

# DEGRADATION AND RESTORATION OF A FLOODED FOREST IN BANGLADESH

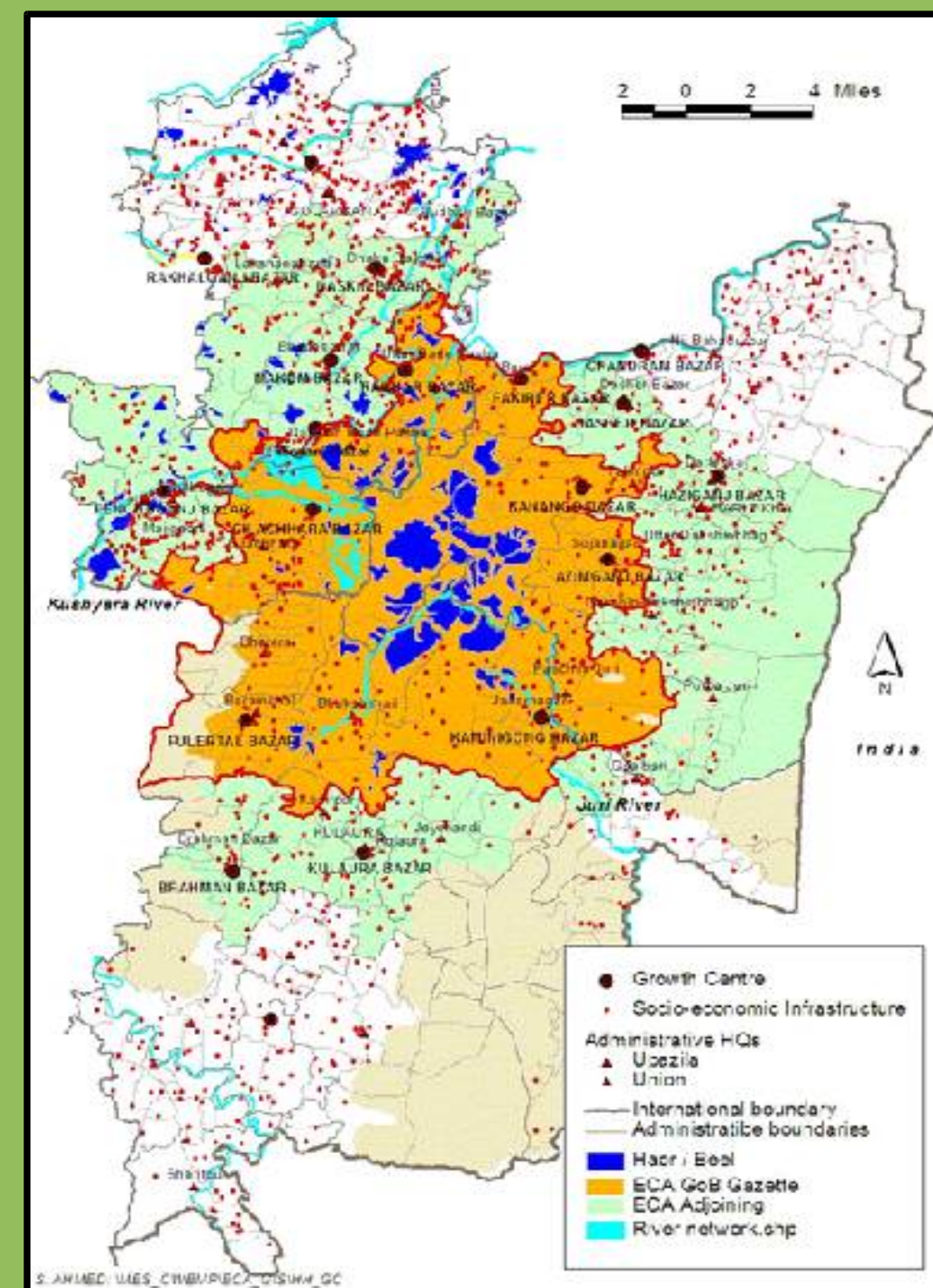
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## INTRODUCTION

On-going efforts to foster the return of a flooded forest in Bangladesh invite inquiries on the socio-ecological complexity of land-use and land-cover change, and its implications for environmental management and restoration (1,2,3).

When, why, and how did the Hakaluki flooded forest become transformed in a patchwork of grazing fields, fallows and fuel-wood sources? What (f)actors are maintaining this system in this 'degraded' alternative state, and which (f)actors are inviting a return of the flooded forest? Is the return of the flooded forest in Hakaluki feasible, or even desirable?

This study outlines the transitions and actors involved, and provides a view on the roles of both social and ecological factors in environmental restoration.



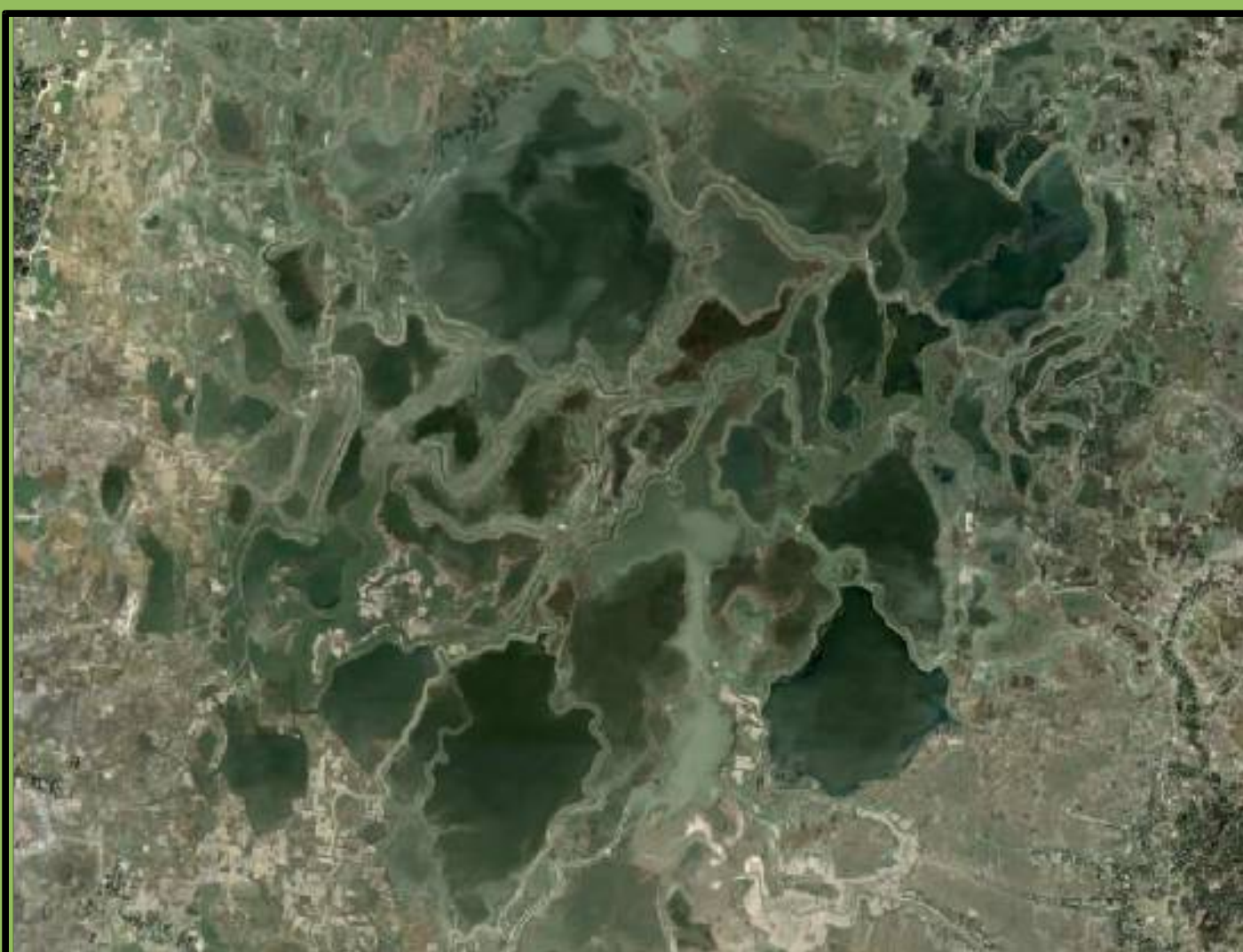
## STUDY AREA AND METHODS

In the northeastern division of Sylhet, (lat. 24°35' N to 24°45' N and long. 92°00'E to 92°08'E.), Hakaluki is one of the largest *haors* in Bangladesh. A *haor* is a large freshwater wetland complex that is entirely inundated during the rainy season (May-Oct.). As the water gradually recedes in the dry season (Nov.-April), it reveals a network of *kandas* (floodplains), streams and rivers, as well as *beels*, bowl-shaped depression retaining water year-round.

*Hakaluki haor* covers an area of over 18,000 hectares, most of which is under water during the monsoon, whereas in the dry season, water is only found in some streams and in the 230 *beels* that then cover up to 4,600 ha. This ecosystem is home to important fisheries, and a crucial stopping point for both domestic and migratory birds.

This area is inhabited by over 200,000 people, most of whom derive their livelihood from fishing, farming (rice and vegetable) and rearing of cow, buffalo and fowl within and around the *haor*. It was historically covered by a thick flooded forest, locally called 'swamp forest', an assemblage of species adapted to existing on floodplains. The tree species then dominant were *Hijol* (*Barringtonia acutangula*), *Koroch* (*Pongania tinctoria*) and *Barun* (*Crataeva nurvala*) with a number of related reed species. This tree cover provided shelter for fish and wildlife, and hindered erosion and flooding.

To understand the mechanisms of environmental change in Hakaluki as they pertain to the flooded forest, we have interviewed local resource users, government officials, and non-government organization (NGOs) employees, visited various restoration sites, converted forest patches and other remnants of this ecosystem. This was supplemented with a survey of various historical documents (e.g. 4) and government and NGO reports.



Satellite view of Hakaluki during the dry season



Homestead and rice paddy on the edge of haor



## FROM ZAMINDARS TO NGOS

We have identified five periods that help explain the transitions between past and current state of the Hakaluki ecosystem.

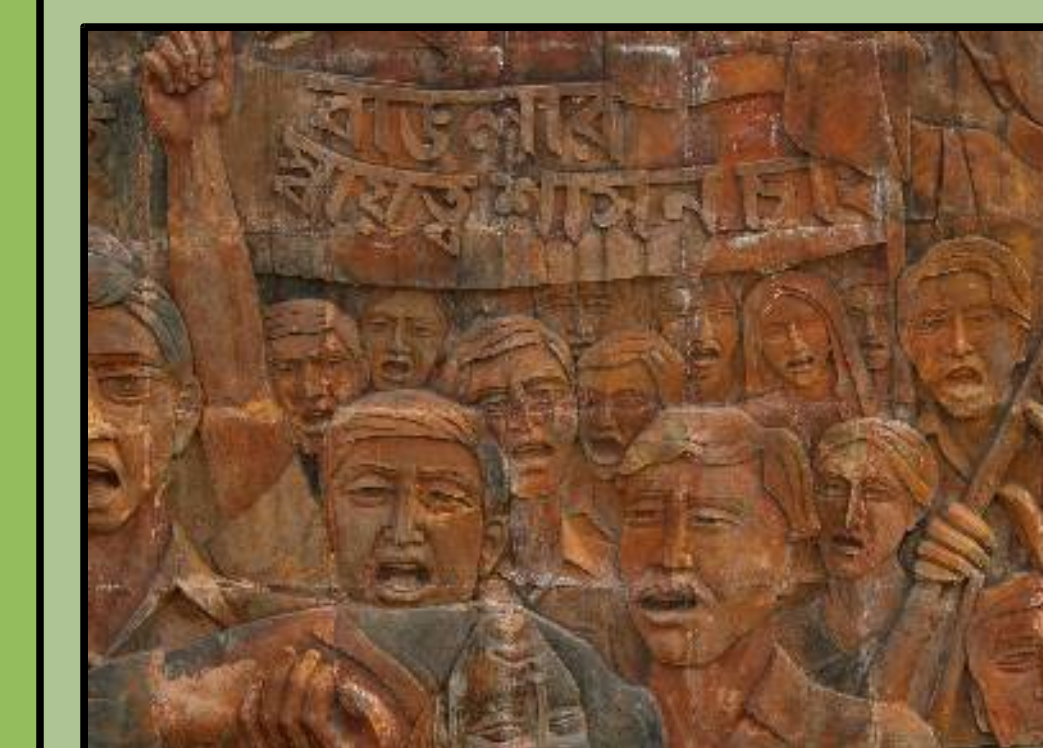
### 1. British India era (1757-1947)

Hakaluki area is under the control of the Kulaura *Zamindar*, in the Assam province of British India. Due to its 'remoteness' and the resistance to colonial rule in the area, British administration was not very active. Local institutions prevail, allowing access and use of common resources, such as collection of felled branches and pruning. The Hakaluki flooded forest is maintained as dense forest.

In Sylhet great difficulty was experienced from a variety of causes; the country plane-tabled consists of hills, forest, and swamp, with little open ground or clearing; the rivers, lakes, and streams are swollen abnormally during the rains as, for example, the Hakaluki Howhar, which though passable on foot in winter, assumes during the rainy season the dimensions of a lake about twenty miles by nine, where lives are yearly lost, and which is described by local native officials as "that dangerous stormy sea." A third cause of obstruction consisted in the difficulty of procuring coolies and supplies. On several occasions some persons of influence would induce the rice-sellers in the bazaars to refuse to sell to the surveyors' men at any price, and even incite them to riot and violence. (Source: (5.) Anon 1882, p. 341)

### 2. Pakistan era (1947-1970)

Eastern Bengal joins the new country of Pakistan after India's independence from Britain. *Zamindar* system abolished and replaced with *Khas* (government) land system. Over the years, population and landlessness increase, while social and political stability decrease. Some forest conversion occurs following expansion of croplands and homesteads. Increasing corruption from forest guards and other government officials, allowing tree felling and conversion in exchange of bribes. Yet, Hakaluki remains characterized by a rather dense flooded forest. Elders recalls having to follow narrow trails when taking cows to grazing fields.



### 3. Bangladesh Liberation War (1971)

During the war for the independence from Pakistan, the social fabric collapses, breakdown of institutions. In Hakaluki, Pakistani troops attempting to crush rebellion order the felling of the forest, where freedom fighters were hiding. The forest disappears in a relatively short period. At the time of Liberation, December 1971, there remains only a few, isolated mature trees dominating a mixture of grasses and saplings.



### 4. Early Bangladesh (1973-1997)

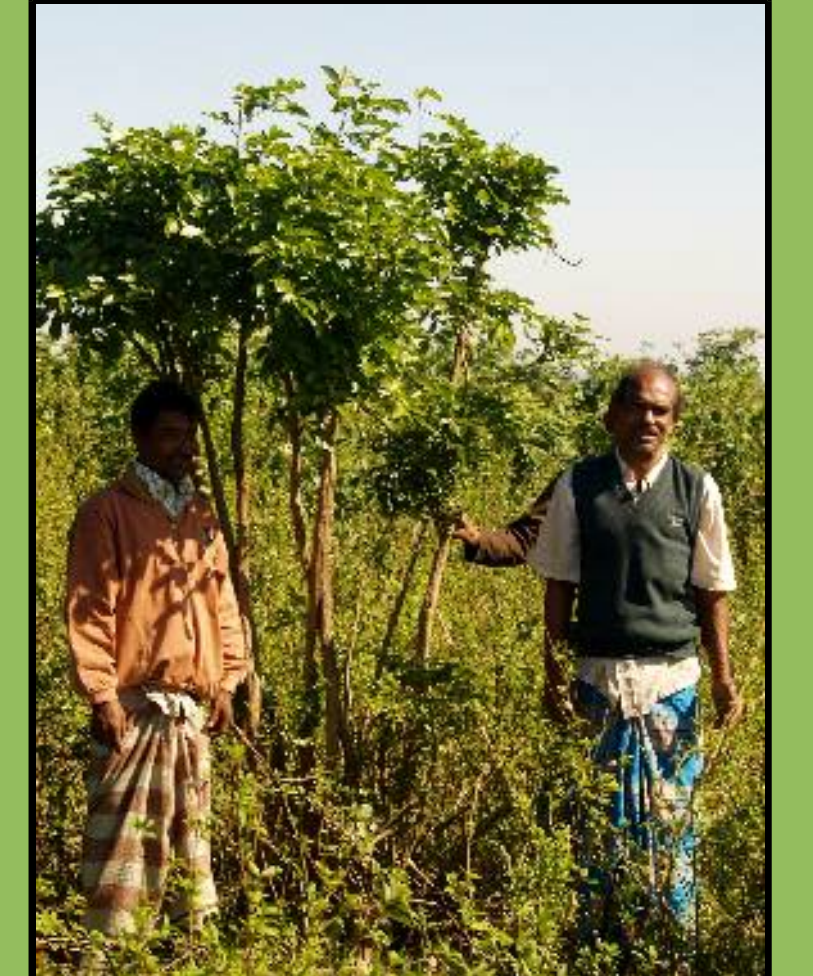
After independence, the new Bangladesh government maintains a similar approach than previous administrations. During the first few years, the administration's relatively weak formal institutions are not active in land management. Population and landlessness continue to increase, resulting in more pressure than before on the ecosystem, and this, just after it underwent profound transformation. Inhabitants start to suffer from increased erosion, floods, and a decline in fish production. Given the nature of the flooded forest species assemblage, most important tree species continue to re-sprout from vegetative growth (coppice), constantly forming patches of shrubs, which are often grazed by cattle or collected as firewood. At the outskirts of the *Haor*, some of these shrub areas get converted to croplands.

### 5. Toward Hakaluki Ecologically Critical Area (1999-)

Government of Bangladesh declares Hakaluki *Haor* one of its 8 Ecologically Critical Area. Environmental initiatives are financed and designed by international agencies, implemented by the Bangladesh government in partnership with NGOs. Central role for community-based management committees composed of resource-users, organized by NGOs focusing on the links between poverty alleviation and sustainable resource management. Funds are provided to NGOs to hire community-based organizations members in nurseries of *Hijol* and *Koroch* and plantation activities. Over 600,000 saplings are planted over the years, only a few survive, but other 'natural' patches are allowed to re-grow following the hiring of conservation guards and community-level resolutions to allow certain fields not to be grazed.



Community-based organization meeting



## DISCUSSION AND CONCLUSION

Social-ecological systems are complex and dynamics assemblages of actors that interact in different ways over time. These 'actors' include the resource system itself, the nature of resource units, as well as the institutional, political and cultural context (3). These interactions shape, among other things, land use and land cover (1, 2). Understanding environmental change, and ecological restoration efforts require the identification of the key actors, and their impact on the trajectory of the given social-ecological system.

Hakaluki haor was covered by a dense cover of flooded forest for the most part of the recent centuries, providing resources such as firewood, and contributing to fish productivity, flood and erosion reduction. Local institutional arrangements allowed some use of the resources while allowing this forest system to continue. Social collapse during the Liberation war, along with army's ordering of felling of the forest, led to a rapid transition from dense forest cover to patches of shrubs that are more vulnerable to grazing pressure and to firewood collection. Whereas the nature of the vegetation species of the flooded forest make them particularly prone to recovery, and the forest would be able to grow back through vegetative growth and flood-driven seeding system, grazing and collecting hinders this return. In the absence of an institutional context to ensure that important patches of forest area allowed to return, Hakaluki has remained in a non-forested state for decades.

The synergy between international donors, NGOs and government has invited the creation of such an institutional context. NGOs, one of the main sectors of the Bangladeshi economy, have for mandate to create and facilitate the work of community-based organizations in a manner that meets the needs of both the local resource users and international agendas for environment and development. At each of these levels, there appears to be a desire for the return of the flooded forest in the area. Parts of the Hakaluki flooded forest are on a trajectory toward recovery, due to both the 'dormant' potential of the flooded forest root system that favors re-growth, and the creation of the institutional context through economic opportunities provided by NGO-related work and local desire for the return of the services provided by the ecosystem.

Specific historical events, the nature of the ecosystem, and the institutional context have and continue to shape land-use and land cover in Hakaluki.

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