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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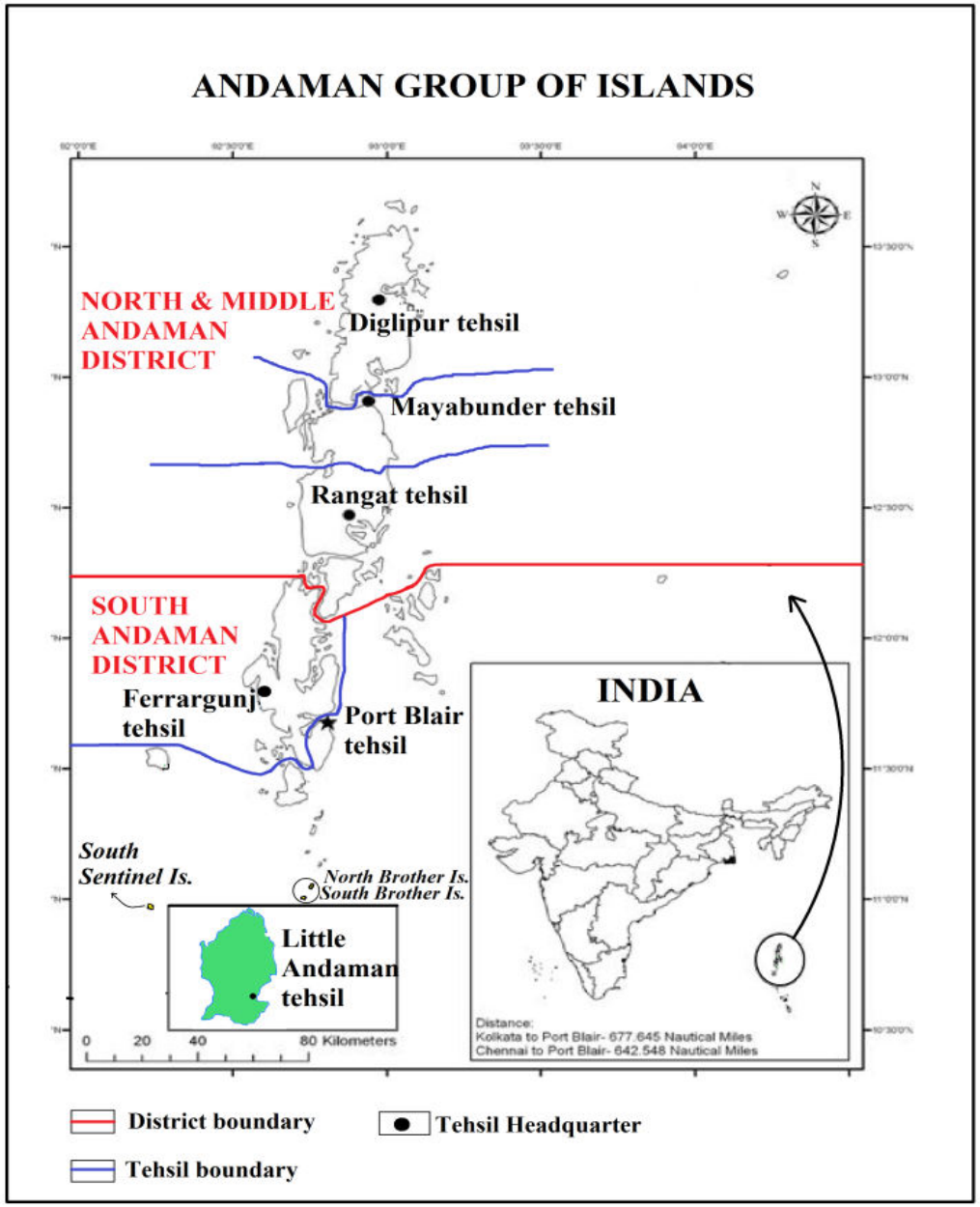
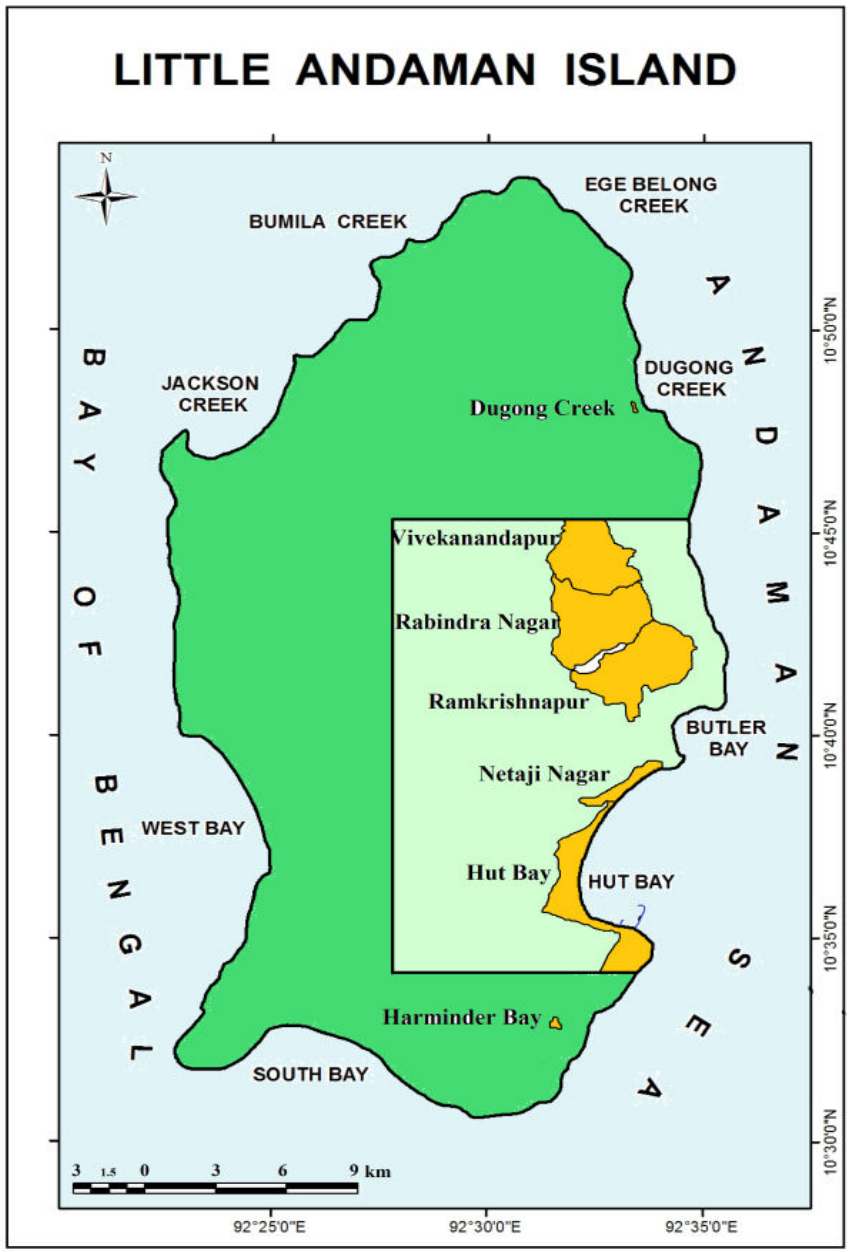
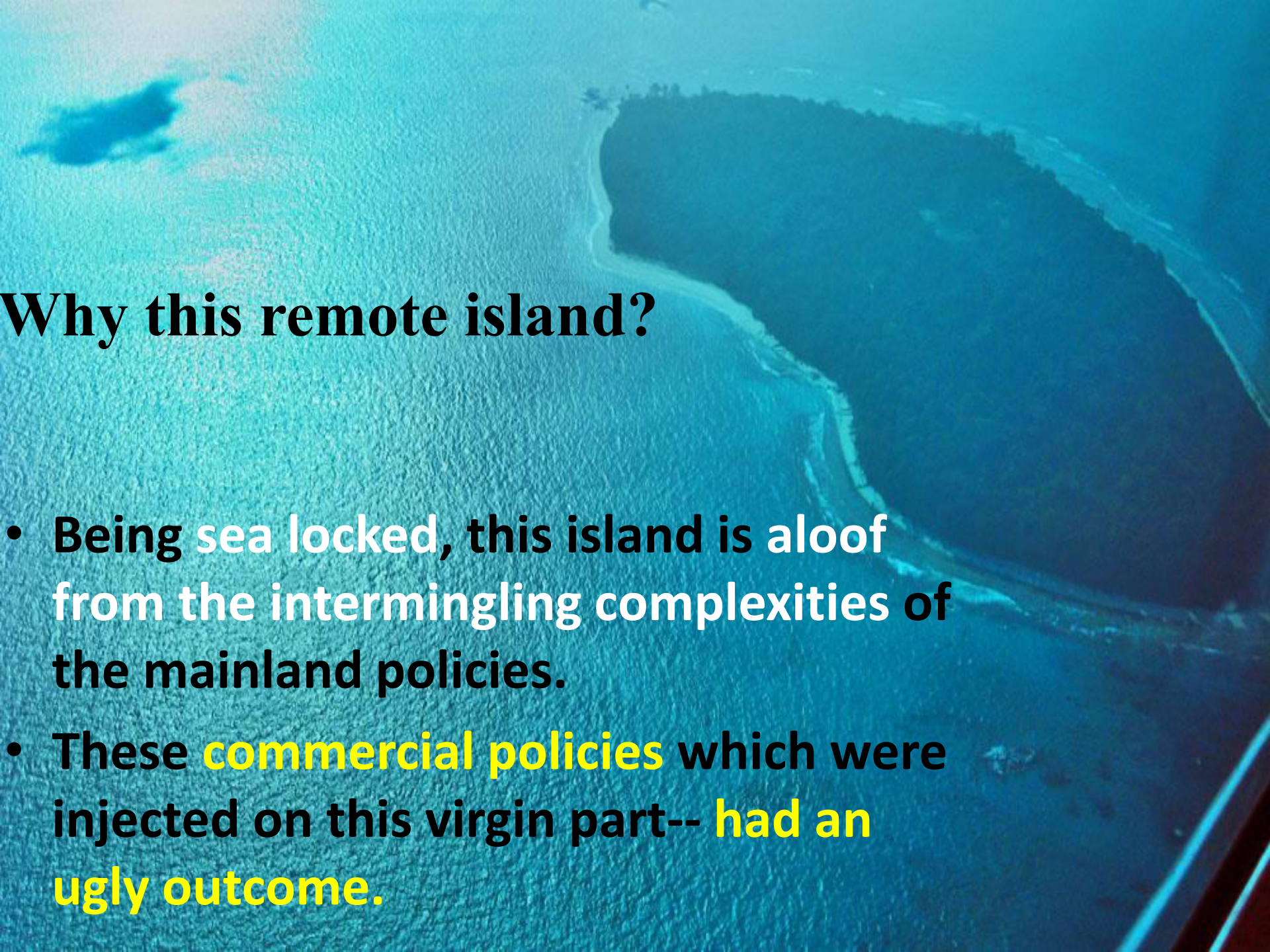
Location of Andaman Island in context to the world

Map not to scale

LOCATION MAP OF THE STUDY AREA







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).**

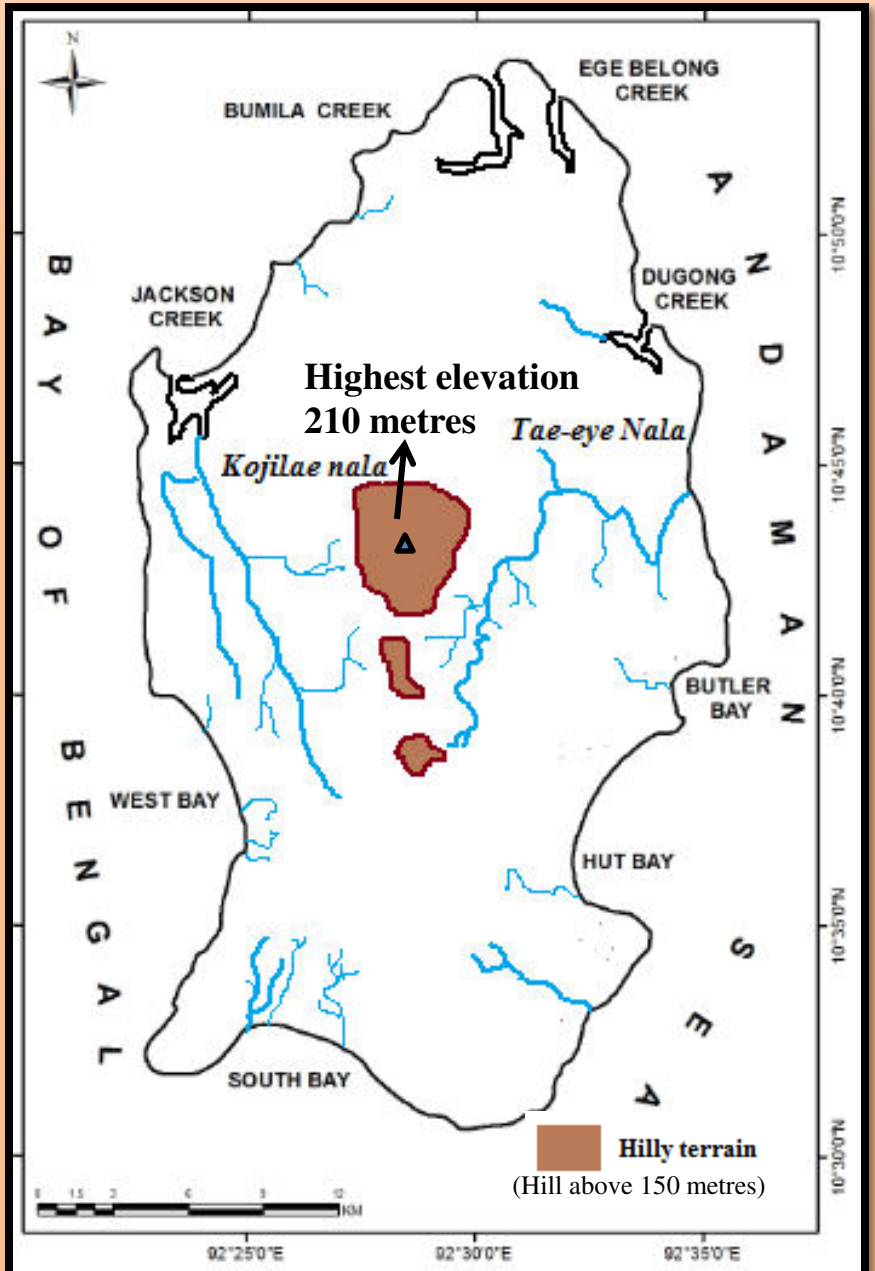
2) Its unique **chronological input of developmental strategies** since Indian independence.

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.

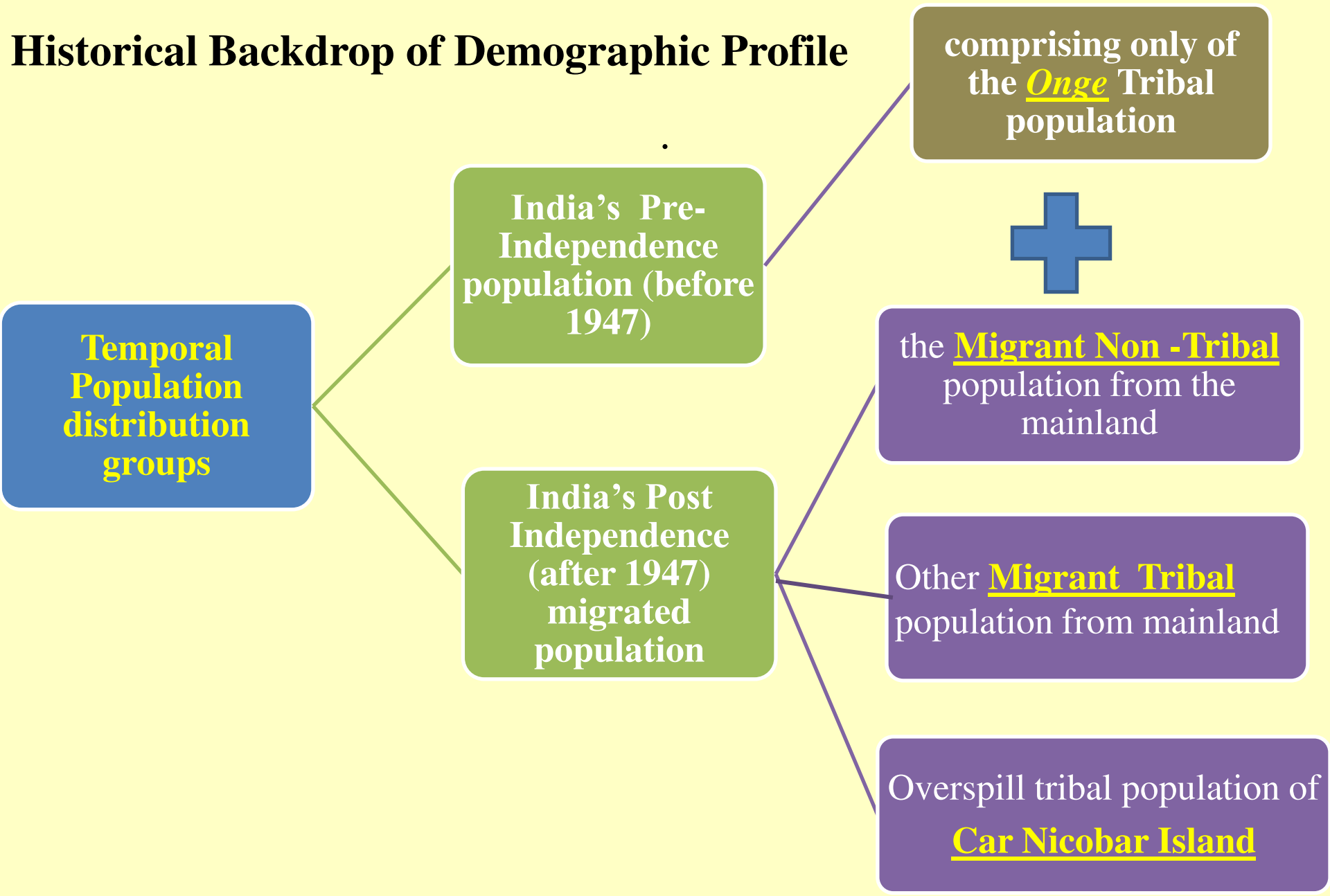
- **Climatic characteristics:**
- **This Island depicts a true tropical climate regime**

- **Mean maximum temperature = 33.3 ° C** during the month of April
- **Mean minimum temperature = 19.1 ° 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.**

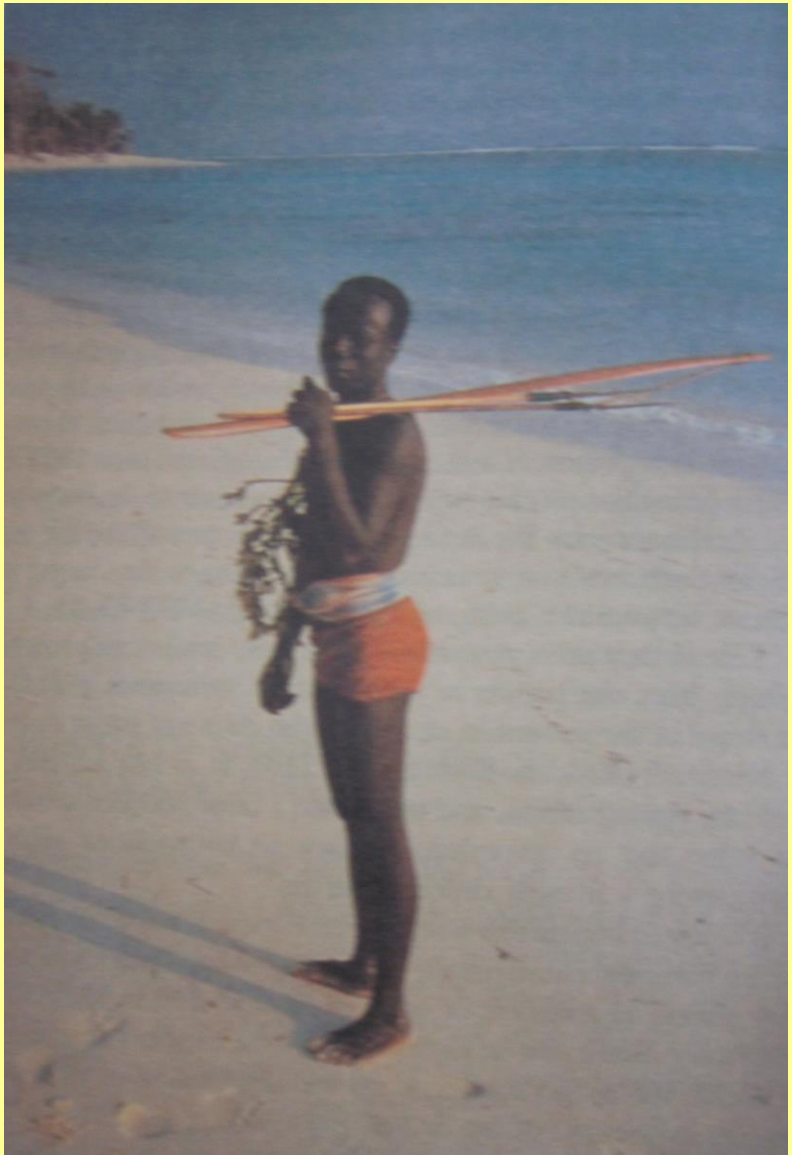
Source: working plan of Little Andaman

Historical Backdrop of Demographic Profile



Pre-Independence population of Little Andaman Island

Onge



Pre-Independence period

- Onges were the main residents of Little Andaman Island
- the Onges resided all throughout the island.

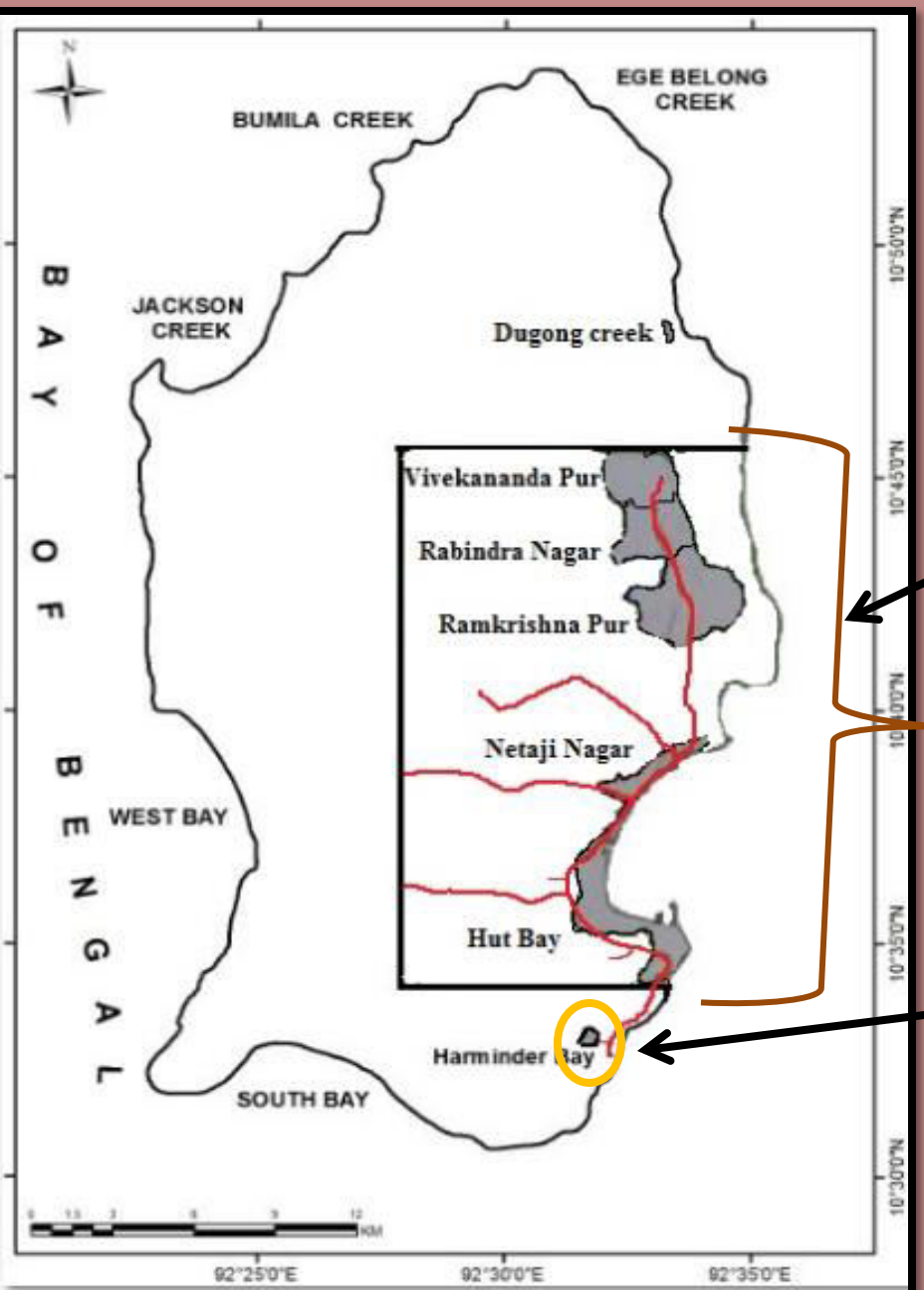
Post Independence

- **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

Since 1825	Visit of the first outside contact by vessel *Earl Kellie*
1867	Attack by the Onge on the British ship Assam valley
1881	**First footstep of development**: Little Andaman visited by British officer M.V. Portman
1952	Little Andaman visited by Italian Anthropologist Cipriani to study the Onge.
1957	**Declaration of the *"Onge Tribal Reserve"***
1965	**Report by The Inter-Departmental Team on Accelerated Development Programme for the Andaman and Nicobar Islands' Ministry of Rehabilitation Government of India.**
1969	**366 East Pakistan families settled in Little Andaman.**
1970	Group of personnel were deputed to outline the area for the establishment of red oil palm plantation.
1970	**First sawmill set up on the island; Annual intake 2000m^3 of timber per year**
1972	**First amendment to the Tribal Reserve.**
1973	**50 Nicobarese families settled in Harminder Bay area on the island.**
1974	**Forest Department (FD) assessment of timber productivity of the island's forests.**
1975	**Forest Department (FD)initiates work on the red oil palm plantation.**
1975	**Creation of the first 160 ha of red oil palm plantation.**

Contd……

1976	**Creation of the *Andaman Adim Janajati Vikas Samiti (Andaman Tribal Welfare Society)***
1976	**Andaman and Nicobar Forest Plantation and Development Corporation (ANIFPDC) proposal for logging and forestry operations in Little Andaman.**
1977	**The ANIFPDC starts functioning.**
1977	Second amendment to the Tribal Reserve.
1977	**118 families from mainland settled on Little Andaman during 1977-1979**
1990	Master plan for the development of the tribes of the Islands by S.A. Awardi.
1991	Final amendment to the Tribal Reserve.
1996	Supreme Court of India ruling on forests.
1999	**Case filed in the Calcutta High Court (Port Blair Circuit Bench) asking for stoppage of all timber extraction operations in Little Andaman.**
1999	Intervention filed in the Supreme Court of India in the matter of the deforestation on Little Andaman Island.
2000	Supreme Court of India orders the stoppage of felling of 'naturally grown trees from the forests of the entire Andaman and Nicobar Islands.'
2002	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.
2004	**Tsunami strikes Little Andaman. Reallocation of Onge tribes only within Dugong Creek area. Clearance of forests for the rehabilitation of the tsunami affected population of the island.**
2006	**Initiation of an independent Little Andaman Tehsil**

Upcoming Development projects

*Initiation of **Ecotourism** within the Island.*

*Preparation of **Master plan***

*Development of **inter-island helicopter service***

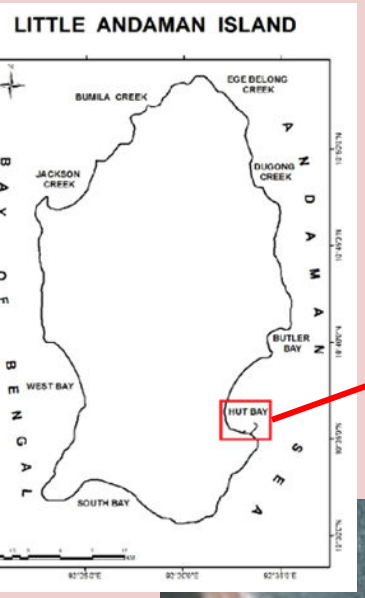
Impact of Developmental strategies on the physical and social Environment

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

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.**

Quarried products sorted for transporting to the Hut Bay jetty via trucks carrying 3 tonnes & finally **shipped to Car Nicobar.**

Heavy soil erosion due to skeletal origin

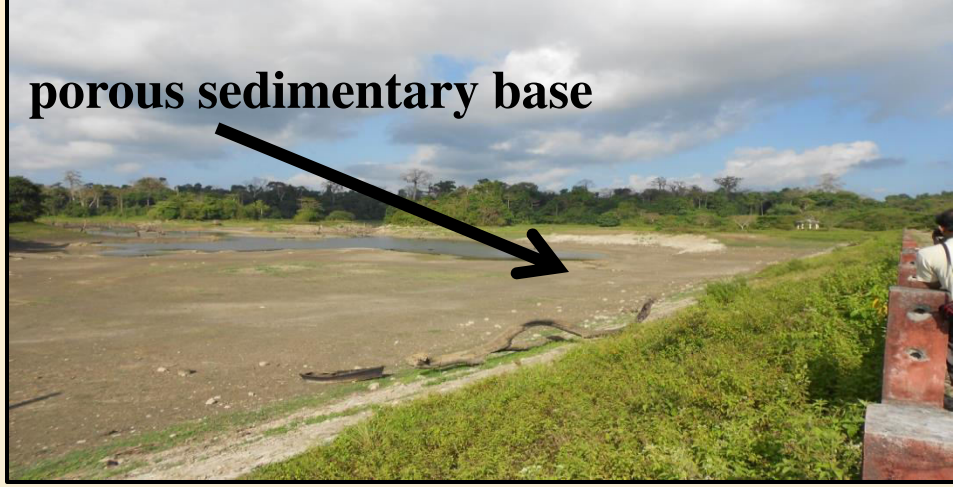
huge excavated sites not being filled up, stores in water – **changing the micro geomorphic feature**

Huge **unmanaged plots** within this tiny island

old machineries & sheds lay astray

Impact on the fresh water sources

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



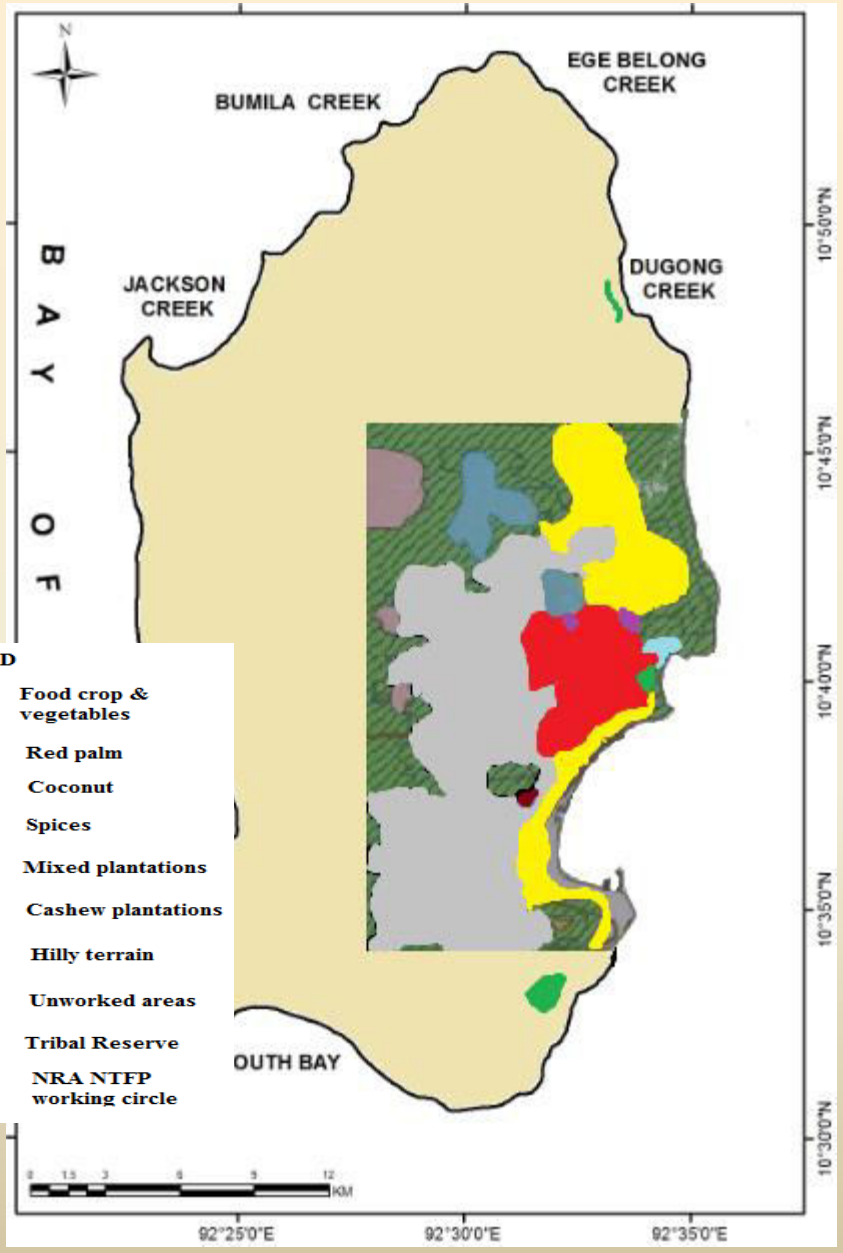
Dry dams

The dams on the Krishna nallah and the Vishnu nallah had been done on a **porous sedimentary base**

Krishna nalla receives effluents from the red palm oil mill

Out of **397 labours** employed in this project 53% are suffering from water borne diseases.

Impact on the soil



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

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- **Reduced soil quality**

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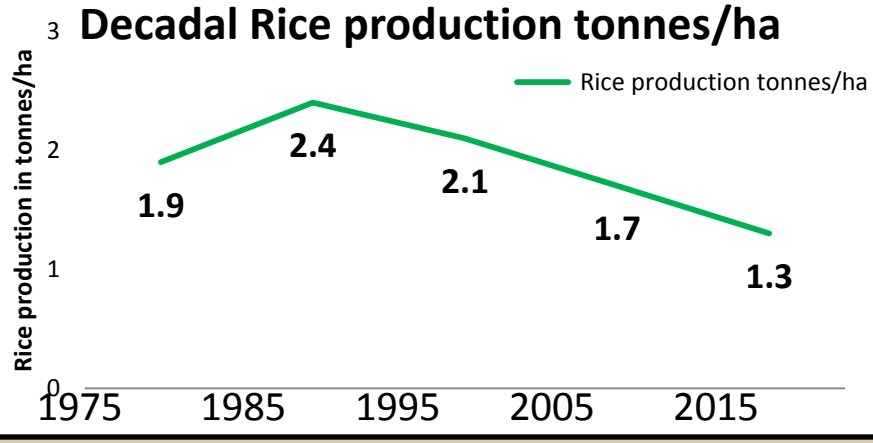
- **Decadal decline of food crop production.**

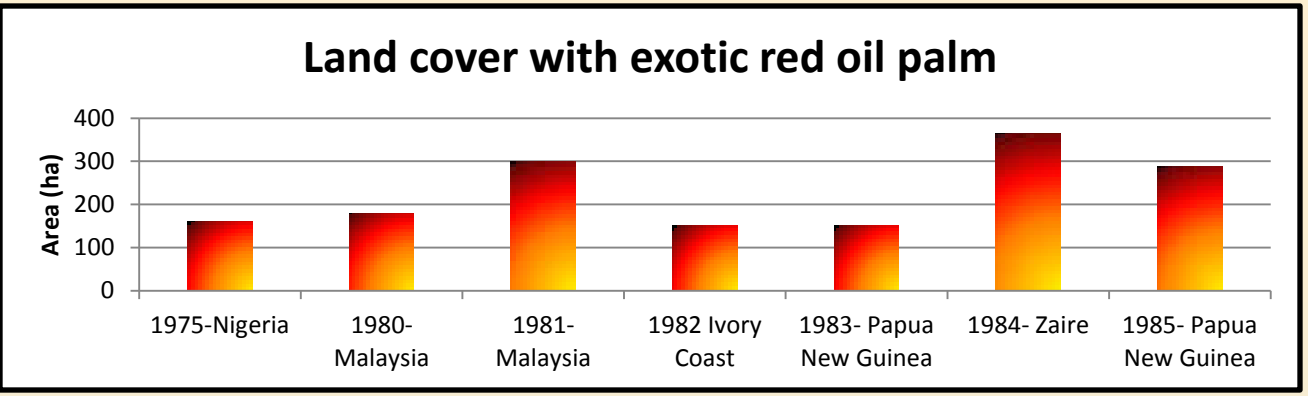


Virgin dense tropical forest

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*

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

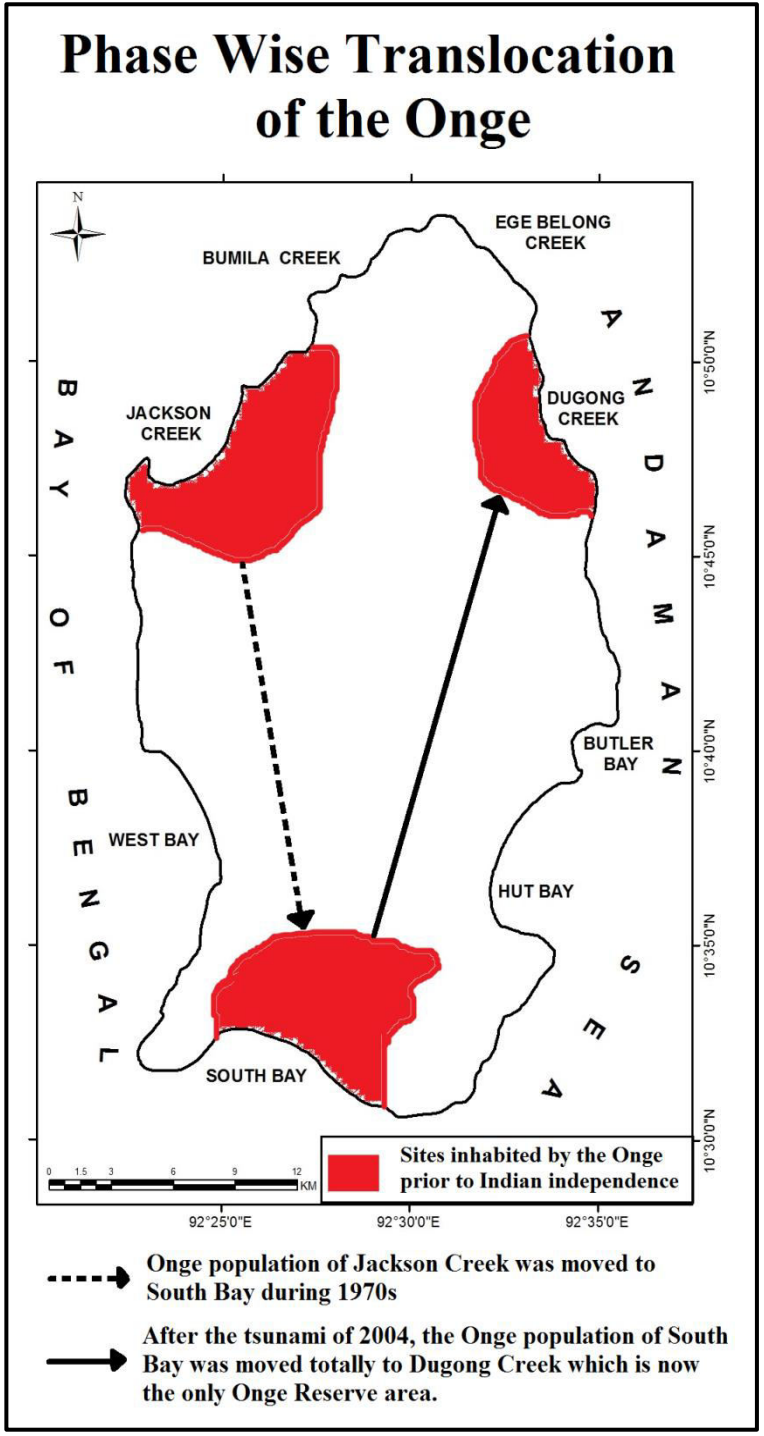
Effluents contaminates the skeletal soil + **eutrophication** of the streams

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.

Impact on Housing:

Traditional Hut = *Korale*

Welfare agencies have constructed 26 Wooden hut

Raised Cemented Platform

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Tin-Roofs

Photo source: Venkateshwar, S.

Uncomfortable in the tropical hot and humid.

Co-Operative Society-A Misnomer

- Introduction of a ***cooperative society***

for encouraging **market culture.**

Introduction of popular amusement)- radio and television

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Lost the social significance

•***Impact of induced agriculture***

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

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

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•**Worked as daily labors in the plantations**

•**Piggery farms**

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•Introduction of milching animals

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

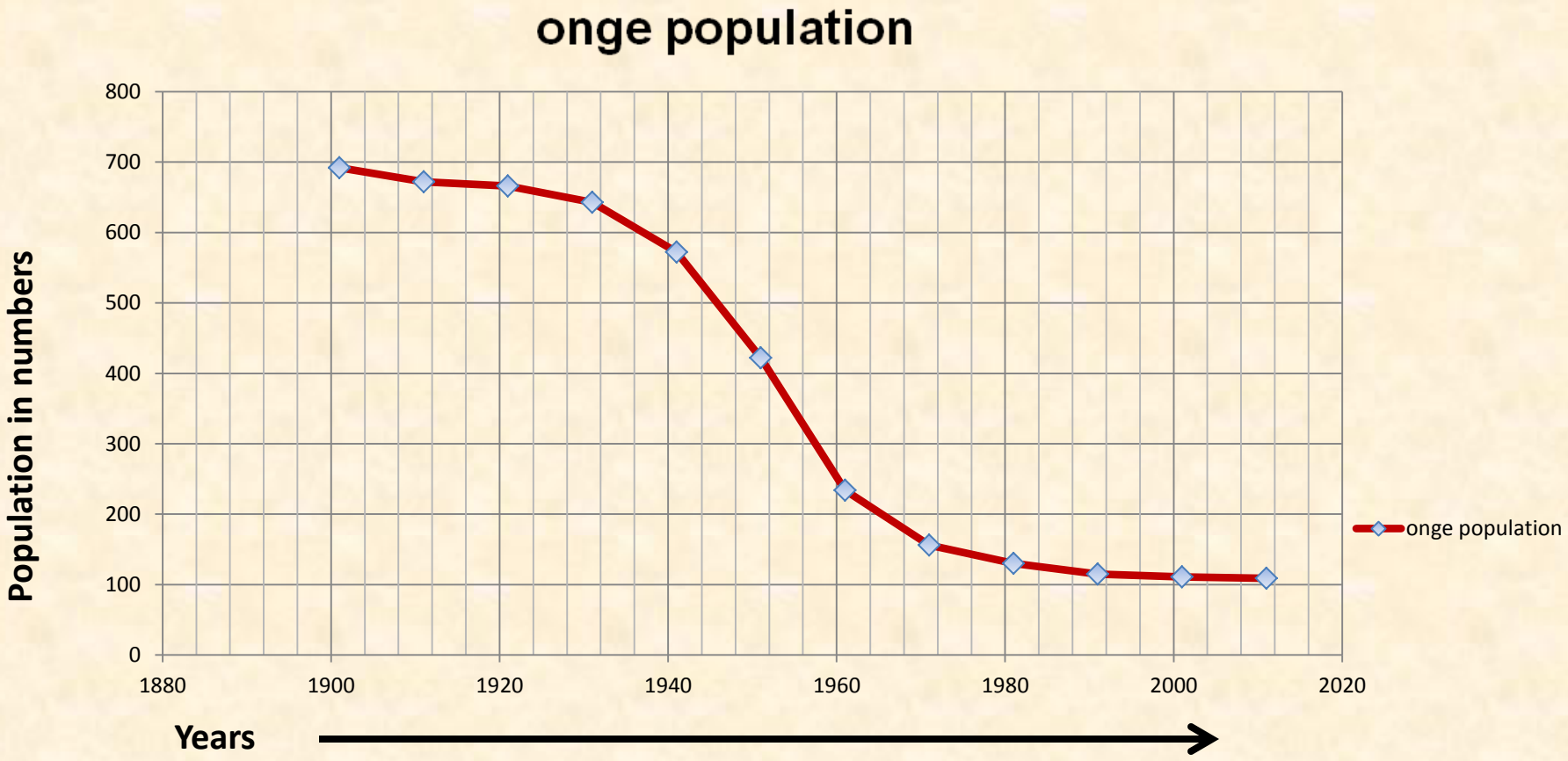
•***Impact of induced mainstream diet***

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



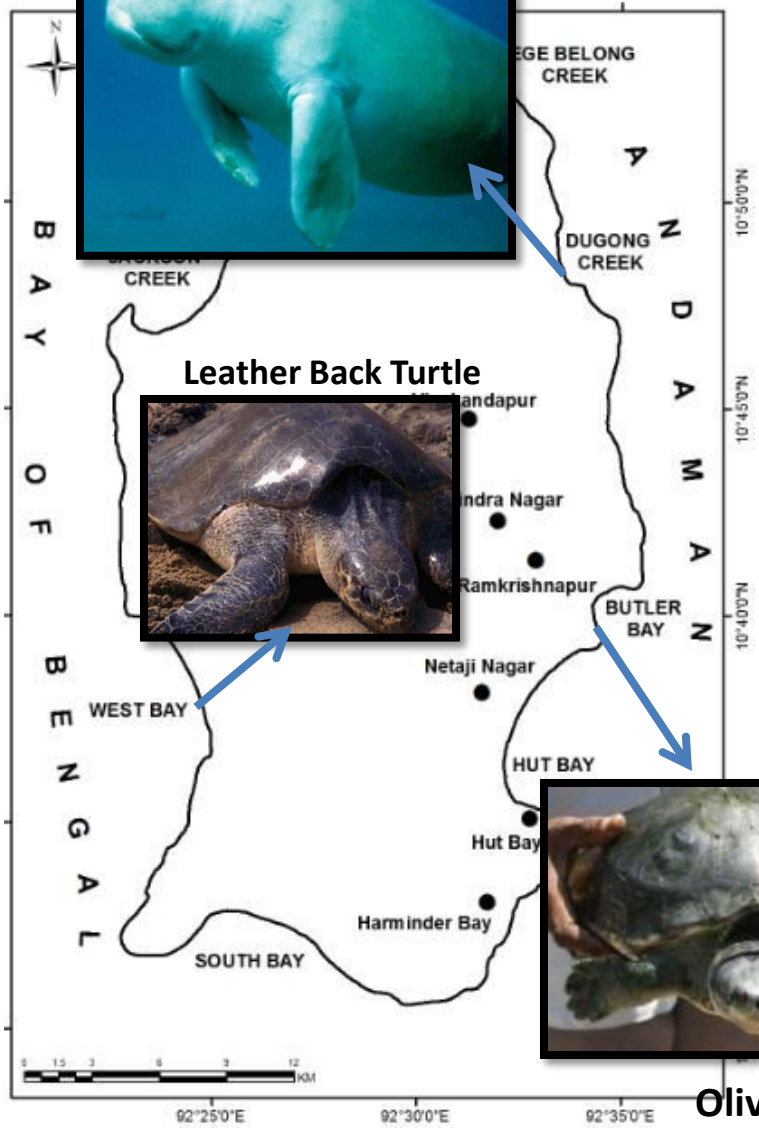
Data source: Census of India

Impact on endemism

Dugongs

Leather Back Turtle

Olive Ridley turtle



Exotic flora: Tropical Food crops, Red oil palm,

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

Impact on

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)