Complementarities of Human-Nature Well-beings: A Case Illustrated through Traditional Forest Resource Users of Sundarbans in Bangladesh

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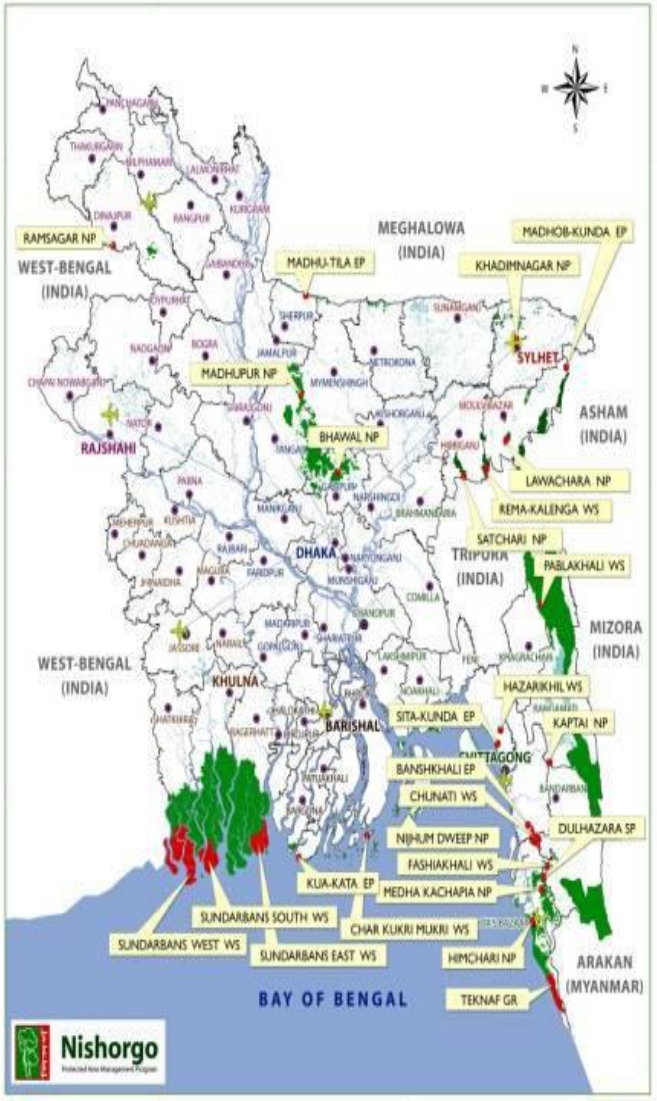
The Sundarbans

- World's largest single tract of mangroves comprising a total area of 10000 square kilometres placed in between Bangladesh and India
- Bangladesh part of the Sundarbans belongs to the area of 6071 square kilometres (62% of the total Sundarbans area)
- Declared as Reserve Forest (RF) in 1875, where some form of resource extraction is allowed but no one is permitted to settle, cultivate and graze inside the forest (*Need Permit to enter or collect resources)*
- UNESCO has declared three wildlife sanctuaries as 798th World heritage site in 1997
- Ramsar convention in 1992 declared Sundarbans as the 560th Ramsar site.



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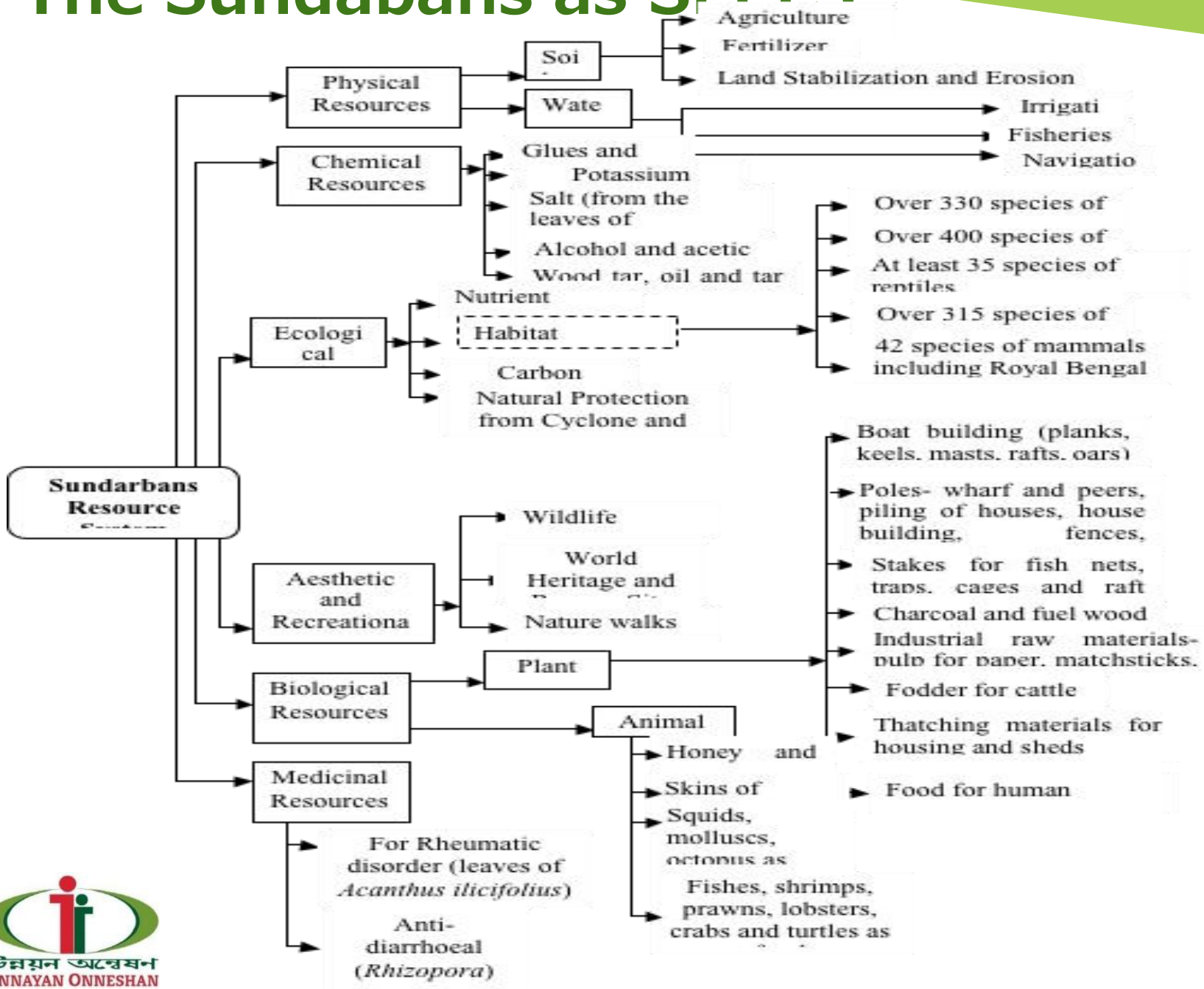
The Sundabans as SFDLS



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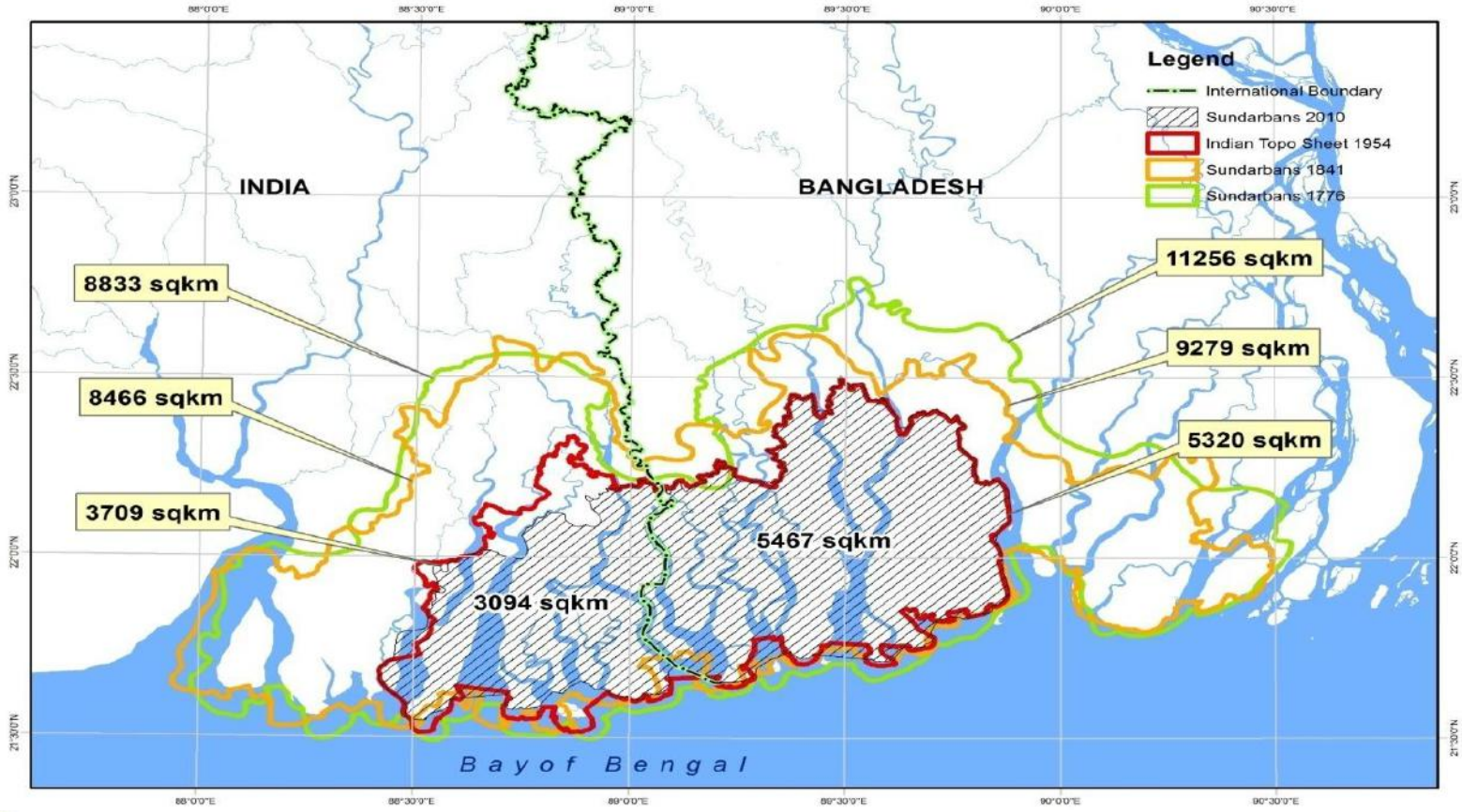
Mangrove forest change of the Sundarbans from 1776 to 2010



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The Sundarbans

Biodiversity

- 334 species of vegetation
- 49 species of mammals (Including Famous Royal Bengal Tiger)
- 53 species of reptile
- 120 species of bird
- 8 species of amphibians
- 300 species of fish

Traditional Resource User Groups

- 3.5 million people directly or indirectly depend on the Sundarbans for livelihood
- Bawali (Wood Cutter and Nypa Palm collector)
- Mouwali (Honey Collector)
- Jele (Fisher man)
- Chunari (Snail and Oyster Collector)
- Prawn fry collector
- Crab farmer
- Small scale honey and timber businessman

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Climate Change impacting the Sundarbans

Anthropogenic pressure- driven Climate Change

Illicit destruction of the forest; conversion of forest land into commercial shrimp cultivation; use of agrochemicals etc.

Cyclone *Sidr*

- Hit south-west coast of Bangladesh on 15 Nov, 2007
- Total loss: USD 1.7 billion or 2.6% of GDP
- One-fourth of total *Sundarbans* damaged
- Specifically, 8% to10% - destroyed completely and 15% - damaged partially

Cyclone *Aila*:

- Hit same region on 25 May, 2009
- Forced 50,000 people to be homeless
- The wave was 20 feet high
- Trees were uprooted and several species of flora and fauna lost their lives

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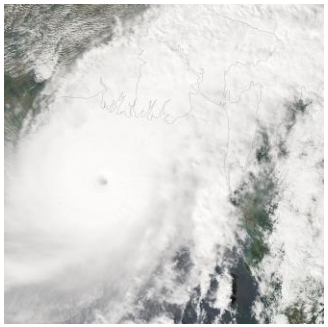

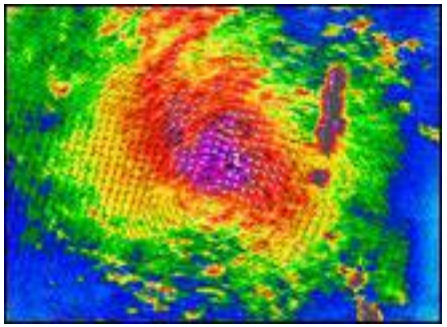

A. Protection and Restoration of Vulnerable Ecosystem: Traditional Rules and Practices

- **Mouals (honey/wax collectors):** In case of collecting honey from the honeycombs, the Mouals usually cut a specific section (about two thirds) of the honeycomb and leave the rest for reproduction; try to make sure that no young bees are being killed while collecting honey; squeeze beehives by hand.
- **Bawalis (wood collectors):** Bawalis leave at least one stem in each clump of trees after cutting. Once they have harvested wood from a compartment, in the following year they won't use this compartment for harvesting, but will harvest on a cyclical basis so that there will be adequate re-growth of plants.
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Protection and Restoration of Vulnerable Ecosystem: Traditional Rules and Practices

- **Golpata (*Nypa fruticans*) Harvesters**: exploitation in any area is not allowed more than once in a year and is not allowed during June to September (growing period); cutting only the leaves that are approximately 9 ft long and cutting in a way so that the central leaf and the leaf next to it in each clump must be retained; the flowers and fruits should in no way be disturbed.

- **Jele (Traditional Fisher-folks):** Fishers avoid catching fish fry; don't use 'jal' net (very small-meshed net); use big-meshed net for rivers and small-meshed net for closed water bodies; don't catch all species of fish and also avoid fishing in the spawning period.

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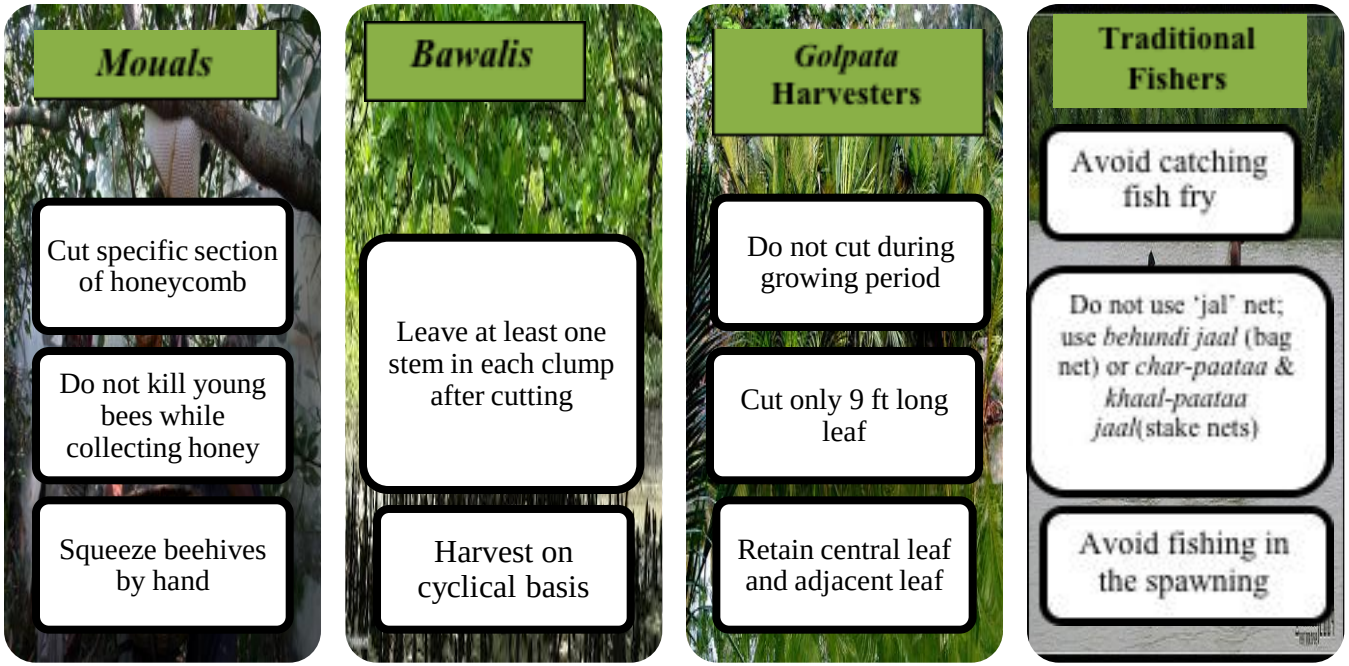
Traditional Rules and Practices followed by IPLCs at a glance



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Innovative Eco-system based Adaptation to Climate Change

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Community based Mangrove Aqua Silvi (CMAS) Culture

A practice of integrated cultivation of some mangrove faunal species - crabs, oyster or fishes (e.g: Shrimps, Bhetki [*Lates calcarifer*] Tengra (*Mystus tengara*), Baila (*Awaous guamensis*), Tilapia (*Tilapia nilotica*) etc.), and floral species - Golpata (*Nypa fruticans)*, Keora (*Soneratia apetala*), Goran (*Ceriops decandra*) etc.

The CMAS Pioneer

Khoybor Sardar, aged about 60, is a marginal farmer cum traditional collector (Bawali) of resources from the Sundarbans who resides in the village of Nanksha, upazila of Koyra under the district of Khulna. The enthusiastic farmer pioneered the integrated cultivation of some mangrove species, both floral and aquatic, like Golpata, Keora , Goran, shrimp and some types of finfish (*Bhetki, Bangal* and the like).

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Community based Mangrove Aqua Silvi (CMAS) Culture

Economic and Ecological Return of CMAS Culture		
Economic Return (Benefits>Cost)	**Mangrove Cultivation (flora):** Total Income (per 'Bigha' /per year): BDT 56250 Total Cost (per 'Bigha' /per year): BDT 1800 Net Benefit: BDT 54450 Cost Benefit Ration: 1:32	**Mangrove Aqua Farming (fauna):** Total Income (per 'Bigha' /per year): BDT 1, 83, 000 Total Cost (per 'Bigha' /per year): BDT 14,750 Net benefit: BDT 173250 Cost-Benefit Ratio: 1:12
Ecological Return	Protection from River and Land erosion, Reduce Pressure on Shundarbans, Biodiversity Conservation, Providing Breeding Ground for Aquatic Species, Carbon Sequestration, Utilization of Salinity rich Land etc.	

Source: Unnayan Onneshan, unpublished manuscript

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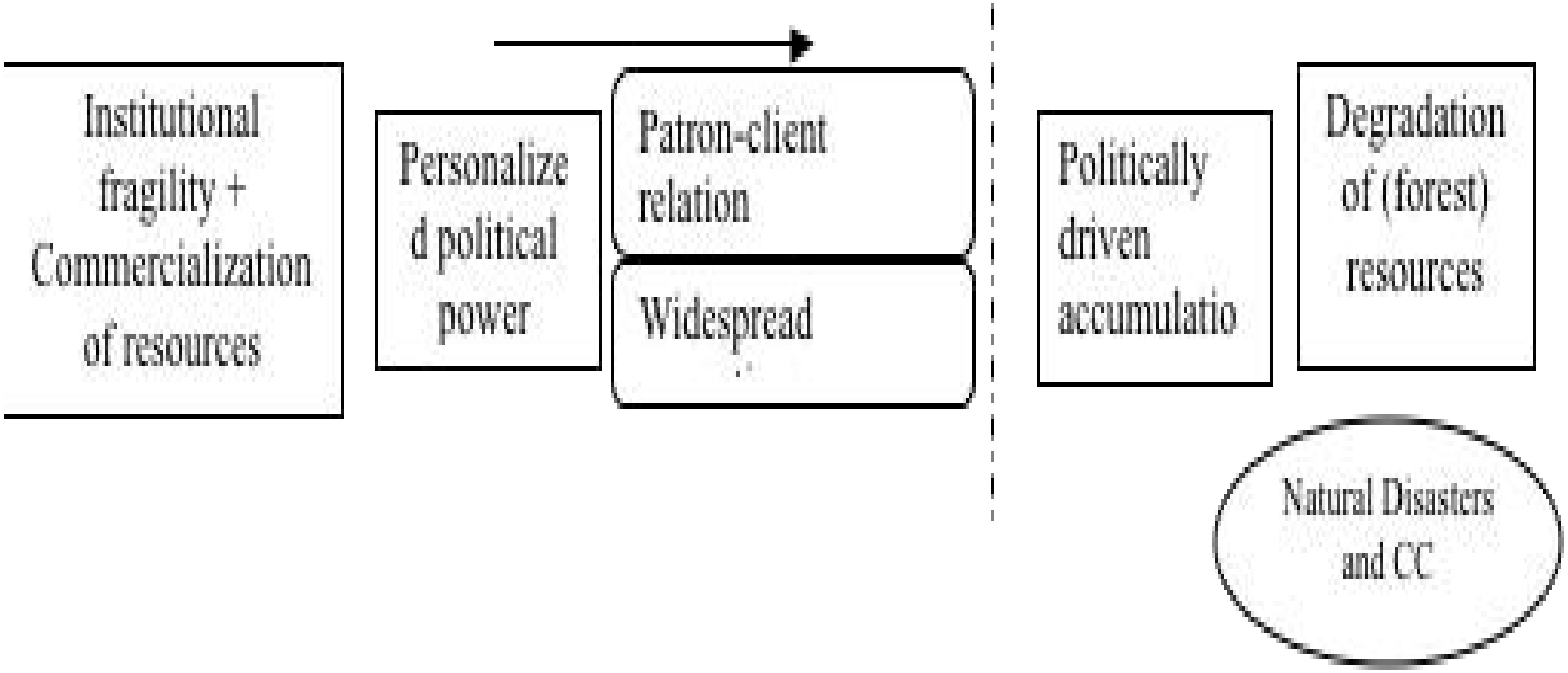
Factors Inducing Biodiversity Resource Degradation



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Key Message

Aichi Biodiversity Target Ten

By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Mangrove ecosystem plays a crucial role in maintaining the stability of forest and aquatic ecosystems:

- **prevent erosion**;
- provide an indispensable input of **organic carbon** into the aquatic ecosystem;
- provide a sustainable source of **wood and wood products**;
- serve as an essential habitat for a variety of **wildlife**.

Direct contributions of IPLCs towards this target include:

- ☑ Protection and restoration of vulnerable ecosystem
- ☑ low-impact lifestyles in vulnerable ecosystems,
- ☑ Innovative adaptation to changing climate, and
- ☑ active advocacy on climate change issues.

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