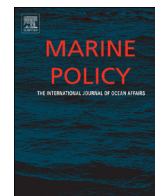




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# Economic incentives for sustainable hilsa fishing in Bangladesh: An analysis of the legal and institutional framework

Md Monirul Islam<sup>a,\*</sup>, Essam Yassin Mohammed<sup>b</sup>, Liaquat Ali<sup>c</sup><sup>a</sup> Department of Fisheries, University of Dhaka, Dhaka 1000, Bangladesh<sup>b</sup> International Institute for Environment and Development (IIED), 80–86 Gray's Inn Road, London WC1X 8NH, United Kingdom<sup>c</sup> Bangladesh Centre for Advance Studies (BCAS), House – 10, Road – 16/A, Gulshan – 1, Dhaka 1212, Bangladesh

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## ABSTRACT

Bangladesh's hilsa shad (*Tenulosa ilisha*) comprises the largest single-species fishery in the country, constituting 11 per cent of the total catch and employing 2.5 million people directly or indirectly. Since 2003, following a sharp decline in catch figures, the hilsa fish has been the subject of a government conservation programme offering fishers economic incentives or payments for ecosystem services (PES). While PES schemes are widely used to conserve natural resources such as forests and watersheds, Bangladesh's programme is a rare example of PES for sustainable fishery management. Catch figures have improved since the programme was introduced; but concerns remain about fishers' socioeconomic conditions and the long-term sustainability of Bangladesh's hilsa fishery. This paper analyses the conservation scheme's legal and institutional frameworks, identifying challenges to its design and implementation, and makes recommendations to overcome them.

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## 1. Introduction

'Ecosystem services' are the benefits that people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as floods, drought and disease; supporting services such as soil formation, photosynthesis and nutrient cycling; and cultural services such as recreational and spiritual benefits [1]. In particular, ecosystem services provide livelihoods for millions of people, many of whom are poor and make a significant contribution to their economies. However, the world's ecosystems have dramatically declined over the past 50 years as more areas are used for agriculture, forestry, fisheries, industries, and urban growth [1]. Payment for ecosystem services (PES)<sup>1</sup> is an environmental management approach that offers cash payments or other compensation to encourage the conservation

\* Corresponding author.

E-mail address: [monirulislam153@yahoo.com](mailto:monirulislam153@yahoo.com) (M.M. Islam).

<sup>1</sup> The term 'payments for ecosystem services' is not universally adopted. Depending on the cultural and political context, other terms such as 'recompense', 'compensation' or 'reward' may be used. PES projects are also referred to as 'improved management of hydrological resources' or 'reciprocal arrangements'. Payments for ecosystem services are sometimes called 'incentive-based cooperative agreements', 'stewardship payments', 'compensatory schemes' or even 'performance payments'.

and restoration of ecosystems. PES is a widespread tool and is increasingly used in diverse countries around the world where vulnerable ecosystems are under threat. Over the last decade several studies have found that ecosystem services have benefitted or could benefit the low-income sellers of these services [2–8]. Reviewing several studies, Milder et al. [9] concluded that PES is providing important livelihood benefits to poorer households or communities in the form of cash payments or noncash benefits, and could provide more: 'We estimate that by the year 2030, markets for biodiversity conservation could benefit 10–15 million low-income households in developing countries, carbon markets could benefit 25–50 million, markets for watershed protection could benefit 80–100 million, and markets for landscape beauty and recreation could benefit 5–8 million'.

While incentive-based approaches such as PES have gained popularity in terrestrial environments such as forest and watershed ecosystems, there are few examples in aquatic ecosystem and sustainable fisheries management [10]. Yet coastal and marine ecosystems generate some of the most important services to humankind; and they too are endangered by overexploitation and loss [11]. Mohammed and Wahab [10] infer that a well-designed economic incentive mechanism can play a major role in incentivising fishing communities to conserve and manage their resources.

The government of Bangladesh has introduced a PES scheme to

conserve and sustainably manage hilsa shad fish (*Tenualosa ilisha*) populations. Hilsa comprises the largest single-species fishery of the country, providing 11 per cent of Bangladesh's total fish catch, and directly employing half a million fishers – most of whom are poor [12] and affected by climate variability and change [13,14]. A sharp drop in hilsa catch figures over the years 2001–2003 (having previously shown a steady increase) had a significant impact on the country's economy, particularly on livelihood in fishing-dependent communities. Most observations and surveys identified overfishing (of both adult and juvenile hilsa, or 'jatka') as the main reason for the dwindling catch. From 2003 onwards the government put several protection and conservation measures in place, including closing some areas to fishing, restrictions on fishing gear, restrictions on the fishing season and regulations for fishing vessels. These measures are designed to ensure a target production of hilsa, as well as to improve the socioeconomic conditions of the fishing communities. Under the PES scheme the fishers are given direct incentives during the fishing ban period: they receive food as well as some support for alternative income generation. After the scheme came into effect, the total hilsa catch level began to increase again in line with previous years. However, there has not yet been a rigorous evaluation of the scheme's impact on catch size, so the increased catch cannot be credited conclusively to PES. Siddique [15] found both positive and negative perceptions of hilsa conservation among civil societies and researchers. He reported that supporters of incentive-based hilsa conservation measures consider it an effective way to increase fish production, while those against it point to the socioeconomic losses to fishers, who mainly come from poorer social backgrounds.

Key to successfully establishing a PES scheme – and maximising its benefits – are legally binding environmental standards, judicial and compliance review mechanisms, enforcement procedures, and appropriate institutional frameworks. Law and policy create the basis for the institutional structure, especially public institutions, to function and support PES [16]. PES legislation should develop through practical experience, with local projects informing regional and national legislation; these in turn should provide greater legal certainty, and a framework that enables rather than restricts regional and local PES [16]. The institutional structure guides the practice, and ultimately the effectiveness, of a PES scheme [17,18]. Since they have the potential to either facilitate or hinder the development of PES schemes, there is a clear need to better understand these legal and institutional frameworks. This study's objective is to analyse the conservation scheme's legal and institutional framework to identify how the framework can be improved to best support the scheme. The findings have important implications for other PES schemes for fisheries management in similar settings.

Section 2 describes the study's methodology; Section 3 describes the characteristics and history of hilsa shad fishery; Section 4 reviews the existing legal institutional and policy framework for hilsa conservation; Section 5 outlines the existing hilsa conservation programme and its economic incentives; Section 6 critically assesses the legal and institutional challenges and opportunities for the hilsa conservation programme and economic incentives. Section 7 concludes by restating the rationale and findings of this study, and suggests policy implications.

## 2. Methodology

This study is based on a review of existing legal, policy and institutional documents, as well as recent literature relating to hilsa fishery and conservation. It also draws on primary information gathered from key informant interviews and focus group discussions described below, held between January and April 2014.

### 2.1. Key informant interviews

This study used the 'key informant' interview method, carrying out in-depth qualitative interviews with individuals who have direct specialist knowledge of the issues being researched. The key informants included individuals from both within and outside hilsa fishing communities. This study selected six fishers who are knowledgeable about PES from communities in Chandpur, an area included in the hilsa conservation programme. This study also selected ten government officials from different tiers of the Department of Fisheries (DoF) and Bangladesh Fisheries Research Institute (BFRI) who were directly involved in payments for the hilsa conservation programme. This study prepared a checklist for the interviews beforehand which included questions on hilsa fishing, PES related legislations, institutions, and enabling and disabling factors as well as the key informants' recommendations on these. For these interviews the East Midlands Oral History Archive (EMOHA) guidelines for key informant interviews were largely followed [19].

### 2.2. Focus group discussions

Two focus group discussions (FGDs) were conducted with fishers who receive compensation under the hilsa conservation project in Chandpur. A list of topics and possible questions for the participants were developed beforehand to ensure some structure and direction in the discussions. The emphasis was on clarifying issues that were raised in the key informant interviews. Each FGD session ran for about three hours and between five and eight issues were covered.

Between five and eight fishers took part in each FGD. These were fishers who had experience of the main issues under discussion, or who seemed able to explore the key concepts [20] and who appeared to be cooperative and enthusiastic. In facilitating the FGD sessions the authors aimed to ensure that the focus was kept, momentum maintained and that there was real participation and closure on questions [21]. Both the interviews and the FGDs were held in 'neutral' places, with no significance for the participants and no bearing on the subject under study. The facilitators also ensured that the meeting places were comfortable and that seating arrangements allowed participants to see and hear each other clearly.

## 3. Characteristics and history of hilsa shad fishery

Hilsa fish belong to the clupeid family, which includes herrings and sardines, found in South and Southeast Asian [22]. There are three separate species of hilsa shad in the Bay of Bengal: *Hilsa kelee*, *Hilsa toli* and *T. ilisha*. *T. ilisha* is an anadromous species, migrating from the sea up rivers to spawn, while the other two species are restricted to the marine environment. In this study, 'hilsa' generally refers to *T. ilisha*, as this species makes up 99 per cent of the hilsa catch in the Bay of Bengal [23]. It is found along the coasts of India and Myanmar as well as Bangladesh.

In Bangladesh the fisheries sector as a whole directly supports the livelihoods of about seven million fishers, contributing 4.43 per cent to GDP and 2.73 per cent to export earnings [12]. Most marine fishing (93 per cent) is small-scale in nature, supporting the livelihoods of over half a million fishers and their household members (ibid). The annual hilsa catch worldwide is approximately 0.3–0.4 million metric tonnes (t), of which 50–60 per cent is caught in Bangladesh [24]. Hilsa catches in Bangladesh were 298,921 t in 2008–2009 (95,970 t from inland waters and 202,951 t from marine waters) and accounted for 39 per cent of the total marine catch, 4 per cent of inland catches, and 11 per cent

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