Chapter-III  

Natural and Cultural Landscape of Bharathappuzha

Landscape constitutes the visible features of an area of land including the physical elements of landforms like mountains, hills, water bodies such as rivers, lakes, ponds and the seas, living elements including indigenous flora and fauna, human habitations depicted by, buildings and structures, and transitory elements like lightening and weather such as lighting and weather conditions. Combining both their physical origins and the cultural overlay of human presence, often created over millennia, landscapes reflect the living synthesis of people and place vital to identity formation, be it local or cultural or national. Landscapes, their character and quality, help define the self image of a region, its sense of place that differentiates it from other regions. It is the dynamic backdrop to people’s lives. The landscapes are of mainly of two types, the natural and the cultural landscapes. The natural landscapes are those that are originally emerged like valleys, caves, rivers etc. The latter are those that are emerged due to the intervention of the culture, i.e. human being with the nature.

Alexander von Humbolt who travelled extensively in South America became the first to conceptualize a natural landscape.\(^1\) The natural landscape is a place under the current control of natural forces and free of the control of people for an extended period of time. It remains unaffected by human activity. A natural landscape is intact when all living and nonliving elements are free to move and change. The nonliving elements distinguish a natural landscape from a wilderness. A wilderness includes areas within which natural processes operate without human interference, but a

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\(^1\) Alexander von Humbolt (1769-1859) is a German geographer and his studies contributed much in the field of Bio-Geography. His studies of plants were based on the idea of distribution of organic life as affected by varying physical conditions. His approach to science was needed that could account for the harmony of nature among the diversity of the physical world. He conducts intense fieldwork to get the inner dynamics of natural world with the help of sophisticated scientific instruments. The quantitative methodology which he followed known as ‘Humboldtian science’. See for further details, Alexander Von Humboldt, *Personal Narrative of Travels of the Equinocial Regions of the New Continent during Years 1799-1804* (London, 1814), Vol. 1, Pp.34-35; Chunglin Kwa, Alexander von Humboldt's invention of the natural landscape, *The European Legacy*, Vol. 10, No. 2, pp. 149-162, 2005.
wilderness must contain life. As implied, a natural landscape may contain either the living or nonliving or both.

A cultural landscape is a physical representation of how humans have related to, and transformed their environment; it highlights the significance in built form, natural features, and the interaction between the two. According to United Nations Educational, Scientific and Cultural Organization “cultural landscapes represent the combined works of nature and of man”. They are illustrative of the evolution of human society and settlement over time, under the influence of physical constraints and/or opportunities presented by the natural environment and of successive social, economic and cultural forces, both external and internal”\textsuperscript{2}. National Capital Commission viewed “Cultural landscapes are geographical terrains which exhibit characteristics or which represent the values of a society as a result of human interaction with the environment”\textsuperscript{3}. The study of geographical features of an area is essential to understand the engagement of humans to their natural settings. In this context, “a cultural landscape is defined...as a set of ideas and practices, embedded in a place. This definition is used to capture the relationship between the intangible and tangible qualities of these sites”\textsuperscript{4}. In the earlier period to the present age human life was dependent on the surrounding environment in which they have inhabited. This meant that from the onset of human life there exist a relationship


\textsuperscript{3} The National Capital Commission of Canada (NCC), Parks Canada Workshop, 1993, Canada; Susan Buggy, Parks Canada Architectural History Branch, Cultural Landscapes in Canada, Draft Article, 1994:1.

\textsuperscript{4} Julian Smith, Definition and Assessment of Cultural Landscapes of Heritage Value on NCC Lands, December 2004, Canada: National Capital Commission.
between man and his environment. This can be attributed to have an influence on the origin and development of different types of cultures in diverse environmental zones.

This chapter is divided into two sections; section one deal with the natural landscape and the second section brings out nuances of cultural landscape of the river, Bharathappuzha.

Section I - Natural Landscape of Bharathappuzha

The main natural resources attributed to a region are landforms, soil, climate, vegetation, water etc., and they act as pivotal element in moulding the culture of the people. Here, each one of these has been dealt with to understand the natural settings and how far they have been helpful for the inhabitation of the people on the banks of Bharathappuzha.

Kerala is situated on the southern part of Indian peninsula and is divided into three major natural divisions- highland, midland, low land. The land is rich in terms of availability of water and there are forty four rivers flowing through the state, of which forty one flows towards the West and the remaining three towards the east.


6 The Kabini, Bhavani and Pambar originate from Kerala and flow eastwards. Kabini originates in Wayanad districts of Kerala and flows to join the Kaveri River at Tirumakudalu Narasipura in Karnataka. The Bhavani originates from the eastern slope s of Western Ghats in Attapadi reserve forest of Palakkad district of Kerala and joins the Kaveri river at the northern part of Erode district of Tamilnadu and the Pambar originates in the Anamudi hills of in Idukki district of Kerala and flows east of Kerala and joins to Kaveri at Karur Tamil Nadu.
It is interesting to note that the water streams in Kerala are known as ‘puzha’. The Malayalam word *puzha* means a small river/stream of water or water flows. Generally in India, the large natural stream of water known as *nadi*. The word *nadi* is derived from Sanskrit root word ‘nad’ meaning channel, stream or flow. In the case of Kerala, almost all water streams are small comparing to other parts of India and the people name it as *puzha* (small water stream). Even though it is very small, it never denotes the English word river which is a large natural stream of water.
water flowing into the sea. All *puzhas* in Kerala are small in size. There are two kinds of water streams that exist in Kerala i.e *puzha* and *aar*. The *puzha* is the water stream merges into the sea whereas *aar* flows or merges into lake. The major *aar* in Kerala state are Periyar, Shiriyar, Meenachilar, Manimalayar, Pambayar, Achenkoil, Pallikalar and Kalladayar which flows to the *kayal* (lake) such as Vembanatukayal, Kumbala lake, Vembanatukayal, Pamba, Vembanatukayal, Vembanatukayal, Kozhikode canal, Ashtamudikayal respectively.

Bharathappuzha River is also known as *Nila* (long/blue), *Perarua* (peru + aaru) and *Ponnanippuzha* (Ponnani + puzha). It is considered that, Bharathappuzha is originated from a small lake of Anamalai hills in Western Ghats. Each region attribute local name to the river that flows in their region. In India, most of the rivers are considered as goddesses. But it is interesting to note that Bharathappuzha is not recognised as god or goddesses for the world view of the folk of Kerala perceived it as a stream rather than as a river. This is because of the very geographical local of the State of Kerala. It is situated in a strip of territory between Western Ghats and the Arabian Sea, infested with thick vegetation obstructing the eyes from clear and long view of the water flows at any given point of space. In the neighbouring States the river flows are visible clearly for very long distances unlike in the State of Kerala. Perhaps due this very physical feature, the folk of Kerala considered the river as *puzha* or *aar* denoting stream.

**Table No3.1: Rivers of Kerala**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of the River</th>
<th>District which river basin is located</th>
<th>Length (KM)</th>
<th>Main Tributaries</th>
<th>Irrigation Projects</th>
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<tbody>
<tr>
<td>1</td>
<td>Achenkoil</td>
<td>Pathanamthitta, Idukki Alapuzha</td>
<td>128</td>
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<td>2</td>
<td>Anjarakandyppuzha</td>
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<td>Kappu Thodu, Idumba Thodu</td>
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<td>3</td>
<td>Ayroorppuzha</td>
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<tr>
<td>4</td>
<td>Bharathappuzha</td>
<td>Palakkad, Malappuram &amp; Thrissur</td>
<td>209</td>
<td>Gayathrippuzha, Chittoorppuzha, Kalpathippuzha, Thoothappuzha</td>
<td>8 Nos</td>
</tr>
<tr>
<td>5</td>
<td>Chalakudypuzha</td>
<td>Thrissur, Palakkad &amp; Ernakulam</td>
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<tr>
<td>6</td>
<td>Chaliyarpuzha</td>
<td>Kozhikode, Malappuram &amp; Wayanad</td>
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<td>Karimppuzha, Kanchirappuzha, Cherupuzha</td>
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<tr>
<td>No</td>
<td>Puzha Name</td>
<td>District</td>
<td>Length (Kms)</td>
<td>Major/Minor Branches</td>
<td>Additional Information</td>
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<td>Pavuru</td>
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<td>25</td>
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<td>26</td>
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<td>27</td>
<td>Muvattuppuzha</td>
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<td>Nileswaramppuzha</td>
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<td>30</td>
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<td>31</td>
<td>Pambayar</td>
<td>Pathanamthitta Idukki</td>
<td>176</td>
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</tbody>
</table>
Configuration of Bharathappuzha River System

The Bharathappuzha is the longest river in Kerala and is situated almost in the central part of the state. The total length of the river is 255 km wherein 46 km flows in Coimbatore district of Tamil Nadu and the rest of 209 km course flows through Kerala state from the east to the west. The river originates from a small lake of the ‘Thrimurthy hills’ of Anamalai in the Western Ghats at about 610.26 metres above mean Sea Level. It flows through Coimbatore district in Tamil Nadu, Palakkad, Thrissur and Malappuram district of Kerala.

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In Kerala the river flows through Chittoor, Alathoor, Palakkad, Ottapalam, and Mannarkkad taluks of Palakkad district, Thalapilly taluk in Thrishur district and Perinthalmanna, Thirur, Ponnani taluks of Malappuram district. Kerala’s heavy monsoon rains swell up the river before it slams into the Arabian Sea at Ponnani’s scenic estuary in Malappuram. It has an extensive catchment area of 6186 sq.km. Bharathappuzha is bestowed with a rich web of tributaries and sub-tributaries. The river basin receives an average rainfall of 2,300 mm and the annual average stream flow is estimated to be 5,082.9 cubic metres. The earth surface by the isolated mountains and hillocks gives birth to the number of water course to the river. Coverage of earth is caused by the resistance substance of lateritic, bed rocks and a belt of hard rock to reduce the quantity of rain water infiltration into the earth. Even under such conditions the river flowed continuously throughout the year in the olden days. But in contemporary times, it is drying up well before the summer. The major part of the Bharathappuza River flows through Palakkad district running through Thrishur district and the ending in Malappuram District. Hence, it is important to
look at the physical features of the area that might be highly influencing the entire nature of the river.

Main stream of the river originates from the Anamudi peak in the southern portion of the Western Ghats. It gushes down from the point of origin and traverses through the upper basin of the Aliyar dam and then falls in to the main dam constructed at 300 metre above Mean Sea Level in Tamil Nadu. From the dam, it runs into the north-east direction and confluences with another river called Palar, which originates from another part of the hill range- then flows west in to Kerala through the Palakkad gap, having 32 Km in width comprised of the Western Ghats, the originator of the river. The river flows in Kerala along the length of this gap procuring three major tributaries which originate from different parts of the Western Ghats. Hence, the river is flowing across the originator and is running about 255 Km length before joining the Arabian Sea at Ponnani in Kerala State. The river-system dominates 6,186 k.m on the earth surface. Out of this, 1,786 km is in Tamil Nadu and the balance of 4,400 km is shared by Palakkad, Thrissur and Malappuram Districts in Kerala State. The irregularity of earth surface gives birth to the large number of gutters and streams on the landscape.

The flowing path of the river is divided into three parts: the upper, middle, and the lower parts. In the upper part, it flows through the hilly tract of the Western Ghats and falls into Aliyar dam, constructed at 300 metres above Mean Sea Level in Tamil Nadu. In the middle part, it is travelling with average gradient from the dam to the Moolathara regulatory in Kerala-Tamil Nadu border. From the regulator, it flows in to Kerala with a variable gradient and falls in the Arabian Sea at Ponnani.

The river is flowing 17 km length in the Southern part of Chittoor, with the gradient of 3.47m/km in length. Then it flows along 27 km distance to the location of the Kannadi Bridge in the west of Palakkad town by reducing its rate of gradient up to 1.22m/km. From the location of the bridge to the Kalpathippuzha junction in Parli, it flows to 18 km distance by increasing the rate of gradient up to 1.61 m/km. Then it flows 6 km up to the location of Mankara observatory with 1.5 m/km gradient. Then it runs from Mankara to the Cheerakuzhi river junction near Ottapalam along 16 km length by reducing its rate up to 0.75 m/km. Then it flows

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with almost flat in 0.2/km up to Shoranur. Additionally, it runs along 15 km length to the location of Pattambi, by increasing its rate up to 0.67 m/km. Finally it flows along 41 km from Pattambi to the sea coast and reduces its rate up to the average of 0.49 m/km and hence the river is flowing 155 km length in Kerala with a variable gradient. The entire water on the upper region except the overflows of dams by the particular season is being blocked and diverted through the canals, producing the reduction on the flow of the river.

In olden days, frequent floods were quite natural in Bharathappuzha due to continuous long lasting and heavier rain falls. According to the elderly, the tremendous floods like deluges occurred in 1924 and 1941 which lasted for number of days. But, from 1941 onwards there has not been a frequent flood as in the older days due to the decrease of long lasting, heavier rainfall and the blockage of sources by the dams in different locations of the Bharathappuzha river.

**Form of the Bharathappuzha**

The Bharathappuzha has four main tributaries. They are Kalpathi, Kanadi, Thootha and Gayathri. Kalpathi flows from the north-eastern part and joins the river Kanadi or Chittoor River (flowing from the south eastern part) on the north eastern part of the Palakkadan plains at parali and from that place onwards this river is known as ‘Bharathappuzha’. Then it flows to the Western part and joins with another tributary known as Gayathri from the southern part at Mayanoor. Later on its way, it joins another tributary, Thoothappuzha coming from north-eastern part of Pallippuram. Before the Bharathappuzha joins the Arabian Sea in the Ponnani estuary, another river Tirurppuzha joins in the right side of this river. Finally the river merges with Arabian Sea.

River *Thootha* is one of the tributaries of the Bharathappuzha which originates from the northern part of the Ankida hills of silent valley in the Western Ghat. There the river is known as ‘kunthippuzha’. Kunthi, flowing towards the southern part of silent valley, the gorge of Pathrakadavu reaches at Mannarkad plains and then turns towards south western area and joins with Nellippuzha (from Kuttipuram near to mukali-kallamal area) and again joins with Kanjirappuzha (from the western

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9 Krisnan, K. Possibility to the project of sand mining on Bharathappuzha (Unpublished).
slope of Siruvaaani hills). Later it joins with Thupanattupuzha (from south east) and then the river is known as Thoothappuzha. Finally it joins with Bharathappuzha in Pallippuram.

The Walayar River originates from the Walayar hills of the Western Ghats and joins with Korayar. Then the river is known as Korayar and joins with Malamppuzha. From here, the river is called as “Kalpathippuzha”.

The Palar originates from the slope of Anamallai hills and it joins with Nallar and later joins with Uppar (from Nelliyampathi hills). This Palarppuzha turned to north and north-west and merge with Aliyar. The Aliyar crossed Kerala boarders and known as Chittoorppuzha. The Chittoorppuzha flows to the North West and joins with Kanadi and finally merges in to Kalpathippuzha. The different water streams flowing from the slopes of Nelliyampathi hills are known as Chulliyaar. It flows towards west and meets Meenkarappuzha and from there onwards this river is known as Gayathrippuzha. Padagiri hills are the origin of Ayloorppuzha and flowing towards North West. There are two rivers flowing from the north western part of Nelliyampathi hills. They are Vandayi (east part) and Cherukunnupuzha (west). Ayloor River joins with the streams of Vandhazhi River and flowing towards the north western area. Later, it merges with Cherukunnupuzha (from south) and is known as Mangalamppuzha. In Taroor, Mangalam River joins with Gayathri at Tharooor. Finally Gayathri flows to the Northern area and merges with the Bharathappuzha at Maayanoor.
Water Wealth of Bharathappuzha

The river culture of a particular area will be affected if there is any change in the availability of water on the river banks. There are no hills in the eastern part of the Bharathappuzha valley, and this is one of the distinguishing features of the Bharathappuzha River in Kerala flowing to the western area. In summer, it is very hot in Palakkad and the extreme eastern part of the Bharathappuzha (the plains of Coimbatore and Pollachi of Tamil Nadu). Edavapathi (south west monsoon) wind blows through these slopes throughout six months in a year (from May to October) and the remaining months have dried in eastern wind. As a result, a good amount of water loss occurs with evaporation. Moreover, the earth heats the geographical features of this land and the atmosphere heat is very high. The compression due to funnelling effect of this area and the receiving capacity of heat in the black soil in Chittoor cause high temperature. The increasing amount of paddy fields leads to the destruction of the density of the forest. The peculiar nature of this land gives a special pattern of river discharge. Along the hill slope, many tributaries and sub-tributaries flow through the plains of Palakkad.
A plethora of dams such as Parambikulam, Thunakadavu, Peruvirippallopom, Mangalam, Pathundy, Malamppuzha, Moolathara, Meenkara, Chulliar, Walayar, Kanjirappuzha are constructed along the course of the rivers for irrigation, and most of them are constructed in the sub tributaries of this river. For the construction of dams, many forests were destroyed and there is very little water in these dams and resultantly people divert these for agricultural purposes. In short, there is acute shortage of water in this river even after the south-west monsoon.

**Topography of the River Basin**

Physiographically, the area of the river basin is divided into three parts. They are the upper, middle, and the lower parts. The upper part of the basin is covered by the hilly tract of the Western Ghats. In the middle part, only a few areas of plain land are available in Coimbatore District of Tamil Nadu and in the east and south of Palakkad Township in Kerala state. The remaining area of the middle part and the entire area of upper region of lower part are covered by isolated mountains and hillocks, made up of harder, durable, resistance substance of lateritic, bed-rocks and the belt of hard rocks. Coverage of earth by hills and mountains produces the irregularities on the earth surface. The irregularity of earth is made up of sedimentary rocks, and it facilitates more erosion products. The river-basin has a wide area of natural forests in two areas. They are the reserved forest on hilly tract of mountain belt in the side extremities of the river-basin and the local forests of private parties in central part (plain land of river basin) of the basin area. The lower land and some area of the middle land are situated in Malappuram district which is on the coast of Arabian Sea.

**Land, Soil and Minarets**

The bank of the Bharathappuzha majorly covers Palakkad, Thrishur and Malappuram Districts. The total geographical area of Palakkad district is 4480 sq.k.ms. There are five taluks: Chittoor, Alathur, Palakkad, Ottapalam and Mannarkkad. Palakkad, Chittoor and Alathur taluks are plains. The district falls in the midland region except Attapady that lies in the high land region. There are three types of soils (1) Laterite Soil seen in Ottapalam, Alathur, Chittoor and Palakkad

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taluks (2) Virgin forest soil of Mannarkkad Taluk, Ottapalam taluk- the narrow strip of land along the western boundaries of Palakkad and Alathur taluks and along the southern boundary of Chittoor taluk and (3) Black soil in Chittoor and Attapady valley which is used for the cultivation of cotton. Low grade iron ore (magnetic) is found in Kollangode, Mannarughat and Muthal Mada. Lime stone deposits are found in Chittoor and Kozhinjampaara areas. Muscovite mica is reported in Sholayar villages. Large quantities of gypsum deposit are found in Walayar forest area and a Kerala government’s cement factory is also situated there.

Malappuram District has a total area of 3,638 Sq. K.M. Tirur and Ponnani taluks in Malappuram District are in the middle land and low land regions. The mid land region has lateritic soil. The coastal belt (Ponnani) is covered with sandy loam.11 The coastal belt sand contains ilmenite, magnetite, zircon, garnet and monazite. Additionally, a small portion of Bharathappuzha river also flows through Thalapilly taluk of Thrishur district and this place belongs to the mid land region and the soil type is lateritic.12

**Climate (Rainfall and Temperature)**

There are different kinds of rainfall, and wind in the eastern area of the Bharathappuzha basin (eastern side of Palakkad). In the two sides of Palakkad and within the Bharathappuzha basin, there are hilly tracts measuring 1500 to 2500 meters which provide a complex topography. It is quite interesting that there are many regional variations in this area than the other parts of Kerala. These variations will reflect the land use pattern and the cultural practices of the people of the area.

The monsoons have been supplying the periodical rainfall, which feed the rivers of Kerala. But there is a marked variation in the amount of rainfall that each river-basin gets. In the case of the Bharathappuzha, 63.5% of the total rainfall is received in 75 days by the south-west monsoon and 19.17 % is received in 22 days by the north-east monsoon. The balance (17.32%) of the total amount contributes to

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the summer showers in 21 days time.\textsuperscript{13} It means that the river-basin is blessed with the monsoon and summer showers. Therefore, a medium quantity of rainfall to the basin area is expected in the future also. There is a reduction of north-east monsoon and summer showers and thus the quantity of rainfall received in the central region is very less.

The temperature of Palakkad, recorded in seven years, indicates an average of 39.4 degree Celsius in March to May months.\textsuperscript{14} From the month of June onwards, it gradually cools down owing to the heavy monsoon. An increasing trend of temperature is seen in September and October months. But normally it falls due to in November and December months. Again, it rises in March to May seasons. The cyclic system of the temperature changes and its natural variations give rise to the fluctuation of temperature in Palakkad District; thus facilitating more weathering on the earth surface, resulting in more quantity of erosion products.

The banks of the Bharathappuzha (Palakkad, Thrishur and Malappuram) have a humid climate with a very hot season extending from March to June. In the western part of the banks humidity is less in comparison to the eastern part. The main rainy season is during south west monsoon season which sets in June and extends up to September. About 60\% of the annual rainfall is received during the south west monsoon period. During the period of October to December, the north-east monsoon rainfall gives 30\% water and the summer showers (January to May) offer 10\% water for the river. It shows that the water of the river depends upon monsoon season of this area.

**Winds and Intensity of Wind**

There is a moderate wind blowing during the south-west monsoon and in the summer, rain winds strengthen in the afternoons. As the south west monsoon advances nearer to the funnel of the ‘Palakkad gap’, its velocity increases. In September and October, the land winds blow at night and in the mornings. In the

\textsuperscript{13} Table No: 3-8-2, Possibility to the project of sand mining on Bharathappuzha, Krisnan.K, unpublished and P.7 Ground water Information Booklet of Palakkad District, Government of India, Central Ground water Board, 2007.

Palakkad taluk, especially during February, March and April, a hot wind rushes in from the burning plains of Coimbatore, and dries up every green thing of miles around. In the other seasons, north-eastern winds are common in the mornings, while in the afternoons wind blows from directions between south-west and north-west.  

There is a chance of intensification in the wind on the river basin, because the river Bharathappuzha flows along the length of the ‘Palakkad gap’ and the wind which blows from the Bay of Bengal passes through this gap. The total area of river-basin in Kerala is 44,000 k.m. Only two observatories - one at Malamppuzha and the other at Pattambi - record the velocity of wind passing through. The other areas have no observatories to find out the wind action. According to K. Krishnan, the intensity of storm in summer is dreadful and taking off the thatched roof of huts is a common consequence. Since there are no such a scientific data to prove the wind velocity on the basin area, the two aspects such as the wind action on Malamppuzha and Pattambi, and the knowledge of senior citizens about the intensity of storm in summer are striking, that the velocity of air in contact with the earth surface of basin area is more. That produces the weathering by the disintegration of soil particles; and facilitates more quantity of erosion products. The intensity of wind on the river basin is a peculiarity of the Bharathappuzha that causes more evaporation from the water surface of river and the land evaporation.

**Sand and Classification of Sand in the Bharathappuzha**

Sand is a natural product formalized as a compound of mineral fragments resulting from weathering. It originates in rivers, sea, lakes and dunes. The degree of roundness with grains is varied. Depending on the number of minerals that are

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16 He conducted a field trip and approached a number of senior citizens having good knowledge about the nature of wind on the river banks of Bharathappuzha and also those who reside at different locations on either side of the river, Krishnan. K. *Possibility to the project of sand mining on Bharathappuzha*, (unpublished)

entered into the composition, the sand is distinguished into various kinds.\textsuperscript{18} Depending on the number of minerals that enter into the composition of sand, the following kinds of sands are distinguished as:

(1) Mono mineral sands, comprising only one mineral; (2) Oligomictic sands, consisting of two minerals; and (3) Polymictic sands, with several minerals entering into their composition.\textsuperscript{19} The widespread minerals in the sand deposits are quartz and feldspar.

Rivers generally have their origin in high lands and during their downward journey towards the sea; they traverse through the vast country and naturally come across a variety of country rocks along its path of travel. Hence, the rivers transport the products of their own erosion and also the materials of other mass wasting process.

\section*{Flora and Fauna}

The northern area of Thrishur district and southern coastal belt of Malappuram district were under Palakkad district. Separate accounts about the flora and fauna of this district are not necessary.\textsuperscript{20} Palakkad has been blessed with many mountains, forests and fertile valleys with rivers and mountain streams. Different types of mammals (cat tribes, dog tribe); birds, reptiles (different kind of lizards, snakes, crocodiles, turtles and tortoise) and fishes are among the diversity. Being an inland district the local fishes can be seen from tanks and rivers are the natural treasure of this area.

For some miles on either side of Palakkad town, the hills have been rolled aside by some world convulsions, forming the famous ‘Palakkad gap’ which is about 25 miles broad. So the peculiar wind and different kind of soils help the land for good cultivation. The midland plains of Palakkad are so fertile and so productive that this district is also considered as the ‘granary of Kerala’. Different kinds of crops and special paddy products are the leading cultivations of Palakkad. Tanks and pools and


ditches are dug for storing water where the rainfall is less than that of the other districts. It is also the land known for rotation crops. It is the land of forests, edible fruits, and oil yielding plants, spices, seasonal herbs, palms, timber trees and medical herbs. There is no remarkable difference in the nature of flora seen in this district and it tends to resemble the flora of the neighbouring districts of Kerala. The low land on the banks of Bharathappuzha is situated in Malappuram district and it is a coastal area. There are no springs and spring heads in Malappuram District.

**Land use Pattern and Agriculture**

The area under cultivation in the district of Palakkad is 49% of the total area, where the entire state figure is 58%. Palakkad district is blessed with many resources like agricultural produces, minerals, cattle, forest products etc. The chief agricultural products of the area are rice, pulses, pepper, ginger, turmeric, betel nuts, mangoes, banana, tapioca, coconut, tea, coffee, and rubber. Palakkad leads in the production of paddy. The land of river banks is divided into wet, dry, and garden lands. The first two are used for the cultivation of paddy and the last for coconut, betel nuts, jack fruit, mango fruit etc. Palakkad is also famous for paddy, ground nut; betel nuts while Chittoor for Palmyra palm, cane sugar and tobacco. A well established rotation of crops is its feature. *Chamai, panicum milliare, ginger, ragi* and in the drier parts of the district *sorgum vulgare, pennisetum typhoideum, castor* and other crops are cultivated in the manner. In the eastern part of the district near to Coimbatore district in Tamil Nadu, different variety of grains and crops such as ground nut, *varagu, ragi*, black gram, *cholam, chama*, horse gram and even cotton are cultivated. Black gram is a valuable and profitable crop in south Palakkad. The average land holding per house hold has shown a decreasing tendency over the years: in 85-86, 0.46 hectares per house hold, but in 90-91 holding came down to 0.43 hectares and in 95-96 it is 0.40 hectares.

**Section II- Cultural Landscape of Bharathappuzha**

Humans have shared deep rooted and multifaceted links with their environments. A cultural landscape is used to refer to a landscape defined spatially, symbolically, or physically by its relationship to a particular cultural group – or groups acting with it. A cultural heritage landscape is a geographical area that has

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been modified, influenced, or given special meaning by people and which is of significance to the community. It may be associated with a historic event, activity, or people, embody the broad patterns of history, or display other cultural or aesthetic values. It may be valued for its designed, evolved, or associative qualities.

Water has been a continuing source of creativity and symbols of cultural activities. Rain, wells and rivers are the main sources of water. There exists folklore about different aspects of water sources in Kerala. It is believed in Kerala that one has to accompany the guest till seeing the river. The place for water sources such as wells and ponds identified with the presence of certain trees. This overt observation is based on the trees such as kadambu tree (Neolamarckia cadamba), njaval (Syzygium cumini), karinochi (Vitex Negundo), athi (Ficus glomerata), ungu (Pongamia pinnata), neermathalam (Crataeva magna) and if find any termite soil near to these trees, it shows the presence of water. Most of these trees are soft and its branches are long and hanging down. Bathing is an inevitable element in the life of Kerala people. One has to take bath before sunrise and also after sunset because the sunrise should not touch human body before bath.

**Origin myth of Bharathappuzha**

The origin myth of Bharathappuzha is prevalent among the communities. There are three peaks in Anamalai range. Each one bears the name of the main deities of Hinduism-Brahma (the god of creation), Vishnu (the god of sustenance) and Shiva (the god of destruction). The sage Atri who was a strong monotheist observed penance in the Anamalai hills because he wanted a son who would be like god himself. Bahma, Vishnu and Shiva appeared before him one after the other, each claiming that he was the one and only god. This was meant to explain that god is known by different names but he is one. The three peaks came to be known by the three names of god. Together they are known as Trimoorthisringam- the union of the three gods. When the sage felt extreme thirst at the end of the period of penance, Anasooya, his wife prayed to the Ganga who appeared there in the shape of a small stream. After quenching his thirst, the sage requested Ganga to stay on. Then Ganga said that her presence will be there in the Bharathappuzha River as a small stream at the place of origin of Bharathappuzha. Therefore Bharathappuzha is known as the ‘Dakshin Ganga (the Ganga of South), an honour that shares with the Kavrei.\(^{22}\)

\(^{22}\) Once, the seven rivers were strolling in the Valley of Vindhya Mountain. They met a gandharva (celestial male) and he folded his hand in respect to them. This created an argument among all the rivers, as whom the gandharva respected and folded his hands. Finally there was a big argument between Ganga and Kaveri, while Yamuna, Sarasvati, Narmada moved away without much argument. Both of them went to Brahma for justice. Brahma replied that Ganga is great because she
Bharathappuzha – The Appellatives

Bharathppuzha has two other names which exist in the middle and ending part of Nila and Ponnani respectively. This is the only River in India known with its name as ‘Bharatha’. From Parali, Amaravathippuzha and Kalpathippuzha joins and from that place onwards the river is known as Bharathappuzha. There are many legends/opinions with regard to the existence of the origin of the name Bharathppuzha.23

(1) After the war of Kurushekthara, Pandavas performed the *sradha karma* for the slain fellow warriors and ancestor. After the ritual they attained peace and therefore considered this river as sacred. Interestingly the places between the *swamesharam* and *ivor madam* are known as ‘*bharathakhandom*’ and the river that flows in these places is known as Bharathappuzha.

(2) This is the widest river in Kerala. In Malayalam the word ‘*parathi*’ means wider and the river flowing parathi as *parathipuzha* and later the river became Bharathappuzha due to the syncopation.

(3) *Nila* is another name of Bharathppuzha, which means *neelam* (long). It is a long river in Kerala and the name came from it.

(4) The land on the banks of this river was under the control of Zamorins of Calicut. They conducted market festival known as ‘*mamankam*’ for the supremacy of this area. The king stands on the banks of the river in a place known as ‘*nilappadu thara*’ during the festival to proclaim ritual sovereignty. The word *nila* may have originated from this.

(5) The Zamorins had trade with Egyptian merchants and the river is a path to carry mercantile products to ponnani port. The Egyptian merchants called the river Nila as it has resemblance with the Egyptian river Nile.

is from the toes of Vishnu. Kaveri got angry and she went to make penance to Shiva. Shiva granted her request that she (Kaveri) is equal to Ganga in sacredness and she would know as *Dakshin Ganga* (the Ganga of the south). It is believed that river Ganga comes through underground and merges with Kaveri every year in Tula sign (October-November) and people bathe in the sacred water. See M.P Cariappa, *The Coorgs and their Origins*, Mysore: Geetha Book House Publishers, 1981.

This river originates from the Neelagiri hills of Western Ghats and the people consider the river as the daughter of hills. It is a common notion in India that river is considered as female and hill as male.

Since the water in the river is very clean even the reflections of moon can be seen in the night. The river looks like blue so people termed it as neela (means blue in Malayalam).

Bharathappuzha confluence with Arabian Sea in Ponani. The river is known as ponanippuzha. The name ponani is the combination of the word pon (gold), vaani (water), ozhukuna (flow), sthalam (place) which means water flowing with gold colour (pon vaani ozhukuna sthalam).

In another version, once this place was ruled by a king called as ‘ponan’ and the river was known in his name.

### Table No 3.2: River Name – Appellative Derivation

<table>
<thead>
<tr>
<th>S No</th>
<th>River</th>
<th>Attribution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>1</td>
<td>Barathappuzha</td>
<td>Bharatha</td>
</tr>
<tr>
<td>2</td>
<td>Barathappuzha</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Nila</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Nila</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Nila</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Nila</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Neela</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Ponani</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Ponani</td>
<td></td>
</tr>
</tbody>
</table>

As seen from the above table the appellative derivation of the river comes from the very worldview of the folk. The naming of the river is almost akin to the physical appearance i.e., what the folk see and perceive is the driving force for naming.

**Mythical Origin of Tributaries of Bharathappuzha:**

The tributaries of Bharathapuzha though are natural streams, the mythical attributes are imposed by the human cultures as part of cultural landscaping in order to consume culturally.
1. **Chitoorppuzha** - The name came from the combination of chit+oor+puzha (small place river). The river flows through the place Chitoor. Another name for this river is called sokanashini puzha, the destroyer of sorrow (sokam+nashini). The people believed that if bath is taken in this river every sin will flow along with the water.

2. **Kalpathippuzha** - This river flows through the stone, kal+paathi (stone+path). Kalpathi is considered as the half of Kashi. In these two places, Vishwanatha (Shiva) is the main deity. There are many bathing ghats on this river. In southern part of this river nellidaikalidam temple and bathing ghats, vaidhyanathapuram temple and ghats govindarajapuram temple and bathing ghats, then kalpathi temple and ghats, finally chathapuram temple and ghat. The shivalinga of Kalpathi temple may take from Kashi. It is believed that in 1425 A.D, the king of Palakkad kingdom, Valiya Konikalidam Itti Komban Achan went to Kashi for penance. One day Kashi Shiva appeared his dreams and told him that he will get a shivalinga in Ganga River and take that and install it in your country. So Ittikomban took and install it on the banks of Kalpathi River. Another version is that, Lakshmy Amma, a widow of Sekhari Puram village came back from Kashi and gave one thousand and three hundred and twenty gold coins to the king Itti Komban Achan 1425 AD and requested him to build the temple of Shiva. Hence, saying ‘kashiyil pathi kalpathy’ (half of Kashi is Kalpathy). The Palakkad king invited Tamil Brahmins as the priest of this temple. They came and settled around the Kalpathy Shiva Temple. All these Brahmins came from the banks of Kaveri River. Another view regarding Kalpathy being linked to Kashi is that the main deity is Shiva and the temple is on the banks of the Nila nadhi (river) just as Kashi is on the banks of the Ganga.

3. **Gayathrippuzha** - River consider as the incarnation of goddess Gayathri. It originates from the nelliampathi mountains that are part of Anamalai ranges. The legend says that, Lord Sri Ram came to this place during his forest life (vanavaasa). Finding no water, he shot a powerful arrow at the rocks. The rocks opened up and sent forth a stream. His consort Sita bathed in the river. The spot where she took a dip is known as sitarkund.

There is also an interesting legend about the association of the Raja (King) of Kollamkod with the river. Centuries ago the King of Nakulapuram, a kingdom which was part of this area contracted the dreaded disease of leprosy. He performed severe penance on the banks of the Gayathri. The ritual performance consists of continuous reciting of the sacred Gayathri mantra and bathing in the river for a thousand days. The king and the queen went through the rigors with deep devotion. The king was cured from the disease. The queen gave birth to a male child during this period and named Hemangan. One day the child fell into the river and was washed away by the current. A kollan (blacksmith) rescued the child. The king conferred wealth and honours the blacksmith. The name of the place is thus derived from that of the profession of the man who rescued Hemangan. Hemangan became the king of Kollangod.

4. **Thoothappuzha** - (Bubbles of milk+river- River appeared like the bubbles of Milk). The Kunthippuzha became Thoothappuzha when it reaches the place Cherppulasery. The river flows as milky (pal) white with bubbles (thootha). This name came from this nature of river.
5. **Kunthippuzha** - It is believed that the pandavas, the heroes of Mahabharata, camped for a while on the banks of this river. The river takes its name from that of their mother, Kunthi. They cleaned their vessels after their food. The place known as *paathrakadavu* (Vessel ghats).

Palar is a sub-tributary and known as ‘river of milk’ (*paal and aaru*). It could be from the milk white sand on the banks. Valayaar River, (valayaar+puzha) originates from the valayaar ranges of Anamalai hills. It is the only river to give her name to the mountain range from which she originates instead of deriving her own name from it. The name Varattar (*varat+aar*), may be from the nature of river because most of the time the river seems to be dried. River considered has the power to influence human life because of its nature and *kaneer* river (Kanneer + puzha or Tears River). The river has the power to remove tears or sorrow (tears+river). Parali River is another sub tributary of Bharathappuzha and it flows through the place Parali. Ayloorppuzha (River of Ayloor hills) may be its nature or the river origin from the ayloor hills. It is quite interesting that, a river got its name because of its colour and Karim+puzha (Black River-The colour of the river is black). So the river is known as karimppuzha. Thiroorppuzha joins with Bharathappuzha just before Bharathappuzha merging in Arabian Sea, Thiru+oor+puzha (good+place+river-River of good water). River flowing through the place is known as thiroor. **Kannadi** (*mirror*) is a sub tributary of Bharathappuzha and it appeared like mirror and shows the quality of water which flowing through this river. So it is called as Mirror River.

**Table No 3.3: Tributaries of Bharathappuzha – Appellative Derivation**

<table>
<thead>
<tr>
<th>S. No</th>
<th>River</th>
<th>Appellative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>Chitoorppuzha</td>
<td>Small place river</td>
</tr>
<tr>
<td>2</td>
<td>Shokanashinippuzha</td>
<td>Destroyer of Sorrow</td>
</tr>
<tr>
<td>3</td>
<td>Kalpathippuzha</td>
<td>Stone path</td>
</tr>
<tr>
<td>4</td>
<td>Gayathrippuzha</td>
<td>Gayathri</td>
</tr>
<tr>
<td>5</td>
<td>Thoothappuzha</td>
<td>Bubbles of Milk</td>
</tr>
<tr>
<td>6</td>
<td>Kunthippuzha</td>
<td>Kunthi</td>
</tr>
<tr>
<td>7</td>
<td>Palar</td>
<td>River of Milk</td>
</tr>
<tr>
<td>8</td>
<td>Valayaarppuzha</td>
<td>From Valayaar hills</td>
</tr>
<tr>
<td>9</td>
<td>Varattar</td>
<td>Seems to be dried</td>
</tr>
<tr>
<td>10</td>
<td>Kanneerppuzha</td>
<td>Removal of Tears</td>
</tr>
<tr>
<td>11</td>
<td>Paralippuzha</td>
<td>Through the place Parali</td>
</tr>
<tr>
<td>12</td>
<td>Ayloorppuzha</td>
<td>River from Ayloor hills</td>
</tr>
<tr>
<td>13</td>
<td>Karimppuzha</td>
<td>Black River</td>
</tr>
<tr>
<td>14</td>
<td>Thiroorppuzha</td>
<td>River of good place</td>
</tr>
<tr>
<td>14</td>
<td>Kannadippuzha</td>
<td>Mirror glaze</td>
</tr>
</tbody>
</table>
From the above table it is evident that the appellative derivation of the tributaries also comes from the very worldview of the folk. The naming of the river is almost akin to the physical appearance. Both in the case of Bharathappuzha and its tributaries the naming system of the folk is directly derived from the physical appearance of the water/river in a given geographical local therefore different names are found for the same river/tributary. This suggest that the worldview of the Kerala folk is related directly to their physical realm i.e., the natural surroundings and later to the metaphysical realm i.e., supernatural. The appellation (naming system) therefore is associated with the physical realm and later may crystallize drawing from mythology etc., connected with metaphysical realm. Perhaps this feature of worldview gave a sufficient platform to accommodate the communists/Marxist ideology (based on materialism where in the ‘matter’ is primacy) rampanty in the soils of Kerala. Infact the ritual and mythology in Kerala are prominently found as explanations for the unknown phenomena that are seen in the world of known. The following illustration reveals this phenomenon.
In the cultural landscape human intervention with nature is done to through the mediation of folklore such as myth, epic, legend, proverbs, songs etc., and transform the natural products into cultural products. In the process the non-verbal genres such as beliefs and practices exist to appropriate nature for social solidarity, economic organisation and politico-religious ideology. Generally folklore about water and its sources can be classified as verbal and non-verbal.

Verbal

(a) Omens

There are many omens still exist among the Kerala people about the arrival of rain. If there any presence of rainbow at the time of sunrise or sunset it shows the arrival of rain. If the frogs make continuous sounds and the cocks howl at day time by looking at the sky it is believed that the rain would come.

(b) Legend
The people of Kerala believe that the rain is the gift of lord Indra during the reign of Chera-Chola-Pandiya. The place under this kingdom was facing severe draughts. Then the three kings made a penance to Indra for rain. After their penance, Indra gave the boon and asked them to divide the rain based on their requirements. Following the suggestions, the kings divide the rain. The rains of Malayalam month mithunam, karkadakam, chingam, kanni got by Chera king; the rains of thulam, vrishchikam, dhanu and makaram by Chola king and the rains of kumbham, meenam, medam, edavam by Pandya king. After one year the kings met again. The Pandya and Chola kingdom got plenty of rain whereas the Chera kingdom got less rain. The Chera king requested the other two kings and the Chola king gave the vrishchikam, thulaam months and the medam, edavam rain month by Pandya king to the Chera kingdom. Finally the Cheran received rain for eighth month.

The rain of Mathur, one of the villages of Palakkad is bound by the story of a Muslim saint. One day a Muslim saint reached this village from Tamil Nadu. He wants to stay in that place and meet the landlord of this area. But the place was facing severe draught and the landlord informed his inability. Then the saint asked him to prepare the paddy field to harvest the rain water and he left the landlords house. At that night the village got enough rain. The very next day, the villagers searched for the saint and they found the dead body of the saint. They also found that his walking stick made out of kanjhira tree (Strychnos nux-vomica) was growing near to his head. The villagers constructed a mausoleum in the honour of the saint and currently it is known as theruvathu mosque. On the annual festival day, many people from Tamil Nadu also visit the grave and offer money. In addition they pray for the protection of animals and for good harvest. They receive the sand from the mosque and return home. They sprinkle this sand on the paddy field for good harvest.

(b) Proverbs:

There are many proverbs related to rain. The proverbs which related to water, rains are as follows:

1) 
Pala thulli peru vellam
Many drops huge water
Deluges are made from many drops
Used to show the strength of unity of a group.

2)
**Ozhukin ethire neenthuka**

Flow against swim
Swim against the flow

Encourage the people to go against the present condition; always used as a complement for someone who dares the establishment/structure.

(3). **Kaaka kulichal kokakumo**
Crow bath crane
Will a black crow become white like a crane if it takes bath?
Use to contempt the individual who wish to do things beyond his/her calibre

(4). **Nananjal kulichu thane kayaranam**
Wet bath must come
If you are wet you must take bath
It is an advice to finish the work one which has started.

(5). **Vellathil varacha vara**
Water draw line
The line draws in the water
To inform the people that your wish/ work/ action will not fulfil

(6). **Marubhoominyle mazhapole**
Desert rain
Like a rain in the desert
To tell the arrival of certain good things without expectation

(7). **Vellathil kidakunna thavala vellam kudikathirikumo**
Water laid frog water drink
The Frog in the water can’t avoid drinking water.

It always justifies the misdeeds done by some who are in the power.

(8). **Vavainu ikare kaka akare kadakilla**
Full/new moon this shore crow the opposite shore cross
The crow cannot cross the river in the full/new moon
Used to show / predict the heavy rain in the month of Karkadakam

(c) **Songs**
There are some rain songs prevalent in Kerala such as:
mazhe mazhe thulli thulli va, mazhe mazhe vellaram kallinmel thulli thulli vaa
(hai rain come, come with giggling sounds);

mazha mazha aanaykum paapaanum mungi kulikaan vellamilla
(Rain rain everywhere not single water to bath for elephant and its owner);

achan kombathu amma varambathu, kallen chakettu kondoy thinotee kanda mindenda, padikale patti kuraikanda
(Father is on the branch of tree, mother is on the paddy field, thief has taken jackfruit, let him eat and the dog in the door never barks);

kollaam ee mazha, kollaritheemazaha, kollaam kollaam peythotte
(This rain is good and don’t wet under this rain, let it rain let it rain)

mazhe mazhe peyyale, payyum kutti padathu nellum vithum veyilathu njanum ente ammeyum thanello
(Rain rain not comes now, calf is on the field, seeds are under sunlight, myself and my mother are alone);

kodumpaapi chakaliyo kodamazha peyyaliyo aarum paapichakaliyo aadimazha peyaliyo
(Let kodumpaapi die, big rain has to come and the rain of karakadaka come).

Non-verbal

There are some signs about the arrival of rain. If the colour of earth becomes red it signifies the rain. The tribals of Wayanad district decide the nature of rain by opening the fruit of pulachi tree. If the fruit has more seeds it shows the increase of rain. The people of Kerala conduct some rain making ceremonies. The people of Thrishur area make small bund in the water canal of temple with rice for the coming of rain. On the banks of Bharathappuzha, the people offer the first seeds of paddy and coconut to the lord Ayyapa in Ponnani area by placing them in the river.

The Kodumpapi and Koppiyala are the two rain making ceremonies in Palakkad district. The people make the effigy of a human being with hay of paddy and drag it through the streets by saying ‘kodumpapi vane kodum mazha peythe’(kodum papi has come and huge rain will come). They believe that the place has become draught because of the sinful actions of one. They visit every house for alms for conducting the ritual. Finally at evening they burn the effigy in the street and believe that rain will come.
The Koppiyala is a ritual performance of women for rain. The women folk of village perform a circular dance with ten performers and each participant hold neem leaf (Azadirachta inaica) and goblet made of clay on each hand. They dance in front of the house by praising the rain god. After the performance they believe that the rain will come in the following days.

The southern Kerala is the land of many lakes and it is famous for annual *vallam kali* literally means boat race. The boat racing of Ambalapuzha, Aranmula, and Haripad is attached to the sacredness of temples of this area. In addition the people sing different boat songs while working in the boat.

**Ambalapuzha Champakulam Moolam Boat Race**

This is one of the popular snake boat races in Kerala. Its origin has a mythical background connected with the nearby Sri Krishna Temple at Ambalappuzha. Maharaja Devanarayana of Chempakasseri, as instructed by the royal priest, built a temple at Ambalappuzha. But before the installation of the deity in the temple, the priest informed that the idol was not auspicious. The king was worried, but his minister suggested him to bring down the beautiful idol of Sri Krishna, presented to Arjuna by the Lord himself, from the Karikulam temple in Kurichi.

The minister with a few others went to Kurichi, met the authorities there and returned with the idol. After getting the idol from Karikulam temple, the Raja’s men set forth by boat for the return journey. While returning to Ambalappuzha, night set in, and, as instructed by the Raja, they took shelter at a Christian household, the home of Mappilassery Itty Thommen, in the village of Champakulam. Itty Thommen and his family received the men and the idol with great honour. The next day, the Raja and his entourage turned up at Mappilassery, accompanied by a huge mass of people. *Pujas* were offered to the deity and Itty Thommen and his men also traveled with the flotilla to Ambalapuzha where the idol was duly consecrated and installed. The Raja, pleased with the love and affection shown to him by his Christian subjects, declared that henceforth, to commemorate these events, a great water carnival would be held at Champakulam every year, on *Moolam* day in the Malayalam month of *Mithunam*. Thus began the Champakulam Snake Boat Race and related functions, which continue to this day. The procession is re-enacted
before the Champakkulam Moolam Boat Race takes place. A procession of water boats decorated with colorful umbrella and performing arts before the race.

**Aranmula Uthrattadi Boat Race**

Aranmula boat race, known as the Utratati boat Race is related to the Parthasarathy Temple of Aranmula. The two day boat race conducted during Onam in river pampa. The snake boats are decorated and singers assemble near the temple early in the morning and then move to the boat and make procession. The boat race is held in the afternoon. The Aranmula Boat Race is conduct in memory of a legend of a Brahmin devotee, who made a votive offering of feeding one pilgrim a day. It is believed that one day Lord Krishna himself appeared to him and the overjoyed Brahmin vowed to offer 51 measures of rice and all the provision for the thiruvonan sadya (the sumptuous Onam feast) at the Aranmula Parthasarathy Temple. Once, the thiruvonachilavu thoni (the boat carrying the offerings) was intercepted by rivals from another village, but the Brahmin’s own villagers came to the rescue on snake boats. From then on, the offering was carried by a fleet of forty eight boats representing the nearby backwater villages. The event is marked by a colorful procession of boats by carrying the effigy of Sri Krishna in procession on the lake with children dressed as nymphs and princesses.

**Haripad Payippad Boat Race**

Payippad Jalotsavam is associated with the myth of the installation of the deity at the Subramanya Swamy Temple, Haripad. The three day annual festival on the Payippad Lake is an attractive event for the people during the Onam day celebrations. The myth related to the Payippad boat race is that the people of the village decided to build a temple with Sri Ayyappa as the presiding deity. However, after the construction of temple completed, the villagers had a vision asking them to find the idol of Sri Subramanya, which they would find in the Kayamkulam River under a whirlpool. Finding the idol of Subramanya, the people brought back in a boat, escorted by the devotees in other boats ceremoniously. In remembrance of this event a three day water festival is conducted each year.

Thus the legends, myths, proverbs, songs, tales, beliefs and rituals knitted around water sources, rivers streams, as part of cultural landscaping on one hand enhanced the usage of water resources and on the other abused the same affecting the natural landscape. As a result the river Bharathappuzha is at the verge of decline.
Bharathappuzha at the Verge of Decay

The river which is being a site of FolkLife since the days of yore is now on the verge of collapse in the matters of cultural practices and human sustenance not only in the vicinity of the main river, but also in the regions that cover the course of this magnanimous river. Several factors including natural, cultural, politico economic and social are playing decisive role in the process. They are explained as follows:

(A) Natural Causes:

Natural landscapes have been undergoing various transformations over the ages. The spatial and temporal changes in land cover and land use will be helpful to understand the environmental status of a region. Decay of rivers is a crucial concern discussed in different parts of the world and it is one among the major challenges that humans are facing. There are various reasons behind the decay of a river. This section tries to look at two issues namely; the environmental problems/reasons that lead to the damage of Bharathappuzha river system and what would happen to the culture on the banks of this river, if the river is dying. The major factors leading to the decay of Bharathappuzha are as follows:

Climate

The geographical location of Bharathappuzha is different from the rest of Kerala. The general trend of temperature in the banks shows a trend of significant increase. Temperature and rainfall are the major factors of the water resources in the river and its banks.

Table No 3.4: Mean Temperature of Palakkad 1993-1999

<table>
<thead>
<tr>
<th>S. No</th>
<th>Year</th>
<th>Palakkad</th>
<th>Maximum</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Month</td>
<td>Temperature</td>
</tr>
<tr>
<td>1</td>
<td>1993</td>
<td>April</td>
<td>40.6 C</td>
<td>June</td>
</tr>
<tr>
<td>2</td>
<td>1994</td>
<td>March</td>
<td>39.4 C</td>
<td>July</td>
</tr>
<tr>
<td>3</td>
<td>1995</td>
<td>April</td>
<td>39.4 C</td>
<td>July</td>
</tr>
<tr>
<td>4</td>
<td>1996</td>
<td>March</td>
<td>40.00 C</td>
<td>June</td>
</tr>
</tbody>
</table>
The data show the increasing trend of temperature in Palakkad. The average temperature of Palakkad during the British period is 34.491 degree Celsius and at present it is 39.4 degree Celsius. Therefore the variation in the temperature of Palakkad 4.909 (39.4-34.491=) degree Celsius shows the change of climate and its effects on the rainfall at the banks.

Rainfall

There is a marked variation on the rainfall in the origin, middle and ending part of Bharathappuzha. While the hilly tract of south and north extremities gets 2668 mm and 2304 mm rainfall respectively, only 1631 mm rainfall is available on the middle banks of the river. The higher rainfall of 2630 mm which is received by the lower regions of the basinal area is quite natural by the vicinity of the sea. Hence, the quantity of rainfall received in the central area is comparatively less when compared to the side extremities because the reserved forests in Palakkad district is concentrated mostly on the hilly tract in North-east extremities of the basinal area. The hilly tracts on the south extremities are part of Thrissur district having forest coverage with 34.61% of the geographical area of the district. The hilly tract and its wide area of forest coverage in extremities provide facilities to the condensation of clouds that are accumulated in that area. But in the plain land of middle banks, the clouds just move away without getting condensed due to the lack of forest coverage as the local forests of these areas are converted into rubber


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26 P. Basak, Water atlas of Kerala Plate Number 13, Land Use, Kozhikode: Center for Water Resources Development and Management, 1995, CWRDM.
planted and for some other purposes. Consequently the loss of natural forest coverage results in the reduction of rainfall on the middle banks of river basin.

In the presence of vegetative cover, rain will not be able to compact the soil. It also provides a layer of decaying organic matter promoting the activities of borrowing insects and animals which in turn produce permeable soil structure. Both of these factors help to increase the infiltration capacity of that soil to a considerable extent. But loss of forest cover removes the protective cover of soil and removes the cushion of falling rain drops. This increases their impact and consequent damages. Destruction of forest cover removes the obstacles in the path of flowing water which increases the surface run off and reduces the quantity of infiltration. In another sense, the loss of forest cover leads to the reduction of the quantity of rain water infiltration into the earth’s surface.

Vegetation is an important element for the preservation of water sources. This is because if there is a dense forest or thick vegetation, evaporation will not happen there. But the absence of sufficient area of natural vegetation (because of deforestation) increases evaporation.

The middle river basin has no wide area of vegetations, other than the forest in side extremities. As a result, it is difficult to preserve the water sources because the quantity of infiltration will be reduced while the evaporation will be increased. Therefore, the water sources to the wells and tanks are reduced before the summer, leading to the seasonal drought on the middle basinal area which in turn leads to the reduction of sources to the rivers. The monsoon of India is a major water source for the rivers of Kerala and each river basin has variations in the amount of rainfall received.

**Table No 3.5: Mean Annual Rainy Days on the three areas on Bharathappuzha Banks**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Place</th>
<th>South-West Monsoon June-Sep</th>
<th>North-east Monsoon Oct-Dec</th>
<th>Other than Monsoon Jan-May</th>
<th>Total Rainy Days</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Days</td>
<td>%</td>
<td>Days</td>
<td>%</td>
<td>Days</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>Palakkad (origin)</td>
<td>69</td>
<td>65.7</td>
<td>20</td>
<td>19.5</td>
<td>16</td>
</tr>
<tr>
<td>2</td>
<td>Mannarkad (middle)</td>
<td>77</td>
<td>62.00</td>
<td>25</td>
<td>20.2</td>
<td>22</td>
</tr>
</tbody>
</table>
The total rainfall received in south-west monsoon is 63.5% of (75 days). This quantity of rainfall will not be sustained either by the earth or the dams constructed on the river-head. Hence, more than 60% of the rain water unnecessarily flows to the seaward course. Whereas, 19.17% of the total rainfall, from north-east monsoon (22 days) and the 17.3% from the summer showers (21 days) has helped to maintain the continuous flow of the river in the olden days.\textsuperscript{27} The river flowed continuously in this system with the water of north-east monsoons and summer rains. In addition to that, one has to look at the area-wise analysis of rainfall.

### Table No 3.6: Area-wise Rainfall on Bharathappuzha

<table>
<thead>
<tr>
<th>S. NO</th>
<th>Classification of Locations</th>
<th>Year of Rainfall in mm</th>
<th>1989</th>
<th>1990</th>
<th>1991</th>
<th>1992</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>South extremity of origin area</td>
<td>2355.5</td>
<td>2522</td>
<td>2665.66</td>
<td>3031</td>
<td>2668.5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>North extremity of origin area</td>
<td>2990</td>
<td>1937.75</td>
<td>2377.75</td>
<td>2811.25</td>
<td>2304.187</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Central area</td>
<td>1362.3</td>
<td>1507.9</td>
<td>1777.5</td>
<td>1955.5</td>
<td>1631.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Lower area</td>
<td>2102.75</td>
<td>2449.00</td>
<td>3003.00</td>
<td>2965.5</td>
<td>2630.125</td>
<td></td>
</tr>
</tbody>
</table>

Source: KERI, Pecchi, Thrissur District, Kerala State.

The entire area of the river-basin is divided into four divisions. They are the hilly tract in north and south extremities of the river-basin, the plain land and the lower part in the vicinity of the sea. As on the above table, while 2668.5mm of rainfall is received by the south extremity, the north gets 2304.187mm of rainfall. At the same time, the plain of river-basin (central area) gets only 1631.5mm. But, the 2630.125mm of rainfall received by the lower part is quite natural due to the vicinity of sea. According to the area-wise analysis, the quantity of rainfall,

received on the plain land of basin area, is very less when compared to the other areas.\textsuperscript{28} Hence, the status of the rainfall on the river-basin is unfavourable.

**Loss of flood plains**

Floods are the natural phenomenon of rivers caused by the act of dynamical agencies of the nature. At the time of floods, the streams overflow its channels and deposits are formed. The area on both sides of the river that has been formed by the flood deposits is called ‘flood plains’. The clay and other mineral deposits of the river provide fertility to these plains.

The demand of bricks has increased due to the construction of new buildings in Palakkad region. Brick clay is taken on a large scale from the flood plain deposits along the length of the river. At the same time the process of depositing clay and other mineral deposits on the river side has not been sustained due to the lack of floods compared to olden days. Therefore, the continuous removal of clay deposits and the absence of floods have led to the loss of fertility of soil and also the loss of natural coverage on the earth’s surface. The loss of natural coverage affected the temperature on the banks. It produced more evaporation through the small holes that are present on the earth. The temperature from the brick kilns also facilitates more evaporation from the land and water surface.

In the olden days, frequent floods were quite natural in Bharathappuzha due to the continuous heavy rainfall. According to the statements given by old timers, the tremendous floods occurred in 1990, 1924 and 1941 are the most important ones having lasted for a number of days.\textsuperscript{29} But, from 1941 onwards there are no such frequent floods compared to olden days due to the failure of periodical monsoons and the blockage of sources by the dams in different locations of the same river.

**Water Losses**

**Intensity of Wind on River-bed**

The process of evaporation also depends upon the prevailing nature of air in a region. The Bharathappuzha flows along the length of Palakkad gap and through


\textsuperscript{29} *Vaniyamkulam Panchayath Vijnaneeyam*, Trivandrum: Kerala Council for Historical Research, 2001.
this gap wind blows from the Bay of Bengal. The effect of wind velocity is a peculiarity of Bharathappuzha. Therefore, velocity of the air in contact with the water surface of the river is more. The saturated film of air containing the water vapours will move easily and the diffusion and dispersion of vapour will become easier, causing more evaporation. But, as a result of the prompt supply of periodical rainfall, the evaporation losses by the velocity of wind on the basinal area were not felt in olden days.

Depth of Water

In Bharathappuzha basin, the ground water is commonly seen within 6 to 10 m depth. The short depth of earth produces more evaporation because the evaporation depends upon the depth of water table. If the water table is high, the land evaporation will be more and if it is lowered the land evaporation will reduce. Hence, the land evaporation may be more in the basinal area. But, this activity did not occur in the olden days due to the periodical supply of rainfall by the monsoon and summer showers.

Loss of Natural Springs

Now-a-days, the natural springs that had been flowing continuously for years are drying up before summer. According to K. Krishnan the reason for the loss of five springs in the area of different Panchayaths in Palakkad is deforestation. This is because earlier the upper region of these springs was covered by the local forests of private parties. But, they used the land for rubber plantations that produced more evaporation and reduced the quantity of rainfall infiltration into the earth’s surface. The springs flowed throughout the year in the olden days. But, now they are getting dried up before summer. Moreover many pumping wells are situating on the waterfalls of these springs. They are interrupting the sources of springs. In addition, the water which gets into the well are taken by using different sizes of motor pumps which in turn is causing the desiccation of water sources. Conversion of local forests to the rubber plantations

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31 He has conducted study about the loss of springs in the ten panchayaths such as Lakkidi, Mannur, Mankara, Mundur, Keralassery, Kongad, Kadambuzha, Parli, Pookotu Kalikave and Ambalapara in Palakkad Distret.
and the construction of wells on the upper region of the springs are equally responsible to the loss of springs.

**Vibration of earth surface**

The earth’s surface is under disturbance due to different kinds of vibrations both feeble and severe. These vibrations on the earth’s surface create problems on the water resources of that area. Therefore, the mining activities, fireworks in festival grounds, blasting works in wells are the major causes for the vibration of earth’s surface.

The mining activities such as production of metal/stone for construction works, limestone for cement production also create adverse effects. There are many quarries seen in the Palakkad region of Bharathappuzha basin. But only few of them have license. The daily use of high power explosives in a competitive work of producing materials in each quarries produce the local level vibrations on earth. It also loosens the natural compactness in the outer layer of earth. The chain of vibration from different quarries produces a combined effect on the wide area of earth’s surface. It leads to the weathering effect and also results in the exposing of old cracks and joints in the earth. In that place, many pores are visible at the time of continuous rainfall and are drying up along with the end of rain fall. Before infiltrating into the deeper level, the water flows along the outer place through the joints and cracks. Naturally, the quantity of infiltration has been reduced and it has led to the drying of the surroundings before summer.

Use of fireworks during the ritualistic performance days at the *kavu* is a feature on all the banks of Bharathappuzha.\(^{32}\) The explosive on an average of 100-110 kg is used in the fireworks. It produces vibrations on the earth’s surface.

People construct wells adjacent to their houses without proper scientific knowledge of the hydrological condition of that place. They construct wells in accordance with their own convenience and blast rocks in the wells. Loss of water by the blockage of rocks on water transit to the wells is a common phenomenon. Lack of knowledge about the blasting technology of rock in wells has created problems in the layers of rocks in wells. Sometimes the fractured rocks slip away from each other, cutting the relationship between the existing parts of the layer and

\(^{32}\) All most all the shrines on the banks of Bharathappuzha conduct fireworks as a part of annual ritual performance such as Vela, Pooram and Thalapoli.
the slipped blocks. Therefore, the wells constructed in the slipped blocks are drying up by the faults across the waterways. In addition to this, the rain water and natural water flows of earth, flows to the outer place by this water transit. Whereas the wells on the existing part of the layer indicate the rise of water level by this blockage. All these activities harm the surface of earth with vibrations.

Topography of an area controls the relation between the surface drainage basin and underground drainage basin. In some places both drainage basins are equal. In other places the area of surface drainage basins are greater than those of the underground drainage basins. Sometimes the underground drainage basins are larger than the surface drainage areas. It means that the surface of the earth in the basinal area of Bharathappuzha is in an imbalanced condition due to the above mentioned human activities and natural causes. This leads to a different infiltration process on the banks.

**Table No 3.7: Earthquakes in association with Bharathappuzha**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Year</th>
<th>Location</th>
<th>Magnitude/Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24/06/1865</td>
<td>Near Coimbatore</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>28/02/1900</td>
<td>&quot;</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>29/07/1972</td>
<td>&quot;</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>1981-1993</td>
<td>Central part of Palakkad Gap</td>
<td>1-2</td>
</tr>
<tr>
<td>5</td>
<td>15/03/1989</td>
<td>Near Vadakkanchery (middle part)</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>26/02/1993</td>
<td>&quot;</td>
<td>3.6</td>
</tr>
<tr>
<td>7</td>
<td>02/12/1994</td>
<td>&quot;</td>
<td>4.3</td>
</tr>
<tr>
<td>8</td>
<td>26/02/1996</td>
<td>&quot;</td>
<td>3.0</td>
</tr>
<tr>
<td>9</td>
<td>06/09/1996</td>
<td>Thrissur</td>
<td>3.0</td>
</tr>
</tbody>
</table>


**Emergence of Vegetation**

The rivers carry pollutants along with it as it flow into the sea. Naturally, the river becomes free from pollution. But, at present the rivers have no such continuous floods when compared to olden days. It means that, the river has reduced and has gradually stopped the cyclic processes of the geological work of running water. Due to the absence of these cyclic processes in a long time, the river will be filled with silt, fertile soil and granite powder. This kind of huge silt and soil deposit is one of the features of Bharathappuzha compared to the other rivers of Kerala. These deposits will fill the water volume and in the soil settled at the edges, terrestrial grass starts growing.
This enables other seeds to grow and new species gets established in the river. Shrubs get growing up in the river. These shrubs first grown at the middle part, spread to the other area of the main stream and the tributaries by means of dispersal movements. The chemical fertilizers, industrial waste and municipal sewages that flow from the vicinity, provide the nutrients for the growth of these emergent vegetations.

The nature and the flow of water in a river influence the life style and needs of human beings living at the banks. The activities of humans around their surroundings would also affect the health of a river. This reciprocal relationship decides the future of the culture of these people.

(B) Man Made Causes:

Deforestation

The deforestation rate in the Palakkad region is higher when compared to the other parts of Kerala.\textsuperscript{33} Forest plays an important role in the self protective system of nature. The damage of forest would create ecological imbalances and affect the systematic management of nature or change of ecosystem. There are a number of groves on the local mountains and hills by private parties. As a result of human greed, forests are converted into rubber plantation and for some other purposes. Only a few of them are balanced and nationalized as vested forests. The total area of forest in Palakkad district during 1994 is 1614.055sq km whereas it decreased to 1527.3564 sq.km in 2000.\textsuperscript{34} Forests control the temperature of a region by absorbing carbon dioxide (Co2) present in the atmosphere and therefore the shortage of forest coverage on the surface raises the temperature on the banks.

Dams in the River

The water in the Bharathappuzha is the life line of the four million populations on the banks from its origin to the ending part. The water resources in the irrigation dams supply 493064 hectare agricultural lands.\textsuperscript{35} According to


\textsuperscript{34} Kerala Forests and Wildlife Department, Government of Kerala.

the nature of the physiographic, the land use of the basin also changes. Even though, rice and coconut are the major crops at the ending part of the banks, the major crops in the mid lands are rice, banana, tapioca and seasonal vegetables. The origin part and some of the mid land areas also have rubber plantations with rice. The variation in the rainfall of this region has also affected the temperature from the last few decades.\textsuperscript{36} This has caused the scarcity of water for various purposes such as drinking, agriculture etc and the river banks face severe drought situations.

The largest agricultural land of Kerala is on the fertile banks of Bharathappuzha. This has resulted in the construction of many dams in the river for the irrigation purposes of agricultural lands. There are eleven big dams constructed in different locations on the same river. The total storing capacities of these dams are $651.61\text{mm}^3$ of water. In addition to these dams, there are two regulator-cum-dams on the river namely Moolathara regulator on the main stream in Kerala-Tamil Nadu border and the Cheerakkuzhi regulator in Cheerakkuzhi River, located at the upper side of the river.

Table No 3.8: Details of Dams in Bharathappuzha

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name of Dams</th>
<th>Location in State</th>
<th>Catchment area in km(^2)</th>
<th>Quantity of water storable in Million m(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Upper Aliyar dam</td>
<td>Tamil Nadu</td>
<td>140.52</td>
<td>26.55</td>
</tr>
<tr>
<td>2</td>
<td>Aliyar dam</td>
<td>Tamil Nadu</td>
<td>196.89</td>
<td>109.35</td>
</tr>
<tr>
<td>3</td>
<td>Thrumurthy Dam</td>
<td>Tamil Nadu</td>
<td>80.31</td>
<td>46.05</td>
</tr>
<tr>
<td>4</td>
<td>Attapady Project</td>
<td>Kerala</td>
<td>43.20</td>
<td>60.73</td>
</tr>
<tr>
<td>5</td>
<td>Kanhirappuzha Project</td>
<td>Kerala</td>
<td>70.00</td>
<td>60.00</td>
</tr>
<tr>
<td>6</td>
<td>Malalppuzha Dam</td>
<td>Kerala</td>
<td>147.60</td>
<td>226.00</td>
</tr>
<tr>
<td>7</td>
<td>Pothundi Dam</td>
<td>Kerala</td>
<td>31.00</td>
<td>50.91</td>
</tr>
<tr>
<td>8</td>
<td>Meenkara/Gayathri Dam</td>
<td>Kerala</td>
<td>90.65</td>
<td>12.75</td>
</tr>
<tr>
<td>9</td>
<td>Chulliya Dam</td>
<td>Kerala</td>
<td>29.78</td>
<td>13.70</td>
</tr>
<tr>
<td>10</td>
<td>Mangalam Dam</td>
<td>Kerala</td>
<td>48.85</td>
<td>25.50</td>
</tr>
<tr>
<td>11</td>
<td>Walayar Dam</td>
<td>Kerala</td>
<td>106.37</td>
<td>20.08</td>
</tr>
<tr>
<td>12</td>
<td>Moolathara</td>
<td>Kerala</td>
<td>--------</td>
<td>9.769</td>
</tr>
</tbody>
</table>

The construction of dams and its impacts on the natural flow of rivers are complex and multiple. It also affects the quality of water in the river. All these dams are closed immediately after the rainy season. Therefore, the water which can be stored by these dams are being blocked and diverted to the irrigation canals.\(^{37}\) Besides this, the remaining water on the upper area of the dams will be diverted to the canals. Hence, the entire water on the upper regions, except the over flows of water from dams during particular seasons are blocked and diverted through the canals which in turn again reduce the sources to the river.\(^{38}\) Therefore, middle part of the river is affected by drought during the summer.

**Change of Joint Family System**

Since 1970, there have been reforms in the ownership of lands. The enormous landholding of the *Nadiuvazhi* (landlord) has been transferred to the public by the Land Reform Act of 1971. This act also resulted in the alteration of the socio-economic structure of the state. The existing family structure (joint family system) of Kerala has changed in general and also on the banks of Bharathappuzha in particular. The joint family system shifted to nuclear family system.\(^{39}\) Nuclear family is understood as the totality of husband and wife with their unmarried children. This resulted in a need to have more houses for nuclear families and it created high density of population and caused the conversion of natural landscape into construction sites.\(^{40}\)

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\(^{37}\) G.Prabhakaran, Staff Reporter, The Hindu Daily, March 17, Coimbatore (Edition)


\(^{40}\) R.Mahesh, *Farm Size-Productivity Relationship: Some Evidence from Kerala, KIED Working paper*, Trivandrum: Kerala Institute for Environment and Development, 2000; G.Gopikuttan and
There is no record/evidence that are available to prove this phenomenon. Even though, K. Krishnan has conducted a survey to find out the increase in the number of individual unit of ration cards by removing their names from the joint ration cards and the family partitions recorded in the sub registrar offices.\textsuperscript{41} This shows the increase in residential buildings for nuclear families and how the land in Palakkad region has been portioned further. The agricultural land of Palakkad has been transformed legally for the construction of houses based on the Land Acquisition Amendment bill of 2007.

**Influence of Gulf money**

The employment opportunities with high salaries in Gulf countries have influenced the construction of various buildings in Kerala in general and the rural areas on the banks of Bharathppuzha in particular. The non-resident Keralites especially from the Gulf Countries send money to the state and most of this amount is spent on the construction activities of the State and on the banks of Bharathappuzha as well.\textsuperscript{42} The modern and newly designed enormous buildings are a symbol of status to Gulf Malayalees.

In addition to this, the cheap availability of land is also a reason for the concentration of people in the rural areas of the district. The increasing area of houses has reduced the quantity of rain water infiltration into the earth’s surface. It has then resulted in the reduction of water replenishing sources to the rivers.

**Table No 3.9: Trend in Growth of Buildings in a year on selected Panchayaths during 1980-90**

<table>
<thead>
<tr>
<th>SN</th>
<th>Name of Panchayath</th>
<th>Growth rate on One km2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mannur</td>
<td>5.83</td>
</tr>
<tr>
<td>2</td>
<td>Lekkidi</td>
<td>3.605</td>
</tr>
<tr>
<td>3</td>
<td>Kongad</td>
<td>3.38</td>
</tr>
<tr>
<td>4</td>
<td>Mankarai</td>
<td>6.48</td>
</tr>
<tr>
<td>5</td>
<td>Vanikyamkulam</td>
<td>4.56</td>
</tr>
</tbody>
</table>


\textsuperscript{41} K.Krishnan. *Environmental problems on water resources of Bharathappuzha River System*, 2001, Pattambi, SNGS.

Construction activities

Increasing Demand of Water

The demand for water has been increasing rapidly with the continuous increase of population and the continuous increase in per-capita demand. It is also linked with concerns like sewage disposal, use of gadgets such as air cooling and air conditioning devices, washing machine etc and the re-structuring of recreational activities.

Wells on the banks

During the summer, many streams dry up because of the lack of surface water but they may carry an appreciable quantity of water as underflows. In Bharathappuzha, the sources which flow as underflow channels have been sucked away due to the construction of a number of infiltration wells across the river banks. The chain system of wells at different locations on the river length has caused drought before summer.

Growth of Wells for Domestic Purposes

In the 1981 census the population at the banks was 2 million whereas it has increased to 4.6 million in 2001. The system of separate well for each house is a feature in Kerala. Because of this, the density of wells dug for domestic purposes has increased. The Centre for Water Resources Development, Kozhikode carried out a statistics survey about quantity of water takes from the dug wells for domestic purposes. The survey on 44 samples from all over the three physiographic zone of Kerala indicates that the density of dug wells in coastal belt varies between 90 and 285 wells per sq.km with an average density of about 200 wells per sq.km. In the midland region, the density varies between 65 and 245 wells per sq.km with an

Source: K Krishnan, Environmental problems on water resources of Bharathappuzha river System, 2001, Pattambi, SNGS. and Panchayath Concerned

43 District Census Handbook of Palakkad, 2001; District Census Handbook of Thrissur, 2001; District Census Handbook of Malappuram, 2001; District Census Handbook Palakkad, 2001; District Census Handbook Coimbatore, 2001, Published by The Registrar of Census of India.
average density of about 150 wells per sq.km and the density of high land varies between 25 and 197 wells per sq.km with an average density of about 70 wells per sq.km.\(^{44}\)

The Palakkad District has been an agrarian land. Now it has become a major industrial centre of Kerala. The growth of industries has caused an increased demand for water. Therefore, in order to meet the water requirements, these factories that are located near the river take water directly from the river or from the water supply of various projects. At times when this quantity turns out to be insufficient, they seek the ground water through the dug wells or the bore wells of their own. Thus the industries have given birth to the large number of wells at the banks.

**Agricultural Wells**

Demand of water for agriculture was increased by the advent of Green Revolution Policy of Government in 1960. Through this policy the independent India encouraged the conversion of fallow lands into agricultural lands, by providing loans to construct wells and tanks. This has resulted in the increase of irrigation scheme for dug well system. In addition, the cultivation of coconut, pepper, areca, plantain and betel leaf has been increased resulting in a further increased demand of water to irrigate them.

The summer cultivation of vegetables is the main occupation of poor farmers in rural area. They are depending on the dug wells or the tanks to irrigate them. As on the evidence of records, 5704 hectares of land has been irrigated by using water from the private tanks and 5719 hectares land has been irrigated by the private wells in Palakkad District.\(^{45}\) Hence, the number of tanks and wells used to irrigate this area is conceivable and it has been increasing over the years. The valuable quantity of 10400 hectares land has been irrigated by the dug well scheme of minor irrigation in Palakkad District.\(^{46}\) It has been increasing over the years.

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\(^{44}\) K. Krishnan, *Environmental problems on water resources of Bharathappuzha river System*, 2001, Pattambi, SNGS.


years. Therefore, the influence of dug-wells for the minor irrigation purposes has also increased.

**Growth of Bore-wells**

At present, the tendency to construct bore wells has increased. The first reason is that it can be constructed within a small area of one’s house compound. Secondly, this type of wells can be used to take water from a deeper level. Thirdly, construction of bore well in a house compound is cheaper than the construction of wells. With these reasons, the number of these types of wells has been increasing day by day. In another way, the growth of bore wells construction, without proper scientific investigation of the nature of earth, has caused the reduction of ground water storage.

**Ground Water Potential and Utilization**

The comparative statements of various agencies on the ground water potential and utilization indicates that the storage of ground water in Kerala is 6732.5 km³ (average). Out of this, the 1082.5 km³ of water has been used already and the ground water left is 5650 km³. This has been further reduced by human activities.

Water, is an inevitable ingredient in construction activities. The trend in the growth of buildings in rural areas, gives us an idea about the quantity of water used for construction activities in a year. The large quantities of water used for this activity that are mostly taken from wells and tanks are an unaccountable extraction from the earth.

**Industrial Developments**

There are multiple reasons for the conversion of natural areas. Among them urbanization is one among the major causes of the land use changes. In the case of the banks of Bharathappuzha, the conversion of land for construction activities has caused unprecedented changes to the natural settings and natural resources especially

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the water resources.\textsuperscript{49} Deforestation and conversion of wet lands to construct buildings influence the recharging capacity of ground water and the flow of water.

The bank of Bharathappuzha especially Palakkad area is an agrarian belt and it is becoming a major industrial centre. The climatic-geographical conditions, cheap availability of lands, transportation and availability of water facilities and the vicinity of a major industrial centre at Coimbatore in Tamil Nadu (in a neighbouring state of Kerala, Tamil Nadu) an influence the industrialists to concentrate Palakkad as the hub for major industrial units. As per the 1984 records of district industries’ centres in Palakkad, there were forty eight units/numbers of large and medium scale industries located there whereas, in 2001 it has increased to 75- units/numbers.\textsuperscript{50}

The number of Small Scale Industries (SSI) registered in the district until 1986-84 was 1524 and it has grown up to 6525 within the period of 1992-93. Later it further increased to 17293 as in the year 2000. Hence Palakkad is a major industrial area in Kerala that has supported a large area for industrial infrastructure. The increase of institutional buildings such as civil stations, courts, police stations, recreational buildings and non-governmental buildings have also paved way for the opening of more industrial units.

Construction of Roads

The Mysorean ruler, Tipu Sulatan was the pioneer of road constructions in Malabar. He suggested a scheme for connecting all the main places of Malabar by an extensive chain of roads. The banks of Bharathppuzha were connected to Coimbatore by a number of roads.\textsuperscript{51} Later Britishers gave birth to the metal and concrete roads in Malabar. In the second quarter of the twentieth century, a few numbers of concrete roads of short length were constructed. As a result of population growth, urbanization and industrial and social development, the large number of roads that were made of tar and concrete created problems to the water resources of the river. The roads made of these materials are relatively solid. This


\textsuperscript{50} District Census Handbook of Palakkad. Government of India, 2001: 23

\textsuperscript{51} CA Innes, ICS. Malabar Gazetteer, Means of Communication, Chapter No 7, by. Pp. 268 & 269
artificial layer caused the reduction of rain water infiltration into the earth. A 1704 km length of tar and concrete roads has dominated the land surface of Palakkad district. The present road density on the banks of Bharathappuzha is 16.24 km/100km2 and it has been increasing day by day. Therefore the earth is drying up before the summer which in turn has led to the reduction of water sources to the river.

Table No 3.10: Total land cover (in %) on the banks of Bharathappuzha as a proportion to the total area and change from 1973-2005.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agriculture</td>
<td>27.84</td>
<td>27.54</td>
<td>19.15</td>
<td>-8.69 %</td>
</tr>
<tr>
<td>2</td>
<td>Natural Vegetation</td>
<td>44.43</td>
<td>12.07</td>
<td>12.28</td>
<td>-31.15 %</td>
</tr>
<tr>
<td>3</td>
<td>Plantation</td>
<td>7.46</td>
<td>14.20</td>
<td>8.64</td>
<td>1.18 %</td>
</tr>
<tr>
<td>4</td>
<td>Roads</td>
<td>7.61</td>
<td>8.40</td>
<td>16.24</td>
<td>8.62 %</td>
</tr>
<tr>
<td>5</td>
<td>Urban Centres</td>
<td>9.83</td>
<td>32.63</td>
<td>41.76</td>
<td>31.93 %</td>
</tr>
</tbody>
</table>


Indiscriminate Action on River

The indiscriminate action on river banks destroys the river. Sand deposits in certain height are formed in the upper and the middle part of the river. Instead of cleaning the river by taking the yearly settling deposits, the persons who are engaged in the profession of sand stripping are taking these products according to their own convenience. It is against the scientific principles of sand draw. Such types of activities result in the production of multiple sand heaps on the river and the growth of vegetation on the river. The emergence of these materials causes significant reduction on the quantity of yearly deposits at these locations. Earlier the river that had flowed flattish is now concentrated through the channels and are subjected to expel the sediments to the sea-ward course by the velocity of flowing water that are concentrated in the channels.

52 District Census Handbook of Palakkad, Published by the Registrar of Census of India, 2001
53 M.K Prasad. “Manalvaaraam Puzhayariyathe” (in Malayalam), Deshamithram Weekly
The vegetation on river would not be allowed to settle the sediments by the force of water flowing in the river. Therefore the sands are reasoning to expel to the sea-ward course. Middle part of the river is filled with sediments and the river flows are sluggish. Instead of cleaning the river by removing the sand heaps, the sand takers are interested to take the middle part deposits.\(^54\) This unscientific method of sand looting has resulted in the diversion of the flow of river, reasoning to uplift more and more sand heaps in the river.

**Rubber Plantation**

One of the other reasons that led to the loss of natural vegetation is the expansion of plantation on the banks of Bharathappuzha. Physiographical condition, periodical supply of rain, increasing rate of cash crops, marketing facilities of rubber and the greed of humans are the reasons to introduce rubber plantation in Kerala general and banks of Bharathappuzha in particular. As a result, the area of local forests on the isolated mountains and hillocks are converted into the rubber estates. Therefore, the rubber plantations dominated the banks of Bharathppuzha. Survey shows that the production of rubber in 1990-91 was 14660 tones.\(^55\) In 1951 to 2000 the area under rubber plantation was increased by 62 \%.\(^56\) This expansion happened in the origin part of the river because the hilly area of this part were less occupied compared to the middle and ending part of the river banks. In addition the change of crop for more profit and the socioeconomic shifts in the state also caused the conversion of agricultural wetland to the plantation of rubber and betel nuts.\(^57\)

Generally the area of rubber plantation is not cool as in the area of natural forests. Thus the process of condensation is reduced and results in the reduction of rainfall. The warm atmosphere in the rubber estate is a reason to cause more evaporation. Rubber comes in the deciduous group of vegetation and the foliation takes place in autumn and reproduces the leaves copiously before the summer. Hence, loss of water by the transpiration is more because the role of transpiration depends up on the sun light, available moisture and the stage of growth.


\(^{55}\) *Industrial Potential Survey of Palakkad District*, Table Number 3:4:2.


Activity of burrowing insects is comparatively less in rubber estates due to the use of pesticides. Therefore, infiltration of water is again reduced. Rubber plant extracts more water from the ground. Therefore, the earth’s surface quickly dries up. In a Nutshell, the rubber estates fade the earth and leads to the destruction of ground water in the area and its surroundings. Above all it results in droughts.

To conclude, human intervention and adaptation to natural environments inevitably led to cultural landscape. In order to exploit the natural resources like rivers and streams for their sustenance the folk communities habituated on the banks and made huge settlements. The constant interaction and activities of the communities with the water resources caused disruption to the course of the river flows. Nevertheless, the communities engaged in various forms using the water attributing sacrality especially with the construction activities of shrines and temples and thereby conducting rituals and ceremonies on timely intervals. To understand the ritual activities and the worldview behind these activities it is imperative to know about the communities living on the banks of Bharathappuzha. The ensuing chapter aims at bringing out the settlement patterns of the communities on the banks of Bharathappuzha.