

POLICY AND INSTITUTIONAL ANALYSES OF MANGROVE MANAGEMENT IN THE INDUS RIVER DELTA

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Abstract

Evolving concerns over policy and institutions for the management of mangroves in the Indus Delta of Pakistan are being analyzed in this study. Primary and secondary information was collected through document analysis, in-depth interviews and group discussions. Findings of the policy analysis indicated a lack of clear policies focused on the conservation and management of mangroves due primarily to the conventional wisdom of seeing mangroves as economically less valuable resources. This had resulted in the split ownership of mangroves shared by three agencies namely, Port Qasim Authority (PQA), Sindh Forest Department (SFD) and Board of Revenue. While BoR and PQA were lacking any appropriate institutional arrangements for mangroves, SFD established a relatively management system for their mangroves owing to the agency's primary mandate. Broad suggestions have been given to address policy and institutional issues related to the mangroves.

Keywords: Forestry policies, Indus Delta, Institutional arrangements, Mangroves

Introduction

Tropical environments such as mangroves, rainforests and coral reefs are the most fragile and threatened ecosystems of earth. Although mangroves account for a small proportion of the total area of these fragile ecosystems, their loss has surpassed that of the rainforests and coral reefs (Valiela, Bowen, & York, 2001). From 1980-2005, the global loss of mangroves was estimated at about 3.5 Mha (indicating a decrease of 19 percent) of which about 1.9 Mha or 54 percent occurred in Asia (FAO, 2007a, 2007b). The global decrease of mangroves could be attributed to aquaculture for 52 percent, tree cutting for charcoal making and timber for 26 percent, upstream diversion of river flows for 11 percent, and forest damage by application of toxic herbicides, expansion of agricultural land, salt works and infrastructure for the remaining 11 percent (Valiela et al., 2001). While these are the superficial causes of mangrove loss, the underlying causes could be the weak institutional arrangements for the management of these precious resources. For long, policymakers in various parts of the world had ignored mangroves as 'wastelands' available for conversion into the other so called 'economically valuable land uses' (Choudhury, 1997; Hellier, 1988; Huitric, Folke, & Kautsky, 2002; Primavera, 2005). Nevertheless, now mangroves are increasingly being recognized for various productive and protective services to the humankind and has inspired the ecologist and environmentalist lobbies to advocate for the conservation and protection of these ecosystems (FAO, 2007b). To what extent such recognition has been translated into policies and institutional arrangement conducive to sustainable management of mangroves is a matter that needs further investigation. This paper specifically explores policy and institutional arrangements for the management of Indus River Delta mangroves in Pakistan as an attempt to fulfill the aforementioned research gap.

Research Methods

This study followed a two-step analysis. Firstly, a thorough policy analysis attempted to understand the context within which the existing mangroves governance systems had evolved. Based on foundation of first-stage analysis, the second-stage analysis assessed the institutional appropriateness for the management of mangroves under the jurisdictions of three agencies namely: PQA, SFD and BoR. The information reflecting the opinions of these agencies was collected through in-depth interviews with the concerned officials and, wherever possible, substantiated with group discussions conducted at nine mangroves dependent villages, published and unpublished reports, action plans, and policy and project documents. Supplementary information came from NGO and INGO representatives and other persons with knowledge on institutional and socioeconomic aspects of mangroves management in the Indus Delta. Since mangroves are a kind of forest, they have been governed by forestry policies in Pakistan. Consistent with this, the evolution of mangrove governance is assessed in relation to the forestry policies. In this regard, the intentions of the evolving forestry policies in terms of their concern about mangrove conservation have been analyzed based on four main criteria and associated indicators (

Table 4). The indicators for institutional analysis were drawn from the literature on common property resources. Agrawal et al. (2002) and Agrawal et al. (2008) found from the review of a large body of empirical work that most influential factors governing natural resources including forest were: the clarity in stipulation of user rights and duties; greater participation of resource dependent communities; adequate monitoring of resources and resource outcomes; enforcement of property rights; and investments in institutional capacities..

Table 4: Framework for the institutional analysis of mangrove management

Parameters and Indicators	Data type and sources
1. Boundary and property rights in mangrove areas - Delineation of boundaries - Managerial staff's familiarity with the boundaries - Field staff's familiarity with the boundaries - Stipulation of property rights in mangrove areas - Stipulation of access and withdrawal rights of local communities	Qualitative data obtained through field observation, interviews, policy documents
2. Monitoring mangroves use - Provision of field staff for monitoring - Enforcement of the laws on the use of mangroves - Authority to take legal action against violators of the rules	Qualitative data obtained through interviews and FGDs
3. Restoration and conservation of mangroves - Efforts taken for restoration and conservation - In-house expertise in plantation and restoration - Staff capacity - Partnership with other agencies for mangrove conservation	Qualitative and Quantitative data obtained through interviews, field visits and project documents
4. Community participation initiatives - Participation in mangroves restoration and conservation - Awareness-raising on the importance of mangroves	Qualitative information obtained through interviews and FGDs

Mangrove Management: Evolving Policy Concerns

While pursuing the revenue seeking forest policies of the British Asia, the colonial forestry agency introduced silvicultural management systems in mangrove forests of Sunderban in the then British-India and Matang of Malaysia. Nonetheless, the colonial foresters did not pay any attention to the management of mangroves in the Indus Delta because of the perception that these resources had no direct economic value. This perception was further reinforced by the dominance of mangroves by single species of *Avicennia marina* (locally known as *Timir*) characterized by low quality timber, with little economic value. Therefore, the mangrove covered areas of the Indus Delta were categorized as ‘wastelands’ and put under the jurisdiction of the Board of Revenue (BoR). Nevertheless, there are evidences that in the 1946 one of the colonial foresters proposed scientific management of the Indus Delta mangroves (SFD 1985) but such proposal could not be materialized owing to the end of colonial rule in the then British-India. Following its independence in 1947, initially Pakistan continued with the colonial forest policy of 1894 to cope with scarcity of forest products. However, soon the policy proved to be inadequate as it sought preserving existing forests while the forest scarce country was in need of expanding its forest cover.

Subsequently, the Government promulgated National Forest Policy of 1955 emphasizing plantations of fast growing exotic tree species along roads, railways and canals, and on wastelands. This policy proved a landmark policy in the management of the Indus Delta mangroves that were at that time the wastelands of BoR. Given the fact that the wastelands of the Indus Delta were already occupied by mangroves, SFD saw it as opportunity. As authorized by the still intact Forest Act of 1927, in 1958 the Forestry Section of Food and Agriculture Department of West Pakistan declared these mangroves as ‘Protected Forests’ under the jurisdiction of the Sindh Forest Department (SFD). Subsequently, the SFD established a Coastal Zone Afforestation Division (CZAD) and focused its effort on the completion of three main tasks (SFD 1985). The first task was to take over the control of mangroves, which were sources of firewood and fodder for the local communities. With little agitation, the local communities conceded SFD’s ownership of mangroves and as agreed to pay a nominal royalty for the materials gathered from these forests. The second task, which remained mostly unattained during the stipulated period, was the plantation of mangroves on fallow mudflats. The most important task, however, was to collect all necessary information required for the preparation of a working plan for the silvicultural management of mangroves as required by the forest policies at that time. Nevertheless, not much could be done until 1963 for effective conservation of mangroves (SFD 1985).

The first working plan for management of mangroves was introduced in 1963 and was valid till 1983. With scant in-house knowledge on mangroves and their management, the plan was mostly inspired by the Sunderban management plan of East Pakistan (Bangladesh since 1971). In accordance with the forest policies of 1962, the key objective of the management plan was the plantation of commercially valuable exotic mangrove species while other objectives included the maintaining healthy mangrove cover for the protection of coastline, inland agriculture and human settlements from the effects of the sea (SFD 1964). While half way through its implementation, the plan was failed to comply with the policies aspiring mangroves to contribute into economic development of the country. This was because of the fact that *Avicennia marina* species, constituting more than 90 percent of the mangrove cover had a fourth grade timber (see mangrove wood classification by Becking et al. 1922 in Chapman 1976) that had a utility only as poor quality wood fuel. Besides, the transportation of wood from creeks through boats was also uneconomical. In some cases, the cost of tree

felling and transportation was more than twice the revenue from the mangroves. This led towards the abolition of CZAD in 1975 (SFD 1985). Until then standing trees used to be sold to the contractors who would bear all cost incurred on the harvesting of timber. As a last resort, SFD created a Mangrove Forest Utilization Wing for absolute departmental exploitation. However, this experiment also proved futile, thereby abandonment of the policy of commercial utilization of mangroves (SFD 1985).

In the 1970s the government established the Port Muhammad Bin Qasim to foster the international trade. To facilitate the establishment of the port, the Government asked SFD to transfer an area of about 64,000 hectares covered with mangroves to the Port Muhammad Bin Qasim Authority (PQA). The SFD had no alternative other than complying with the order, which was reinforced by the financial realities of mangrove management. Besides, perpetuation of the British-Indian Forest Policy (1894) urging FDs not to hesitate in relinquishing any forestland for more valuable land uses, such as agriculture, tacitly facilitated the transfer of mangroves to PQA in 1973. Apparently, there was virtually no policy concern about the ecological, aesthetic and social value of mangroves. While thousands of hectares of transferred mangroves were cleared for the construction of the port, the remaining ones were overseen by PQA as protected forest.

Not much effort was made for the management of mangroves until 1985 when SFD prepared their second working plan (1985–2005) for the remaining mangroves under its jurisdiction. This plan envisaged that through better understanding of the value of mangroves, the desired objective of making considerable contribution to the forest wealth of the country would be achieved. Although, the key objectives of this plan were similar to the previous plan, it also compared the protective value of mangroves with their productive value (SFD 1985). Besides, attention was also paid on raising public awareness about the indirect benefits of mangroves. The plan was also concerned with the sustainable supply of firewood and fodder to the local communities. A new Coastal Forest Division (CFD) was established to pursue the objectives of the second plan. Reportedly, plantation of mangroves was also carried out during this period (IUCN Pakistan 2005). Since, the expiry of the second working plan in 2005 till time this survey conducted in 2010, no new working plan was either released or was under preparation.

Meanwhile, Pakistan was also developing a massive irrigation network on the Indus River comprising several large dams, reservoirs and canal networks. Upon the completion of the major phase of the irrigation development in 1970s, the most of the river flow regimes were diverted for upstream agricultural. This caused severe water shortages in the downstream part of the river. As, a result, the agricultural mudflats of the central delta (Keti Bandar and Kharo Chan sub-districts) could no more facilitate the cultivation of red paddy and were ultimately abandoned. In the absence of freshwater, these mudflats were taken over by tidal inundation and were ultimately abandoned by the local communities (Memon and Thapa 2011). Then, the prolonged fallowing of erstwhile rice fields provided an opportunity for the propagation of mangroves which by default came under the jurisdiction of BoR. Three agencies namely: SFD, PQA and BoR thus claim an area that contains more than 90 percent mangrove cover of the country (Memon 2011).

Besides understanding the fragmented ownership patterns of the Indus Delta mangroves, the review of forest policies reflect few other important themes which have important insights for understanding the existing institutional arrangement for the management of mangroves. First, it is pertinent to note that throughout the evolution of forestry policies in Pakistan, mangroves

were exclusively stated first in 1962 and later has been a continuous theme of various policies only since the adoption of NCS in 1992. The revitalized interest in mangroves is understandable in the context sustainable development paradigm that stated gaining worldwide popularity in the 1980s. Second, despite of the failure or weak implementation of almost every forest related policy released since the independence of Pakistan, a blind faith that the FDs could improve the state of country's forests has been the most durable theme of various manifestos. Even the influence of international development thinking and donors prescribing community participation appeared since the policy of 1991 (Ali 2009; Babar et al. 2007) and NCS 1992 could not pose any serious challenge to the domination of FD over forests. Subsequent forest policies of 2001 and 2007 and the environmental policy 2005 demonstrate more relevance in terms of the importance of mangroves and their management. Nevertheless, their effectiveness is limited as both forest policies of 2001 and 2007 are still drafts awaiting the cabinet approval while the environmental policy 2005 provide overarching theme that could have some effect only if translated into concrete actions.

Institutional Arrangements for the Management of Mangroves

Boundary and Property Rights Issues in Mangrove Areas

The boundaries of mangrove areas under the jurisdictions of PQA, SFD and BoR were clearly drawn mostly following creeks in the deltaic landscape. In the areas where such creeks were absent, concrete pillars were erected by SFD in 1962 to prevent any encroachment for agriculture and human settlements. Later when SFD realized this was unlikely to happen primarily due to the unavailability of freshwater in mangrove dominated land, they stopped maintenance of those pillars, most of which had already disappeared. In the case of mangroves under BoR, their boundaries were drawn with reference to various natural and manmade features such as creeks, canal network and roads as these lands were settled. Not only the sub-district level revenue officials but also many of the local people could easily identify the boundaries in BoR area. However, the PQA and SFD officials were not much familiar with the otherwise very clear boundaries of mangroves under their jurisdictions because of their limited field visits and frequent transfers.

Land rights in the areas under SFD and PQA were quite straightforward since these lands were government property and thereby devoid of any private claims. However, land rights in BoR area were somewhat complex as it was gathered based on ZDA (2011) that about 25 percent of the land in Keti Bandar and Kharo Chan sub-districts was under private property rights arrangements (locally called *Qabooli* lands) and another five percent was reserved for public purposes including the land under sanctioned villages, roads and canal networks. The remaining two thirds of the land were registered as government property (locally called *Na-Qabooli* lands). Similarly, rights of the local communities to access and withdraw mangrove forest products from the areas under SFD and PQA were rather clear due to their status as protected forests. Legally, in a protected or second-class forest, local people could collect forest products for their domestic use, while the collection for commercial purpose was prohibited.

Regarding the mangroves of BoR, there was not much concern about the access and rights as this agency was not primarily responsible for the management of mangroves. Despite such limitations on the part of BoR, the local people avoided cutting these mangroves for wood fuel reportedly because the required amount of dead, dying or fallen trees was still unavailable in relatively young mangroves in the BoR area. Therefore, the local people living in BoR area

also continue to collect firewood from the mangroves of Dabbo, Chan and Kajhar Creeks, which is actually the area under the jurisdiction of SFD.

Monitoring the Use and Condition of Mangroves

All three agencies had a provision of field staffs, but only those appointed by SFD were formally responsible for monitoring the local use of mangroves. However, the monitoring of SFD's mangroves could also not be carried out effectively due to inadequate number of field staffs and logistics such as patrolling boats. Moreover, there were legal provisions of fines and sanctions on the reckless or illegal use of mangroves, but reportedly the cases of arrest and prosecutions against rule violators were very rare. It was observed at various group discussions that there was an unofficial consensus among the camel herders and SFD officials that the former will never graze their camels in the planted mangroves, while the latter will not strictly prohibit the grazing of camels in the naturally grown mangroves. In the case of PQA, the concerned official reported that although nobody was formally assigned such a responsibility but the security guards were monitoring the use and status of mangroves as a part of their routine watch on the assets and infrastructure of the port. However, PQA guards were reportedly not much concerned with the permissible use of mangroves as reflected from group discussions in PQA area. Since BoR had not specified any set of rules and regulations on the local use of mangroves, these resources were in principle open for use by everybody. Again, this was attributed to mangroves conservation not being the primary responsibility of BoR.

Restoration and Conservation of Mangroves

SFD has pioneered the restoration and conservation of mangroves in the Indus Delta and has replanted nearly 20,000 hectares of mangrove in discrete locations (IUCN Pakistan 2003). At a smaller scale, PQA has also supported the plantation of about 1,200 hectares of mangroves (IUCN Pakistan 2000; WWF Pakistan 2003). Most mangroves planted by PQA were in replacement of those cleared for the development of port facilities including new jetties. On the other hand, BoR had not initiated any mangrove plantation in their area, as they did not consider it as their responsibility. With an underlying objective of enhancing the financial viability of mangroves, SFD had made significant attempts to reintroduce the extinct or exotic mangrove species in the Indus Delta and to some extent had been successful in the reintroduction of *Rhizophora mucronata* species. In the past attempts were also made to introduce commercially important exotic species such as *Excoecaria agallocha* and *Nypa fruticans*. However, since the survival rate of these species was very low, the policy of promotion of such species was abandoned while currently all plantation projects plant *Rhizophora mucronata* species as it can be easily grown in the local environ. SFD has got the in-house capacity including human resources with good experience in mangrove plantation, while the other two agencies have not. PQA has to some extent overcome this by involving some local and international NGOs having the capacity in mangrove plantation. None of the agencies, including SFD, had made any investment in institutional capacity building for mangrove conservation and restoration. SFD realized such need but, reportedly, lacked required financial resources; while PQA and BoR did not realize such need considering it as beyond their mandates. Almost all mangrove plantations in the Indus Delta had been accomplished through the partnerships with regional and international agencies such as the World Bank, IUCN and WWF. Particularly, SFD has a long established partnership with foresaid agencies while enduring mangrove conservation and restoration (IUCN Pakistan 2005). PQA had also collaborated with NGOs like Shirkat Gah, WWF and IUCN to carry out

mangrove plantation and conservation. However, BoR had not carried out any such activity either independently or in collaboration with other agencies.

Community Participation in Mangrove Management

None of the three agencies had made any kind of arrangement mustering local involvement in management of mangroves under their respective jurisdictions. In the case of PQA and BoR, obviously it was because these agencies had no formal mandate for mangrove conservation. Surprisingly, despite its weak institutional capacity mentioned above, SFD also had no arrangement for involving the local communities in the management and conservation of mangroves. SFD had simply prepared a list of mangrove dependent communities for the entire Indus Delta in 1998 (Shah 1998) but the list was never utilized for any meaningful purpose and is already outdated. Nonetheless, the officials of SFD and PQA claimed that they had involved the local communities in the restoration and conservation of mangroves. However, a follow-up discussion revealed that the so called participation was limited to the engagement of local people in mangrove plantation as wage laborers. Beyond this, none of the agencies had any mechanism through which the local communities could be mobilized to participate in the conservation and management of mangroves or carryout the registration of mangrove user groups. The discussions held with concerned officials gave an expression that social mobilization, mangrove forestry extension, formation and registration of mangrove user groups were alien concepts alien for these agencies. Similarly, none of these agencies had any enthusiasm to introduce any participatory mangrove management systems that current policy framework since adoption of NCS 1992 advocates.

Discussion and Conclusion

The wisdom of 20th century emphasized on the ‘ownership’ of common pool resources such as mangroves and forests as an important condition for their sustainability. Over the last few decades, such understanding has resulted in retreat of governments’ ownership of forests in favor of the private and community forestry (Webb and Shivakoti 2008). Nevertheless, in a situation where governments still own about 80 percent of the global forests (FAO 2010), it is important to ask weather all forests under the ‘umbrella of government ownership’ are the responsibility of agencies appropriately mandated for the sustainable management and conservation of these resources. Findings that mangroves in the Indus Delta are undergoing varying degrees of management and conservation thus corroborate with the emerging consensus that effectiveness of any resource management is only partly explained by who owns them (Agrawal et al. 2008; Schlager and Ostrom 1992). The study further adds that only the owners, managers or users with an objective of sustainable conservation and management of their resources are likely to establish effective resource governance systems. Without the interests of the concerned owners or managers, resources will suffer from the lack of interests and remain vulnerable to unsustainable utilization and eventually degradation no matter under any kind of property right arrangements.

Various implications emerge from this study to guide policy and institutional arrangements for the sustainable management of mangroves in the Indus Delta. Learning lesson from the past fallacy, a robust policy clearly highlighting the need for concentrated national, regional and local level efforts for effective management of mangroves should be devised first. In this context, mangroves should be considered as one of the precious ecosystems comprising not only forest, but also fishery and other allied biotic resources, and providing ecological services as well as many socioeconomic benefits. In view of virtually “no or weak

management system” in all areas arising primarily from the split ownership of mangroves, ideally, it makes sense to suggest integration of all mangroves in the Indus Delta under the jurisdiction of a single agency. Such an agency could be SFD as its primary responsibility is to conserve and manage forest resources including mangroves, and has built some in-house capacity to discharge its responsibilities. As the findings of this revealed, SFD’s capacity to discharge its responsibilities is far from satisfactory, this would require investments in equipping the agency with required trainings, resources and manpower to accomplish this task. Provided this option fails to garner needed support, PQA and BoR should also be obliged to take responsibility for management and conservation of mangroves by introducing separate mangrove conservation wings in their organizational landscapes. Otherwise, mangroves under the jurisdictions of these agencies would always remain vulnerable. This should be followed by building mangroves conservation and management capacities of these two agencies and strengthening the existing capacity of SFD through the provision appropriate trainings, resources and manpower.

While local communities are utilizing mangroves to meet some of their basic needs including fodder and wood fuel, their participation in the management of mangroves is lacking. In view of this reality combined with the lack of adequate required resources, including the manpower, on the part of mangrove owners, provision of an appropriate institutional mechanism mustering local community participation in sustainable management of mangroves is desirable. Such mechanism should enable the local communities to act as custodians of mangroves while continuing the use of these resources for fulfillment of their basic needs. Studies elsewhere suggest that community participation in natural resources management has emerged as a powerful institutional arrangement particularly where governments lack capacities and funds required to conserve and manage such resources effectively (Webb, 2008). Though so far Pakistan has not yet been able to adopt a policy of community participation in natural resources given the provisions in NSC 1992 regarding community forestry for second class forests, the agencies governing mangroves can take action towards this direction as it would ensure effective management and conservation of mangroves.

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