Developmental Strategies and its Impact on an Island’s Ecosystem and Bio-diversity-

A Geographical Appraisal on Little Andaman Island, India

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Location of Andaman Island in context to the world
Why this remote island?

• Being sea locked, this island is aloof from the intermingling complexities of the mainland policies.

• These commercial policies which were injected on this virgin part-- had an ugly outcome.
Uniqueness of the island

• This remote Little Andaman Island is selected because of its several uniqueness:

1) This island remained unaltered through mainstream developmental policies till the pre-independence period (1947).

2) Its unique chronological input of developmental strategies since Indian independence.

3) Its unique composition of forest and its rapid depletion.

4) Its complex population structure: Two indigenous tribal communities and rehabilitated mainlanders.

5) Its unique size and location - the southern most part of the South Andaman district
Physiography and Climate

- **Physiography:**
  - Area = 732.8 square km

- **Highest elevation** = 210 meters above mean sea level.
- Maximum length = approx 40 km
- Maximum width = approx 25 km.

- **Climatic characteristics:**
  - This Island depicts a true tropical climate regime

    - Mean maximum temperature = 33.3\(^\circ\) C during the month of April
    - Mean minimum temperature = 19.1\(^\circ\) C during March.
    - **Average annual rainfall = 3000 mm.**
    - The **south-west monsoon** brings most of the precipitation normally begins in May and ends in October.

- **Soil:**
  - Soil of this Island are nutritionally poor.
  - The **depth of the soil is very shallow** with low Organic matter.

Source: working plan of Little Andaman
Historical Backdrop of Demographic Profile

Temporal Population distribution groups

India’s Pre-Independence population (before 1947)

India’s Post Independence (after 1947) migrated population

comprising only of the Onge Tribal population

the Migrant Non-Tribal population from the mainland

Other Migrant Tribal population from mainland

Overspill tribal population of Car Nicobar Island
Pre-Independence period

• Onges were the main residents of Little Andaman Island

• the Onges resided all throughout the island.

Post Independence

• Little Andaman Island was declared as a ‘tribal reserve’ in the year 1957.

• ‘Reserve Forest’ during 1963.

Recent

• According to 2011 Census, the Onge population is only – 109

• Residing only in the Dugong Creek Region
Settlement Distribution Pattern

Migrated non tribal & tribal population from mainland have their settlement from Hut Bay to Vivekanandapur.

Migrated Nicobarese tribal population from Car Nicobar have their settlement at Harminder Bay.

Source: working plan of Little Andaman
## History of development within the island

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Since 1825</td>
<td>Visit of the first outside contact by vessel Earl Kellie</td>
</tr>
<tr>
<td>1867</td>
<td>Attack by the Onge on the British ship Assam valley</td>
</tr>
<tr>
<td>1881</td>
<td><strong>First footstep of development</strong>: Little Andaman visited by British officer M.V. Portman</td>
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<tr>
<td>1952</td>
<td>Little Andaman visited by Italian Anthropologist Cipriani to study the Onge.</td>
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<tr>
<td>1957</td>
<td>Declaration of the “Onge Tribal Reserve”</td>
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<tr>
<td>1965</td>
<td>Report by The Inter-Departmental Team on Accelerated Development Programme for the Andaman and Nicobar Islands’ Ministry of Rehabilitation Government of India.</td>
</tr>
<tr>
<td>1969</td>
<td><strong>366 East Pakistan families settled in Little Andaman.</strong></td>
</tr>
<tr>
<td>1970</td>
<td>Group of personnel were deputed to outline the area for the establishment of red oil palm plantation.</td>
</tr>
<tr>
<td>1970</td>
<td>First sawmill set up on the island; Annual intake 2000m³ of timber per year</td>
</tr>
<tr>
<td>1972</td>
<td>First amendment to the Tribal Reserve.</td>
</tr>
<tr>
<td>1973</td>
<td><strong>50 Nicobarese families settled in Harminder Bay area on the island.</strong></td>
</tr>
<tr>
<td>1974</td>
<td>Forest Department (FD) assessment of timber productivity of the island’s forests.</td>
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<tr>
<td>1975</td>
<td>Forest Department (FD) initiates work on the red oil palm plantation.</td>
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<tr>
<td>1975</td>
<td>Creation of the first 160 ha of red oil palm plantation.</td>
</tr>
<tr>
<td>Year</td>
<td>Event</td>
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<td>------</td>
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<tr>
<td>1976</td>
<td>Creation of the <strong>Andaman Adim Janajati Vikas Samiti (Andaman Tribal Welfare Society)</strong></td>
</tr>
<tr>
<td>1976</td>
<td>Andaman and Nicobar Forest Plantation and Development Corporation (ANIFPDC) proposal for logging and forestry operations in Little Andaman.</td>
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<tr>
<td>1977</td>
<td>The ANIFPDC starts functioning.</td>
</tr>
<tr>
<td>1977</td>
<td>Second amendment to the Tribal Reserve.</td>
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<tr>
<td>1977</td>
<td>118 families from mainland settled on Little Andaman during 1977-1979</td>
</tr>
<tr>
<td>1977</td>
<td>Second amendment to the Tribal Reserve.</td>
</tr>
<tr>
<td>1990</td>
<td>Master plan for the development of the tribes of the Islands by S.A. Awardi.</td>
</tr>
<tr>
<td>1991</td>
<td>Final amendment to the Tribal Reserve.</td>
</tr>
<tr>
<td>1996</td>
<td>Supreme Court of India ruling on forests.</td>
</tr>
<tr>
<td>1999</td>
<td><strong>Case filed in the Calcutta High Court (Port Blair Circuit Bench) asking for stoppage of all timber extraction operations in Little Andaman.</strong></td>
</tr>
<tr>
<td>1999</td>
<td>Intervention filed in the Supreme Court of India in the matter of the deforestation on Little Andaman Island.</td>
</tr>
<tr>
<td>2000</td>
<td>Supreme Court of India orders the stoppage of felling of ‘naturally grown trees from the forests of the entire Andaman and Nicobar Islands.’</td>
</tr>
<tr>
<td>2002</td>
<td>Supreme Court accepts report of a special commission set up and issues landmark orders related to various aspects of the forests and indigenous peoples of the Island.</td>
</tr>
<tr>
<td>2004</td>
<td><strong>Tsunami strikes Little Andaman. Reallocation of Onge tribes only within Dugong Creek area. Clearances of forests for the rehabilitation of the tsunami affected population of the island.</strong></td>
</tr>
<tr>
<td>2006</td>
<td>Initiation of an independent Little Andaman Tehsil</td>
</tr>
</tbody>
</table>
Upcoming Development projects

Initiation of Ecotourism within the Island.

Preparation of Master plan

Development of inter-island helicopter service
Impact of Developmental strategies on the physical and social Environment

Impact on the Geo-physical Environment

• Impact on the landscape
• Impact on the fresh water
• Impact on the soil
• Impact on Forest

Impact on Social Environment

• Impact on the Onge tribal population
Impact on the hydrodynamic regime of coastal morphology

Jetty - 1200 metres in length and 7 metres deep.

Wave drawn sediments deposited only on one side

Hut Bay coast gets reduced of coastal materials

After Rai, D.C. et al
Impact on the Geo-physical Environment

1 Impact on the landscape

1.a Impact of breakwater cum jetty

Tetrapod cement structure + porous coral stones + limestone from local quarries used for constructing the breakwaters.

1.b Impact of coral mining

Corals of this zone are used for construction and filling purposes.
1.c Impact of Quarrying

Quarried through **blasting process**.

- Quarrying impacts include:
  - Huge excavated sites not being filled up,
  - Stores in water changing the microgeomorphic feature.
  - Heavy soil erosion due to skeletal origin.
  - Huge unmanaged plots within this tiny island.
  - Old machineries & sheds lay astray.

Quarrying products sorted for transporting to the Hut Bay jetty via trucks carrying 3 tonnes & finally shipped to Car Nicobar.
Impact on the fresh water sources

- Despite heavy rainfall, there is shortage of fresh water in this island.

Krishna nallah receives effluents from the red palm oil mill.

Out of 397 labours employed in this project, 53% are suffering from water borne diseases.
2.a. **Impact of agriculture**

- Deforestation done for resettlement and cultivation of crops.
- Introduction of foreign crop species.
- Infected the virgin forest with pests.
- Use of fertilisers & pesticides

- **Reduced soil quality**
  
- **Decadal decline of food crop production.**

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**Decadal Rice production tonnes/ha**

<table>
<thead>
<tr>
<th>Year</th>
<th>Rice production tonnes/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>1.9</td>
</tr>
<tr>
<td>1985</td>
<td>2.4</td>
</tr>
<tr>
<td>1995</td>
<td>2.1</td>
</tr>
<tr>
<td>2005</td>
<td>1.7</td>
</tr>
<tr>
<td>2015</td>
<td>1.3</td>
</tr>
</tbody>
</table>
Red oil palm plantation of 1,593 hectares amidst the Tropical Forest since 1976

Fruit bearing quality declines after 30 years
2.b. Impact of exotic species plantation

- **Impact of plantation’s exotic diseases on the tropical environment**

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975-Nigeria</td>
<td>100</td>
</tr>
<tr>
<td>1980-Malaysia</td>
<td>200</td>
</tr>
<tr>
<td>1981-Malaysia</td>
<td>300</td>
</tr>
<tr>
<td>1982 Ivory Coast</td>
<td>400</td>
</tr>
<tr>
<td>1983 Papua New Guinea</td>
<td>300</td>
</tr>
<tr>
<td>1984- Zaire</td>
<td>200</td>
</tr>
<tr>
<td>1985- Papua New Guinea</td>
<td>100</td>
</tr>
</tbody>
</table>

N, P, K, Mg fertilizers are used in ratio of 7: 7: 14: 7 for the red oil palm growth

Effluents contaminates the skeletal soil + eutrophication of the streams

*After 30 years the production is in decline.*

Forest Department: No further extension of plantation

Return the area to the virgin forest once again

- **Impact of other plantations** like: Coconut, spices, cashew & mixed are quite similar
Impact on Social Environment

Impact on the Onge tribal population

Impact on the Folk Spirit Culture – a Feeling of Topophilia

Topophilia is a strong sense of place, which often mixes with the sense of cultural identity among certain people and a love of certain aspects of such a place.

After their island was "opened to settlement" by the Indian authorities in the 1950s the Onge were translocated from their ancestral sites.

After the devastating tsunami of 26th December 2004 the survivors of South Bay reservation was moved to Dugong Creek reservation which is now the only remaining Onge area.
Welfare agencies have constructed 26 Wooden hut
  
Raised Cemented Platform  
                  + 
 Tin-Roofs ... the tropical hot and humid.

Impact on Housing:

Traditional Hut = Korale

Photo source: Venkateshwar, S.
Co-Operative Society-A Misnomer

- Introduction of a **cooperative society** for encouraging **market culture**.

  Introduction of popular amusement)- radio and television

  Lost the social significance
• **Impact of induced agriculture**

  • coconut plantations along with fruit orchards were raised but **failed**

  +

  • **Poultry farms failed** as they never domesticated birds.

  ↓

  • Worked as daily labors in the plantations

• **Piggery farms**

  +

  • Introduction of milching animals

  ↓

  • **Failed** as these activities were **aloof from** their hunting and gathering livelihood

• **Impact of induced mainstream diet**

  Supplied with **tea, tobacco, cereals, sugar, oils, pulses** which was **alien within their indigenous dietary system**.

  Affected their nutritional status

*Source:* Bose, S.
Decadal population status of the Onge tribal community

Data source: Census of India
Impact on endemism

**Exotic flora:** Tropical Food crops, Red oil palm,

**Exotic Fauna:** Mainland mainstream Population, Elephant, Dog, Cat, Poultry, Husbandry animals.

**Impact on endemism:**

**Endemic flora:** Endemic Palm Varieties, Epiphytes

**Endemic Fauna:** Endemic Onge population, Dugongs, Olive Ridley turtle, Leather Back Turtle, Corals

**Impact of ecotourism** would further aggravate the situation.
In conclusion -

- Any island’s carrying capacity changes with time as given by Mac Arthur Wilson. The environmental change within this island through chronological facets of development is apprehended to lead this island in exceeding the optimum level of the island’s carrying capacity in the near future.

- The ecological knowledge of the Onge community with which they have harmoniously sustained through ages could have been used up for environmental understanding.

- This tiny spot of virgin tropical island if restricted with a broader sustainable environmental philosophy then it would have led to the creation of a laboratory for ecological study in the long run.
Namaskar

(conveying my deep regards to all of you)