

North-East of India - Cradle of Naturenomics™ PRABIR BANERJEA, gms

North East India - Context

India, particularly, the North-East, is one of the twelve-mega hot-spots of bio-diversity in the world, and hence represents one of the few remaining regions of convergence of diverse nature-based assets. The North East, being at the confluence of three major geographical realms of the world (Indian, Chinese and Indo-Malayan), is extremely rich in floral and faunal biodiversity with several endemic species. The following are examples of the bio-diversity of North East India:

- Plants and trees:
 - 7,500 species of plants, including flowering plants (as many as 700 species of orchids)
 - 500 species of ferns
 - 500 species of mosses, etc
- Animals, mammals, birds, reptiles and fish
 - 183 species of animals
 - 236 species of fish
 - 541 types of birds
 - 160 species of mammals
 - 137 species of reptiles, etc

This bio-diversity of North East India naturally lends itself to the development of a Naturenomics™ based economy.

Underlying components of the North East's bio-diversity

At the heart of the bio-diversity of the North East are its tremendous land and water resources.

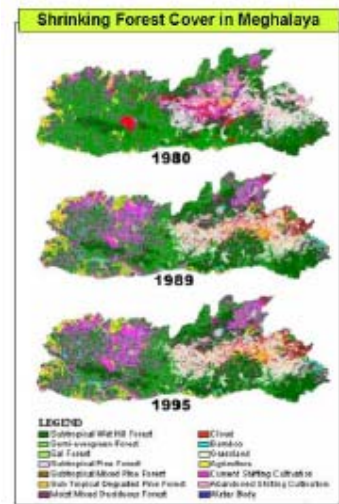
In terms of land resources, even though the North Eastern states make up for only about 8% of the total geographical area of the country, they have about 25% of the country's total forest areas (nearly 70% forest cover) supporting about 30% of the total growing stock of the forest of the country.

In terms of water resources, the North East is extremely rich in rivers, led by the mighty Brahmaputra, lakes, and other natural water bodies. In addition, this region is also one of the rainiest regions of the world, being fed with two monsoons. Rain water further enhances the existing water resources in this region. The regions extensive water resources lead to several species of water living organisms thriving in this environment.

Threats to the North East's bio-diversity

Over the last 20 years, the North East's bio-diversity has been severely challenged due to human and natural factors which have impacted its land and water resources. The key human led challenges are:

- Rapid population growth of the North Eastern states: this poses a tremendous threat to the existing forest cover and the biodiversity of the area. This rapid increase in population, in terms of both absolute and density, means that the fragile capacity of the region to absorb human presence is challenged
- Land use patterns: examples of intensive human land uses include agriculture, industrial and settlement. These land uses dramatically alter the ecological character of the land where they occur, and they tend to be permanent modifications at ecological time scales
- Large scale deforestation: this is rampant throughout the North East. The conversion of forest areas is more towards non-forest category than into other land cover types. The increase in grassland has also been due to conversion of moist deciduous forests and tropical semi



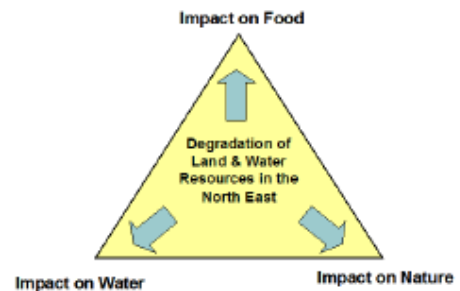
evergreen forests. The increase in area of tea gardens is due to proximity of moist deciduous forest to tea garden areas

- Manmade threats: for example, unplanned and inefficient construction of dams has a significantly damaging impact on the natural surroundings resulting in flooding, relocation of population masses, and even changing courses of rivers

In addition to human-induced disturbance, the North East is also severely prone to natural disturbance. It is one of the worst affected areas of different natural calamities like flood. Taken together, the two magnify the impact on bio-diversity, affecting ecological entities from species to whole communities and ecosystems.

The implications of human and natural threats to the bio-diversity of the North East are far ranging in terms of the ecological equilibrium of the region. Some of the key implications are:

- Impact on food
 - The impact on soil structure due to soil erosion directly impacts the fertility of the soil, resulting in lower productivity of the land for agricultural purposes
 - Food shortage in large and fast growing population geographic pockets
 - Neglect of the water resources reduces the numbers of edible water organisms such as fish
- Impact on water
 - Wastage of water
 - Shortage of water
- Impact on nature
 - Extinction of plants, animals, birds, etc
 - Dramatic changes in climate
 - Damaging impact of floods, landslides, etc
 - Changing courses of rivers



Land and Water Security

In order to arrest the declining bio-diversity of the North East, it is critical to secure its land and water resources. Ensuring Security means creating a strategy and plan to control and manage the human and natural (wherever possible) factors which are contributing to the erosion of the land and water resources of the region, which results in the declining bio-diversity of the North East.

Land security would include (examples):

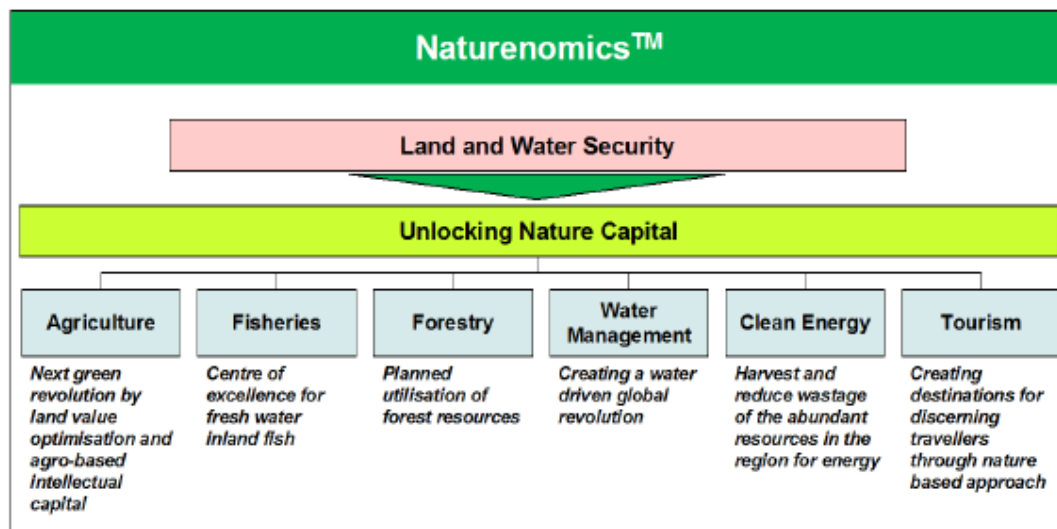
- Economic value addition of agricultural land: growing plants and crops with value added potential such as organic cultivation, medicinal and herbal plants, floriculture, bamboo, reinvention of tea plantations, etc
- Regeneration of agricultural land: land under agriculture has been degenerated if its essential nutrients due to constant cropping and use of chemicals. Once land yields decline, farmers move to other more fertile lands, which are most often forests. This cycle continues resulting in mass deforestation. Organic regeneration of land will return to it its natural nutrients thereby enhancing the productivity of the land
- Protection of green cover: protection of existing forests, and increasing forest cover if possible
- Maintaining the natural habitat: protecting endangered species of plants, trees, and living organisms by maintaining (and enhancing) their natural habitat
- Managing land use and migration: planned urbanization, and creating village based opportunities to reduce migration to urban areas
- Managed exploration of natural resources: planned management and minimised wastage of land based natural resources such as oil, natural gas, coal, etc

Water security would include strategies around (examples):

- Maintaining the natural habitat: creating an environment for water based living organisms to thrive
- Rain water management: harvesting rain water, particularly in the monsoon season to alleviate water shortage challenges
- River water management: managing the abundant rivers in the North East for:
 - cost effective power (not necessarily hydro-electric) by using environment friendly technologies
 - developing navigable waterways
 - improving irrigation

Unlocking Nature Capital

Successful security of the land and water resources of the North East would result in the creation of nature capital in the region, which will fuel the growth of the regional economy. Nature capital can be created through:



- Agriculture - creating the next green revolution by optimising the economic value add of land, and developing agro-based intellectual capital
 - value added cultivation - redefining the types of crops to be cultivated based on demand and economic value add, using the optimal mix of techniques based on multiple cropping, seasonal cropping, single cropping, etc
 - radically enhanced productivity of land under agriculture through organic regeneration
 - reinvention of the tea industry to create sustainable global competitiveness and livelihood. Tea is the oldest and most organised agricultural sector in the North East with world class scale and skills. In a hub and spoke model, tea estates would be the hubs for aggregation of agricultural output around the tea estates.
 - This would impact most villages around the tea estates, resulting in the economic upliftment of the local communities around the tea estates creating intellectual capital for agricultural practices
- Fishery - centre of excellence for fresh water inland fish
 - thriving and abundant fresh water fish
 - best practices and intellectual capital for fish culture
- Forestry - planned utilisation of resources
 - carbon sequestration
 - commercial wood - e.g. bamboo, timber, etc
- Water management - creating a water driven revolution
 - water refineries to harvest sources of water like rain water to manage water shortage

- managing rivers for navigation, irrigation, power, etc
- Fossilised fuels - harvest and reduce wastage of the abundant resources in the region for energy
 - Wind
 - Solar
 - Natural gas
 - Small hydel
- Tourism - creating destination for discerning travellers through a 3-pronged approach
 - Nature: leverage the region's natural diversity
 - Culture: cultural uniqueness
 - Religion: confluence of Hinduism, Buddhism and Christianity

Each of these industries will support symbiotic industries which will create the multiplier effect in the regional economy. Investment in nature capital is critical to restore, sustain and expand the ecosystem.

Possible Operating Structure

The possible operating structure could consist of 3 broad components, with subcomponents within each. The operating team will be guided by a Steering Committee comprising the Chief Ministers of the 8 North Eastern states (including Sikkim), and other selected representatives from the constituents involved.

The core operating structure will consist of the following components, and sub components:

- Strategy and Monitoring: This component will be responsible for developing the vision and strategy, and monitoring the operationalisation of that vision and strategy. It will consist of:
 - The core strategy team
 - Advisors for strategy development
 - Partners for implementation

Implementation and Delivery: Teams will be formed for implementation and delivery, within a matrix structure of the 8 North Eastern states and the departments related to the focus 'nature capital industries' (eg. agriculture, water management, etc) within each state

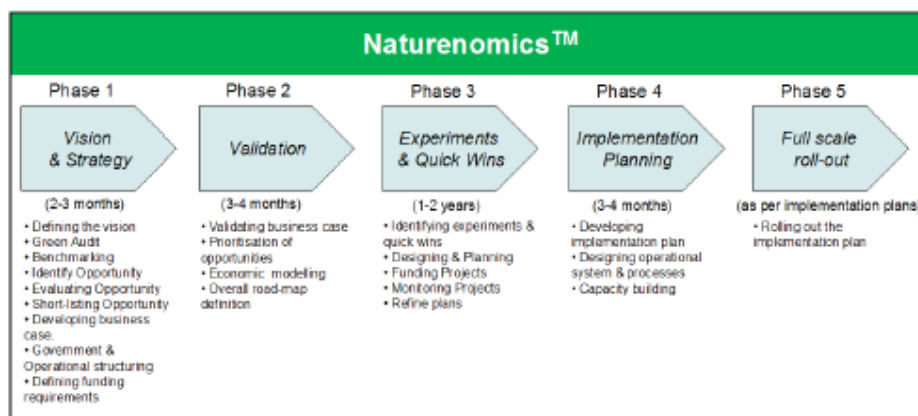
Support: Departments within the states that will provide support services for the implementation and delivery of the vision and strategy. This will consist of:

- Human resources management
- ICT
- Finance
- Capacity building

We also recommend assembling an Advisory Committee comprising of experts from a cross-section of areas - government, public sector and private sector, to guide the development of the vision and strategy, and its implementation and delivery.

Suggested Approach

We would suggest a 5 phased approach to migrating the North East towards Naturenomics™. These are:



The North East has lagged behind India and the rest of the world in economic development. Emulating industrialisation strategies of other states of India will only ensure an uncompetitive 'me too' regional economy. We strongly recommend the alternative and differentiated approach of Naturenomics™ for the North East's economic development by nurturing its differentiated asset - NATURE.

NaturalGist

- *North-East India: Is one of the twelve-mega hot-spots of bio-diversity in the world, and hence represents one of the few remaining regions of convergence of diverse nature-based assets. It is extremely rich in floral and faunal biodiversity with several endemic species. This lends itself to being the*
- *NE India Land resources: Even though the North Eastern states make up for only about 8% of the total geographical area of the country, they have about 25% of the country's total forest areas.*
- *NE India Water resources: The North East is extremely rich in rivers, led by the mighty Brahmaputra, lakes, and other natural water bodies and one of the rainiest region being fed with two monsoons.*
- *Biodiversity: At the heart of the North East's biodiversity are its land and water resources.*
- *Biodiversity under threat: The North East's Biodiversity is now under threat due to rapid population growth, changing land use patterns, large scale deforestation and manmade threats. This is degrading the land and water resources in the North East extremely impacting food, water and nature.*
- *Food & Water Security: Ensuring the security of food and water resources in the North East is critical to unlock nature capital which will fuel the growth of the regional economy. Nature Capital can be worked through the focus on agriculture, fisheries, forestry, water, clean energy and tourism.*
- *5 - Phased Approach: A 5-phased approach should be developed to migrate the North East towards Naturenomics™*