



Multilevel governance in climate change adaptation in Bangladesh: structure, processes, and power dynamics

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Abstract

Climate change adaptation requires the engagement of multiple actors in different sectors and at various levels of governance. The different roles played by policy actors and their interactions shape the process of adaptation governance. Nevertheless, to date, there has been limited attention paid to how the structure of relations and their associated power dynamics between these actors affect adaptation governance process at different levels. In this study, we analyzed the structure, processes, and power dynamics entailed in the multilevel governance of adaptation to floods in coastal areas of Bangladesh. We used social network analysis approach to map and unpack the interactions between actors that influence the adaptation governance. We categorized five types of organizations based on the structural attributes of the governance network and their functions. Our analysis shows that the organizations with high influence over the governance process reside at the national level and the adaptation governance process is influenced by elite-pluralism. We found that both top-down and bottom-up processes co-exist in different phases of adaptation governance (planning, implementation, and monitoring). Lastly, we conclude that a more equitable redistribution of power (roles and responsibilities) may diminish the negative implications of federal centralization in adaptation governance.

Keywords Climate change adaptation · Multilevel governance · Power dynamics · Governance structure & processes · Bangladesh

Introduction

Climate change impacts do not conform to political and territorial jurisdictions and can be observed at multiple levels: global, regional, and local (Wilbanks and Kates 1999; Cash

et al. 2006; Termeer et al. 2010). Effective and efficient climate response thus requires engagement of multiple policy actors in different sectors and at different levels of governance (Adger et al. 2005; Amundsen et al. 2010; Eakin and Patt 2011; Bauer et al. 2012). While national governments guide

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the country-specific climate adaptation policy and practices, increased participation of local government, civil society, and non-government organizations (NGOs) has fostered local level adaptation (Keskitalo 2010, Juhola and Westerhoff 2011, Haque et al. 2015). The constellation of diverse actors forms a multilevel governance milieu. Multilevel governance (MLG) can be defined as a decision-making arrangement that involves a multiplicity of interdependent public and private actors operating at multiple territorial or political levels in which decision-making power is dispersed along the vertical and horizontal interactions of actors (Marks 1993; Schmitter 2004; Stein and Turkewitsch 2014). Enhanced participation of actors can promote learning, coordination, attentiveness to smaller details, and accountability (Poteete 2012). At the same time, MLG involves trade-offs. With increased participation of actors, overlapping responsibilities, conflicting mandates, and coordination dilemma can hamper governance processes (Termeer et al. 2010; Poteete 2012; Bache et al. 2016).

Whether the interactions among actors facilitate climate change adaptation governance process, or hinder it, largely depends on the arrangement of actors' interactions and the power dynamics they exhibit (Bulkeley and Moser 2007; Keskitalo 2010; Bauer et al. 2012). Scholars of MLG have posited that governance arrangements can typically be placed on a spectrum ranging from "elite-centered" to "pluralistic" orientations, which then provides insights into how power dynamics may play out in decision-making processes (Sova et al. 2017). In an elite-centered structure, a small subset of policy actors holds the most power and exert disproportionate influence on governance (Mills 1956), while in a pluralistic structure, power is distributed among various groups in the society with some groups having more influence than others on certain issues (Dahl 1957).

The analysis of MLG processes focusing on climate adaptation began with the work of Keskitalo (2010), who showed that MLG structure and processes can be centralized or decentralized, each with distinct contextual advantages and disadvantages. More recent works (i.e., Brockhaus et al. 2012; Fidelman et al. 2013; Hanssen et al. 2013; Bauer and Steurer 2014; Verkerk et al. 2015; Di Gregorio et al. 2019; Smucker and Nijbroek 2020; Stehle et al. 2020; Rahman et al. 2021) have found that non-government and private actors also play significant roles in adaptation management, but the governmental organizations are typically at the vanguard. While these studies demonstrate how organizations are embedded in MLG networks and how they interact, they mostly consider "government" monolithically, as a single entity. Thus, they limit the insights on how different government organizations, with different mandates and functions, interact in the design of adaptation policies, implementation, and evaluation of adaptation programs and through these interactions create a complex milieu. Furthermore, they lack the analysis of how power

dynamics among the organizations in the multilevel network create hindrance in the adaptation governance process.

We argue that the mapping out and unpacking these interactions is necessary because it helps explaining why and how certain policy actors are more powerful than others. Despite the apparent mandate and existence of specific state and non-state organizations to facilitate participation, local voices are not heard or some actors become disproportionately influential. We think that the understanding and insights of the MLG milieu and the interaction network among organizations and related policy actors would be useful to decipher the complexities and smoothen the adaptation governance. The existing set of MLG and power-related climate adaptation studies lack evidence from climate-vulnerable Global South (but see Bisaro et al. 2010, Di Gregorio et al. 2019, Smucker and Nijbroek 2020, Stehle et al. 2020), where institutional arrangements can be fragmented or fragile or innovating depending on the economic and political context.

Focusing on the context of adaptation to coastal flooding in Bangladesh, this study aims to address these limitations by analyzing the structural characteristics of MLG arrangement and the interactions between organizations and respective policy actors through which power dynamics influence the adaptation governance processes. We focus on different levels of organizations of the public sector and pose two interrelated questions: (1) *How do multiple organizations at different levels influence the adaptation governance in Bangladesh?* (2) *How do power dynamics among these organizations affect the adaptation governance processes in Bangladesh?* Insights into the sources and dimensions of power can help evaluate the mechanisms of adaptation governance (Crona and Bodin 2010; Duit et al. 2010) and assess the performance of governance (Hayward and Lukes 2008). Understanding which actor is more powerful than others, and in what ways, can lead to improved policy and institutional design (Sherman and Ford 2014). To address these questions, we conducted interviews with representatives of public sector organizations involved in adaptation governance in the coastal areas of Bangladesh and employed social network analysis (hereafter SNA) and interview analysis approach for the analysis of data.

The remaining article is divided into four sections. We briefly review the concept of power and conceptualize it for the purpose of this study ("Power dynamics: conceptual argument" section). Next we discuss our research methods in section "Methodology." In section "Structure of multilevel adaptation governance," using SNA, we show the mapping of adaptation governance landscape and identified the relative influence of organizations over adaptation governance and in section "Multilevel adaptation governance processes," we presented the power relations among these organizations and their impacts on adaptation governance. Lastly, we reflect on our key findings and discuss the policy implications and suggestions.

Power dynamics: conceptual argument

In this article, we follow an actor-centered conceptualization of power (Weber 1947; Dahl 1957; Bachrach and Baratz, 1963; Krott et al. 2014), where power is the ability of an actor to influence others within a relationship in order to meet their interests regardless of resistance. In this article, we use the terms “power” and “influence” interchangeably, and we focused on the interactions among actors representing organizations that are actively involved in adaptation governance of Bangladesh. Furthermore, we assume that the actors represent their respective organizations (state or non-state) and fulfill the mandates of the organizations or positions held, which ultimately gives them the power to influence other actors. Hence, our analysis also uses “actor” and “organization” interchangeably (Giddens 1984). Power rests upon the institutional design and arrangements in which the actors are embedded (Giddens 1984; Clegg 1989). Positions in the organizations and relations between actors (i.e., hierarchy) determine power and therefore, we claim that actors can use organizational rules and norms, authority, position and relations, and ideologies to exercise power over another actor (Purdy, 2012).

Based on the use of actors’ position within organizations, we consider that an actor exercises power via two main resources: material and ideational. Material resources represent financial capacity, human resources, position, and authority, while ideational resources include cognitive and normative resources such as knowledge, ideas, narratives, and information (Fuchs and Glaab 2011; Orsini 2013; Vij et al. 2018a). Experts and consultants also use ideational resources (i.e., knowledge) to dominate the policy processes to reduce the influence of the vulnerable citizens (Ojha et al. 2016; Vij et al. 2018a). Policy actors (representing different organizations) at different levels of governance interact with each other to meet their interests. During such multilevel interactions, policy actors configure and use material and ideational resources in different situations. Policy actors can combine material and ideational resources to exert more power (Dare and Daniell, 2017).

Methodology

Adaptation governance context

As one of the most climate vulnerable countries in the world, Bangladesh is experiencing the adverse impacts of climate change particularly in the coastal areas (Warrick, and Ahmad, Q. K. (Eds.). 2012). In response to these impacts, the government of Bangladesh formulated the National Adaptation Program of Action (NAPA) in 2005, Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2009, and National Plan for Disaster Management (NPDMD)

in 2010. The government has also distributed the responsibility for climate change response across multiple organizations with mandates of different scopes, and has fostered the participation of non-governmental organizations (NGOs) in reducing climate change vulnerability. These organizations operate at different levels of governance with variable authority (Rahman and Tosun 2018).

The government successfully mainstreamed climate change adaptation in the Annual Development Plan, Five-Year Plan as well as other development plans and sectoral budgets of ministries (Ayers et al. 2014; Vij et al. 2018b; Ishtiaque et al. 2019). Although the adaptation projects have apparent similarities to regular development projects, they are intrinsically different. Unlike a development project, in an adaptation project, emphasis is given upon current climate change impacts and future scenario (see, for instance, Schipper 2007). The sector specific adaptation projects are formally led by the line or sectoral ministries. These ministries have associated departments and other collaborating partner organizations at different levels of governance. NGOs also lead projects partnering with different organizations. Together, they formulate, implement, monitor, and evaluate adaptation projects, having different roles in each phase of the planning and implementation process, and, in each phase, different degrees of influence.

Data collection

As climate change impacts are most evident in the coastal region, we limit our analysis on the coastal region. Our study context was south-central coastal areas of Bangladesh. We identified the organizations associated with adaptation governance process in the coastal region through an online search and snowball sampling. We began our selection process by identifying the government organizations from the websites of sectoral ministries. After reviewing the legally embedded functions and activities of the organizations, we selected only those organizations whose mandates included adaptation to flood in coastal areas. From the websites of each of these organizations, we identified their collaborating partners and thus expanded our subset. In order to obtain the directionality of partnership, we reviewed the websites of those partner organizations as well. At this stage, we identified 19 organizations.

Furthermore, using a semi-structured interview protocol, we interviewed the key informants from the initial list of organizations. Key informants were selected based on two criteria — (1) respondents who had substantial knowledge of that organization’s activities; (2) respondents at senior and mid-level positions in the bureaucracy to comment as a representative of that organization. We used snowball sampling to expand this initial sample, given that not all partnerships would be evident from websites. We specifically excluded

those disaster management related organizations that focus on short-term disaster response and immediate recovery, not on adaptation. Through this process, we identified a total of 38 organizations that are involved in the adaptation governance process (see Table 1). To draw the boundary of the governance network, we considered only those organizations that are in regular collaboration (at least once in 2 months) with each other, and thus disregarded rare collaborations with university departments or short-term committees.

Data analysis

In order to analyze the process of adaptation governance, we asked the key-informants about the governance strategies and practices they undertake. For instance, we asked them how they collaborate and interact with other organizations they work with (or the other way around). Our questions also focused on how they monitor adaptation activities, how they

evaluate the performance of partner organizations, and how they ensure proper implementation. Furthermore, we reviewed their published reports, plans, and agendas to understand how they interact with other organizations and influence the governance process. In these ways, we garnered information on the resources (e.g., material or ideational) they use in collaboration and interaction processes.

Social network analysis

We employed social network analysis (SNA) to analyze the structural characteristics of the MLG network. SNA helps to reveal the interrelationships and interactions among actors, which they establish through collaboration, coordination, and cooperation. In SNA, the nodes represent the organizations and the edges represent their interactions. We determine the presence of edges based on the frequency of interactions—if an organization connects with another at least once in 2

Table 1 Selected organizations and their acronyms

Organization	Acronym	Organization	Acronym
National level:			
Ministry of Water Resources	MOWR	Ministry of Agriculture	MOA
Ministry of Environment, Forest and Climate Change	MOEFCC	Ministry of Social Welfare	MSW
Ministry of Local Government	LGD	Ministry of Planning	MOP
Bangladesh Water Development Board-Dhaka	BWDB_N	Ministry of Finance (Economic Relations Division)	MOF
Department of Environment	DOE	Water Resources Planning Organization	WARPO
River Research Institute	RRI	Bangladesh Agricultural Development Corporation- Dhaka	BADC_N
Local Government Engineering Department- Dhaka	LGED_N	Department of Agricultural Extension-Dhaka	DAE_N
Bangladesh Agricultural Research Institute	BARI	Bangladesh Rice Research Institute	BRRI
Bangladesh Agricultural Research Council	BARC	Bangladesh Institute of Nuclear Agriculture	BINA
Seed Certification Agency	SCA	Soil Resource Development Institute	SRDI
Forest Department- Dhaka	FD_N	International NGOs	INGO
Development Aid Agencies (i.e., World Bank, Asian Development Bank)	DAAs	NGOs (i.e., BRAC, CAST)	NGO_N
left for Environmental and Geographic Information Services	CEGIS	Institute of Water Modeling	IWM
District level:			
Bangladesh Water Development Board-Patuakhali and Barguna	BWDB_D	Local Government Engineering Department- Patuakhali and Barguna	LGED_D
Forest Department- Patuakhali and Barguna	FD_D	Bangladesh Agricultural Development Corporation- Patuakhali and Barguna	BADC_D
Department of Agricultural Extension-Patuakhali and Barguna	DAE_D	District Administration- Patuakhali and Barguna	DA
Sub-district level:			
Bangladesh Water Development Board-Kalapara	BWDB_SD	Department of Agricultural Extension-Kalapara	DAE_SD
Local Government Engineering Department- Kalapara	LGED_SD	Forest Department- Kalapara	FD_SD
Kalapara Sub-district Administration	SDA	NGOs (i.e., BRAC, Sangram)	NGO_L

months, it will have an edge with that organization. The interaction can be formally mandated or informal in nature. We captured these interactions through interviews; these interactions are thus as perceived and experienced by the actor interviewed. Later, we computed a set of network structural measures related to governance processes and outcomes: network density, degree, and betweenness centrality (Table 2). We further conducted core-periphery analysis to identify the nodes that belong to the densely connected part of the network. Based on the centrality scores and core-periphery analysis, we categorized the influences of the organizations into high, medium, and low. Organizations (or nodes) that have the centrality scores (i.e., degree and betweenness) greater than the first quartile and belong to the core of the network are assumed to have high influence over the adaptation governance process. Organizations that have the centrality scores less than the fourth quartile and belong to the periphery of the network are assumed to have low influence. The rest of the organizations should have medium influence.

Power dynamics analysis

To analyze power dynamics in the adaptation governance process, we clustered our surveyed organizations into five categories: key, funding, bridging, supporting, and frontier organizations (see Table 3). Our analysis was focused on identifying the similarities of their roles, responsibilities and functions. This clustering process is important because many of these organizations function and have overlapping roles and responsibilities, and their influence in the adaptation process is tied in part to their function and role. An analysis of power dynamics for each of the 38 organizations would thus be repetitive and exhaustive. The clustering process allowed us to discuss broader patterns in the interactions of organization categories, rather than focus on the subtle differences among the 38 organizations with potentially common contributions

and roles in adaptation governance. It is important to note that these functional categories do not a priori determine an organization's power in adaptation process. Furthermore, to understand power dynamics our interviews focused on questions such as what ways these organizations collaborate and interact with other organizations, how they evaluate the performance of partner organizations, and how they ensure proper implementation. These questions helped us to understand what type of material or ideational resources were used by actors to collaborate or overpower other actors.

Results

Structure of multilevel adaptation governance

The structure of the multilevel adaptation governance in Bangladesh comprises of horizontal and vertical interactions among the organizations (Fig. 1). Higher mean degree centrality indicates that at the national level, compared to sub-national level, the organizations have relatively more connection to each other and interact regularly for planning, implementing, monitoring, and evaluating adaptation actions (Table 4). However, a higher density at sub-national level indicates that all organizations at the sub-national level are overall well connected with each other compared to national level organizations. Lower density, but higher mean degree centrality, at the national level indicates that some organizations may have substantially greater connection than others (Table 4). At the national level, we found that the interactions among organizations are more formal in nature and follow procedural protocols, while at the sub-national level (district and sub-district levels), the interactions are relatively less formal. The sub-national level organization officials sometimes interact informally and cooperate/collaborate without a protocol or paperwork. This “discontinuous chain of actions”

Table 2 Social network measures and their relationship to governance

Network structural measure	Definition	Relation to governance process
Density	Overall connectivity of the network and is measured as the ratio of observed ties to the maximum possible ties	Higher density facilitates collaboration and builds trust (Ostrom 1990, Burt 2003) but may cause homogenization of knowledge and experience as well (Crona & Bodin 2006).
Degree centrality	A node-level measure of connection	Higher degree centrality represents significance of the actor in the governance process through mobilizing resources to action and diffusing information to other stakeholders (Calliari et al. 2019).
Betweenness centrality	A node-level measure of the extent to which a node lies in path of other nodes	Higher betweenness centrality indicates higher bridging capacity. The actor with a high betweenness centrality can have greater influence over the network by controlling the flow of ideational and material resources (Bodin & Crona 2006, Baggio et al. 2015).

Table 3 Organization types based on their interactions, roles, and functions

Organization type	Description
Key	Organizations that play a lead role in managing the adaptation actions: from conceiving the plan to implementing to monitoring and evaluating, and are often known as “implementing organizations.” They are generally associated with a ministry and can operate at national and/or subnational level/s of governance.
Supporting	Organizations that contribute through providing information, knowledge, or other forms of resources. They mostly operate at the national level of governance and aid in the adaptation project by conducting impact assessments, modeling human/environment system, and carrying out research.
Bridging	Organizations that primarily act as coordination platforms. Operating at national or subnational levels of governance, these organizations create a converging space where all involved organizations interact together.
Funding	Organizations that are responsible for evaluating the adaptation budget, allocating the funding sources, and managing the financial aspects of the project. They usually operate at the highest level of governance.
Frontier	Organizations that operate at the subnational level and often act as the representative of national level organizations to the local stakeholders. In most cases, they are the local subsidiaries of the key organizations.

(Verkerk et al. 2015) is particularly evident in the case of minor confusions or instances when one agency requesting assistance from another. For example, in an adaptation project, sub-district level water development and forestry organizations (BWDB_SD, FD_SD) had overlapping jurisdictions. Confusion began when they started working at the same time. They finally resolved it through informal interactions. We found that these informal interactions, in addition to regular, formal interactions, among the organizations facilitate the sub-national level governance process by strengthening trust and respect among them. However, other than these instances of ad hoc informal cooperation, the collaborations among the subnational level (i.e., district, sub-district levels) organizations are often dictated by the national level organizations, meaning the national level organizations direct the sub-national level organizations to which organizations they should connect.

We found that some national level organizations have relatively higher influence as they play different roles. For example, the ministries play a “representative” role by associating subordinate organizations (see Appendix Table 6) while connecting with other organizations outside their sectors. These ministries again act as a gatekeeper by controlling knowledge flow from those associated organizations. Furthermore, the ministries act as a coordinator when they connect two or more of their associated organizations that would not interact otherwise. Because of these different types of roles, the betweenness centrality scores of some organizations are significantly higher than others (see Table 5). Our SNA also revealed that some organizations that are mandated to be focal organizations are not enough influential. To illustrate, the MOEFCC (a national level organization) is the focal ministry for climate change and is mandated to play a leading role in adaptation governance.

However, SNA showed that MOEFCC does not portray high influence because of its relatively weaker convening or coordination power and lack of material resources (i.e., budget, manpower) (see Table 4). This was evidenced in the adaptation project budget of Bangladesh (2009–2015) in which the MOEFCC received less than 0.20% of total budget amount (see Rahman and Tosun 2018). The dilution of power of a focal ministry consequently led to the rise of individual, often uncoordinated, attempts to plan and implement adaptation actions by other ministries.

The district level organizations have relatively moderate influence over the adaptation governance processes. They can affect the governance processes by controlling information or knowledge exchange between national and sub-district levels. The bureaucratic structure of governance allows them to exercise power over their sub-district subsidiaries. The sub-district level organizations have moderate to low influence over adaptation governance. Although these organizations remain at the forefront of adaptation management, their actions are often directed and controlled by the district level organizations. Yet, they contain the power to influence the information flow between local level and higher levels of governance, as they deal with the local beneficiaries.

Overall, from the structural characteristics of multilevel adaptation governance in Bangladesh, we found that the organizations with high influence reside at the national level. However, at sub-national level, all the organizations are well connected to each other, even though they have moderate to low influence. Our interview analysis revealed that these connections are often informal in nature, in contrast to strict protocols at national level. In the following section, we will dissect these connections and analyze the power dynamics among these organizations.

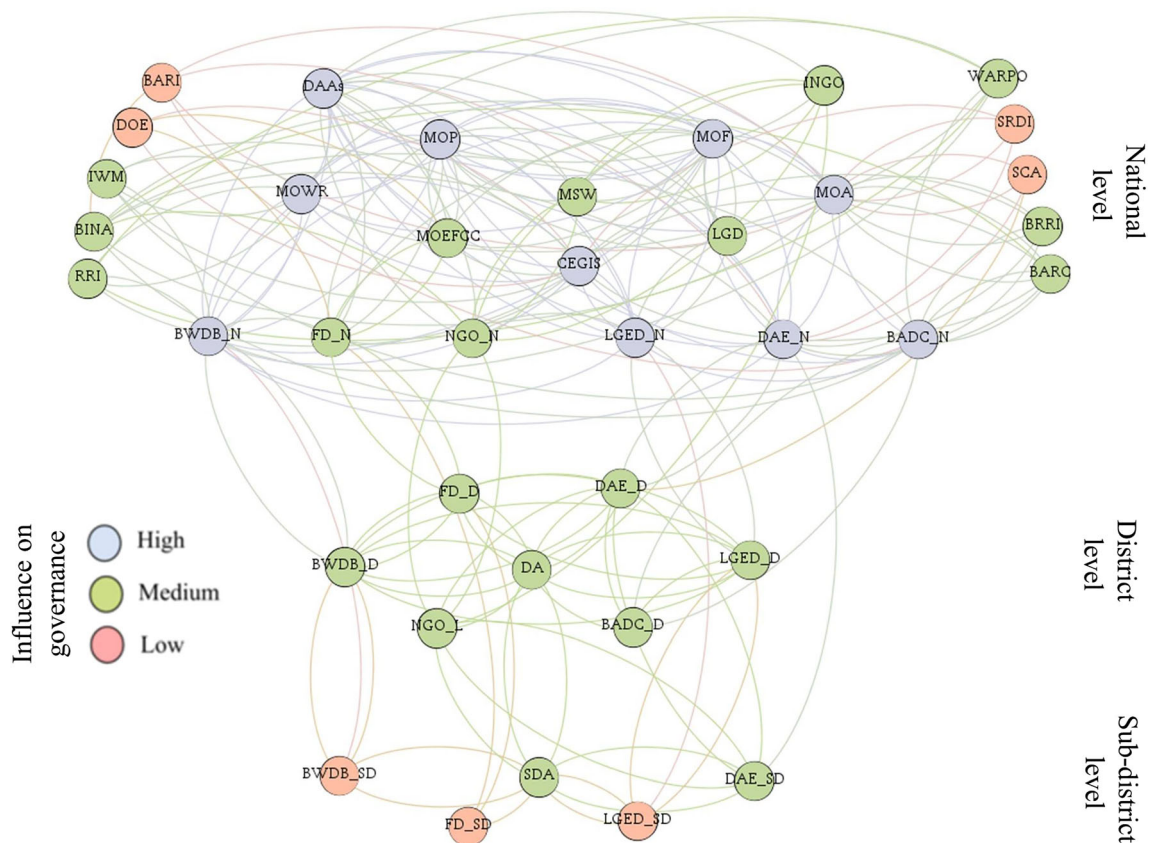


Fig. 1 Influence of organizations in terms of collaboration network (see Table 2 for acronyms). The color of the node represents influence on governance process in terms of collaboration ties. The color of the edge represents the source organization that initiates the collaboration or interaction

Multilevel adaptation governance processes

In the following sub-sections, we will portray how power dynamics play out through the interactions of the five types of organizations (see Table 3) that operate at different levels of governance (Fig. 2) and in different phases of adaptation, drawing from how the organizations described their activities and relationships in adaptation governance. We classify the phases of adaptation as planning, implementation, and monitoring and evaluation (Moser and Ekstrom 2010).

Planning

The climate adaptation planning process begins with the conception of an adaptation project, usually by a national level key organization. Using material resources (i.e., funding,

administrative position), a key organization exercises power over frontier organizations to collect data on local priorities. The frontier organizations utilize their ideational resources (i.e., information/ knowledge) to shape the objectives of the adaptation project. As an illustration, we found that the sub-district local level engineering department (LGED_SD) assists the national level office (LGED_N) in preparing an adaptation plan by obtaining information on the importance and locations of disaster shelters. In our interviews, we learned that some frontier organizations further exercise power over the local stakeholders by consulting with only local influential people and neglecting marginalized vulnerable people. This perception of elitism is represented through a sub-district level official’s comment: “the sub-district administration (i.e. SDA) is like a king here and the king knows better what is good for their subjects (i.e. local people) than the subject themselves.”

Table 4 Exploratory SNA measures at national and subnational level

Level of governance	Density	Mean degree centrality
National	0.120	8.39
Subnational (i.e., district and sub-district)	0.150	5.11
Entire multilevel network	0.140	10.37

Table 5 Results of social network analysis for each organization

Organization name	Level of governance	Degree centrality	Betweenness centrality	Core/periphery	Influence over governance
MOA	National	20	229.980	Core	High
MOP	National	22	129.761	Core	High
MOF	National	22	129.761	Core	High
MOWR	National	15	109.366	Core	High
DAAAs	National	21	147.584	Core	High
LGED-N	National	16	155.061	Core	High
BWDB-N	National	18	158.236	Core	High
DAE-N	National	19	184.914	Core	High
BADC-N	National	15	82.752	Core	High
CEGIS	National	17	152.781	Core	High
MSW	National	9	10.133	Periphery	Medium
INGO	National	7	6.014	Periphery	Medium
WARPO	National	6	3.410	Periphery	Medium
RRI	National	6	1.452	Periphery	Medium
MOEFCC	National	9	4.736	Periphery	Medium
LGD	National	7	0	Periphery	Medium
BRRRI	National	6	29.834	Periphery	Medium
BARC	National	8	41.043	Periphery	Medium
IWM	National	6	1.577	Periphery	Medium
BINA	National	8	21.342	Periphery	Medium
NGO-N	National	10	58.680	Periphery	Medium
FD-N	National	12	68.123	Periphery	Medium
LGED-D	District	11	71.515	Periphery	Medium
BWDB-D	District	12	78.941	Periphery	Medium
BADC-D	District	5	6.860	Periphery	Medium
DA	District	12	41.515	Periphery	Medium
FD-D	District	9	25.600	Periphery	Medium
DAE-D	District	11	81.253	Periphery	Medium
DAE-SD	Sub-district	7	28.204	Periphery	Medium
SDA	Sub-district	10	28.867	Periphery	Medium
NGO-L	Sub-district	8	41.591	Periphery	Medium
SRDI	National	4	2.930	Periphery	Low
BARI	National	5	0	Periphery	Low
SCA	National	4	1.200	Periphery	Low
DOE	National	4	1.095	Periphery	Low
LGED-SD	Sub-district	5	9.935	Periphery	Low
BWDB-SD	Sub-district	5	12.029	Periphery	Low
FD-SD	Sub-district	3	0	Periphery	Low

As a result, they may select convenient information to transfer to key organizations.

To buttress the local-level needs assessment, the supporting organizations use their ideational resources such as downscaled climate projections or impact analysis. In this process, the key organization can use material resources (i.e., funding, administrative position) to mobilize the supporting organizations. To illustrate, in one instance, the national-level water

organization (BWDB_N) requested a downscaled climate projection from a research organization (i.e., RRI) for an adaptation plan on embankments. With these ideational supports from the frontier and supporting organizations, the key organizations formulate adaptation project proposals. However, in certain instances, supporting organizations can use material resources as influence over key organizations to formulate new adaptation plans based on their research findings or

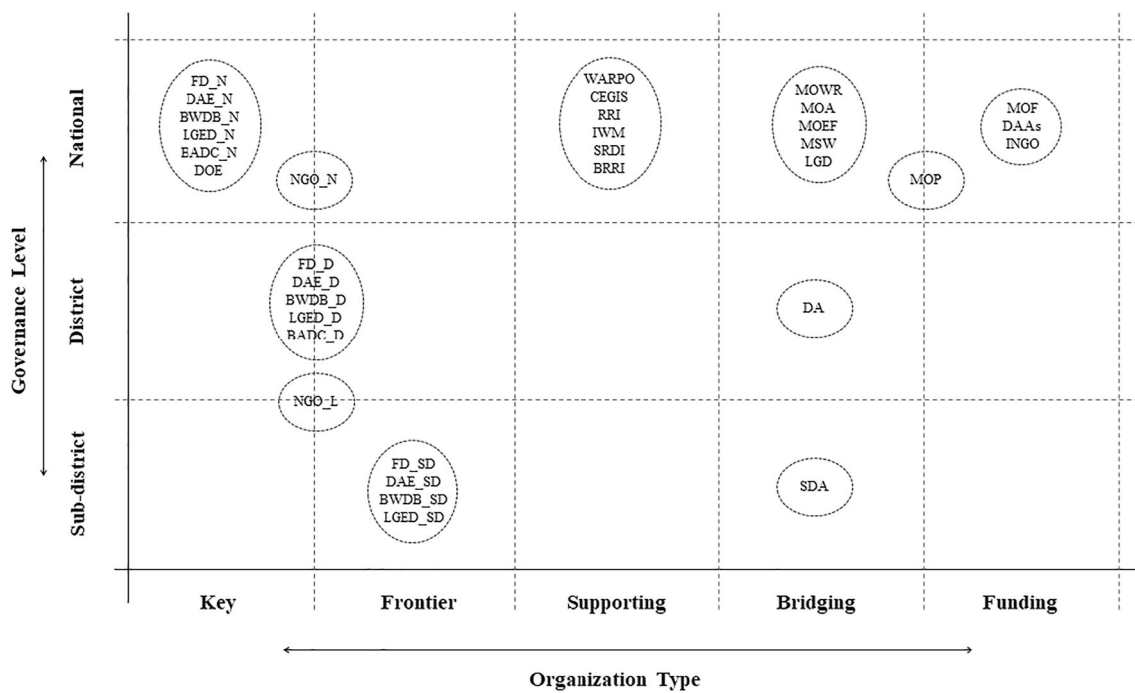


Fig. 2 Organization type and their operation at different levels of governance (see Table 2 for acronyms)

innovations. For example, BRRI, a supporting organization, took the help of the national-level agriculture organization (i.e., DAE_N) to distribute its newly invented flood-tolerant seed varieties, a material resource, to coastal farmers as a central part of its adaptation plan.

The national-level bridging organizations (i.e., line ministries and the Planning Commission under the MOP) use their material resources (i.e., administrative position) to evaluate the project proposals to examine whether they are aligned with the medium to long-term plans of the government, possible redundancies, project feasibility, and budgetary requirements and connect key organizations with funding organizations. Furthermore, by arranging meetings, the bridging organizations create a converging space of interactions for all involved organizations. However, their exercise of power is substantially truncated when the key and funding organizations reach to an agreement independently and disregard the meetings. A respondent from a bridging organization commented: “These project evaluation meetings sometimes become mere formalities. Even many important organizations, such as Ministry of Finance, do not attend many meetings.” In this way, overpowering the bridging organizations, both key and funding organizations limit the scope of participation of other organizations.

In sum, the adaptation planning process in Bangladesh ensures participation of all types of organizations, yet the contributions of the supporting and bridging organizations are subordinate (Fig. 3a). The key and frontier organizations take leadership by exerting power over others. Although the funding organizations operate at the highest level of

governance, our interviews did not reveal that they participate extensively in the overall planning process. The fusion of top-down process, influenced by material resources, and bottom-up process, dominated by ideational resources, seems to exemplify a well-crafted adaptation planning process, but the minimal exercise of power by the bridging and supporting organizations and the perception that frontier organizations are elitist are concerning. As a result of the subordinate roles of the bridging and supporting organizations, their efforts to communicate local needs could be undermined and important local knowledge could be overlooked in the planning process.

Implementation

In the adaptation implementation processes in Bangladesh, the key organizations mobilize the frontier organizations using their material resources (i.e., administrative position). Both of these organizations connect to local stakeholders by arranging workshops, trainings, and demonstrations in an adaptation project. For instance, in agricultural sector, the sub-district level agricultural organization (DAE_SD) arranges demonstrations and training programs to provide information on newly invented flood-tolerant seed varieties to the farmers. However, interviewees reported that they are sometimes accused of not including the farmers from remote areas and disregarding the marginalized farmers. In contrast, in the water resource or infrastructure sector, the involvement of key and frontier organizations with local beneficiaries is minimal. In this sector, project implementation is outsourced through

online bidding and the key and frontier organizations are responsible only for supervision and monitoring.

Key and frontier organizations can wield power over the bridging organizations using their material resources to meet various needs. In one example, the water development board (BWDB_N) asked the district administration (DA) or the Ministry of Land to acquire lands for the purpose of a project. However, the bridging organizations can exert power over key and frontier organizations by creating coordination platforms and acting as adjudicators. For instance, the district and sub-district administrations arrange a bi-monthly coordination meeting which serves as the only formal sub-national platform for coordination and conflict resolution among the adaptation implementing organizations.

Overall, the adaptation implementation process is dominated by the exercise of material resources of power, and the key organizations exercise relatively more power, which makes them the most significant actor in this process. These key organizations mostly operate at the national level and the asymmetries in influence suggest a centralized top-down governance process, although this might not be readily observable. This subtle polarization of power impairs the implementation process, as the frontier organizations cannot take independent decisions in case of emergencies, or if the implementation process requires sudden alteration. Such rigidity impairs the implementation process, and the crisis management capacities of these organizations remain low. This overall power dynamics is represented in Fig. 3b.

Monitoring and evaluation

The monitoring and evaluation (M&E) of adaptation progress in Bangladesh is conducted primarily with two approaches: onsite and offsite. The onsite approach is a direct form of M&E: the organization sends its team to the field site. In contrast, the offsite approach follows a hierarchical bureaucratic system of M&E: the funding or national level organization collects information from subnational level organizations. Through the offsite M&E system, the key organizations use material resources (i.e., administrative position) to wield power over frontier organizations and by generating weekly or bi-weekly progress report frontier organizations can exercise power through ideational resources (i.e., information). For instance, the sub-district level organizations provide the district level organizations with weekly updates on the implementation progress. As unsatisfactory progress can lead to financial restrictions and authoritative pressure from higher level organizations, it is probable that the frontier organizations can cherry-pick the positive information. Notably, whether an adaptation project progress is “satisfactory” is determined primarily by the frontier organizations or district level key

organizations. As such, by allowing or restricting information on progress, they conserve more power than others.

Under the onsite M&E system, the key and funding organizations use their material resources (i.e., inspection teams) to obtain progress information. However, their visits are often arranged by the frontier organizations giving the frontier organizations enough power to control information flow to and from key or funding organizations. In addition to sending inspection teams, the key and funding organizations sometimes use citizen science to collect information that allows information to flow directly from local level to the national level. The World Bank, for example, gave away \$100 phones to the highly respected community members in the adaptation project areas as a part of the M&E process so that these individuals could contribute in monitoring by sending pictures and short messages. However, the key and funding organizations cannot take an onsite M&E or citizen science approach for all projects because of human or financial resource constraints. For instance, IMED randomly selects 10 projects in a financial year to conduct onsite M&E and for the rest they rely on offsite M&E. Such overreliance on the offsite approach provides the frontier organizations with more power to wield in the M&E process.

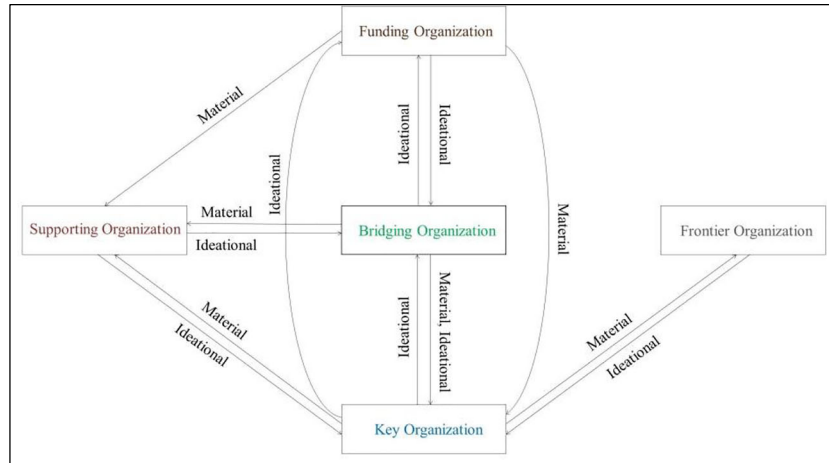
Overall, the exercise of power in the M&E phase of the adaptation in Bangladesh is dominated by the use of ideational resources (Fig. 3c). Although the combination of both onsite and offsite approaches appears to enhance the efficiency of the adaptation M&E process, the offsite approach remains dominant in the M&E process. Because of the reliance on offsite M&E approach, the participation of local stakeholders is enabled through the frontier organizations, and, as a result, is often limited. Furthermore, the supporting organizations are often kept outside the M&E processes that further empower the frontier organizations. As these organizations conduct research on climate change impacts, without their participation in the M&E process, the information on effectiveness of adaptation actions may remain incomplete. We think that such exclusion of local stakeholders and supporting organizations may mar the success of adaptation.

Discussion

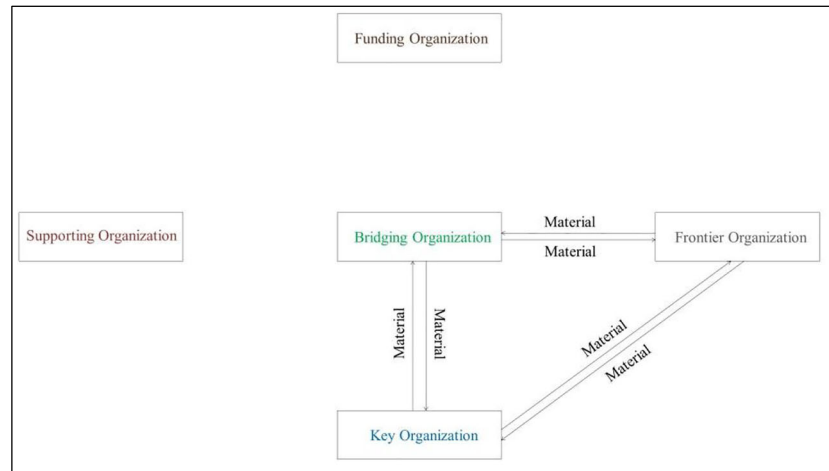
All adaptation takes place in political context where actors struggle, contest, and negotiate to meet their interests (Eriksen et al. 2015). The first step of addressing the power dynamics in adaptation governance processes is to understand how power unfolds through the interactions among the involved actors (Bulkeley 2012; Nightingale 2017). Power asymmetries will always exist among actors in governance; while complete parity in participation and decision-making is unlikely and perhaps undesirable, it is important to make visible asymmetries in influence and participation, and evaluate

Fig. 3 Power dynamics in different phases of adaptation governance process. **a** Planning. **b** Implementation. **c** Monitoring and evaluation

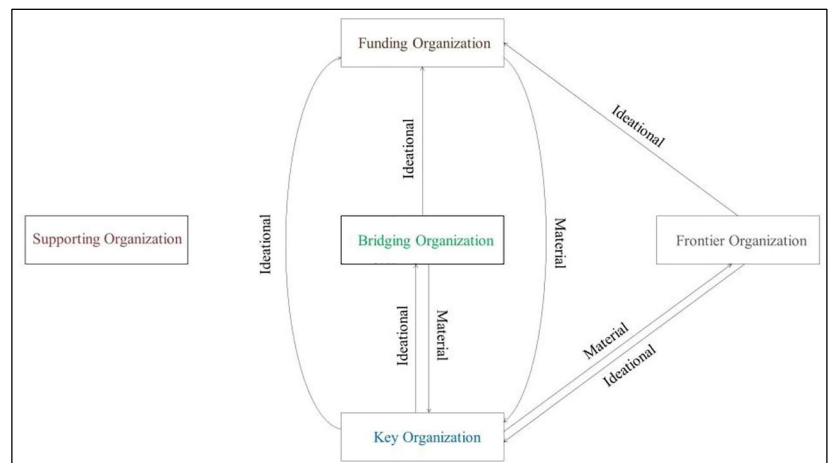
a) Planning



b) Implementation



c) Monitoring and Evaluation



how it affects decision processes and outcomes. Much of the attention to power dynamics in adaptation research has been in relation to different social sectors: the tensions among, for example, civil society, private sector interests, and

government actors (e.g., Eriksen and Lind 2009). Nevertheless, the wide range of power differences in the multilevel adaptation governance in Bangladesh also lies within the bureaucratic arrangement of governance in the public

sector (Rahman and Tosun 2018). Attention to the interaction of organizations within the public sector provides insights into the mechanisms through which different organizations have influence over what constitutes adaptation programs, how such programs are implemented, and whether they are considered successful or not.

In adaptation governance in Bangladesh, the power of decision-making is variably dispersed at multiple levels of governance, but a small number of national level actors are dominant in the adaptation process. The governance includes both top-down and bottom-up processes at different phases of adaptation, yet the key decision-making power consistently rests with some of the national level actors. Evidence across the world suggests that such relative centralization of adaptation governance is *Janus-faced* (Eriksen et al. 2015). On the one hand, it can facilitate better coordination and, as a result, prevent overlapping authorities, conflicting responsibilities, and duplicating functions (Termeer et al. 2010; Gillard et al. 2017). On the other hand, it might prohibit experimental learning, trust building, collaborative management and lead to a disregard of local priorities and context sensitivities (Ostrom 2010; Jordan et al. 2015). Empirical and experimental evidence support the conclusion that the disadvantages of such centralization outweigh its advantages (i.e., Cole 2015, Ojha et al. 2015, Nightingale 2017, Sova et al. 2017). We came to similar conclusions in Bangladesh as well.

In Bangladesh, climate adaptation governance appears to be similar to *elite pluralism*—in which power is dispersed among several actors, yet a few actors contain more power than others (Dahl 1982; Marsh 2002). In an elite pluralistic governance milieu, as demonstrated in Indonesia (Di Gregorio et al. 2019), Lesotho (Bisaro et al. 2010), and in our case, power is variably distributed among multiple levels of governance but some national level organizations—in most cases, the sectoral leading organizations—influence the overall adaptation governance process the most. Despite actively participating in different phases of adaptation, the frontier organizations mostly follow orders or instructions and have few opportunities to initiate new ventures, and the bridging and supporting organizations have little power to wield. This elite pluralistic nature of adaptation governance in Bangladesh can have serious implications.

First, the emergency management capacity of frontier organizations is likely to be low. For instance, we found that in an event of embankment breached flooding, it takes at least two weeks to repair the embankment because frontier organizations lack power to act independently of central organizations. Second, as the frontier organizations perceive themselves as elites, local priorities for adaptation may remain unaddressed. In recent past, a disregard of indigenous knowledge (i.e., Tidal River Management) in flood management caused long-term water logging in southwest Bangladesh (Ishtiaque et al. 2017). Third, it is likely that the success of

any adaptation will not be evaluated rightly. The evaluation of success requires more than mere information on physical progress of the adaptation actions but rather consideration of how adaptations are addressing the local socio-ecological complexities, feedbacks, and future changes (Adger et al. 2005; Eriksen et al. 2011). Lastly, the bridging organizations may not be able play an effective role as adjudicators or evaluators. For example, adaptation project evaluation becomes a mere formality for the Ministry of Planning (MOP).

To alter the elite-pluralistic nature of adaptation governance and build a more collaborative, pluralistic environment, Bangladesh government has to address at least two issues: power dispersion to certain organizations and the creation of an operating space for collaboration and coordination. The frontier organizations could be given more material power to manage emergency situations and the supporting organizations should have the power to independently evaluate the adaptation progress and outcome. The capacities of these organizations need to be enhanced as well to wield the given power. In some cases, and where accountability is strong, these organizations should be given more autonomy to undertake decisions during emergency and evaluation stages. With increased capacities and greater liberty to respond to immediate local needs, these organizations may be able ensure more effective adaptation governance processes.

The analysis also highlights the value in the existence of an operating space where stakeholders can continuously interact. Unlike a coordination platform, which demands the existence of a bridging organization, there is a need for an operating space that would allow stakeholders to directly communicate with each other. The World Bank's experiment with citizen science provides one example of such a virtual operating space; a more sustained system of communication would likely be valuable. Such an operating space for collaboration and coordination would facilitate trust building among stakeholders and prevent elite-capture (see also Vij et al. 2021). For example, in the face of a risk of elite-capture by the local influential people and frontier organizations in an aquaculture system in Bangladesh, the funding organization ensured that the key and frontier organizations could directly reach to local stakeholders to increase representation and accountability of local stakeholders, and thus effectively diminishing the risk (Ratner et al. 2013).

Conclusion

In this study, we discussed the adaptation governance operating within a multilevel public sector governance system in Bangladesh, and how organizations within the public sector mobilize material and ideational resources to influence the adaptation process. Our analysis of structure of governance and power dynamics among actors demonstrate that the

adaptation governance processes are not as inclusive as it seems to be; instead, processes are dominated by a few actors that represent a wide range of power differences among actors. Diminution of power of some focal organizations (i.e., MOEFCC, MOP) weakens the collaboration among actors and creates enough opportunities for power exercise by a few organizations. Our analysis illustrates that it is not just the function of an organization that matters, but rather how this function operates within relationships of influence, and how organizations use the opportunities available to them to

shape governance processes and outcomes. The success of adaptation largely relies upon how the involved actors work together to achieve common goals. The dominance of few actors and the existence of significant power differentials can be a barrier. A more equitable redistribution of power and emphasis on coordination/collaboration will likely to have a positive effect on the adaptation governance process; nevertheless, more evidence is needed on the implications of power dynamics on adaptation outcomes.

Appendix

Table 6 Sectoral (government) organizations involved in climate change adaptation management in coastal areas of Bangladesh

Sector	Key ministry	Associated organizations	Key actions
Agriculture	Ministry of Agriculture	I. Department of Agricultural Extension II. Bangladesh Agricultural Development Corporation III. Bangladesh Agricultural Research Council IV. Bangladesh Agricultural Research Institute V. Bangladesh Rice Research Institute VI. Bangladesh Jute Research Institute VII. Bangladesh Institute of Nuclear Agriculture VIII. Agricultural Information Services IX. National Agricultural Training Academy X. Department of Agricultural Marketing XI. Seed Certification Agency XII. Soil Resource Development Institute	<ul style="list-style-type: none"> - Providing need based extension services to farmers. - Enabling farmers to optimize resources to promote sustainable agricultural practices and socio-economic growth. - Assisting the farmers to increase agricultural productivity and adopt new technology.
Hydrology	Ministry of Water Resources	I. Bangladesh Water Development Board II. River Research Institute III. Directorate of Bangladesh Haor and Wetland Development IV. Water Resources Planning Organization	<ul style="list-style-type: none"> - Development and management water resource projects through embankments, levees, and sluice gates. - Management and mitigation of river bank erosion. - Promoting food production through surface water irrigation. - Ensuring stakeholder participation in environment friendly development initiatives.
Infrastructures	Ministry of Local Government, Rural Development & Cooperatives	I. Local Government Engineering Department II. City Corporations III. National Institute of Local Government IV. Department of Public Health Engineering	<ul style="list-style-type: none"> - Improving accessibility of rural growth centers. - Construction of embankments. - Construction of disaster shelters, tree plantation on embankments. - Urban infrastructure development. - Providing technical support to district, sub-district, and union administrations.
Forestry	Ministry of Environment & Forests	I. Bangladesh Forest Department II. Department of Environment III. Bangladesh Forest Research Institute	<ul style="list-style-type: none"> - Conservation and sustainable management of forest, wildlife, and biodiversity. - Increasing land stability and climate resiliency of ecosystem. - Expanding social forestry and ensuring stakeholder participation.

Table 6 (continued)

Sector	Key ministry	Associated organizations	Key actions
Socio-economy	Ministry of: Social Welfare, Disaster Management and Relief, Finance, Health & Family Welfare	IV. Bangladesh Forest Development Corporation I. Local Non-Government Organizations (NGOs) II. International NGOs III. Other relevant government organizations	- Increasing forest cover through afforestation and reforestation. - Microfinance - Disaster management - Education provision - Community empowerment - Human rights and justice - Eliminating poverty - Health and nutrition

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