

Direct incentives for Hilsa fish conservation

24-25 March 2013

Bangladesh

Workshop report

Incentive-based Hilsa fish conservation and management in Bangladesh: prospects and challenges

Multi-stakeholder workshop report
Essam Mohammed (editor)

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Definitions

In this document, the following terms are used:

Incentive-based conservation: refers to a form of conservation whereby incentives are used to target the behaviour of resource-users in an attempt to encourage more sustainable resource use. In this particular case, incentive-based conservation refers to the incentives given to fishers (30kg rice per family per month) in return for not fishing Hilsa during a defined period.

Hilsa fish: The Hilsa consist of three species (*Tenualosa ilisha*, *Hilsa kelee*, and *Hilsa toil*) which are found in the Bay of Bengal. The majority of Hilsa fish captured belongs to *Tenualosa ilisha* species, also known as the Indian Shad. Hilsa have significant ecological, economic and cultural importance, and are currently the focus of conservation efforts to preserve the sustainability of the fisheries.

Jatka: The Jatka is the juvenile form of the Hilsa fish. The biology and ecology of the Jatka are distinct from the adult Hilsa stage. Conservation of Jatka is important as juvenile species should not be fished before they reach maturity. Removing the fish before breeding age prevents reproduction processes occurring, and therefore continued growth of the Hilsa species. Economically, Jatka are smaller therefore has considerably less market value too.

Acronyms and abbreviations

AIGA Alternative income generation activity

BAU Bangladesh Agricultural University

BCAS Bangladesh Centre for Academic Studies

BDT Bangladeshi Taka

BFRI Bangladesh Fisheries Research Institute

CPUE Catch per unit of effort

DoF Department of Fisheries

GDP Gross Domestic Product

GEF Global Environment Facility

GoB Government of Bangladesh

HIFIG Hilsa fishers' group

IIED International Institute for Environment and Development

NGO Non-governmental organisation

NTU Nephelometric turbidity units

PES Payments for ecosystem services

SSO Senior Scientific Officer

VGF Vulnerable group feeding

Project background

The Hilsa fish, called 'Ilish' in Bengali, is of national importance to Bangladesh. It's one of the country's main staple foods.

But increased demand for the fish, which is popular throughout South Asia, has led to pressure on the fish species. Not only is the Hilsa in danger, but so are the livelihoods of more than 3 million fishermen, fisherwomen and fishery workers who directly or indirectly depend on the fish for their livelihood.

Bangladesh has recognised that something needs to be done. The government has already declared five areas as sanctuaries to allow successful breeding and recruitment. Fishing is banned in these sanctuaries during the reproductive season. In return for not fishing in these areas affected fishing communities or households are rewarded with sacks of rice or provided with microcredit to start up small businesses to replace the lost income. This is an example of how economic incentives can be used to conserve fish resources.

However the scheme is not without its flaws. Knowledge gaps highlight the need for further research into the effects the sanctuaries are having on Hilsa stocks, and also how the scheme is reaching and affecting those people who depend on the fish for a living, particularly the poorest and most marginalised fishing communities.

IIED has launched a project that aims to fill this gap by redesigning the system that rewards people who help to protect it. Working in partnership with Bangladesh Centre for Advanced Studies and Bangladesh Agricultural University and in collaboration with the Department of Fisheries of the Government of Bangladesh, we will work with affected communities and ecosystems to learn about what is working and what is not, and to find ways to improve it.

History of the Hilsa fishery

Hilsa, commonly known as 'Indian shad', is an anadromous¹ fish. It migrates into the rivers Padma, Meghna and its tributaries from the Bay of Bengal for breeding and nursing. It was the most abundant fish in the Ganges river system in the pre-Farakka barrage² period until the mid-1970s. The catch of Hilsa has declined in the Meghna and Padma rivers and coastal areas. Man-made influences, river siltation, closure of migratory routes, over-fishing, use of damaging fishing gears, pollution, hydrological and climatic changes are responsible for the decline of Hilsa fish. The Government of Bangladesh (GoB) through the Department of Fisheries (DoF) has established fish sanctuaries and introduced restrictions on the catching of brood fish and juvenile Hilsa (Jatka) since 2003. Economic incentives in the form of alternative income-generating activities (AIGAs) and food grains have been provided to Hilsa fishermen. According to reports from the DoF the incentive-based management appears to have increased Hilsa production from 0.19 million metric tonnes (MT) in 2001-02 to 0.34 MT in 2010-11 and improved livelihoods of fishermen.

Averting crisis – management of the Hilsa fishery

Despite this apparent success of this management approach, there are several specific questions of sustainability of this incentive-based conservation initiative. The trade-offs between conservation measures through payments and revival of Hilsa fisheries are yet to be ascertained. Effective payment mechanisms through the participation of service providers and beneficiaries plus collaboration with both Myanmar and India are necessary for the sustainable conservation of Hilsa fisheries.

¹ Ascends rivers from the sea for breeding.

² The Farrakka barrage is a dam system built by India in the upstream Ganges that reduced the flow of water into Bangladesh and into the Ganges delta.

Workshop overview

This multi-stakeholder workshop was jointly organized by the IIED, London, UK, Bangladesh Centre for Advanced Studies (BCAS) and Bangladesh Agricultural University (BAU). It took place in the BRAC Centre Inn, Dhaka, Bangladesh on the 24-25 March 2013. A range of stakeholders attended including senior officials from the Government of Bangladesh (GoB), extension officers from the Department of Fisheries (DoF), research scientists from the Bangladesh Fisheries Research Institute (BFRI), university academics, fishermen's representatives (president and secretaries of fishermen's committees), community representatives, the media, and staff from local and international NGOs.

Emphasis was given to bring all the relevant stakeholders and policymakers together who are directly or indirectly involved in the exploitation and management of the Hilsa fish. A list of potential participants was prepared by all three partner institutions. Both workshop schedule and participant list were prepared in consultation with BCAS, IIED and BAU project personnel. The Hilsa Research Team of the BFRI and Hilsa Conservation and Management Team of the DoF actively participated in the scientific and plenary sessions.

Details of the workshop schedule and the list of participants are included in annex I.

Workshop aims

The aims of the workshop were to bring together representatives from different interest groups including researchers, academics, policy makers, civil society organizations and representatives from affected communities to gather their perspectives on:

- The effectiveness of the incentive-based conservation mechanism.
- The role of the mechanism in poverty alleviation.
- The role of the mechanism in Hilsa fish conservation.
- The contribution of Hilsa fishery to the national economy.
- Identification of some critical limiting factors that inhibit the effectiveness of the compensation scheme.

The aim of this report is to communicate the main insights and content of the workshop, so as to remind the participants of what was gained by attendance. We welcome continued feedback on its content, and are very keen to gather any further thoughts and ideas that the reading of this report might illicit from participants and other interested parties.

Workshop structure

The workshop was divided into three main sections. First a number of speeches were given by prominent guests. These set out the context of the talk and reminded listeners of the importance of conservation efforts.

Second, presentations, which took the form of technical sessions, were given. These allowed participants of the workshop to understand the knowledge base regarding the biological and social aspects of the Hilsa fishery.

Last, the discussion sessions allowed workshop participants to discuss pressing questions related to the fishery, its conservation, and the programme of economic incentives offered by the government.

The emergent output of these sessions was a set of recommendations presented at the end of the two days.

See annex II for further details of the workshop agenda.

Key workshop outcomes

The key outcomes of the workshop were:

- An exploration and evaluation of the knowledge base of the Hilsa fishery in Bangladesh, and an assessment of knowledge gaps.
- An exchange of experience between different stakeholders.
- A productive discussion and emerging recommendations on the incentive-based management system.

Workshop sessions

Inaugural session – recognising knowledge gaps

Talks were given by Dr Mohammed Yousuf, Senior Scientist, BCAS; Dr Craig Meisner, Director of the WorldFish Centre, South Asia; Syed Arif Azad, Director General, DoF; Mr Mohammed Anisur Rahman, Joint Secretary, Ministry of Fisheries and Livestock; Dr Essam Yassin Mohammed from IIED, and Mr Liaquat Ali, Senior Fellow, BCAS.

In his welcome speech Mr Liaquat Ali introduced the guests and the participants and described the historical evidence of Hilsa fishery for the people of Bangladesh as well as the other countries within the Bay of Bengal Region.

Former Chief Scientific Officer of the BFRI, Dr G.C. Haldar, was invited to give the keynote presentation. In his presentation he described the biology of Hilsa, its migration pattern, catch dynamics, findings on the breeding grounds and time, feeding and nursery grounds, and causes of decline of catch of Hilsa from 1990 up to 2002. He highlighted the reasons for decline in catch as overfishing, siltation in the river channels, man-made intervention, pollution, and lack of implementation of the management principles and Fisheries Acts of Bangladesh. He also discussed the BFRI research findings, carried out from the early 1990s to 2002, and described the DoF's intervention in the scientific conservation and management. He later provided some practical suggestions and recommendations for considerations.

Dr Craig Meisner reminded the audience of the large-scale WorldFish-sponsored Hilsa workshop held in September 2012 which explored the Hilsa aquaculture to reduce the pressure on its capture fishery. He expressed his support to the Darwin Initiative for helping sustainable conservation and management of this renewable resource without compromising with the livelihood of poor fishers' families.

Syed Arif Azad outlined the government's intervention on Hilsa conservation and management for halting decline of Hilsa capture fishery as well as to assist the fishermen' families during the fishing ban period. He emphasised the need for in-depth scientific studies on the ecology and biology of Hilsa as well as the socio-economic conditions of the large number of fishermen and women for the implementation of conservation initiatives. He also highlighted the need for trans-boundary cooperation and joint exploration and conservation of the Bay of Bengal with India and Myanmar.

Dr Mohammed Anisur Rahman forecasted the future plan of the Government of Bangladesh and nature of investment required for maintaining the present increasing trend of the capture fishery as well as keeping the livelihoods options of the fishermen sustainable in order to make conservation measures a success. Mr Rahman suggested including the neighbouring countries in this study so that the outcomes of the research may be applicable to the other countries within the Bay of Bengal region.

Dr Mohammed Yousuf emphasised that the number of fishermen should be limited to reduce unsustainable fishing pressure. Transparency, equity and justice also need to be maintained in the implementation of incentive-based management measures. Dr Yusef also advised to look for other management and conservation practices to explore the possibility of adoption of these proven measures into the Hilsa fishery.

The presentations

Six presentations were made over the two days including three technical sessions and a plenary session. Two papers were presented in each technical session followed by a more interactive questions and answers session. The technical sessions were chaired by Mr Nasiruddin M. Humayun, Director, Marine Fisheries, DoF; and Dr Essam Y. Mohammed, from IIED. Dr G. C. Haldar was the keynote speaker. Other presenters included Professor Md. Abdul Wahab, BAU; Dr Anisur Rahman, BFRI; Dr Nirmal Chandra Roy and Musud Ara Momi, DoF; ABM Zahid Habib, DoF; Dr Jalilur Rahman, DoF; and Dr Zenebe Bashaw Uragachi, HELVETAS Swiss Intercooperation.

On the first day of the workshop, the afternoon session was devoted to ecological and biological aspects of the Hilsa fish, and understanding of the socio-economic dimensions of the Hilsa fishery.

Ecology and biology of Hilsa

Dr Anisur Rahman (SSO, BFRI)

Dr Rahman presented the first session of the workshop. He explained the ecology and biology of the Hilsa fishery. Because good conservation management depends on sound understanding of the biology of the species in question, and a number of knowledge gaps have been identified in the field of Hilsa ecology. Fish production in Bangladesh is 3.26 million metric tonnes, of which the Hilsa catch represents 11 per cent of the total fish production. The fisheries sector overall contributed 4.43 per cent to national Gross Domestic Product (GDP); of which the Hilsa fishery alone contributed 1 per cent of total GDP in the financial year 2011-12. Therefore the Hilsa is a relatively high-value fish.

There are three Hilsa species found in the Bay of Bengal, *Tenualosa ilisha*, *Hilsa kelee*, and *Hilsa toil*. The majority of Hilsa fish captured belongs to *Tenualosa ilisha*. The Hilsa migrates to the upstream rivers from the Bay of Bengal during May to November for breeding. The juvenile Hilsa (Jatka (<23cm)) remain for 6 to 7 months in the upstream rivers and estuaries from November to May. After completion of their early life in freshwater and hyposaline brackish water, Hilsa migrate to the sea – the Bay of Bengal. They again migrate back to the rivers between 2 to 3 years of their lifecycle to spawn.

Migration and distribution of Hilsa

Dr Mohammed Jallilur Rahman, Consultant, Marine Fisheries Capacity Building Project, DoF

The Hilsa is distributed in all major rivers, including the Meghna, Padma, Jamuna/Brahmaputra, and in some minor coastal rivers such as the Tetulia, Ilisha, Baleshwari, and Andermanik. There are about five major breeding and nursery grounds in both Meghna and Padma rivers, including the Meghna estuary and other coastal rivers. The largest nursery ground of Hilsa can be found in the Meghna river. These breeding grounds form the sanctuaries where fishermen are not allowed to fish between certain periods, and are thus compensated. Recently, a new fifth Jatka sanctuary has been established in Chandpur (60 km²).

Factors which create obstacles in Hilsa migration include obstructive fishing nets on migratory routes, river siltation, construction of barrages, dams, sluice gates, pollutant discharge from industries, sewerage, agricultural inputs, poison fishing, ship breaking, climate change, and natural disasters.

Though the Hilsa is generally regarded as an anadromous fish, there is evidence that it is in fact a diadromous fish, which means it migrates both ways between ocean and river. There are two peak seasons of Hilsa migration; the monsoon migration from August to November (which peaks in September - October) and the winter migration (January - February). The Hilsa generally migrates in schools, but may also migrate singly or in a small group.

Factors that trigger the Hilsa migration depend on if it is the monsoon or winter migration. During the monsoon migration, triggering factors include rainfall, heavy inflow of freshwater, lowering temperature and lowering salinity. During the winter migration, increased temperature in the upstream, lower current velocity, increasing salinity, increasing upstream food organisms, and plankton population are triggering factors.

Conditions for the Hilsa to breed include a depth of below 20m, a turbidity (cloudiness) of between 100 to 140 nephelometric turbidity units NTU, a temperature of between 29.3-30.2 °C, a salinity of 0.1, a pH of between 7.7 - 8.3, and chlorophyll density of between 0.11 - 0.18 µg/l.

Hilsa in the national economy and socio-economic conditions of Hilsa fishers' households

Dr Nirmal Chandra Roy and Ms Masud Aara Momi, Jatka Conservation Project, DoF

Findings from a DoF study indicate that within fishing communities most males are professional fishermen (82 per cent). The average family size is six members. There are high levels of illiteracy among the fishers (69 per cent). The housing they occupy is 38 per cent thatched cottage house, 62 per cent corrugated tin housing. For sanitation, 85 per cent of fishers' families use katcha toilet (i.e. open latrine).

A minority of fishermen have their own fishing boats (26 per cent) however most own their own fishing nets (78 per cent). The use of the destructive Jal net (fishing net made of monofilament synthetic nylon fibre of different mesh sizes) and deep (Behundi) net has decreased. Thirty five per cent of fishers earn between BDT 100,000-125,000, 53 per cent earn between BDT 80,000-99,000, and 12 per cent earn between BDT 60,000-79,000.

The study shows that fishers perceived that their loan dependency from *Dadonder* (private money lender) was decreasing, whilst their decision-making abilities were increasing, having a positive effect on their independence. Fishers perceived their ability to make their own decisions as increasing. They have benefitted from increased capacity building in order to engage in fish selling systems. Furthermore, there has been increased contact with local fisheries officers. Most fishermen perceived an increase in their social welfare. For example, there has been increased availability of interest free bank loans from public banks for buying fishing equipment.

The findings also highlighted fishers' perceptions of conservation measures. The level of Jatka fishing during the ban period has been decreasing. Also, the amount of brood Hilsa caught during the peak spawning ban period has been decreasing. There was an increase in knowledge of the beneficial effects of Hilsa conservation. Socio-economic development of Hilsa/Jatka fishers was increasing because of both increased Hilsa production and export earnings.

Beneficiaries have been trained in alternative income generating activities (AIGAs). Money allocated for AIGAs totalled 13 million BDT (2012/13). Furthermore, the most vulnerable groups have been supplied extra food, particularly the poorest fishers' families. The quantity of food supplied for vulnerable group feeding (VGF) was 87,070 metric tonnes over the last 5 years (2008/09 to 2012/13).

Incentive-based Hilsa fish conservation in Bangladesh: status and challenges

Mr Zahid Habib, Director, Jatka Conservation Project, DoF

The objectives of the DoF's projects are to: i) increase Hilsa production by saving Jatka and brood Hilsa, ii) enhance and strengthen Hilsa sanctuary activities, iii) create alternative job opportunities for the fishers', and iv) create mass awareness about the importance of Jatka conservation.

The project areas are located in four districts (Chandpur, Laxmipur, Bhola and Patuakhali) including 21 upazillas (sub-districts).

The main activities of the project include mass awareness-raising about Hilsa conservation, training and implementation of AIGAs, implementation of Fish Acts, maintenance of Hilsa sanctuaries, and continuation of VGF.

In 2013 1700 households have been involved with the programme which has cost 13.05 million BDT. A total of 24747.48 metric tonnes have been distributed to 0.89 million families in the VGF.

The prospects for the Hilsa fishery are good. The DoF estimates that production can be increased by up to 0.50 million metric tonnes; meaning increased export earnings, value-added products, an increase in processing industries, and employment generation to anticipate.

However there are also serious challenges to the sustainability of the fishery, including Hilsa overfishing and illegal fishing of Jatka/brood Hilsa, deterioration of physical-chemical characteristics of different river and estuarine water bodies, pollution, siltation, destructive fishing gears, dependence of fishers on *Dadon* (private money lenders), negative social influences, lack of knowledge on the breeding time of Hilsa, destruction of brood Hilsa, piracy and illegal export.

Benefit sharing: lessons from income transfer programmes

Dr Zenebe Bashaw Uraguchi, HELVETAS Swiss Intercooperation

This presentation aimed to i) provide lessons from income transfer programmes to payments for ecosystem services (PES) and ii) explore benefit distribution systems.

There are many challenges of allocating scarce resources, inducing behavioural change, institutionalising market-based service provision and bringing different stakeholders to the table, mainly

public agencies and private companies. Legitimacy for the programmes must be established to help address some of these challenges.

There are three approaches currently in use: i) income transfer programmes ii) PES, and iii) rural market development programmes. Some of the key challenges with these different income or benefit transfer programmes are the difficulty of involving the private sector, establishing sustainable source of funds, and effective selection of beneficiaries. ; the most critical of all is leakage and under-coverage.

There are several ways to addressing leakage and under-coverage; this includes: i) introduction of national identification cards ii) introduction and improvement of rights to information iii) introduction of multi-dimensional targeting and iv) looking at the role of local elites.

Payments for ecosystem services: applicability and sustainability for Hilsa fishery

Professor Md. Abdul Wahab

Twenty-four specific ecosystem services were identified and assessed by the Millennium Ecosystem Assessment (UN, 2005); the top three services identified were climate change mitigation, watershed services, and biodiversity conservation.

The principles of PES are as follows i) improve the sustainability of protected area ecosystems ii) maintain biodiversity conservation iii) enable communities to become financially self-sustaining. The scope of PES includes watershed and water services, biodiversity, species or ecosystems, carbon sequestration, landscape and seascape beauty.

Coastal and marine PES can include regulation by incentives, payments to protect resources, coastal habitat restoration, sustainable fishing practices promotion and conservation of endangered species.

Payments for Hilsa fishery management have demonstrated that economic incentives and incentive-based management has increased Hilsa production. Also, effective payment mechanisms can be achieved through the participation of service providers and beneficiaries.

The Hilsa Fisheries Management Action Plan (HFMAP) includes the involvement of district administration, boat rallies for awareness building, nationwide awareness-raising, and the enforcement of the Fish Protection Act. It also has objectives for Jatka protection including the identification of operation areas, coordination among implementing agencies, and economic incentives (in-cash and in-kind). Economic incentives for Hilsa conservation include incentives to fishermen for Hilsa sanctuaries, support for awareness raising, support for AIGAs, and providing food grain to poor fishers.

The strength of incentive-based conservation include an increased Catch Per Unit of Effort (CPUE), catch of large-size fish, increased Hilsa production, increased DoF subsidies and AIGAs, increased foreign exchange earnings, plus a positive impact of the socio-economic welfare of the fishermen, and increased mobility of officers.

However, only about 50 per cent of fishermen have been brought in under support programmes, only 20,000 fishers' brought under AIGAs programmes, there is no incentive programme in place for other fishermen, there is still ongoing issues with local money lenders (*Dadon*), and there are no arrangements for bank credits to the fishermen.

Discussion sessions

Following the presentations, the participants were randomly divided into three groups. They were provided with three questions to discuss and report back on. Then, a plenary session looked at the way forward towards sustainable conservation and management of Hilsa fishery in Bangladesh as well as in the countries within the Bay of Bengal region

Hilsa conservation and fishermen livelihoods - knowledge gaps

In this discussion session, the researchers who have been working for more than 25 to 30 years on Hilsa species highlighted that the biology and ecology of Hilsa is still not known. Despite the fact that research on Hilsa has been going on for more than 100 years, there are still wide knowledge gaps that impede Hilsa conservation and the design of good management. Some of the most crucial gaps in knowledge concern the feeding and breeding habits of the Hilsa. Furthermore, understanding the factors which determine the dates and timing of the Hilsa migration will have a great impact on the design of effective evidence-based management. We need to understand why the fish migrate, and why they go back to the sea.

With regard to the Hilsa incentive-based conservation approach, a proper study should be carried out on understanding the impacts of the cash and in-kind support given to fishers during the long ban period. As of yet, there has been no study on how the kinds of top-down management approaches, controlled and administered by the government, have worked, and whether they have had the required impact on the fishers. Another critical study that affects the effectiveness of management which is key is to understand the justice aspects of the distribution of the incentive-based conservation, including the cash and in-kind support given to fishers and their families, and the distribution of the AIGAs. There are serious questions regarding the breakdown of the distribution of these resources, along lines of gender, religion, political factions and wealth. We must be clearer on who is getting the benefits from the system, whether distribution is just, and whether some groups are being deprived. These aspects of understanding are critical to appreciate the overall knowledge gap, which is the balance between costs and benefits of different types of fishers for participation in the scheme.

Incentive distribution and challenges

The fishermen's representatives, several from one of the large organisations, including the president, as well as the president of a smaller organisation gave their impressions on the effectiveness of the incentive scheme. They expressed dissatisfaction with the way that the scheme has been administered. They believe that many fishermen at present have to sacrifice more than they benefit from participating in the ban and the compensation scheme. The biggest cause of this dissatisfaction concerns the way that the cash and in-kind support for fishers, including the AIGAs, is being distributed. At present there are lots of loopholes in the system. There is a worrying amount of partisanship in the distribution system. Different kinds of fishers appear to benefit or lose to different extents, dependent on their religion, or even pre-existing wealth. The government is responsible for much of this unjust distribution, and must rectify the justness of their methods of deciding who will benefit. There is also nepotism and mild levels of corruption that are contributing to the unsatisfactory levels of support that many fishermen who are sacrificing during the ban period are currently experiencing.

Sustainability of the present system versus viable alternative options

The government officials and the policymakers within the DoF, including the Director General, expressed their belief that the Hilsa fishery can be maintained using the current system of incentive-based conservation. They even expressed optimism that production of the fishery might be increased. They expressed the view that for such a vision to come about there needs to be greater levels of investment in the system so that all the fishermen experiencing the ban are covered by the various kinds of compensation and support.

However they expressed concern that, at present, it is the Bangladeshi fishermen who are making the sacrifice by abiding to the ban which lasts almost 6 months of the year. During this same period, the fishermen in India and Myanmar can continue fishing. Therefore they are reaping the benefits of the

Bangladeshi fishermen's sacrifice but not making any sacrifice themselves. Therefore the costs and benefits of the current system are unfairly distributed. In order to rectify this situation, there should be a tri-country common pool resource management system put in place.

The fisheries representatives expressed the view that the current system of incentives has indeed benefited fishers, despite the inequality in distribution. They state that the system is working and should continue. They stated that the fishermen are not benefitting more from the system including the compensation than they were before the management was put in place. They are therefore gaining higher levels of welfare now than before.

Recommendations

- 1) The predominant recommendation of the group was that Jatka fishing should be stopped. The government should explore alternative options during the ban period, because the current system of subsidies given by the government is insufficient for dealing with the problem.
 - There should be a supply of food grain for the entire ban period.
 - The government should provide sufficient subsidies, at least 30kg rice for every fisherman per month.
 - All fishers' are to be brought under the incentive-based programmes.

- 2) The Darwin Initiative project can help in the form of increasing understanding of fishermen's needs when they are involved in making assessments of the fishermen's communities. Through these assessments, greater understanding of the relevance and interest in particular AIGAs can be achieved.
 - Efforts need to be taken to register the fishers' households.

- 3) Accordingly, local government authorities, including members of fishermen's committees, their chairmen, and fisheries officers must respond more directly to the needs of fishermen. Issues include;
 - Food distribution not carried out properly; corruption exists in the incentive distribution chain.
 - Fishermen suffer from and need to be protected from robbery while fishing.
 - Fishers' community welfare centres should be developed, following a holistic approach for fishers' village development.
 - The need for a creation of a Hilsa Fishers' Group (HIFIG).
 - Better management through PES.

- 4) Prevent the use of current *jal* and other destructive nets, alongside ceasing production of monofilament nets. The government should stop giving licenses for producing these nets.

- 5) River siltation is a major problem for the Hilsa fishery. A process of dredging river channels should begin, especially the Meghna channel, in order to keep the migratory route of Hilsa clear.

- 6) The government should stop leasing the Bollatia river (part of Meghna river) in order for that part of the river to be used by fishermen. The government should explore the possibility of providing fishermen with rights to particular parts of the river. This would encourage sustainable conservation practices.

Policy implications

Government policy can be modified to increase social, economic and ecological sustainability of the fishery in the following ways:

- 1) Dredging of the river channels, reducing discharge of pollutants and industrial effluents, fish pass or fish-friendly structures in the dams and barrages, increasing water flow from the upstream, construction of large reservoirs to hold water in the dry season and maintenance of normal river flow.
- 2) Ensuring systematic and fair selection for AIGAs, encouraging the formation of fishers' group and representatives, as well as identifying local service providers. A greater number of fishermen should be connected to markets to avoid exploitation by middlemen. The social capital of the Hilsa fishing communities can thus be maximised.
- 3) Initiating regional collaboration among three neighbouring countries, Bangladesh, India and Myanmar. This would greatly improve the management capabilities for the fishery.
- 4) Conducting a programme of research which focuses on understanding the present incentive-based Hilsa conservation, particularly the strengths and weaknesses of the management. Research should be carried out on the demand for Hilsa fish for domestic consumption in Bangladesh.

Annex I – Workshop agenda

Day 1

Time	Subject	Speaker/Expert
9.30	Registration	
10.00	Recitation from the Holy Quran	
10.05	Welcome address Workshop objectives and programme	Mr Md. Liaquat Ali Senior Fellow, BCAS
10:15	Hilsa fishery - status, potential and challenges	Dr. G.C. Halder, (Hilsa Expert), Former CSO, BFRI
10.35	Speech from IIED	Dr Essam Y. Mohammed, IIED, London, UK
10.45	Speech by guest of honour	Dr Craig A Meisner, Director, World Fish
10.55	Speech by special guest	Syed Arif Azad, DG – DoF
11:10	Speech by chief guest	Mr Anisur Rahman, Jt.Secretary, MoFL
11:25	Speech by Chairperson	Dr Mohammad Eusuf, Senior Fellow, BCAS
11.40	Tea	
12.00	Ecology and Biology of Hilsa Fishery	Dr Anisur Rahman, SSO, BFRI
12.20	Migration and distribution of Hilsa	Dr Md. Jalilur Rahman, Consultant, Marine Fisheries Capacity Building Project, DoF
12.40	Open discussion	
13.00	Lunch and prayer	
14:00	Hilsa in the National Economy and Socioeconomic Conditions of Hilsa Fishers' Households	Dr Nirmal Chandra Roy and Ms Masud Aara Momi, Jatka Conservation Project, DoF
14:20	Incentive-based Hilsa fish conservation in Bangladesh: status and challenges	Mr Zahid Habib, PD, Jatka Conservation Project, DoF
14:40	Open discussion	
15:15	Concluding remarks from the Chair and close	
15.30	Tea	

Day 2

10.00	Benefit sharing: lessons from income transfer programmes	Dr Zenebe Bashaw Uraguchi, HELVETAS Swiss Intercooperation
10:20	Payments for ecosystem services: applicability and sustainability for Hilsa fishery	Dr. Md. Abdul Wahab, BAU
10.40	Open discussion	
11:00	Tea	
11:15	Panel discussion	
	Hilsa conservation and fishermen livelihoods - knowledge gaps	
	Incentive distribution and challenges	
	Sustainability of the present system versus viable alternative options	
12:30	Presentation by each group: future course of actions	
13.00	Session wrap up and concluding remarks from Chair	
14:00	Lunch and end of the workshop	

Annex II – Participants

SI No	Name of the participant	Position / Organization	Role
1	Mr Anisur Rahman	Jt. Secretary, MOFL	Chief guest
2	Syed Arif Azad	Director General, DOF	Special guest
3	Dr A. Atiq Rahman	Executive Director, BCAS	Chairperson in the inaugural session
4	Dr Craig A Meisner	Director, The World Fish	Guest of honour
5	Dr Essam Yassin Mohammed	IIED	Facilitator
6	Dr Zenebe Bashaw Uraguchi	HELVETAS Swiss Intercooperation	Presenter
7	Mr Liaquat Ali	Senior Fellow, BCAS	Organiser
8	Mr Sarder Shafiul Alam	Fellow, BCAS	Participant
9	Professor Md. Abdul Wahab	Faculty of Fisheries, BAU, Mymensingh	Facilitator
10	Dr Sainar Alam	Asstt. Director, DoF	Participant
11	Mr ABM Zahid Habib	PD, Jatka Conservation Project, DoF	Presenter and Participant
12	Dr Nirmal Chandra Roy	Assistant Director, Jatka Conservation Project, DoF	Presenter and Participant
13	Ms Masud Ara Momi	Assistant Director, Jatka Conservation Project, DoF	Presenter and Participant
14	Dr Anisur Rahman	SSO, BFRI, Chandpur	Participant
15	Mr Phani Bhusan Malo	Secretary, National Fishermen Association (JMS)	Participant
16	Advocate Islam Ali	President, National Fishermen Association (JMS), Dhaka	Participant
17	Mr Anwar Hossain Shikder	President, Small Scale Fishermen Association (JKMS)	Participant
18	Mr Parsho Nath	Hilsa Fisherman, Chandpur	Participant
19	Waziullah Majhee	Fisherman Doulatkhan, Bhola	Participant
20	Dr G. C. Haldar	Ex-CSO, BFRI	Presenter and Participant
21	Dr Md. Jalilur Rahman	Consultant, Marine Fish. Project, DoF	Participant and Presenter
22	Ms Noor Akter	HELVETAS Swiss Inter-cooperation	Participant

23	Mr Shamim Hossain,	HELVETAS Swiss Inter-cooperation	Participant
24	Mr Nasiruddin Mohammed Humayan	Director, Marine Fisheries, Ctg.	Participant
25	Dr Aminul Haque	Deputy Director of Fisheries, Barisal	Participant
26	Mr Pritish Kumar Mallick	District Fisheries, Bhola	Participant
27	Mr Ratan Kumar Dutta	DFO, Chandpur	Participant
28	Dr M. Eusuf	Senior Fellow, BCAS	Participant
29	Mr Mainuddin Khandaker	Senior Fellow, BCAS	Participant
30	Professor Anwarul Haque	Senior Fellow	Participant
31	Mr Md. Abdus Sattar	Research Fellow, BCAS	Participant
32	Pronoy Kumar Sarker	M.Sc. Student of IUB, Dhaka	Participant
33	Sk. Shahinur Islam	Research Fellow, BAU, Mymensingh	Participant
34	Md. Sabber Ahmed	Research Associate BCAS	Participant
35	Shamima Ishrat Rita	Senior Research Officer, BCAS	Participant
36	Shamshun Nahar	Senior Research Officer, BCAS	Participant
37	BM Faruque Ahmed	Head of Program BCAS	Participant
38	Mizanur Rahman	Senior Research Officer, BCAS	Participant
39	Sunil Chandra Das	Fisherman, Chandpur	Participant
40	Abdur Rahim	Fisherman, Chandpur	Participant

This workshop was held as part of a project that aims to reduce overfishing of the Hilsa fish in Bangladesh through a payment for ecosystem services (PES) programme. The Hilsa fish is of national importance to Bangladesh yet increased demand through South Asia has led to pressure on the fish species. PES is often seen as an effective form of conservation yet there are still many knowledge gaps to address. The workshop brought together representatives from different interest groups to gather their perspectives on;

The effectiveness of the incentive-based conservation mechanism.

The role of the mechanism in poverty alleviation.

The role of the mechanism in Hilsa fish conservation.

The contribution of Hilsa fishery to the national economy.

Identification of some critical limiting factors that inhibit the effectiveness of the scheme.



Event Materials

Fish

Keywords:
Marine conservation, PES



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