliability coefficients and eigen values than those of the other two factors (Table 3).

The regression model for this group showed that the first factor had the highest positive influence on collective action. Therefore, we can assume that social capital was the key feature of the collective action of the community. Although variables like work contribution and cash contribution require household capacity, they do not stop community members from engaging in collective action because the financial contributions for such interventions are generally not compulsory. This is supported by the regression coefficient of the second and third factors which imply that the physical and financial assets had little positive influence on collective action. Finally, the regression coefficient of the fourth factor shows that group heterogeneity and household income had almost no influence on the collective action of community members (Table 4).

Table 3 Factor analysis of community members who are not in the community fisheries organization

Factors	Factor loading	Eigen value	Explained variance	Reliability coefficient
Factor 1:		5.357	31.510 %	0.940
NM	0.944			
MA	0.932			
IP	0.952			
IO	0.904			
CI	0.715			
CCS	0.730			
WCS	0.672			
Factor 2:		4.318	25.402 %	0.782
HS	−0.945			
YE	0.424			
AHH	−0.826			
LO	−0.668			
HO	−0.649			
NFE	−0.845			
NEP	−0.797			
Factor 3:		1.071	6.302 %	0.319
NCO	−0.439			
Factor 4:		0.769	4.525 %	0.164
HI	−0.451			
THI	−0.413			
Total variance explained	67.740 %			

Extraction method: Principle component analysis

Rotation method: Varimax

KMO (Kaiser-Meyer-Olkin measure of sampling adequacy): 0.800

Bartlett's test of sphericity: statistically significant at 0.0001 level ($p<0.001$)

NM Number of membership; *MA* Meeting attendance; *IO* Informal organization; *CI* Community initiation; *CCS* Cash contribution score; *WCS* Work contribution score; *HS* Household size; *AHH* Age of head of household; *NEP* Number of employed person; *THI* Total household income; *YE* Tears of education; *LO* Low land owned; *NCO* Number of cattle owned; *NFE* Number of fishing equipments; *HO* Highland owned; *IP* Index of participation; *HI* Heterogeneity index

Leadership: The Role of Linking and Bridging Social Capital in Collective Action

Community representation based on symbolic power and leadership is an important part of cooperation development with external agents like government agencies, non-government organizations and other social and economic sources of resources. Both act to bridge the community with external agents to foster information exchange and the building of ties.

Developing Leadership

Our qualitative data revealed that only a few members of the community played a leadership role and held symbolic power. Answering the question—what makes them leaders—one such leader replied, "…… *obtaining the decentralized wetland property right involves several bureaucratic processes that require clear understanding about official activities, communication skill and external connectivity*". Another leader added, "… *social acceptance is also necessary for a leadership role. Community members obey a leader only when they find him reliable, responsible and sympathetic to their personal choices*". We also identified that they invest their financial ability, personal reputation, family background and social status to establish themselves as leaders.

Maintaining Communication

However, leadership development in a competitive social environment requires continued communication and collective

Table 4 Result of multiple linear regression describing the role of social capital and the household control variables on the collective action of the community members except fisheries organization members

Source	Value	Standard error	t	Pr>|t|
Intercept	3.579	0.287	12.462	<0.0001
F1	0.577	0.290	1.986	0.055
F2	0.201	0.291	0.690	0.495
F3	0.248	0.322	0.769	0.447
F4	−0.050	0.337	−0.149	0.882

R^2 =0.33; Adjusted R^2 =0.28

activities of the leaders. That is why the leaders generally involve themselves in different social programs like religious festival arrangements, village meetings for infrastructure development, taking part in the village school establishment and maintenance, etc. Although these activities consume their personal time, they also provide communication channels with different external agents like political leaders, government officials and private investors. In addition, most of the community members did not have the financial ability to pay fees for government revenue. However, leaders were described as being able to arrange financial investment from the local elites and money lenders by utilizing their personal reputation and communication networks. In addition, communication also works as a tool for seeking information which is scarce among community members. Consistent with this finding, a fisheries organization member remarked: "*...they* (leaders) *provide us information that we cannot get from the governmental authority directly. We keep faith on them because we earn our livelihood from their initiatives and they inform us of the government decisions beforehand so we can question them for clarity*".

Symbolic Power for Decision Making

Leadership and communication were found to enrich some people with symbolic power, primarily through linking and bridging social capital, which allows them to practice authoritative control over the community members in fisheries group formation. It enables them to devise the organizational norms for work contributions, member selection and conflict mitigation. Consequently, they can choose organization members from their kin and peers ensuring homogeneity in the group. This group formation strategy and members' attitudes facilitate the collective actions initiated by the leaders without significant challenge.

Discussion

This study identifies that the existing wetland resource decentralization process of Bangladesh, followed by collective action, requires a significant contribution of social capital that comes in three forms: bonding, linking and bridging. Bonding social capital is an individual household asset which creates trust and reciprocity among the community members and fuels collective action (Dale and Newman 2008). Our quantitative analysis suggests that bonding social capital is necessary for the collective action of both community members who form a fisheries organization and those that don't (Dale and Sparkes 2007). However, financial assets also distinguish the two groups, particularly when the collective action involves financial investments (Khan and Haque 2010; Rahman and Begum 2010; Rahman et al. 2012). Ostrom (1996) presented a comparable finding while studying collective action in Nigeria, observing that the government's requirements for financial contributions by community members posed a major constraint to collective action, despite having adequate bonding social capital. Comparing this observation with our study, we can summarize that under the Bangladesh government's revenue-based resource decentralization system, bonding social capital alone will likely not be adequate for equitable collective action in support of sustainable wetlands management. In addition, our finding that a household's level of physical and financial capital had no significant impact on accessing fisheries property rights through collective action indicates that households likely relied on credit to participate. This credit would likely be sourced informally because formal credit access is difficult to secure without longer-term or permanent rights to wetland resources (Agrawal 2003; Rahman et al. 2012). This situation was described by de Soto (2000) in his seminal book 'The Mystery of Capital', where he explains how the economic and social potential accompanied by the collective action of a community can die due to government policies which are incompatible with the needs of local development. In these situations, social capital in the form of networks, trust and reciprocity become essential to access financial resources.

Another important aspect of collective action is the role of community leaders in directing collective decision making. Our results indicated that community leaders bridged the gap between community members and external agents through linking and bridging social capital, playing a central role in collective decision making. For example, community leaders were able to select the organization members from their peers and kin, while there was no other organizational instrument that allowed community member access to the group (e.g., voting, need based selection, lottery, etc.). This resulted in undemocratic decentralization and devolution of resources, undermining public policy objectives of transparency, accountability and the equitable distribution of natural resources (Larson and Ribot 2004). Our case study suggests that while community members were able to participate in collective action, they played a limited role in collective decision-making processes, which were dominated by local leaders (see also, Bodin and Crona 2009). Our results suggested that these leaders were often highly opportunistic, taking advantage of the fact that most community members lacked adequate linking social capital by filtering and manipulating information for personal benefit. On the other hand, community members reported not being able to pay the access fees individually, instead relying on these leaders to arrange loans from local money lenders and community elites. This liability makes the community members more dependent on the leaders and money lenders (Khan and Haque 2010), leaving the collective choice and decision-making to them. Consistent with Krishna (2003), our research provides an

empirical example of how collective action-based organizations can become dominated by local leaders and elites. According to Dasgupta and Beard (2007), in such situations there is a need to ensure greater accountability of leaders through enabling broad-based participation and fostering democratic governance with a view to giving member's a voice in decision-making (see also Adhikari and Falco 2009).

Overall, our findings point to the central importance of information flow to sustainable natural resource management systems (Adger 2003). This is an area that the formal institutions responsible for sustainable wetlands management can play a central role. Our case study indicates that the community was a 'receiver' of government information through one-way and top-down processes that left decision-makers in formal institutions unaware of community-level feedback, politics and outcomes. Woolcock (1998) identifies this dilemma as the underlying reason for failure in identifying appropriate local leadership, particularly in economically impoverished societies. Therefore, it appears likely that formal institutions also need to be better bridged and linked with communities to ensure two-way information flow in support of policy learning and innovation.

Conclusion

Social capital (including bonding, linking and bridging) has immense importance in collective actions, particularly to obtain property rights under a government policy of decentralization. However, our study suggests that in addition to the need for high levels of bonding social capital, financial capacity plays a crucial role when the decentralization policy also involves generating revenue for government. In such situations, information access and communication with external agencies were found to be prerequisites for receiving the wetland fisheries property rights. Here, linking and bridging social capitals become essential. Due to the low levels of linking and bridging social capital held by community members in our study area, local leaders were able to take advantage of information access and widespread communication with external agencies and other financial sources to establish symbolic power in the community and dictate collective decision making.

While a considerable amount of research has been conducted in Bangladesh criticizing the macro-level institutional flaws associated with governmental policies and operational activities associated with decentralization of wetland property rights, few have considered the micro-level processes associated with earning these property rights. Therefore, our study suggests that in addition to the previously identified government policy flaws, the status and dynamics of social capital in a resource-dependent community requires more focus in decentralization policy formulation. More specifically, initiatives should be taken to enhance bridging and linking social capital among community members. Here, a participatory group building framework may assist community members to establish direct communication with external agents (e.g., government agencies and sources of credit). It may also contribute to reducing the potential for elite capture of collective decision-making and actions.

The decentralization of resources may be more effective for resource-dependent communities when democratic devolution of power can be ensured. Better two-way information flow between communities and government and a reorganization of revenue-based decentralization rules may improve collective action outcomes in the community, however further research is needed to assess community capacities to meaningfully participate in collaborative decision making processes in Bangladesh.

Acknowledgments We would like to acknowledge the Prince Albert II of Monaco Foundation and IPCC for their financial support. The comments of the paper are solely the responsibility of the authors and under no circumstances may be considered a reflection of the position of the Prince Albert II of Monaco Foundation and/or the IPCC. We would also like to acknowledge two anonymous reviewers for their constructive comments on the earlier draft of the manuscript.

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