CHAPTER V

DOCUMENTARY ANALYSIS, EXPERIMENTAL CONSTRUCTS AND CASE STUDIES
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PREAMBLE
A study on environment and community resources should primarily focus on the real environment and real communities. Hence making intense case studies beginning with some innovative points in the locality would be a useful starting point. But such empirical mapping from the ground level would be a slow route to form an idea of the universe of the real environment. It would be much more economic to operate with documents which would already bring together codified information about the environment according to set themes done by agencies which have been assigned such tasks. On the basis of such codified secondary information it would be possible to probe certain points more deeply to check whether the pedagogic use of the environment and community resources could be optimised further. In this exploration, which has already been illuminated by the readings (Vide Chapter I and II) a number constructs for identifying and using the resources for pedagogical ends might arise. Besides merely identifying the resources, way of putting them together and transacting them also may be tried out. The results of the efforts done in this direction during the past five years are presented in this chapter. Chronologically case Studies were the first to be begun in this study (but they were also continued till the end). But it is very difficult to put them into logical categories. Hence, the documentary analysis and pedagogic constructs arising from them are placed first and the case studies are placed last.

This chapter is divided into four subheads:

A. Documentary Analysis
B. History made living with archaeology and other sources
C. A Tryout in Alappuzha of Application of the Analysis
D. Case Studies
A. DOCUMENTARY ANALYSIS

The documents found most handy to gauge the environmental and community resource mapping already done were the panchayat reports the district hand books. Since the aim was not to exhaust the possibilities but to work with some illustrative materials for developing relevant models, it was not attempted to cover all these documents in full. The Panchyat reports in the Alappuzha region and a few typical ones from other areas were included in the analysis. Among the District Handbooks only four were available the investigator - Alappuzha, Kannur, Palakkad and Wayanad. It was felt that the tourism materials etc. can supplement the data with an aesthetic, locational and investigational base to the learning. The Proceedings of the Kerala Science Congress were also added as one of the master sources.

Since the panchayat reports and the district handbooks have already got a categorisation of describing their regions on the basis of some themes. There minor variations among these, but a common basis was evolved out of these. It must be added that while the panchayat and district reports state what exists in their area under certain heads, the focus of this report is to tap out the pedagogic possibilities. These may not always be explicit. This is briefly indicated in the beginning, occasionally touched upon in the middle, and explicitly discussed in Sections B and C. The Cases are presented in Section D.

Learning may be first integral and branch off into the various sciences, arts, history, archaeology and other branches.

The expanding habitat

Learning starts with one's habitat. In fact education provided at a healthy home gives a sense of security, affection and adequacy. Later the child learns incidentally about the larger units where he dwells. Since textbooks
are produced at the State level, the State, its geography, its bounty, its history, culture etc, get focused early. In effective transaction in a good school, the child will be drawn gently towards the larger and larger units, through the state, nation and one world. In recent years, there have been several commissions and committees, constituted about the state of public education, especially in the primary stage. Following the Report of one such Committee, maps began to appear suddenly on the walls of primary schools. In particular, the maps of Kerala and of India began to be displayed on the walls of schools. Maps are important, and in good education, the meaning of maps will emerge in optimal ways. More basic is the presentation of the life and culture of the people in a live form. Kerala map stands in focus in primary texts (along with the national map) produced at state level. But the basic emotional and sentimental associations should be developed in positive ways very early with the immediate realities which are available in plenty all round. The intellectual analysis and the will to act constructively too will accompany. Hence education, particularly primary education should create a positive affect about the habitat and all that grows therein, both the physical and cultural products.

**Nature's bounty**

Kerala is well-placed for the habitat-centred opening. Rightly selected and presented, there are several attractive starting points that could trigger the emotional, cognitive and motor intelligence of the inhabitant. Wonder, tenderness, attraction, even awe could easily be aroused by the backwaters, "streams, winds, woods, flowers, fields, mountains, yes, the sea," if a deadening, joy-less and even de-educational school routine is not prematurely thrust on the child in the name of schooling. If schooling is friendly, joyful, full of invitations extended to see the familiar environment around in fresh ways even as the child grows up, learning could emerge as a series of discoveries in which the head heart, hand and all the senses have their part to play.
Kerala is blessed with the bounty of both the monsoons and presents an evergreen appearance. The introductory lessons in language cum social studies even in some earlier texts present this natural beauty and bounty as the base on which its art, culture, flora, fauna, agricultural and other production and economy could be based (but in reality, beauty and real culture were perhaps buried in the books too early). Sometimes the pressure for economic and industrial development tends to deface this beauty, and attempts at preserving the natural heritage requires a clear vision of the original beauty. Some Malayalam poets have depicted this beautifully in their verbal pictures. This aesthetic-educational message would be most effectively conveyed if supported by artistic photographs or paintings. Though textbook producers do their best given their financial and other constraints, this side of the textbook expose has not yet come up to the mark. The pictures in the District Handbooks give realistic pictures, but they often do not reach the highest aesthetic standards.

It is here that the pamphlets designed to attract foreign tourists to the state can be drawn upon as aesthetic-educative resource. Some of the tourism pamphlets collected present

“No artificial colours, no added fragrance”  “VITAMIN SEA”

“View with a room” Houseboat in the backwaters
extremely attractive pictures supported by picturesque descriptions of the natural beauties of Kerala as “Water colours by God”, “View with a room” (house boat in the back waters), “Vitamin Sea,” “No artificial Colours, no added fragrance” etc. Three of these have been presented above. The third picture representing the vast stretches of backwaters parallel to the coastline is typical of Kerala. It attracts the tourists who make a ‘room’ in it and become part of Kerala in their short stay. Schooling should not prematurely drag children who are born and brought up in it from the aesthetic enjoyment of this little ribbon of land bounded by mountain and sea (vide the first two pictures) in the South-West coast of India into cognitive exercises of the lower kind. It has been said: “The intellect is but a speck afloat in a sea of feeling.”

Geography
Kerala has the fortune to have all the different geographic features compressed in a relatively short area. Since the earth (combined with the bounty of heaven received by it) is the source of a wide variety of physical and cultural products, education centred round our earthly habitat can perhaps be planned best in Kerala.

Topography
Kerala is divided into three natural regions – highland, midland and lowland. Most of the districts have all the three regions at least to some extent. There are some districts like Wayanad, Palkkad, Idukki, which lack the seacoast and are scarce in lowland. Alappuzha district does not have the highland component. Kottayam does not have a sea coast, but has a lowland component served by backwaters and lakes.

Kannur is a typical district which has a balance of highland, midland and lowland regions. Hence, to describe the features of this district is to describe Kerala itself. The highland region comprises mainly of mountains. This is the area of plantation crops such as coffee, tea,
cardamom and other species and rubber. Timber trees like teak itty, are grown in plenty in this region. The midland region, lying between the mountains and the lowlands is made up of undulating hills and valleys. This is the area of intense agricultural activity. The lowland is comparatively narrow and comprises of rivers, deltas and seashore. This is the region of coconut and paddy cultivation. This is also the most densely populated region. Most of the important cities of Kerala are situated in this region.

Climate
Kerala has a humid climate with an oppressive hot season from March to the end of May. From June to the end of September it is fed by the South West monsoon rains. It is followed by the North East monsoon rains. So Kerala is blessed with rain from both the monsoons.

The rainfall and other metrological details of various parts of Kerala are found in reports at state, district and panchayat levels, which can be used as resource materials for geography, mathematics and other areas if relevant. The different levels and complexity of the data would provide the opportunity for developing curricular spirals in this area.

Soil types
The soil type analysis in the panchayat Reports and in the District Handbooks give information which could be relevant for agriculture. It is not easy to sharply separate the two. In this subsection those aspects that are most relevant for agriculture (which follows) are present. Those relevant for industry are placed under ‘Minerals’

The Alappuzha report gives a very clear analysis of the different types of soil in the district – sandy, peaty, alluvial and laterite. Alluvial soil is heavy in texture, consists of fine slits and is supplied by organic matter, Nitrogen
and Potash. Hence this forms the most fertile soil which is significant for the granary of Kerala.

Wayanad presents loamy soil with wide variations in depth and texture. It has high content of organic matter.

In Palakkad, peaty (kari soil) soil, black soil and forest matter are seen. Besides laterite.

Flora
The flora of Kerala is tropical. Blessed with fertile soil, abundant rain and a variety of land forms, the State appears like a perennial garden with an ever-green face. It has a rich ethno botanic culture, as can be seen from naming the flowers by the hours of opening, naming the plants by their medicinal, morphological, sensitivity and other properties. The flower kurinci, or neelkkurinchi is known to have the property of flowering once in twelve years. That this fact was known as early as two millennia ago is seen by thekurinchi theme in literature, set in the mountain landform  umbolising love in union. An excellent colour photograph of a continuous stream of these flowers in full bloom is presented as an attraction by the Kerala Tourism Development Corporation.

Kurinchi flowers in full bloom (Munnar, Idukki District)

The tourism publications are full of the botanical attractions of Kerala. The District Handbooks also project the botanical richness of their area. The
flora of Wayanad is characteristic of western Ghats. Trees of wild type like rose-wood, *anjili* (*artocarpus*), *mullumurikku* (*erthrina*), several species of cassia etc. are preserved here. The major portion of the land is covered by coffee. In a majority of coffee plantations, the age-old species are replaced by the silver-oak, which is suited to the cold climate, grows quickly, gives shade and support to pepper. It is used for the plywood industries. Eucalyptus grandis, a shorter variety of the plant is grown widely and eucalyptus oil is extracted on a commercial basis from its leaves. Teak plantation, arecanut palm and jack trees are also grown. Tea is grown as an industry in large estates. Soil and climate is suitable for horticulture. Conservationists complain that some of the most precious old forests of Kerala have been destroyed and plead that at least further destruction should be avoided (*Discover Wayanad, the Green Paradise*).

It is interesting that M.S. Swaminathan Research Foundation has started a Biodiversity Centre in which the rare and dying species can be identified and preserved. It uses tribal youth in colonies as co-researchers in this Programme of investigation and Preservation. A separate note on this aspect is given elsewhere.

Palakkad, though dry in many parts, has the advantage of containing the silent valley area, a rain forest. An attempt at building a dam there has been stalled through the efforts of conservation groups which have argued that a unique eco-system and some of the rarest flora and fauna not seen elsewhere could be destroyed. Some of the dominant trees of Palakkad area are *mavu* (*mangifera*), *parangimavu* (*anacardium occidentale*), pilavu (*artocarpus integriofoila*), elavu (*cieba pentandra*), ezhilampala (*astamia scholoris*).

Kannur has a rich vegetation. Except in the coastal area there are different types of forests. Different parts of the district have their own microclimate or special edaphic features leading to different types of plant communities.
The sterile sand tract supports only a poor vegetation of the *psammophyte* type. Plants are few and mostly prostrate. Erect species are small and short. Since the soil has poor water holding capacity, the plants have special xerophytic adaptations. In the estuaries of rivers and back waters Mangrove vegetation is still formed, sometimes extending to the interior along the banks. In recent years these Mangroves have suffered great damage.

**Fauna**

The rich fauna of Kerala particularly in Wayanad, Kannur and Palakkad are a feature of the ecosystem. In wayanad, elephant, tiger, leopard, bear, gaur are sometimes found in thick forest. But with the clearing of the forests, most of them have vanished from the area. One can still see the bonnet monkeys, loris, mongooses, jungle cats, squirrels, hares etc. in the limited forest areas. Elephants, bear and other wild animals sometimes stray from the wild life sanctuaries in Karnataka and Tamil Nadu into Begar forest range in Muthanga (on the Karnataka border of Wayanad).

In the reserved forests of Pallakkad, tiger, leopard, gaur, bear are sometimes found. Sambar and Spotted Monkey were found in large numbers. Poisonous and non-poisonous snakes are also found. The common birds are jungle crow, king crow, myna, woodpecker, sunbird, kingfisher, skylark, paradise fly catcher, parrot, peacock pigeon etc. The silent valley area has the distinction of being a rain forest, very rare in the world. It is spread over an area of about 9000 hectares. This thick forest is rich in some of the rare species of plants and animals.

Iduki is also rich in fauna A Picture of mountain goats taken from the tourism pamphlets on Munnr is shown above. Rare birds can be caught unawares in any quiet site, if one is watchful
The study of the rich fauna may require study trips into the forest area, but study of a wide variety of plants in their natural setting is possible almost in all the districts of Kerala. Even if a district lacking in plants of a particular geo-habitat a short excursion of about 50km could expose the pupil into it.

**Agriculture and agricultural research**

Agriculture can be a useful and meaningful starting point for teaching Botany, Entomology, Soil Type, Water Resource Economics etc. All the Panchayat Hand Books and District Hand Books give some basic information about agriculture in their respective areas. Agricultural field can be testing point for what is studied in school. A typical project approach can even start with agriculture and later branch off into specific subjects.

The Kannur District Hand Book is most analytical in identifying various crops. Twenty eight crops have been identified starting with Paddy (3 types). Paddy is a crop which is cultivated less and less in Kerala because it is not economic for the farmer. The general state farm at Aralam is concerned with seed production and planting materials for plantations and
horticulture. The pepper research station at Panniyur helps to augment pepper cultivation. It develops the first pepper hybrid in the world-Panniyur-I. Brown’s plantation at Anjarakanđi is Asia’s largest plantation. It cultivates pepper, nut mug, clove and cinnamon but cinnamon alone flourished. Alappuzha district prided itself on possessing the rice granary of Kerala (Kuttanad). It attempted to increase the paddy field by blocking the entry of sea water into the vast tracts of Kuttanad fields by Thanneermukkom bund. But this created other environmental and health problems. Various reports in Alappuzha district give profuse information about this. The dialectics of development (high yield) versus environmental issues has been explored through interviewing the farmers, other inhabitants, environmentalists, fishermen etc. Given all these problems, the challenge of maximizing the field of rice still remains. The District Agricultural Farm at Mavelikkara, state seed farm at Arnootimangalam and Veeyapuram, and the Rice Research Station at Mancombu and Kayamkulam have been set up to contribute to this.

Palakkad is also called the rice bowl of Kerala. The intense agricultural development programme and the intense paddy development programme have been in operation for more than three decades. Integrated seed development farm at Eruthi is designed for multiplication of green manure, seeds, sugar cane, cotton and ground nuts. There are number of agricultural instructions like the Regional Agricultural Research Station, Soil Testing Laboratory, Fertilizer Quality Control Laboratory, Mushroom laboratory and Agriculture Workshop. The mainspring for all these
operation comes from the Agricultural university with its main campuses at Mannuthy, Thrissur and Vellayani, Trivandrum. The Central Orchard, Pattambi and Horticulture Development Farm, Malampuzha promote vegetable, coconut, mango and ornamental plant cultivation. There are important agricultural training centres at Alathur and Malampuzha. The Farm Information Bureaus and the Krishi Vignana Kendras setup all over Kerala help to bring the lab findings to the land.

Wayanad as its name implies has paddy cultivation areas even in the heights. But the high altitude permits the cultivation of Perennial plantation crops and species. The major plantation crops include coffee, tea, pepper, cardamom, rubber and ginger. There are extensive research centres for the high land plantation crops at Wayanad. The agricultural promotion work is also closely in relation with tribal development. The extension scheme at Ambalavayal is managed by the agricultural department. Recently a regional research for agriculture has been developed there.

Recently the M.S.Swaminathan Foundation has started a Community Agro Biodiversity Centre at Puthoorvayal, Kalpatta. Top ranking scientists of this foundation have identified Wayanad as a haven of both medicinal plants and traditional medical practitioners. It attempts to help the villagers to revitalize their health-care heritage. Tribal youth who dropped out of school are taken in as co-researchers to identify rare plants. They have listed 637 plants in their publication (2001). Of which 150 species are collected for their stem, 139 for roots and 136 species for the whole plant. The Foundation has brought out publications about several crops grown in Wayanad and their multidimensional analysis. Some of the publications highlight crops grown in Wayanad and present a multi-dimensional analysis around them. Some of these, especially the one about Mushrooms is laid out in excellent Pedagogy Presentation.
Animal husbandry and dairy development

Animal husbandry figures are given in Panchayat Reports as well as District Hand Books. Details of Veterinary Polyclinic, dispensaries, hospitals, mobile units, artificial insemination centres etc. are given. These are not so elaborately dealt with as many other heads in the Reports.

The Kannur Handbook refers to the Regional Poultry Farm at Mundayad, Goat farm at Kommeri and Broiler Farm at Matannur as the major veterinary institutions in the district. There are 150 milk co-operative societies with about 50,000 members in the district. MILMA has a pasteurisation plant. There are chilling plants elsewhere too.

Wayanad has 16 veterinary dispensaries and 51 artificial insemination centres. There are 49 milk cooperatives of which 29 are working in the model of Anand.

Alappuzha District has the Central hatchery at Chengannur, the biggest hatchery in the State. It has facilities for poultry training and training in chick sexing. It has two regional artificial insemination centres, one at Chertala and another at Mavelikkara.

There is a Regional Poultry Farm at Malampuzha to rear chicks for the plan schemes, a Government Goat Farm at Attappadi

Fisheries

Kerala has a long indented coastline, with a tradition of fishing and marine adventure from early times. It is also responsive to modernisation. Hence relative to the size of the State and the length of the coastline, the amount of fish harvesting is much higher than the other states. Formerly indigenous methods were in vogue, employing country crafts (small, medium and large), and nets made out of natural fibres. During the past
Analysis, construct and case studies

two decades, mechanised fishing boats, nylon nets of different types with huge capacity have become popular. This area also has been well covered in the Kannur Handbook. The Mappila Bay at Kannur is a fishing harbour with facilities for launching, landing mooring and repairing. There are also facilities for, processing and marketing of fish.

In Cochin and Trivandrum vast strides are being made in this field. A fish seed farm is being developed at Vizhinjam. The marine science and fishing technology of the Cochin University of Science and Technology are making very important contributions in the field.

Natural resources
Minerals
The discussion of soils passes off imperceptibly to minerals. Palakkad report presents some details about the chemistry of the minerals. Low grade iron ore (magnetic) is found at Kollam grade, Mannarghat and Muthalamada. Limestone deposits are found in Chittur and Kozhinjampara firkas. Muscovita mica is found in Sholayar villages.

The Kannur Report gives the most analytical treatment of the geological features, which would be very useful for correlated treatment of the geography (rock types) and related chemistry. The following extracts from the Kannur Report bridges conceptual information with textual analysis style. Use of this material from the locality or region will help to give meaning to some difficult portions in geography (where the geology of rocks and minerals are presented in a dry string of technical terms.)

Archean: greisses (hornblende biotite) and charrokiates (in midland and highland)
Recent Formations: alluvium, laterite, lime shells, lignified woods (coastal areas)
It is interesting to note that laterite is commonly available throughout Kerala and is used freely as building materials.

This is an area where geology, chemistry and construction activities carried all-round fit in neutrally. Many studies by earth scientists and scientists working on specific projects in various panchayat can also help to illuminate this.

Since lime stone deposits are found in large amount in Wayanad, government started a cement factory there.

Kannur District Handbook gives the most detailed information about the industrial application of minerals. China clay is found in plenty in Thaliparamba and Kannur taluks. Various types of clay are used for potteries, tiles and ceramic industries. Laterite is quarried for bricks throughout the district to meet the local demand. [In fact this is characteristic of the whole of Kerala]. Kaolin type of clay is found below laterite in some places. A thin horizon of lignite is found in the cliff section. Ilmenites, monazite, Zircon and Titanium are found in the coast of Kannur. [This applies to many coastal areas of Kerala]. Silliminite, graphite and iron are recently discovered. Light bauxite is found and used in the manufacture of refractories and cement. Lime shells found in the back waters are used for the making of white cement and industrial purpose.

The bauxite found in Kannur is not of high quality and may find use for the manufacture of refractories and cement. Lime shells found in the backwaters of Kannur are used for the manufacture of white cement.

Industry
Kerala is not a state where entrepreneurs start large-scale industries. Even Keralites prefer to start industries elsewhere. There are several reasons for this. It is not the purpose of this study to list out the industrial
resources. Benedict documented 1324 medium and large scale industries in Kerala, of which 134 were chemical industries. He also developed a model how to visit such industries for optimum educational benefit. But it is the small scale industries that are more transparent for educational study.

All panchayat reports give information about the small scale and larger scale industries in their areas. This will be good starting point for investigation for the pupils. Only, in some panchayats there may not be any major industry. It may not be impractical to use the information from neighbouring panchayats also. At the district level it is feasible to collect a larger number, but only the Palakkad Report attempts to highlight the important ones with the opening sentence, 'Traditionally agriculture-based, Palakkad is set to be the industrial capital of the State'. The Kanjikode Belt connects Palakkad and Coimbatore, is identified as an area for industrial development because of infrastructure facilities such as NH 47, trunk railway line, cheap availability of labour, cheap power and water being the attractions.

Kannur Handbook also lists (though confessing to be an industrially backward district) the important industries, both cottage, and the major ones. Among the modern industries Keltron has started a group of industries. Among the cottage industries, beedi industry was very popular employing mostly young girls. But in response to the anti-smoking campaign, Dinesh Beedi industry has been closed, and to provide alternative employment to the workers, they produce squash, pickle, other food items, especially from coconut, umbrella and the like.

Handloom and Hosiery industries are well developed in Kannur, the start being given by Basel Mission. There are 12 medium-scale industries, most of them concerned with cotton textile or plywood manufacturing. The coir industry there uses traditional technologies.
Alappuzha has listed more than 20 medium/large scale industries covering areas such as drugs and pharmaceuticals, Keltron controls. Cattle feed, Glasses, Switch Gear, Briston Boats, Frozen Food exports, Spinners, phosphorus and chemicals, new marine foods, distillery etc. Nearly 1500 industrial units have been registered. Coir industry is concentrated in this district, many of them are now mechanised.

Water

Kerala is fed by about forty west-flowing rivers. Only three rivers flow east and join the Bay of Bengal, of which Bhavani passing through Palakkad is one. Since it is fed by both the monsoons the chance of scarcity of water is low compared to other states. But recently scarcity of water has begun to be felt. Much of it is due to poor water management. Hence the water authority is making careful plans to meet the problems in the present and the future. The supply of a safe drinking water and saving of groundwater is a problem on which panchayats and other bodies are concerned throughout Kerala. Generally studies indicate that ground water resources of the coastal sandy tracts were fairly good for development. In the laterite covered areas it is limited. Water found in wells is usually of good quality and could be used for domestic, industrial and irrigation purposes.

Because of the topography of Kerala, particularly in midland and highland, the bulk of the rainwater, which is the only source of groundwater, escapes as run off. Only ten per cent of the water can be considered as contributing to recharge. Hence plans are made for making check dams.

Most of the rivers are navigable. Some rivers are connected with backwater and canal systems so that long distance transport of goods by waterways is possible.

The Palakkad Handbook highlights the dams (Walayar and Malampuzha, Mangalam and Pothundi, besides three projected dams. The area of land
brought under cultivation because of the irrigation facilities thus provided are also highlighted. But electric power is not available from these dams.

The population figures are given for different levels of administration in various hand Books. The problem of health, mortality etc. is also given. These have powerful potentialities which have not been adequately used in the high school curriculum transaction.

Kerala has long coast line - besides plenty of in land water spots. Hence fish cultivation and harvesting is a powerful industry. Fish landing centres, fish making and repairing centres, materials for fishing, co-operative union for fishermen etc. are found in reports at different levels.

The terrain of Kerala is not quite conducive to games like cricket and golf, though cricket madness has started growing recently because of the influence of television. Athletics and games like football and volleyball have been nurtured for several decades and it has produced several outstanding sportsmen in this fields. The Kannur Report in particularly proud of its performance in this field, and gives a long list of successful athletics and sportsmen and denaturing facilities.

Religion
In religion, Kerala has a long tradition of religious harmony. Several varieties of Hinduism, Jainism and Buddhism are proud to have remains dating back to more than a thousand years. It is claimed that Christianity came directly to Kerala through the missionary activities of St. Thomas (52.A.D). Islam also came directly to Kerala through trade and scholarly exchange. The original nurturing of these religions in Kerala seems to have entirely peaceful. During the Portuguese period and during the Tippu invasion aggressive postures also seem to have been prevalent. But these are shorter episodes and in the long read the climate is one of
assimilation, tolerance and peaceful quiet system and even mutual cooperation among peoples of different religions. There are many festivals in which peoples from other religions also freely participate. Religion also contributes relics of historical value and a store house of ideologies. Sometimes, ideological conflicts have also arisen, but these are often resolved in course of time permitting peaceful quiet system.

Each panchayat Report gives coverage of the religious establishments and places of worship in their area. Many district handbooks cover the places of worship in their district, which have both historical value and tourist attractions. The Tourism Development Council’s coverage of such monuments is of course more attractive. Religion is more than temples and monuments. Kerala has a tradition of ‘forest saints’ belonging to almost all religions practising and preaching the most spiritual forms of religion. But temples and other places of worship are not only relics (primary sources) for the historian to work upon, but serve as preferred abodes as well as reminders of their faith to believers in religion. Jain and Buddhist temples dating from very early times show the influence of these heterodox sects among the masses. These sects had monasteries and nunneries, and they spread education among all. This may be one of the factors that accounted for the spread of learning among all sections in Kerala. Though India was the birth place of Buddhism the religion lost its followers in course of time. Radhakrishnan cites a saying "Brahmanism killed Buddhism with a fraternal embrace" in opening his treatment of Sankara’s advaita philosophy. Brahmanism took several good traits from Buddhism in the process.

Jainism also lost its influence in the South, particularly in Kerala and Tamil Nadu, though in some parts of North India, and in Karataka Jainism still held sway. Some of the groups from the North, particularly from Gujarat, were influential in business. The princes in Kerala gave them facilities for trade and helped them to build temples. We can see remnants of temples built with the help of missionaries from Karnataka in the late middle ages.
in Wayanad, and by Gujarati-speaking Jains in Calicut in the early modern period. Hinduism of all varieties and even *lokāyata* seem to have thrived in Kerala from very early times.

The Wayanadu District Handbook mentions Thirunelli temple, Valliyurkavu Bhagavathi Temple, Maha Ganapathy Temple (Sulthan Bathery), Thirunelli temple, Valliyrkavu Bhagavathi temple, Ponkili temple (near Karnataka border) and Sita Devi Temple at Pulpally. The last two are associated with the myths of Sita Devi. In the Pulpalli temple, Lava Kusa rather than Sri Rama are worshipped. The Valliyoorakavu Temple near Mananthavadi had tribal festivals in which the binding of the tribals to serve their master for the year were affirmed.


Among the places of worship of other faiths, the maidani and Varampatta mosques, the church at Sultahan Bagtheri, St. Lourd Church (Pallikkunnu) and St. Peter’s Church (Meenangadi).

The Kannur Handbook calls attention to the mosques founded by Maliq Ibn Dinar of Arabia. It also calls attention to the St. Thomas legend (52 A.D.), the main varieties of Christianity in Kerala (Suro-Malabar, Latin Catholic, Orthodox Syrian and Church of South India). The constribution
of the German Evangelical Mission founded by Dr Gundert in their area is highlighted.

The most famous church in Alappuzha district, St. Sebastian’s Church at Arthungal is shown lower along with an episode. Still more famous churches are located in districts for which Handbooks could not be got.

The main message about the proximity of so many different religious places of worship is that people could worship the Almighty All-Merciful God in peace with absolute religious tolerance. On many occasions people belonging to other religions help the other sects, even with reference to their places of worship and organising their festivals.

Folk arts and Festivals

Kerala has a profusion of folk arts. They have been classified as religious, heroic, entertaining, scientific and moral (Ullur, 1957), as social and recreational, religious, martrial, and tribal (Payyanat 1987) and in various other ways. Among the numerous folk art forms, just a few examples are presented in pictures and the coverage in one or two District Handbooks are also summarised.

Kannur is particularly famous for its folk art forms, especially the martial, expatiatory and cathartic forms, and those in which the weaker sections assert their rights, or symbolically take vengeance on the aggressor. It may be worth quoting from the Handbook the essential features of Kalaripayattu.

Kalari means school and payattu means combat. Kalaripayattu is one of the advanced combat sciences of the world and has reproduced many a hero whose exploits are celebrated in legends and folk songs.

In the past each desom or locality had its kalari or gymnasium, presided over by the guardian deity called Kalari Paradevatha or Bhagavathi. Most of the heroes of medieval Kerala were products of the kalari system. Both boys and girls received training in the kalari... this (training) is valued very
much from the point of view of physical culture. The whole philosophy underlying kalaripayattu is that the system is to be used only for noble causes and never for self aggrandisement. The glorious days of kalaripayattu had set with the dawn of the 17th century with increasing use of guns and cannons.

Kannur is also famous for other folk arts. Vadakkan pattukal were ballads of North Kerala celebrating the miraculous and heroic deeds of heroes and heroines. They are closely associated with kalaripayattu. These songs were sung in praise of heroes of two families in North Kerala – Potturam Veedu and Tacholi Manikkottu Veedu, celebrating the Tiyya and Nair subclasses respectively.

There were several folk dances in this area accompanied by drums and community singing. In many of these, the so-called lower castes and tribes excel. Godamuri is an entertaining folk play with masks, celebrating the cow and including fertility rites important for the farmers. Vedan Pattu is one in which Siva and Parvathi are identified with the lower castes.

Poorakkali is a temple festival min honour of Goddess Bhagavati. Maruttukkali is a fusion of cultural arts involving arguments and counterarguments on scientific subject. It cannot be discounted that this is
a method by which the upper caste people who can climb trees or do other kinds investigations through work which was considered beneath their caste, could learn the ethno science of the lower castes.

Teyyam is a ritualistic dance very popular in Kannur district, performed by the Mannan, Velan and Malayan communities. It was patronised by the feudal chiefs of Ezhinadu, Puzhinadu and such other places where the Dravidian culture was maintaining its supremacy. Sometimes Theyyams pronounce judgements on temporal matters and give blessings to the believers. Theyyam is essentially a human creation; it has an absolute relationship with and in giving vent to his strong feelings against injustice and wickedness and assert his desire to maintain the well-being of society.

The ethno science and ethno mathematics of the ordinary people can be seen in the head gear, mask and several other accessories associated with the art. It is likely that arts such as the kathakali which might have risen to classical stature grew out of them lower forms like Theyyam.

There are several festivals associate with different religious groups. In many of these festivals people of all communities participate. The Pooram
festival at Trichur with an array of decorate elephants reacting gracefully to a variety of musical instruments played by a large number of folk artists attracts very large crowds, including foreigners.

Kerala also celebrates several secular festivals, of which the most famous are perhaps the boat races in Alappuzha and other places.

B. HISTORY MADE LIVING WITH ARCHEOLOGY AND OTHER SOURCES

The discussion in this section is different from the preceding in that it attempts to present the data got from the documents as materials for investigatory learning of history. In the new curriculum an attempt is made to present science as investigation, and even history, where possible to be drawn from the immediate environment is hinted to be started that way. But such local derivation of history is done to a limited extent in the lower classes. When the District Handbooks and tourist information materials give beautiful pictures of what the historians would call remains or relics, class reaching also can be related to these sources. In places where archaeological museums are accessible, pupils can use the relics suggested in the handbooks and use them as primary sources. History will then become alive, instead of being a string of dry facts. Sometimes the District handbooks and the tourism write-ups have attempted to present history to tourists in live ways; e.g., Discover Wayanad: The Green Paradise. The educational authorities too may consider these.

The documentary analysis yields plenty of information which could be useful for giving life to the study of archaeology and history. For example, the pupils study about paleolithic, neolithic and other prehistoric periods in
their texts as mere information. But if the remains and relics of the old period could be presented in the text in the original at least in pictures, it would pave the way for the pupil learning history more meaningfully and even as investigation.

The first chapter in the Social Studies text book of standard IX treating 'Life in the pre-historic period' gives factual information about Palaeolithic and Neolithic periods. The presentation is factual rather than investigational. There is one mention about India along with Egypt and Sumerian in referring to the remains of the very early period otherwise the evidence is cited mostly from Germany (Neander Valley), France (Cro-Magnon) and Italy (various caves). The pictures of the old stone implements are also given. In referring to the neolithic age, reference is made in the text to some remains of the period found in Kerala in a general way.

It is here that the resources provided by the district hand books, gazetteers, tourism information sources can give a specific local habitation to the abstract and generalized references in the text books. Such references can stimulate direct investigation in the particular districts and indirect investigation in the other parts.
Once the pupil gets some investigational base with archaeological sources from actual remains in specific Kerala settings it will pave the way for understanding about our own early culture and other ancient cultures from pictures and descriptions in cases where relics and remains can't be provided as investigational base.

Some parts of Kerala have preserved relics of the very distant past. This is particularly evident in the district handbooks of Kannur and Wayanad. Plenty of evidence about the habitation of Neolithic age in Kanur and Wayanad districts have been preserved: “Rock-cut caves and megalithic burial sites of the Neolithic age have come to light in certain parts of the district. The Thikkilparamb-Kannur-Thalassery area abounds in rock-cut caves, dolmens, burial stone circles, menhirs, all of megalithic burial order.” “Countless evidences about New Stone Age civilisation can be seen on the hills of Wayanad. The two caves of Ampukuthimala located between Sulthan Batheri and Ambalavayal, with pictures painted on their walls and pictorial writings, speak volumes of the bygone era and civilization”.

Some of these sites can be visited by pupils in the district and by excursion parties even from outside. The investigator had the privilege of leading her B.Ed. students from her Centre to visit some of the old remains and relics in Wayanad. The students were thrilled at seeing the famous Edakkal cave near Ambalavayal. The earlier mental picture of the cave that the investigator and her students had was that it was solely something that was dug out. The Edakkal cave presents a different picture of a cave formed by several layers of rock formation. The beautiful symbolic inscriptions in the Edakkal cave filled the group with awe.

The relics could be seen ex situ in various museums. KIRTAD the Pazhassi Raja museums display several implements and other relics of the early period. The museum at Ambalavayal, Wayanad has been
recently started and it is not very dense with very old materials. The museums in Kozhikode are the chief sources for the Neolithic and other relics in Wayanad.

Secondary sources helped to give meaning and a deeper interpretation. This kind of material is available in some of the university history departments, particularly of Calicut University, but such materials can be read with only by scholars. Some of the District Tourism Promotion Council materials present highly technical material in popular language. Their booklet entitled Discover Wayanad: The Green Paradise is full of such materials written by eminent scholars.

The article "The Edakkal Rock Engravings: Morphology and Meanings" by Professor Rajan Gurukkal is extremely deep and full of symbolic interpretations. He identifies the site as a habitat of neolithic people on the basis of the nature of representations on the cave walls. He notes that in representational richness and uniqueness, it has no parallel anywhere in the world.

In the interpretation of graphic symbolism, Gurukkal uses the deep theories of several anthropologists and sociologists and hypothesises that the society which produced this art form "was facing the transitional crises and contradictions which were insurmountable to the people who in the form of fantasy production found a purely imaginary resolution in the aesthetic realm."

For the ancient period, relics with age precisely fixed are not indicated in the District Handbooks are analysed. However some early relics found in museums might relate to the early phases of Buddhism and Jainism. Sangam literature forms the main source for the history of Kerala in the first few centuries A.D. The Kerala Sahitya Academi has published some of these works in Malayalam script with explanation. After Elamkulam
Kunchan Pillai very few Malayalam scholars have paid much attention to this source, which is in very old Tamil.

For the medieval period from about 8th Century to 15th Century several relics and inscriptions are available in old Jain temples. Some of them are cross-referred in DTPC documents. In Wayand, there are remains of Jain temples, some with inscriptions in Kannada analysed by Dr. Raghava Warrier. Some of these abandoned temples may be worth renovation with the support of UNESCO or other bodies.

There are references to the Chera dynasty re-established under Kulasekhara Varma in the 9th Century A.D. at Mahodayapuram. Dr. Sasibhooshan’s analysis of Thirunelli temple is rich with historical cross-references to the medieval period. The Kannur Handbook also refers to the visit of several Arab scholars to the West coastal towns of importance – Baliapatam, Srikantapuram, Dharmadom, Bekal and Mount Eli (Ezhimala).

When we come to the modern period an enormous amount of data are available. Both Kannur and Kozhikode Handbooks present very important relics regarding the Portuguese contacts with India. The Kappad beach where Vasco Da Gama landed is itself an important landmark. The seashore itself is bent at that point where the river, fit for navigation, also joins the sea. This geographic feature provided a vantage point for Kunjali Marakar’s fleet to surprise the Portuguese. The DTPC, Kozhikode is starting a museum in honour of Kunjali Marakkar near that point. Incidentally the quadrangular transactions among the Portuguese, Zamorin, the Kolathiri prince and Kunjali Marakkar are also documented in the Kannur Handbook. Of special interest in gothic context is the Fort of St. Anjelo or Kannur Fort, constructed by Francisco de Almeda of Portugal in 1505. This fort later passed on to the hands of the Dutch. The British erected a fort and a factory at Thalassery at the end of the 17th Century.
The story of the forts and the fleets in Kannur district is being developed as a model for a relic-centred animation of history.

The arrival of the French at Mayyazhi (Mahe) in 1725 and Tippu Sultan's invasion of Kerala (1788) add new dimensions to history. This offers interesting quadrangular political interactions with the French, British, Mysore and the indigenous kingdoms.

The Palakkad Handbook refers to the invasion of Palakkad by the Zamorin of Kozhikode in 1757, the entry of Hyder Ali of Mysore to help the Raja. Then the whole of Palakkad passed into the hands of the Mysore rulers. Later Malabar was ceded to the British and became part of the Madras Presidency and remained so till the formation of the Kerala State in 1956.

The French withdrew quickly from the scene, but the triangular interactions between the British, the Muslim factor (first as invaders, then as Mopla resistors) and the indigenous
groups continued for a long time. Pazhassi Raja factor is profusely illustrated with legends, folklore as well as relics (Handbooks of Kannur, Kozhikode and Wayanad).

Tippu Sultan factor also is evidenced by several relics and monuments. The top-moist town in Wayanad is known as Sultan Batheri. Tippu Sultan came down far into the interior of Kerala and the famous Tippu sultan Road starting from Kodungalloor is a typical reminder of his invasion. But it is very interesting to note that the Panchayat Reports (1997) in that area (Kodungalloor, Mathilakam etc.) are written in a vein that would promote peace rather than hatred. These reports attempt to dispel the feeling that Tippu (or Muslim invaders in general) were destroyers of temples. They have expressly called attention to several temples lying along the road and noted that none of them bear any mark of damage. They also add several instances in which Muslims have donated land for building Hindu temples, of Hindus giving land for building mosques, participation of Muslims and Hindus jointly in some festivals etc.

It may be interesting to note that Kodungalloor has been culturally important from very early times. Many scholars feel that this was Vanji referred to as the capital of the old Chera kingdom. The Chera prince Ilango Adigal wrote his famous epic Cilappadikaram from Mathilakam about 10 km east of Kodungalloor. The epic is a masterpiece presenting the classical and folk arts of Kerala even two millennia ago (Manuel, 1964, 1983). About the 8th or 9th Century Kodungalloor was the centre of Cheraman Perumaln about whom several legends are current. According to one tradition (recorded in early Tamil epics) he was a Saivite saint. According to another he became a Muslim and went to Mecca. In both cases he is shown as a very pious man. *In any case Kodungalloor was a confluence of several cultures and religions. Islam came here in peace through trade and intellectual-spiritual transactions by the ninth century or even earlier. Dr. Thomas Isaac who was in charge of monitoring the
decentralised plan during the rule of the last ministry (9th Plan) had developed a model for starting a cultural museum near Kodungalloor. It is not clear where the matter stands now.

For research in both the mediaeval and modern period, stone inscriptions and copper plates form important primary sources. Proclamations of the rulers in palm leaf (neetus)

![Copper plates](image1)
![Stone inscription (Vattezhuthu)](image2)

also form important sources, such materials do not last long. Some neetus are preserved carefully in archives. Copperplates and stone inscriptions can be found in museums. A plate and inscription kept in Padmanabha Palace Museum (under the Kerala Tourism administration though the location is now in Tamil Nadu) are displayed in the publications of Trivandrum District Tourism Development Council.

In summary, documents and pictures of the type identified above can help even school children to approach history as investigation, with a historiographic point of view oriented towards tolerance and mutual understanding. A broad view of culture and of believing that all cultures
are of equal worth, and that geniuses can be drawn out of all sections can also come out of this analysis.

C. A TRYOUT IN ALAPPUZHA OF APPLICATION OF THE ANALYSIS

Alappuzha, the district where the investigator is working provides plenty of materials from the District Handbooks and other documents to make learning a living experience. In addition the investigator made several rounds through Alappuzha and its environs to identify points which can be made the environmental trigger-point to catalyse pupil's learning. Armed with these mental furnishing the investigator attempted several conducted tours in that area with children of different age groups. In this brief description the precise fitting of age group and depth of treatment is not noted. The last case study given at the end of this chapter presents some work done in her own garden. The starting point was taken from those experiences as well as from the documentary analysis given above, but a point developed in her garden case study is not repeated here except to serve as take-off point. What was done outside alone is given greater focus.

The children had already noticed differences in soil colour and texture even in the limited environment of her garden (hereafter called the base). Going out to various parts Alappuzha, Cherttala and other places, these differences could be more clearly seen and further differences also were evident. In this exploration, some of the panchayat reports were used for cross reference. Sandy soil was Western Cherthala not too far from her house, was examined minutely. Most of the sand was white in colour with large grains. In some places coloured sand was also found. Its mineral value was discussed. In Eastern Cherthala peaty soil was observed. Observation as well as discussion with inhabitants showed that the plant yield was low there. Halophyte plants which could not be identified in the base, were available in plenty near some coastal points.
Plant study which had already been started in the base was extended during the study tours. More varieties, types were identified. In the Kanjikuzhi panchayat they had developed a model of vegetable gardening which had won acclaim even from foreign experts. This was observed in detail.

Spinning of coir could be seen even from the base. A coir factory was visited where the spinning and weaving were done on machines. The dyeing of coir also was observed. Now the colouring is done through synthetic chemicals. An old worker explained that twenty years ago most of the dyes were natural ones obtained from plants, and he gave the details. The big looms in which huge coir mats were observed. It was a massive operation and a complex system of pulleys was used. In weaving the large mats four weavers had to tread in quick succession according to a specific rhythm. The perfect rhythm (*tala*) was absolutely necessary for the operation to succeed.

Coir mats of different colours, shapes, patterns catching the attraction of the visitors could be seen in the retail marketing regions north of Alappuzha. Each pattern had its own mathematics, but this could be learnt better in the hand weaving processes than in machine-weaving.

Fisheries operations were observed from several points of view at Purakkad, about 27 km south of Alappuzha. Different types of nets and their material were observed. The boats - their shape, size, oars, other accessories, paint etc were observed. The mechanical boats of different types were observed. The way of launching and landing was very interesting.

An aquaculture farm named Nature's Way, situated quite near the base, was observed. Types of fish, their habits - eating, moving, breathing were
observed. Breeding and nurture of fish, their upkeep, the fish bowls of various types. Since this is a point where ornamental fish were marketed, it was possible to get several details regarding the process ranging from the science through the aesthetics, to commerce.

Going round the town the light house was seen. Nearby the bridge leading to the deeper waters could also been seen. A child asked what is the need for such a bridge and lighthouse when ships do not come to our place. The history of Alappuzha port and its importance naturally took off from this stimulus. During most of the eighteenth century, the main port in that side was Purakkad, and even it was a centre for even foreign trade. But the port in Purakkad declined by the close of the 18th century. The Dewan of Travancore, Raja Kesava Das, selected Alappuzha and developed it as the new port. A European engineer Mr Crawford was in charge of the project. Canals were dug to connect the seashore with the backwaters. A bridge was also needed to lead to the deeper waters. The port was opened for foreign traders in 1792 and a lighthouse was put up in the western coast near the port in 1862.

At that time gothic was then biggest port in the Travancore. The products from Kerla such as copra, coconut oil, coir and coir products, hill produce such as spices. Because Aleppey became an important trading centre people from other parts of India such as the Parsis, Marwadis, Gujaratis, Kuchimenons and Gowdasaraswatha Brahmins from Goa came and
settled here for trade. Foreign (Anglican) missionaries who had Kottayam as the main centre landed in Alappuzha. Hence an early English medium school (e.g., the one in the name of Mrs Norton) was started here.

The children were inquisitive about the Buddha statue (which was named Karumadi Kuttan), which they saw in their trip. Around this stimulus the history of Buddhism in Kerala was explained. Pictures from other parts of Kerala were also shown.

Kerala as a place where many religions could co-exist peacefully could be brought out by helping the children observe churches, temples and mosques in close vicinity.
The St. Sebastian Church at Arthunkal, located 22 km N.W. of Alappuzha is very famous. The festival conducted here in January every year is attended not only by Catholics, but members of other sects too, including non-Christians. Originally this festival was the meeting point of traders, and even now that spirit has not diminished.

D. CASE STUDIES : IDENTIFYING/USING COMMUNITY RESOURCES

1. The Mud bank or Chākara : Ethno science of the Fishing Community

This episode covers an aspect of ethno science well understood by the fishing communities, much of it being explained by modern science too. The chākara phenomenon is very familiar to persons in Alappuzha district and other coastal areas of Kerala. This phenomenon has been popularized through several works in Malayalam literature. All Keralites are aware of the haunting song from the film “Chemmeen”, which end with the refrain chākara and the verses describing the lives of fishermen

Mud bank formation, a distinct feature of the Kerala coast, usually occurs about a week after the onset of the south west monsoon. It has a calming effect on the sea. It permits even small country crafts to ply over it safely, even when the sea is turbulent all round. Formerly, this was attributed to the presence of oily substances in the mud. Later it was explained in terms of the increase in viscosity over a very loose and non-rigid clay bottom. Several other theories have also been advance, some representing folk science and some representing modern science. But the occurrence of the mud banks is sporadic and erratic, and a combination of several factors such as the intensity and duration of rain fall, temperature, salinity and some unknown factors seem to decide their formation, extent and continuance.

Mud banks usually occur at a distance from river outlets. This is a phenomenon to which fishermen eagerly look forward. They act as an immense storehouse of organic matter inviting concentration of fish. They exercise a decisive role on the shore stability of the Kerala coast. They trap the littoral material passing through them. Because of the claming
effect of the sea during chākara foreign ships can safely come and
harbour in the area. Thus it has helped to shape the history of Kerala. This
phenomenon must have existed for several centuries, but the earliest
recorded evidence in modern times seems to be in 1723.

The chākara phenomena that occurred in the seacoast in Purakkad
and Arthunkal beach, were observed by the investigator along with 30
students on September 13th, 1999. The sea was very calm as compared to
the beach 1½ km south as observed by the group. Sometimes the chākara
exists only for a short period, but in this particular case, the chākara
extended for some months. An interview was initiated by the investigator
with an aged coastal inhabitant in that locality. The information gathered
from that interview is summarised below:

The sea mother (Kadalamma) is faithful. The sea is clam during
chākara season. By observing the calmness of sea, fishermen
recognise the chākara (mud bank) and reap a good harvest of fish.
The ‘chākara’ of chākara (the richer reaping in terms of learning) is
attained by mediators. The fishermen get only low wages. They
can’t save much money after paying the rent for boat and fuel
charges. But the mediators “reap” more benefits without any effort.

From the description of aged fishermen, we can see that the folk
are to make ethnoscientific predictions. When the sea becomes suddenly
calm they expect that the mud bank will be formed and they will get a
richer haul of fish. Even in their sufferings the fishermen maintain a sense
of humour and use poetic metaphors, “chākara’s” chākara is a typical
example. Chākara for the fishermen is the rich catch of fish. Chākara’s
chākara for the trader is the richer amount which he gains by exploiting the
fishermen. Even though the government provides loan and subsidies for
buying nets and boat, fishermen can’t pay back the loan at proper time in
non-seasonal fishing times.

During chākara season, fishermen from other places reach
Purakkad region. A fisherman met at Purakkad from Kayamkulam said
that "Arayas" are the descendants of Valmiki Maharshi, the author of Ramayana. This Hindu myth indicates that the mother of Valmiki is an Araya lady called Sathyavathi and father is Parasaramuni. Even now Arayas consider the sea as their Pottamma (foster mother) and they worship the sea.

During earlier times, only Arayas were engaged in fishing as the occupation. At a time when development of mechanised boats and new fishing techniques attract other people belonging to different communities towards fishing, fishermen want their children to go away from their profession and lose the benefits of labour-saving mechanisation and modern scientific approach. Government provides free education to the children of fishermen through Government Residential Vocational Higher Secondary School and other schools. But parents want to send their children to the academic type of schools instead of fisheries-oriented schooling. However, it is the financial incentive in the residential school that attracts poor fishermen to send their children to these schools. The son of the interviewee from Kayamkulam is at the 8th standard of Arthunkal Government Vocational Higher Secondary (fishery) school.

Most of the fishermen are aware about the breeding season of fishes and trawling control. Trawling is banned for about 45 days in each year from June 1 to July 15. This is for preventing the destruction of eggs and neonatal fishes. Trawl nets can catch more fish but they don’t allow the very young fishes to survive because the meshes of the trawl net are very small. Knowledge about the scientific aspects of trawling helps the fishermen to understand the necessity of trawling ban.

Talk with an Araya lady travelling in the van on the way from Purakkad chākara region is summarised as follows:

The van was filled with peoples. Most of them were women belonging to fishing community. In spite of the crowd one Araya lady was trying to keep some distance away from the investigator. The investigator asked her to
sit closer to her. Then the Araya lady responded that most of the travellers keep distance from them because of the foul smell, but all of them like to eat fish. Most of the transport employees do not allow the Araya ladies to board their vehicles with the fish basket because other travellers dislike their presence. The investigator asked her about the Malsyafed bus, where they don't have this problem. But the interviewee responded that Malsyafed bus has a particular time schedule. But they can't sell the fishes within that time in all days. So they have to take other means of transport.

Interview with a fisherman at Arthunkal beach is summarised as follows:

Mackeral is obtained only from deep sea water. Boats with large engine are needed for fishing in deep sea water. The small boat does not have sufficient capacity to reach the deep sea. The expenditure of using boats with powerful engines is high. Ordinary fishermen can't afford it. More benefit can be attained from fishing prawn during chākara season. Usually one basket of Chemmeen (prawn) fetches Rs.1,500/-. The rate depends upon the availability of the prawn. During the chākara period fishermen give fishes free to neighbours and those who visit their places. Fishermen unanimously say that anyone can do the fishing job without considering the caste, colour, union, religion or party. The main complaint of fishermen is that without any tension and effort middlemen get the benefit of chākara.

In spite of all their limitations children of some fishermen have distinguished themselves in academic learning also and have taken up various professions. A son of a fisherman known to the investigator is a doctor and another son, an M.Sc. B.Ed.

Even though they are in poverty, they are co-operative within their community. Fishermen start fishing early in the morning and return to their hut by noon. They cook in the boat or eat bread or banana. The interviewee emotionally responded that fishermen satisfactorily feed once in a day while others eat three times in a day, and the food is often made more tasty through the hard and risky labour of the fishermen. Sometimes, even the one time food is not available to them.

Because the fishermen have had traditionally a very hard and risky life and have been exploited, most of them want to give up fishing altogether
and try other avenues through the academic type of curriculum. As already indicated, a very small minority have already succeeded in this line. But a far larger number end up without a successful academic career, failing at various stages. Such pupils have lost the benefits of the old occupational chance and fail to get new ones. They have every right to get into a general stream and complete successfully with others. But they can do this even better by developing a positive attitude to modernised fish craft, combining the best of the old and the new. Some can distinguish themselves in the academic stream also. But others can take advantage of the preference given to them in training them for leadership in the modernised fishing profession.

2. Tapping the Rich Resource of Socially Weaker Sections

A careful study of the cultural history of Kerala will show that not only the Brahmins but also the so-called lower working classes have made great intellectual contributions. The contribution of the palm tree-climbing caste to the development of even modern botany has been made evident through *Hortus Malabaricus Indicus* in which Itty Achuthan was the chief investigator. There is internal evidence that Viswakarmas have contributed to *Viswakarmayeyam*, the scientific treatise in architecture: “Varayālattut tachchāsān, collittannoru lakshanām.” Even now there are several groups like kākkālar and arayar (fishermen) and various other groups whose ethnoculture could be tapped with profit. In this episode an interview with the tribal group *ullādar* settled near Alappuzha is described.

The *Vālmiki Valluvar Grāmam* (V.V. gramam) started in 1953 is situated 15 kms away from Alapouzha. It is inhabited by girijans and harijans. Chithira Tirunal Maharaja gave 15 cents to each family. V.V. gramam has two blocks – A and B. A block is for Valluvar (girijans) and B block is for harijans. Most of the harijans are educated, taking advantage of the government schemes provided for their welfare and are engaged in agriculture, business, driving, etc. The educational status of girijans is not so developed as that of harijans. Most of the girijans are involved in
marappani (wood work). Some take up in factory work, driving, etc. The main occupation of women in both harijan and girijan colony is coir making. Within each colony there is good co-operation. Between the two colonies the co-operation is not so high.

An aged girijan said that wood of Maññakadambu and käyämpuli are more suitable for making small boats and paddle because the wood of these plans is more lasting.

Padmanabhan, an old informant aged 85, has studied only up to class IV. He is a good Vaidyan. But now due to old age he is not able to do any work. However he is interested in giving information about the Valluvar. According to Padmanabhan, the adimanushyar (primitive men) are Ullādar (girijans), Ulādanmar are 'people of the interior' (of forest). They bring medicines from forests. Even now some aged women are engaged in collecting medicines from forest. Ullādar holds the view that snakes will not harm them.

An interesting folk story of the origin of the Ullādans was narrated by Padmanabhan. Once Lord Mahavishnu appeared in the form of Dhanwanthara muni and called the Ullādar. The muni asked them to pluck the leaf of a plant. One Ullādan give the leaf of kurunthotti. Dhanwanthara muni informed him about the medicinal value of different plants.

Three 8th standard pupils who accompanied the investigator noted down the details about the demonstrated plants by the Ullādar. The pupils had been told about some medicinal plants in their class but they had not seen them. Now they got direct information from the original source.

One of the interviewees illustrated the power of Ullādar through a folk story. Once upon a time the so-called higher caste people depended on them and asked them to leave the forest and settle in the place near to them. The Ullādar were not interested to leave the forest and live in the villages. So they said that the coastal climate will affect their breath. But the higher caste people replied that forests existed in their area also. Thus the Ullādar from the thick forest reached a place called Kadakkarapally.
with a forest, not far away from Alappuzha. There was a huge pāla tree. One of the Ullādans climbed upon it and hung upside down, did some acrobatics. The pāla tree also began to show springing motion. On seeing this, the higher caste people realised the power of Ullādar.

There are about 15 harijan families in A block and 15 girijan families in B block. Padmanabhan describes the cruel punishments given in the Asān Kalari. An old interviewee recited a few lines from Amarakōsam and Sidharoopam. He also told the older calculations through a song. The name Vālmiki Valluvar denotes that the girijan are the followers of Vālmiki maharshi so called Valmiki. The word Valluva denotes harijans from Valluvar nādu.

The older Valluvar ladies have deep knowledge about the medicinal plants and its medicinal values. When the representatives of Panchayat made some mistakes in the identification of medicinal plants it was corrected by the Valluvar ladies.

3. Kunchan Smaraka Mandiram, Ambalappuzha: Seat of art form Tujjal

About 25 km south of Alappuzha, there is a place called Ambalpuzha where there is a temple called Krishnaswami Kshetram. It is the seat where the great Malayalam poet Kunchan Nambyār created a new art form called tujjal. There is a story about its origin.

About two hundred years ago Chākyār Kūṭtu was the most popular art form performed in the temples. In Chākyār Kūṭtu, the performer (Chākyār) used to sing slokas in Sanskrit, and then explain the meaning in Malayalam with humorous anecdotes. Kunchan Nambyār was accompanying the performance of a famous Chākyār on a percussion instrument called mizhāvu. Nambyār was probably inattentive at a particular point during the performance and the Chākyār criticised him in public. Smarting under the insult, Nambyār took revenge on the Chākyār by inventing a new art form called tujjal and performing it on the same stage.
In this art form the whole story is sung with accompaniment of dance by the artist, and the whole piece will be in good Malayalam. It is not as if the standard form is in Sanskrit and the lower expository form in Malayalam. In *tullal* Malayalam is elevated to a high level. Though puranic themes are taken for the story, it is only a pretext. Plenty of humour and satire is used to make it a criticism of current social affairs and situations.

Now in memory of the great poet, *Kunchan Smārakam* has been founded, and boys and girls are taught the art form and also the accompanying music and dance form. The investigator, accompanied by four pupils belonging to Class 9, visited the *Kunchan Smārakam*, observed the performance of the boys and girls who were learning in the centre. Some of the pupils performed skits to show their learning. More time was given to the performance of a pupil who chose the passage from Nambyar's *Kalyāṇa Sowgantikam* starting with the words *nōkkadā ninnde*, which had been prescribed for study in the regular schools for Class 9.

The idea contained in the theme is this: At the request of Draupati, Bhima sets out in search of a rare flower called *Kalyāṇa Sowgantikam*. He has to traverse over mountains and valleys and passes through thick jungles. On the way Bhima sees an old monkey lying on the road blocking the way. He asks it to move away. The monkey pleads that it is too old, and requests Bhima to bypass and go round him. Bhima does not know that the monkey is none other than Hanuman, his elder brother (both were sons of the God of Wind). The monkey is taken to represent the lower castes who should not occupy the Highways, and Bhima utters words of disdain in the arrogance of his higher caste. These crucial words were being performed.

The boy who performed did it flawlessly and expressively in terms of Malayalam language, music and singing and in the dance and *abhinayam* (communication through expressive action). The pupils who accompanied
the investigator said that when the lesson was taught in their own class, the teacher would read it, sometimes ask a pupil to read or recite it, and then tell the meaning of the difficult word, or write them on the board. Occasionally the teacher would tell the story which formed the context of the poem. On the whole they did not enjoy the lesson. They even found Malayalam difficult, because they could not get into the spirit of the work. Here these small boys did the text, the song and the dance together as one integrated whole. It should have been difficult to do all these. But they did it as an integrated unit, and made it appear easy.

Talk with the pupils who studied this integrated art form in *Kunchan Smārakam* and examination of their notebooks showed that they had studied the Malayalam part thoroughly, learning the meanings, junctions, grammar, figures etc. They had a music teacher who taught them musical theory and practice systematically. The dance teacher not only taught the movements and *abhinayam* but also unified all the arts together.

The investigator also interviewed the Secretary of *Kunchan Smārakam*, and some Malayalam teachers associated with the programmes. Prominent among them were Professor Gopakumar, teaching Malayalam in S.D. College, Alappuzha and Sri Sreedharan Pillai, teacher of Malayalam at Government High School Ambalapuzha. Some facts gathered from them are presented below:

*Kunchan Smārakam* is an institution recognised by the Government of Kerala. The boys and girls admitted up to the age of 12. They should have high aptitude for art. A stipend of Rs 50 per month is given to them. The classes are conducted mostly on Saturdays and Sundays. The dance masters are Vaidyan Krishnan Kutty for *tuljai* and Ramakrishna Kurup for *Velakaji*. 
Professor Gopakumar gave the following information: Nambyar created *tulāl* by assimilating the components of various art forms which existed in the Travancore State in the 18th century (*padayāni, ṇāṭṭupāṭṭu, chakrapāṭṭu, Koithuppāṭṭu et al.*). In those days farm labourers and other manual labourers were ill-treated by their masters. The labourers were really intelligent in work and ethno science as can be seen from the physics built into their instruments. They also sang as they worked. Since Kunchan Nambyar had built his rhythms from the work rhythms of the people, his work was immediately appealing to the working people.

Nambyar presented his art form for the peasants and others belonging to the lower castes. He had to perform his art outside the temple, as they could not enter the temple. He also criticised the social evils with his powerful satire. Even now this is one of the temple arts which is performed outside the temple premises in Ambalapuzha.

4. The Itinerant Pesticide Promoter as a Community Educator

Just as medical representatives go round houses of doctors to promote new drugs, the pesticide promoters also visit the houses of agriculturists, who raise their doubts whether the pesticides are effective or have certain harmful effects, etc. In such cases the promoters explain the functioning as well as the science in simple language. Sometimes they help to set up controlled experiments with two plots – one in which the target pesticide is used and the controlled plot where it is not used. Sometimes three plots are set up – one with the target pesticide, the second with previously used pesticide, and the third without pesticide treatment.

In the diffusion of agricultural innovation research, Rogers and others have identified the phenomenon of early adopters, late adopters, laggards, resistors, etc. One interesting thing is that they successfully use opinion leaders. These opinion leaders reinforce the innovation diffused through the mass media. Probably following this strategy the pesticide promoters
very often identify traditional farmers with large land holding. These farmers would generally follow traditional approaches. But if they can be convinced even to tryout the new method it would be a big achievement. And if the bigger traditional farmers accept the innovation, the large number of small farmers will buy them.

Another method is to arrange a meeting of agriculturists to give information about the particular pesticide and to canvas consumers.

Sometimes the pesticide causes certain side effect like the destruction of friendly organisms in the paddy field. In the discussions, the promoter has to clear the doubts about the side effects also. In addition to promoting the pesticide the precise way of using it has to be explained. Otherwise the effect of a good product will be nullified by wrong use.

Hazards in the use of pesticides will have to be anticipated. In order to recognise the intensity of the effect of pesticides different colours are given outside the bottle. For example

<table>
<thead>
<tr>
<th>Colour</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Very high intensity of danger</td>
</tr>
<tr>
<td>Yellow</td>
<td>High intensity.</td>
</tr>
<tr>
<td>Blue</td>
<td>Moderate intensity.</td>
</tr>
<tr>
<td>Green</td>
<td>Low intensity (fungicide)</td>
</tr>
</tbody>
</table>

Such effective symbolic communication could be helpful to avoid fatal accidents even to human beings. Even with literate persons this immediate colour effect could be a powerful warning. For illiterate farmer, it is an absolute necessity.

The nonformal educational resources for several aspects of applied science are involved here. In this particular case chemistry and biology come centrally, and physics comes in the spraying techniques, and pesticides, etc. Other sciences also may be incidentally related. Perhaps
the most important aspect may be an area which is not formally in the
syllabus, namely, communication with the rural persons. This is
elaborately analysed in rural sociology and agricultural innovation
diffusion. It has an indirect lesson for educational experts, especially
those dealing with inservice education. If they adopt the methods used in
agricultural extension they might be much more effective than they are
now.

5. Dayal’s Experimental Plot

In addition to the regular resources in the community like the museum,
krishi vinjana kendram, hospitals, primary health centres, various work
parts where fabrications are made and there are certain resource centres
created by committed and innovative individuals. They voluntarily allow
students to visit their resource centres and learn. One such case is that of
Mr. Dayal’s experimental plot at Muhamma of Alappuzha District.

The study starts with the problems encountered by Mr. Dayal in his
cultivation of coconut in his 1.5 acre land. In spite of providing enough
water and fertilizers, pests affected his crops after five years. One day he
happened to read an article related to natural care of plants in
Mathrubhoomi Daily. Stimulated by this he wrote to Mathrubhoomi for
further details. He got an advice from them not to cultivate a particular
crop only in a land but to try multicrop cultivation. After that Dayal read a
book related to the method of cultivation, ‘One Straw Revolution’ later
translated as otta vaikol viplavam. He adopted the principles mentioned in
this book. But his crops were completely destroyed.

In 1991 Dayal participated in a meeting related to permaculture held at
Wayanadu. About 45 members from different fields participated in that
meeting. K. V, Dayal was selected as convenor of the ‘Jaiva Krishi Samiti’
for promoting biopesticides and biofertilizers. The main aim of the samiti
are
a) Cultivate nutritious and non poisonous food items
b) Develop safe method of cultivation
c) Avoid ecological problems and hazards to health.

In order to attain these objectives Dayal observed the natural pattern of growth of trees in forest and studied about it, conducted interviews with traditional agriculturist, read many books. After five years Dayal formulated five basic principles about agriculture.

a) Medicinal values of plants are determined by the fertility of the soil. The fertility of the soil can be increased by using biofertilizers, the excretory, product of animals and decaying plants and animals, which contain the energy already tapped out from the original source, the sun.

b) The stored fertility of soil is decreased due to the continuous cultivation.

c) Since plants know the technology of food production by capturing solar energy, maximum solar energy can be stored through planting maximum plants.

d) Agriculture is the means of food production to man.

e) Except plastic and glass all other waste items are 'food behind the food.'

Out of his 1½ acre cultivating lands, Mr. Dayal has made a natural forest in 15 cents of his land. Here the interference of the man is reduced to minimum. He has also made a cultivated ecosystem in the remaining 135 cents of his land involving man too.

Dayal also observes the companionship of plants in the forest and he applies this principle in his land. Baniyan trees and mango trees grow together. Coconut, jack fruit tree, pepper, amorphous and plantain pattern, etc. form a community. Dayal does not dig his land; nor does he give any chemical fertilizers. These aspects do not occur in forest also. He has been
adopting this principle for 14 years. The decaying leaf of the plants increases the fertility of soil. So there is no need of other fertilizers in soil and plants have original qualities as they grow naturally.

Dayal’s cultivating land is utilised for educational purpose. He conducts nature education camp in his farm. Students from different schools reach his experimental plot for observing the natural plant-cultivating method. More than teaching specific principles of cultivating plants, he is interested in developing a philosophy of environmental education. Dayal asks the students to observe various parts of his large campus – the natural forest and cultivated land. He allows them to observe and make collections. He brings out awareness of conservation with several practical examples. If pupils conserve paper, avoiding unnecessary waste indirectly they are saving more plants from being cut.

The educational visit to Dayal’s campus often culminates in meditation about nature. Dayal presents the poem Maram oru Varam (the tree is a boon) of Sugathakumari on black board and asks the students to write it on their note books. Then he explains the meaning of the poem and asks them to recites the poem along with him. Then he gives an idea about galaxy and asks them to imagine their place in the galaxy. Students are asked to close their eyes and imagine themselves sitting in the galaxy. He asks how we can and should protect nature of which we are also a part.

6. Kuriakose’s Ecosystem : a Case cum Experiment

In Arthunkal near Alappuzha, Mr. Kuriakose, a retired school master is maintaining a pond ecosystem and a rich garden with high educational potentialities. It was proposed to use it as a resource system in the community for education. A group of 16 high school pupils who volunteered for the experiment from St. Joseph’s high school, Arthunkal along with their
physical education master assembled in his residence. Mr. Kuriakose and the investigator gave them an introduction to learn directly from the environment through observation. This approach, it is hoped, will correct and complement the compartmentalised text book method of teaching. The pupils were advised to first go round and explore freely noting features which attract them and present novel situations. They were also advised to pose questions and discuss they note down the new things that they saw and draw pictures.

The investigator gave explanations and demonstrated the significant features. The first item observed carefully was the pond ecosystem. Mr. Kuriakose used the pond water for irrigation. In addition to this, he used this pond for pisciculture (fish culture). Pupils notice about Six types of fishes – Varal, Kari, Chempalli, Tilapia, Rohu and Cutla, and learn their characteristics features.

Mr. Kuriakose gave some rice to the pupils and they throw it into the pond and then fishes came on the water surface for eating these food particles. Then the students could very clearly observe them and their movements such as the lashing movements of caudal fin (tail) and other fins. They discussed about the necessity of fins in fishes and the investigator gave necessary information.

Pupil also noticed the phytoplanktons in ponds. The investigator elicited the necessity of the phytoplanktons in ponds. A student named Aftal said that phytoplanktons are the producers of the pond ecosystem. Some other items learned in context are:

Ecosystem is a functional unit of mutually depending and regularly interacting abiotic and biotic components. Microbes, plants and animals are the biotic components. Functionally they are three main categories – autotrophs, heterotrophs and decomposers.
Autotrophs are organisms which can synthesize organic food from inorganic constituents. Heterotrophs are the organisms which feed upon producers (plants) are known as herbivores. They form the primary consumers of the ecosystem. All other consumers feed upon different groups of animals. They are called carnivores. The carnivores which feed directly upon herbivores are called primary carnivores – secondary consumers. Those carnivores which feed upon the primary carnivores are called secondary carnivores. They represent the third level of consumers of the ecosystem. In this manner a chain of consumers can be recognized in an ecosystem.

Pupils observed producers and consumers of pond ecosystem. The investigator elicited the necessity of decomposers in the ecosystem. Students were helped to understand the importance of decomposers in biogas production and the relevant chemistry was brought out.

Decomposers are a group of micro consumers which bring about the decomposition of dead organic matters into inorganic constituents by enzymatic action. They include bacteria, fungi and yeast. Some of the decomposition products are absorbed by them as food. The remaining is returned to the physical environment. Producers may use these compounds again for synthesizing organic food. Thus, decomposers enable the recycling of essential elements between organisms and the environment.

The investigator then asked the students to arrange the organisms that they were observed there in the order of producers, consumers and decomposers. Then she asked them to prepare a food chain from it. All the students prepared food chains from their observations in the pond system.

Another line of investigation was about the different types of plants in the garden. Pupils identified thirteen types of plants in the garden. Pupils identified thirteen type of plants. Most of the students were attracted by the different types of orchids and anthurium plants in the garden. The scientific technique of the production of orchids (tissue culture) was demonstrated to the students with the help of a local resource person named Ajith, who conducts a tissue culture centre.

Pupils grouped the plants according to the colour of the flower, size of leaves, arrangement of leaves, etc. during classification some set theory mathematics also emerged.
Several types of creepers like pepper, kōval, pāval, padavalam, etc were observed in that location. Mr. Kuriakose gave information about the type of fertilizers that he used to ensure better production, irrigation, the importance of horticulture, etc. to the pupils. Pupils also compared the size of pepper seeds from Panniyur-I and ordinary pepper. Then they discussed about hybrid variety of plants.

Pupils had noticed an aquarium kept under the mango tree. Students watched the different types of fishes in aquarium and identified 4-different types of fishes. They notice the adjustments for refilling water in the aquarium and discussed about the necessity of changing water in the aquarium. Pupils also noticed the respiratory movements of fishes very clearly and they discussed about the necessity of opening and closing of mouth and operculum of fishes alternately. The investigator helps them to reach the conclusion.

While washing a mango fruit in the pond one of the student noticed a small water snake in the pond and made a frightened noise. Then some pupils identified that it was a non-poisonous snake. Then they discussed about poisonous and non-poisonous snakes.

In the final discussion pupils expressed that they learnt a lot without a feeling of hard study. The whole experience was like play so they were not fatigued. It was an interesting learning experience.

7. Participant Observation cum Naturalistic Experiment in Government Fisheries Vocational Higher Secondary School

Participant observation was conducted by the investigator along with the supervising teacher on December 7th, 1999 in Government Fisheries...
Vocational Higher Secondary School at Arthunkal, 28 km from Alappuzha town.

The high school section is completely reserved for fishermen's children. Children are weak in English, mathematics and physics. The head Master is of the opinion that the lack of trained English teachers is the basic reason for the poor performance of children in English. It is taught by teachers trained in other subjects. Considering this low level sometimes teachers are tempted to think that they are good for nothing. But the students responded positively with the graded learning approaches and Singlish [in which the poem *Coromandel Fishers* (standard 10) was taught through singing].

Plus two level fisheries-oriental courses are open to everybody with preference for fishermen's children. About 50% of the students belong to the fishermen's families. But their standard is very low, though they have passed the SSLC exam. Even among the other students many do not come under the first level competition for predegree or plus two places. For the vocational higher secondary schools the competition is only at a second level. The students' level of English is very poor, though the medium is English. So the teachers explain in Malayalam and then dictate the notes in English. It is a wasteful approach.

Though the level of students is lower than the plus two level, they have themselves made the course over loaded. In addition to the vocational courses they study physics, chemistry and biology for which they would not have got admission in a regular plus two. So they find it very difficult to cope with. The additional physics, chemistry and biology courses are equal to the academic stream but the pupils are not able to reach the
academic standard. The vocational course also does not reach the true vocational levels.

The purpose of the fishery school is to provide better education to children of fisherman to become future skilled fishermen combining the breadth of modern science and technology. But none of the children from fishermen's family like to become fishermen. They have joined the course by the attraction of the extra physics, chemistry and biology, which may open the door to a profession with a bleak chance for most. There is no opportunity in the school to participate in boat driving and fishing. The provision to satisfy the vocational aim is weak. Though situated near the coastal area the school does not utilise the service of the local fishermen. Therefore the vocation in the old sense is lost. Vocation in the new sense is not gained.

The marine engineering part is done mostly in the institution with inadequate equipment. It is not done under marine conditions. However some beginning has been made in aquaculture. The school has an aquaculture lab sponsored by Panchayat. There are about ten bowls with fishes in this lab.

8. Purposeful Map Reading through Local Maps from Panchayat Report

Most pupils in high school are illiterate in map reading though the teacher explains several times. Geography is studied only for examination and it has no connection with life. So it was proposed to teach map reading to pupils using the maps of their own locality in the Panchayat report.

Informal pre-test conducted at SNM High School., Purakkad, showed that students did not have even basic map sense. They did not understand the symbols for many land features like type of soil, locating of the road, etc.
They did not show any interest in reading the legend of the map and trying to understand the representation involved. They had not earlier shown interest in the symbols of different entities like church, school, mosque, railway line, river, etc.

They suddenly got interest in the problem when the maps given in the Purakkadu (Alappuzha District) Panchayat Development Report were used as a learning aid. As soon as they located the Purakkadu junction and specific points like their own school, Panchayat office, Krishibhavan, post office, etc, their interest was aroused in map reading.

Earlier map reading was imposed as a meaningless, purposeless task only for examination. Pupils were mechanically looking at the map. Now they are involved in the study and are able to read the map. Map reading is like an extra eye to them. helping to observe certain details which they might not have observed precisely.

The experience of map reading was given as a group work. Each bench was given a copy of the maps and students were asked to locate different areas. Now the first thing that was noted was the total area of Purakkadu panchayat bounded by other Panchayats – Ambalappuzha in the north, Thakazhi in the east, Karuvatta in the south east, Thrikkunnappuzha in the South. Then they went into the details – important landmarks, location of their school etc.

At the post test it was found that children are able to locate the boundary of their Panchayat, they were able to precisely locate temple, church and other features. Though their own houses were not marked in the map, they were able to guess the location of their houses. They felt earlier that Geography is a meaningless subject but now they began to feel that Geography is an interesting and meaningful subject. It became easy to understand.
9. The Polio Home, representing Centres for the Disabled

The Polio home, Thiruvananthapuram is taken as a typical representative in this study for presenting an awareness of the problems of the disabled, re-education of the disabled, integrating them with modern culture, therapeutic measures and preventive measures. The polio home at Thiruvananthapuram is one of the best resource centre possible for this purpose being founded and directed by a distinguished marine biologist, Dr. S. Jones and later directed by Dr. I. Azariah. It is conducted with German aid under Kinder Not Helpe (KNH) – help for children's need. It gives them a sound general education, helps to rebuild confidence, to earn a livelihood and lead a full life. It seeks to create awareness among the parents and the public about the cause of polio and about the vaccinations to be given to children.

It has a good hostel, auditorium, library and workshop. It has department of physiotherapy. The therapist explained that the disease is cause by polio virus through contaminated water. The Post Polio Residual Paralysis (PPRP) is the permanent paralysis condition due to the attack of a disease called Poliomyelitis. Infection of poliomyelitis is through intestine and it affects the nerves, spinal cord and even brain. When a PPRP child is admitted to the institution, the treatment available for it has three phases – pre operative, post operative and rehabilitative. But the best is preventive measures. Two common types of vaccines are salks and sabins.

The investigator visited the institute with a group of 11th class students. We studied the working of the various aspects of the institution. Some of the methods used by them could be used with profit event for normal children. The children get a very good general education and learn to make the best use of the body with all the handicap they have. They sing very well. They frequently win prizes in competition even with the normal children. The scientific aspects of immunology, defectology and therapy is
also clearly expounded in this institution. This is taken as a prototype of education of the handicapped.


Viswanathan, the founder of Mitraniketan, a community education centre located 25 km to the north of Thiruvananthapuram, experienced the oppression of the downtrodden by the upper class and other elite groups even in his boyhood. He was influenced by the teachings of Narayana Guru and Ponnara Sreedhar, a freedom fighter working for village uplift and community work with Harijans and other farm workers. He started protesting against these discriminations. When there was in danger to his life, some well-wishers sent him to Santiniketan for his safety. There he saw Tagore’s model of national and international education, relevant education for the community and the education brimming with joy, beauty and creativity. Then he spent some time in Sewagram, Wardha and studied Gandhiji’s approach to improve the rural community through relevant education. In 1953, he visited the United States. He met people like Bill Grove, friend of Gandhiji and Tagore in Pensylvania. He was influenced by the Quakers (Friends), a group of Christians committed to a sense of equality, social justice and pacifist belief. At Pendle Hill, he learnt self help movement and grass root organization. He also studied the work of catholic worker community in Manhattan slums. He was invited by Dr. Arthur Morgan to Yellow Springs, Ohio and studied his community service programme. He also studied some Folk schools in Tennesse and Carolina.

Inspired by Dr. Elmhirst, he studied the agricultural and adult education extension programmes and Rural Community Councils related to Oxford University.

Then he visited Denmark where the Folk schools inspired by Bishop Grundvig were originally started. There he studied the principles of Folk
schools, living word, enlightenment for life, connecting with one's own culture, community and vocation, balanced education, and wisdom of the common people.

In 1956, September, on Onam day, Mitraniketan (the home of friends) was founded at the village of Vellanad. His family home became a community centre. He started a Balasamaj, working with children. Through the children, he started influencing by the community. Adults began coming to Mitraniketan. Khadi making was taken as a project and a co-operative society was formed in 1957. The land was cleared for agriculture. Contour surveys were conducted. The relevant government departments were contacted for soil conservation. Local ground water resources were traced, sloping land was terraced, ponds were dug. A variety of trees and plants were grown, which not only helped to raise the level of sub soil water but also converted the arid land to a lush green habitat.

Mitraniketan also became an education centre. It started a school with the state syllabus but did not follow the formal and verbal teaching methods. Outdoor education, residential living, organization of the school as a community, treating the teachers as elder brother or sister, exposure to pre-vocational training. Mrs.Sethu Viswanathan who had done her B.Ed. at Santhiniketan became the head of the school. Bela Banerjee, a nurse who came from Bengal and Dr. Jean Kohler helped to found the community health centre and diffuse the principle of clean healthy living in the surroundings. Dr.Arthur Morgan, the founder of the rural University movement in India visited Mitraniketan at the age of 90. A printing press, wood work and carpentry, social forestry programme and other productive programmes were established.

In 1973, the Centre for Education, Research, Innovation and Development (CERID) was founded with Dr.N.P.Pillai, former professor and Dean of
Education, Kerala University as the first Director. After his, Dr. N. V. Manuel, retired professor and Dean of Education, University of Kerala took over as the Director of CERID in 1998. Some of the heterodox educational research programme during the tenure of Dr. Manuel are analysed by Biggers (1996), an American Writer.

Through his leadership CERID focused on Mitraniketan as a testing ground, incorporating a pedagogical approach for utilizing the development activities and crafts as well as the surrounding nature, in every-day lessons. CERID researched and then wrote a syllabus for the craft training scheme. Their theories sought to expand on Mitraniketan’s experience, bringing practical experience together with functional theory resulting in more useful practice.

Mitraniketan has a very strong Krishi Vinjana Kendra (KVK) and technology center. As Biggers says:

Analyzing the needs and possibilities of the surrounding area KVK began its programmes in agronomy, animal science, horticulture, home science and rural engineering. Mitraniketan’s life-long vision of combining the laboratory, demonstrating and testing sites with farm extension service into the villages had finally come to fruition.

11. Farm Information Bureau

Farm Information Bureau is the major extension mechanism of the department of Agriculture. Its head quarters is in Kowdiar at Thiruvananthapuram. Most of the information was collected by interviewing the officers and analyzing the pamphlets available in the main office. It also has two regional offices, one at Ernakulam and the other at Kozhikode. The various districts are monitored by these two regional offices.

Farm Information Bureau has mainly five medias of communication. The first is through the radio. Every day Akashvani transmits at 6.55 a.m, Karshika Mekhala Varthakal (farm news). In this news they give technical
information about methods of farming, current plant/animal disease, and ways of meeting them. Milk development, various aspects of animal husbandry, details of developmental plants, seminars, financial assistance and other supports to farmers etc.

The second is through television. Doordarshan gives a programme 'Nattinpuram' at 5.20 p.m, in which the ideas transmitted in Karshika Varthakal are transmitted along with visual support.

The third is through the news media. All the important news papers devoted a page for karshikarangam contributed by leading scientists from Central Plantation Crop Research Institute (CPCRI), Central Tuber Crop Research Institute (CTCRI), Spices Board, Coconut Development Board etc. The benefits of the departmental schemes are projected. Innovative farmers also contribute from the 'land'. The FIB itself publishes a biweekly journal Kerala Karshakan in which better methods of crop cultivation, biofertilizers, biopesticides medicinal plants, modern techniques of agriculture, and other beneficial items are given in addition to some media coverage of important events.

The fourth mode of communication of FIB is through the publication of small booklets and pamphlets on specific themes-pesticides attacking different crops, writeups devoted to specific crops such as coconut, pineapple, plantain, mango, biogas, vermiculture etc. Many of these pamphlets are structured and presented so clearly that can be used as supplementary reading material for school children. (compared to their publication issued a decade ago quality of printing and photograph seems to be gone up considerably)

The fifth means of communication of FIB is through exhibition. They conduct exhibitions at different levels. The rural and urban exhibitions include Karshikamelas, Kisan melas and information about new
developments. The bureau also participate in exhibition in the international trade fair at Delhi in every year.

Thus the farm Information Bureau forms an educative and communicative bridge between the top most scientist working at the agricultural colleges, various central and state institutes of applied research in tuber plantation crop, rice, coconut and other fields. By using the pamphlets and other publications, school science education can be enriched through projects and problem solving methods. The information imparted by FIB is of highly applied nature and much of it is interdisciplinary cutting across several disciplines-Botany, Zoology (particularly Entomology), Soil Science, Chemistry, Economics and Commerce.

12. Centre for Science in Society (C-SiS)

The Centre for Science in Society was founded and continues to be directed by Dr K.G. Nair, former professor of Cochin University of Science and Technology (CUSAT). Beyond providing the buildings and some furniture, he University does not incur any expenditure on it. The Centre functions on a self-financing basis. The Director works in a purely honorary capacity and his love of science and promotion of science education in nonformal drives him to do so. Some of the items in the equipment are improvised. Some are donated by well-wishers and admirers of the work. Dr. Kasturirangan of Indian Space Research Organisation was so much impressed with the work done there that he contributed a set of models on space flight.

C SiS conducts a Child Scientist' Forum. Young children studying in classes 4 to 9 are invited to participate in it. This is a once-in-a-month programme (four hours on a Saturday) for children to acquaint themselves with various science principles and experimental set-ups. (During registration a cost share of Rs. 675, a refundable deposit of rs. 475 are
collected. Monthly membership fee for the children's Science Library is Rs. 10.) The programmes offered include:

1. *Lecture cum Demonstration* on a topic in a frontier area in science
2. *See and Believe Laboratory Experiments*: to feel the thrill of science
3. *Science Pavilion for children*: to interact with various gadgets and models
4. *The Children's Science Park*: to learn science principles through play
5. *Children's Science Library*
7. *Miniworkshop facility.*
8. *Question and Answer Session*
9. *Problem-solving Sessions*
10. *Quiz Programmes*
11. *Mock Interviews and Personality Development Programmes*

There is also a one-day attachment programme in which seven of the above programmes are offered. The fee paid is Rs. 55. This programme is open on all working days from 9.30 A.M. to 3.30 P.M. Students come as individuals or as parties organised by schools.

There are also *Midsummer Programmes* for School Children called *Science Talent Development Programmes (STDP)*. It is arranged four days in a week from 9.30 A.M. to 1.30 P.M. for seven weeks. A fee of Rs. 475, a refundable deposit of Rs. 475 and a library fee of Rs. 50 are charged.

Newspaper reports periodically come about the child prodigies developed by C-SiS. Ten-year-old Varun, a fifth standard student of Chinmaya Vidyalaya, Kannur, has demonstrated his extraordinary memory before audience including the Centre for Science in Society (C-SiS) of CUSAT a number of times. He was the 30 child prodigies honoured by Vice-President Krishna Kant, for exceptional achievement in 2000.
13. The Kerala Sastra Sahitya Parishat (KSSP) as a Secular State-wide Learning Community

The concept of learning society has been popularised at global level for nearly three decades. But the Kerala Sastra Sahitya Parishat established as a voluntary organisation much earlier (1962) has popularised the concept throughout Kerala in various phases. It started as a forum of Science writers having the aim of popularising science through the mother tongue. It has expanded through the decades and now has over 50,000 members.

KSSP has always been concerned with social injustices, exploitation, silencing the voice of poor and downtrodden sections of people, and perpetuation of a ruthless competitive order. To overcome these, it has conducted awareness programmes, kalajathas and even agitations. But the present case analysis is limited to its educational contribution, and in particular relating to education to the community. The present case is different from the case studies described earlier, in the sense that it is not limited to a community limited to a small geographical area. The Parishat, of course, works with a large number of small communities trying to link them up with modern educational and social ideologies. But KSSP quickly moves towards the wider community and into the ideological dimensions. It will be made out towards the close of this case that the Parishat can be analysed as a learning community as made out by King and Brownell in their analysis of a structure of disciples.

A community exists through communication. In order to develop the ordinary people into a scientific community it is necessary to popularise science communication in Malayalam. This work was taken up by KSSP as early as in 1967. The use of technical terms in Malayalam was discussed and an effort was made to develop suitable forms of communication through science magazines for children and adults. The
science syllabi were upgraded at the national level in the late 60’s, but in Kerala the upgraded sciences came to effect in the middle 70’s. The formal educational extension mechanism of the State could only give directives from above. But genuine scientific spirit can be developed only through free natural communication in a scientific setting. Otherwise enjoyable investigational matter will turn out to be a burden. This workload imposed on children by forcing them to memorise guides and other coaching materials to pass the examination in upgraded science was keenly felt by the Parishat members. They formed about 1,000 science clubs in schools to learn science in the spirit of science through investigation. The Eureka test and the Sāstra Keralam quiz competition were organised by them. An attempt was made to relate ‘Nature, Science and Society’ by conducting classes. To popularise the idea the first Kalajātha was conducted in 1977. Eureka Bālavedis and Sāstra Kerala Clubs were organised in 1978-79. KSSP was actually more progressive than the State and National Councils’ set-up for infusing and diffusing modern ideas. So it actually tries to educate ‘the masters’ from below through school children and teachers. The attitude of the Department and its academic wings has been ambivalent. The voluntary resources of highly committed workers in the promotion of science should be welcomed by a Department, which does not have sufficient resources and cannot command the commitment. During certain phases they did welcome the KSSP inputs but conservative phases also alternated with the progressive phases when the Department adopted the science clubs as part of the system. Hence in 1980-81, the KSSP withdrew from the school science promoting clubs introduced two years earlier.

Intervention in the content of education took several forms. The programme Patanam Rasakaram (learning is enjoyable) consisted of lecture demonstrations by Parishat activists in school. They also organised BāLOTSAVAM programmes (children’s science festival) where children camped and were given lectures, demonstrations, practical projects.
Balotsava Jathas toured all over the Kerala making science enjoyable through demonstration, songs, dance, play, painting and puppetry.

‘Living with Science’ was organised during April-May, 1987 involving 5,000 children and 1,000 teachers. It was an experiment in integrated science teaching. The methodology was participatory, learner-centred and activity-oriented. A more advanced form called integrated science teaching was organised. In 1988-89, life-centred activity mode was facilitated through the use of improved modules.

‘Living with environment’ camps were organised in April-May, 1988 involving 1,000 children and a few hundred teachers. This went beyond the ‘Living with Science’ programme. The emphasis was on environment-based education. Mathematics, Physics, Biology, Geography and Chemistry were taught more effectively outside the class room in direct contact with nature.

Balotsavam camps are being organised regularly in various parts of Kerala from 1988 involving thousands of children. The camps were organised around ‘corners’ and ‘corner chiefs’ dealing with a variety of topics such as music, drawing, mathematics (for fun), hobbies, story telling, theatre, magic of chemistry and so on.

KSSP was instrumental in introducing the total literacy programme in Ernakulam during 1989-90, followed by the Akshara Keralam programme for Total Literacy in Kerala state. Genuine non-formal educational programmes were used for this purpose with a high degree of animation. The crucial interface of the society and educational system was revealed through this involvement.

The Parishat analysis showed that illiteracy prevailed not only among adults and children outside the school but also inside the school,
especially among the downtrodden sections of population, often first
generation learners. A survey conducted in Thiruvananthapuram district
showed that 30% of the primary school children were enable to meet the
minimum requirements in literacy. A similar situation prevailed in
Kasargode and Kannur also. To remedy this Aksharavedis were formed in
primary schools. The programme called Aksharapulari was conducted by
DIETs with the participation of the KSSP activists. For teaching
mathematics, a beginning was made with the programme called Ganithavedi.

Kothari Commission Report’s recommendations regarding school complex
programmes through people’s participation did not take off because the
national and state educational extension agencies could not spark off this
participation. But KSSP catalysed this needed community participation and
developed Panchayat school complexes at Madikkai in Kasargode district
and Kalyasseri in Kannur district. Vijyanavedi experiment in
Thiruvananthapuram district was also an effort in this direction, but in a
slightly different way.

KSSP attempts to correct the formal paper-oriented examinations placing
a premium on route memory through the programme of Vijyanotsavam
conducted annually in the form of projects and experiments in a festive
atmosphere. Vijyanotsavam has been a refreshing experience for KSSP as
well as for the whole teaching-learning community. Children are usually
afraid of examinations. Even then they participate in Vijyanotsavams with
extreme joy. It is conducted at Panchayat levels and their teachers bring
pupils from various schools in a Panchayat to one place (usually a high
school). The average number will be around four hundred students per
Panchayat.

For a long time, KSSP was carrying all the activities - conscientisation,
research, extension etc. as one total unit. Recently, they felt the need for
developing a specialised unit for educational research because many of their innovations and experimental evaluations have gone without proper documentation. It was also felt necessary that in a world of information communication technology with great futurological possibilities studies should be conducted to project future trends with interdisciplinary scholarship. Since there are many innovations applied of NCERT and SCERT. It is important to have comprehensive documentation of relevant literature and studies. Hence the Educational Research Unit (ERU) was formed in 1999. The main objectives of ERU are:

- To develop academic resources in policy making in the field of education.
- To conduct different kinds of studies and researches.
- To conduct training programmes in education
- To function as a lab for testing the resources for academic interventions.
- To conduct joint research programme in collaboration with other research institutions.

The Integral Rural Technology Centre (IRTC), Mundur near Trichur, is one of the significant projects of KSSP, concerned with energy management. It started with the project smokeless choola designed by the Parishat (Parishad Aduppu). It gets core support from the Department of Science and Technology of Government of India. It has identified sites for small Hydel projects in Kerala. One such project has been taken up by Palakkad District Panchayat. It is also involved Panchayat Resource Mapping with people’s participation. It has contributed to Demand Side Management approach to energy planning in Kerala. It has also developed other innovations such as Inclined Upward Tapping, a new method for rubber tapping which increases latex yield significantly,

It would be interesting to examine the role of KSSP as a learning community and as a promoter of learning communities throughout Kerala.
on the lines developed by some modern analysts of the curriculum with focus on symbolic structures. King and Brownell (1964) have given an excellent analysis of the disciplines of knowledge as communities of discourse. This analysis projected on to the functions of the KSSP makes it stand out in a different sense from the intellectual-social point of view than all the other communities that have been presented in the earlier cases. To begin with it would be appropriate to list the ten characteristics of a discipline. A discipline of knowledge is

1) a community
2) an expression of human imagination
3) a domain
4) a tradition - has a history
5) a syntactical structure (a made of inquiry)
6) a conceptual structure
7) a specialized language/system of symbols
8) a heritage o literature/a communication network
9) a valuative and effective stance
10) an instructive community.

It is interesting that in the first and last item in this analysis the term community is used in a special sense relevant to the disciplines. A discipline in this context is the corps of human being with a common intellectual commitment who makes a contribution to human thought and to human affairs. It also highlights the existence of a group of competent scholars, which possesses the most common characteristics of specialities of disciplined scholarship in a changing and seemingly anarchical kingdom of specialities. The community of persons in a disciple, then, tends to be self-conscious of its ‘brotherhood’. The discourse of any discipline is ‘community property’ and immediately available to all members, but the members may not be in complete and constant communion with each other.

The last characteristic, namely, an instructive community also needs to be explained here. Philip Phenix notes that ‘the distinguishing mark of any discipline is that the knowledge which comprises it is instructive – that is particularly suited for teaching and learning’. This is a kind of community
in which the elder and the younger members participate as members of a family.

While characterizing the KSSP as a community within the framework of disciplines of knowledge, it is not meant that they promote a specific academic discipline. Such communities may be found in some rare university disciplines working with the deep academic commitment and social brotherhood. But Sātra Sahitya Parishat is committed to intellectual inquiry in general and to diffusing it among the people, both adults and children, breaking every barrier that stands in the way of a genuine academic social community.

Several distinguished foreign writers on education have noted the unproductive curricular practices which stem from the problems of mistranslation of disciplines in the process of curriculum design. In our country the level of mistranslation is probably far higher, but sensitivity to such distortions is very low among parents as well as among official expertise. Their concern in mainly with results. In this process they attempt shortcuts to pass examination. But in the long run the route turns out to be long. Children rote-memorise, forget, rememorize, forget, etc., because the learning lacks meaning, environmental connection and the self-activity of the child. There is a high level of illiteracy even among school-going children, and the learning obtained is largely lifeless and rootless. KSSP has been the one major agency in Kerala, which has been sensitive to this educational distortion and mistranslation and tries to put back the discipline of knowledge in the right path, exciting the imagination, affirming the structures, the communication networks and promoting a positive affective stance through an instructive community built on a voluntary footing outside the school but having links with the live instructive community within the school.
Besides the immediately appealing modes such as the street theatre and the carnival to celebrate science and learning, KSSP has also produced a large number of books sharing modern ideas on education and on various scientific themes among children and adults. It also produces scholarly books, two recent ones being *Report of the Kerala Education Commission* (with Dr, Ashok Mitra as Chairman) and *Education – An Introduction to Change* - a masterly work in Malayalam on the foundations of modern education by a group of teachers.

Manuel (1983) characterizes KSSP as the most important agency devoted to the cause of educational dialogue among equals and of integration of the authentic word and authentic practice in the whole of India.

The use of Science drawn from the people’s experiences and modern science presented in the people’s idiom and people’s folk art forms to create a total awareness among them and pave the way for a social resolution. In their scientific jathas they make the street itself a centre for education as did the Siddhas, as well as the folk artisans documented in early Tamil literature- Pulavar, Pānar and Kūttar.

Manuel also analyses the street theatre technique of the *Parishat* in terms of other moving folk theatres - Jātras of Orissa and Bengal, the Rasdhāri of Rajasthan, Bhave’s Marathi theatre, *Yakshagāna* of Karnataka, the Moghul *Tomāsha* etc. The *Parishat* shows the awareness and education do not need any stage-décor. Any improvised site is good enough and the whole approach is one where the actor-spectator barrier is broken. He also compares it to the laboratory theatre of Grotowsky. In this “poor” theatre “the proximity of living organisms ... becomes something real, extraordinary, close to ecstasy: it is therefore necessary to suppress all distance between the actor and the spectator, to eliminate the stage, to abolish all frontiers”.

This investigator also was first attracted to the work of KSSP on seeing their street theatre presenting science and awareness message. Nearly two decades have elapsed since then and since the time of Manuel’s positive critique. But with the introduction of television and other electronic
media, the use of the street theatre seems to have diminished, though not completely abandoned; but the concern to develop a scientifically trained and aware community among the masses of people continues unabated.

14. The Investigator's Gardens: Towards a Habitat Education Centre

After studying the cases of several centres serving as models of educational uses of environment and community resources, it was felt that the investigator's own house, gardens and environs can be developed into an environmental education centre, and if possible towards the emerging broader concept of habitat education centre. In fact the 'larger family' (taravādu) has a large compound, in which the different brothers (of the investigator's husband) have separate houses, which are not separated by fences or compound walls. There is a single compound wall in front separating the road and the row of houses, and at the back, the paddy fields (in which vegetables too are cultivated in inter-crop rotation) form the frontier. Within this large campus (of about one and a half acres, there is free movement. If the full potential is analysed and drawn out, it would constitute an enormous wealth, in the environmental and educational sense.

In fact the campus is educative in the traditional as well as in the modern sense. At one extreme where the eldest cousin's family dwells, there is the family kāvu (sacred garden) in which not only the members in the campus, but even relatives from outside assemble on the occasion of important festivals. In Kerala, the celebrations of such festivals themselves are occasions for delving into of ethno biology. Worship is offered using flowers of sacred plants such as tulasī, chetti etc. the inflorescence and tender leaves of the coconut and many other plant products (turmeric and pepper seed) play an important part. But the main aim was to propitiate the snake god who is supposed to dwell in the kāvu. During the annual festival the folk minstrel-priest called pulluvan comes with his little harp, and the pulluvatti accompanies him on a special type of drum, set on the
mouth of an earthen pot. The songs sung on the occasion *sarppapāṭtu* (snake songs) have deep intellectual intricacies already analysed by Dr. Vishnu Nambudiri. Many secularists think of the *kāvu* cult as a superstition. But it has value even in a modern world for preserving the ecosystem – not alienating certain pieces of land for commercial purposes, conducting certain operation which will preserve the fertility etc. In the initial ‘pedagogical meet’ held in the garden, the participants ranged from children in Class 2 to predegree students. On the pair of photographs which follow, the left one shows the little children exploring the medicinal plants grown near the *kāvu* and on the right students drawn from various classes ranging up to the predegree class are exploring the variety of plant life in the campus.

The explorations in the campus covered several fields, but the botanical explorations alone are focused here.

The habitat and habits of plants strike the eye and mind most readily. In this campus plants of different habitations could be located even by young children. The most common is *mesophyte* which occurs in fairly and continuous moist conditions. There are several ponds in the campus where children could identify *hydrophytes* such as water lilly, and *pistia* (*kulappayal*). Even *xerophytes* (cactus) were grown as garden plants in the campus, though they could adapt themselves even in very dry habitats. But children noticed that they were not watered like many other garden plants. An example of *saprophytes* (those that live on dead
organic matter) in the form of *agaricus* (mushroom) was found near the place where hay was stored. Several examples of *epiphytes* (those which habit in other plants) could be found – e.g., *vanda* on a mango tree. Parasites (plants which both habit and draw nutrition from other plants) were represented by *loranthus* living on another mango tree.

Even the smaller children could identify different types of roots. The special types of aerial roots in *pandanus (kaita)* attracted the children. Since the stem of the plant is weak, these roots help to attach the plant to a strong support. The commonly known pepper plant has roots which could help in clasping and climbing on a support. Though the young children were familiar with this plant, they observed the precise functions of the root in this encounter.

The +2 students did some exploration with some stems specialised for reproduction - *runners* (slender stems that run or creep over the surface of the ground) in *hydrocotyle*, *stolon* (prostrate branch with strikes root at its tip where it touches the ground and then develops ascending growth) in rose, *suckers* (short branch which arises commonly from a subterranean stem from the axil of a scale leaf) in *chrysanthemum* and *offset* (stout and short runner-like branch) in *pistia*.

The students of +2 class showed special interest in phyllotaxy which is concerned with the mode of arrangement of the leaves in the plant to ensure that the leaves get maximum amount of sunlight for photosynthesis. They identified alternate or spiral type arrangement in *thespesia*, opposite arrangement in *calotropis*, whorled arrangement in *nerium*. 
The botanical exploration alone is treated at some detail. The analysis of animal life, both on the land, under the earth, in water, the flying visitors etc. belong to this investigator's specialty and a full map of the zoological potentiality is on the anvil. Apart from several pond ecosystems, there is scope for several terrestrial ecosystem studies. The soil is of the sandy type, but with a rich iron content. The water in the wells and ponds are not saline, and hence halophytes characteristic of coastal areas are not found there. Explorations on these lines can lead to geo-chemo-bio studies leading up to economic and other studies.

The campus also has a coir-twisting and sericulture units. It also has potentiality for development on new lines. Hence it is possible to straightaway start an ecopedagogic or environmental education unit. A case of a unit on an enlarged plane on the lines being developed by Bose and Manuel of exploring a new field of Habitat Education is also possible.