

Institutional Framework for Halda Fisheries: Drawing Lessons from CBFM Experiences¹

Mohammed A. Rab*

Abstract

River fisheries in Bangladesh is characterized as “open-access” and the history of administrative and legislative measures bear “contradiction and dilemmas” in resource extraction. The 1950 Fisheries act, the proclamation of 1973 that restricted lease to the registered fisher cooperatives and the experimental New Fisheries Management Policy (NFUP) of 1986 could not contribute to devolve into any participatory institution to introduce sustainable fisheries management. Because of persistent “commons dilemmas”, increasing fishing pressure and other anthropogenic reasons, the River resources degraded substantially. Over the past ten years, the Department of Fisheries (DOF) in collaboration with NGOs has been implementing community based fisheries management (CBFM) approaches with the technical assistance from the World Fish Center. The principal goal of the approaches is to provide access rights to the fishers through organizing poor fishers and the community to introduce sustainable fisheries management in beels, floodplains and River sections. The CBFM experiences suggest that management and institution building process in River sections is complex, and require participation of all concerned stakeholders including local government institutions and administration. CBFM-2 river fisheries management has broad based institutional framework to include the community at large and ‘ the local government along with the direct beneficiaries and resource users..A positive feature of such institutions is its ability to facilitate flow of information among agents, which is a key to maintain solidarity within and across group s. In this paper, an institutional framework is suggested to manage the Halda Fisheries. that can be debated and refined.

¹ Submitted for presentation in the regional seminar organized by the Bangladesh Economic Association, Chittagong Chapter. This paper is based on CBFM project documents, monitoring reports and field observations of World Fish staff and partners. Author acknowledges the contributions of project partners and World Fish staff for their effort in Collecting and documenting project interventions and output. However, the author alone is responsible for the views expressed in the paper, World Fish Center or any partner of the project do not bear any responsibility for any of the Views or comments.

* Scientist (Resource Economist), World Fish Center, Bangladesh and South Asia Office, Banani, Dhaka

1. The River Fisheries in Bangladesh: The “Commons Dilemma” Persists

The open-access river fisheries in Bangladesh resembles the characteristics of “common-pool resources” where property rights are not clearly defined as to who can use these resources and who can regulate it. The history of administrative and legislative measures since 1950 bears a “contradiction and dilemma in government policies.³ that could not contribute to devolve into effective participatory institution at the resource user level. The Fisheries Conservation Act of 1950 provided management responsibilities to the Ministry of Land (MOL) and enforcement of fisheries law to the Department of Fisheries (DoF) without adequate power of convicting the offenders. Nevertheless, the Act mainly focused to protect few important species like carps and hilsha fish from premature catch rather than focusing on the modern fisheries conservation and management that can protect other indigenous species and the fish habitats. The gear restriction provisions provided by the Act cannot keep pace with the innovations in using gears that are more destructive.

Since 1950, the MOL managed these resources with the objective of raising revenue by providing short-term access rights to the highest bidders through auction, not necessarily to the fishers. The proclamation of 1973 restricted the lease to the registered fisheries cooperatives without changing the revenue-focused strategy. The introduction of the experimental New Fisheries Management Policy (NFMP) in selected 270 water bodies in 1986 could not yield intended result to restrict open-access through issuing license to the “genuine” fishers. Under the NFMP, the DOF and a few NGOs joined hands in fisheries management. One of these projects was the “Improved Management of Open water Fisheries” (IMOF) implemented by the DOF in collaboration with four NGOs with the financial assistance from the Ford Foundation. The World Fish Center (formerly known as ICLARM) provided technical support to the project. Experience of the project suggest that although licensing provided limited gains in achieving equity (Aguero and Ahmed (1989), most of the benefits were diverted to the ex-leaseholders who in many instances were able to retain control by advancing funds to pay license fees (Pomeroy and Viswanathan 2003). The new policy contributed to grow a class of rent seeking powerful non-fishers who managed to procure the licenses and created a type of “patron-client” relationships in which real fishers lost their traditional access to the resources. In

³ Pomeroy and Viswanathan, 2003. Fisheries and Co-management in Southeast Asia, In “The Fisheries Co management Experience: Accomplishments, Challenges and Prospects” eds. D.C. Wilson, J.R. Nielsen and P. Depbol, Kluwer Academic Publishers, Dordrecht/Boston/London.

1995, government abolished the licensing system and continued to rely on the revenue-oriented policy. Therefore, dilemma of the commons accumulated over the years and continues to persist and the result is over fishing. In addition, increasing fishing pressure due to exploding population growth, anthropogenic causes, siltation and trans-boundary water sharing problems aggravated the resource degradation. Its productivity has been declining every year; many of the indigenous species are either extinct or nearly extinct. Declining catch from open waters has made the livelihoods of the poor fishers worse. this paper is an attempt to review the experiences of project base alternative management approaches in river fishery and how these experiences are useful in designing institutional framework for management.

2. Commons Dilemma: Melting the Ice

The most important characteristic of the common-pool resources is the “subtractability of resource units once extraction occurs”⁴. That is one harvest from the resource unit subtracts from the amount left at any point in time that creates rivalry in consumption among the resource users. Another feature of these resource systems is the impossibility of excluding beneficiaries once improvement of any set of resource unit had been made. This is the classic case of “free ride, problem in collecting revenues once a public good is provided. Experimental psychologists and game theorists explain this individual behaviors by playing one shot Prisoner’s Dilemma game with the assumption that each individual in the society pursue his self interests, that is competing with each other, and the end result is over extraction of resources or “tragedy of commons” as emphasized by Hardin (1968) in his celebrated article “The Tragedy of Commons”. Implications of this theoretical development had been to establish private property rights in the resource system and the obvious solution was the introduction of leasing system. This made the government defacto owner and manager of the common resources. History of resource management until late 1990s echoed the one shot prisoners’ dilemma game, which could little solve the commons dilemma.

Throughout the 1970s and 1980s, social scientists, experimental psychologists examined the factors that influence cooperation across a range of social dilemmas

4 Dietz, T., Dolsak, N., Ostrom, E., and Stem, P.C. 2002. The Drama of the Commons, In “The Drama of the Commons”, eds, Ostrom, E, Dietz, T., Dolsak N., Stem, P.C., Stonich, S., and Weber, E.U. National Academy Press, Washington, DC.

including commons dilemma (Olson,1965); Kelley and Stahelski, 1970; Kelley and Grezlak, 1972; Dawes, et al., 1977)*. These, theoretical developments suggest that the individuals' decision not only determined by his self interested motives but also by social motives and "altruism", that is individuals take others' welfare into account. Kelley and Stahelski (1970) identified two types of personalities using repeated prisoners' dilemma game "cooperative" and "competitive". Now the baffling question is how and under what circumstances the "competitive" individuals become motivated to extend cooperation. Experimental research suggests that cooperative behavior may be achieved through a "payoff structure" that will provide rewards and punishment (Van Lange et al., 1992). Gatcher and Fehr (1999) moved beyond the economic rewards to examine the effects of social approval on people's willingness to participate in cooperative games. Social approval yields optimum results when participants in the resource units have the opportunity to interact over time and the participants belong to group. This emphasizes the importance of communication within group members that enhances group solidarity, elicits commitments to cooperate (Kopelman et al., 2003).

Empirical research provides evidences of successful resource management in different parts of the world that devised community-based management or co-management institutions applying the above theoretical developments over the past two decades. Reviewing the stories of implementation of co managed institutions all over the world, Agarwal (2003) concluded that successful institutions are those "that last over time, constrain users to safeguard the resource and produce fair outcome". This means that the common property arrangements can result in efficiency, equity and sustainability, but all these come at a cost. The features of sustainable common property institutions can be summarized below:

- Information sharing and communication
- Networking of stakeholders
- Equal participation (homogeneity of identities and interests)
- Shared norms
- Built-in incentive structure both moral and material
- Appropriate leadership/democratic values
- Interdependence among group members and group solidarity
- Accountability and transparency in financial management and decision making

3. CBFM Experience in Bangladesh

3.1. Background

The experience of IMOF project that was implemented to support the NFMP provided important insights about the importance,~ of collaboration between NGOs and DOF, and only NGOs has the capacity to organize effective participatory institutions of fishers for collective management. This led to a more flexible community-based approach, which strengthened NGO involvement through the CBFM Projects phase I and 2. The World Fish Center has been playing a vital role by providing technical and research support. The phase I was initiated in late 1995 and continued until July 1999. It worked in 19 widely scattered water bodies (10 rivers and 9 beels and baors) with the support from three NGOs and the DOF worked as the implementing agency. The project worked to empower fishing communities to become co-managers of these fisheries, and to ensure a more equitable distribution of benefits from fishing.

Although the CBFM-I proved effective in establishing participatory management of fisheries and providing equitable distribution of benefits, sustainability of the community organizations and its coordination across extensive inland floodplains and appropriate CBFM models for various social and environmental conditions remained unanswered. The CBFM-2 was designed in response to these lessons, needs and policy issues with funding from Department for International Development (DFID). The goal of the CBFM-2 project is to improve livelihoods of the poor people dependent on inland aquatic resources through testing and assessing arrangements for user-based (community-based) fisheries management across the diversity of inland fisheries in Bangladesh, and by informing and facilitating appropriate changes in policy. The CBFM-2 is being implemented through a partnership of Department of Fisheries (DoF), World Fish Center and I non-government organizations (PNGOs). The project has been successful in mobilizing fishers and communities for fisheries management and capacity building over the last four years. It has covered 117 water bodies including 14 CBFM- I sites spread over in 47. Upazillas of 22 districts. In addition, 17 water bodies have been selected as control to assess the impact of CBFM approaches and interventions.

The project is testing three institutional approaches for fisheries management. Fisher managed approach is being largely implemented in government khas water bodies that involves lease payment to the* government revenue department. Beneficiaries and management committee members are absolutely fishers who

were selected based on project set criteria. Community led approach is mostly applicable in flood plains where most of the lands are belong to private owners and therefore, support from all concerned including the larger community is essential in establishing fisheries management. The water body management committee includes all stakeholders although much weight is given to fishers who have fishing as their primary occupation. The third approach involves women as the dominant stakeholders although other stakeholders are eligible to participate in either the management committee or the advisory committee as members. The overall leadership belongs to the women members and the poor women have the access to project support such as training and credit.

3.2. Institutions and Fisheries Management

Community Based organizations (CBOs) are in place in all the project water bodies and receiving continued support from the PNGOs to enhance their capacity in fisheries resources management, leadership development, financial management and alternative income generating activities, etc. As part of providing legal status, 117 out of total 136 CBOs have been registered with the relevant government entities (Department of Social Welfare or Department of Cooperatives). Forty-nine CBOs constructed community centers with the partial assistance from the PNGOs; CBOs donated land and the PNGOs provided construction costs of the structure. Cluster management established in 13 clusters covering 80 water bodies. The CBOs and the beneficiaries received trainings to enhance their management skills and income generating activities. The project has so far organized 23,096 poor fisher families around rivers, closed beels, open beels and floodplains. In addition, the project provided indirect benefits (secondary and tertiary) to 113,029 beneficiaries.

The project has made significant contribution in fisheries management and habitat restoration in the working water bodies. Project beneficiaries and the community are practicing sustainable fisheries management by creating sanctuaries, protecting illegal and destructive fishing, stocking indigenous fish that are extinct and banning fishing during spawning season. The project has successfully established fisheries management principles in 117 water bodies. The project efforts enabled community leaders and local government officials to resolve problems and conflicts. One hundred sixty four sanctuaries have been established in 81 project water bodies. Conservation measures such as 3 months' ban period in each year, restriction of harmful gear, prohibition of kuas and kathas (fish aggregation devices) in floodplains are also being implemented. Substantial

progress has been made in disbursing micro-credit for alternative income generating activities (AIGAs) to the beneficiaries. Almost 93% of the principal amount has been disbursed and evidences (in the form of case studies) show that there is a link between AIGAs and reduction of fishing pressure.

3.3. Institutional Sustainability

Sustainability of the CBOs has been an issue since the beginning of the CBFM-2 project. The only way to assess the sustainability of the CBOs is to withdraw project support from the water bodies. The project severed from the CBFM-1 water bodies (14) during August- September 2005. These water bodies are under periodic monitoring about their performance. Monitoring results suggest that almost all the CBOs are performing well and a sense of self-dependency has been created across the CBO leaders and beneficiaries. They are conducting regular meetings, keeping meeting minutes and financial records. NGO workers have limited activities that are confined to credit. CBOs are maintaining linkages with the local elites and local government agencies and they are happy about the cooperation they are receiving from the DOF and other local government agencies.

To strengthen the scope of CBFM institutional framework the project organized CBO networking committees both at the regional and national levels. All the committees are still ad hoc. A draft constitution for the CBO networking national committee has been drafted with the help of BELA. The national committee will be registered with the social welfare department of the government of Bangladesh. The registration process is being held up as the government temporarily stopped new registration.

3.4. Impacts

The project is not yet prepared to provide conclusive results on its impacts. Full four year cycle of monitoring data are now available and are being analyzed. We are expecting to provide conclusive results on impacts of CBFM once the impact survey is completed. However, partial analysis of catch monitoring and gear survey data of 22 water bodies until 2004 provides good indications about productivity and biodiversity increase in the project water bodies. Preliminary analysis show that fish production increased by 132% and 40% in closed water bodies and river systems as compared to the base period 1997, and the same increased by 45% and 72%, in semi-closed and floodplains, respectively as compared to the baseline year 2002. A difference in productivity is also observed

between project and control water bodies. Average fish production per man hour in the closed, open, floodplain water bodies and river system during 2003/2004 showed 0.51, 0.40, 0.56 and 0.44 kg/man-hour for the project sites and 0.28, 0.31, 0.27 and 0.34 kg/man/hour for the control sites, respectively. Species diversity also increased compared to baseline year.

Although improving the livelihoods of the beneficiaries is the major objective of the project, the project impact on livelihoods is not straightforward. Pathways of impacts on the livelihoods follow building of capable institutions to establish access rights and to introduce fisheries management that will enhance production. Benefits to the poor fishers will follow through the establishment of access rights and distribution of increased production. Provisional results on the livelihood impacts based on income expenditure and consumption monitoring data until 2004 and few interim surveys and case studies suggest that 68% of the project fishers' income has increased, and the magnitude of the increase in income is 26%. Forty four percent of the control fisher indicated that their income increased by 14%. Similarly all other indicators including the food security and basic necessities showed improvement, and the rates of improvement were higher for the project fishers.

3.5. Partnership and Linkages

The basic strength of the CBFM-2 project lies with the solid foundation of partnerships between government agencies, NGOs and the "WorldFish Center. This partnership provided the opportunities to learn from core strength of each other. Nine out of 11 NGOs have been implementing the CBFM-2 project activities at the field level directly working with the communities. Between the two specialized PNGOs, FemCom. is responsible for providing media and message dissemination support. BELA, a legal NGO provides legal support to the project and project beneficiaries and to DOF/MOFL to frame new laws. World Fish Center has three types of roles: overall coordination, research, monitoring and capacity building support. Role of DOF in the project is to ensure government revenue collection from the leased water bodies, providing and facilitating local administrative support to protect the fishers' user rights, and providing technical advice to communities for sustainable fishery management.

Although the project partnership has much strength, it has many weaknesses and challenges. Field level DOF staff lacks resources and time to provide their full potential in CBFM activities. As member of government bureaucracy, in addition to their normal departmental duties they have to maintain local administrative

protocols and have to participate in local level administrative duties assigned by the Thana or district administration. Therefore, it is hard for them to keep up with the project activities. Nonetheless, the quality of partnership at the field level very much depends on quality and perception of the individual. In some instances, the project could not realize enough support the District and Thana level officers. As a result, the project had to drop four water bodies in 2005.

Similarly, field level implementation of CBFM activities and establishing better links with local administration and community at large to minimize shocks and conspiracy of the vested interests are to some extent depend on the personality, character and capacity of the assigned NGO worker. Politicization of NGOs has made the field level implementation worse in few cases as the local elites/leaseholders take advantage of the politically weak position of the NGOs. In such situation, local level administration is also reluctant to take any positive action when something becomes too political. Despite weaknesses, the CBFM-2 project has accomplished most of its objectives through this partnership.

4. CBFM Experiences in River Fishery Management

As the River fishery is open-access public property, resource appropriation is not subject to revenue payment. Mobility of the fish resources and heterogeneity of the stakeholders in the River system have made management and institution building process complex, and require participation of all concerned stakeholders including local government institutions and administration. The most prominent beneficiaries (also stakeholders) of the river system are the poor fishers (dependent on fishing); rich fishers who can afford most efficient but destructive fishing gears, katha/kua owners (mostly rich and influential) and the subsistence fishers (only fish for consumption). Implementation of any fisheries management in river sections should have built-in incentive structure that motivates agents to introduce fisheries management through collective action. A flexible and inclusive institutional framework allows actors with diverse interests to come into a common platform to pursue their common goals. Actors/agents in such institutions are able to negotiate their interests and expected to reach to an agreement that is close to Pareto Optimal. A positive feature of such institutions is its ability to facilitate flow of information among agents, which is a key to maintain solidarity of the group.

CBFM-2 river fisheries management follows this inclusive and broad based institutional framework to include the community at large and the local government along with the direct beneficiaries and resource users. However, the

institutional building process is somewhat painful and long that requires a motivated driver (NGO) who carefully selects the beneficiaries and stakeholders, provides motivational (moral incentive) and awareness trainings. Probability of building a resilient institution is much higher if the institution building process involves this multi-stage processes. However, given the nature of the resource system, management of the river sections becomes challenging when it is implemented in a section of a flowing river. It is hard to motivate the stakeholders to invest in fisheries management like establishment of sanctuaries, observation of ban period etc., as the benefits are spilled over to the whole river system. In such a situation, drivers and the implementing agencies have to show the positive results through investing public resources in fisheries management. In most instances CBFM-2 has positive results where fish production and biodiversity have shown a positive trend although not conclusive yet.

CBFM-2 has been implementing CBFM approaches in 39 river sections of which the Fatki River consist of 15 sections (30 km long) located in Magura and Shalika Upazila under Magura district. Although management responsibility is vested with the river section management committee, the project developed an institutional mechanism for linkages and coordination among the river section management committees. This was necessary because resources are linked and the downstream beneficiaries have the incentive to “free ride” as they are in a position to -get positive externality benefits from the upstream management interventions. Discrete management of one river section will not be effective in improving fisheries resources and the lives of fishers dependent these resources. The adjacent floodplains that are also linked with the river system and share resources were included under the same institutional framework. In the river sections, 5 Cluster Committees have been formed taking 3 closely located river sections in each cluster, and one Cluster Committee has been formed in 3 floodplain beels. The nested structure of this institutional framework began with the election of 87 fisher groups or village committees. Next level committees are River Section Management Committees (RMSC) that are formed with elected/selected representatives from the village committees and the cluster committees are composed of 15 members elected from the RMSCs. A 23-member Apex Committee has been formed with the representatives of 17 water-body level management committees. The Cluster Committees and Apex Committees proved effective in minimizing conflicts across the water bodies and in establishing linkages and coordination with the district and Upazilla level government officials, politicians and other stakeholders.

5. Institutional Framework for Halda Fisheries Management

The 80 km long, River Halda passes through four Upazillas (Fatickchari, Rauzan, Hathazari and Chandgaon) to join the tidal River Karnaphuly. A number of streams also feed the River in its course from watersheds that carry nutrient materials from rather large catchments (Khan and Azadi 2006). Recently it has drawn attention of the government and policy makers due to the alarming decline in spawn production, which is the major supplier of genetically pure broods and spawns of Indian major carps and Galda. One can mention many reasons from anthropogenic causes to excess fishing pressure for the degradation of the River resources, but these entire boil down to the basic question- how is it managed. The management history of the River is not isolated from the big picture scenario of the country. Whatever the official policy to manage this River fishery, evidences suggest that commons dilemma exists. Although there is no official provision to secure license to have the right to fish, there are many instances that the old auctioneers/leaseholders sublease the right of fishing to the ignorant poor fishers using their social power and influence. There are also evidences that the fishers and the community living along the riverbank have established a kind of proprietorship over a segment around their homesteads. Every family sets a Ghira Jal, katha or kua in the edge of the* river adjacent to their homesteads or paddy lands. In some instances, this right is transferable (Khan and Azadi 2006). Thus along with the open access nature of resource extraction a class of people have grown over the years who claim proprietorship in some segments of the River. Once fishing was the profession of a selected Hindu caste called “Jaladasa”. Over the years due to explosive population growth new entry in to the fishing occupation occurred mostly from the Muslim community. These new entrants have more capital to afford technologically superior destructive gears that contributed to the over fishing (Khan and Azadi 2006).

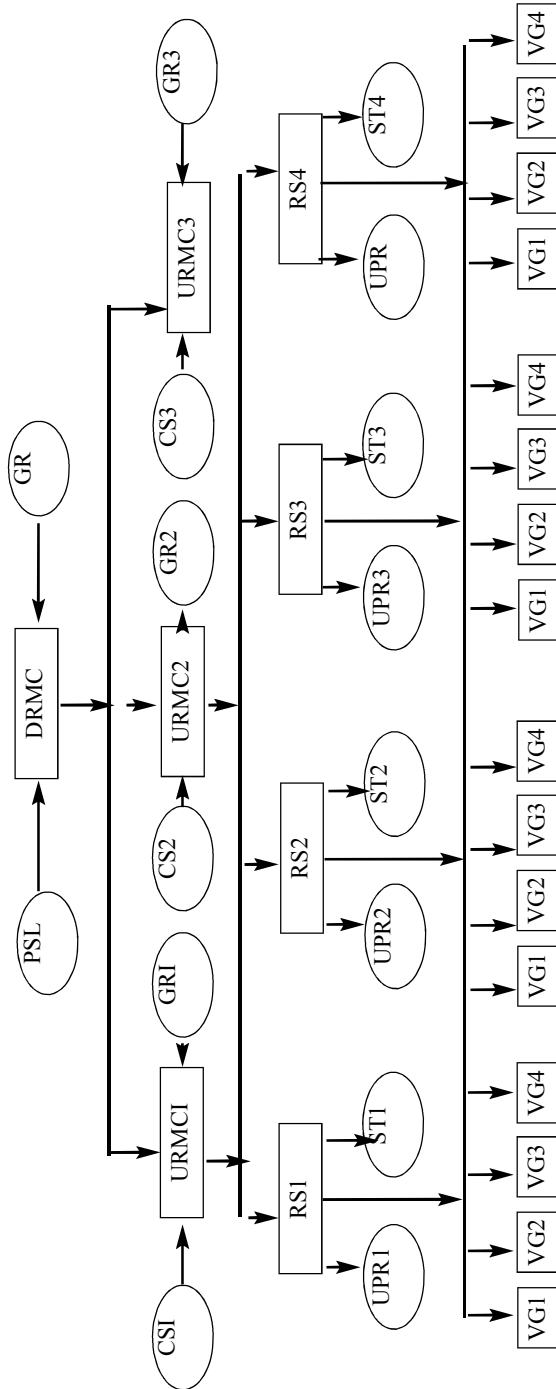
Along with these commons dilemmas, human interventions both government and private aggravated the resource degradation. The private interventions occurred to straighten the loops to protect the nearby inhabitants from river erosion. Over the past decades, government also constructed flood protection dams and sluice gates for irrigation purposes. Once there were five loops that facilitated carp spawning, now only one loop is left which is also in the process of straightening. Sluice gates interrupted fish movement to the rich nutrient areas that was otherwise fish habitat. Restoration of the Halda fisheries require immediate intervention to stop cutting of last remaining loop and regulated use of the sluice gates, in addition to fisheries management measures such as enforcing ban period, restricting harmful

gears, sanctuary declaration, etc. These fisheries management measures have implications on the livelihoods of the poor fishers dependent on the River resources. In this respect government safety net programs can be extended during ban period and Public support such VGF Effective enforcement during ban period government support.

Enforcement of fisheries management rules as developed by the community will require a broad based consensus among the diverse stakeholders through careful designing of an institutional framework. However, given the vastness of the river area and heterogeneous stakeholders, institution building is not an easy task and it has high transaction cost. In this regard, CBFM experiences may provide necessary guidelines, but the institutional framework should satisfy the scale of the resource unit and heterogeneity in resource users. The River flows through four Upazillas, connected with many streams of canals and seasonal floodplains. The institutional framework should cover all the River catchments to be able to introduce meaningful fisheries management. Again, stakeholder characteristics are diverse and in many instances, their interests are opposing to each other as their livelihoods are mostly related to it. Any intervention to support one group affects another group. In these circumstances, co-managed institutions can provide division of responsibilities between government and the resource users through delegation of responsibilities to the community based resource user groups. Government has a key role to set the initial conditions or rules that will provide incentives to the parties to come together and as a co-manager, it has dual role as sponsor and stakeholder. As a sponsor, government can play a vital role by providing technical support, credit, marketing support, safety nets to the vulnerable groups of fishers during ban period and protective legislation. Government is also a stakeholder as it has relationship with many affected actors and the government itself also affected by the outcome, i.e., government might have to forgo revenue and incur costs while participate. The resource users are unorganized, scattered, and lack capacity. They need support, which can be provided by competent NGOs. These shared responsibilities can be described as integration of both vertical and horizontal institutional models.

With these notes above, ‘ an institutional framework (Fig. 1) has been suggested as a starter that may be improved and refined through debate and at the implementation stage. The framework suggests dividing the river into several sections and each river section will include existing fish habitats and streams. Within river sections, each village will form a group in which among others, fishers, farmers and fish traders will be member. River Section Management

Figure 1: Institutional Framework for Halda Fisheries Management: A Proposed Scheme



Committee (RSMC) will be formed with four representatives (at least two fishers) from each village. Union Parishad Chairman and two members will also become member of the RSMC. RSMC will elect an executive committee through democratic process. Each RSMC will also create a surveillance team to guard against illegal and destructive fishing. At the Upazila level, Upazila River Management Committee (URMC) is suggested but its formation will be little bit different from the lower level institutions. The Upazila Nirbahi Officer will be the Chair and the Upazila Fisheries Officer will work as member secretary. Representatives from the RSMC and selected line ministry representatives/officers at the Upazila level will be the members of the RSMC. Similarly, District River Management Committee will be formed at the District level. Thus, in the institution building process government officials will be integrated in a nested institutional framework. This will provide more power to provide incentive and sanctions, the important element of effective fisheries management.

6. Conclusion

It is easy to dream about an institutional framework but, hard to implement. The implementation process is painful and requires time. It is not an easy task to change peoples' age-old behavior, it requires continuous motivation, skill development and awareness building. Folk songs and Folk Theater may be the important tool to motivate and raise mass level awareness among the resource users along with training and workshops. We have to think about the costs and benefits of introducing fisheries management through co management institutional framework. Major costs are related to institution building, awareness raising and ensuring compliances, most of which are one shot. Benefits may not be limited to the restoration of degraded resources; it may have prospects of developing eco-tourism in the Halda River. If it is possible to restore its spawn, brood stocks and fish production to its previous peak without affecting genetic purity, we can easily brand the product and market it both nationally and internationally.

References

- Aguero, M., and M. Ahmed. 1989. Economic rationalization of fisheries exploitation through management: experience from the open-water fisheries management in Bangladesh, pp. 747-750. In R. Hirano and L. Hanyu (eds). *The Second Asian Fisheries Forum*, Asian Fisheries Society, Manila, Philippines.
- Agarwal, A., 2003. Common resources and institutional sustainability. In *The Drama of the Commons*, Ostrom. E., T. Deitz, N. Dolsak, P.C. Stem, S. Stonich, and E.U. Weber, eds., National Academy Press, Washington, DC.
- Dawes, R.M., J. McTavish, and H. Shaklee. 1977. Behavior, communication, and assumptions about other people's behavior in commons dilemma situation, *Journal of Personality and Social Psychology* 33(1).
- Dietz, T., Dolsak, N., Ostrom, E., and Stem, P.C. 2002. *The Drama of the Commons*, In "The Drama of the Commons", eds, Ostrom, E, Dietz, T., Dolsak N., Stem, P.C., Stonich, S., and Weber, E.U. National Academy Press, Washington, DC.
- Gatcher, S., and E. Fehr. 1999. Collective action in social exchange. *Journal of Economic Behavior and Organization* 39(4):341-369.
- Halls, A. S., M.G. Mustafa, and M.A. Rab. 2005. *An Assessment of the Impact of the CBFM Project on community-managed fisheries in Bangladesh*. Report to the World Fish Center, Bangladesh, July 2005, 67pp.
- Hardin, G. 1968. The tragedy of the commons. *Science* 162:1243-1248.
- Kelley, H.H., and J. Grezlak. 1972. Conflict between individual and common interests in an N-person relationship, *Journal of Personality and Social Psychology* 21(2): 190-197.
- Kelley, H.H. and A.J. Stahleski. 1970. Social interaction basis of cooperators' and competitors' beliefs about others. *Journal of Personality and Social Psychology* 16(1): 66-91.
- Khan, M.S., and M. Azadi. 2006. *Studies and management strategies to revive and sustain the fisheries in the River Halda (Draft Report)*, Bangladesh Shrimp and Fish foundation, Dhaka
- Kopelman, S. M. Weber, and D.M. Messick. 2003. Factors influencing cooperation in commons dilemma. In *The drama of the commons*, Ostrom. E., T. Deitz, N. Dolsak, P.C. Stem, S. Stonich, and E.U. Weber, eds., National Academy Press, Washington, DC.

Pomeroy and Viswanathan, 2003. Fisheries and Co-management in Southeast Asia, In
“The Fisheries Co management Experience:

Accomplishments, Challenges and Prospects”, Wilson, D.C., J.R. Nielsen and P.
Degnbol, eds., Kluwer Academic Publishers, Dordrecht/Boston/London.

Van Lange, P.A.M., W.B.G. Liebrand, D.M. Messick, and H.A.M. Wilke. 1992. Social
dilemmas: The state of the art. In Social

Dilemmas: Theoretical Issues and Research Findings, W. Liebrand, D. Messick. And
H. Wilke, eds., Oxford: Pergamon Press.