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Resource-dependent livelihoods in the Sundarbans

by

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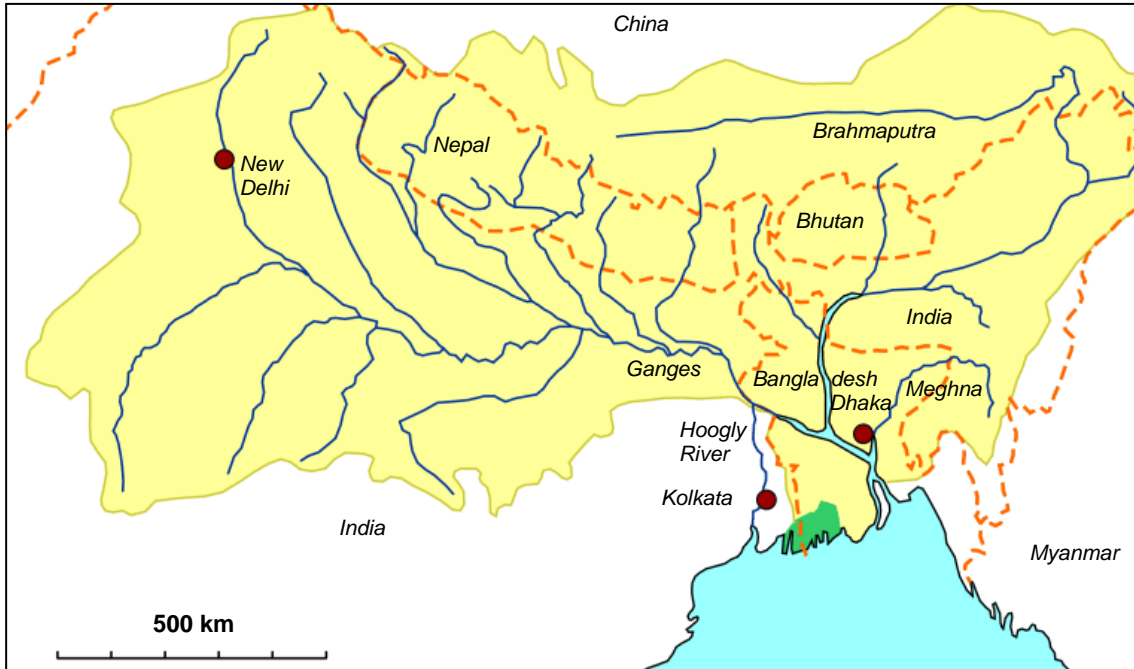
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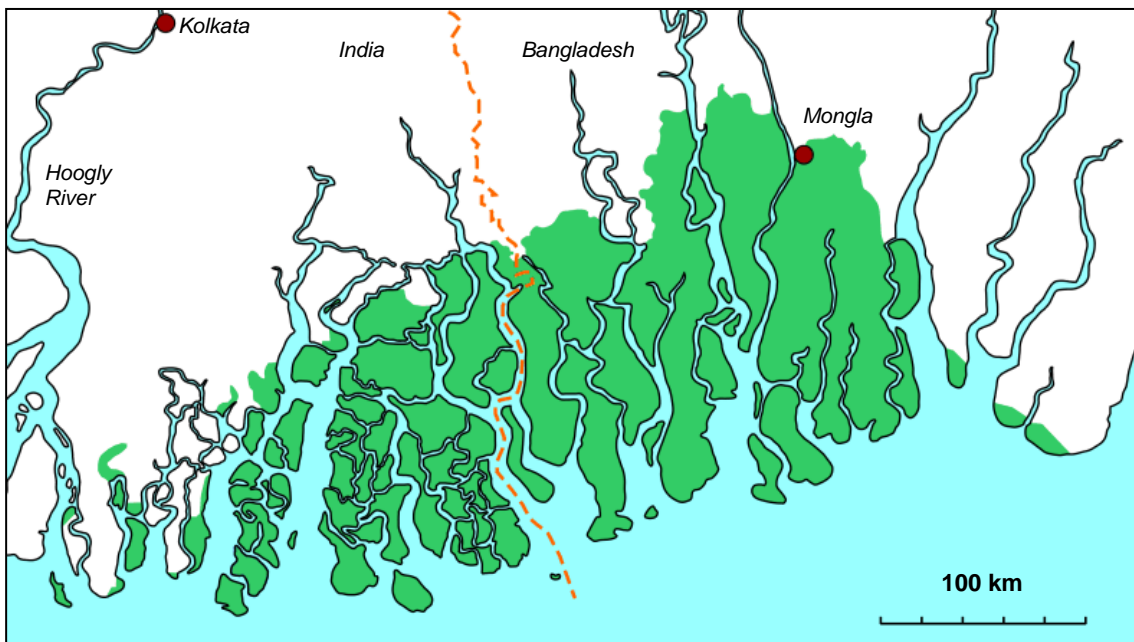
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Location map



----- National border (indicative)



Glossary

Eco-region: A large area of land or water with similar natural conditions and related ecosystems. The boundaries of an ecoregion can depend on conditions '*as they were some time in the past*' or '*as they could have been*' rather than '*as they are*'. WWF has selected the *Global 200*, a list of 200 ecoregions which are regarded as conservation priorities. Sundarbans has two ecoregions on this list: The Sundarbans freshwater swamp forests and the Sundarbans mangroves. Their combined area (of 35,000 km²) extends well beyond today's conventional delineation of the Sundarbans

Integrated management (in the present context) provides a powerful linkage between (1) management of natural resources and the environment on the one hand, and (2) social development and poverty alleviation on the other. Both resource utilization and poverty can be influenced by public regulation and intervention, and coordination of such efforts can in many ways add value to each other

Mangrove: (1) Trees and bushes growing below the high-water level of spring tides (FAO); (2) a coastal forest growing on land that is permanently or regularly inundated by fresh, brackish, or saline water. Mangrove vegetation is characterized by its ability to grow under such conditions. Mangroves are the natural vegetation of three quarters of tropical coastlines, but large parts have been reclaimed for shrimp farms, salt ponds, or other purposes. Mangroves can have rich ecosystems and can provide protection against erosion and storm surge

Microcredit: Small loans extended to poor people, with the objective of improving their livelihood (for example by buying a tool, seeds, or some livestock). In some schemes, repayment is collectively pledged by a user group. Impressive positive experience from the Grameen Bank in Bangladesh (established in 1983) has served as an inspiration to many other countries. In 2006, its founder, dr. Muhammad Yunus, shared the Nobel Peace Prize with the organization itself for the development of microcredit as a tool for poverty alleviation

Subsistence economy: An economy serving own household needs only

Total Economic Value (TEV) is a concept that can be used for policy formulation and planning. TEV includes the following components: (1) *Direct value*, related to production and consumption of goods (primary & secondary) that can usually be traded (so the value becomes visible). Examples: Crops, fish, firewood, timber, non-timber products; (2) *Indirect value*: The benefits derived from ecosystem functions. These are usually not traded - so the value becomes uncertain - but can be large. Examples: Flood control, storm protection, soil conservation; a beautiful scenery; value related to income from tourism; (3) *Option value*: The value derived from a possible future use; (4) *Bequest value*: The value of conserving things for future generations. Example: A fish or forest resource not used today; (5) *Existence value* is related to the satisfaction to know that something exists - such as cultural value, heritage value, spiritual value, etc.; and (6) *Intrinsic value*, the value of a living resource in its own right, unrelated to human utilization. Example: The Royal Bengal Tiger

Summary

The present paper describes an example from the Sundarbans, Bangladesh, of a community living in a balance with a surrounding mangrove forest, upon which it depends for subsistence and livelihoods. The balance is fragile, because excessive exploitation can undermine the resource availability. At the same time, due to prevailing poverty, there is an urgent need of supplementary or alternative livelihoods and income generation.

The Sundarbans is the World's largest continuous mangrove area, covering some 10,000 km² of land and water within the Ganges Delta, with some 62 percent located in Bangladesh and the remainder in the Indian state of West Bengal. The Sundarbans forms a uniquely rich ecosystem, famous for its tiger population (with perhaps more than 600 individuals), but with some 40 other mammal species, hundreds of bird species, as well as a wealth of reptiles, shellfish and marine turtles.

Exemplified by one community, Southkhali, typical occupations are fisheries, farming, labour, trade and services, with half of the households depending mainly on the mangrove resources for their livelihoods, and the remaining ones to some extent.

Several development initiatives are in progress, and more are needed, in pursuit of sustainable resource utilization and an overruling need of poverty alleviation.

Good management - and good knowledge - are required to assure a win-win situation rather than a development where both the mangrove forest and its communities stand to lose.

Acronyms and abbreviations

BRAC:	Bangladesh Rural Advancement Committee (an NGO)
NGO:	Non-governmental organisation

1 Introduction

The present paper describes an example of a community living in a balance with a surrounding mangrove forest, upon which it depends for subsistence and livelihoods. The balance is fragile, because excessive exploitation can undermine the resource availability. At the same time, due to prevailing poverty, there is an urgent need of supplementary or alternative livelihoods and income generation.

2 The Sundarbans

The Sundarbans is the World's largest continuous mangrove area, covering some 10,000 km² of land and water within the Ganges Delta, with some 62 percent located in Bangladesh and the remainder in the Indian state of West Bengal.^{1 2}

The Sundarbans has a population of over 4 million, but a large part of the area is free of permanent human habitation. Various non-timber forest products and plantations help generate considerable employment and income generation opportunities for at least half a million poor coastal population.³

The Sundarbans forms a uniquely rich ecosystem, famous for its tiger population (with perhaps more than 600 individuals), but with some 40 other mammal species (for the tigers to feed on!), hundreds of bird species, as well as a wealth of reptiles, shellfish and marine turtles.

Originally covering most of the coastal zone between the Hoogly and the Meghna Rivers, the area of the Sundarbans has been reduced to half over the last 200 years, due to clearance for agriculture.⁴ Several spectacular species became extinct in the process, including the Javan rhinoceros, the water buffalo, the swamp deer and the gaur. In recent decades, the hydrological regime has been affected by the Farakka Barrage (commissioned in 1975) that diverts up to 40 percent of the dry season flow from the Ganges to Hoogly River. There is influence from other human intervention, as well as natural, long-term, large-scale planform developments of the Ganges (moving eastward) and its delta.

The area is inundated twice per day, during high tide. The salinity decreases along the coast from west towards east (and of course from the sea towards inland). The weather has a high seasonality, with around 80 percent of the annual rainfall occurring during the monsoon (June-October). Cyclones hit the area occasionally, with storm surges of up to 7.5 m. Severe oil spills have happened over the years.

The Sundarbans was declared a reserved forest as early as 1878 under the 1865 Forest Act. In 1987, parts of the Indian Sundarbans - the Sundarbans West Wildlife

¹ Most of this chapter is from UNESCO (Jan 97)

² Please note that literature and websites (and quoted statistics) about the Sundarbans often implicitly cover either the West Bengal or the Bangladeshi parts of the area, or the protected parts of those areas

³ According to Wikipedia (Dec 09)

⁴ According to UNESCO (Jan 97)

Sanctuary (133,000 ha) - became a UNESCO World Heritage Site, and parts of the Bangladeshi Sundarbans - the Sundarbans Wildlife Sanctuaries (140,000 ha) - received the same status in 1997.

Values of mangroves

The uses and values of mangroves are many and important. Wood products range from timber, poles and posts to firewood, charcoal and tannin. Non-wood products include thatch, honey, wildlife, fish, fodder and medicine. In addition, mangrove lands are often converted to salt ponds or to agriculture or aquaculture purposes. (FAO, 1994).

Among the '*intangible*' benefits, often taken for granted, are: (a) coastal protection against wave and wind erosion; (b) moderating the effects of coastal storms and cyclones; (c) shelter and habitat for diverse wildlife, particularly avifauna; (d) nutrient sink-effect and reduction in excessive amounts of pollutants, and (e) entrapment of upland runoff sediments thus protecting near shore reefs and reducing water turbidity. Mangroves also provide opportunities for education, scientific research, recreation and ecotourism.

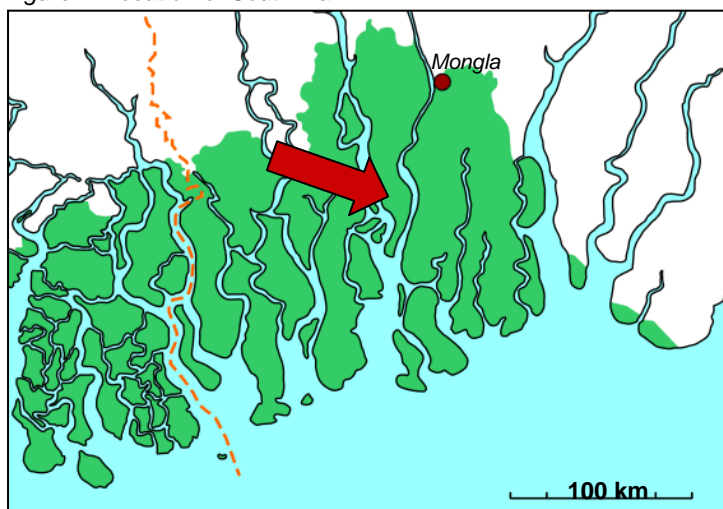
3 Case study: Socio-economics of Southkhali

In 2001, during the BSc study, the author conducted a socio-economic survey in Southkhali Union (of Sarankhola Thana under the district of Bagerhat):

Area:	75 km ²
Households:	9,500 (1991)
Household size:	5.3 persons (1991)
Population:	50,500 (1991) (51 pct female)

The area is intersected by numerous of river channels. It is bordered by two major rivers, Bhola river and Baleswar river, which are eroding, causing landlessness. 38 percent of households had dwelling units and 62 did not.

Figure 1: Location of Southkhali



The soils are acid and become toxic if allowed to dry. For this reason, and due to salinity, the area is not well suited for agriculture. Still, farmers can raise one rainfed crop of rice per year (aman) and small amount of winter rice (boro) with a yield of 1.3-3.5 t/ha. Also, a few varieties of vegetables are cultivated.

Table 1: Livelihoods in Southkhali

Main livelihood	Percent of households
Fishery	32
Farming	25
Labour	15
Trade	13
Service	5
Other	10
Total	100

(All households, 2001 data)

100 households were selected for detailed interviews. Among these, 50 pct earned less than 590 USD/household/year, and 90 pct earned less than 1430 USD/household/year.⁵ On the average, 1.4 household members contributed to the household income. All of these, with one single exception, were male.

49% of the households directly extracted forest resources for their livelihood, including 98 percent of the landless forest fishers. Almost all remaining households depended partly on the forest resources. The forest fishers, traders and some of the labourers directly depended on forest resources, earning money from either selling or processing these resources. Most of the farmers and service holders depended on forest resources indirectly because they used forest resources for their households (for food, fuelwood, building materials etc). It was a clear trend that the higher the household income, the higher the dependency on forest resources.

Utilization of mangrove resources comprised

- Food: Fish, honey, crabs etc.;
- Fuelwood from various trees;
- Fry collection; and
- Building materials: Golpata (or nypa palm)⁶, timber etc.

There are some medicinal plants in the mangroves, but these were not utilized.

Most of the households depended entirely on fuelwood for cooking. This demand causes rapid depletion of forest and consequently the ecosystem, as well as air pollution and health problems.

Once upon a time logging was practiced in felling mode, but now in selective mode. When carried out in felling mode, the result can be erosion of the exposed ground and impoverishment of the soil within the affected area. In selective mode, as carried out at present, the removal of many valuable species can still damage the ecosystem, and in

⁵ Converted at 58 taka/USD, roughly reflecting the exchange rate of that time

⁶ The only mangrove palm species, suited for roofing material and several other uses

this mode, the space of the removed individual trees may be taken by other, less valuable, species. In either case, the forest resources become less valuable.

Fish is the potential source of protein of the people of Bangladesh. Many people of the Sundarbans households totally depend on fishing, usually by nets that are very effective but catch all fishes. Sometimes poisoning is applied, with severe environmental impacts. Tourists can enjoy the sight of fishing by trained otters.

Shrimp cultivation is profitable business, and is totally dependent on natural fry. People collect fry from the river by nets of small mesh, with severe consequences to a multitude of other species.

On 15 November 2007, Southkhali was completely destroyed by a 5 m storm surge during cyclone Sidr.

4 Development support initiatives

At the time of the case study, the following development support initiatives were in progress by government agencies (Department of Social Welfare, Department of Fisheries, Department of Forestry, and National Youth Development Department):

- Rural services for women;
- Implementation of the Fish Act: Awareness-building, and species protection;
- Training in sustainable fry collection;
- Tree planting schemes and a nursery development program;
- Strip plantation along embankments, roads and highways;
- Training in poultry farming;
- Training in fish farming;
- Training in garments manufacturing; and
- Microcredit.

Two NGOs, BRAC and Prodiplan, were involved in

- Support to poultry and livestock farming;
- Support to agriculture;
- A health programme;
- A social development programme;
- A *Vulnerable Group Development* (VGD) programme;
- A *Save Our Sundarbans* (SOS) programme;
- Formation of cooperative groups;
- Awareness-building about the Sundarbans; and
- Microcredit.

5 Management of resource-based livelihoods

Forest management in general can aim at

- Sustainability of forests and forestry;
- Ensuring adequate supplies of forest products;
- Maintenance or expansion of forest cover and species composition;
- Habitat and ecosystem conservation;
- Improved quality of products and improved efficiency of production and distribution systems, as a basis for
- Improved value of forests and forestry (including but not limited to economic revenue).

Management of mangrove habitats and dependent communities has an even broader, multi-disciplinary scope. The following aspects have been identified as relevant for the Sundarbans, with the explicit aim of sustainable resource utilization, to the benefit of future generations as well as present ones.

Policy measures

- Drainage basin and habitat conservation
- Reforestation where needed
- Protection of ecosystems and biodiversity

Legislation and enforcement

Legislation is in place, with the 1927 Forest Act (amended in 1989), and the 1974 Bangladesh Wildlife (Preservation, Amendment) Act.

Regarding implementation, there is a scope for strengthened resources for the Forest Department, and for mobilisation of active support from the local government. A need is seen of legal provisions for wood extraction and forest fisheries.

Public awareness

Awareness-building is facilitated by a fair literacy rate and education level.⁷ Both governmental bodies and NGOs should conduct environmental and conservation awareness and education programmes throughout the society, through education, public meetings and cultural activities for households engaged in the utilization of resources.

Alternative livelihoods

The pressure on the resource utilization can be eased to the extent that alternative livelihoods are available. This is a challenge for both governmental bodies and NGOs, providing education, microcredit, and access to markets. It is noted that tourism and recreation is an emerging sector that can, in the course of time, offer highly attractive employment and income opportunities, if pursued in a prudent way.

Demand management for forest resources

The widening gap between demand and supply of forest products can be reduced by measures such as

⁷

The literacy rate among the surveyed households was 77 percent (with 100 percent for those employed with services), and 52 percent had primary education

- Supply augmentation: Increasing the supply through social forestry programmes and reforestation of bank areas of forests, including old plantations, and regeneration of exploited areas; and
- Demand containment: Efficiency improvement and waste minimization of fuel wood, timber and bamboos, by
 - Promotion of improved ovens in rural areas and introduction of biogas plants throughout the country;
 - Strict enforcement of the ban on use of wood fuel in brick fields;
 - Public awareness of benefits of use of seasoned and treated timber; and
 - National facilities for seasoning and treatment of wood, bamboo, thatch grass and golpata

6 Observations

People living within or near the Sundarbans mostly depend on its resources to satisfy many of their basic needs, such as food, fuel, materials for construction of houses, boats, furniture and fishing implements, medicinal herbs and many other items for trade and commerce.

Some people, however, extract resources beyond their needs. Due to misuse and mistrading the natural resources are decreasing. There is a clear scope for gentle regulation, in the interest of the very people who depend on the resources.

One observation was a surprisingly low awareness of the resource dependency and the resource utilization implications. An improved awareness seems a viable measure, given the fair literacy and education level.

Another observation was an apparent attractive scope for introduction of alternative or supplementary livelihoods and income generation, including involvement by the female part of the population.

Such development initiatives must - and can - interact with an overruling need of poverty alleviation.

Good management - and good knowledge - are required to assure a win-win situation rather than a development where both the mangrove forest and its communities stand to lose.

Among other measures in this respect is an improved knowledge base, providing for timely and appropriate decision-making and implementation.

Need of knowledge

A substantial information is required for appropriate management of forest resources:

Resources

For each type of resource, the information is needed about availability, productivity, assimilative capacity, extraction, and costs. Also, data are needed about land use, tree cover; fisheries and agriculture - materials and equipment; economics; and human resources.

Operational information

Various operational information is needed, such as land clearing including timber harvesting, hauling, burning, pond construction, canal construction etc; site preparation for afforestation/reforestation; nursery establishment, planting, maintenance and protection; improvement and production control and river transportation logistics, canal etc.

Resource utilization

There should be an effective demand-forecasting system for the forest products and services expected to be produced from the forest at various levels. This information type is required from timber- or fuelwood producing mangroves. Even for the environmental management areas, the objective may change over time to include production functions. Relevant factors to consider are preferred species, spacing, area, growth rate, location of forest, processing units and transport facilities, site conditions affecting logging costs, profile on traditional wood or non wood uses.

Socio-economics

Economic considerations are required over and above purely financial ones simply because strict analysis of cash expenditure and revenue does not fully account for the real costs and real benefits to the community as a whole. In multiple-use management, timber production may be reduced or even curtailed to preserve or enhance aquatic production and the trade-offs between alternatives compared. As the economic qualification of intangible cost is still as an early stage as applied to forestry in general and mangroves in particular informed estimates may be used instead as shadow labor cost, labor opportunity cost, associated soil cost, discount rate to be used, shadow price for produce to reflect price distortions due to taxes, duties and price control mechanisms, value of non marketable benefits and development impact of intangible benefits to local and regional economy, training etc.

Institutional framework

Institutional factors are mainly political by nature, but also include the legal frameworks. The management planning should include statements such as legal obligations; legal privileges and rights; policy guidelines; support to communities, education and training; recreational facilities; local attitude and impact on local society; and research linkage and support.

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