Responsible Wetland Fishing and Policy Options: An Economic Analysis

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Abstract

Half of Bangladesh (50% of land surface) is wetland and wetland supplies most of the freshwater fisheries in Bangladesh. Tanguar Haor (haor means wetland with vast waterbodies) is a declared Ramsar site which posses one of the largest fishery stock in the country. However, there is no clear-cut guidance in using the vast resources this wetland posses. Government so far through some regulations tries to control the resource, which has produced non-sustainable outcome. The attempt of the present paper is to see that what alternative measures can produce sustainable out come and the economic cost benefit associated with it. In the absence of any property rights over-fishing is taking place and the local power group who are non fisherman is depleting the resource at a unsustainable manner. The options open to manage this fishery resource are Command and Control Policies of the government (CAC) through some administrator, lease to private entrepreneur and use of Market Based Instruments (MBIs) to bring real fisherman in the picture. The available market based instruments are Tradable Permit, Grandfathering Principle etc. The use of these instruments has the option of success as our analysis shows. The paper has done extensive calculation in comparing all the three options. In other words, it has accomplished an economic analysis of different policy options to find out a sustainable outcome of the resource.

Introduction

Fishery is renewable resource if it is used in a sustainable way. Responsible fisheries refer to the abiding to fishing regulations and laws, preventing the spread of aquatic nuisance species and respecting private property and the rights of other anglers. The crude definition implicitly exposes the essence of property rights and importance of rules and regulations. Bangladesh fortunately has one of the richest fisheries resource in the world. However, little substantive data on the ecology of these species is available. Although tremendous genetic diversity is embodied in the over 282 fish species, which inhabit in inland, estuarine and coastal waters of Bangladesh. Of late Bangladesh inland fisheries are being displaced or disrupted by different foul policy games, which are directed towards other action in agriculture and flood controlling measures. As a result of these perturbations, inland capture landings have been offset at the national level by increased marine catches and strong growth in aquaculture subsection, including increased shrimp export.

An estimated 73 percent of rural population is engaged in fish harvesting, fish processing and also in fish marketing activities. This sector's contribution in GDP is 5 percent and in export earning 11 percent. It also provides full time and part time employment for 1.2 million and 1.4 million people respectively. As per Department of Fisheries (DoF) statistics the national fish production was 1.7 million metric ton in 2000-2001 and 1.8 million in 2002-2003. There are about 10 thousand ***Jalmahals*** (large water bodies) at present in Bangladesh. These are owned by and managed by Ministry of Land and Ministry of Fisheries except the one i.e. Tanguar Haor which is our centre of discussion of this paper. Tanguar Haor is managed by Ministry of Environment and Forest as this haor has been declared as Ramsar site recently. The ministry of land leases out these water bodies for a period of 1-3 years to the public on open auction basis only with a view to realising revenue. In reality these waterbodies are taken lease by the influential

non-professional fishermen groups through the practice of auction. As a result the catch does not maintain any sustainable path leading to depletion of this resource and ultimately extinction. Out of these Jalmahals, haor is the most important source of fisheries in Bangladesh and this haor management is in real jeopardy. Since Tanguar Haor has been declared as the Ramsar site and it is one of the largest waterbodies in Bangladesh with enormous importance in terms of mother fisheries ground and ecological balance the present paper takes it as test case for analysis.

Tanguar Haor is the largest of all haor in Bangladesh. This is a huge pristine water reservoir with enormous wetland bio-diversity. Among its resources it has 141 spices of fishes (which is half of Bangladesh's total fish spices and 55 of these are tested as threatened categories. The fish resources are well known in terms of spices richness, diversity and production. Tanguar haor is one of the important mother fisheries of the entire haor basin with 10,000 hectre of land supporting 50,000 people The major source of these people is fisheries. This haor has been declared as Ecologically Critical Area and later on as Ramsar Site.

Overview of Legal Aspect of Fisheries

Fishermen in this part of the Indian Sub Continent during the period before 1793 enjoyed unrestricted right of fishing with a portion of the catch earmarked for the ruler. However, during the British colonial rule (1773-1947) the rulers of Bengal and their surrogates (big landlords) got a permanent right of private property in water bodies attached to their land estates under the land settlement of 1973. In return they paid to the state of the British colonists a fixed proportion of their land revenues. This is how the fishermen lost their direct and unrestricted access to most water bodies. They had to come to some arrangement with the lease -holders who leased such water bodies from the rulers or the big landlords. The fishermen could hardly take direct lease of water bodies from the landlords. During this period non fishermen took the lead of lease and targeted maximum cash income possible in the absence of guarantee of getting further leasing. After 1947 the new rules came into being which introduced auction of water-bodies. In such open auction, only the rich and influential got the lease and in most cases they paid much less than the market value. The government did not care much for protecting and nurturing the fish resources. Moreover, some sort of co-operative of fisherman was practiced after Bangladesh got freedom. Fisherman co-operatives were provided with bidding options and if they failed to strike a minimum bid the lease was made public. This is how the non- fisherman entered the process and took control of the resource. Here lies the crux of the problem. The ordinary fishermen were driven out and local political musclemen made co-operatives as instrument of exploiting the resource.

The legal aspect of the waterbodies refer to creation of fish sanctuary, banning of catch of fish below 9 inches and smooth conservation of aquatic resource and its use by the active cooperation of professional fishermen.

Methodology

Data for the above activities have been collected from primary as well as secondary sources. In the primary part on the spot surveys among 500 fishermen have been conducted at different points of Tanguar Haor together with discussion with local people and observation. Discussion with fisheries department officials and fisheries expert has contributed to the estimation of fish restocking activities. However opinion survey has been the major source of obtaining a sustainable outcome.

Policy Options

We will try to gather inputs for our policy options and their associated costs and benefits by explaining the graph below. This is an application of bio-economics, which produces the logistic growth function of fish.

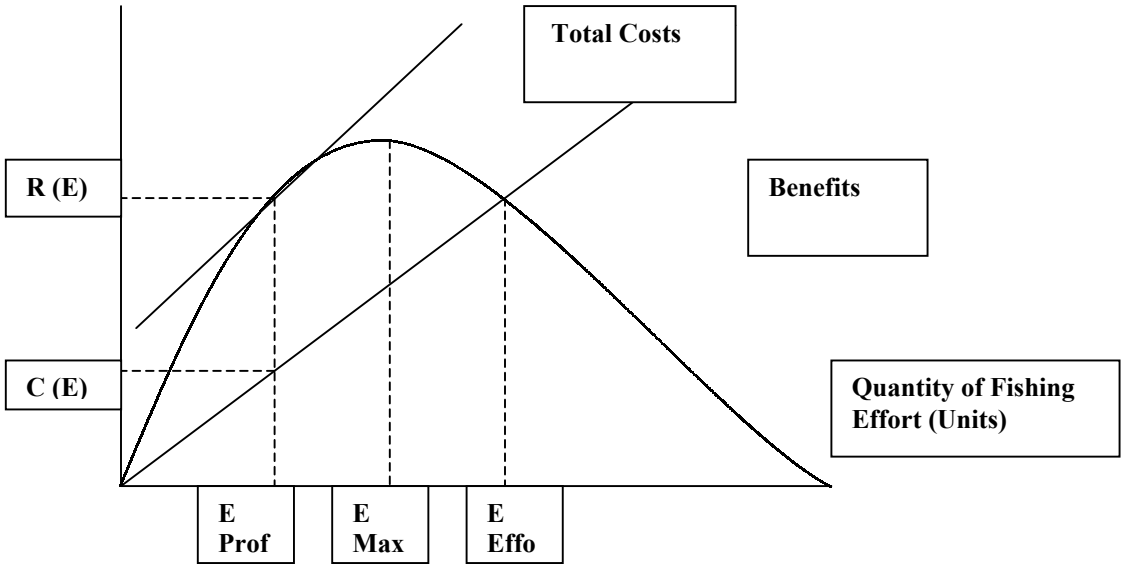

Fig: Sustainable Fisheries

The simple graphical exposition above opens three options for us. In case of E prof, the profit will be maximum and catch will be minimum if the resource is individually controlled. However, the maximum yield is on the right of E prof, which is sustainable catch. At E max, the catch will be highest and it resembles the Tragedy of Common property phenomena, as catch will continue till costs are covered by revenue. The entire ball shaped curve is our revenue curve and total cost is the cost associated with total effort. If we use this theoretical exposition in terms of Tanguar haor we see that individual leasee will maximize the stock of fish by catching the profit maximizing level at E Prof. However, to our utter surprise we found that the lease holder is a muscleman with no previous experience in fisheries and tried to catch the possible maximum due to lack of further securing of lease. As a result, the loss to fisheries stock is enormous and private benefit is high and short-lived. The government is currently practicing this option as government gets revenue from single source. It is only the direct revenue, which attracts the government, not the other values attached with this resource.

Our survey has also revealed that the actual situation is TC = Benefit (E effort). As long as it costs less the fishing efforts is on as the lease hire the labor from other part of the country with low wage payment. They are used in seasonal basis and they usually don't have any other options but to work as long as the lease wants them. The lease system moreover, failed to reduce rent dissipation and open access since the licensees were non fishing middlemen who then collected tools from fish workers that could be as much as one third of gross catch. These middlemen rigged the auction to keep prices down and shorten the period of licenses, with no assured renewal, led them to maximize revenue by allowing as many as fish workers as possible to fish. The outcome of this practice is non- sustainable, which is threatening the volume of fish resources. Moreover, the legal binding leading to responsible fishing is totally being ignored as they temper the law enforcing authority by bribing them.

Recently some changes were attempted to administer the haor by the government through forming a committee consisting of local administrator and other people from different stranza but it did not work that long and haor went back again to individual lease till middle of last year. At present some combined efforts are being made with the help of local administration to run the wetland in Adhoc basis.

Market Based Instruments as Alternative

In case of fishing at Tanguar Haor both market and policy failures are present. Market fails because that the basic requisite of resource ownership is not present. So the consequence is over-fishing. Moreover, market failure usually is supplemented by policy failure, because the policies in place have the opposite effect. Instead of restricting effort, helping prevent overuse, and allowing stocks to recover many policy makers simply help prevent fishermen as if fishing were any standard industry. Thus credit and subsidies are provided for faster and bigger boats, longer and more finely meshed nets, and new fish finding gears. All these technologies lower the cost of fishing but expand capacity beyond the optimal, sometimes even beyond the optimal sustainable level so they make over-fishing worse. In case of Tanguar haor the influential leasse obtains permit from the government to bring fishing equipment at very subsidized rate because fishing is most important sector of food and nutrition supplement in Bangladesh. As consequence of this the average cost of fishing goes down and fishing stock dwindles.

Subsidies that lower the cost of fishing are bad policy if the main problem is over-fishing as a result of individual lease. However, several policies appear to work, including partial property rights, fishing quotas. These are most direct policy instruments is to set catch limits in the form of a total allowable catch based on maximum or optimum sustainable yield (E Max in our Fig 1). However, they must be enforced, for example individual transferable quotas. Best alternative is the Common Property Resource Management, which presupposes the introduction of formation of Fishermen's Community based on Grand fathering principle. In this options the fishermen who have the history of fishing should be allowed to form a Community approach like Co-operatives with out any bidding with a nominal fee they should be allowed to have the right of fishing.

In our sample survey all respondents are in favor of Community approach management where all fishermen should be included. Since the major source of income of these people is fisheries they should be allowed to fish at the haor and government can buy the catch for further sale.

Alternatively the haor can be saved by introducing some plan, which will make the dependent villagers independent of haor resources including fisheries. A calculation of economic values of alternative management plans can be represented below. Where different activities together with value of other direct and indirect use and non-use values have been calculated in terms of cost and benefit.

Cost Benefit Analysis

Total Financial Cost

1. Habitat Restoration Project : US$ 76,274
2. Fisheries Restoration Project : US$ 42,546
3. Resource Substitution Project : US$ 110,649
4. Curbing Reclamation of Beels : US$ 26,650
5. Income Generation of Local : US$: 364,133
Community at Traguar Haro
6. Monitoring and Protection of Wildlife : US$ 73,762
7. Welfare uplifting Programme : US$ 123,757
8. Establishing Community Based Management : US$ 143,100
9. Introducing Sustainable Fisheries : US$ 52,000
10. Training in Sustainable Management : US$ 63,700
Non- Fisheries Natural Resources
11. Conservation Awareness Programme : US$ 82,500
12. Environment Education Programme : US$ 23,050
Total ---------- : US$ 1,182,121

Conversion rate: US$ 1 = Taka 52. Present conversion rate Taka 58

Table 1

Financial Cost Benefit Analysis

YEAR	BENEFIT	COST
0	0	497306
1	121146	390656
2	147485	239381
3	288049	108483
4	302210	99475
5	317043	103667
6	332892	92448
7	349535	97069
8	367011	101922
9	385359	107018
INTERNAL RATE OF RETURN 12%		

The pure financial cost benefit analysis seems to a meager portion of the Economic benefits one can derive from having different management than the current one being followed by the lease.

Table 2

Economic Valuation (Benefits)

Direct Use Values	**US$ 337,698**
Sustainable Harvest Products:	
Fuel Wood	US$ 68,906
Fishing	US$ 72,000
Duck Keeping	US$ 33,692
Tourism	US$ 48,635
Genetic Materials	US$ 68089 one-time Use Value
Education	US$ 5,000
Human Habitat	US$ 41,376
Indirect Use Values:	**US$ 888,354**
Ecological Function	US$ 525,258 one-time Use Value
Protection of Endangered Spices	US$ 93,096
Carbon Store	US$ 270,000
Option Values:	US$ 155,632
Future Uses: Medical Importance	US$ 155,632
Existence Values:	**US$ 204,267**
Biodiversity	US$ 204,267
Total Economic Value	US$ 158,5951

Table:3

Economic Cost Benefit Analysis

YEAR	BENEFIT	COST
0	0	- 497306
1	807589	390656
2	553760	239381
3	998137	108483
4	1047802	99475
5	1417235	103667
6	1488093	92448
7	1562496	97069
8	1640691	101922
9	1722648	107018
EIRR 107%		

The calculation of economic valuation of fisheries takes into account the alternative fishing arrangement by digging ponds at different haor adjacent villages so that they don't encroach into haor fisheries resources. The haor fisheries resource is worth 1.5 million US dollar in financial term. However, in terms of their economic value they are much more as they are also the breeding ground of many endangered spices of fish in Bangladesh.

In case of lease the government gets a very small amount as the power full lease owner prohibits other to enter the scene so there is financial loss. In case of Fishermen cooperative the gain is much more as they routinely pay the right amount to government for their catch and abide by the rules and regulation of fisheries because they have much more feeling than lessee. So a proper cost benefits analysis for alternative plan where Market Based Instruments are given priority outweighs the cost.

Conclusion

The huge resource Tanguar haor posses need to be managed by fisherman's cooperatives based on grand fathering principle. If the present arrangement of individual leasing goes on, the haor will soon be without fish and nation will loose a mother fisheries of endangered spices of fish. The command and control policy will be expensive, as it is difficult to administer and fishing always taking place without any respect to the norms of responsible fishing. The individual leasing to non-fishermen is suicidal and unfair to this renewable resource, importance of which has been recognized internationally.

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