

1. Introduction and study aim

The notion of the global forests' protection has been emphasized first at the United Nations Conference on Environment and Development (UNCED) in 1992, where world leaders first developed a nonbinding statement of Forest Principles outlining the guidelines (Siry et al., 2005). Since the Earth Summit of 1992, the concept of sustainable development has gained rapid interest in global policy debate (Holvoet and Muys, 2004)—which incurs effective policy solutions in any forest management. Moreover, the context of global climate change has evolved new dimension in forest governance (D'Amato et al., 2011), especially with the complex landscape. Mangroves are coastal forests comprising diverse ecosystems and habitats with a range of flora and fauna that have developed adaptations to live in tidal environments (Tomlinson, 1986) of estuaries, riverbanks, and lagoons. Thus, the mangrove forests are referred to as unique forests with diversified and complex interfaces between land and ocean, commonly found in tropics and subtropics. Mangroves have multiple socioeconomic and environmental functions (Datta et al., 2010; García-Fernández et al., 2008; Jusoff and Taha, 2008), for example, wood and non-wood forest products, fish and fisheries products, breeding grounds and nutrients for fishes, coastal protection against natural calamities, ecosystem restoration, and conservation of biological diversity (e.g., mammals, reptiles, birds, amphibians; FAO, 2007; Khan and Giessen, 2021).

Several studies have demonstrated anecdotal evidence of global mangrove losses at an alarming rate (e.g., Alongi, 2002; Feka, 2015; Polidoro et al., 2010). Because of increased population pressures in coastal areas and the lack of awareness of the conversion usage of mangrove areas in the majority of countries in which they exist, environmental degradation is largely observed (e.g., Brammer, 1990). Some scholars have argued that the forest sector follows the ancient tradition of utilitarian aspects, although the introduction of conservation features for sustainable forest management brings complexities to the forest policies (Khan and Giessen, 2021). Thus, the true value of mangroves has not been assessed based on comprehensive information on conditions and trends (Duke et al., 2007; Spencer et al., 2016), which is also limited at the global and regional levels. By contrast, the diversified environmental resources of forest coverages (e.g., mangrove areas) are administered by multiple bureaucratic actors who address relevant policies, resulting in potential conflicts of interest (Krott, 2005). Additionally, effective participation of local communities in mangrove management (Roy, 2016; Vierros, 2017) and promulgation of policies and implementation with adequate financial and human resources are the foremost necessities for conserving and mitigating the widespread loss of mangrove resources (FAO, 2007; Khan and Giessen, 2021).

Hence, the author employed the Sundarbans Mangrove Forest (SMF) of Bangladesh—the world's largest single tract of mangrove forest, as an illustrative case to describe mangrove forest policy and management in this study. Comprising diverse ecosystems, with a range of flora, fauna, and their habitats, the Sundarbans is characterized as a unique mangrove forest (Islam, 2003) and is listed as a UNESCO World Heritage Site and a Ramsar designated wetland of international importance. Through multiple uses (Hoq, 2007, 2014; Iftekhhar, 2006; Roy, 2016), such as timber extraction, fisheries, honey production, and others, the resources of the SMF support the livelihoods (Roy, 2017) of 3.5 million people in coastal communities (Kabir and Hossain, 2008). Thus, the Sundarbans is an area of national as well as international importance from policy and management perspectives (Khan et al., 2020). Like other mangrove forests of the world, the Sundarbans have been adversely affected by both natural and man-made factors over time. The natural factors include the courses of rivers changing, reduced freshwater supply to the mangroves, silt deposition in riverbeds, sea-level rise, salinity intrusion, etc. (Khan et al., 2020). In the future, salinity intrusion and pollution may significantly reduce the fish diversity, and production in this region since mangroves are critical areas for sustainable coastal fisheries production (Primavera, 1998; Manson et al., 2005; cf. Dharmawan et al., 2016). The anthropogenic factors include land-use change due to shrimp farming and agriculture (Hoq, 2014) in areas adjoining the forest and increased pollution of water from industrial and urban waste, altering the hydrological and morphological settings and the quality of the fish habitats in the Sundarban delta (Khan

et al., 2020). Moreover, the SMF is being continuously degraded—its total tree cover has been reduced by 50 percent over the past 20 years (Kabir and Hossain, 2008).

The management of the Sundarbans is entirely entrusted to the Forest Department (FD) of Bangladesh, which also performs development projects through its Annual Development Programme (ADP) with a clear budget and objectives every year (Khan et al., 2020; Khan and Giessen, 2021). Due to the combination of maritime and forest ecosystem properties, mangrove forest management and policy can be assumed to be highly multifaceted and contentious, with many issues arising around their management (Khan et al., 2020). However, the dynamics of protected forest discourses, the political orientation of the forest bureaucracies, and economic priorities play significant roles in policy arrangements applicable to the SMF (Khan and Giessen, 2021). For instance, the Government of Bangladesh implemented various initiatives to protect the SMF through coastal green belt afforestation programs and creating artificial mangrove forests (Khan et al., 2020). As per the provisions of the Environmental Conservation Act 1995, the Ministry of Environment, Forest and Climate Change (MoEFCC) declared a ten km-wide band surrounding the northern and eastern boundaries of the Sundarbans, an ecologically critical area, with the primary objective of protecting the SMF (MoEFCC, 2018). The Integrated Resources Management Plan for the Sundarbans, the first-ever comprehensive plan document for the Sundarbans, recommends protecting, restoring, sustaining, and enhancing the biodiversity of the SMF (BFD, 2018a).

In the case of the Sundarbans, the actors include local communities, politicians, non-governmental organizations and associations, as well as different administrations at multiple levels (Roy, 2014), which is very much consistent with the mangrove ecosystem (Feka, 2015). Diverse resources demand imperative multi-bureaucratic involvement in a coordinated manner for the SMF, which is significantly absent in the Sundarbans (Khan et al., 2020). Conflicts exist among different bureaucratic agencies due to their overlapping interests in the SMF (Roy, 2014). Hence, what remains unknown is whether the Forest Department is acknowledged for using mangrove issues as forest expertise in its existing and upcoming policy interests to sustain in the realm of bureaucratic rivalry and policy competition. Also, the ways in which different actors voice their arguments and interplaying different power elements into multilevel mangrove governance, and the degree of formal and informal interests to which they do rely upon, however, is currently demanding to explore.

Based on the aforementioned rationale, the doctoral study followed few guided research questions as below:

Research questions:

1. Which issues are addressed by the governmental bureaucracies in their mangrove forest policies?
2. What degrees of bureaucratic rivalry can we observe from the mangrove forest policy and management?
3. Which strategies of multiple actors exist to gain power in terms of authority and resources allocation in mangrove governance?

To address these questions, the author carried few consecutive pieces of research to pursue a cumulative PhD focusing on the field of interest—*mangrove forest policy and management*. In doing so, the objective of this doctoral study at the meta-level is to describe and explain the bureaucratic rivalry among the actors in mangrove forest policy and management. To illustrate the broad objective of the study, the author adopted case-to-case specific objectives that were addressed in six constitutive articles as below:

Research Article	Specific objectives
<i>Article 1:</i> Khan, M. F. A., Rahman, M. S., & Giessen, L. (2020). Mangrove forest policy and management: Prevailing policy issues, actors' public claims and informal interests in the Sundarbans of Bangladesh. <i>Ocean & Coastal Management</i> , 186, 105090.	<ul style="list-style-type: none"> - to identify the current issues which are publicly debated in respect of the multiple uses and management of the Sundarbans; - to analyze actors' public claims and arguments concerning those issues; - to assess if only formal interests are reported or if actors' informal interests are also partially revealed in the public deliberations;
<i>Article 2:</i> Khan, M. F. A., & Giessen, L. (2021). Exceptional bureaucratic rivalry in mangrove forest policy: Explanations from the Sundarbans, Bangladesh. <i>Ocean & Coastal Management</i> , 203, 105510.	<ul style="list-style-type: none"> - to analyze and reveal the assumed high degree of bureaucratic rivalry in the Sundarbans mangrove forest policies; - to explain it by using bureaucratic politics theory, especially the allocational rivalry and functional rivalry between the lead agency and other bureaucracies involved.
<i>Article 3:</i> Khan, M. F. A., Uddin, M. S., & Giessen, L. (2021). Microcredit expansion and informal donor interests: Experiences from local NGOs in the Sundarbans Mangrove Forest, Bangladesh. <i>World Development Perspectives</i> , 21, 100295.	<ul style="list-style-type: none"> - to examine the causes of microcredit expansion adjacent to the Sundarbans, with the aim of finding any causal link, if present, between the independent variables—local people's financial status and available financial support from the NGOs—and the dependent variable, microcredit expansion.
<i>Article 4:</i> Khan, M. F. A., Villanueva, F. P., & Giessen, L. (2021). International Mangrove Governance: A Fragmented Regime Complex without Institutional Core. <i>Global Policy</i> , [Under review].	<ul style="list-style-type: none"> - to explore the International Mangrove Regime Complex (IMRC) by mapping the institutional elements which comprise it; - to identify the potential synergetic or conflictive relationships that may exist among the institutional elements.
<i>Article 5:</i> Khan, M. F. A., Rahman, M. S., Maryudi, A., & Giessen, L. (2021). Actors' Power Network in the Multilevel Governance: A case for Sundarbans Mangrove Forest of Bangladesh. <i>Forest Policy and Economics</i> . [To be Submitted].	<ul style="list-style-type: none"> - to identify actors and the extraction of their interrelationships based on different power resources, which frame power interaction of the Sundarbans mangrove governance at multiple levels of jurisdictions.
<i>Article 6:</i> Rahman, M. S., Khan, M. F. A., & Giessen, L. (2021). Sustainable Development Goals and its policy development for achieving environmental sustainability. <i>Sustainable Development</i> . [To be Submitted].	<ul style="list-style-type: none"> - to analyze the status of policy changes related to Sustainable Development Goals (SDGs) policies currently implementing by the environment and forest sectors of Bangladesh using the analytical framework of policy coherence and consistency as well as symbolic and substantive policy changes.

2. Analytical framework and hypotheses

2.1. Mangrove forest policies and their wide range of policy issues

The concept of policy and policy process are explained in Article-2 (Khan and Giessen, 2021). Based on the domestic policy process and different types of existing/envisaged policies, mangrove forest policies and multiple issue areas were conceptualized. The theory is used in order to select appropriate policies as well as to understand the bureaucratic conflicts among the relevant actors.

Policies are defined as planned actions adopted or proposed by an organization or individual intended to address a problem (Howlett et al., 2003; Rayner and Howlett, 2009). Anderson (2014:20) defined policy as a “purposive course of action or inaction undertaken by an actor or set of actors in managing a problem or matter of concern.” Forest policies are delineated at the core notion of central policy studies by a number of scholars, and successful resource management of any forest relies on efficient formulation and implementation of policy and legal perspectives (Khan and Giessen, 2021). Forest policies may be considered as i) forest-focused policies (formally and explicitly addressing forests as a primary issue), ii) forest-related policies (as a secondary issue), and iii) forest-relevant policies (not addressing forests formally and explicitly, but having empirical relevance to forests on the ground; similar to Kleinschmit and Edwards, 2013; cf. Giessen et al., 2016; Khan and Giessen, 2021). Thus Khan and Giessen (2021), summarised the forest policies in public sectors comprising all the corresponding acts, regulations, decrees or orders, programs or projects, objectives or visions, and plans or guidelines linked to forests (primarily, secondarily, or empirically) in the economic, environmental,

and social context of the state. Because mangroves are widely treated as forest lands in the bureaucracy of Bangladesh, and diverse resource interests of the mangrove forest belong to different bureaucracies, this research considers mangrove forest focused, related, and relevant policies as *mangrove forest policies* (Fig. 1) (Khan and Giessen, 2021).

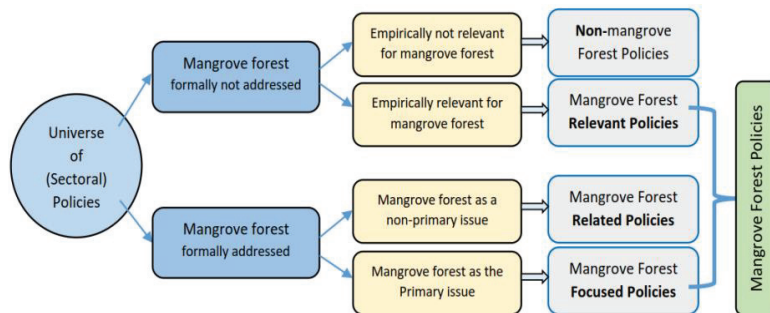


Figure 1: Definition of Mangrove Forest Policies (adapted from Giessen et al., 2016; cf. Khan and Giessen, 2021)

Inclusive policies are derived from the forefront complementary state and non-state actors, and sufficient knowledge and expertise contributed to the formulation, adoption, implementation, monitoring, and evaluation stages (Zafarullah, 2015; Khan and Giessen, 2021). Therefore, analyzing policy development processes is challenging because it has complexity at the strategic and implementation levels and manages many bureaucratic actors and economic, social, and environmental perspectives (Khan and Giessen, 2021). Thus, this research categorically divided policies into two types: “*Policy Directives*,” where all the acts, rules, regulations, plans or guidelines, orders, or decrees exist, and these are officially structured as various types of general instructions at strategic levels in the bureaucracy for the specified sector; and “*Policy Programs/Projects*,” the set of time-framed activities, which designed to be implemented with distinct budgets to fulfill particular objectives for the specific geographical location (Khan and Giessen, 2021).

Issues are the specific agendas discussed, particularly when different actors have a common interest (Krott, 2005), and actors have active roles in relation to specific issues and perform a plan of action based on self-interest, often covertly (Khan et al., 2020; Khan and Giessen, 2021). Therefore, bureaucratic actors’ interests influence which policy issues are adopted and considered for execution in the bureaucratic politics of a targeted policy field (Khan and Giessen, 2021). Because the Sundarbans possess diverse types of resources in a single tract of mangrove forest (Rahman, 2000), they have multiple uses in different sectors (Khan and Giessen, 2021). Through multiple uses, such as timber extraction, fisheries, honey production, and others, the resources of the SMF support the livelihoods (Roy, 2017) of 3.5 million people in coastal communities (Kabir and Hossain, 2008, Khan et al., 2020). Thus, the Sundarbans is an area of national and international importance from policy and management perspectives (Khan and Giessen, 2021).

The developmental process of Bangladesh’s forest policy is strongly intertwined with the political development in the British colonial period to the present-day bureaucratic structure in social, political, and economic contexts (Zafarullah, 2003; Khan and Giessen, 2021). The authority entrusted with managing the SMF, the Forest Department (FD), has the core position of implementing policy tasks. Moreover, the SMF possesses diversified natural resources leading to multiple uses (Hoq, 2007, 2014; Iftekhar, 2006; Roy, 2016) and creates further complexities through different bureaucracies (Khan and Giessen, 2021).

Hence, the concept of mangrove forest policies and their multiple uses by different bureaucratic actors is important to understand how these features bring conflicts among relevant actors in utilizing multiple issues. This led to developing the idea of hypotheses 1 and 2.

2.2. Bureaucratic collaboration and rivalry in cross-cutting policy domains of multifunctional mangrove forests

The concept of bureaucratic collaboration and resulting fields of rivalry are explained explicitly in Article 2 (Khan and Giessen, 2021) under the purview of the theory of bureaucratic politics.

To understand the bureaucracy's political role, scholars have widely justified the decision-making process, which occurs among bureaucracies with bargaining, compromising, and negotiating, resulting in political decisions on a given issue area (e.g., Allison, 1971; Giessen and Krott, 2009; Giessen et al., 2014; Hubo and Krott, 2007; 2010; Krott and Hasanagas, 2006; cf. Khan and Giessen, 2021). "Politics is generically defined as the authoritative allocation of values, or the process of deciding - who gets what, when and how" (Easton, 1965; Lasswell, 1936; cf. Frederickson et al., 2018:50). Hence, state agencies compete among themselves informally for resources, political domains, and influence (Allison, 1971; Niskanen, 2017; Peters, 2010; Stern and Verbeek, 1998; Khan and Giessen, 2021). Importantly, cross-cutting policy issues (e.g., environmental issues) lead relevant bureaucracies to integrate specific policy fields for coordinated programs (Khan and Giessen, 2021). Giessen and Krott (2009) also argued that this integrated approach in the bureaucratic policy process receives remarkable attention in the environmental arena. Moreover, state agencies may uphold and adjust their strategic policy demands in a systematic manner within the purview of relevant actors' joint actions to retain potential in the subsystem (Krause, 1997; Khan and Giessen, 2021).

Based on Weber's (1980/1922) bureaucratic theory, a public institution is mainly recognized by its distinct tasks and responsibilities, hierarchy, and rule-bound procedures for delivering public services (Khan and Giessen, 2021). However, Peters (2010) detailed it further: Bureaucracies compete with one another when they aim for the same object of responsibility in a cross-cutting policy issue area (similar to Downs, 1967), for example, agriculture or environmental sectors (Giessen et al., 2014). Thus, bureaucratic rivalry exists when implementing policy tasks conducted by more than one actor who has a lead role in a given policy issue area (Khan and Giessen, 2021).

Bureaucratic collaboration has attained paramount significance in the literature, and it is considered inherently good and where actors generally make the best mutual decisions (Ostrom, 1990 cf. Kumar Panday, 2006). However, to illustrate the policy process based on advocacy coalitions, Sabatier (1988) suggested how a belief system is shared in values, assumptions, and perceptions, which together influence the policy in favor of actors' desires (Khan and Giessen, 2021). These shared beliefs determine actors' strategic roles in competing coalitions, resulting in policy (Arts, 2012; Sotirov et al., 2011; Sotirov and Memmler, 2012 cf. Giessen et al., 2014). Although empirical evidence suggests that this bureaucratic strategy of alliance forming does work in a limited number of situations for devising public policy, the endeavor of these coalitions reconnoiters the significance of bureaucratic competition over policy composition (Nicholson-Crotty, 2005; Khan and Giessen, 2021).

However, literature has observed two strains of state agencies' competition, those are competition over scarce budgetary resources and competition over bureaucratic autonomy and authority (Khan and Giessen, 2021). The latter is generally known as "*functional rivalry*," and the former is known as "*allocational rivalry*" (cf. Nicholson-Crotty, 2005). Acquiring financial resources is the most important area, which forces conflict between bureaucracies (Campbell and Szablowski, 1979). However, the decisions between the competing bureaucracies are inherently political for the case of budgetary processes, although each side shows their logical arguments (Peters, 2010). On the other hand, Downs (1967) argued that bureaucratic agencies act to grab a position within a policy space, where they could secure the policy preferences that fit best inside their territory (Khan and Giessen, 2021). Thus, the functional rivalry of bureaucratic competition exists among multiple state agencies, where they fight to perpetuate their autonomy while supervising a considerable share of staff and budgets in policy implementation (Khan and Giessen, 2021). In addition, policies are being formulated, and the

establishment of budgetary allocation and functional autonomy is being earmarked for specific actors for implementing policy tasks (ibid). For example, the Forest Department (FD) of Bangladesh regularly allocates fishing permits to control fishery resources (Hoq, 2003) of the Sundarbans Mangrove Forest (SMF), which are supposed to be issued by the Department of Fisheries assuming the resources responsibilities (Khan and Giessen, 2021). Moreover, Roy et al. (2012) argued that issuing fishing permits by FD are heavily under-priced relative to fishing patterns and the amounts harvested, and sustainability and conservation aspects are overlooked (Khan and Giessen, 2021). Because of the ability of other bureaucracies to implement policy tasks in the SMF, a rivalry in the allocation and autonomy and policy competition is occurring among the involved bureaucracies (ibid). Sometimes, cross-cutting issue areas for the same policy field are drivers for the bureaucratic agencies to work together and establish comparative efficiency among them, and latent conflict sometimes emerges while interests interplay (ibid). Throughout the successive policy initiatives for the SMF, collaboration among relevant bureaucracies has occurred in some cases to cross-cutting policy domain, resulting in conflicts and competition because of their overlapping interests in the SMF (Roy, 2014; Khan and Giessen, 2021).

To look into the widespread concept of multifunctional forestry, Dietrich (1953:21) first described that the notion of "multifunctional forestry" is an attempt to define the optimal use of the forest for the common welfare of the people. However, multifunctional forest management practices as a land-use strategy are capable of meeting divergent societal interests, including rational and economic production as well as recreational functions and services. Diversified demands on forests, profound changes in the relationship between government and citizens as well as structural limitations on financial resources are decisive factors that determine the range of possible management options (Schmithüsen, 2007). Gustafsson et al. (2012) argued that the majority of the world's forests are multifunctional in cross-cutting issues, which often claim conflicting goals between production and conservation approaches. Mangroves are largely considered to be the provider of multifunctional forests both on ecological and societal aspects (Ma et al., 2019), and they hold a number of cross-cutting issues for planning and making policy decisions. Since multifunctional forestry was set as one of the main goals over the last two decades in several national forest policies (Sotirov et al., 2014), mangrove forests are also taken into account for the potential sector for studying underlying conflicts among relevant actors both in the aspects of autonomy and resources allocation.

In a nutshell, actors emphasize cross-cutting policy issues and/or diversified policy fields to uphold their desired budgetary allocation for undertaking different policies, which may be explained as allocational rivalry in the policy process (Khan and Giessen, 2021). To withstand the bureaucratic rivalry process, actors may emphasize sectoral expertise and interests to be focused on in the policies for ensuring and maximizing autonomy and financial resources (see the conceptual framework in figure—2).

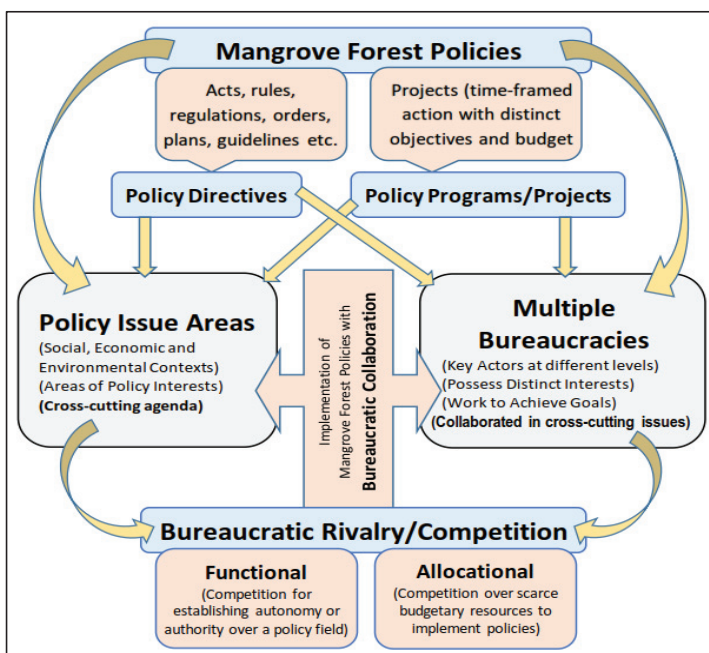


Figure 2: Conceptual framework of key factors in bureaucratic rivalry (Source: Khan and Giessen, 2021)

Hence, the concept of bureaucratic collaboration in cross-cutting policy issue areas of multifunctional mangrove forests shows that functional and allocational rivalry among bureaucratic actors is assumed. This led to developing the idea of hypotheses 1 and 2.

2.3. Actors’ formal and informal interests in multilevel governance systems

The theory of actors and actor categories, formal and informal interests, and multilevel governance are explained in Article 1 (Khan et al., 2020), Article 3 (Khan et al., 2021), and Article 5 (unpublished). The theories are used in order to capture the comprehensive concepts on multiple actors’ roles and interests in the multilevel governance of the Sundarbans.

Actors are the key players, ranging from different government or non-government organizations to individual persons (Krott, 2005). They have active roles concerning specific issues and perform a plan of action based on self-interest, often covertly (Khan et al., 2020). Schusser et al. (2015) denoted an actor is an entity that has a distinct interest and possibility of influencing a policy. Specifically, an actor is defined as “a social entity, a person or an organization, able to act on or exert influence on a decision. In other words: actors are those parties that have a certain interest in the system and/or that have some ability to influence that system, either directly or indirectly” (Enserink et al., 2010, p. 80). Based on this definition, actors are identified in Khan et al. (2020), who have delivered public statements focusing on the Sundarbans, with a distinct interest in it and a possibility of influencing. In social relation, scholars also use stakeholder as synonymous to the actor (Enserink et al., 2010) since stakeholder also refers to individuals, groups, or organizations that possess interests or partake in decision-making processes and can influence or are being influenced by an evaluation process or its outcomes (Bryson and Patton 2015; Article 5). Based on the definition of actors and stakeholders, the term ‘actor(s)’ is used in Article-5 (unpublished) who posits in multilevel governance on the Sundarbans Mangrove Forest (SMF) in Bangladesh, with a distinct interest in it and a possibility of influencing or being influenced.

In the current context, actors are analyzed based on the classification of Krott (2005) as forest users/dependents (i.e., local inhabitants and workers), associations and political parties, and government

and administration, that further elicited by Khan et al. (2020) with a particular case of the SMF in Bangladesh. Practically, the government and administrations are responsible for ensuring public welfare and exist as a powerful public actor at the center of the political organization (Krott, 2005), where political decisions, in general, come from (Khan et al., 2020). This category comes from the national-level state actors, which are mainly ministries and departments—i.e., public organizations, responsible for implementing government agendas in relation to a specific field of interest (Article 5). Fights for gaining powers in terms of financial allocations and authority are very common within government and administrative actors; thus, similar interests happen to support the argument and the establishment of a self-predetermined agenda (Peters, 2010; Khan et al., 2020). Development partners (often known as donors) are being categorized in this actor category, which provides technical and financial support (Aurenhammer, 2012), thus hold a powerful position in the policy process (Biermann et al., 2009; Willetts, 2001; Article 5). In the actor category of ‘associations and political parties,’ according to Krott (2005), associations representing organizations attempt to implement their interests by lobbying politicians. And, political parties are also kind of voluntary organizations which work independently to promote votes in competition with other parties, with the goal of representing themselves when elected to political office (Krott, 2005). The Mangrove Forest User group comprises people involved primarily with economic activities (Schusser et al., 2016)—i.e., honey collectors, fishermen, boatmen, tour operators, etc.—in the Sundarbans (Khan et al., 2020).

According to Myint (2003), actors’ choices are always concentrated on either issues or interests. However, actors exist on different geographical levels and build a social relationship through exchanging information (Schusser et al., 2015). Therefore, actors’ positions made them interlinked as Böcher and Töller (2012) rightly pointed out that actors’ interests are determined as driving factors in the way how actors behave (Khan et al., 2020). Understanding the issues and interests related to the effectiveness of any forest management planning, thus decision-making could be improved with prior actor analysis and organizing its network in a participatory process (Marques et al., 2020; Martins and Borges 2007; Article 5). According to Krott (2005:8), “Interests are based on action orientation, adhered to by individuals or groups, and they designate the benefits the individual or group can receive from a certain object, such as a forest.” These are favors that are often kept secret (Krott, 2005) but that influence issues to be adopted and considered for implementation by politicians (Khan et al., 2020). Self-interests could be informal interests—to increase budgets, staff, and fields of responsibility in the case of public bureaucracy, for example (Rahman and Giessen, 2017). Due to the presence of apparent diversity of different actors, informal interests are often not disclosed, though they can be predicted (Khan et al., 2020). There are formal interests of actors who clearly set out their responsibility according to their mandates towards policy goals (Krott, 1990); while implementing formal interests, actors always try to accomplish informal interests simultaneously (Khan et al., 2020).

According to Krott (2005), for classical forestry as a field, conflicts among multiple actors exist when there are multifunctional aspects that derive multiple interests to them. For the case of mangroves, the multiple functions are derived from their diversified resources, which cause conflicts amongst the interests of multiple actors (Adger et al., 2003; Khan and Giessen, 2021). These conflicts of interest remain latent until an actor involved mobilizes material or non-material resources (Yusran et al., 2017)—towards other actors in multilevel governance through which they interplay, for example (Article 5). Multilevel governance (MLG) creates dispersion of administering responsibilities or power among multiple jurisdictions in order to ensure more flexibility rather than to concentrate these functions in one jurisdiction (Hooghe and Marks, 2003). Hence, decision-making powers are distributed and custom-designed with such variation in mind across multiple levels of governance (Article 5). For example—multilevel governance of the European Union is solely network-based among different jurisdictions (Kohler-Koch, 1996), and its authoritative allocation of values is negotiated among the multitude of public and private actors (Ansell, 2000; Schout and Jordan, 2005; Article 5). On the other hand, functional differentiation among the multiple jurisdictions leads to form a relational network with task-specific deals in a given policy challenge (Leuffen et al., 2012). As forest policies exist at the core

notion of central policy studies, scholars often elicited the successful resource management of any forest relies on efficient formulation and implementation of policy and legal perspectives (Article 5). Martins and Borges (2007) argued that multilevel collaborative actors' involvement in such a landscape of forest management is the critical success factor in the decision-making process (Article 5).

Hence, the concept of multilevel governance for the Sundarbans mangrove forest is sketched following the identification of different actor categories with their underlying formal and informal interests. This led to the development of the idea of hypothesis 3.

2.4. Actor-centred power across multiple levels

The relevance of power theories and network relations of different power elements applicable for the actors at multiple jurisdictions are explicitly explained in Article 5 (unpublished). The theories are used to capture the comprehensive concepts on Actors' Power Network in the multilevel governance of the Sundarbans.

The theory explains that power is a key factor in forest politics and in scientific analyses of the interests and behaviors of actors working towards achieving a policy goal (Krott 2005; Krott et al. 2014). Power is assumed as the capability of an actor to influence other actors, which makes it difficult with practical politics since it is an invisible force in nature mostly (Krott et al., 2014). Conventional understandings of power lead multiple actors to arrange the immediate necessary action following existing rules and procedures to implement policies (Article 5). Scholars have some confusion with the power factor in forest governance and politics as it disappears oftentimes and used the terms 'influence' or 'capacity' instead of power (Silva, 1997; Winkel and Sotirov, 2011)—which seems power debate is very diverse having it produced different terms, overlaps and partly contested (Krott et al., 2014). Moreover, dichotomies were sorted as some power theories "situate power at the level of acting agent, while others situate power at the level structures" (Arts and van Tatenhove, 2004:347)—for example. Therefore, the author relates the visible or invisible capability of actors that determines other actors' action/position with mangrove governance in multiple jurisdictions and avoids vague connection to power observations in the same network (Article 5).

Brukas & Hjortsø (2004) argued that the relationship among various levels of actors describes power analysis in the policy process. Significantly, individual power action by particular actors embedded in broader configuration seemingly influences as significant within the network (Newell, 2006). Since actors are the fundamental factors in policy analysis and sometimes adhered to organizational hierarchy, the study assumes that both the structural hierarchy and the actor itself with power that is applied within a policy field (Article 5). Furthermore, identifying the resources or elements seems important to describe actors' power capability in a social relation (Article 5). The concept of allocating authority or physical sanction to the subordinate actors and distributing economic means (material resources) for implementing policy tasks were considered as the important elements in actors' power analysis (ibid). These two basic concepts of power resources were conceived in the literature of Etzioni (1975) and Krott et al. (2014). The first one was delineated as power based on coercion, and the second one was based on incentives. In addition, Krott's school proposed information as a power element as it acts to influence other actor's behavior also. Hence, the author tried to follow one of these novel contributions in the theory of actor-oriented power analysis—i.e., Krott et al., (2014)'s three elements [coercion, (dis)incentives, and dominant information], which were revealed earlier as the core instruments of actor-centered power in community-based forest governance. *Coercion* is defined as "altering the behavior of the subordinate by force" (Krott et al., 2014:4). *(Dis)incentives* refer to "altering the behavior by means of disadvantage or advantage" (ibid:5). And, *dominant information* is defined as "altering the behavior of the subordinate by means of unverified information" (ibid:6). However, information of individual actor's power elements helps them to posit in their relational network in problem-solving as well as decision making since these power elements justified them as appropriate. This study used the actor category of Krott (2005) for analyzing aforementioned power elements to

produce network relationships for the multilevel mangrove governance in Bangladesh as an illustrative case. Table 1 shows a brief description containing contextual boundaries adopted in the study of Article 5.

Table 1: Power elements with their observable facts and contextual boundaries

Power Elements	Observable Facts	Contextual Boundaries	Example
Coercion	Physical action, threat for physical action, or sources for physical action	<ul style="list-style-type: none"> - Approval for establishment of the concerned actors - Permission for launching a program - Threatening with operating a program - Possibility of a hindrance to the activities - Threat for punishment 	Permission for operating microcredit
Dominant Information	Providing of, or threat with, sources of information	<ul style="list-style-type: none"> - Providing the related information - Sharing of research/field experiences - Sharing of technical knowledge - Sources of rules/regulations/guidelines 	Training for the biodiversity conservation
(Dis-)incentives	Providing of, or threat with, sources of material or immaterial benefit	<ul style="list-style-type: none"> - Providing the financial supports - Sanction for promotion or upgradation - Sources of office or organizational support - Sources for material support for the operational program 	Financial support for creating alternative income-generating activities of the local people

Source: Adapted from Krott et al. (2014), Rahman et al. (2016)

Hence, the concept of multilevel governance for the Sundarbans mangrove forest is sketched incorporating power theories and power elements of different actors. This led to developing hypothesis 3.

2.5. Key arguments and hypotheses

It is evident from the aforementioned analytical concepts; mangrove forest exists as an important field of interest for a large variety of actors due to its multidisciplinary functions and implications—which assume an exceptional degree of conflict of interests among them. Actors may range from concerned individuals to non-governmental organizations to government bureaucracies, and since the Sundarbans are state property, they are primarily administered by the MoEFCC. Other state bureaucracies as well as non-state actors, are involved in the usage of their respective resources and have different abilities and interests. Interest theory suggests that actors do not fully display their interests and hide certain elements (Fatem et al., 2018; Hubo and Krott, 2013; Krott, 2005; Rahman and Giessen, 2017). In particular, public actors, such as ministries and agencies, are reported to display dual interests, consisting of their formal interests, publicly stated in their public mandates, and their informal interests regarding responsibility for issues, resulting in budgets and staff resources (Giessen et al., 2014). Using the case of the multiple uses, interests, and conflicts in the management of mangroves, this study has assumed the existence of the bureaucratic rivalry for the Sundarbans as a diversified field with cross-cutting policy issues based on different policy tasks conducted by state institutions. To withstand the bureaucratic rivalry process, actors may emphasize sectoral expertise and interests to be focused on in the policies for ensuring and maximizing autonomy and financial resources.

On the other hand, actors' power largely drives the resources mobilization through which they interplay and build network relationships to implement particular policies of a given sector. Coercion and information act as non-material power resources, whereas incentives act as materialistic power sources of an actor. Apart from the actors of national-level state actors, some local-level private actors and user group actors are grown-up with their own interests for due reasons of multiple functions of the mangrove forest. However, dispersion of power across multilevel governance is assumed as it may help to highlight the absence of local level user actors as an important part in decision-making in the contemporary diffusion of power away from national-level actors.