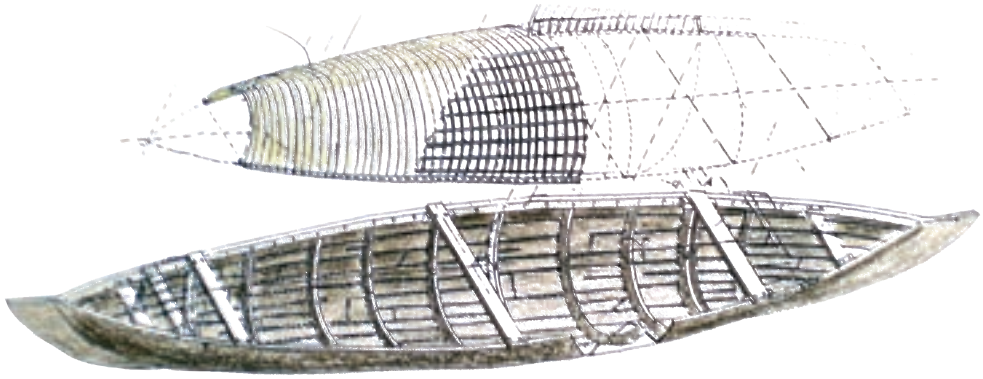
Chitra Mary Thomas
Thesis Project: Masters in Landscape Architecture, SPA

Inland waterways of Kuttanad, Kerala:
a cultural landscape undergoing change

The thesis was awarded Narendra Juneja Gold Medal for the best thesis in the Department of Landscape Architecture and Prof. T J Manickam Gold Medal for best thesis among all departments (School of Planning and Architecture, New Delhi, 2000)



The Cultural Landscape is a characteristic product of the complex interplay between a given human community embodying certain cultural references and potentials and particular set of natural circumstances. It is a heritage of many generations of human effort. Aspects of conservation, tourism and development need to be combined together while developing areas that are also significant Cultural Landscapes. This study is an attempt to identify and evaluate the elements that constitute the Cultural Landscape of an area, the negative changes they are undergoing and to propose development guidelines, which control these changes.

The product of the study will contribute to evolve a landscape planning strategy, which incorporates the Cultural Landscape, tourism and development of the region.

Scope and Intent

Kuttanad region comprises of the delta of five west flowing rivers- Achenkoil, Pamba, Manimala, Meenachil and Muvattupuzha rivers as they drain into the Arabian sea through Vembanad estuary. Around 507sqkms of the total spread of 875sqkms lies below sea level. Tidal intrusions from the mouth of the estuary and annual floods flush and drain the delta effectively.

As a geomorphologic formation, this estuarine deltaic system has a very recent history. According o historic records of the 1st and 2nd century AD by Pliny and Ptolemy, there is no mention of the villages in Kuttanad, but much is written about the port towns of the Muziris (Cranganore) and Porca (Purakkad),which lie north and south of the region. This along with the geological evidences suggests that this area was actually a large forest submerged by the sea by a sudden natural disaster.

The depositional features are the results of the large volumes of the sediments washed down from the Western Ghats by the rivers along with the turbulent monsoons sea with large quantities of suspended matter. This is the natural system that formed the region. The people and their culture in Kuttanad evolved and developed from the wide variety of internal and external forces. Many of the centers of the rural agriculture in Kuttanad have a recorded history of only 500-600 years. The spread of Christianity was one of the determining factors in shaping the cultural landscapes.

The region belongs to the Wet Rice Culture complexes of the world, other examples of which can be seen in Bengal and South East Asia. Port towns on the coast and the markets in the midlands marked the extents of this region. All these together developed a distinct cultural landscape with a strong visual image.

Background Study

Vembanad Region: Natural Ecological Features

The Vembanad region refers to low lying areas surrounding the Vembanad Lake, which also is the delta of Periyar, Muvattupuzha River, Achencoil, Pamba, Manimala and Meenachil Rivers originating from Western Ghats. It covers an area of 870 sq kms comprising of about 490sqkms of paddy fields, 300sqkms of garden lands and remaining portion of Vembanad Lake(Cochin Backwaters – largest and most productive of estuarine systems in Kerala) consisting of lagoons, canals, rivers, rivulets and the like. A large area lies below sea level at the depth of 0.5m – 2m.

The paddy fields and other low lying areas of Kuttanad in the southern part of the region, which is predominantly a delta, get flooded every year during Southwest and northeast monsoon rains. About 2/3rd of the Kuttanad region remains submerged under water for more than half the year. The water is drained into the Cochin backwater.

The two rivers – Muvattupuzha and Periyar also empty their contents into Cochin Backwater which in turn discharges into the Arabian Sea through a dredged and maintained gut at Cochin and also through a natural gut at Munambam. The detritus brought down by the rivers resulted in the formation of a narrow strip of land separating the backwaters from the sea. The sediments brought down by the river gradually accumulated raising the ground water level above the sea level in isolated parts of Kuttanad. The ground above the water level subsequently became the garden lands and the areas of the human settlement .More ground was raised and extended by the constructing bunds and filling the confined area with materials excavated from the rive deposits. The age old process of reclamation still continues.

The Vembanad ecosystem is influenced by salt water incursion during high tide in dry season and fresh water inundation during monsoon rains.

Vembanad lake and its environs owe its formation to a series of transgressions and recessions of the sea as a result of various natural forces that possibly acted on it over a period of millions of years.

Geomorphology

Physiographically, this area is unique in the sense that the entire region is a product of fluvial estuarine agencies modified by the human activities in terms of reclamation. The entire region is formed by Tertiary and quaternary sediments flanked by Precambrian rocks along the eastern border. At present the region appear as a saucer shaped basin flanked by sand dunes on the west and low lateritic hills in the east. The delta can be divided into two parts, upper delta or upper Kuttanad, developed mainly by natural processes and lower delta or lower Kuttanad originally developed by natural processes but modified by gross human interferences.

Soil Profile

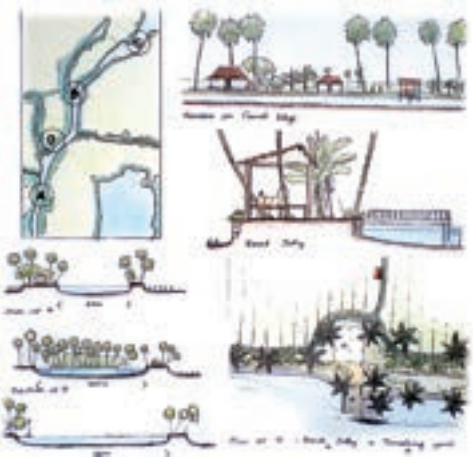
The soil of the area ca be divided into four broad categories. Coastal alluvium (Sand): Western Part, deposited by marine agencies, Colluvium alluvium (Riverine alluvium): Eastern Part and Acid Saline: Main Kuttanad region and Hydromorphic saline: Area surrounding the backwaters.

Hydrology

Pampa, Manimala and Achencoil have formed integrated drainage system which dominates the southern and south Central part of the region by developing a delta. Being the rice bowl of Kerala the region has the major crop as rice followed by coconut.

THIS PAGE [L to R]
Kuttanad maps: Land, Water & Wetland; Landuse; Geology; and Soil

FACING PAGE [L to R]
Canal near Alleppey; Changanacherry Market



History of Vembanad Region

The settlement in the region reflects the regions ecological history. The trade history, cultural history, folk, linguistic and livelihood ecologies and historic development of its natural setting are all reflected in the architectural character of the region's settlement patterns. It is dominated by backwaters and the unique cultural expression live in delicate ecological mechanisms. They gained and lost prominence along with the natural ecological transformations that the area underwent. Some of the towns include Kodungallur (Muziris), Niranam (Nelcynda), Parur, Purrakkad (Porca), Njarrakkal, Alleppey, Cochin Port, Fort Cochin and Mattancherry, Tripunithura, Vaikom (Bakerie), Thalayolaparambu, Athirampuzha, Kottayam, Cherthalai, Changanacherry and Thiruvalla.

Physiographically, the region can be divided into three parts: Coast and Sandbar, the lowlands and the midland edge.

The dominant elements of the culture that defines the Kuttanad region is the system of agriculture- Wet Rice Culture – that possibly required and eventually evolved a system of inland water transportation with its network of channels and country crafts. The latter was a direct response of the flourishing international trading activities that was going on from the port of Alleppey. Paddy Culture and water transpiration spread and grew in Kuttanad to reach its zenith in 1950s and 1960s, The former took centuries to transform from subsistence agriculture to its present commercial form that was going on in Kuttanad from 3rd century A.D. The culture was shaped by various groups of people from the locals- Pulayas, Aryans, Christians and also from various groups like the Tamil Brahmins, Kutchis etc.

The region represents the extents area of paddy culture networked by the waterways that provided transport and communication across the wetlands from the midland markets to the port town of Alleppey, predominantly for international trade and export.

Alleppey

In mid 1700s, the site where Alleppey lies was selected as the site for the proposed port town by the Tranvancore kingdom. The selection was largely governed by the physical – geographical considerations and prevailing modes of inland transport. Around 1760, the construction of the port took place. A canal was dug or rather extended from an existing watercourse, across the dunes close to the beach and the sea, the warehouses and few shops were constructed. During 1800 century, it developed on a grid pattern with construction of roads and bridges. The latter part of 19th century saw Alleppey growing to the zenith of glory. Subsequently with the development of port city of Cochin and development of road networks, Alleppey ceased to be the spices outlet of Tranvancore. After independence it lost its stature as the major port. Ever since Alleppey town is in state of slumber - the port has become non-functional and the canals have become waste dump yards.

The smooth system of transportation as required in a port was made possible by one way system of traffic through canals. The edge treatment of canals used for commercial purposes was different than the regular edge. Commercial canal used to have steps, platforms, loading ramps. Another significant feature was that the canals were not used for household purposes. These canals are spanned at regular intervals by vehicular and pedestrian bridges at a level higher than road level to allow the passage of boats beneath. The network of roads perpendicular to the main artery of the canals extends these zones farther inland. At the eastern end of the commercial canal is Chugam which is located strategically at the junction of the canal and the backwaters.

Chaganacherry Market

With the development of port town of Alleppey, this market was established in 1805 A.D as an increasing flow of hill produce from places like Kumili, Peerumedu, on the Western Ghats to the port of Alleppey. Landmarks of the market place include a market pond. Today, boat service operates from Changanacherry jetty to various destinations - Kuttanad, Alleppey and Kottayam.

Studies were done regarding the sequential development of the various components that constitute the cultural landscape (towns, villages, markets, rivers and canal system, etc.). Their value assessment and the series of changes that they are undergoing were listed and analyzed to arrive at a set of guidelines. Extracts from the study and analysis follow. Similar analysis regarding value and changes in landscape were also done for Canals and Rivers of Kuttanad, and Vembanad Lake.

Summary of Analysis

Alleppey: Value of the landscape

HISTORIC	ENVIRONMENTAL	FUNCTIONAL	ECONOMIC	AESTHETIC	SYMBOLIC	CULTURAL
Alleppey was a port town from 1760 to 1981 taking part in the international trade; the remnants of which are the sea pier, godowns, markets and canal system.	The canal system of the lown had an efficient self clearing mechanism using tidal variations to clean the waters and to prevent siltation.	The canal system allowed transportation and trade from the hinterland to the port at the see edge, across the sandbar. The domestic water transport network (KSWTC) that serves Kultanad starts from these canals.	Alleppey is a planned commercial / trading town with trading houses located on either sides of the two canals.	The canals with the built form of markets and godowns on either sides provide a system of linked open green space connecting the lake to the sea and the beach.	The town with its built heritage and canal network is the epitome of the inland water based trade network of the region.	The trade activities attracted ethnic groups the settlement patterns of which reflected the part of trade activity they handled and respective traditional architecture and spatial organization.

Alleppey: Changes the landscape is undergoing

AGENTS CAUSING CHANGE	CHANGES THEY CAUSE	EFFECTS AND CONSEQUENCES	FUTURE TRENDS
• THANNER MUKKOM BUND construction across Vembanad lake has made the canal waters stagnant and devold of sallnity, circulation and movement. • SPREAD OF ROAD NETWORD and the automobile population growth • TOURISM	• Siltation of the tidel entry point on the sea coast • Siltation of the canal floor • Growth of water weeds • Accumulation of pollutants • Faster means of transportation and communication making water transport obsolete • Commercial developments around the bus depot and surroundings • Canals put to pollution causing pollution and aesthetic eyesores • Mushrooming of hotels and lodges in the town and the canal edge • Change in livelihood of local people due to opportunities offered related to tourists Eg. Boat owners using boats for waterway tours for the tourist. • Commercialization of artforms like Kathakali.	• Hampers navigation • Cause health hazards to people • Decline of water transportation • Traditional built forms being replaced by concrete structures • Health hazards to people • Neglect of paddy, agriculture and water borne trades • Loss of authenticity of traditional artforms.	• Economic crisis, environmental and health problems and uncontrolled tourism is changing Alleppey into a dying town • Shift in the focus of development from the canal edge to the bus depot area is changing the traditional patterns of development • The beach with the port and related godowns is getting cutoff from the recreational activities.

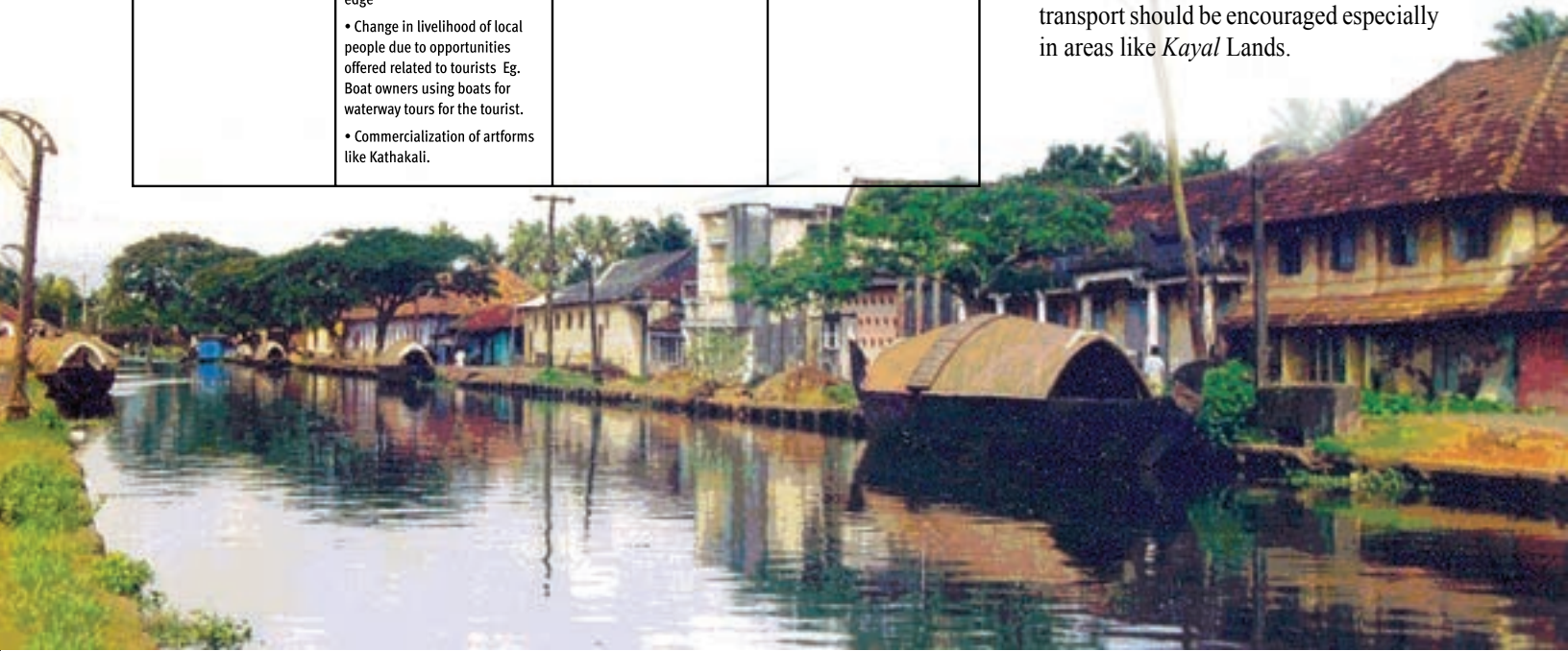
Guidelines

The guidelines and development controls are only broad suggestions to be considered while working out the landscape planning strategy for the region considering the value of the cultural landscapes as well as the negative changes taking place to it. An exhaustive study of the Region is to be done before any area specific guidelines are prepared.

Roads

Guidelines regarding the layout of roads

- The layout of roads shall be such that the area under wetlands that is to be filled or reclaimed for usage as road is minimized. Wherever possible, the orientation of the road is to be such that it is parallel to the anticipated path of drainage or flow of floodwater specific to that area. (The general direction is from SSE to NNW.)
- Culverts are to be provided across the road at required frequency to allow for storm water drainage. When a road has to cross a water channel or a water body, a bridge with the required minimum under clearance is to be built to allow the free passage of water, boats and aquatic animals.
- In areas where drainage across a road is a critical need, the road may be supported on pier allowing free flow of water underneath.
- The fill material should be clean, stable and coarse to avoid siltation and erosion. As far as possible the spread of road network should be controlled and inland water transport should be encouraged especially in areas like *Kayal* Lands.



Guidelines regarding development along road parallel to the water edge

- Guidelines should be prepared regarding the controlled development (specifically of commercial nature) of areas, which tend to grow rapidly as a result of the spread of the road system. The type of use, density and scale of development, character and style of the built form, material, colour and building height and setbacks should be harmonious to the existing development and vernacular style.
- Local byelaws regarding the common (public) space to be left as green strip at the water edge and the pedestrian path parallel to it should be adhered to.
- Needs for new requirements like ferries, conversion of pedestrian bridge to vehicular bridges etc. are to be considered in such a way that the existing elements of the water transportation system are not disturbed.

Guidelines regarding the height of bridges along roads

- Sufficient under clearance may be provided for any new bridge such that it allows the free passage of navigation vessels used in that channel.
- According to local byelaws the height are as follows but it should be checked according to specific site requirements. Country boats – 1.5m, Special boats – 2.7m, Motor boats – 3.7m

Development along newly laid out roads [example AC Road]

- Provision of culverts at required interval for free movement of surface water and drainage of floodwater. Utilization of the canal parallel to AC Road for navigation to link the AC Road to interior areas by other canals (instead of the use of off shoot roads).

Indiscriminate land filling

Land is scarce resource in the region. Although filling of paddy fields provides more space for habitation, considering the harmful effects of landfill on the environment the following guidelines may be followed.

- Filling of wetlands should be allowed only for infrastructure needs like roads and other services. The Kerala Land Utilization Order (KLU 1967) of the Government of Kerala (which prohibits "change in land use, especially of land cultivated with food crop to any other crop or any other land use") should be strictly enforced so that filling of paddy fields do not take place at random.
- In special cases where land filling is allowed the proposed land should be compatible with the existing development and should not cause harmful effects like polluting effluents or aesthetic eyesores.
- Landfill is to be allowed only in areas where surface water flow and storm water drainage is not adversely affected. The fill material should be stable and coarse.
- Filling of canals and water bodies is not to be allowed under any circumstance.

Thanneermukkon Bund

The Thanneermukkom Bund was initially proposed to control salinity in the water during summer so as to facilitate double cropping of paddy in Kuttanad. But the ecological harm and the imbalances it caused, it finally adversely affected the paddy produce.

- To regain the efficient hydrologic pattern drainage and tidal flushing with the controlled ingress of salinity that Kuttanad once enjoyed, and considering long-term benefits, it is suggested that the Thanneermukkom bund is opened permanently.
- The process may be carried out in phases so as to ameliorate the immediate damage it can do to the paddy farmer. The bund may be kept closed in the extreme summer months only for a few years till the farmers adjust the cropping seasons.
- With the opening of the Thanneermukkom bund the whole of Kuttanad region will fall under Coastal Regulation Zone III (CRZ III). A set of guidelines incorporating the specific needs of the Region should be worked out and added to the Coastal Zone Management Plan (CZMP) already prepared.

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Alleppey canal and kettuvallam (houseboat)

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BELOW: Changanacherry Market
BOTTOM: Canal and boats



Water Pollution

- Opening the Thanneermukkom Bund to allow tidal flushing and ingress of salinity.
- Controlled use of agricultural pesticides, insecticides and herbicides and replacement by biological control wherever possible. Controlled use of fertilizers and their replacement by farm yard manure.
- Introduction of a common sewage treatment system for compact settlements.
- Use of septic tanks to be encouraged for individual scattered houses.
- Areas of coconut retting to be cordoned off as retting 'tanks' and discouraging retting activity in the inland areas where salinity ingress is less.

Tourism

The Landscape of the Region attracts hordes of tourists and it is listed among one of the top tropical tourist destinations of the world.

- A comprehensive schemed should be worked out for areas with potential to be developed in relation with tourist activities, marking out areas which should not be developed and those areas which may have controlled development (as in CRZ III).
- Regulation of activities in tourism potential areas should be worked out similar to Annexure II of the CRZ regulations providing stipulations regarding the plot size, building type and building height, treatment of effluents, public access to the water edge, etc shall be made.

ABOVE [L to R]
Alleppey canalfront trading houses; Ferry in Moncombu; Modified tourist kettuvallam (houseboat)

- Use of inland waterways for sight seeing tours as well as and transportation of tourists in the region should be encouraged. Positive integration of the means of livelihood of the people with tourism related activities so that the local populace is also benefited by the development.
- Integration of the canals of Alleppey in the tourist circuit so as to revive the dwindling economy of the people of Alleppey.

Government policies regarding:

Exploration of natural resourses

- Control time periods for trawling in the backwaters for prawn and fish.
- Abolish shell lime mining from the *Kayal* lands; instead encourage manual collection of lime from the floor of the Vembanad Lake (renewable source).

Infrastructure

- Regulate the supply of piped water for domestic (drinking and cooking) purposes only.
- Allowing the spread of roads only to areas that need them and encouraging water transport wherever a functioning route exists.
- Providing health facilities in all water locked settlements.

Treatment of edge of water ways

- Species planted under Social forestry scheme of the Government to include coconut trees and native species of mangroves and mangrove associates.
- Revert to use of clay or permeable materials like laterite for edge treatment and provisions to control floodwaters.

Water balance - Floods and Droughts

- An integrated policy considering the reservoirs and dams for hydro-electricity generation in the Western Ghats and the Thannermukkom barrier and the Thottapally spillway is to be worked out by an expert committee to suggest an ecologically sound solution to the problem of fresh water needs and flood control in Kuttanad.

Designation as Protected Landscape

- The landscape of the Region is a living model of the sustainable use of land natural resources.
- Respecting the above values of Cultural Landscapes as indicated in "*The Lake District Declaration",* selected areas in this region with unique Natural and / or Cultural Heritage may be designated as Protected Landscapes.
- "Management sensitive to social and ecological conditions should be confirmed so that this inhabited landscape, which is in a delicate and dynamic equilibrium; is not allowed to stagnate or fossilize. But change must be guided so that it does not destroy the inherent values." (Lake District Declaration).

Text, drawings and photographs courtesy Chitra Biley.
Article compilation: ***Tushara, Aathira***

Chitra Biley nee Mary Thomas is presently practicing as Principal Landscape Architect and Partner at Idea Design, Cochin.
ideadesign@eth.net