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C.P.R. ENVIRONMENTAL EDUCATION CENTRE

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A Centre of Excellence of the Ministry of Environment, Forests & Climate Change, Govt. of India.

C.P.R. ENVIRONMENTAL EDUCATION CENTRE

Established in 1989

- ✯ **1980** - The C.P. Ramaswami Aiyar Foundation starts nature education for teachers and students.
- ✯ **1989** - C.P.R. Environmental Education Centre (CPREEC) established jointly by the Ministry of Environment and Forests and the C.P. Ramaswami Aiyar Foundation as a Centre of Excellence of the Ministry of Environment and Forests. Government of India.

Our Mission

- ✯ To increase knowledge, awareness and interest among the public about the environment in all its aspects
- ✯ To develop resource materials for environmental education and awareness raising
- ✯ To conduct training programmes for a wide cross-section of people
- ✯ To take up environmental projects for demonstration and research

Our Activities

- ✯ Training and awareness raising
- ✯ Awareness to and through action
- ✯ Awareness programmes in ecologically fragile areas
- ✯ Conservation of the ecological heritage
- ✯ Research and surveys
- ✯ Generation of resource materials
- ✯ Exhibitions
- ✯ Courses, seminars and symposia

Facilities

- ✯ Environmental Laboratory
- ✯ Library
- ✯ Computer Division
- ✯ Publications Division

Geographical Spread

CPREEC's activities extend to

- ✯ Andaman & Nicobar Islands
- ✯ Andhra Pradesh
- ✯ Goa
- ✯ Karnataka
- ✯ Kerala
- ✯ Maharashtra
- ✯ Orissa
- ✯ Tamilnadu
- ✯ Puducherry

NGO Network

CPREEC has an extensive network of about 600 NGOs. All educational programmes are carried out in partnership with select NGOs, Universities, Colleges and Schools.

Publications

- ✯ Activity and information books and pamphlets for children
- ✯ Environmental training guides and kits for teachers
- ✯ Researched Publications
- ✯ Colourful and informative posters
- ✯ *ECONEWS* - A quarterly magazine
- ✯ *Indian Journal of Environmental Education*, a peer-reviewed journal

Exhibitions

CPREEC designs three new exhibitions every year and has a bank of mobile exhibitions that travel all over India.

Environmental Education

- ✯ Green Schools of India (GSI)
- ✯ Training programmes for Teachers
- ✯ Training programmes for School and College Students
- ✯ Environmental Law Education

Special Projects

- ✯ National Green Corps (NGC)
- ✯ Biomedical Waste
- ✯ Biodiversity Conservation

Research and Surveys

- ✯ Sustainable Technologies
- ✯ Surveys of Natural Resources
- ✯ Socio-Economic Surveys
- ✯ Lab to Field Technology Transfer

Contents

Climate Change

Dr. P. Sudhakar

Climate change refers to the variation in the global climate over a period of time. There is a clear evidence to establish substantial variations in the earth's climate over geological timescales. In fact, for most part of our planet's existence, ice ages have alternated with inter-glacial periods. These changes were caused by geological processes or external forces such as the variations in the sunlight intensity. But in recent times, drastic rise in global temperature is perceived as a grave threat to the planet's survival. Human activities, rather than natural processes, have been identified as the major contributor to the changes in the climate - recorded since the early 1900s.

Antropogenic factors driving climate change

The major human activity to influence global climate change is the emission of greenhouse gases - such as carbon dioxide, methane, nitrous oxide, chlorofluorocarbons and troposphere ozone. The continuous infusion of these gases into the atmosphere has intensified the greenhouse effect. Enhanced green house effect induces the atmosphere to trap more heat and makes the planet warmer. The major sources of these greenhouse gases include fossil fuel combustion, deforestation, rice cultivation, livestock, coal mining and oil and gas extraction.

Impacts of climate change

From rising sea levels to complete eradication of species, climate change is likely to affect humans as well as the earth's environment in several ways:

Sea-level rise and flooding

As the global temperature rises, the sea absorbs more heat from the atmosphere and expands - leading to a rise in the sealevel. Although there is a popular misconception, it is untrue that the melting of ice sheets, due to higher temperature in Greenland and Antarctica, causes the rise in sea level. Sea level rise causes severe flooding and erosion in coastal regions and the most vulnerable areas are some of the islands.

Health

The rise in earth's temperature increases the incidence of heat related diseases. Higher global temperatures would also enable vectors to move into areas that were previously too cold for them to survive. Ailments like cholera, dengue, yellow fever, malaria, etc. are likely to become more rampant. But the redeeming aspect is that, with shortening winter spans, there would be fewer cold-related deaths.

Agriculture

The increased heat and dryness could adversely affect both the quality and yield of crops. Climate change is expected to cause a number of weather extremes which could directly affect the agricultural yields. The rise in temperature may also result in increased

pest attacks and water scarcity. Warmer temperatures are likely to alter the type of crops cultivated in different regions of the world and this could bring about positive changes.

Wildlife

Climate change and global warming are of great concern to wildlife throughout the world. The most seriously affected species are the ones in the Arctic and in Antarctica, where rise in temperature would damage the ice cover. The entire ecosystem would also be affected and the best examples are the coral reefs.

Vulnerability of the poorer, developing countries

Though the effects of climate change will be felt throughout the world, it is the developing countries which will suffer the most. Poor countries are especially vulnerable because:

- their economic activity relies heavily on natural resources
- large populations live in disaster-prone areas (low-lying and coastal areas and small island states)
- Their institutional capacity to cope with disasters is usually low
- they have inadequate infrastructure
- they lack economic resources for disaster preparedness and rehabilita -tion

This seems unfair considering the fact that the richer and developed world has predominantly contributed to the emission of greenhouse gases. Strangely, the industrialized nations that constitute 20% of the world's population are responsible for nearly 80% of the world's total emissions.

Conclusion

Climate change not only affects our lives and our environs, but also has repercussions on the future generations The Government should work in tandem with the scientists, industrialists, business establishments and other decision makers to lessen the production of heat-trapping gases.

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Tiger Conservation Education

Dr. T. Sundaramoorthy

The world population of wild tigers is estimated between 5000 and 7500. They are mainly found in Asia in different habitats – from tropical evergreen and deciduous forests of southern Asia to the coniferous woodlands of Siberia.

The tiger population is distributed in 14 Asian countries. About 50 years back, nine tiger subspecies were found, today only six subspecies exist while three subspecies have become extinct. The tiger sub-species Bali, Java and Caspian have been declared as extinct. Presently available the Siberian, Bengal, Indo-Chinese, South China and Sumatran subspecies prevail. The largest subspecies is the Siberian tiger, weighing up to 300 kg and the smallest subspecies is the Sumatran tiger weighing about 100 kg. The subspecies vary in body size, colour and markings. At present only around 500 tigers are found in India.

As human population is increasing, the tiger habitat is being lost or fragmented and the tiger is forced to venture into human habited areas for food. The tigers are often the victims. Besides the man-beast conflict, the tiger is poached even in protected areas. The teeth, bones and skin of tigers are used in traditional Chinese medicine thus spurring illegal trade. A tiger pelt is sold for about $10,000 in China. India acts as one of the most fertile hunting grounds for the Chinese supply lines. Statistics reveal that in India alone 684 tigers were killed between 1994 and 2003.

Facts about tiger

Tigers are territorial in nature and are solitary beings most of the time. Tigers hunt mainly at night and their main prey are deer and wild boar. Tigers are excellent swimmers. The body length is about 4.9 to 9.2 feet, the life span is 15 – 20 years, the gestation period is 104 – 106 days and each tigress produces 2 – 4 cubs at a time.

Why should we conserve the tiger?

The survival of the tiger – the apex predator – is crucial to measure the health of the entire ecosystem. When the habitat of the tiger is destroyed, the environment which provides food and water for the other dependants also gets depleted.

Conservation of tiger – world scenario

Once tigers were fairly distributed all over Asia. But their dwindling numbers have forced the declaration of the tiger (*Panthera tigris*) as a critically endangered animal by IUCN. It has been listed in the Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Despite the protected status, their population in the wild continues to decline at an alarming rate.

The major conservation problem is the lack of knowledge and understanding about tigers, its habitat and

misinformation by the community. Tiger conservation measures are being implemented by various countries the world over. Apart from this, many International Conservation agencies are also funding and executing projects in research and conservation education. The tiger census techniques are also being standardised.

Programmes for capacity building and awareness education have also been initiated in a few countries. Attempts at *ex-situ* conservation (like the zoos) have proved partially successful. Apart from IUCN and CITES, international funding agencies like the 'Save the Tiger Fund Council' are funding various research and livelihood support programmes estimated at nearly $8 million in the current year. The Government of India also launched a three year project to survey tiger and prey populations. Such programmes are aimed at building a database on tigers.

For conservation of tigers apart from all the initiatives of international agencies and Indian government, extension education and capacity building are essential. Conservation should mainly be aimed at the local communities and student communities. The objective is to communicate the concept that the natural resources such as forests, mountains, etc. are essential for our country's ecological balance and environmental security. Of all the species existing in India, the fact that the tiger is the main indicator species should be established.

Tiger conservation education for student community

Environmental education has been made compulsory and books are being written for various state boards. Indicator species such as the carnivorous tiger; herbivorous elephant and frugivorous species such as hornbills should be made special topics of focii.

Inclusion of topics in the curriculum may help the students in knowing about the animals. But, more importantly, the young children should be oriented about the ecological benefits of tiger conservation.

The major obstacle in tiger conservation education is the lack of proper knowledge about ecological benefits of tiger conservation. Proper information about tigers, their habitat, role in ecology and benefits to the ecosystem have to be passed on to the learners to raise their awareness.

Children of various levels should be made to understand the importance of tigers to the ecosystem. Linking of various aspects of human life to tiger conservation directly would make the children relate positively. Citing tangible benefits to the human community due to tiger conservation is important in making the child comprehend the need for tiger conservation.

It is important to develop locale-specific learning materials for effective conservation education. The local variations in ecology, societal customs and habits should be carefully studied before preparing the manual for use. A systematic study advocates and identifies time-tested traditional conservation practises which can be used to emphasise pro-conservation living.

In the same way, pointers related to poaching, habitat destruction, man-animal conflict, wildlife trade, use of wildlife products in traditional medicine and fancy-driven consumption of tiger products should be dealt with in relevance to the whole issue. In the larger context, the problem of tiger conservation may appear complicated; but if simplified and brought down to the level of individual responsibility, the issue could be easily addressed through education.

Common Property Resources - Concept and Management

R. Sabesh

Common property resources are collectively owned and managed by a well-defined group of users and generally governed by a common property regime, i.e. a system of established rights, duties, controls and punishments for violations agreed by the user group to ensure equity and avoid over exploitation. Common property resources include pastures, community forests, panchayat lands, common threshing grounds, land fills, watershed, drainage system, village ponds, tanks, rivers, rivulets, ground water etc.

Irrespective of the locations all common property resources face one common problem, that is, how to coordinate different individual users to attain an optimal rate of production or consumption for the benefit of the whole community. It was Hardin, who debated on common resources through his famous article "The Tragedy of Commons". When any one of the common resources have access to several individuals, they are likely to be overused and exhausted.

Common property regime

The term "common property regime" refers to a particular social arrangement regulating the preservation, maintenance and consumption of common property resources. Common property regimes typically protect the core resource and allocate the fringe through complex community norms, rules that limit the amount and timing, and the technology used to withdraw various resource units from the resource system. Setting the limits too high would lead to overuse and eventually to the destruction of the core resource, while setting the limits too low would unnecessarily reduce the benefits obtained by the users.

In common property regimes, there is no free access to the resources and common-pool resources are not public goods. While there is relatively free but monitored access to the resource system for community members, there are mechanisms in place, which allow the community to exclude outsiders from using its resources. Common property regimes arise in situations where appropriators acting independently in relationship to a common-pool resource, generating scarce resource units, which would obtain a lower total net benefit than what is achieved if they coordinate their strategies in some way, maintaining the resource system as a common property instead of dividing it up into chunks of private property.

Common property resource management – Indian context

Pre-colonial India was the land of strong local communities and caste groups with relatively no central authorities. Extensive areas of land and water therefore were controlled by local communities and were presumably used in sustainable fashion. In fact some of

the kingdoms of India were founded on the organised irrigation societies like Cholas and Pandyas. Britishers changed the situation by establishing strong state control. After independence, the state policy continued to serve the urban-industrial interests with ongoing effort to do away with the involvement of local rural population in the utilisation and management of common property resources (Gadgil, Prasad and Ali, 1983). These policies have resulted in further degradation of CPRs. Subsequently the government began to emphasise people's participation through decentralized development decisions (Gadgil and Iyer, 1992). Despite the shift of involving local village councils and voluntary agencies in resource management, Gadgil and Iyer feel that the powerful state machinery is still reluctant to confer any real powers on the local institutions.

All along in the history of rural resource management, it has been the collective local institutions, which have shouldered the responsibility of maintaining and using the resources in a sustainable way. During the British rule and after independence, various departments like revenue and forest were given the responsibility to maintain and exploit the resources. The take over by the government departments made the local people loose interest in maintaining and conserving the commons, as they no longer belonged to the village and had no stake in maintaining and using them in sustainable way.

Decentralized management of resources

With an objective to rebuild India free from deprivation, disparities and discrimination, Mahatma Gandhiji advocated the concept of "village republics" and "village zones utilizing different resources by the Tamils. Thesefacts reveal a close relationship between religion and nature from the *Sangam* period onwards. Our age-old traditional practices have been recognised and honoured by the people from all over the world..

Conservation may be motivated by anthropocentrism; where a species or system is conserved to avert the dreadful consequences of environmental degradation (Martell, 1994). In this case, only human beings are assigned any intrinsic value, i.e., value in itself, while all the other species or systems are given only extrinsic value. Naess (1973) termed it as shallow ecology. At the other end of the value spectrum are the deep ecologists, who profess recognition of value in all species of organisms and even in the ecosystems of which they are a part (Naess, 1973; Martell, 1994; Attfield, 1995). This view is often termed as ecocentrism (Vermeersch, 1994). The extensive debate on the merits of these different ethical positions (Martell, 1994; Attfield, 1995) are beyond the scope of this paper.

Conclusion

It may be contended that neither an anthropocentric nor an ecocentric ethics is sufficiently holistic to ensure complete protection and/or sustainable use of biodiversity or ecosystems. In this context, an analysis of the man nature interactions in ancient traditional societies of Tamilnadu reveals that they have been able to live in harmony with their environment by adopting appropriate ethical positions.

An ecological point of view is often the essence of the lifestyle and beliefs of indigenous societies of Tamils. For instance, the ancient people believed that the destruction of forests in close proximity of villages will bring a loss of prosperity and disease outbreak

(Changkija, 1996). The killing of certain animals is taboo among certain groups. For instance, several ethnic groups in Tamilnadu, do not kill the crow, the owl, the vulture, the elephant and Cobra (Dhasmana, 1979).

Community based conservation in Tamilnadu is exemplified by the sacred groves, based on religious beliefs and in the form of village forest reserves. In the sacred groves the footwear is to be removed at the entrance, as is done in the other groves of India (Oliver King et. al., 1997). Besides the sacred groves where total protection is enforced, limited extraction of resources is allowed in certain groves, while tribals of Ooty in Tamilnadu such as *Kurumba, Irula, Kota* and *Badagas* maintain Community forests (Sekar, 2005).

*Evolving conservation systems in India – lessons to be learnt

The ethical positions adopted by the communities while conserving, could be found to range from purely anthropocentric to ecocentric. Thus, in the sacred groves, sacred trees and sacred animals, the motive for conservation had started with anthropocentric ethical standpoint and gradually blossomed into ecocentric standpoint. It is evident that by observing the footprints of traditional ecological conservations, 'an act of conservation' started with human purpose in mind and in the process the communities/societies understood ecological values: thus paving the way for a `system in place' for centuries to come.

We could understand that for any natural conservation system to thrive and surpass the test of time is to make it human friendly in the beginning and making them learn the ecological value in the process. Sacred grove, sacred trees and sacred animals teach us the footprints to be learnt in the evolution of conservation system in the wider fabric of cultural pattern of India. (*Amirthalingam, 2006).

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Rivulet in Myths and Folklore of Tamil Nadu

M. Amirthalingam

Introduction

Human beings have since early times congregated and settled near convenient sources of water. Most of the ancient civilisations grew along rivers. The Egyptians centered their civilization on River Nile. The Mesopotamian civilisation was found between the rivers Tigris and the Euphrates. The Chinese civilisation was also located principally in the Huang Ho and the Yangzi river basins, while the Indus valley civilisation was built along the River Indus. Rivers have not only remained a witness for the growth and survival of the human civilizations and in some cases their extinction, they have also evoked in human beings a sense of awe, inspiration and reverence.

From time immemorial, the Tamils too have protected and revered their water sources as they provided them with a means of subsistence as well as transport and communication. On the banks of rivers and lakes, places of commercial and religious importance sprung up. The water sources were often featured in superstitions, legends and folklores. For instance, it is believed that when a breach of the Madurantakkam Lake was imminent and the authorities began to evacuate the local residents, Lord Rama appeared with Lakshmana and protected the lake. This has some basis in the fact that an English official of Chengelput, Col. Lionel Place, who is supposed to have witnessed the event, built a shrine for Janakavalli (Sita) in the local temple of Rama and has set up an inscription.

This article focuses on the folklore of water sources in the state of Tamil Nadu, with a special focus on the minor (unfamiliar small) rivers. It tries to highlight as to how the lives of Tamils is intimately intertwined with the region's rivers and offers glimpses of that relationship as evidenced through various aspects of folklore - myths and legends, customs and beliefs, festivals, folk arts and popular religion.

Rivers in Tamil Literature

The Tamil river basins like the other great river basins of the world were cradles of civilization and culture. The three major ruling dynasties of *Tamizhakam* (corresponding to the areas known as south India today) in the early centuries of the Christian era, represented the fertile agricultural tracts of major river valleys - the Cheras in the Periyar valley, the Cholas along the Kaveri and the Pandyas on the banks of the Vaigai and Tamirabarani. These rivers have for centuries captured the minds and hearts of the rulers and masses alike because of the agricultural prosperity and commercial wealth they bestowed upon the lands and its people.

The rivers were closely interwoven with the cultural history of the state. Many famous schools of music, dance, crafts and philosophy flourished on the banks of these rivers. A common feature of Tamil literature is the praise of rivers by poetic

descriptions. For instance, the Tamil epic Silappadikaram speaks about the glory of Kaveri in the following words – '*Uzhavar Oodai, Madagu Oodai, Udai Neer Oodai Tanpadangkoal Vizhavar Oodai Siranthu Aarpa, Nadhanthai Vazhi Kaveri*', which is translated as '...thou walkest along, listening to the songs of ploughmen, the resonance of sluices, the roar of the breaking waters, and the noise of the festive crowd celebrating the freshets... All this flow of thine, along with the din of merry making, is expressive of the prosperity of our King...Hail to thee Kaveri!'.(Puhar Kandam, Kanal Vari4, Silapaddikaram). Similarly, Parimelazhagar, the commentator of Paripaadal, devotes as many as eight expositions to the river Vaigai, known then as *Vaiyai*.

Local festivals and celebrations were associated with the inflow of fresh water and the rise of floods in the rivers. People living in the vicinity of these rivers as well as the cultivators celebrated the rise of water. The festival of *Tai Niradal* was especially popular. Women and young girls bathed in the rivers early morning during the month of *Tai*. They offered prayers for being blessed with a fine husband, under the guidance of elderly women.[1] '*Nyayiru kaaya nalli marip pin Kullathu, Ma Irun Tingal, Maru Nirai Aathirai..... ....Taai Aruge Nindru Tavath Tai Niraadudhal? Nee Oraithi, Vaiyai Nadhi*' goes a phrase in Paripaadal describing the bathing ritual in the river Vaigai (*Paripadal*, 11.75-90).

Rivers in Myths, Legends and Customs of Tamil Nadu

Even in present times, the integration of rivers with the cultural, spiritual and the daily lives of the people is common in Tamil Nadu. The local rivers too are perceived as nurturing mothers, who feed, quench the thirst and when angered flood lands. It is believed that bathing in the rivers and praying to the deities ensures one of well being.

Local festivals and celebrations are often associated with the rivers. The *Aadi Perukku*, for instance, celebrates the rise of water levels in the Kaveri River due to the rains. The s*aptha stana utsavam* during the month of Chitirai brings together the Shiva deities of seven nearby villages at Tiruvaiyaru, which is named after the five rivers - Vadavar, Vettar, Vennar, Kudamurutti and Kaveri that flows close it. One of them is Ayyarappan or the Lord of the Five Rivers, the presiding deity of the Thiruvaiyaru.

Folk performances also glorify the river Goddesses, particularly Ganga and Kaveri.[2] The folk dance of *Karagam* or *Karagattam*, also known as *Kudakoothu* is performed as an expression in praise of the Rain Goddess, Mari Amman and the River Goddesses, Gangai Amman or Kaveri Amman. [3] During the dance, the performers balance a water pot on their heads. The water pot is filled with water, which is believed to be rain and the seven holy rivers.[4] Rivers have been so much revered and glorified and even today the girl Childs are named after the rivers in Tamil Nadu.

Palar

The Palar River (Palaru) originates in the Kolar district of Karnataka. It flows for about 90 km in Karnataka, before entering Andhra Pradesh where it traverses a distance of 33 km. The river enters Tamil Nadu near Vaniyambadi. The Kavundi River joins Palar near Pallikonda. The river is an ephemeral channel, which remains dry most times of the year. The Cheyyaru, Kamandalaru and Kavundiarum are the important tributaries of the Palar. The name Palar (known in olden days as *Ksheeranadi*)

signifies the river of milk. Some believe that the name refers to rapid flow of the water downhill suggestive of the boiling over of milk, but this seems unlikely as the rise of the river is not sudden. One of the sacred legends associated with the river goes that once Lord Siva was displeased with Nandi and transformed him into the hill of Nandidurg at Mysore, where the Palar rises. Nandi prayed to Lord Vishnu, who interceded with Lord Shiva. Finally Ganga, who resides in Siva's locks, consented to bless the hill by falling upon it as a stream of milk, which today flows as the river Palar.[5]

Thirumukkodal or Pazhaiya Seevaram in Kancheepuram district is the place of confluence of the Palar with the rivers Cheyyar and Vegavathi. It is known as *Dakshina Prayag*. It is considered by some to be more sacred than the Prayag at Varanasi as all the three rivers are visible. Devotees take a holy dip at the confluence during the month of Tai. They perform rites towards departed souls of their relatives.

The flooded Palar features in the legendary escape of Rana Bhaire Gowda - an ancestor of Kempe Gowda who is credited to have established the city of Bangalore. Rana Bhaire Gowda was a powerful chieftain of Alur near Kanchipuram. He lived with his daughter Doddamma, who was exceptionally beautiful. Both decided to flee the place to Karnataka for fear of trouble from Selva, a scion of the Pallegar family who was in love with Doddamma. At the time of their escape, river Palar was in spate. Doddamma invoked the aid of the river Goddess and cast her earring into the water as offerings. The Palar River is believed to have miraculously divided, allowing her party to escape and then interposed its swollen currents to her pursuers.[6]

Pennaiar

The Pennaiar River arises on the eastern slope of the Nandidurg Mountain in Karnataka, where it is known as the Dakshina Pinakini or Southern Pennar. The river flows southwards for about 80 km in Karnataka before entering Tamil Nadu, where it is referred to as Pennaiar or Ponnaiar, though Pinaka appears in ancient Tamil literature. In Tamil Nadu, the river turns southeastwards and flows 320 km to enter the Bay of Bengal at Cuddalore.

A legend is popular with regard to the origin of the river Pennaiar. It is believed that during a great drought, Lord Shiva asked Parvati to go forth from Nandidurg in the form of rivers. The Goddess obeyed and flowed in two directions, forming the rivers, Uttara and Dakshina Pinakini. Thus the rivers are believed to be the manifestations of Goddess Parvati. The continuous curve formed by the course of the Uttara and Dakshina Pinakini, which both arise near the Nandi hills, sacred to Lord Shiva, may probably account for their receiving the name Pinakini, from *Pinaka*, the bow of Lord Shiva.[7] The Pennaiar is considered sacred and bathing in the river is considered meritorious. Various celebrations are held at many places along the banks of the river.[8] At Manalurpettai in Tirukkoyilur, the lord from Tiruvannamalai is brought down to bathe in Pennaiar river.

Gadilam

The Gadilam River (also spelt as Kedilam) originates from Mayanur hills in Villupuram district. The total length of the river is 112 km. It joins the Bay of Bengal at Cuddalore. The name Gadilam is said to be the colloquial form of the name *Garuda nadi*, named after the *vahana* of Lord Vishnu. A legend goes that

once Lord Vishnu, after helping the devas in a battle against the asuras, felt very tired and thirsty. He asked Garuda to get him some water. The Lord waited for some time, but Garuda did not return. He then asked Adisesha to get him water without any delay. Adisesha split the earth with his tail and water came gushing out. He gave the water Lord to quench his thirst. Meanwhile, Garuda, who went to collect water from viraja nadi, which in Hindu mythology encircles heaven, on his way, saw a sage, who had his kamandalam filled with *viraja theertam*, which he had obtained by his prayers and devotion. Garuda tilted the kamandalam with his beak and tried to divert the water towards Thiruvahindrapuram, where Lord Vishnu was waiting. The sage saw the water flowing out of his *kamandalam*. He got angry and cursed that the water should become impure. Garuda realized his mistake and asked the sage for forgiveness. He requested the sage to divert the water towards Lord Vishnu in the form of a river. When Garuda reached Thiruvanhindrapuram, he realized that Adisesha had already provided the Lord with water. Vishnu told him that he need not have any regrets and blessed Garuda that the river brought by him would henceforth be referred to as Garuda nadi and it would be held as sacred as the Ganges.[9] Even in present times the river is considered sacred and its water is used for *thirumanjanam* for the Lord Deivanayakan, the deity at Thiruvahindrapuram temple.

Vellar

There are two rivers by the name Vellar in the Tiruchirapalli district. Of the two, the northern one rises in the Salem district and during its course forms the boundary South Arcot and Tiruchirappalli districts. It meets the sea south of Porto Novo (Parangipettai). There is a legend that Arjuna, one of the Pandavas, when on a pilgrimage came to the spot where the river rises, when he wished to perform puja he could not find water. So he drove a hole in the rock with his arrow, and the water welled up and formed a river. As Arjuna is called Sweta-vahana or one who uses white horses for his chariots. The river was thus called Swetanadi, which when translated to Tamil became Vellar.[10]

The southern Vellar originates in the Vellamalai of Tiruchirapalli district. It flows throught the districts of Tiruchirapalli and Pudukottai and finally meets the Bay of Bengal north of Manamelkudi. This river too is of mythological origin as evidenced in the local folklore and the Tiruperundurai puranam. A king named Svetaketu prayed to Lord Shiva for a river that would confer bliss to those who bathed in it. The King's prayers were answered and the river formed was named after him as Svetanadi or Vellar.[11] There are many sacred bathing ghats on the banks of the river including Peraiyur, Pushyatturai, Kadayakkudi and Tiruvidayapatti. During the festival of Taipussam, deities from in and around Pudukottai are brought to the Vellar River for *theertavari* or holy dip. Thousands of people congregate on the banks to witness the event.

Gingee

The Gingee River, also known as Senji, has its source in the hills of Malayanur of Villupuram district. It follows a course of about 34 kms before its confluence with the Bay of Bengal. The Gingee River is also known as *Varahanadi,* the river of the boar. Once, Nantichola Raja of Kanchipuram built a *nandavanatottam* in the honour of Varadarajaswami but wild boars devastated the garden. The King attacked them on a horseback and dispersed them, but one big boar took up onto his tusk a lime tree bush and a

flowering Crepe Jasmine shrub (*nandiyavattai*) together with some earth and led the king towards Gingee. To the west of Gingee, the boar stopped besides a mountain and opened a spring for the king to quench his thirst. The king then chased the boar further east and as the boar ran, it dug a course with its tusk for the water to follow (*panri kombale keerina valiye tannir peruki vantatu*). The King chased the boar until it reached the village of Singavaram. The boar then entered a cave and dropped the two trees and the soil. As the king followed the boar into the cave, he saw the boar taking the form of Vishnu. He seeked the Lord's blessings and later built a temple there for Lord Varadarajaswami at Gingee. The river whose course was traced by the boar came to be known as the Varahanadi.[12]

Manimuthar

The name Manimuthar is given to the river owing to the existence of pearls in it.[13] On the western banks of the river are five Siva shrines, all of which are Swayambu Lingams. The pilgrims generally take a dip in Manimuthar and then worship in the shrines.[14] An important pilgrimage on the banks of the river is the Vridhagiriswarar temple at Virudhachalam (Cuddalore district). The yearly festival of *Masi Magam* attracts a large Gathering.[15]

Conclusion

Rivers have indeed been an integral part of Tamil history and this can be well understood by studying the folklores – legends, customs, beliefs and festivals. In the villages of Tamil Nadu, there are countless narratives from mythology, local legends and songs that extol the glory of sacred rivers. The study of the beliefs, customs and folk festivals also reflect the wisdom of our forefathers, who made protection of the rivers and other water sources, an integral part of native culture and community life. People travel miles to pay homage to the sacred rivers. However, later they pollute the very rivers they revere. They use soaps and shampoos, throw garbage – plastics, discarded clothes etc. – and sometimes even urinate / defecate in the holy waters. It is time we revive and expand our old water wisdom and practices!

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Story Telling – An Effective Tool in Environmental Education

U. Thirunavukkarasu

Everyone likes stories. We grew up listening to stories told by our grandparents and elders. When we hear stories of our own people, young children feel elated, and the elder feel nostalgic. Stories were carried from generation to generation. They surpass the boundaries of time and space. Yet, they carry the essence of society, its pattern of living, beliefs, customs, traditions, resources, events and even history of civilizations and kingdoms. Indian society has the custom of educating the young ones by narrating stories. Our *puranas*, *ithihasas*, and folklores were considered an effective tool in 'moralizing the young ones'. The stories were told through many forms such as drama, folk arts, puppetry, songs, music and other oral and graphical expressions.

The importance of stories

The stories, apart from their entertaining and educative value are also relevant to the modern day world in suggesting solutions to many of our problems. Environmental Education can be effectively imparted by employing stories as an effective tool.

The Indian folk tales carry a lot of meaning in creating a positive attitude towards natural resources. The talking animals and plants, adventurous kings, saints, sages, warriors and the common man – as characters in stories – were infused with values.

- ❖ Properly narrated and created stories promote development of pro-nature attitudes among the learners.
- ❖ The learners understand the relevance of traditional wisdom in the present-day context.
- ❖ Environmental Stories help in instilling environmental values among the young learners.
- ❖ Environmental Stories helps in developing concern for the environment among the learners.
- ❖ Indigenous and contemporary stories may present 'scientific conception of an environmental challenge' in a more palatable form to the non-scientific popular community.
- ❖ Even the greatest and the most complex problem of the environment can be surmised into a story and passed on to the learning group for easy assimilation of concepts.
- ❖ The wealth of stories on various themes on the environment may be used as an effective tool in vitalizing environmental literacy.

Environmental stories

Stories are stories perse. One cannot compartmentalize stories into various categories and label them as different for the purpose of environmental education. If we stick on to strict regimentation of infusing environmental values in to every story, the story looses its charm. Moreover, the holistic purpose of integrating social, environmental, spiritual concerns into a common agreeable form would be lost if we are

particular about one aspect or message. So, it is necessary that the 'story' should be a 'story'. Environmental stories can be identified from many of our traditional stories, folk tales and *puranas* and passed on from generation to generation or it may be carefully created.

Identification of environmental stories

The environmental stories can be identified from our rich cultural storehouse. The traditions of oral tales may also be recorded from various rich sources. One can find that the stories from different environmental resources use varied approaches in portraying the wealth they possessed. The hill people tell stories different from that of coastal habitants. It is important to trace out the source, record and use it according to the purpose.

Creating environmental stories

Stories can be created based on an environmental theme. Carefully crafted stories around an environmental education theme for a particular age group can be effectively used as a tool in learning.

The broad guideline for creating/writing stories for environmental theme would be

- ❖ The story should be properly crafted around a theme of environment.
- ❖ The portrayal of the theme should be appropriate to the value system of the culture and should not go against it.
- ❖ Infusion of social values and environmental ethics should be the bedrock of the story.
- ❖ Scientific concepts in the name of stories should not be passed. They confuse the learner rather than promote environmental education.
- ❖ The backdrops or plots of stories should not be culturally alien to the learner.
- ❖ The major purpose of environmental stories should be to create positive attitudes and to develop concern for the environment among the learners. It should not attempt to create negative feeling or feeling of helplessness among the learners.
- ❖ The story can be projected in an appropriate form to the audience either orally, dramatically or in graphical expressions. An illustrative pictorial story attracts a primary class child more than a written one.
- ❖ A group of people from different areas may come together to create a story. Environmentalists, psychologists, teachers and creative artists can form a group to create a story.

Story telling as an effective tool in environmental learning

Stories of mankind

There were stories told for centuries to the people and are still being told to many. Those are the stories 'time tested' through many generations and continue to go around. Find such stories and use them in appropriate environmental learning situations.

Indigenous stories

All cultures and communities have many stories of their own. The stories get enriched by repeated narration however retaining the central theme. Those are the ones which always trace our roots. At times one can find family stories, village stories, forests stories and many others.

Stories of time

Many stories reflect the time and status of the particular society at large and

discuss about customs and traditions. They teach us about the conditions that prevailed during a particular period. They vouch for the resources present in earlier times and the kind of affinity that existed then. We can take pointers from those stories and attempt to develop a sense of comparative analysis among the learners.

Using professional story tellers

The services of a professional story teller can also be employed for narrating stories. Story telling is an art by itself. Each individual has his own way of narrating a story. The medium used for narration adds to the effect of story telling. While narrating stories orally, the voice, modulation, intonation, presentation, pause and dramatization of the stories influences them.

Each one is a potential 'story maker'

Ask the students to craft their own stories based on experience. A visit to the nearby tank or temple may form the central point to the story. Teach them to write a simple story and encourage them to record their environmental experiences in the form of stories.

Contemporary stories

Any current event can be an effective theme for creating stories. Select some local events that happened recently and try to craft a story around it. This could help in portraying the message of environmental conservation. Recording a present day crisis of environment can also help further learning.

Using success stories

The success stories of a group or an individual can be effective themes for creating good environmental stories. Success stories help in highlighting the issues of concern and in creating positive morale among the learners about environmental actions and activism. The stories about 'Rajendra Singh' and 'Sunderlal Bahuguna' are good examples. Salamaradha Thimmakka of Tumkur district in Karnataka is also a notable example of a success story for an environmental cause.

Using scientific evidences to promote stories for environmental education

The scientific evidences, principles, concepts can also be used as a basic material to create environmental stories. Based on proven scientific facts, fallacies about science and environment can be dispelled from the minds of children.

The famous twentieth century classic *Silent Spring* by Rachel Carson is the best example of a story - an environmental portrayal with the support of scientific evidences achieving the intended cause of conserving the environment. The *Silent Spring* startled the world by portraying the harmful effects of chemical pesticides in an impressive narrative.

Concept stories

If a particular concept of the environment is complex and comprehending it is difficult, the concept may be passed through a carefully crafted story to the learners.

Linking curriculum and message

The environmental stories narrated to the learners should be linked properly to the curricular element of the formal or informal education. The level of the learners should be taken into consideration and the curriculum component should be highlighted appropriately.

The medium of narration

As envisaged earlier, the stories can be narrated through many media. Based on the level and comprehending ability of the learners, an environmental story may be portrayed or narrated in a verbal, musical, graphical and many other creative expressive forms.

Conclusion

Story telling is an art in our society. The *harikatha*, *villupattu*, puppetry, *poikal kuthirai*, stage drama, street theatre and other innumerable art forms of India were narrating stories of various kinds over centuries. The artisans of our country portrayed the rich traditions and culture through many creative expressions. If these treasure troves are used for the noble purpose of promoting environmental education among the learners, the broader goal of achieving 'sustainable future' may be reached. The importance of story telling does not get over until we listen to a story.

The magic tree

Here is a 'concept story' attempted around the theme of "intensive farming through chemical fertilizers and pesticides poisons the bio-system".

In a beautiful and calm village called Nanjavati, a man called Rama lived in a hut, near a lush green grove. Everyday Rama rose up in early morning amidst the chirping of birds and buzzing of bees, and went to the grove admiring its cool shadows to get ripened fruits. He enjoyed a healthy and happy life with his grove. The daily requirements were almost met by the grove he owned. The food, water, clean air and the salubrious surroundings – everything was perfect.
In the centre of grove, there was a lone mango tree, bushy and glistening in the sun. The tree was different from the others. The tree was very healthy. Birds, insects, and other animal would also come seeking the tasty fruits and green leaves. Rama also preferred the fruits from that particular tree. But unfortunately, the tree bore very few fruits.

Rama yearned for the season to arrive to enjoy the fruits every day. Rama grew impatient gradually and wanted to eat more. He approached a fertilizer shop in the nearby town and asked their advice to increase the yield of the mangoes, so that he can consume more fruits and sell the rest. The fertilizer man prompted him to buy chemical fertilizers and pesticides to apply to the mango tree.

Rama started applying chemical fertilizers and pesticides. The magic tree started bearing more fruits in the season. Rama was happy. But, unfortunately, the fruits were not tasty as before. The number of animal friends like birds, insects and other animals visiting the tree and grove also declined. The grove became grim season after season. Rama started observing dead insects and animals in the vicinity of the grove. The magic tree had also lost its shine. With the worry of degeneration of the grove, Rama went to bed. He had a nightmare in which he dreamt that he was lost in a desert with parched throat. He woke up as if a thunderbolt struck him. Next day morning, he approached a village elder and narrated the whole episode about the grove and his bad dream.

The wise village elder told him that he was a victim of his own greed. Rama requested him to elaborate on it. The wise man explained to him about the harmful effects of chemical fertilizers and pesticides and advised him to follow the traditional wisdom of applying bio-fertilizers without disturbing other organisms and the natural balance. Rama, at last understood his misadventure in chemical farming and decided to return to the traditional method of farming.

Elephant Country

Kumaravelu

Scientists have raised the question, 'Is there a link between deforestation and the severe droughts and calamities that have affected India and countries in Africa?'. Changes in the rainfall pattern, intensity of rain and increase in wind speed during monsoon seasons are the major evidences. Most of the coastal zones in the southern peninsular of India are experiencing unexpected wind velocity. Human exploitation of the forest for their needs have resulted in the increasing incidence of natural calamities. Unsustainable developmental activity that de-links the continuous stretch of woodland and thinning of the canopy are also major causes for these changes.

In the Nilgiris, changes in the rainfall pattern, i.e., intensity of rain, has become a common phenomenon in recent years. Thinning of wooded area and fragmentation have resulted in the disappearance of resources such as water, food, etc., and man-animal conflict is on the increase. According to scientists and environmentalists, the existence of elephant and tiger in the forest is the indication of the existence of virgin forest patches. In India, from the conservation aspect, the elephant is the prime species among the herbivores and tiger is the prime species among carnivores. Both stand as umbrella species, which could maintain the ecological balance. The disappearance of these two prime species raises question about the continued existence of virgin forests.

Table 1: Zonation of Elephant Country - South India

In northeast India, the tiger habitations are disturbed and, due to the loss of continuous forest patch the elephant population is also dwindling. In Southern India, patches of continuous forest are found to a certain extent and provide a home for elephants and tigers.

Elephant country, in the southern part of India, has been divided into four zones for study and better conservation purposes (Table 1).

Table 1: Zonation of Elephant Country - South India

Zone	Area covers
Brahmagiri	Brahmagiri Sanctuary of Karnataka and Wayanad North Division of Kerala
Nilgiri Biosphere Reserve	Nagarhole, Bandipur, Wayanad, Mudumalai Sanctuaries and Nilgiris North & South Divisions, Silent Valley, Mannarkad, Attapadi and Sathyamangalam, Kollegal and adjoining forest zones.
Biligirirangaswamy Sanctuary (BRT)	Chamrajnagar & Sathyamangalam eastern portion
Cauvery tract	Cauvery Sanctuary, Kollegal, Hosur and Dharmapuri Divisions.

Among the zones mentioned in Table 1, the Nilgiri Biosphere Reserve is vital for providing a home for many species of fauna. The Nilgiri Biosphere Reserve is the single largest zone which accommodates several elephant and tiger populations. In Asia, only the Nilgiri Biosphere Reserve has six National Parks & Sanctuaries, in which Nagarhole, Mudumalai, Wayanad and Bandipur reserves are continuous forest patches. The migration path between BRT Hill ranges and Nagarhole is still intact. In the Nilgiri Biosphere Reserve, among 12 major corridors, only 5 corridors are still intact and minimally disturbed. The rest of the corridors are on the verge of disappearance (Table 2).

Table 2: Nilgiri Biosphere Reserve Corridors and their Area

Major corridor	Area
Masinagudi – Moyar	Segur plateau
Singara – Masinagudi	Masin& Bokkapuram
Kaniyanpura	Bandipur & Segur Plateau
Sujilkottai	Sathyamangalam RF
Brahmagiri – Tirunelli	Brahmagiri, Wayanad North
Kallar	Nilgiris Eastern Slope
Anaikatti	Nilgiris Eastern Slope
Vazhikadavu	Nilambur North
Mannarghat - Mukkali	Mannarghat
Bekkatur-Arabikere	Chamrajnagar, Kollegal
Chattiramdoddi - Hunsanhalli	Bangalore, Hosur
Periyar Corridor	Wayanad North

The common threats, such as collection of firewood, cattle grazing and removal of biomass, are growing year by year. Particularly, cattle grazing and removal of biomass are curbing the regeneration of forage plants. On the other hand, unplanned tourism activities disturb animal movements. The encroachment of *poramboke* lands at the fringes of and adjacent to the corridors poses physiological stress to the animals. Elephants are most affected by such encroachments. In most of the encroached areas, crops like paddy, maize and plantain are grown. These crops attract the animals, particularly elephants, and as a result the man-animal conflict is on the increase. Though the forest staff monitor and maintain a vigil, the people involve themselves in many illegal activities, including poaching and illegal poisoning of protected wildlife.

Conclusion

It is essential to put an end to deforestation and protect the continuous forest patch that would hold animal movement. The effective protection of habitat could be achieved through better management. Firstly, by ensuring that the protected habitat, which include wealthy grassy areas and wooded land is free from fire. Secondly, restoration of the habitat to prevent fragmentation. Degraded areas should be improved with the plantation of a mixture of indigenous plant species. Thirdly, prevention of livestock grazing and collection of firewood and biomass are essential. Lastly, constant patrolling to check poaching and illegal activities alone, will ensure better protection of the habitat for the entire fauna.

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