

Natural resources based landscape planning for a heritage tourist destination: Tarangampadi, India

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Abstract. India, home to a rich heritage of cultural and historical sites of global importance spread around the country, has experienced explosive growth in urban areas due to which the notion of a comprehensive natural resource based region is increasingly being lost. Cultural landscape systems are under threat due to ignorance as well as lack of planned transition from traditional to modern systems leading to a net loss of natural resources and cultural landscapes in the region. Heritage tourism is gaining importance in India and transforming heritage sites rapidly into tourist centers. In order to avoid mistakes of urbanization and generate sustainable development around heritage sites, it is necessary that natural resource based regional planning be followed.

This paper presents an example of a natural resource based landscape development proposal at Tarangampadi, India which was a colonial Danish port and trading town. Tarangampadi is a fishermen's town of 6,000 persons in South India. It possesses invaluable architectural & cultural heritage, being a landmark Tamil & Arab trading center since first millennium AD, a Dutch port 16th century onwards, as well as the first place in India where printing press was established. Large parts of the town were washed away during the 2004 Tsunami including many heritage monuments. Faculty of Landscape Studies at CEPT University was invited to study regional landscape and cultural heritage of the town in order to propose a comprehensive regional landscape plan which included not only sustainable use of natural resources and preservation of landscape character, but also addressed various social, economic & tourism issues.

Keywords: Natural resources, landscape planning, heritage tourist destinations, water scarcity, coastal areas, infrastructure up gradation

1. Preface

I believe that an ecosystem is composed of four foundation components of land, water, sky and living beings that continually exchange complementary resources of mass and energy between them, and is a continuous process of balancing exchanges between these components, where each component draws one of the two resources and contributes other to the ecosystem. Thus, an ecosystem can be imagined as a complex web of exchanges wherein the total sum strives to be a zero. Each ecosystem has a definite capacity depending upon composition of its elements. For millennia, humans have been compatriots of ecosystems and contributed at par with other living beings. However in last 200 years, they have transcended ecosystem capacities by demanding more resources than they contribute, thus upsetting its balance. Once host ecosystem becomes incapable of providing to their increasing requirements, humans tap surrounding ecosystems resulting in a large scale deficiency in the entire region over a period of time. Natural resource based landscape planning aims to direct human activities to increase ecosystem capacity by contributing resources equal to what they draw, in order to achieve a holistic growth in the region.

Culture is a crucial link between an ecosystem and humans, and it consists of society, traditions, beliefs as well as religion. A heritage or cultural landscape is an intrinsic part of human culture, and thus becomes

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an important ingredient for strengthening ties between humans and ecosystem. Natural resource based landscape planning extends beyond traditional boundaries of landscape architecture practice into the realm of cultural interpretations, in order to maintain an ecosystem's natural balance for sustainable development.

2. Tarangampadi

2.1. Background

Faculty of Landscape Studies (FLS) at CEPT University undertakes a regional landscape study each year that explores sustainable development and conservation solutions to strengthen relationships between man and nature, while exposing students to complex natural systems and human interactions existing in a given region. In the year 2007, FLS was invited by Indian National Trust for Art and Cultural Heritage (INTACH) to study Tarangampadi, a former Danish colony and now a heritage town, located on the southern coast of India.

2.2. Region

Tarangampadi is situated along the coast of Bay of Bengal in the delta of River Cauvery, one of the largest in India (*figure 1*). This stretch of coast is erosive in nature, and over a course of about a thousand years, it has receded by almost five hundred metres, an action that has gained momentum in the last century or so. This region is known for its rich history and culture, along with agriculture and plantations, and presents a very traditional rural setting on the whole.

Tarangampadi lies on north bank of River Virasolnar, a distributary of River Cauvery, where the former meets the sea. The town is bounded by sea coast to the east, River Virasolnar to the south and former fort wall's moat to the west and north, the fort wall having been dismantled by locals for building material.

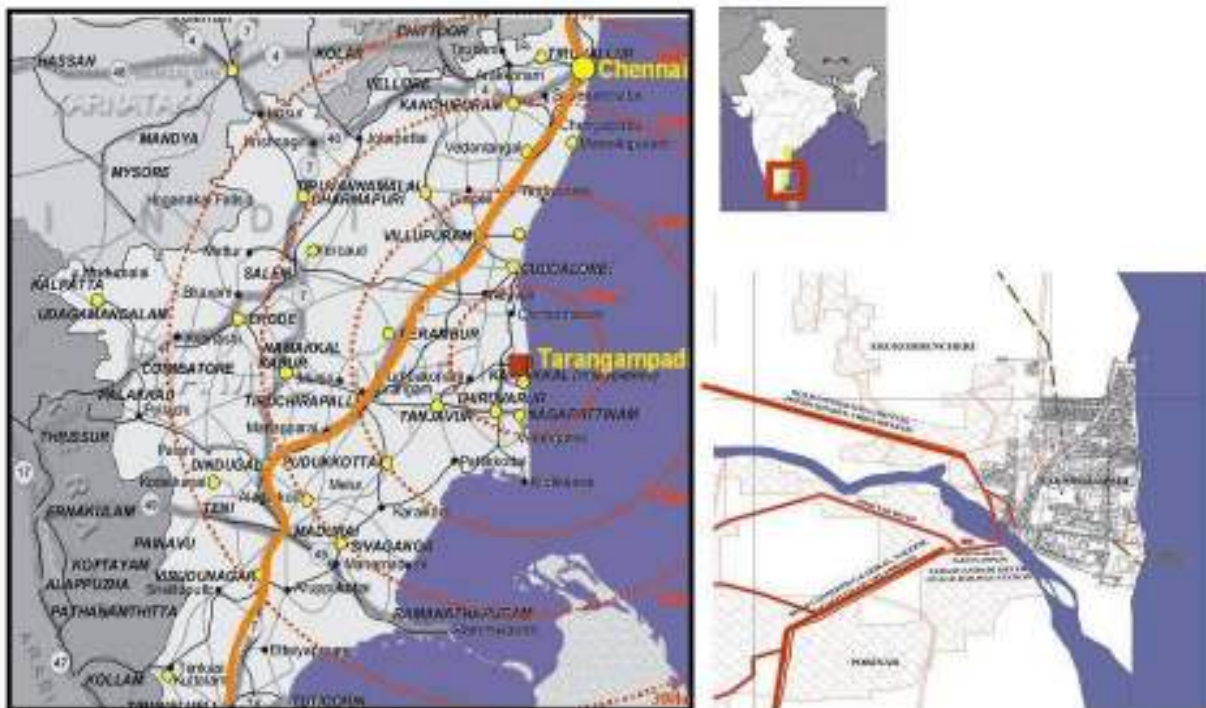


Fig. 1: Location of Tarangampadi – clockwise from left: Tarangampadi and its surroundings, location in India, location along banks of River Virasolnar and Bay of Bengal

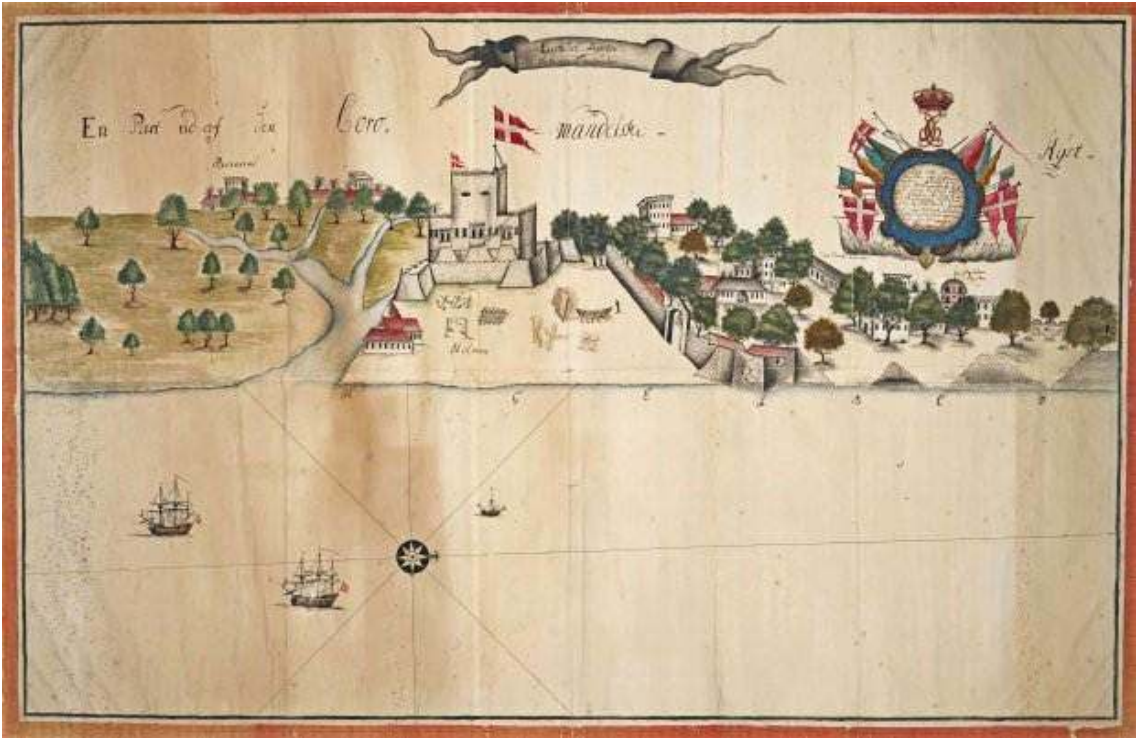


Fig. 2: Painting of Tarangampadi made in 1730 AD

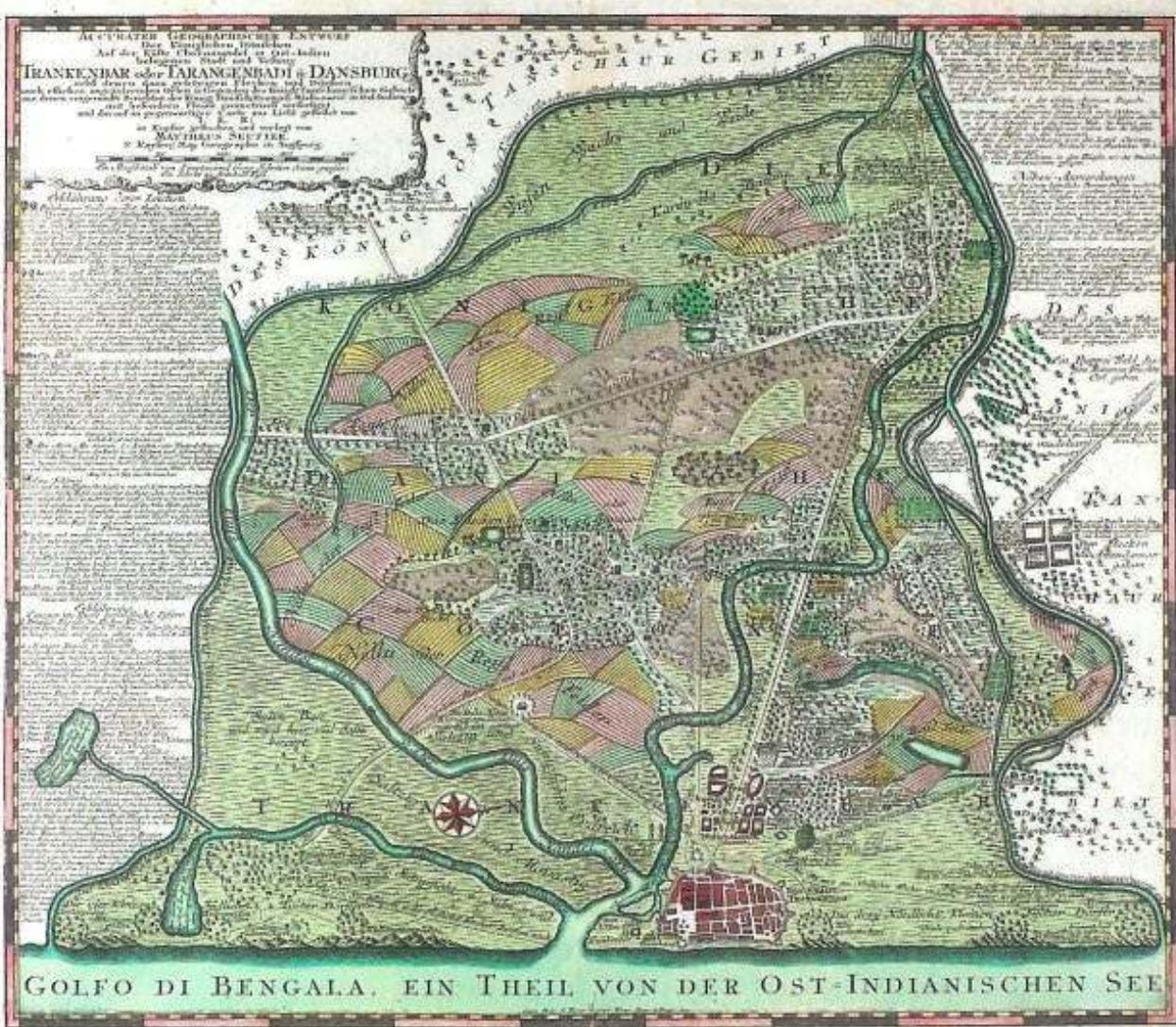


Fig. 3: Map of Tarangampadi and its surroundings made in 1730 AD

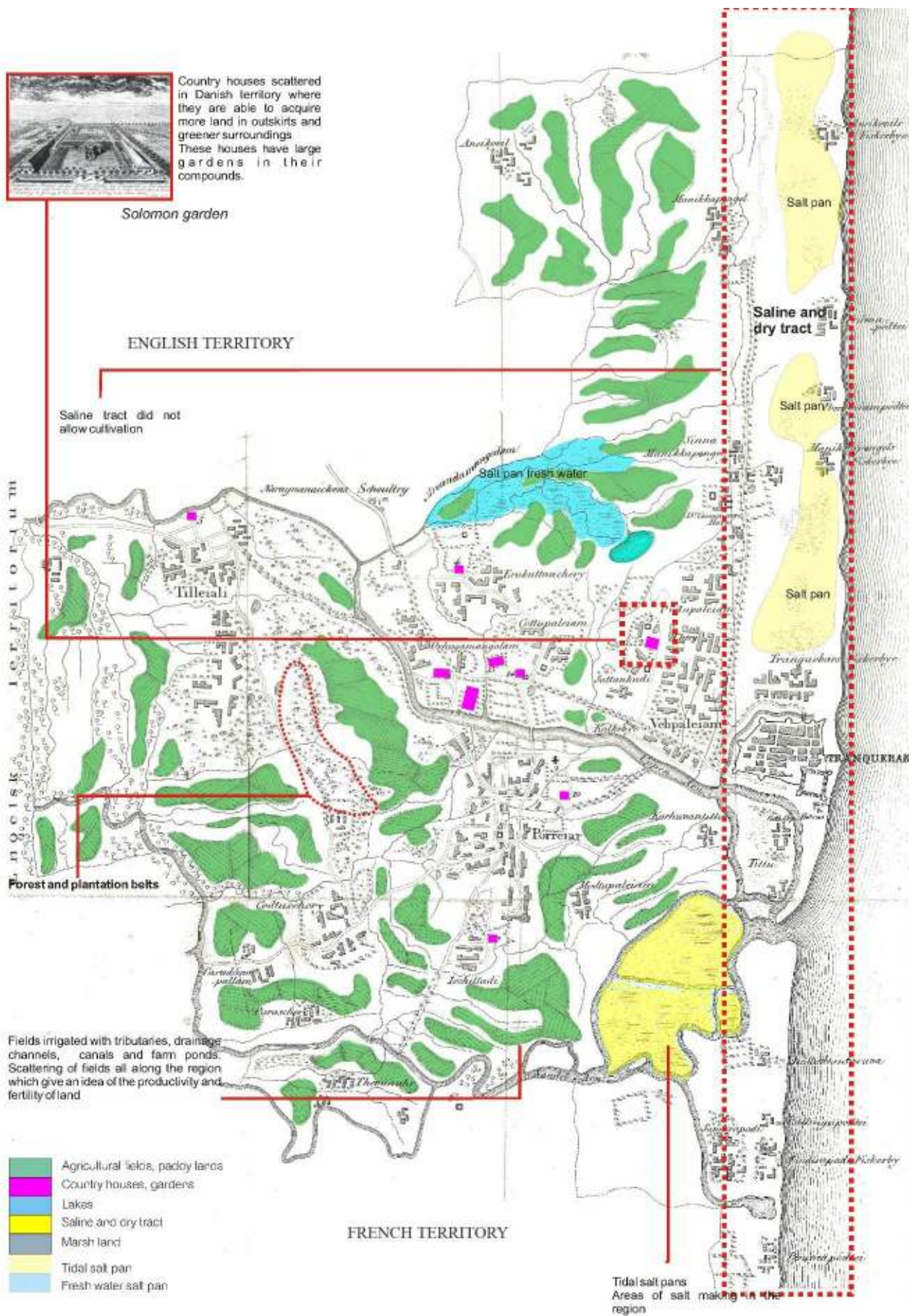


Fig. 4: Map of Tarangampadi and its surroundings (recreated by FLS)

2.3. History & Importance

The region has a rich history of global trade with Europe and East Asia from 1st century AD till 18th Century, and is known for the historical port town of Kaveri Puhum Pattinam which, according to a traditional text, is said to have been washed away by a Tsunami around 500 AD because the king did not honour nature. This serves as an interesting historical lesson on disregarding the importance and power of nature, as well as the natural calamities that ravage the region frequently.

Tarangampadi was established as a fishing hamlet, where Tamilian Muslim goldsmiths and Arab traders settled during Tanjore reign (12th Century AD) of Vijaynagara Empire to trade with Middle-East and South-East Asia. In 1620 AD, Danish East India Company (DEC) bought Tarangampadi from King of Tanjore in order to establish a trading post. DEC built Fort Dansborg in a natural harbour at the mouth of River Virasolnar, overlooking the sea (*figure 2*). While DEC built Dansborg and important public buildings along King's street, the Governor and well-off inhabitants lived in country estates outside the town (*figure 3*). These estates were dense plantation and farmlands irrigated by Virasolnar, which gave the Danes a respite from the hot and humid climate (*figure 4*).

DEC never traded with India, and only used Tarangampadi as a resting stop on Europe – East Asia route. As their own trade subsided, DEC acted as logistics suppliers to other traders like the Portuguese. Increasing disputes with King of Tanjore led to creation of a moat and fortification around the town's edge. As DEC's income decreased, they sold Tarangampadi to British East India Company (BEC) in 1845 AD, and the latter established a local administrative centre in Tarangampadi. British linked the moat to a waterway network for coastal areas and also brought railways just outside of Tarangampadi, both of which were abandoned after independence.

2.4. Tarangampadi today

Today, Tarangampadi is a small town of about 7,000 inhabitants constituting 1,725 households. Main occupation in the town is still fishing and related activities, with 1,670 registered fishermen and many more families connected by ancillary activities. Tamilian goldsmiths abandoned Tarangampadi due to changes in Government's gold trading rules in 1979 AD. Rest of the town's households are occupied in general activities ranging from daily-wage labour to carpentry. While only 13 households are involved in subsistence agriculture, very few people seek work outside the town.

By virtue of its location in one of the most progressive states of India, Tarangampadi has adequate infrastructure for primary education, piped water supply, electricity and well-built streets. However, state administration's lack of empathy and irregular maintenance leads to problems like inadequacy of water supply, misdirected education initiatives and concrete streets in a heritage precinct.

A heritage gate on the west end of King's street is the only entrance to the town, and leads to Dansborg through the colonial precinct (*figure 5*). However, the gate is not wide enough to allow buses and trucks, which scrape it each time they pass. A small bridge across the canal in fishermen's settlement is not wide enough to allow large vehicles to pass through.

Tourists park their vehicles in Parade Ground, visit Dansborg and recreate on the beach. Basic amenities like toilets and shaded areas are lacking, and tourism based economic activities are non-existent. Those few tourists who stay back find accommodation in the heritage hotel, which was the British Collector's bungalow, or an economy hotel, both across the street from the Dansborg.

Tarangampadi lacks a solid waste disposal and sewerage system. The town's edge and the canal have become large unhealthy dump yards of solid waste and sewerage, with people performing their daily ablutions on canal banks. Most houses have soak pits or septic tanks which add to ground water pollution. A primary school and vocational study centre have been established, but there is no attempt to understand the culture and lifestyle of the townsfolk and create educational programs that help them become self-sufficient or generate new avenues of employment.

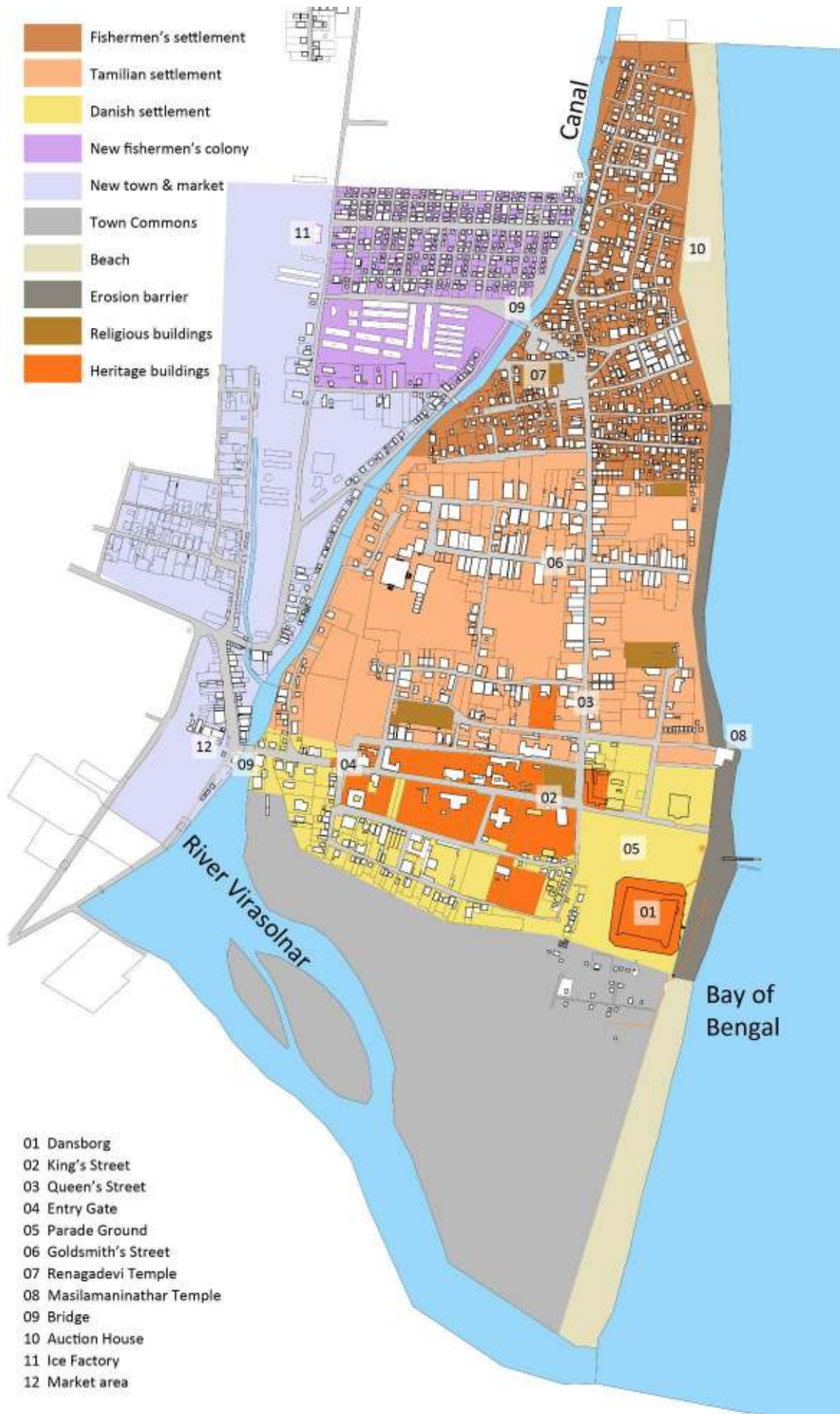


Fig. 5: Tarangampadi today



Fig. 6: Dansborg Fort as viewed from King's street



Fig. 7: King's Street with heritage buildings



Fig. 8: Goldsmith's Street



Fig. 9: Fishermen's precinct



Fig. 10: Remains of temples along the coast

2.5. Heritage

Tarangampadi is an eclectic mix of native fisherfolk culture, TAMILIAN culture and a colonial legacy. Three cultural precincts are observed in the town - fisherfolk occupying north end (*figure 9*), TAMILIAN Muslims in central town (*figure 8*) and Danish development lying at south end (*figure 5*). Tarangampadi is thus custodian to a complex heritage mainly represented through cultural and built fabrics. Religious structures and housing typologies form anchors of cultural and built fabrics respectively. Fort Dansborg adjacent to the coast, seen from afar and separated from the town by Parade Ground, becomes a landmark (*figure 6*). Tarangampadi has two main streets –King's street on which most colonial buildings are located (*figure 7*) and Queen's street which is mainly residential and exhibits an entire variety of housing typologies while leading from Dansborg to fisherfolk's Renagadevi temple. Goldsmiths' street connecting the coast to a mosque in the heart of Tarangampadi contains traditional TAMILIAN houses, which formerly belonged to

goldsmiths. Tarangampadi is also known to have nine Hindu temples, six of which exist today, while rest seem to have been washed away by an eroding coastline and their remains can be found scattered along the coast (figure 10).

3. Natural Resources of Tarangampadi

Tarangampadi has been bestowed with an enviable combination of natural resources – a bountiful sea, a rich river delta and a vibrant culture, whose value seems to be lost to the present townsfolk. Landscape processes of Tarangampadi are understood through a flow chart (figure 11) that analyses status of and relationships between various landscape components.

Indian cultural belief states that all animate and inanimate things on earth are composed of five natural elements, known in Sanskrit language as “Panchmahabhoota”, namely *vyom* (atmosphere), *tej* (sun), *vayu* (wind), *dharti* (land) and *jal* (water). FLS used this philosophy to study and understand natural resources of Tarangampadi, and grouped them into following categories:

CURRENT STATUS OF HUMAN LANDSCAPE RELATIONSHIPS IN TARANGAMPADI

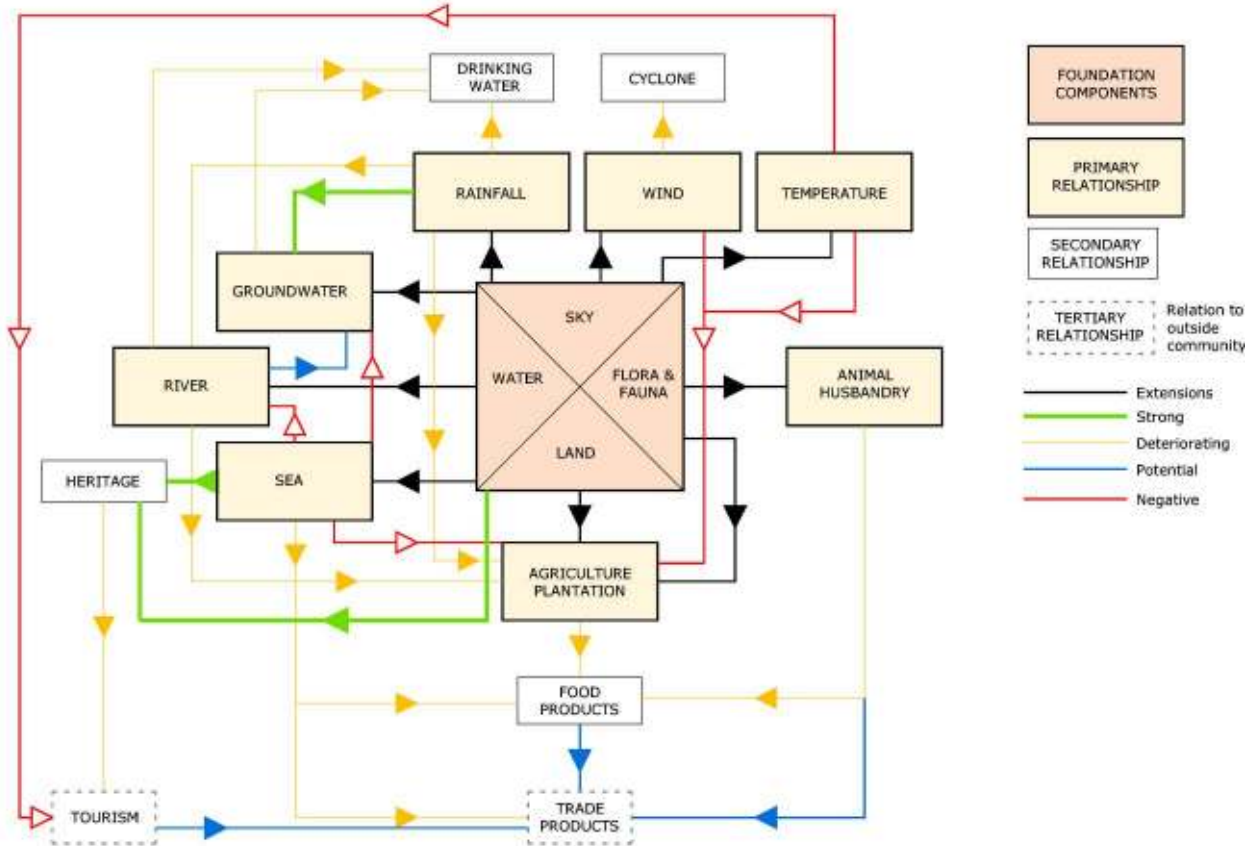


Fig. 11: Current status of human-landscape relationships in Tarangampadi

3.1. Sky (*Vyom, Tej and Vayu*)

Tarangampadi lies in hot and humid climatic regime. Average annual temperatures vary between 22°C and 34°C, while humidity varies from 70% to 100%. Temperature is suitable for luxuriant flora, fauna, and human development, but high humidity leads to lethargy, and shade becomes a much-sought after commodity.

Annual evapotranspiration rate is recorded to be 1100mm, so open water bodies lose a considerable quantity of water to evaporation. The region has a high vulnerability to cyclones arising in Bay of Bengal with a major cyclonic event at least once in three decades, a fact that can be traced back to earliest historical texts. Storm surge tide can range up to 4.5 metres from mean sea level (MSL), with wind-speeds up to 180 km / hour.

Tarangampadi receives 1170 mm mean annual rainfall, 30% of which is contributed by South-West Indian monsoon from June to September while remaining 70% is contributed by returning North-East monsoon from October to December.

Coastal tract has saline soils, a problem that is further aggravated by strong saline winds from sea, rendering land useless for agriculture. Fishing and prawn-farming have thus become mainstays of this small community. Salty winds also lead to corrosion of all metal infrastructure in the town.

3.2. Land (*Dharti*)

Land in and around Tarangampadi is highly saline and unsuitable for agriculture in its present form, though many salt-tolerant plant species with potential for economic plantation are observed to be growing well. Topography is generally flat with few undulations, and slope is constant towards river bank and sea.

Geological character of Tarangampadi can be divided into three sections as one moves inland from the sea— sandy coastal beach deposits up to 2 km inland from coast, black clayey tidal flats and fluvial deposits brought by Cauvery's distributaries, with the latter having high potential of intensive agriculture. Rainwater percolation rate is recorded to be moderate to low, with water gaining salinity as it percolates through soil.

Soils in the region exhibit several variations of clay and sand, but are mostly saline, a character which decreases as one moves inland from coast. Quality and quantity of flora is observed to improve as salinity decreases.

Coastline of Tarangampadi is highly erosive, and has made ingress 300 metres of ingress in only last 200 years or so. Local administration has created an erosion barrier by dumping large rocks along the beachfront from time to time, which need to be replenished every year (*figure 10*). While this effort has reduced coastal erosion, the entire beachfront has become inaccessible and unusable for any recreational or tourism activities (*figure 10*).

3.3. Water (*Jal*)

3.3.1. Surface water

Rainfall received by Tarangampadi and its surrounds mostly flows into the sea. Percolated water mixes with saline ground water and becomes unusable for human consumption or agriculture. Tanks are traditional rain water harvesting structures prevalent in South India, but there are no recorded examples in Tarangampadi region due to high percolation rates of primarily porous geological strata. In the past, there was no need to devise a rain water harvesting system as Virasolnar brought adequate water to the town round the year. In last 200 years, the river has lost most of its water source due to numerous dams being built upstream on Cauvery, and now has water for only a few weeks contributed by local catchments during monsoon.

3.3.2. Ground water

Tarangampadi has two types of aquifers – coastal aquifer lying in tidal flat geological section which is highly saline and has a very low yield, and the aquifer lying to west of the town that is below 150 metres but holds moderately saline water. Coastal aquifer is further stressed by over withdrawal of groundwater leading to seawater ingress. In addition, Virasolnar hosts a shallow aquifer few metres below its surface that carries overflowing dam water that which percolates below the soil.

3.3.3. Sea

Sea is the lifeline of Tarangampadi and its culture, providing it with fish – the primary mode of sustenance, and generating folk culture based on the community's primary occupation. Modern trawler fishing and large scale packaging industry are a continuous threat to small fishing communities like Tarangampadi, and will eventually lead to a decline of the town's economy.

Existing fishing infrastructure is disconnected, spread throughout the town and many facilities are non-existent. The town does not have a fishing port for docking of fishing boats, due to which fishermen are required to physically lift each boat and lay it on the beach, an act which takes eight persons and one hour per boat daily (*figure 12*). An auction point is built on the beach along fishermen's colony where boats are

docked, but the ice factory is half a kilometre away, with no vehicular connection to the auction house. Town market lies outside Tarangampadi, half a kilometre away from both – ice factory and auction market. It was observed that fisher women physically carried fish in baskets to the ice factory and then town market and neighbouring towns via local transport, but the fish would last only half a day in absence of packaging facilities, leading to daily monetary losses.

Tarangampadi was one of the towns most affected by a tsunami in 2004, where waters reached beyond Queen's street, leading to more than 300 deaths, complete destruction of the fishing hamlet and boats as well as widespread damage to heritage and other properties. Post-tsunami, government housing relocated fishermen to concrete settlements outside town, but owing to the settlements' distance from coast and resulting problems for their daily activities, fishermen have rebuilt their cottages along the coast (*figure 9*).

Trade, a previous mode of sustenance, is not available today because modern logistics systems require deeper and larger ports. The natural harbour at mouth of Virasolnar has undergone vast changes due to sea based erosion and successive river silt deposition. Hence, water enters this area only during high tides, leaving a barren river bed during low tides. While modern cargo ships cannot be berthed in this harbour, a harbour to berth fishing boats and protect them from the perilous sea can be created.



Fig. 12: Fishing boats berthed on the beach every evening

3.4. Flora & Fauna

Tarangampadi has Tropical Dry Evergreen forest type, which includes terrestrial species like *Albizzia amara*, *Phoenix acaulis*, *Carissa spinarum*, *Spinifix littoreas*, *Pandanus fascicularis* and *Indigofera viscosa* along with numerous varieties of mangroves. Vegetation observed on site also included *Borassus flabellifer*, *Cocos nucifera*, *Casuarina equisetifolia* and *Lannea coromandelica*. As noted earlier, soil along the coastline has been rendered unsuitable for flora due to continuous salt spray from the sea. At household level, residents gain fruits and building material from numerous backyard plants and raise poultry for meat and eggs.

FLS studied historical texts and maps to document native landscape and plant species of the region with an intent to regenerate the landscape. Historical maps revealed that coastal tracts of Tarangampadi up to half a kilometre inland from the coast were used as salt pans, while inland areas were developed as agriculture and plantation irrigated by creating small canals from Virasolnar and other distributaries of Cauvery. Soils had adequate fertility, and did not suffer salinity due to presence of dense coastal plantation that reduced effect of salty winds. Tarangampadi was thus, a vibrant and diversified economy with salt, agriculture, fishing, trade and services at its core, a far cry from today's deteriorating town.

4. Landscape Planning Proposals – Nature as a resource

FLS deduced that many of the town’s problems arise from the community’s low capacity to interact with nature and cultivate it in various ways to derive resources as well as livelihood. Tarangampadi’s community faces water scarcity, its economy is completely dependent on fishing, has insufficient infrastructure for commerce and society, lacks suitable land for agriculture and does not foresee any alternate avenues of growth and long term sustainability.

FLS proposed a regional landscape plan aimed at conserving and sustaining nature and heritage, generating employment beyond traditional fishing occupations while building resources and providing self-sustaining community cooperation solutions to daily needs and problems. Flow chart from figure 11 has been analysed to strengthen weak and deteriorating connections to allow the town to develop sustainably (figure 13).

STRENGTHENING HUMAN LANDSCAPE RELATIONSHIPS IN TARANGAMPADI BY CREATING CONNECTING INFRASTRUCTURE

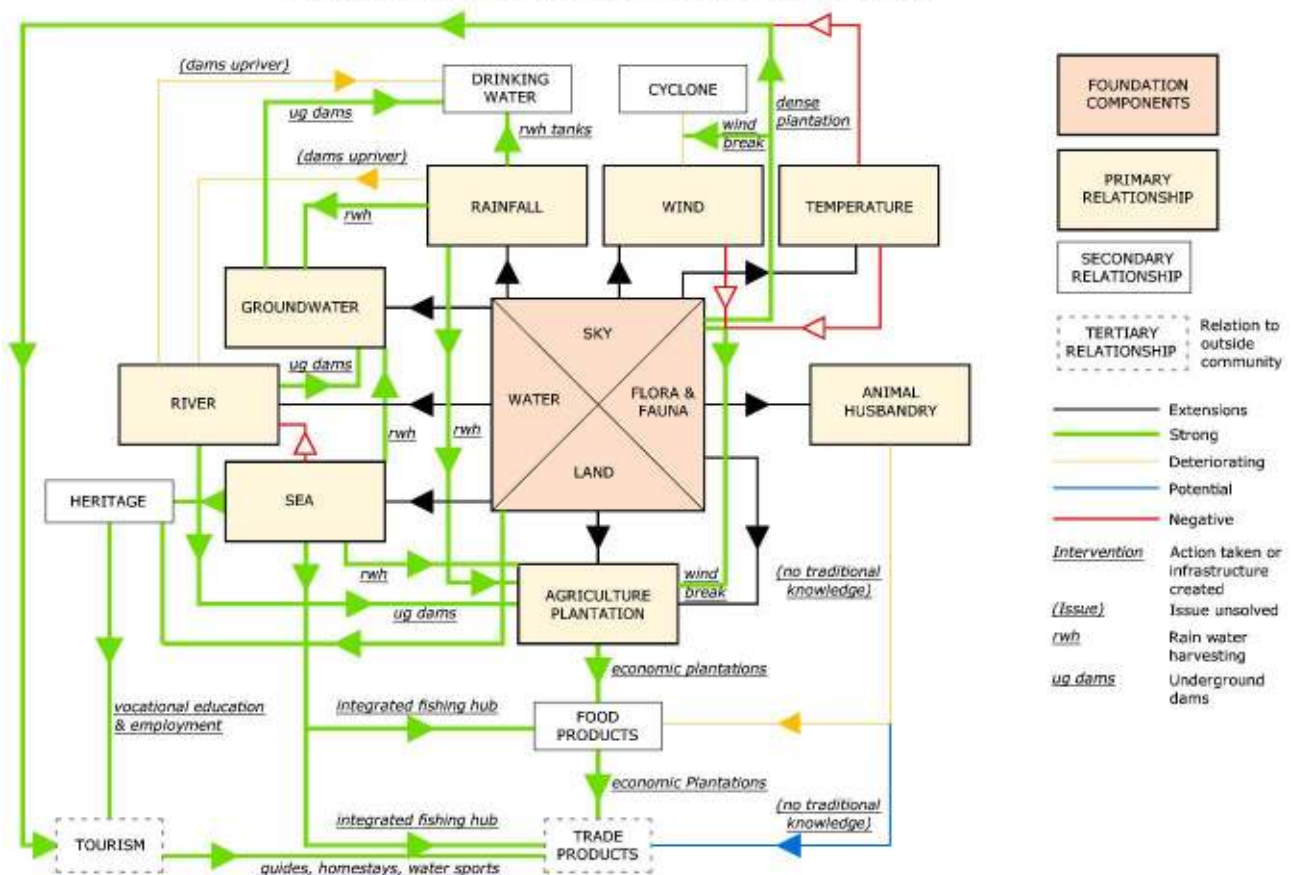


Fig. 13: Strengthening human-landscape relationships in Tarangampadi by creating connecting infrastructure

4.1. Water Resources

Water is the most critical issue in Tarangampadi - artificial water scarcity leads to waste of time and effort in water collection and unavailability of water for agriculture. A long term solution to augment drinking water in Tarangampadi was proposed through a combination of sustainable groundwater tapping techniques and rain water harvesting measures, which would also generate alternative employment.

It was observed that Virasolnar is dry most of the year, yet there is a steady flow of water in its immediate aquifer, which arises due to overflowing dam waters and runoff from other catchments. Underground check dams are a sustainable means of tapping such aquifers as they aid direct withdrawal as well as spreading of fresh water to surrounding aquifers, while allowing excess surface and ground water to pass over them. Applied to Virasolnar, these would also help in suppressing salinity ingress in coastal aquifer.

Tarangampadi has high rainfall that can be harvested to create a steady drinking water supply. The common land on bank of Virasolnar was proposed to be transformed into a large rainwater catchment

sloping towards a central tank lined with impervious material (*figure 14*). Further, rainwater harvesting systems were proposed on roofs of all public and private buildings to collect water in precast underground tanks. While, water from the town's pond and public buildings would be pumped to common taps in all streets, each house would also have its own rain water tank. These measures could generate 200 days of drinking water supply for the entire town, which would be supplemented for remaining part of the year by existing water supply system, thus reducing the latter's load.

These measures would diminish dependence on local wells, which provide saline water in any case, and thus reduce sea-water ingress over a period of time, making wells usable after a decade or so. This effort should provide full time annual employment to about 10 families, as civic services of cleaning building roofs, tanks and common land along with general maintenance of water storage and supply system.

4.2. Sea Resources

An integrated fishing hub was proposed on south bank of Virasolnar, adjacent to the interstate road allowing ease of transit (*figure 14*). This hub would include a fishing harbour created by local dredging of the river, relocation of ice factory and auction market to this location, as well as infrastructure for drying, packaging and processing of fish. Ancillary facilities of harbour maintenance and fish processing would generate annual employment for about 100 families. A biogas plant fed by solid waste collected from the town was proposed for partial power supply of the hub, and would provide annual employment to 10 families. Creation of fishing hub would free the beach from docked boats (*figure 12*), and allow more space to be utilized for local recreation and tourism.

No cost-effective way of transforming the erosive coastline could be found, hence tourism facilities would be created on the erosion barrier developed on site. These would include walkways, seating areas and basic amenities, effectively making the erosion barrier a strong coastal pedestrian connection through the town (*figure 14*).

4.3. Flora Resources

A comprehensive flora stabilization and improvement proposal was developed to generate local employment via direct maintenance and flora products like fruits, timber, building material, etc including a wind buffer along the coast to allow steady soil improvement for developing plantation and agriculture over a period of time.

A series of shelter belts of *Casuarina equisetifolia* complemented by *Panicum antidotale*, *Brachiaria mutica* and *Cenchrus setigerus* were proposed along the coast line to prevent wind and water erosion, and prevent salt sprays from deteriorating the land (*figure 14*). Over a period of a decade, successive rain water flows would cleanse the soil of its salinity improving its quality for agriculture and plantation. Proposals also included plantation of economically important species like *Borassus flabellifer*, *Pithecellobium dulce*, *Tamarix aphylla*, *Barringtonia acutangulata* and *Aloe vera* in yards of all houses, saline agricultural tracts and town's common lands.

Both banks of Virasolnar were proposed to be planted with native mangrove vegetation to stabilize the edges from constant wave generation of fishing boats passing through, and also to protect the harbour from storm surges (*figure 14*). Species selected included *Acanthus illicifolius*, *Aegiceras comiculatum*, *Avicennia marina*, *A. officinalis*, *Rhizophora mucronata* and *R. apiculata*.

Within the town, periphery of all street edges and public spaces were proposed to have plantation that would reduce effect of salty winds and generate sustenance along with employment through flora products like fruits, timber, etc. Selected species included *Thespesia populena*, *Barringtonia racemosa*, *B. acutangulata*, *Hibiscus tiliaceous*, *Pandanus fascicularis*, *Indigofera cordifolia*, *Caesalpinia banducella*, *Clerodendrum inerme*, *Pluchea lanceolata* and *Tylophora tennis*.

Streetsides, beach edges and unused open areas would be planted with sand-binder species like *Ipomoea pes-caprae*, *Sesuvium portulacastrum*, *Spriufix littoreus*, *Indigofera cordifolia* and *Pandanus fascicularis*.

4.4. Town Planning and Society

After analysing town's fabric, a new street was proposed between southern town edge and common land, which would connect market area directly to Queen's street at Dansborg bypassing King's street completely (*figure 14*). This would allow partial pedestrianization of King's street as a tourist heritage walk, improving its ambience.

Tourist vehicles, which are parked in front of Dansborg fort, would be relocated to dedicated parking lots along the new street and near market area. Tourist amenities would also be located on new street, and lead directly to best parts of the beach to south of Dansborg. Parade Ground was proposed to be transformed in to a shaded tree plaza where tourists and residents could rest and socialize.

In addition to the north-south pedestrian link on erosion barrier along the beach, the derelict canal was proposed to be converted in to a pedestrian cum cycling path leading to north of the town (*figure 14*), where three to four tourist resorts would be permitted through long term lease of town's common land. This tourism infrastructure development and maintenance would provide employment to about one hundred families including those employed by resorts.

Tarangampadi is known for its brave seafaring fisherfolk. With introduction of industrialized fishing activities, their incomes dived with no alternative employment direction to successive generations. A vocational training centre was proposed for up gradation of fishing techniques along with training for navy, coast guard and sea linked tourist activities like speed boating, parasailing, etc.

4.5. Heritage and Tourism Development

Tarangampadi's residents do not have a strong association with its heritage; leading to the latter's deterioration. Post-tsunami awareness also attracted non-governmental organizations like INTACH, who are aiding in conservation of heritage fabric of the town. A comprehensive heritage conservation proposal was worked out by INTACH in association with the Indian Government that would generate tourism and employment opportunities. Few heritage homes were identified for conservation and conversion into homestays where tourists could partake of daily life in Tarangampadi. In addition, the Governor's bungalow along the coast and opposite to Dansborg was converted into a heritage hotel.

FLS proposed several town level landscape modifications to recreate the heritage landscape of Tarangampadi. These included creation of a circumambulatory walkway that would include pedestrianization of King's street, creation of coastal walkway on erosion barrier and development of canal as walkway cum cycling path (*figure 14*). Walkways would be shaded by native species like *Ficus benamina*, *Terminalia catappa*, *Thespesia populnea* and *Calliandra calothyrsas* (*figure 15*). This would be complemented by plantation of economically important species in yards of all houses and sand-binder species along the coast. The entire effect would evoke memories of shaded dense plantation estates of Tarangampadi documented in historical drawings and descriptions (*figures 3 & 4*), creating a cool humid atmosphere for the townsfolk and tourists to relish alike.

A vocational training centre dedicated to heritage and tourism management was proposed, which would generate long term employment for about fifty families through landscape management and conservation, tourism services, heritage building management and tourist amenities like groceries, cycling tours, etc.

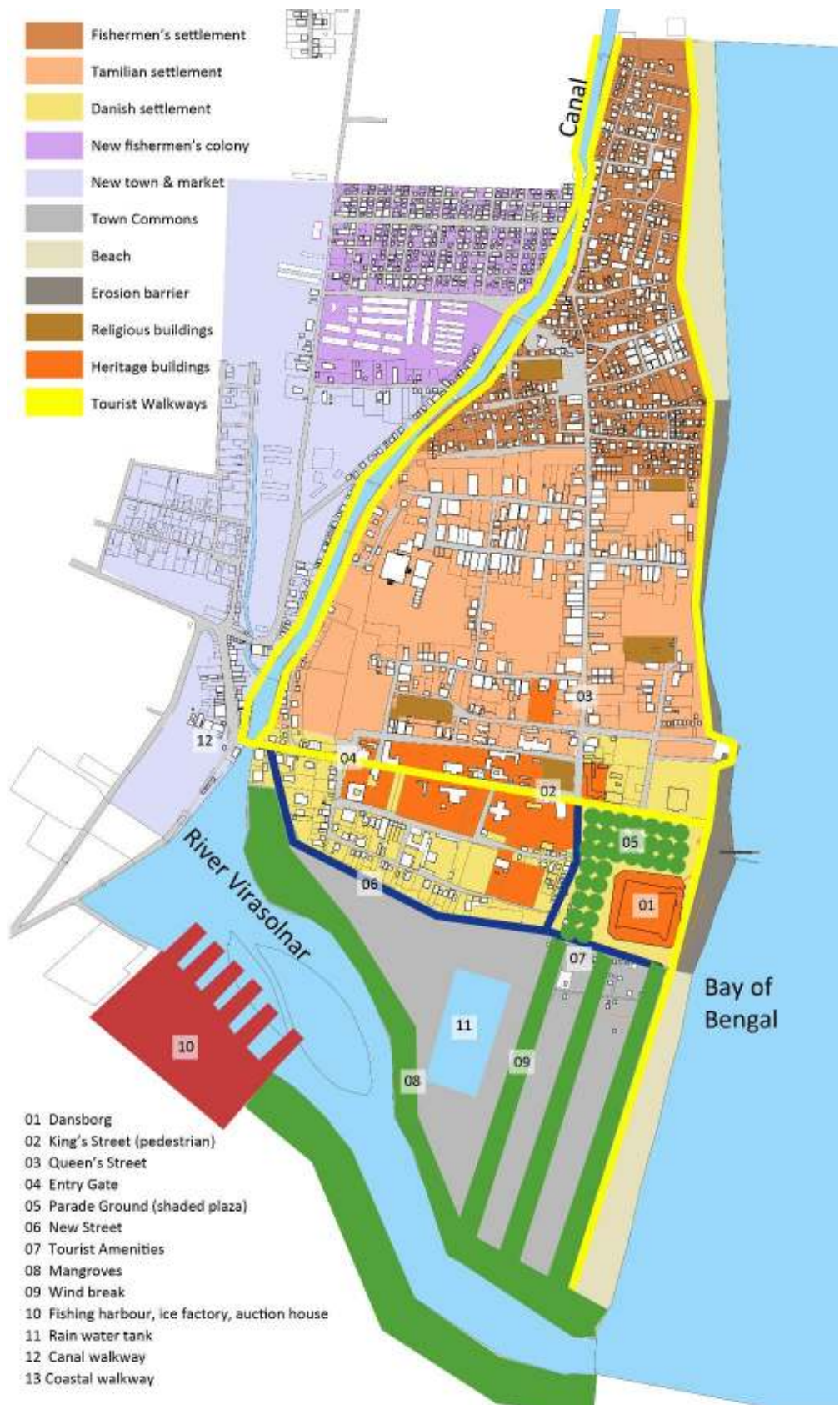


Fig. 14: Proposed developments in Tarangampadi

LEGEND

<p>Type A shrubs</p> <p>A1- Nerium 'Dwarf' A2- Stachytarpheta indica A3- Calotropis procera A4- Duranta repens A5- Barleria A6- Cassia alata A7- Ixora coccinea A8- Jasmanium grandiflorum A9- Tabernaemontan coronari</p>	<p>Type "D" Plantation</p> <p>D1- Thespesia poponense D2- Plumeria alba D3- Pongamia glabra D4- Ficus virens D5- Colomndilica D6- Casuarina equisetifolia D7- Tamarix aphylla D8- Azadirachta indica D9- Albizia procera D10- Syzygium cumini D11- Millingtonia hortensis</p>
<p>Type B shrubs</p> <p>B1- Crinum asiaticum B2- Agave B3- Alocera</p>	<p>Type E</p> <p>E1- Lantana oselwiana E2- Poddarthus E3- Ipomea pes-caprae E4- Vinca rosea</p>
<p>Type "C" Shrubs</p> <p>C1- Thevesia peruviana C2- Nerium oleander C3- Hibiscus Rosa sinensis C4- Caparis roosei C5- Justicia adathoda C6- Vitex nudunda C7- Vitex altissima C8- Hibiscus tiliaceus C9- Cordia sebestina C10- Tecoma gaudichaudi C11- Tecoma stans C12- Lawsonia inermis</p>	<p>Existing Tree</p>

Type D Big sized tree as specified

Type D Medium sized tree type "D" plantation / as specified

Type D Small sized tree as specified

structure/ building (dark grey)
road
lighting post as per specification
compound wall
private grounds /open to sky (light grey)

NOTE:

- 1) All dimensions are in metres.
- 2) All dimensions to be read and not measured.
- 3) refer to table no. 3.4.8.1 for list of plants used here
- 4) refer to dwg no. 3.4.8.2 for detailed planting plan of all plant types
- 5) refer to detailed drawings where specified.
- 6) refer to dwg. no. 4.1.1 for lighting specifications.
- 7) refer to dwg. no. 4.1.2 for paving specifications for roads.
- 8) refer to dwg no. 4.2 for details of plant list.

key plan

scale

0m 5m 10m 15m

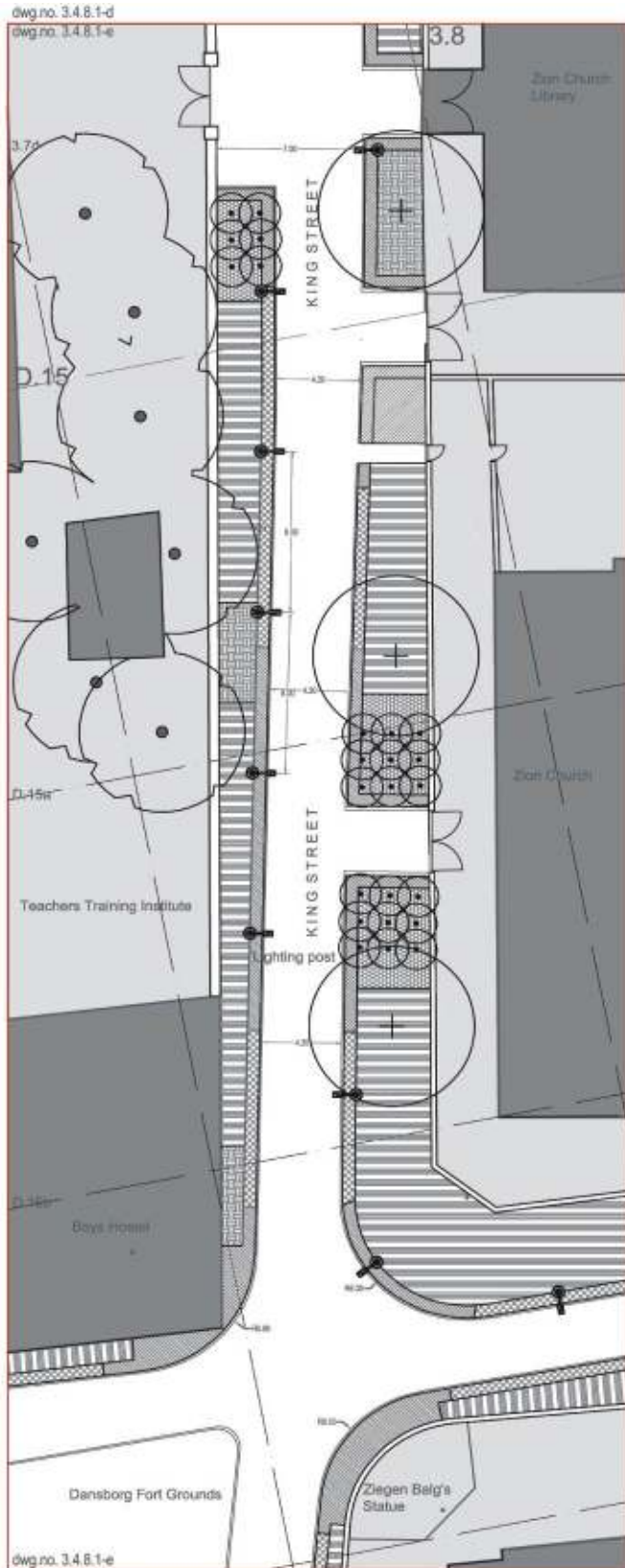


Fig. 15: Street edge design and planting layouts such as this drawing were prepared for all major streets

5. Conclusion

It is evident that conservation and sustainable development of natural resources will support long-term development of Tarangampadi as an ideal community and heritage town. The master plan proposed by the FLS integrates an ecosystem based approach that addresses concerns of both – nature and community, thus proposing a heritage town that takes care of its region and in turn reaps the qualitative benefits of increase in ecosystem capacity.

Asia is the birthplace of great ancient civilizations, cultures and religions, which have bestowed upon us heritage – tangible and intangible, that allows us to develop in a sustainable manner. Lessons of history should be revisited in order to find solutions to our current problems and drawbacks. Landscape development processes derived from historical reconstruction and natural resource analysis, such as one developed for Tarangampadi, act as case studies for development of not just similar communities, but also for urban areas that have deviated from their natural strengths to follow a global pattern of industrialization.

6. Acknowledgements

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