RIVERINE HEALTH AND FUTURE OF DOLPHINS IN NORTH EASTERN INDIA

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Aquatic Resources of NE India

- Altitudinal variations coupled with heavy rainfall and high humidity are probably responsible for the evergreen forests in the upper Brahmaputra basin, and climatic condition more or less sub-tropical
- Habitat diversity of NE region from mountain lakes to mighty Brahmaputra makes it a biological hotspot
- The region shares its resources from Indo- Gangetic plain gene pool and to a lesser extend with the Myanmar's and south Chinese fauna
- During rainy season (May to October), the river water remains highly turbid and planktonic density is very low as water velocity exceeds 40cm/sec for most of the time
- It is the adjacent floodplain lakes (*beels*), which not only provide food and shelter for most of the riverine species but also breeding grounds for them including the IMC

- About 1000 species of aquatic macro-fauna including 300 odd fish species have been reported from the region, half of which are endemic or having restricted area distribution
- Several new species of fish have been discovered from this region in the last couple of decades
- About 45% of the available species are considered as food fish and 30% as ornamental having a great potential of employment generation
- The avian and herpetofauna of BRB are also mind boggling- over 500 avian species have been reported
- The most fascinating fauna of the Brahmaputra River is however, the dolphin (*Platanista gangetica gangetica*)

Brahmaputra Basin -Present Scenario

- Brahmaputra carries 30% of India's water resources and has the potential to generate over 40% of its hydroelectric production
- Fluvial geomorphology of the Brahmaputra is in a state of flux which is fuelled by Himalayan tectonic activities, geology and terrain characteristics, anthropogenic disturbance and hydrological change
- Bank erosion and siltation of river bed have apparently resulted in channel aggradations and channel widening
- Variability of meteorological parameters have serious impacts on the limno-biological parameters and fisheries

Satellite Imagery of Upper Brahmaputra Basin

Diverse Aquatic Habitats






R. Barak at Different Seasons

Dolphin habitat – R. Kulsi

Dolphin surfacing at Memdubi (DSNP)

Riverine Flow and its Catchments

- In a river system, water with their own properties and natural behaviour maintains its own ‘health’
- **Flow** and **Catchments** are two major factors influencing riverine habitat
- Aquatic species have evolved life history strategies primarily in direct response to the natural flow regime
- Modification of flow thus has cascading effects on the ecological integrity of river
- In maintaining river health, the water quality and quantity is the master variable, which includes natural flow regimes, physico-chemical properties, sediment transport and drainage basin runoff

Seasonal Floods and Aquatic Biota

- ❖Freshwater system is already under pressure mainly due to an increase in demand for food, services and depletion of natural resources
- ❖Specific hydrologic phenomena (floods or low flows) are critical to the integrity of river ecosystems
- ❖Flushes out floating hydrophytes and delays eutrophication
- ❖Maintains diversity of aquatic biota
- ❖Facilitates spawning activities of riverine fishes

Riverine Habitat :Deep Pool

- Important fisheries habitats include deep pools, flood-plains and associated wetlands.
- A deep pool is significantly deeper than surrounding riverbed and retains water in the dry season
- Sometimes it may be isolated from the main river
- Deep pools (*dahr* in Barak valley are ecologically very significant in the conservation of large sized fish species, turtles and the dolphins
- The river dolphins prefer deep water and particularly favour counter-current pools, of eddies, that provide refuge from the swift current of the river

Phangsura tecta

Nilssonia nigricans

Purple Swamp Hen

Asian Open Bill

Activists seize dolphin carcass from fishermen

OUR CORRESPONDENT

Dibrugarh, July 3: Green groups seized the carcass of a Gangetic river dolphin at Bogibeelghat on the banks of the Brahmaputra here this morning.

The nearly three-foot female calf of the endangered dolphin species, weighing around 10kg, was being carried away by some fishermen around 6.30am when the members of Aaranyak, an environment NGO, blocked their way.

The Aaranyak members were working as field assistants under the Dolphin Research Conservation Programme headed by Gangetic river dolphin expert Abdul Wakid and IRAB-KIRAB, a Dibrugarh-based NGO.

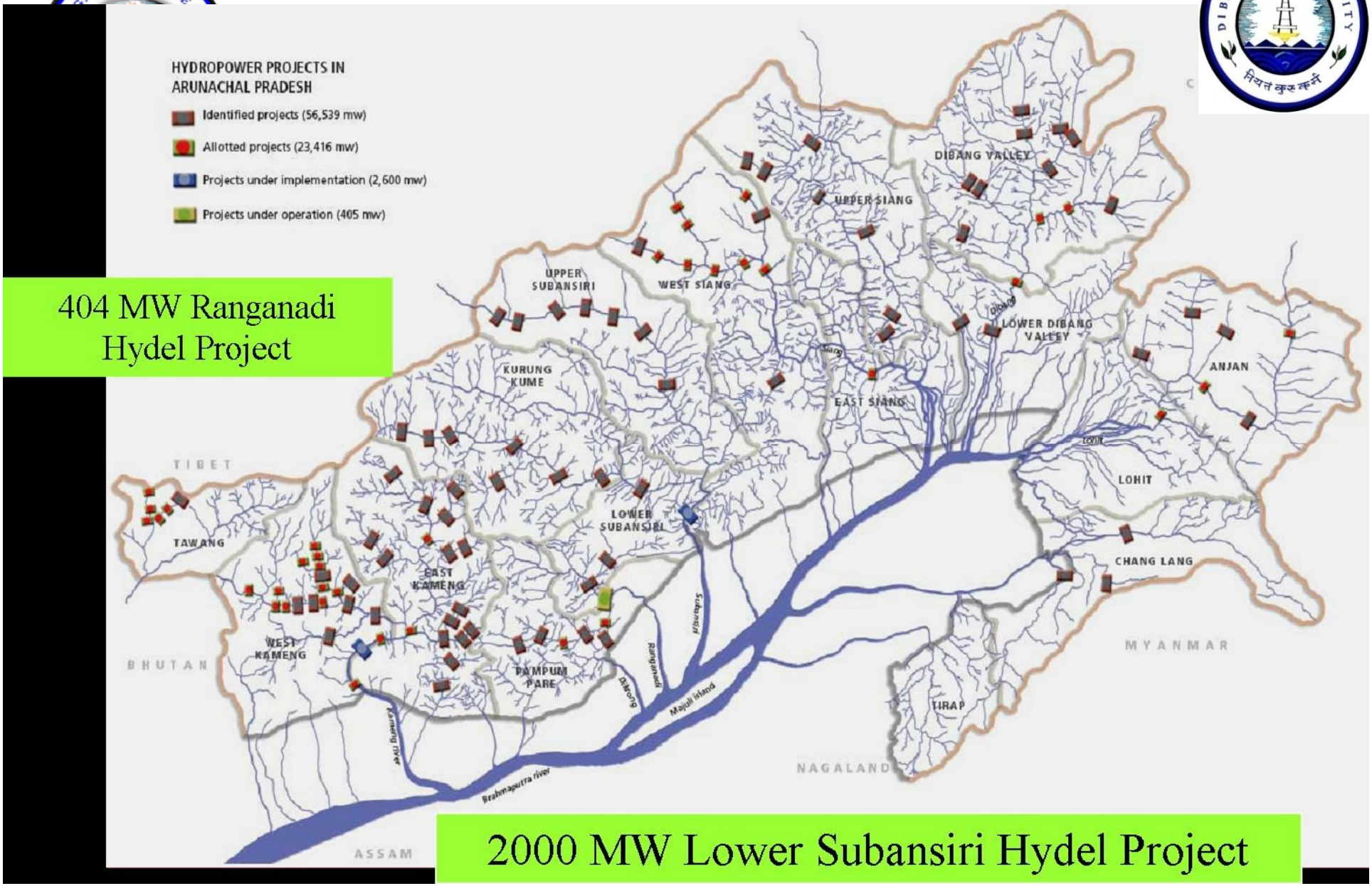
"The fishermen who were coming from the Kareng Chapori side in Dhemaji district were initially reluctant to part with the carcass. When we made them understand the legal implications of hunting dolphins, they handed it over to us. We immediately informed the forest authorities in Dibrugarh," the field assistant of the programme, Pulin Das, said. Nearly 30 field assistants have been deployed to man the Brahmaputra stretch from Sadiya in Tinsukia district in Upper Assam to Dhubri in lower Assam.

When a dolphin's beak gets entangled in fishing nets after it comes out of water to breathe, its survival chance is bleak. The forest officials disposed of the carcass at the forest range office camp in Dibrugarh after a post-mortem.

Forest officials with the dead dolphin at Bogibeelghat in Dibrugarh on Friday. Picture by Eastern Projections

Environmental/ Ecological Issues

- Seismically active zone
- Soft alluvial soil
- Felling of trees/ timber logging
- Shifting cultivation/ Deforestation
- River projects
- High rate of siltation
- Urbanization & dumping of solid wastes
- Aquatic pollution due to agricultural pesticides
- Construction of embankments


HYDROPOWER PROJECTS IN ARUNACHAL PRADESH
Identified projects (56,539 mw)
Allotted projects (23,416 mw)
Projects under implementation (2,600 mw)
Projects under operation (405 mw)
404 MW Ranganadi Hydel Project
2000 MW Lower Subansiri Hydel Project
TIBET
BHUTAN
ASSAM
NAGALAND
MYANMAR
TAWANG
WEST KAMENG
EAST KAMENG
PAPUM PARE
KURUNG KUME
UPPER SUBANSIRI
LOWER SUBANSIRI
WEST SIANG
UPPER SIANG
EAST SIANG
DIBANG VALLEY
LOWER DIBANG VALLEY
LOHIT
ANJAW
CHANG LANG
TIRAP
Brahmaputra river
Majuli Island

Major consequences

- ✓ Bank erosion
- ✓ Raising of river bed
- ✓ Channel modification- natural and anthropogenic
- ✓ Blocking of channel mouths / Feeder channels
- ✓ Pollution from non-point sources
- ✓ Loss of water cover / habitat loss
- ✓ Depletion of mega fauna

Bank erosion and Siltation

Aggradation of R. Lohit

Sand dumping site- R. Kulsi

Effect of siltation

Raised river bed →

← **House submersed by siltation**

Flash flood & Bank protection by spurs

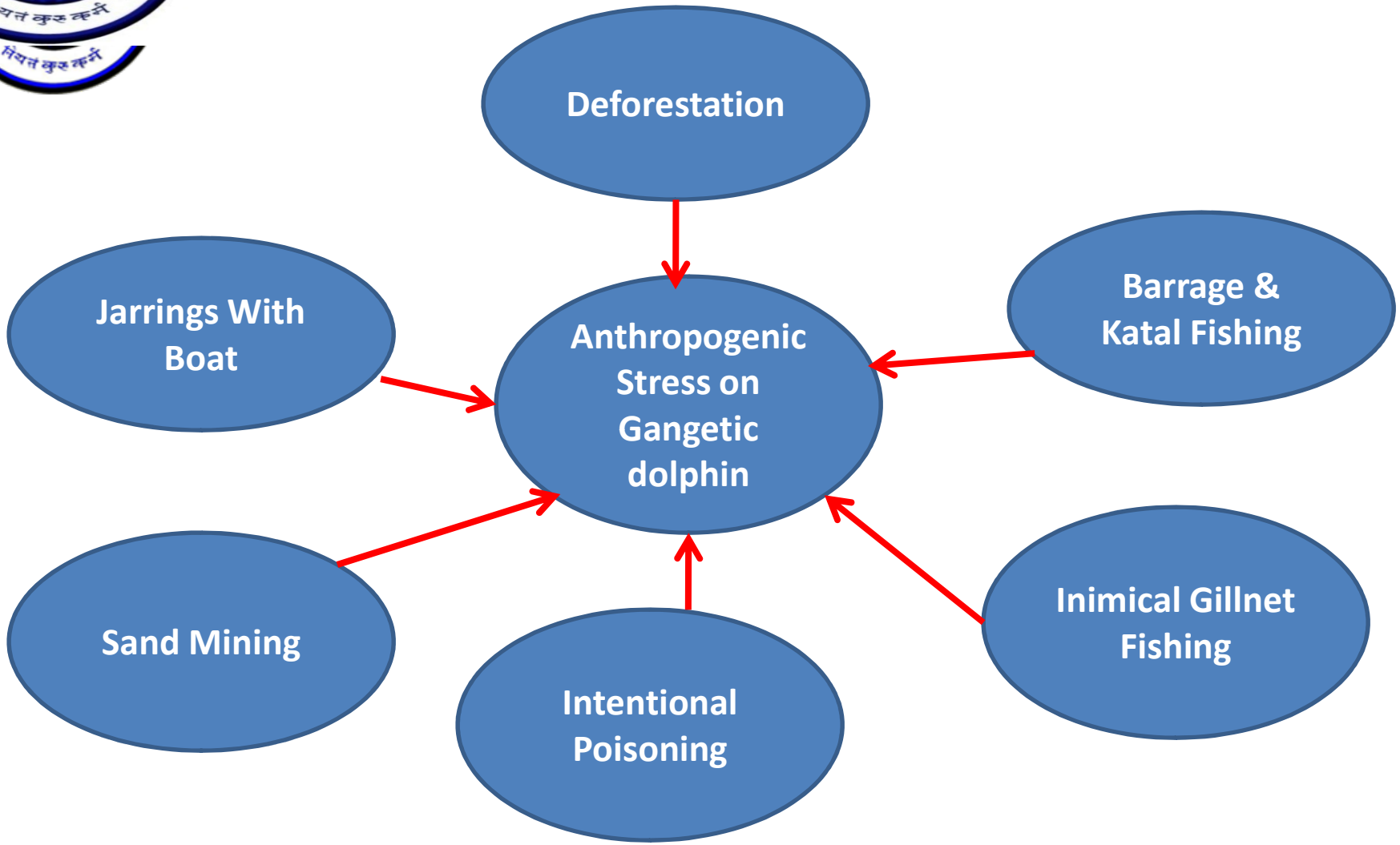

Structural Measures


Non-Structural Measures

Ecological Issues

- Large scale felling of trees in the catchment areas and construction of embankments along the Brahmaputra, leads to heavy siltation of river bed and wetlands
- Consequently, mega fauna are deprived of adequate water cover.
- Three factors, either individually or in combination relates the availability of the dolphin in a particular river- adequate water cover, water quality and abundance of prey food
- Environmental flows aim to find a balance for meeting a variety of water needs, including those of river dependent ecosystems and downstream communities

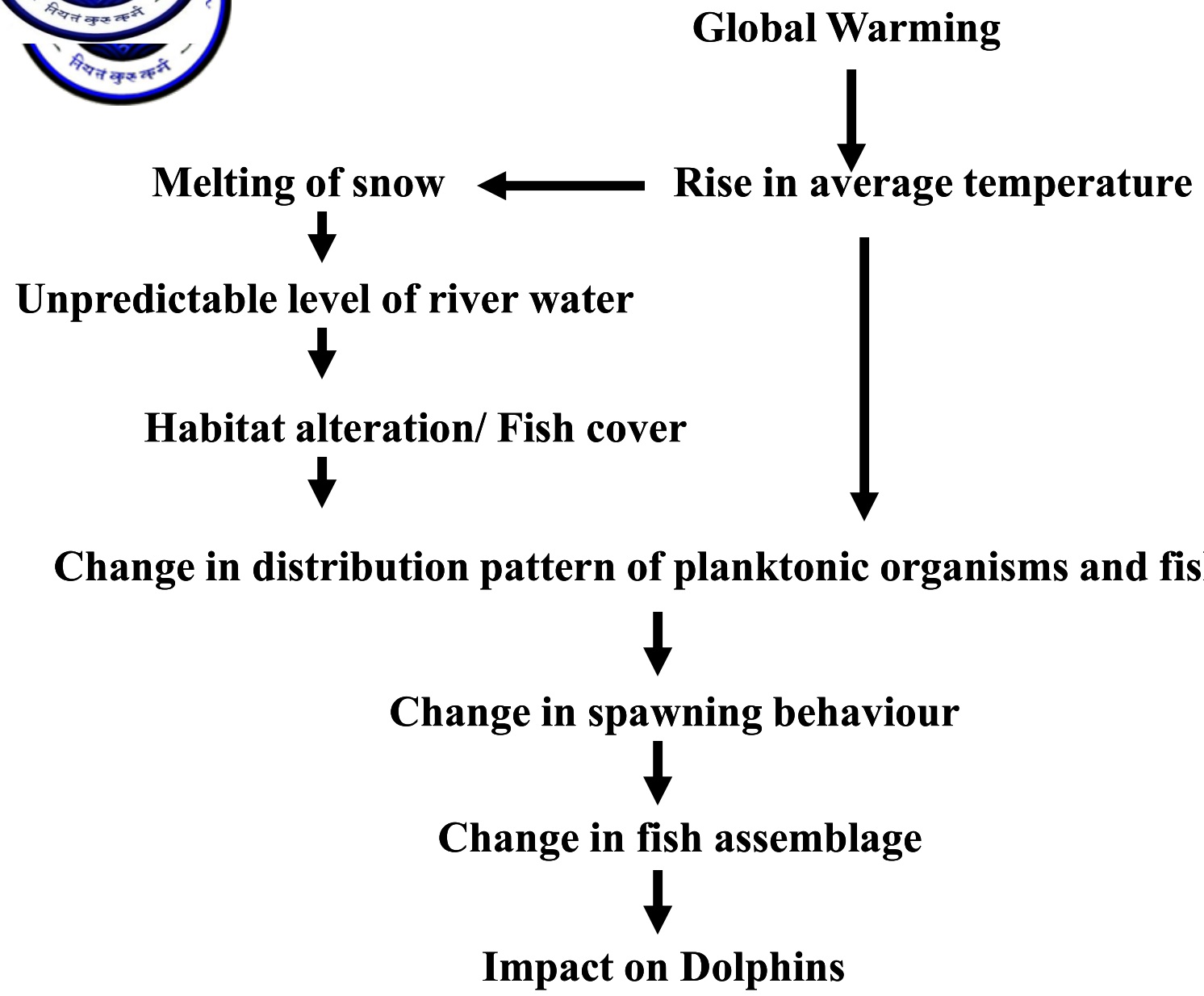
Anthropogenic Stress on River Dolphin



Ecorestoration of Riverine Habitat

- River is like a highway and provision for extra space for smooth passage of flood water is necessary
- Let there be embankments or highways on both sides of the river, but the connectivity of the channels of natural wetlands should be retained (through sluice gates)
- Dredging of the river is essential - It is not adverse to aquatic biodiversity rather it will create the much-needed ‘cover' for the aquatic megafauna
- Application of ecohydrological tools by involving all the stakeholders is the need of the hour.

Impact of Global Climate Change on Dolphins



Long term strategy

- Regular monitoring of river health (water quality) and assessment of dolphin population
- Detail behavioural study of river dolphin at local and regional level
- Development of ecotourism in dolphin sighted areas
- Enforcement of Fisheries and Environmental Acts in letter and spirit
- Restoration of riverine habitat by dredging of riverbed
- Recovery plan/ transfer of dolphins in safer areas
- Co-ordination among all stakeholders at local, regional and national/ international level

In a nutshell.....

- River dolphins prefer deep water and particularly favour counter-current pools, where fish assemblages are more
- A total of three factors, either individually or in combination relates the availability of the dolphin in a particular river- adequate water cover, water quality and abundance of prey food
- There is growing recognition that the environment must be viewed and studied as a social–ecological system
- A new model for integrated socio–ecological research, the key components of which include environmental and social sciences, press and pulse interactions, and ecosystem services
- Application of this approach will bridge the social and natural sciences and build a knowledge base that can be used to help solve current and future environmental challenges
- We need Sustainable Development and alternative livelihood for riparian people to minimize dependence on natural resources