INTRODUCTION

"Traditional systems of knowledge are not just curiosities; they are important for rediscovering new principles for the more sustainable uses of the natural environment."


TRADITIONAL KNOWLEDGE

Ancient societies considered nature and natural resources as an inalienable part of their life system. Such societies were characterized by stable environment, sedentary life style, closed social structure and stagnant technologies. Consequently, their pattern of life was largely unchanged and depended heavily on natural resources of their own locality for sustenance. Dasmann (1988) called these groups “Ecosystem People” who by their historical continuity and dependance accumulated extensive knowledge about the landscape elements and living resources. Much of this knowledge was aimed at obtaining food and ensuring good health. However, it was not formally systematized but was maintained and transmitted through generations orally amongst the members of their societies as useful information. Thus, the indigenous knowledge as it is called, is characteristically an attribute of societies with historical continuities and expressed through customs and traditions (Berkes et al., 1995).

In course of time, population increased and exploitation of natural resources which were hitherto considered sacred, accelerated. Nevertheless, identification with nature and the concern for conservation of natural elements were so deep that they revered and respected them, even as they disturbed, slashed, killed or consumed them (Tanner, 1979). To ensure the conservation of nature, they concretized their knowledge into “rules of thumb” subtended by a variety of behavioral patterns. As a result, such conservational practices became woven intricately into the fabric of traditional culture of ancient societies (Gadgil, 1987). Though such indigenous societies disintegrated into
disparate groups, subsequently migrated to the plains and aggregated into castes and communities, traditional knowledge continued to accumulate among them.

Cotton (1996) while reviewing indigenous knowledge identified its different facets and redefined the existing terminologies as they were either ambiguous or overlapping or at times confusing. He distinguished between Indigenous Technical Knowledge (ITK), Indigenous Agricultural Knowledge (IAK), Traditional Ecological Knowledge (TEK), Rural Peoples Knowledge (RPK), Traditional Botanical Knowledge (TBK) and Integrated Knowledge Systems (IKS). Traditional botanical knowledge is defined as the total botanical knowledge held by non-industrial communities and incorporates all utilitarian, ecological and cognitive aspects of both plant-use and vegetational management and must be considered within its original cultural, spiritual and ecological contexts (Cotton, 1996).

From the ethnobotanical angle, the TBK is the outcome of the interaction between local people and their natural environment (Ford, 1981). Ever since its inception in 1895, when Harshberger coined the term ethnobotany to denote the use of plants by aboriginal people, the concept has been widening from time to time to encompass cultural and social dimensions (Robins et al., 1916) and knowledge from non-indigenous societies (Martin, 1995). During the last three decades, it has diversified into a truly multidisciplinary field of natural science drawing heavily from the expertise of Anthropologists, Archaeologists, Molecular Biologists and Ecologists. Consequently, the focus of research has been shifting gradually from the indigenous tribal communities within the confines of the forests to non-indigenous sections settled in the plains. Underscoring this shift is the realisation that these caste groups and communities are largely descendents of ancient societies and have co-existed with their native cultures for hundreds of years.
Cotton (1996) has delineated three main approaches, utilitarian, cognitive and ecological that characterize ethnobotanical research. Whereas the utilitarian approach is synonymous with economic botany, the cognitive approach probes the cultural dimensions of the peoples perception of plants and vegetation. The ecological approach examines the bio-cultural perspectives in the ecological context. Such a divergence of approach has yielded perceptible gains: (i) it has validated several practices of the traditional societies which prima facie appeared irrational and unscientific, besides reemphasizing the cultural links to conservation. (ii) it has unmasked astounding ecological designs camouflaged by mystics, myths and traditions to conserve biodiversity, and (iii) it has rekindled the interest of the traditional people in issues relating to biodiversity, bioprospecting and biopiracy.
ECOLOGICAL TRADITIONS: SACRED GROVES

Sacred groves are unique habitats preserved by ancient societies exemplifying their ecological perceptions of natural environments which were fortified by cultural traditions. They have been described variously as natural museums of giant trees, treasure - houses of threatened species, dispensaries of medicinal plants, regulators of water-sheds, recreation centres for urban life, veritable gardens for botanists, gene banks of economic species, paradise for nature-lovers and laboratory for environmentalists (Gadgil and Varak, 1975; Vartak, 1983; Vartak and Kumbhojakar, 1984; Vartak et al., 1986; Somashekar, 1998).

Historically, the sacred groves could be traced back to the hunter-gatherers society when they embarked upon cultivation after clearing of forests and shifted from place to place allowing regeneration of the original forest in the cleared area. And thus was born the system of shifting cultivation which, in fact, is an expression of ecological prudence. Sooner or later, clear felling surpassed the restoration activities threatening the very survival of forests. To arrest this pernicious trend, stemming from avarice than of necessity, forests and trees had to be sanctified as judicious management of forest became virtually impossible due to population pressure (Rappaport, 1971; Vannucci, 1991). In retrospect, sacred groves represent conservation systems of the pre-agrarian self organised societies. They were essentially hunter-gatherers practising shifting cultivation. Despite the advent of agriculture and resultant fragmentation of societies,
the system continued mainly because it was insulated by religious sanctions and had traditional roots.

Villagers regarded sacred groves as abodes of spiritual beings and prohibited ordinary activities. Every grove, therefore, was dedicated to the specific God, though groves without images are not uncommon. Chandran and Hughes (1997) delightfully recollect the Devaravattikan in Mattigar village of Karnataka. Being a remnant of original evergreen forest, it is tall, cool and dark extending over one hectare: offerings are ritually made but there is no evidence of an image or figurine. An old man confirmed it and said that "the Gods there live among the trees".

**Distribution**

India is dotted by sacred groves like a leopard skin; their size ranges from small plots with a temple and a few trees to vast stretches of forest covering several square kilometers (Buchanan, 1870; 1956). Dietrich Brandis (1897) the first Inspector general of Forests was awe-struck by the numerous sacred groves along the Western Ghats and found them occurring upto Shevaroys in the South, dry and arid terrains of North-West, and the Hill ranges of Garo and Khasi in the North-East. They continue to exist to this albeit in attenuated forms day as borne out by several inventories. Contrary to the general belief that they are confined to the tribal belts in the hills, they do occur in significant numbers in the agricultural plains too (Rao, 1996; Amirthalingam, 1998).

Reflecting the diversity of the ethnic groups nurturing them, they are known by different names in different dialects. An elaborate nomenclature prevails in North-East India *Ki Law Lyngdoc* or *Mawphlong* were forest patches under the control of traditional religious leaders, later protected by village councils. Certain sacred groves are meant for sacrificial and religious ceremonies. *Ki law Kyntang forests* or
Mawsmai forests are of that type. Forests of religious significance are locally called as Ki law Nyam forests and protected forests are known as Ki law Adong forests. The forests from which the local community obtains forest resources for its uses are known as Ki law Shnong forests. Out of the five, the first four types of sacred groves are totally protected from any form of human interference. However, the forest produce from these forests is auctioned by the village headman known as syien, lyndoc, dolvior, sardar for religious functions or repairing of houses. Almost every village in the Khasi Hills of Meghalaya had its sacred groves or Law Kyntangs. It was sacrilege to touch even leaves of trees in these groves. However, only Mawphlang and Mawsmai categories of sacred groves are well preserved today (Alfred, 1996).

A grove is called Gamkhal in Gangte language of Manipur region. Lungchik in North Sikkim, Vanis, Kenkris, Shamlatdehs and Oran in Rajasthan Sharana or Malwan in Madhya Pradesh, Sindharavana, Dev Vana, Devar Kadu or simply Kan in Karnataka, Deovan or Deo Rai in Maharashtra. Deovan in Garhwal Himalayan ranges, Kavu in Kerala, Samithoppu or Swami Shola in Tamil Nadu. It is pertinent that the term Swami Shola was recorded as early as 1897 by Dietrich Brandis.

According to an estimate there are about 3000 groves in Maharashtra, 1300 along the Western Ghats and are also known as Devrahthi (Gadgil and Vartak, 1976). In Kerala, about 15,000 Kavus existed prior to 1800 A.D. in the erstwhile Travancore state alone (Velupillai, 1940) and they were innumerable in Malabar too (Logan, 1887). In a recent survey, Induchoodan (1991, 1996) has listed 761 sacred groves in the Western Ghats and coastal plains of Kerala. The Kavus of Kerala are associated with Lord Iyappa or Goddess Bhagavathiamman. The Sabarimala, the famous pilgrimage centre, is perhaps one of the largest Kavus in Kerala. Kavus are also dedicated to Nagaraja - the Serpent. In his Malabar manual, William Logan (1920) refers to the
practice of setting aside one seventh of land in the south-east corner while clearing forests for cultivation; every tree, bush and branch therein was considered sacred; in course of time, it became a wild jungle dedicated to snake and was known as Sarpakavu (Gadgil, 1992). In Surguja district of Madhya Pradesh each village has a grove about 20 ha. The leeward side of Aravalli ranges has a number of Bishnoi villages adjoining patches of greenary. That Uttara Kannada and Kodagu regions of Karnataka, and Pune and Kolaba districts of Maharashtra have numerous celebrated sacred groves has been well documented (Gadgil and Vartak, 1976).

A WWF - India survey led by Dr. R.K. Rao and R. Rajamani enumerated over 800 sacred groves in 23 districts of Andhra Pradesh (Rao, 1996). A sacred grove at Gootybailu Village near Kadiri in Anantapur district has come to symbolise a noble house-wife who committed sati and transformed herself into a banyan tree. People worship the tree as Thimmamma Mari and sacrifice their land permitting its expansion. The huge tree, which is incidentally the largest specimen of Ficus benghalensis in the world now, covers more than 1.6 ha. Some other groves in the same district harbour old trees of enormous size (6 to 10 m girth). The Lanka Malleswaram sacred grove spreads over 100 ha. and has a majority of the trees towering beyond 30 m.

Culture and conservation

The practice of dedicating the groves to deity validates the nature - god or tree-god concept. Chandran and Hughes (1997) traced the stages of transformation of a grove into a temple (Plate 1). Initially the trees were equated to Gods with no icon at all. A termite mound with or without being associated with a tree was the next stage (Plate 1). A few unorganised clump of stones marked the beginning of image installation. A carved stone relief or a statue standing uncovered under a tree followed; An ornate temple for the main deity, shielding the icon from sky, distinguished the
PLATE 1

EVOLUTION OF TEMPLES IN SACRED GROVES

1.1 Termite mounds in a grove (Puthu) - the first object of veneration.

1.2 A sacred tree under which bricks and stones are arranged to mark a cult spot (generally, 7 pieces are placed to symbolise 7 virgin girls Kannimars) - beginnings of idolatry.

1.3 Iconography introduced: A carved relief in granite with images of Aiyanar in the centre and his wives, Poorani to his right and Porkalai on left. (the icon is installed in the open under a tree with a piece of cloth tied around).

1.4 Advent of concrete structures: a low-level arched roof covering the icon (note the terracotta horses offered by devotees standing in front of the idol).

1.5 A parapet surrounds the icon to demarcate the sanctum; ceramic tiled flooring indicates modernity. The icon still lies in the open but granite imagines of a bull and an elephant faces the main deity.

1.6 A building of brick and mortar/lime enclosing the main deity; only one concrete structure in the grove signifying a shrine.

1.7 A temple complex: Large imagines of animals, minor deities (open as well as housed), votive offerings and the sanctum all enclosed within a compound wall.
sanctum sanctorum later; with the advent of modernism architectural considerations ruled high, resulting in a complex of shrines centering a sanctum sanctorum. Votive offerings of images of animals like horses, elephants, bulls either in granite or in terracotta was a later development (Plate 2.4).

A synchronous transition in the conception of reliefs or images could also be traced. Starting from amorphous stones, carved reliefs on the granite followed whilst modernism has invaded every other aspect of temple construction. It is remarkable that wherever Aiyanan is the main deity it is just a granite slab with images sculptured on one side only.

Historians believe that the growth and spread of Brahminical Hinduism consequent to Aryan invasion accentuated the attitudinal change of ancient people. Growth of Arts and appreciation of values also contributed to fabrications and beautification of the temples. Even then, natural resources were the first choice as exemplified by the wood temples of Kerala. Stone structures originated after the sixth century A.D. and were substituted by mortar and concrete in the recent past (Gadgil and Chandran, 1992).

Probably, ancient cultures imposed restrictions, slapped sanctions and handed down hard prescriptions mainly to arrest the attitudinal change eating into the vitals of conservation. To supplement human authority, they invoked godly interventions in the form of rites, rituals and folklores to instill a fear-psychosis. They warn the desecrators of divine retributions and harsh reprisals. Befitting the primitive nature of the hunter gatherers the deities invented by them evoke awe and fear and are believed to be ruthless in punishing the offenders, often condemning them to death (Gadgil and Vartak, 1976). The tribals, though illiterate and ignorant, scrupulously established
PLATE 2

SALIENT FEATURES OF SACRED GROVES

2.1 An idol in granite slab lying in the open - Aiyanar accompanied by his two wives Poorani and Porkalai.

2.2 Pidari Amman as the main deity of the grove; a carved granite image under a banyan tree lying in the open.

2.3 An ornate temple with huge images of horses and other animals (domestic or wild).

2.4 Granite and lime stone images of elephants, bulls and horses offered by devotees in olden days.

2.5 Terracotta images of horses as votive offerings.

2.6 Minor deities along with minions / soldiers. (Note the impact of modernity in image construction and attire).

2.7 A water source - A pond adjoining the grove (Note the temple within, surrounded by trees).

2.8 A Peepal tree - a constituent of many groves which is also a key-stone species.
traditional customs rituals and ceremonies which, with the passage of time, syncretized into their culture.

In addition to restrictive practices, they observed rituals and organized festivals to please the supernatural forces forwarding off of dangers in the form of drought, sickness, epidemics etc. and demanding bounties in the form of enhanced yield and good health. Offerings are made ritually during festivals and these included miniatures of horses, bulls and elephants, the last one being characteristic of coastal groves (Amirthalingam, 1998). The terracotta images were smaller in olden days but assumed gigantic proportions recently. The philosophical underpinning in the making of a terracotta image, is interesting. Parts of the old terracotta images are pounded and mixed with the clay for making new ones. The cyclic role of clay is correlated to Hindu philosophy of birth, death and rebirth. The images-horses, elephants, or bulls represent the finiteness of life time (Amirthalingam, 1998). Customarily, terracotta images are commonly offered but images of limestone or granite were offered in earlier days.

Human activities are restricted within the grove with the exception of festivals and prayer times. In addition, taboos and folklores also restrain the people from disturbing the forest. The very practice of dedicating the forest to a God in which supernatural forces also find their abode forbid people from committing any act of sacrilege. The fact that there are no artificial boundaries or fences for such groves is a point in proof.

Consumptive use of the flora and fauna is also proscribed. Grazing by animals is not allowed which was ensured by digging trenches along the periphery (Brandis and Grant, 1868); Trees should not be felled; nor the branches axed; even the trees fallen naturally were allowed to remain and rot. Ploughing, sowing and erection of
unauthorised structures were prohibited. Fallen fruits may be gathered but vegetable matter, even dead wood cannot be removed except for making the traditional cooking of sweetened raw rice (Pongal). Instances of relaxation have also been known but are rare. Francis Buchannan, a British traveller has noted as early as 1802 that permission of the deity was occasionally obtained through the Priests in trance or oracle for auctioning the timber or using in temple construction. Vartak and Gadgil (1981) have deduced that the merchants or devotees seek to propitiate God with animal sacrifices before cutting trees. The cult spot - the places where the animals are beheaded exist within the groves. In extreme cases, human sacrifices seem to have been made, though such horrendous practices have been given up. To Vartak and Gadgil (1981) the smearing of saffron symbolises the blood of sacrificial victims. In a sacred grove of Maharashtra the human sacrifice is symbolically offered even today. Frazer (1922) has assiduously documented the whole variety of taboos from all over the world.

In retrospect, the rituals and taboos which moulded into established traditions gave conservation a cultural orientation. These traditions perpetuated despite the fragmentation of the original peasants society and diversification of professions. The belief that the grove is an integral part of the villagescape and should be protected collectively by the villagers still rules in the country side.

**Biodiversity**

The Indian subcontinent is a land of tremendous ecological diversity as it lies at the trijunction of three biogeographic realms of Ethiopian, Palearetic and Indo-Malayan. Consequently, its natural heritage is a veritable treasure unsurpassed in any other land mass of comparable size in the world (Gadgil, 1989).
Floristically, sacred groves are considered as patches of climax vegetation of the respective areas. They represent a variety of formations ranging from typically evergreen to dry-deciduous forest types of Himalayan ranges and Western Ghats, swamps of the coastal plains along the Western coast, oases of thorny scrubs in Aravally ranges and scrub woodlands of Coromandel Coastal plains, corresponding to the different climatic zones. The claim that the groves that are miniature biosphere reserves is sustained by floristic analyses; in certain cases, they serve as refugia of relict species; some others harbour genetic stock and germ-plasm of breeding value.

It was Harris (1984) who pointed out that because of the heterogenous landscape and climatic variables the groves may function as a refugia of rare life forms. Kanjilal and Das (1934) impressed by the floristic composition in the North-East commented, “It is indeed to these fascinating groves that the Khasi hills owe their reputation as richest botanical area - not only in India but perhaps in the world”. The Botanical Survey of India has rediscovered some rare specimens of orchids in the sacred groves of Khasi hills in Assam (Gadgil and Vartak, 1976). At low elevations of Maharashtra (400-1500 m) sacred groves are the only patches of broad-leaved forests. Arboreal vegetation is dominated by Hirada tree (*Terminalia chebula*) which is a source of tannin. The grove at Yeotmal in Pune district of Maharashtra has elite teak specimens which exhibited genetic superiority (Gadgil and Vartak, 1976). A small grove at village Tunbad in Srvardhan taluk in the same state shelters a gregarious specimen of *Entada phaseoloides* var. *pursaetha* of Mimosoideae (Fabaceae). It is called garabi or Gaidhari locally; the bark of this leguminous liane is the only source of medicine in 40 km radius for treating snake bite in cattle (Vartak *et al.*, 1986).

To a discerning ecologist, these are islands of dense vegetation amidst disturbed landscape wherefrom the flora and fauna have no escape routes. When the groves are
destroyed the biota also disappears totally, thus making the groves virtual 'death traps' (Kanjilal and Das, 1934).

The floristics of groves in the Western Ghats have been studied extensively by Professor Madhav Gadgil's group of Indian Institute of Science, Bangalore. Many typical forest species like *Mesua ferrea*, *Vateria indica*, *Dysoxylum binectariferum* and *Leea guianensis* grow luxuriously in the Kans of Uttara Kannada (Chandran and Gadgil, 1993). *Dipterocarpus indicus*, another majestic evergreen tree of Western Ghats grows only in a couple of sacred groves in the north on a hill top amidst secondary evergreen forest there. The geographical range of Dhup tree, *Canarium strictum* ends in Uttara Kannada, but two magnificent specimen of this tree live in a sacred grove of Maharashtra, 200 km away. A sacred tree, a gigantic specimen of *Michelia champaca* worshipped by Maharaja of Mysore is a part of a grove in the Biligrirangan hills in Mysore district (Gadgil and Vartak, 1976).

That Kerala is a land of sacred groves cannot be gainsaid. Surveys by Induchoodan and Balasubramanyan (1991) and Ramachandran (1993) indicated a high degree of endemism in the groves of Kerala. They enumerated 154 species endemic to Western Ghats including 51 (33%) tree species in 364 groves. In a subsequent survey, Induchoodan (1996) considered 761 groves in Kerala of which 361 were analysed floristically. Of the 720 species in 472 genera belonging to 127 families, 155 were endemic. Scores of trees and lianas are endangered being represented by lone specimens. Four threatened species, *Blepharistemma membranifolia*, *Buchanania lanceolata*, *Pterospermum reticulum* and *Syzygium travancoricum* survive only within the groves (Balasubramanian, 1997). Another grove shelters five species of *Hopea*, four of which are endemic to South-West India. Sasikumar (1995) recorded the endangered taxa, *Aerva lanata*, *Cyperus rotundus*, *Desmodium giganteum*, *Plumbago*
*rosea, Rauvolfia serpentina* in the groves. Mohanan and Nair (1981) identified a new taxon *Kunstleria keralensis* in a Kerala grove. This is not only a new species but only the second genus of legume reported from India. Nair (1985) discovered *Dalbergia benthami* for the first time in Kerala from a sacred grove.

Because of the diversity/richness of *Dipterocarpus* in the groves, the Kavus of Kerala bear a resemblance to the low land Dipterocarp forests of Malaysia (Induchoodan, 1988). The Myristica swamps in the southern tip of Kerala are situated on the ill-drained valley-bottoms with sluggish streams. Endemics like *Myristica fatua var. magnifera*, *Gymnakranthera canaria*, *Semecarpus auriculata* and a fragile palm, *Pinanga dicksonii* have found asylum in these groves (Chandran, 1997). Because of their ecological uniqueness these swamps have been declared rare and threatened habitats of Southern Kerala (Krishnamoorthy, 1960). Otherwise, few such swamps are found far off in Uttara Kannada only.

Systematic studies on the sacred groves of Andhra Pradesh have been initiated only recently. A WWF survey revealed the existence of over 800 sacred groves in 23 districts of Andhra Pradesh. The groves around the temple town of Tirupati are the home of several endemics like *Boswellia ovalifoliolata*, *Cycas beddomei*, *Pimpinella tirupatiensis*, *Pterocarpus santalinus*, *Shorea tumbledagaia*, *Syzygium alternifolium* and *Terminalia pallida*. Tall (73 m.), old (75-1000 yrs) and robust (6-10 m. gbh) trees provide a magnificent view of the Lanka Malleswaran sacred grove extending over 100 ha. in Anantapur district. Of the 98 plant species enumerated there, four are rare ones (Rao, 1996; Raviprasadarao and Jayaprada, 1997).

On global scale, patches of Australian rain forests are saved from burning because of their sacred grove status and the myth that the offending land owners will
become blind if they degrade the groves. This has ensured the survival of fire-sensitive plants like *Dioscorea* sp. (Cotton, 1996).

The groves are sanctuaries of a variety of common and rare animals too. The enlisted fauna include panthers, antelopes, wild boars, bears and snakes. Arboreal mammals, particularly monkeys are abundant in many of them (Rao, 1996). Birds frequent the groves and nest in them. Half of the bird species of Siddapur district of Karnataka are found in the groves (Gadgil and Chandran, 1993). To be specific, the lion-tailed Macaques, which are the endangered primates, are found in Katlekan groves of Uttara Kannada (Gadgil and Chandran, 1992). In Bangladesh, the shrine (Dargah) of a Muslim Saint at Byazid Bostami has a sacred pond which harbours the world's only known population of rare turtle, *Trionyx nigricans* (Rezakhan, 1980).

To Gadgil (1992), the groves signify an attempt to maintain an ecologically steady state with the biological resources in the wild. In certain regions, these provide an ideal microclimate for certain species as evidenced by luxuriance of orchids in North-Eastern hills. The farmers of Asahpoorna Devi Ki Oran at Devikot in Jaisalmer district of Rajasthan forecast the climate of the following season from the appearance of the grove at the time of annual rituals. It enables them to evolve suitable strategies for managing the village livestock against adversity (Gadgil and Vartak, 1976). The grove species may also provide propagative materials for ecorestoration of degraded patches of other groves or of secondary forests.

The water-shed value is no less significant. As densely wooded areas receive more precipitation, they hold moisture in air and soil, and regulate perennial streams often. They also channelise the run off towards a storage reservoir and prevent floods in the low-lying areas. The storage provides drinking water to the villages and recharges
the underground water table as well. To cite an example, the grove is the only source of water for the cattle in Gani village of Kolaba district in Maharashtra as extensive deforestation and consequent soil erosion have dried up the perennial springs in that area. While flowing through the groves, the run off-water washes the minerals from the top soil layers and enriches the fertility of adjoining fields (Gadgil and Vartak, 1975).

**Non-wood produce**

The taboos, edicts, beliefs and the folklore have precluded only a systematic collection of materials from the groves. That the groves harbour several edible fruit trees (*Artocarpus heterophyllous, Artocarpus hirsutus, Flacourtia montana, Garcinia indica, Garcinia xanthochymus, Glycosmis cochinchinensis, Mangifera indica, Syzygium cumini, Terminalia catapa* etc.), spices and condiments (*Artocarpus gomezianus, Cinnamomum zeylanicum, Garcinia gambogia, Garcinia indica, Murraya koenigi, Myristica malabarica, Zanthoxylum rhetsa* etc.) is well known. For medicinal herbs like *Rauwolfia serpentina, Asparagus spp., Gloriosa superba* the groves and the forests are the main sources. The utility value of *Entada phaseoloides var. pursaetha* has already been highlighted. A toddy-tapping community of Uttara Kannada called kan divers live closer the kans and regularly extracted toddy and sugar from the wild palm, *Caryota urens*. Reeds like *Calamus sp., Ochlandra sp. and Pandanus sp.* provide raw material for basket and mat weaving. In the erstwhile Mysore territory, people used to collect honey, pepper and coffee from the neighbouring kans only (Chandran and Gadgil, 1993).

**Erosion of sacred groves**

Several studies have been undertaken to enumerate the groves in different parts of India. Still, precise estimate of the total area under groves and the extent of erosion is still elusive. But the scars of destruction are everywhere.
According to an estimate, hardly 0.012% of the forested land of Maharashtra is under sacred groves now. Extrapolating this data, Gokhale et al. (1997) projected a figure of ca. 33,000 ha. for whole of India. In a plot of 25 km² in Siddapur taluk of Uttara Kannada the coverage is reduced to a mere 0.3% in 1991 from the original level of 5.85% at the time of independence. Likewise, about 10.3% of land and watersheds were considered sacred in the Gante tribal belt of Manipur in 1950s but now reduced to nothing (Gadgil et al., 1998). Considering that the British India had about 10% or more of land dedicated as groves the erosion could be more than 1000-fold.

Causes of erosion

That the concept of sacred grove has survived testing times in history is laudable. But most of them occur in their original state in far flung regions inhabited by relatively autonomous societies, tribals and peasants. While they do persist in the agricultural plains, they are either attenuated or at the brink of obliteration. Gadgil (1992), Chandran and Gadgil (1993), Chandran (1997), and Chandran and Hughes (1997) have examined the history, cultural links and status of the sacred groves. From their assessment multiple factors - social, cultural, political, economical and religious - have precipitated the decline either independently or in tandem.

The influence of the Brahminical Hinduisim on the local cults and cultural traditions has been subtle and strong. The tolerance, acceptance and perpetuation of local cult practices speaks to the plasticity of Hinduisim. The elaboration of temple structure and of iconography are two prime factors that have side-lined the environmental considerations. A paradigm shift in the people’s attitude to the groves has crept in and the focus shifted from the groves and their management towards the temples and rituals. Of late, westernisation of Indian culture is on the rise and it has had a definitive and insidious effect by slackening the hold of beliefs, rituals and taboos on
the people, especially in urban areas. The practice of dedicating one seventh of forest land as sarpakavu is also on the wane in Kerala.

Failure to recognise the role and involvement of people in conservation practices has surfaced as another critical factor. The Marakkanam Dry Evergreen Thicket abutting the study area and classified as a reserve forest (RF), has survived through ages mainly because the people derive tangible benefits from it. Restricted grazing and regulated harvest of fuel wood and medicinal herbs have made people realise that protecting the forest serves their own long-term interest (Meher Homji, 1997).

According to White (1967), monotheistic religion like Christianity and Islam have been rather inimical to the sacred grove concept. Both of them reposed faith in one God who is supreme and omnipresent. No tree or a spring or a forest need be associated to exhibit their faith.

The decline and resurrection of sacred groves in Churachandpur area of the Manipur state is a pertinent case. It was the habitat of Gangte tribals with a mosaic of sacred groves called Gamkhals. Since 70s the tribals were converted to Christianity and now more than 90% population are Christians. Concomittant with the spread of this religion, the tribal traditions and culture were replaced by cultural ethos, rites and rituals of Christianity. The commitment to the protection of groves was weakened and they were reduced to a stand of isolated trees (Gadgil et al., 1998).

The thick stands of Gamkhals had functioned as fire-breaks amidst shifting cultivation (Jhum) areas. As the groves were abandoned or exploited commercially forest fires raged and engulfed the neighbouring villages. The ecological jurisprudence of the erstwhile Gangte dawned on the neo-christian population only lately. They have
now revived and resurrected the groves but call them "safety forests" or "forest reserves" in their correspondence (Malhotra, 1990). The revival of the sacred grove concept in Manipur has proved that religion and culture vis-a-vis conservation can be complementary and not contradictory.

Forest management policies followed by the pre and post-independence Indian rulers have also contributed to the decline substantially. Market economic priorities dictated by political considerations decided the policy initiatives. Timber extraction for trade, commercial plantations on the hill slopes, expansion of agriculture in the plains proceeded unabated since the British era. These defective management policies, aping the American and European models, failed to recognise the human component while evolving conservation strategies. The classification of forests into reserved, protected and minor categories under the Indian forest act of 1865, 1878 denied the people of their right to their own territories of the first two categories. In fact, the Britishers viewed the concept of sacred groves as a contrivance to prevent their take-over by the colonial government (Brandis, 1897). Alternatively, the minor forests were open to public and hence suffered the "tragedy of commons". The distinction between the sacred grove and the contiguous forest area was not considered either (Berkes, 1989; Chandran and Gadgil, 1993).

The dawn of independence did not change the scenario. The era of exploitation continued; besides exploitation for timber and industry hydro-electric projects submerged pristine forest cover; commercial plantations of coffee, tea and rubber were encouraged. Tragically, the government itself entered the field by floating corporations for commercial plantations of *Eucalyptus* sp. and *Acacia* sp (Chandran and Hughes, 1997).
Prospects for conservation

May be, the concept of a sacred grove does not enjoy scientific sanction under modern forest management strategies; but its positive contribution to the ecology and biodiversity conservation cannot be maimed. Equally important is the historical value in reaffirming the bond between human beings and nature (Gadgil and Vartak, 1975; Nair et al., 1997).

Gokhale et al (1997) deduced three factors for comprehending the status of sacred groves. They are (1) Resistance: continued belief in traditional protection (2) Revival: Resumption of the earlier practice of protection and preservation on a subsequent realisation or by persuasion (ecorestoration) and (3) Emergence: initiation of a new site and beginning a new tradition.

The impact of religion on certain communities has not eroded yet. The villagers of Mathigar in Uttara Kannada protect a one hectare evergreen forest patch despite the adverse cost-benefit ratio. A small community of shifting cultivators, Karivokkaligas are the saviours of the grove ostensibly due to religious conviction. The grove is dominated by *Vateria indica* and stands contrastingly among extensive patches of *Acacia auriculiformis* and *Casuarina equisetifolia* plantations. The story of abandonment of Gamkhals of Manipur-Mizoram regime's due to market economic considerations coupled to the dethronement of Hinduism has been explained in the foregoing; instances of its revival are more frequent in the interiors where modernity and market economy have not corrupted the life pattern, and the community organization is still intact. Emergence of new groves justify three different approaches: (1) It may serve a tangible function by employing religious beliefs. (2) It may relate directly to the religious beliefs without serving any tangible function. (3) It may be part
of the state machinery attempting to ensure protection through the medium of traditional religious beliefs (Gokhale et al., 1997).

People of Almora and Pithoragarh area in Uttar Pradesh established new groves for material benefits. Unable to curb over-exploitative practices the villagers of Jakhani decided to dedicate the grove to a local goddess, Kokilamata who is the goddess of justice. They demarcated the boundaries and adopted a set of rules for sustainable utilisation of the resources before dedication. People can collect fire wood and dead wood; they can hunt animals which are excluded from the bane. This practice started in 1982 and has now spread to neighbouring areas. A similar initiative has been launched successfully in foot hills of Aravalli mountains in Rajasthan since 1994 (Gokhale et al., 1997).

History has taught certain lessons to conservation managers which are harsh but inevitable. Any successful conservation model must weigh the plant, animal and human components equally. Decentralisation or exclusion of administrative hierarchy, if possible, is a necessary adjunct to ensure success.

The concept of Pavitra vana (= sacred forest) is borne out of this realization. In 1988, State Forest Department of Govt. of Karnataka, sought to create new protected sites with the involvement of local communities. An attempt to raise a “Sridhar Van” was made in a hill-side village Salkani of Uttara Kannada with the co-operation of local youth organizations. The ritual species were planted in astrological designs in 1 ha. land at the hill top. Below this other useful species of non-timber forest produce (NTFP), fodder and fuel, were planted as demanded by local villagers. The Barren hill-slopes are now covered by these stands which will serve as a wind-break and protect the arecanut and coconut plantations at lower elevations. Following the success of Salkani
experiment, another was established in a nearby village, Bakkal in 28 ha. People forced the government to abandon the proposal for an Acacia plantation in the area and supported the new initiative (Gokhale et al. 1997).

Although the pavitra vana is an assemblage of plants denoting astrological signs as per Hindu scriptures, eventually, it turned out to be a heterogenous assemblage of Acacia catechu (Mrigasilisha) Calotropis gigantea (Shravana) belonging to dry open habitats, along with evergreen like Artocarpus heterophylla (Uttarada), Mesua ferrea (Ashlesha), Pinus longifolia (Jyestha) and deciduous species such as Butea monosperma (Hubba), Spondias mangifera (Hastha) (Gokhale et al. 1997). Essentially, it is a synthetic sacred forest which may not be a surrogate for a natural vegetation. Nevertheless, it is a clear signal of the lurking desire to revive our old traditions and reaffirm our relationship with nature.

Sacred groves in Tamil Nadu and Pondicherry

Meher-Homji (1986) studied a natural vegetation receiving protection due to the presence of deities in Puthupet, about 13 km north of Pondicherry on way to Marakkanam on the East Coast Road. Apart from having a temple for Manjiny and Aiyanan with images of horses and other guardians of the village, it also has a puthu i.e. a termite mound with snake holes. The whole patch of green vegetation is protected on the basis of religious faith. The floristics and vegetation structure were analysed by Sethi (1993) through which 104 plant species in 44 families have been reported.

Maheswaran et al. (1995) have studied the floristics of Vedanthangal bird sanctuary, a miniature sacred grove on the Passumari hill-top, near Chingleput in Tamil Nadu and found it a refugium of rare species like Amorphophallus sylvaticus and Drosera burmanii. Balasubramaniyam and Rajasekaran (1996) of Salim Ali Institute of
Ornithology and Natural History have surveyed 23 sacred groves of Coimbatore forest division. They enumerated 82 woody angiosperms belonging to 39 families besides 21 species of birds and 3 species of mammals.

Parthasarathy and Karthikeyan (1997) described the Aiyanar temples, plant biodiversity, vegetation pattern of two sacred groves at Kulandaikuppam and Thimmanikkuzhi in Cuddalore district of Tamil Nadu.

Raj and Sukumaran (1997) have studied 43 ‘miniature temples’ from Southern districts of Tamil Nadu and found them harbouring rare, endemic and endangered plants. Amirthalingam of C.P.R Foundation (CPRF), Chennai has surveyed 82 sacred groves from Thiruchirapalli and Pudhukottai districts. CPRF has enumerated 499 sacred groves in Tamil Nadu state and since 1994, based on social and ecological considerations, it has embarked upon ecorestoration of 16 degraded sites to their original status through systematic and graded steps; the soil is first analysed for its fertility value and enriched by applying farm-yard manure for raising a crop of nitrogen fixing legume; tree species of commercial value and key-stone species are planted selectively; the after-care, which is the key element in ecorestoration was achieved by enlisting the cooperation of local community. Early reports are encouraging and indications are that the impugned sites would soon become oases of greenary amongst the vast expanses of agricultural tracts (Shankar, 1997; Amirthalingam, 1998).

M.S.Swaminathan Research Foundation - Chennai (MSSRF) has launched. Community Biodiversity Programme which also concentrates on documentation and ecorestoration of the groves in Andhra Pradesh and Tamil Nadu. (Nanditha and Bhawanishankar, 1996). Sacred groves of Salem, Theni, Thiruvannamalai and Vellore regions have been enumerated by Arivudai Nambi of M.S. Swaminathan Research
Foundation, Chennai. In 1997, the same institute has published a report on two groves at Suriampettai and Kulandaikuppam entitled 'Marudham Sacred Groves of Cuddalore District of Tamil Nadu' (King, 1997). It has developed a data base on the botanical, socio-cultural and ethnomedicinal aspects of 150 sacred groves from 11 districts. Preliminary data have been gathered for 111 more groves, as a part of the project on Biodiversity (Nanditha and Javanthi, 1992; Amirthalingam, 1998).

From the descriptions available, the sacred groves of Tamilnadu are mostly dedicated to Aiyanar (Plate 2.1) or Amman (Plate 2.2) which may lie in the open or in roofed structures; very rarely the presiding deity may be Hanuman or Lord Vishnu (Ravishankar et al., 1995). Modernization is reflected in making the votive offerings for minor deities (Plates 2.4 to 6). Generally, they are associated with a water source (Plate 2.7). Vegetation which reflects various stages of degradation may have a few key-stone species also (Plate 2.8).
"Each time a medicine man dies, it is as if a library has burnt down"

- Harry G. Plotkin (U.S. - Ethnobotanist).

TRADITIONAL MEDICAL KNOWLEDGE: LOCAL HEALTH PRACTICES

Traditional societies throughout the world have accumulated a wealth of knowledge on ecological, technological and medicinal values during the prolonged interaction with the natural world (Schultes and Von Reis, 1995). Knowledge gathered through the perceptions of plants and their uses is termed Traditional Botanical Knowledge (TBK). Information on the plants around them as the main source of health care system forms the basis of Traditional Medical Knowledge (TMK). Within the realms of ethnomedicine it is called ethnomedicine (Cotton, 1996).

Historically, the art of curing involved mystique and magic in primitive societies. Plant based approach originated later. The psychoactive plants known as magic or psychedelic plants were the first ones to be used. More plants, following the "doctrine of signature" were used subsequently in the old world (Cotton, 1996). Literature on traditional medicine dates back to first centuary A.D and relates to Materia Medica by Dioscoredes (Naranjo, 1995).

The scientific medicine had its first pharmacopoeia in the 17th century. By 1930, around 90% of official medicines were of plant origin (Swain, 1972). Chemotherapy was introduced simultaneously and the discovery of antibiotics, signalled a flurry of activity in synthetic medicine. Synthetic chemistry moved to the centre stage displacing the plant-based approach. Today 90% of all standard medicines are synthetic chemicals or the product of fermentation (Naranjo, 1995).
The TMK exist in two streams: codified systems and oral or verbal tradition systems. The codified systems are Ayurvedha and Siddha of India, Unani of Middle East and Tibetan system of Chinese and are world renowned. The medical knowledge elaborated by this systems is recorded information resting on theoretical foundations detailing the philosophical basis, diagnosis, medication and surgery.

The other stream represents the traditional system of medicine practised by folk medical practitioners in villages and semi-urban areas, and passed on from generation to generation by word of mouth. The medication is essentially derived from plants in the wild and administered in the form of crude drug preparation. To people in the interior rural pockets and the remote tribal belts, it is easily accessible and probably, the only source of health care (Pushpangadan, 1995). Eventhough the oral traditton has no written culture, information has been gathered through prolonged observation, experimentation, innovation and perfection. More importantly, it has survived through millenia with total people’s support. While tribal medicine automatically qualifies the term, the prevalence of TMK among the non-indigenous societies has also been realised in recent times (Cotton, 1996).

Distribution

Unfortunately, most traditional societies have developed very little written culture despite strong linguistic identities. As a consequence, the knowledge has been channelized into myths, legends and traditions as well as useful oral information and practised in ceremonial or spiritual atmosphere for acceptance. Plants such as the elephant tree (*Bursera microphylla*) and desert lavender (*Hyptis emoryi*) were used during Shamanic healing practices in Mexico (Cotton, 1996).
Traditional Medical Knowledge, curdled out of practical experience is holistic, intuitive, qualitative and practical. It may have written scripts but can be perpetuated through oral communications. It is influenced by socio-cultural factors such as spiritual beliefs and is held within the society. In contrast, the Western scientific knowledge (WSK) including allopathy has a theoretical basis leading to generalizations; it is essentially analytical, reductionist, quantitative and has a written culture. This knowledge is influenced by peer review, shared by trained specialists and improved periodically (Shankar, 1995).

The reaction of the West to the traditional knowledge system has been varying. While the ethnographers have shed their bias against TBK, the scientific community, particularly the protagonists of allopathy, remain unconvinced and skeptical. They continue to brand TMK as “primitive” “unscientific” “imprecise” and even “wrong” and dismiss its spiritual connotations contemptuously.

Borlaug (1992) even complained that the ethnobotanists are simply romanticising the virtues of their traditional knowledge. Yet many of them varily acknowledge the profound benefits accrued to the western medicine from traditional knowledge. The advocates of alternative medicine further contend that the traditional systems have their own epistemological and scientific foundations with local roots (Shanker, 1995).

Benefits from TMK

Nature has no parallel in constructing simple or complex molecules of unimaginable properties. The strength of the traditional medicine lies in recognizing their hidden therapeutic values. According to World Health Organisation (WHO)
estimates, over 80% of people in developing countries depend on traditional medicine for their primary health care. Thus, for some 400 million people traditional medicine is the only source of succour (Farnsworth and Soejarto, 1991). The chinese system called, "Zhong-Yao" is 2000 years old; its pharmacopoeia of 1990 enlisted 784 traditional medicinal drugs of which 630 are plant derivatives. The Japanese Pharmacopoeia of 1996 has 123 plant drugs, both crude and pure, of which 29 are used in western medicine. In Côte d'Ivoire most of the 800 urban house-holds surveyed use traditional medicine only (Bodekar, 1997).

Ayurvedha, an ancient system of health care and longevity matured between 2500 and 500 B.C. and has some 1000 remedies (Dev, 1997). Siddha, a system of far-south in India, has been flourishing since 6-7 century B.C (Caldwells, 1875). It was formulated by 18 Siddhars and codified in palm leaf scripts (Thirunavukkarasu, 1995).

Plants had been a major source base for early western pharmacopoeia as 130 allopathic drugs of known structure and function are plant derivatives. The European scientific co-operative on phytotherapy (ESCOP) has screened and listed 150 herbal drugs as beneficial. Meticulously designed clinical trials of crude herbal drugs have confirmed the anti-inflammatory property of a tincture of beach morning glory, Ipomoea pescaprae of Convolvulaceae (Balick and Cox, 1997). Shanan Pharmaceuticals Inc. of San Francisco has developed two anti-viral products based on ethnomedicinal information. The tests have reached the clinical trial stage (King and Tempesta, 1994).

The gains from TMK in terms of specific drugs may be fewer in number but substantial; because, some of the more acute or chronic diseases for which the allopathy has no answer are cured by native medicaments. The conventional medicine stands to gain through drug recovery programmes by tapping TMK. Malaria is treated by the
putative drug chloroquine for which strains of *Plasmodium vivax* and *Plasmodium falciparum* have developed resistance. The cerebral malaria does not respond to this conventional drug. A new drug, artemisinin isolated from *Artemisia annua* has potential to control them. The clue was provided by a Thailand/Chinese sect who used it traditionally to control fever (Klayman, 1985).

Tea brewed from the leaves of club mass *Huperzia servata* has been used as a remedy against memory disorders of elderly people in China. It has now yielded Huperazine A which has reached the trial stage against Alzheimers disease which is the scourge of senior citizens, *Aloe vera*, the xeric member of Liliaceae has been conventionally used for treating burns in Europe (Balick and Cox, 1997). A south American creosote bush, *Larrea tridentata* used in folklore medicine in Central Africa and America has proved its efficacy against multiple Keratoses, as skin disease (Dev. 1997).

*Subramoniam* and Pushpangadan (1975) and Dev (1997) have reviewed the contribution of ethnomedicine to allopathic drug development. A total of 119 plant drugs of known structure and activity are now prescribed in Allopathy (Farnsworth, 1990). Dev (1997) also reported that over 700 new chemical therapeutics were introduced world wide during 1950-90; but hardly 17 were fashioned after plant derivatives. During the subsequent 5-year period also, only 2% of the new drugs related to plants. As it takes 5-10 years and costs >100 million dollars to develop a drug the economic value, even from this small number is really incredible (Balandran *et al.*, 1985).
TMK in India

India has rich traditions of plant based knowledge distributed amongst a vast number of ethnic groups. Of course, diversity and pluralism are hallmarks of Indian society and is reflected truly in the traditional medical sphere also. Both systems, codified (Ayurvedha, Siddha, Tibetan and Unani) and non-codified or oral are in vogue over the ages. According to Unnikrishnan (1997) Indian health system goes back to 1500 BC and the pertinent literature is available in the form of books, inscriptions and palm leaf-scripts in the country and also in libraries abroad. Over 7500 plants are estimated to be used in traditional medicine of which Ayurvedha and Siddha depend on 1700 and 600 species, respectively (see Pushpangadan, 1995).

The folk medical practitioners are called Nattu Vaidhyans in South India, or Vaidu or Amchi in other states. They have a low profile existence, no-sign boards, no degrees and not even a consulting room. Most of them are non-professionals - may be farmers, masons, potters, musicians, barbers etc. Both male and female practise local health traditions, the latter being predominantly birth attendents called Maruthuvachi in Tamil. According to a Shankar and Majumdar (1997) there are around million traditional village-based carriers of herbal medicine traditions in various forms. (Table 1). Complementing these folk-practitioners are over 4 lakhs licensed, registered medical practitioners of codified systems.
Table 1: Carriers of village based health traditions

<table>
<thead>
<tr>
<th>Folk medicine stream</th>
<th>Traditional Carrier</th>
<th>Conditions treated</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Housewives &amp; Elders</td>
<td>Home remedies Food and Nutrition</td>
<td>Millions</td>
</tr>
<tr>
<td></td>
<td>Traditional birth Attendants</td>
<td>Normal deliveries</td>
<td>7 lakhs</td>
</tr>
<tr>
<td></td>
<td>Herbal healers</td>
<td>Common ailments</td>
<td>3 lakhs</td>
</tr>
<tr>
<td></td>
<td>Bone setters</td>
<td>Orthopaedics</td>
<td>60,000</td>
</tr>
<tr>
<td></td>
<td>Visha Vaidhyar (Snake, Scorpion, dog bites specialists)</td>
<td>Natural Poisoning</td>
<td>60,000</td>
</tr>
<tr>
<td></td>
<td>Other specialists</td>
<td>Eyes, Skin, Respiratory, Dental, Arthritis, Mental diseases, Liver, Gastro-intestinal, Wounds, Fistula, Piles</td>
<td>1000 in each area</td>
</tr>
<tr>
<td></td>
<td>Wandering monks</td>
<td>Several</td>
<td>Many thousands</td>
</tr>
</tbody>
</table>

(Adapted from Shankar and Majumdar, 1997).

An Indian initiative led by Sukdev of National Chemical Laboratories, Pune, sponsored by Government of India screened over 2000 ayurvedhic drugs during 1988-93. Concentrating on brain physiology, they found preparations from leaves of Shankhpushpi, rhizomes of Jatamanshi fruits of Haritaki (Terminalia chebula), roots of aswagantha more effective in influencing memory enhancing activities, evidences for the effectiveness of Triphala components (Terminalia chebula, Terminalia bellirica, Emblica officinalis) in tackling gastro-intestinal disorders. The group successfully marketed a well defined modern drug - guggulsterones in 1986-87. It was obtained from guggulu resin of Commiphora wightii (=C. mukul) as revealed by Ayurvedha. Palsonin from the seeds of Butea frondosa with anti helminthic properties has also its roots in Ayurvedha. The group also testified to the claims of Ayurvedha for Andrographis paniculata, Picorrhiza curroa, Phyllanthes niruri, etc. Antimalarial
activity of neem indicated by folklore medicine was substantiated by the isolation of gedunin which was effective against *Plasmodium falciparum* (Dev, 1989; 1997).

A herbal balm based on banana, (*Musa paradisiaca*), turmeric (*Curcuma longa*), and Thazai (*Pandanus tectorius*) developed by Parameswaran Nair of Kuttipuram in Kerala treats challenging cases of burns of fire and chemicals where cosmetologists and plastic surgeons have failed (Science Express, 1998).

The Tropical Botanical Garden Research Institute (TBGRI) Trivandrum, Kerala has marketed a new drug called “Jeevani” formulated from Arokiapatchai plant, *Trichopus zeylanicus* sub sp. *travancoricus* of Trichopaceae. It is an anti-fatigue remedy and restorative. Its utility value was discovered serendipetously during a sojourn in the Agasthiamalai forest when the accompanying Kani tribals of Kerala often drifted away to consume the leaves and fruits of Jeevani plant (Pradeep, 1997).

Recently Rao *et al.*, (1996) reported the discovery of an antifertility drug from *Vicoa indica* of Asteraceae and the clue emanated from the practice of Adhivasi tribes of Bihar. The tribals have long been using powdered concoction of this banjauri plant for permanent sterility. Consumed on the first 14 days of three consecutive menstrual cycles or daily from day 2nd to fifth after delivery, the powder alongwith seven pepper seeds in water, prevented conception for ever. A team of scientists at IISC, Bangalore has confirmed the anti-fertility effect on monkeys for 13 successive ovulation cycles. In another trial the drug preparation (50 gms powder and 7 seeds of pepper) was administered in a small dose on the second day of abortion on 362 lady volunteers and was a tremendous success with only 14 failures. Further clinical trials with active principles vicolide A, B and C isolated from banjauri are reported to be in progress (Rao *et al.*, 1996).
Rural India has a number of renowned TMPs. The Ankola treatment tradition, perfected and practised for over 200 years by the Gowda lineage in Belampur in Uttaa Kannada is one such. They provide miracle cure for paralysis in 40 days and claimed to that Mahatma Gandhi had been treated once. (De Silva, 1997). The traditional bone-setters of Puthur in Andhra Pradesh revel in orthopaedic practices using herbal pastes, whole leaves, bamboo planchets but don’t perform surgery. Vaidhyar Arjunan of Telugupayam in Coimbatore of Tamil Nadu belongs to the same class but specialises on polio, myopathy and other neuromuscular ailments (Anon 1997a; Shankar and Majumdar 1997).

Nadeekal Kunjan Padmanabhan, bolstered by his 40 years experience in herbal medicine has evolved a new verocidal, immunostimulant and liver protector - KAMILARI. It has 107 herbal constituents and is effective against hepatitis A, B and C. Surprisingly, it showed a decline in viral load and virulence of HIV too. Dr. S. G. Deshpande of SNDT University, Mumbai who evaluated it pharmaceutically on animals vouches for its low toxicity and efficacy. He has already patented 40 different herbal formulations for various diseases (Menon, 1998).

Till now, diabetes could only be managed and not cured. Nothing more could be exciting for a diabetic, who has to depend on insulin life long and struggle with side effects, than a herbal remedy. P. N. E. Balaram, a Kerala industrialist fortuitously deciphered a herbal formula for diabetic which has worked wonders. First formulated as ‘Vijayasar’ in 1897, it was submitted to Indian Council of Medical Research (ICMR) in 1992, which successfully tested it on animals. Now it is pressed into double - blind trials on humans in collaboration with - Mayo Clinic in Minnesota, USA. The anti-diabetic preparation includes the following: *Azadirachta indica* (3.0 g) *Phyllanthes*
emblica (0.7 g), Terminalia bellirica (0.7 g) Terminalia chebula (0.7 g). Tribulus terrestris (1.0 g), Aconitum heterophyllum (0.1 g) Curcuma longa (0.8 g), Syzygium cuminii (2.0 g) and Rotala aquatica (1.0 g) but not Gymnema sylvestre known to rejuvenate pancreatic beta cell (Rao, 1998).

Tribals in the snow-capped Himalayan ranges, used to drink a decoction of Ephedra vulgaris sp to guard themselves in the rarified atmosphere long before the discovery of ephedrine as a remedy for cold and cough (Anon, 1997c).

Despite the impressive benefits drawn from traditional medicine, the western scientists were reluctant to recognize them as parallel health care systems (see Pushpangadan et al., 1995). The conventional medicine has a molecular basis - only single activity drugs called 'magic molecular bullets' would pass the test; compounds that affect multiple points are unacceptable. The indigenous systems are effected through crude drugs containing a cocktail of molecules. Hence, they insist on pharmaceutical evaluation of herbal drugs on the premise that science is one, universal and uniquely expressed in its own scientific paradigms. A group of moderates in the East are not against such an approach and this compromise led to the emergence of a new field - ethnopharmacology (Rivier and Bruhn, 1979; Bruhn and Homstedt, 1981). But most eastern scientists argue that the traditional codified system have evolved in specific native environments, have successfully withstood the test of time and have their own epistemological foundations too. They contend that any indigenous system should be evaluated by indigenous parameters only and not by alien yardsticks.

The methodology of traditional medicine is not crude altogether. While codified systems have elaborate protocols for diagnosis and therapy, the oral traditions mostly follow the principles of Ayurvedha and Siddha. The body-soul concept guided
diagnosis. A thorough understanding of the plant, and its relationship to the habitat and environment characterize their approach. The utilization of one plant for several diseases in different regions suggest that experimentation and validation had been integral part of their systems.

Of late, there has been a perceptible change in viewing the traditional medical systems. In 1967, search for psychoactive drugs leaned upon TMK for formal therapeutic agents (Efron et al., 1967). Though validation of herbal drugs by the contemporary scientific paradigms can revolutionise global health care systems, a new school of thought advocates the integration of western science with traditional systems to fetch of immediate benefits (Richards, 1985; Johnson, 1992). This welcome shift in the attitude is reflected in the increasing number of co-authorship of scientific papers for the traditional herbal healers along with the western evaluators. This would entitle them patent rights for bioprospecting from the information they provide. An increasing number of nations including China, Mexico, Nigeria and Thailand have already decided to integrate traditional medicine into their Primary health systems (Naranjo, 1995; Balick and Cox, 1997; De Silva, 1997).

The resurgence in ethnomedicinal research has boosted the field of "grey pharmaceuticals" - drugs of proven safety and efficacy that are marketable in West. As an inevitable corollary, it has fuelled contentions issues related to bioprospecting and intellectual property rights (IPR) (Balick and Cox, 1997). Living resources have been generally viewed as common heritage of human kind by people of world. But our new world contemporaries perceive it differently in terms of assets, properties, ownership, rights and returns. They advocate IPR over materials and technologies but also on knowledge of uses of the resources. This is where most of the developing nations, whose bio-diversity is vast and traditional knowledge is abundant, have a stake. With
an array of modern medicines flowing from indigenous systems, the rightful ownership of their medical knowledge and the utility value of these sources entitle them to IPR on par with western scientific investigators (Dutfield, 1995).

A social dimension also has emerged. Now-a-days, people look forward to a long term cure without side effects rather than a short term relief accompanied by lots of ill-effects. Traditional medical systems may be a slow science but the west is gradually turning towards the natural systems of cure and care.

The convention on biological diversity (CBD) has been ratified by over 160 centuries and has come into force in 1993. It specifically recognised the rights of indigenous and local communities. Article 29 of the draft UN declaration on the rights of indigenous peoples states that:

"Indigenous peoples are entitled to the recognition of the full ownership, control and protection of their cultural and intellectual property. They have the right to specialise measures to control, develop and protect their sciences, technologies and cultural manifestations, including human and other genetic resources, seeds, medicines, knowledge of the properties of fauna and flora, oral traditions, literatures, designs and visual and performing arts".

Prospects of TBK

Several agencies, both at the national and global level have formulated schemes to collect, document, and systematize traditional knowledge. Peoples and Plant Initiative (PPI) was started by WWF, UNESCO and Royal Botanical Garden at Kew;
Global Initiative For Traditional Systems of Health (GIFTS) signifies another international attempt. Traditional Medicine For The Islands (TRAMIL) is yet another multinational applied research programme of the Carribean government targetting medical knowledge. An Indian initiative funded by Danida in the name of Foundation for Revitalisation of Local Health Traditions (FRLHT) is based in Bangalore since 1993 (Anon 1997b&c). With the colaboration of the governments of Karnataka, Kerala and Tamil Nadu on one hand, and research institutes and non- governmental organisations (NGO) on the other, it has launched a pilot project for identification, conservation and sustainable use of medicinal plant diversity with a biocultural approach. So far it has created 33 in situ Medicinal Plant Conservation Areas (MPCA), 16 ex situ Medicinal Plant Conservation Park (MPCP), 7 in situ Medicinal Plant Development Areas (MPDA) besides 3200 medicinal plants chest / home herbal gardens in 309 villages. It has evolved a data base for 2250 plant species providing information on their utilisation epistemology and conservation status (Shankar and Majumdar, 1997).