



ADDENDUM TO THE BIODIVERSITY CONSERVATION IN SRI LANKA

A Framework for Action

CHAPTER REPORT - 05



BIODIVERSITY DIMENSIONS IN TRADITIONAL KNOWLEDGE AND LIFE STYLE

**Biodiversity Secretariat
Ministry of Environment**

Addendum to the Biodiversity Conservation in Sri Lanka – A Framework for Action

**CHAPTER REPORT ON BIODIVERSITY DIMENSIONS IN
TRADITIONAL KNOWLEDGE AND LIFE STYLE
(TASK FORCE NO-04)**

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(TASK FORCE NO-04)**

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Introduction

Sri Lanka with a recorded history of over 2500 years and a prehistory of several millennia, acquired an accumulated wisdom of managing and conserving her natural resources and her rich biodiversity. This knowledge base had been gradually eroded due to foreign influences and a spell of colonial rule extending over 500 years. Despite these vicissitudes of history, people of Sri Lanka and particularly those in the rural interior, continue to retain a reasonable stock of traditional knowledge related to biodiversity. Traditional medicine depends heavily on the exceptional diversity of tropical plants in the Island. The rich biodiversity of the Island is also reflected in its toponomy, culture and literature. It appears that, this wealth of traditional knowledge had hardly been recognized or harnessed in the past for development or biodiversity conservation. It is now increasingly recognized that, in sustainable development and in the conservation of nature and its riches, traditional wisdom and the life styles of people with minimal demands on natural resources, could perform a vital role.

BCAP 1998 and the Need for Review

In the Biodiversity Conservation Action Framework (BCAP), although there is some passing reference (Overview Section 2.2) to history and culture, it is doubtful whether it had actually received the attention it deserved. Thus it has not been highlighted in any of the seven main chapters. None of the sub-headings with the exception of the overview section 2.2 is devoted to the cultural aspects of biodiversity. It is only in section 6.9 that there is some significant reference to the need for preservation of indigenous knowledge particularly in relation to agriculture and traditional medicine. It must be appreciated however, that it had recommended the launching of a programme for the collection and archiving of related data and institutionalizing the process, while regulating and controlling access (Recommended Action 11). Therefore, our present attempt to delve into the cultural aspects of biodiversity is a logical continuation of the initial recommendations of the BCAP 1998.

The BCAP also refers to (Section 6.12.3) gathering information on indigenous knowledge on the use of plants for medicinal purposes and carrying out vertical integration in biodiversity prospecting. With regard to the legal framework, BCAP recognized the need for protecting indigenous knowledge of the country through petty patents or such other similar mechanisms irrespective of time limitations. These have been extremely valuable suggestions despite the fact that the progress of any efforts towards achieving them had been slow and lethargic.

Apart from the limited attention paid to cultural biodiversity in the BCAP 1998, it is also doubtful whether it had adequately grasped the length and breadth of the field of local cultural biodiversity and its strengths and weaknesses. In consequence, apart from some brief reference to bio-prospecting, how the cultural value of biodiversity could be harnessed for development and biodiversity conservation has not been adequately appreciated and prioritized.

Objectives of the Study

The field of cultural biology appears to be relatively new and had hardly gained a niche in the modern scientific discourse. The Present study on the cultural biodiversity of Sri Lanka, rests largely on the premise that there is a wealth of traditional knowledge passed down from generation to generation, gathered through long experience and ancient wisdom. This knowledge remains largely scattered and under the threat of total extinction in the wake of advancing technology and modernization. Therefore, it is worth preserving for the benefit of present as well as future generations of human society both locally and globally. It is also presumed that traditional knowledge may have the potential, if properly applied, for addressing many challenges confronted by the modern society and particularly those related to biodiversity conservation and sustainable development. In order to achieve this broad objective, the study had strived to attain the following specific objectives:

- (a) Open the fascinating field of cultural biodiversity for further investigation and research
- (b) Identify the main fields of traditional knowledge where either a substantial quantum of information is still preserved or still applied.
- (c) Within each field to summarize and highlight a few issues that deserve concerted attention.
- (d) Recommend strategies to facilitate the application of traditional knowledge in development and conservation of nature and biodiversity
- (e) Recommend institutional and other mechanisms to give effect to proposals for conservation and application of traditional wisdom.

Methodology

The study had to proceed largely along unbeaten tracks on a highly multi-disciplinary terrain spreading into such diverse areas as traditional medicine, agriculture, art, architecture and archaeology. It also extended to literature, folklore, poetry, culture and life style and local toponomy. In view of the limited time and resources available, the study had to depend heavily on published material and easily accessible data sources. With regard to medicinal plants for example, a primary source of information was the *Sarartha Sangrahaya* compiled by the renowned King Buddhadasa in the 5th Century AD, and published recently by the Department of Government Archives. For biodiversity related toponomical studies, a village data bases (though incomplete) available at the Ministries of Environment and Agriculture (at Plant Genetic Resources Centre) as well as the internet data bases compiled by the US Department of the Interior, and the Islamic Finder Web Sites, were utilized.

In general, the accumulated knowledge of the members of the team who came from varied academic disciplinary backgrounds is reflected in the compilation of the text. Therefore, the methodology adopted in different fields of traditional knowledge also varied according to their specific requirements. Some details of such approaches adopted are discussed under each field.

Present Status of Cultural Biodiversity

Cultural aspects of biodiversity are examined in five related fields. These include some aspects of flora, fauna, ecosystems, agriculture, culture and toponomy. Preliminary findings under each field of study and recommendations arising out of them are summarized.

Flora Diversity

Plants have performed a significant role in Sri Lanka's culture and religion since time immemorial. Apart from the use of plants for agriculture, and for traditional medicines and diet, they have also become part of religion and in personal and place names. Plants and their products have been extensively used for fuel wood, as insect repellents and for domestic lighting as in the case of Kekuna (*Canarium zeylanicum*) and Mee (*Madhuca longifolia*) oils before the advent of petroleum and electricity. Roots of certain plants were used for brushing teeth (*deheti*) like *pila mul* (*Tephrosia purpurea*), *karanda* (*Pogamia pinnata*) and *bombu* (*Symplocos spp.*), along with wood charcoal. For house construction and roofing material selected varieties of timber trees and grasses were used. Different types of timber had been used for furniture for different purposes and even for coffins it had been selective like *gonna and ruk Attana* (*Ficus sp. and Alstonia scholaris*). As found in some folk poems a variety of sticks even for corporal punishment were used in the schools [*We-wel kotu* (*Calamus* species such as *C. ovideus*, *C. pseudotenuis*, *C. rivalis*, *C. rotang*, *C. thwaitesii.*), *Naran* (*Citrus reticulata*), *Siyambala athu* (*Tamarindus indica*); *Kitul* (*Caryota urens*), *Pol iratu* (*Cocos nucifera*), *wel kahambiliya athu..* (*Tragia hispida or Tragia involucrate*)].

People have also attributed cultural values to different plants and given them higher or lower status than others. Plant species related to *Esatu* (*Ficus tsiela*) were treated as *Vanaspathi* or the lords of the forest. The religious value of the *Bo Tree* (*Fiscus religiosa*) led not only to its protection but also to the protection of other forest patches around the temples which were used as sites of retreat and meditation. Thus the temples have traditionally being the refuges for rare plant species. This potential of temples as centres of biodiversity conservation had hardly been realized in recent times. In the case of flowers, those with fragrance were given higher status as those suitable for religious purposes. Flowers without fragrance were compared to women without virtue (*Suwanda Neti Kaela Mal Samawe*). Among the flowers, the lotus had been in the lead as it appeared in a wide variety of sculpture and painting while *Na* (*Mesua nagassarium-our national tree*) and *Sapu* (*Michelia champaca*) were culturally prominent tree species. It is doubtful, whether the actual depth of cultural significance had been adequately understood in officially determining the present 'national tree' and the 'national flower' in the recent past.

The people who lived in the forest or the *Beddo* apparently came to be known as *Veddo* and those overlords of the forest in the North West and North Central regions were known as *Wanninayake*, *Wannihamy*, *Wannihuru* (Sinhala) and *Wanniars* (Tamil).

As a case study, most of the plants that have been used by King Buddhadasa (5 A.D.) for the preparation of herbal medicines were identified. The text of the book "Saritha Sangrahaya", originally written by King Buddhadasa himself and recently re-edited in 1987 (A.

Kumarasinghe) was used as the main source of reference for this investigation. Accordingly, a total of 170 medicinal plants quoted in the “Sarartha Sangrahaya” were scientifically identified. The breakdown of these different plants are as follows: cereals-51 species, herbs-61 species, shrubs-10 species, climbers-20 species, trees- 20 species, tubers- 07 species and mushrooms- 01 species. Furthermore, a range of books that describe the ancient culture, art, traditional medicine systems and lifestyles were also made use of for this investigation. It is doubtful whether the cultural significance of tree and flower species had been adequately taken into consideration in declaring the ‘national tree’ and the ‘national flower’ in the recent past.

In addition to the above, some twenty five plants have been identified in relation to written documentation available on forestry, urban and environmental biodiversity, bio-industry and traditional medicine. Some plants that have been investigated so far in relation to these aspects are listed below in Table 1:

Table 1

Weni wel. *Coscinium fenestratum*.

Commonly present in the wet zone of Sri Lanka. Specimens Examined: Kalutara District, Ratnapura District and Galle District.

Bulu. *Terminalia bellirica*.

Commonly present in the wet zone of Sri Lanka. Specimens Examined: Jaffna District, Puttalam District, Kurunegala District, Kandy District, Badulla District and Kalutara District.

Tala gasa. *Corypha umbraculifera*.

Commonly present in the wet and dry zones of Sri Lanka. Site: Coastal groves, home gardens, roadsides; moist coastal and wet lowlands.

Niyada. *Sansevieria zeylanica*.

Commonly present in the intermediate zone of Sri Lanka.

Divi kaduru. *Pagianta dichotoma*.

Commonly present in the intermediate and wet zones of Sri Lanka. Specimens Examined: Kegalle District, Kandy District, Nuwara Eliya District, Colombo District, Ratnapura District and Galle District.

Nari latha. *Habenaria crinifera*.

Commonly present in the wet zone of Sri Lanka. Specimens Examined: Kandy District and Ratnapura District.

Kadupul. *Phyllocactus crenatus*.

Commonly present in the wet zone of Sri Lanka.

Ehela. *Cassia fistula*.

Commonly present in the dry zone of Sri Lanka. Site: roadsides, home gardens, monsoon forest sub canopy and dry lowlands.

Weta keyiya. *Pandanus kaida*.

Commonly present in the intermediate and wet zones of Sri Lanka. Specimens Examined: Colombo District and Kandy District.

Sapu. *Michelia champaca*.

Commonly present in the intermediate and wet zones of Sri Lanka. Site: home gardens, roadsides, forest plantations, intermediate land and wet lowlands.

Binara. *Exacum trinervium*.

Commonly present in the wet zones of Sri Lanka. Specimens Examined: Kalutara District, Colombo District, Galle District, Ratnapura District and Matale District.

Annasi. *Ananas spp.*

Commonly present in the wet zone of Sri Lanka.

Aralu. *Terminalia chebula*.

Commonly present in the dry and intermediate zones of Sri Lanka. Specimens Examined: Jaffna District, Kandy District, Badulla District, Ratnapura District and Moneragala District.

Nelum. *Nelumbo nucifera*.

Commonly present in the dry and wet zones of Sri Lanka. Specimens Examined: Vavuniya District, Anuradhapura District, Matale District, Colombo District and Hambantota District.

Bo. *Ficus religiosa*.

Commonly present in the dry and wet zones of Sri Lanka. In the wild state *F. religiosa* is now rare but it has prospered due to its holiness. A sprig of the tree under which the Buddha attained enlightenment was brought to Sri Lanka in the year 288 B.C. Site: Parks, gardens, temples; widespread.

Samanpichcha. *Jasminum angustifolium*.

Commonly present in the wet and dry zones of Sri Lanka. Site: secondary forest and scrub and dry lowland.

Kos. *Artocarpus heterophyllus*.

Commonly present in the wet, dry and intermediate zones of Sri Lanka. It is one of the best known tropical trees. Widely cultivated throughout the tropics.

Vee/ Rice. *Oriza sativa*.

Commonly present in the wet, dry and intermediate zone. Specimens Examined: Amparai District, Anuradhapura District, Batticaloa District, Colombo District, Hambantota District, Polonnaruwa District, Puttalam District, Ratnapura District and Trincomalee District.

We -wel. *Calamus rotang*.

Commonly present in the wet, dry and intermediate zones of Sri Lanka.

Kaluwara. *Diospyros ebenum*.

Commonly present in the dry zone of Sri Lanka. Specimens Examined: Polonnaruwa District, Badulla District, Matale District, Moneragala District, Vavunia District, Kurunegala District, Mannar District, Trincomalee District and Puttalam District.

Nuga. *Ficus benghalensis*.

Commonly present in the dry and wet zone of Sri Lanka. Specimens Examined: Trincomalee District, Colombo District, Jaffna District, Mannar District, Badulla District, Batticaloa District, Kalutara District and Kurunegala District.

Na. *Mesua nagassarium*.

Commonly present in the wet and intermediate zone of Sri Lanka. Specimens Examined: Kalutara District and Kandy District.

Pus wel. *Entada Phaseoloides*.

Commonly present in the wet zone of Sri Lanka. Specimens Examined: Matale District, Kandy District, Ratnapura District, Badulla District, Amparai District and Galle District.

Kekuna. *Canarium zeylanicum*.

Commonly present in the wet zone of Sri Lanka. Specimens Examined: Matale District, Kandy District, Nuwara eliya District and Galle District.

Amba. (Wal Amba) - *Mangifera zeylanica*

Commonly present in the dry, wet and intermediate zone of Sri Lanka. Specimens Examined: Kandy District, Galle District, Puttalam District and Badulla District.

The use of plants species for herbal medicines is well known through out history as reflected in the hospital complexes in ruins, as at Ritigala, Mihintale, Polonnaruwa and Anuradhapura. One area of the indigenous medical practice which is continuing to be popular is traditional orthopaedics, and a large number of practitioners still operate around places such as Ritigala, where the necessary herbal material still available. The use of *Beheth Oruwa* or the medicinal trough had been widespread and the remaining stone troughs defy any proper understanding of its ancient use. It is interesting however, to note that, the present interest in ecotourism has given the medicinal bath a lucrative place in the hotel industry. The local and overseas market for herbal products has also increased tremendously in the recent past as reflected in numerous products.

Similarly, if one considers the plant species referred to in the folk poetry as reported in those of the Uva region where many aspects of local culture still remains, it is possible to understand the regional diversity of flora. Thus in a compilation of folk poetry of Uva (Sumanasekera Banda, 1977) occurs the following names:

Burutha (*Chloroxylon swietenia*), *Na* (*Mesua nagassarium*), *Aralu* (*Terminalia chebula*), *Kitul* (*Caryota urens*), *Dunuke* (*Pandanus thwaitesii*), *Thala* (*Corypha umbraculifera*), *Madu* (*Cycas circinalis*), *Kenda* (*Macaranga peltata*), *Bo* (*Ficus religiosa*), *Mee* (*Madhuca longifolia*), *Kos* (*Artocarpus heterophyllus*), *Del* (*Artocarpus altilis*), *Goraka* (*Garcinia quaesita*), *Lolu* (*Cordia curassavica*), *Himbutu* (*Salacia reticulata*), *Kumbuk* (*Terminalia arjuna*), *Mee Amba* (*Mangifera indica*), *Heen Thambala* (*Carmona microphylla*), *Paramadala* (scientific name not found), *Bukkeeriya* (scientific name not found), *Ginithilla* (*Argyrea populifolia*), *Una* (*Bambusa vulgaris*), *Mora* (*Glennia unijuga*), *Dotalu* (*Loxococcus rupicola*), and many names of fruits and vegetables. Most of these species are still found in the area. However, tree species such as *Paramadala* and *Bukkeeriya* may have become extinct?

A further description of the plants in relation to Bio industry, Traditional medicine and Urban biodiversity has also been prepared. Taking into consideration the demand and social acceptability, we propose that a few species such as *Santalum album* (Suduhandun), *Coscinium fenestratum* (weniwel), *Caryota urens* (Kitul), *Artocarpus heterophyllus* (Kos), *Corypha umbraculifera* (Tala gasa), *Bambusa vulgaris* (Una) and *Azadirachta indica* (Kohomba) that have very close cultural affinities and with greater potential for future use be explored further to develop suitable bio-industries in Sri Lanka. The uses, economic potential and methods of cultivation of some of these plants are listed. The development of these bio-industries may be for local requirements as well for export.

Recommendations

- (a) **Conduct further research on the “national tree” and “national flower” and review the process that led to their declaration**
- (b) **Select a few types of plants that have greater potential for bio-industry (Eg. Suduhandun, Weniwel, Kitul, Kos, Tala, Una and Kohomba. This may be to satisfy local requirements as well as for export. Since there are on-going programmes regarding Kitul and Kohomba, priority may be given to others.**
- (c) **Traditional orthopaedic treatments based on herbal medicines continue to remain popular and therefore there is a need to probe whether they have any scientific basis.**
- (d) **Revive the concept of ‘beheth oruwa’ for its own local use as well as for Ecotourism**
- (e) **Promote the possibilities of using religious places of worship for biodiversity conservation through the development of plant and animal refuges**

Faunal Biodiversity

Animals have always been closely associated with Sri Lanka's culture and society. Books written on traditional Sinhalese medicines clearly indicated the medicinal value of some of our indigenous animal groups. *Sarartha Sangrahaya*, by King Buddhadasa (5 A.D.) for example, has listed the medicinal properties of a number of our animal species (Table 2) found at that time.

Table 2: Animal groups identified in the *Sarartha Sangrahaya*

Animal group	Number of species
Freshwater fish	12
Marine fish	7
Birds	10
Mammals	14 (including two introduced ones)
Insects	2

In Sinhalese folklore and folktales too, one comes across many animal groups and faunal material that are used in traditional medicine for curative as well as for preventive purposes. There are beliefs among Sinhalese that flesh of certain animals possesses curative qualities. For instance people in the dry zone of Sri Lanka where a large number of irrigation tanks exist from time immemorial, believe that regular consumption of the flesh of reservoir living fish "*Loola*" (*Channa striata*) cures anaemic conditions in man. Similarly, the flesh of certain animals such as Toque Macaque or *Rilawa* (*Macaca sinica*) for *mandama*, Grey Langur or *Wandura* (*Semnopithecus entellus sp*), Purple-faced leaf monkey or *Kalu Wandura* (*Trachypithecus vetulus*) for *arsas* or piles, Indian Porcupine or *Ittewa* (*Hystrix indica*) for asthma, Land Monitor or *Talagoya* (*Varanus bengalensis*), and Flap shell Turtle or *Ibba* (*Lissemys punctata punctata*) or Fresh Water Terrapin for vitality, are believed to be of curative or nutritional value. Python oil is used in the traditional orthopaedic treatment. The flesh of *Ukussa* or Brahminy Kite (*Haliastur indus*) and *Monara* or Peacock (*Pavo cristatus*) are supposed to improve eye-sight. Similarly the use of *Urule Sattam* (Scent Gland of Civet Cat), teeth and skin of leopard (*Panthera pardus*) among other things for preventive or curative purposes is still prevalent in some areas. It would be of interest to subject some these systems of belief to scientific scrutiny through analyses of the chemistry of such animal material.

Traditionally, the rural folks also assign different languages, sounds, and meanings to the calls of animals and birds. The sound 'tin-tin' is for *lena* (squirrel), 'ton-ton' is for *gona* (sambhur), *buh-buh* is for dog and *gnaaw- gnaaw* is for the cat. This may sound different from similar usages in the western countries. The sound of frogs is finely differentiated according to the size of rain drops that fall during rainy periods. Some calls of birds are considered to be conveying some

messages or their complaints and grievances. *Avichchiya* (Indian Pitta or *Pitta brachyura*) has a grievance about his dress being stolen by the peacock (*Evith Giya..Evith Giya, Ayith kiyannam, methē budun buduwana vita ayith kiyannam*). Then *kirala* (Red-wattled Lapwing) supposed to protect his eggs from the falling sky, utters obscenities in pure Sinhala when provoked! However, early Englishmen here believed that lap-wing spoke English (Did you do it; Did you do it! Etc.).

The traditional Sri Lankan villager also believes that, certain animal signs (especially animal calls) bring them good or bad news (Ratnapala, 1980). Howling of Jackal (*Canis aureus*), hoots of Forest Eagle Owl *Bubo nipalensis* (S: *ulama*, E: devil bird who is supposed to say *Kollan Walalan, Kellan Godagan*) are interpreted as upcoming sad news. Similarly, the calls of the House Gecko (*Hoonā*), *Kaputa* (Crow – some type of call) and dogs (some type of barking – *uduburaleema*) are also taken seriously as bad omens. The calls of Swallow or *Wehi Lena* (*Hirundo rustica*), and *Kendetta* or Malabar Pied Hornbill (*Anthracoceros coronatus*) are taken as predictions of rainfall.

Although animal sacrifice was not practiced to a large extent among the Sinhalese, there are occasions where people offer animals or their parts to some gods in order to get their blessings (eg. Fowl had been used for the practice of *pideni*, and *huniām ritual* sacrifices, and for this reason chicken was not a favoured dish during the olden days). Some of these systems of belief may have had their origins in ancient Hindu Culture due to its close association with Tamil and Sinhala communities. For instance goats are sacrificed by the Hindus as offerings for the goddess *Kali*.

Use of animal signs in our traditional crafts and paintings as well as in our flags (including the national flag) is quite remarkable (Table 3). Our traditional national flag that has a history of over two millennia depicts a lion at its centre. This is believed to depict the mythical origin of the Sinhala race from a lion. The lion in the ancient flag was however, different from that in the present national flag which had been designed by a Parliamentary Committee in the 1940s. The ancient flag had a much thinner lion (as those that could be seen in both national flags as well as in some regional (*dissawa*) flags, leading to the speculation as to whether in fact such a smaller and slimmer lion lived in Sri Lanka in the historic past. The reference of Deraniyagala (1963) to the remains of a lion – *Leo Leo Sihaleyus* seem to add fuel to such speculations (See Table: 3). In the early literature too (*Anguttara Nikaya*) refers to four types of lions namely, *thruna sinha* (grassland lion), *Kaala sinha* (possibly a dark lion), *Pandu Sinha* (possibly a bronze coloured lion) and the *Kesara Sinha* (lion with a mane). These lines of indirect evidence suggest that a lion who evolved within the Sri Lankan habitat conditions would have possibly lived in the Island.

Certain animals, especially the elephant is also of high cultural value. During the time of our ancient kings, elephants have been used in war, forming the first of the four battalions namely, *Eth* (Elephant Tusker), *As* (Horses), *Riya* (Chariots) and *Pabala* (Infantry). However, today the elephants are mainly used in religious processions and for domestic work. The Kandy *Esala Perehera* epitomizes the role assigned to the elephant. After the water cutting ceremony at the end of the *Perehera*, most parents wish to make the children walk under the elephant to invoke blessings against unknown illnesses and to dispel deep-seated fears. Elephants are also used as a symbol of status and wealth of a family, throughout the Sri Lankan history.

According to folk belief, people attribute different status to different animals. While the lion is recognized as the leader of the animal kingdom, there had been leader animals in different ecosystems. In lake and pond ecosystems *loola* is treated as the dominant fish while *kanaya* was given much lower status. However, on the banks of rivers and interfluves, the crocodile (*Degambada Raja*) is treated as the king. (*Degambada raja kimbula novedo*) Although highly venomous, *naya* (Cobra) is accorded higher status than the *polanga* (viper) according to folk tales.

Sri Lankan traditional medicine has extended to even animal care. Care for captive elephants is well documented (Ranasinghe, 1986). As the history maintains, King Buddhadasa himself treated even venomous snakes. The treatment to cattle and buffaloes is also documented in ola leaf records in the possession of some rural physicians. In view of the importance of the problem of snake-bites in the rural areas (even today over 10,000 persons are reported for treatment at state hospitals and at least a thousand people die each year) a large number of snakes, spiders, scorpions, and even bees are identified in such records. Snake venom treatment forms a separate branch of the indigenous medical practice and a large proportion of rural people still prefer it than western medicine. The identification of different snakes for different forms of treatment may provide a wealth of information on their diversity and behaviour. It would be of interest to codify this knowledge and subject them to some form of scientific scrutiny, since it appears to have the potential to open new vistas in the medical practice in general. However, the tradition of *Guru Musti* or 'keeping the secrets of the science' confine the custody of the traditional knowledge to a limited number of practitioners and families.

Sri Lankans also have a habit of comparing the strength of a person to that of an animal such as an elephant, a 'lion' or a "gawara" (Gaur). Although the relationship to lion is well exhibited, our linkage to Gaur is supported by only a few evidences. One such evidence is in the village names such as *Gawarammana* and *Gawaravila* and *Gavara Kele*. A grass species named as *Gawara mana* (*Garnotia exaristata*) which is found growing in the plains of the highlands is supportive evidence. If one goes by such cultural evidence there is reason to believe that some species of animals such as the lion (Sri Lankan), gawara, a pigmy elephant (as depicted decoratively on some old maps) and birds like *gurula* and snakes such as *henakandaya* were existent in the past.

The traditional classification of fauna is distinctly different from that of modern classifications. The traditional system is based on the nature and formation of legs; i.e. Apa (without legs) Depa (with two legs) Sivupa (with four legs) Buhupa (with many legs). With regard to elephants, present day mahouts recognize 11 types and this is somewhat similar to what is given in the Sarartha Sangrahaya as well as in the writings of Deraniyagala. Similar classifications are also found with regard to cattle (Deraniyagala refers to 7 types), buffaloes and cobras. In comparison with modern classifications, most traditional classifications appear to be more detailed and extensive. It is therefore worth exploring the bases of such traditional classifications that reflect greater cultural biodiversity.

Recommendations

- (i) *Traditional classifications of animals appear more detailed and extensive than some modern classifications. Therefore, it is worth investigating whether there is anything that could be learned from traditional wisdom.*
- (ii) *Rural people seem to rely heavily on the traditional medical practice for snake venom treatment that recognizes a wide variety of snakes and reptiles. It is worth codifying this knowledge and subjecting it to scientific scrutiny.*
- (iii) *The symbolic lion in the present national flag is not the same lion that was depicted in our traditional national and regional flags. The slimmer lion that appears in our ancient national flags may represent a lion that actually lived in Sri Lanka. This deserves further investigation.*
- (iv) *Certain calls and behavioural patterns of some animals are believed to have the capability of predicting rainfall. It is worth investigating this further.*
- (v) *There is a widespread belief that eating the cooked meats of certain animals has some curative effects. This may be investigated further along with other medicinal uses of animal material*

Table 3. Animals used in paintings and flags

Animal Group	Species	Cultural value	Remarks	References
Mammals	Lion (<i>Leo leo sinhaleyus</i>)	Animal in the National flag. Name "Sinhala" derived from lion Pride of Sinhala people shown on these singha paintings	Extinct animal Location: parts of skull found in a gem pit in Ratnapura	Deraniyagala ,P.E.P 1963, <i>Spolia Zeylanica</i> (Vol.24)
	Hawa (Rabbit)	Seen on Temple Paintings	Location: Crowell Cambridge, Report part3.	Ananda.K. Kumaraswamy, 1962, <i>Madiyama Kalina Sinhala Kala</i>
Birds	Berunda Pakshiya	A design seen on jewellery with gems in the Kandyan period. Seen on wood carving, Ivory carving. Symbol on the Thun Korale flag.	Hypothetical animal Location: Meddepola Temple Giriulla,Ambakke Temple.	Siri Disanayake 1992, <i>Kalawa Agaema</i>
Birds	Sarapenda (A design with a head of a Lion body of a Bird, scales of a Fish.)	Seen on temple drawings. Brass carvings.	Hypothetical animal Location: Ridee Viharaya Babaragala Temple. Ambakke Temple. At Magulmaduwa. Haguranketha Temple. Malwatta Temple.	Siri Disanayake 1992, <i>Kalawa Agaema</i>
	Athkandalihiniya (Head of a Lion and body of an Eagle Carrying two elephants by its claws.)	Carvings on wood and brass. Wall paintings.	Hypothetical animal Location: Ambakke temple Katharagama devalaya Badulla.	Siri Disanayake 1992, <i>Kalawa Agaema</i>

	Girawa (Two birds joined together.)	Seen on the Binthenna Flag Brass Lamp	Location: Lanka Thilaka Temple	Ananda. K. Kumaraswamy 1962. Madiyama Kalina Sinhala Kala
	Hansaya (The symbol of the law. Two birds joined together)	Seen on Sadakadapahana Can be seen in the Kandyan period. Brass carvings.	Location: Anuradapura Polonnaruwa, Kandy	Siri Disanayake 1992, Kalawa Agaema
	Makara (Similar to a crocodile. Trunk of an Elephant, body and tail similar to a bird)	Seen on paintings and pandols.	Hypothetical animal Location: Madagoa Temple	Ananda.K. Kumaraswamy 1962. Madiyama Kalina Sinhala Kala
	Narasingha (Lion with a human head)	Seen on paintings	Hypothetical animal Location: Bell's Kegalle Report.	Ananda.K. Kumaraswamy 1962. Madiyama Kalina Sinhala Kala
	Vrushaba Two heads of cow	Seen on brass carvings and wood carvings. Symbol of good fortune.	Hypothetical animal Location: Bell's Kegalle Report	Ananda.K. Kumaraswamy 1962. Madiyama Kalina Sinhala Kala
Snakes	Nagarupa (People believe that God of the water)	Seen on Ponds and Tanks .Wall paintings. Temples Wood carvings.	Location: Mihinthale pond, Thuparamaya Anuradapura Colombo Museum.	Siri Disanayake. 1992. Kalawa Agaema.
Fish	Mathsiya (Fish)	Symbol of good Fortune. Seen on Pots and pan. Ancient paintings.	Hypothetical animal Location: Bell's Kegalle Report	Ananda.K. Kumaraswamy 1962. Madiyama Kalina Sinhala Kala

Ecosystem Diversity of Sri Lanka

–The Traditional Perspective

‘Sri Lanka has a greater biodiversity per unit area with regard to certain animals and plants than those in any other Asian country’ (*Natural Resources of Sri Lanka* (1991:222). As the term biodiversity primarily denotes genetic diversity, species diversity and ecosystem diversity, a high biodiversity necessarily connotes high ecosystem diversity.

The traditional knowledge systems (i.e. social capital systems) of the country had distinguished a diverse array of ecosystems natural, semi-natural and man-made. The present study is an attempt to see how the ecosystems of Sri Lanka have been differentiated according to the traditional knowledge systems. This may be achieved by examining the country’s ecosystem types with respect to the modern nomenclature and then, striving to grouping and fitting the traditionally identified ecosystems into principal modern types.

Modern Ecosystem Classifications

According to the modern classifications, most ecosystems of Sri Lanka may be included within the following five groups: Forests, Scrublands, Grasslands, Savannas and Wetlands. Each group has several types. Irrespective of the different nomenclatures used by different writers, the constituent types of each of the above may be examined on a physiognomic basis. For instance, there are about five forest types (physiognomic) based on the factors of topography and climate. If the floristic divisions are included, this number rises to seven or eight. Similarly, the grasslands and savannas together, have four or five types. There are eight or nine types of wetland inclusive of inland, marine and man-made types.

These modern types of classifications may be summarized as shown in the following Table (4).

Table 4: Ecosystems of Sri Lanka - A Summary Based on Modern Classifications

Ecosystem	Ecosystem type	Occurrence	Main Criteria Used
Forests	Tropical Wet Evergreen Rainforest	South-western Lowlands	Climate
	Tropical Dry Mixed Evergreen Forest	Northwest to Southeast Lowlands	Climate
	Tropical Submontane Rainforest	South-western Midlands	Elevation
	Tropical Montane Rainforest	Highlands	Elevation
	Tropical Thorn Forest	Arid Lowlands	Climate
Scrublands	Dune Vegetation	Dry Zone Sand Dunes	Physiognomy, Location
	Fern lands	South-western Interior	Physiognomy

Grasslands	<i>Wet Patana</i>	Highlands	Physiognomy, Edaphic Condition
	<i>Dry Patana</i>	Western and Eastern Midlands	Physiognomy, Edaphic Condition
Savannas	<i>Damana</i>	Central North-eastern Lowlands	Physiognomy
	<i>Talawa</i>	Eastern and South-eastern Midlands	Physiognomy, Composition
Wetlands			
Inland	<i>Villu</i>	Lowland Dry Zone Floodplains	Hydro Regime
	Marsh	Lowland Wet Zone Floodplains	
	Swamp forests	Lowland Wet Zone Floodplains	
	Streams		
	Lowland Dry zone Floodplains		
	Tanks (Reservoirs)	Mainly Lowland Dry zone	Human Factor
Coastal			
	Lagoons	Near Estuaries Around the Coastline	
	Estuaries	River Mouths with varying brackishness	
	Mangroves	Peripheries of Lagoons and Estuaries	
	Salt Flats	Adjacent to Dry Zone Mangroves	
Marine			
	Coral Reefs	Shallow Continental Shelf, Fringing the shore around the country	
	Sandstone Reefs (Beach Rock)	Fringing the shore especially Northwest to southeast	
	Sea grass Beds	Shallow Continental shelf and Lagoons	

Traditional Ecosystem Classifications

The traditional knowledge systems seem to have had an in-depth perception of ecosystem diversity (especially of the terrestrial environment) in Sri Lanka. This is evidenced by the indigenous terminology that identifies a greater number of ecosystems or habitats (especially boundary or transitional ecosystems) than found in the modern classifications. Such 'sub systems' seem to have been identified or classified on the basis of a variety of factors such as physiognomy, functioning and successional stage, geomorphic setting, hydrological regime as well as human use and conservation status etc.

Table: 5: Traditional Ecosystem Classification

Ecosystem Type	Sub Type
Forest	<i>Bedda, Kelaya, Vanaya, Adaviya, Aramba, Mookalana, Gonna, Golla, Badawetiya, Digiliya, Pelessa, Kadolkele, Gomuwa, Ketiya,</i>
Grassland and Savanna	<i>Patana, Eliya, Talawa, Damana, Villu</i>
Wetlands/ Inland Waters	<i>Wagura, Villu, Oya, Ara, Ganga, Kandura, Hela, Wewa, Kulama, Pokuna, Wila, Owita, Pothaana, Degambada, Kadolaana, Heba, Ebe</i>
Maritime Landforms	<i>Boku, Kalapu, Moya, Wella, Tuduwa, Kadolaana, Helawa, Kala, Duwa,</i>
Inland Landforms	<i>Hinna, Ulla, Tenna, Vinna, Kanda, Ovilla, Pitiya, Galla, Pane, Goda, Deniya, Kinda, Bokka, Muduna, Munna, Waka</i>
Caves	<i>Lena, Dena, Guhawa Muhudu guhawa, Hummanaya</i>
Traditional Agro-ecosystems	<i>Gewatte, Gangoda, Yaya, Kumbura, Hena, Kanathu, Athdanduwwa, Helmalu Ruppawa</i>

If for instance forests are considered, while the modern systems have five or six types in Sri Lanka as depicted in Table I, the traditional system identifies many more stages of forest succession. *Hime* is a wet zone low country- to- montane virgin high forest mosaic, whereas a dense protected forest (crown forest) in any climatic zone will be a *Thahanam-kele* that translates as a 'forbidden forest'. *Adawaiya* (something like a forest range) has a sacred value as well as a protected status e.g. *Sri Pada Aadawiya*, *Singharaja Adawiya*. *Landa* is a scrub area with occasional trees found in an undulating terrain, whereas *Leheba* presumably denotes an isolated forest edge situation. The usages such as *gomuwa*, *gonna*, *gollewa*, *pelessa*, *digiliya* etc. are also descriptions of local forest ecosystems.

Certain woodlands are named after one or more dominant species. This approach (in more advanced form) is now known as the floristic approach/classification. *Madol kele*, (a locality in the Dumbara Hills) thus does not mean a monoculture but rather suggests the dominance of the *Garcinia echinocarpa* tree species. Similarly, *Maussa kele* near Sri Pada (Peak Wilderness Sanctuary) indicates the abundance of the shrub species *Dendrocnide sinuata*. It may also mean the high forest where large eagles or kites lived. *Boralanda* (near Haputale) could have been a thicket or forest with *Ligustrum robustum* and other species. There are several *Kirala keles* (*Sonneratia* spp) in the coastal areas. *Kirala* is found in the mangroves that yields an edible fruit. This precedes the modern 'Floristic Classifications' of ecosystems or vegetation types of Sri Lanka. (e.g. Gausson at al. Greller and Balasubramaniam (1980).

The secondary forests had different stages identified based on their subtle variations. For example, *kanattha*, *ath-danduwwa*, and *mookalana* indicate different stages of recovery in the succession of abandoned *chena* lands.

It was a long time ago that the grassland and savanna communities were given local names. *Patana* (grassland type), *Talawa* (savanna type) and *Eliya* (open Wet Patana) (e.g. *Maha Eliya*, the native name for the Horton Plains, *Haawa Eliya*, *Seetha Eliya* etc.) grasslands provide some examples. The term *Eliya* indicates the perception of the early people that the Wet *Patana* as wide, open grassland as opposed to *Talawa* characterized with numerous scattered trees. *Damana* represented another savanna type of grassland that is reflected in many place names. (Ed. *Palugas damana*, *Wara Damana* etc.)

The wetlands are also manifold. *Hela* is a wet zone marsh type with a floating peat mat. *Owita* is a boundary system between a wetland and a highland. *Kalavita* in the southern province is somewhat like an *owita* but is often used for threshing and winnowing harvested paddy. *Yaya* on the other hand refers to a tract of (usually cultivated) paddy land. It is also for a tract of forest as in the case of *Mora Yaya*. *Badawetiya* is a hedge especially with low trees and shrubs that provides edible fruits, leaves etc., often with imperfect drainage conditions. *Deniya* is a physiographic position on a river floodplain with imperfect- to- poor drainage conditions and a variety of associated trees, shrubs and rushes. Many village names in the central hills have *deniya* at the end of their names (Eg. *Guru deniya*, *Peni deniya*, *Peradeniya* etc). Similarly many

place names in the low country wet zone have names ending with *goda* depicting highlands among the surrounding lowlands as in the case of Pa Goda, Pu Goda and Mee Goda etc. Similarly *Pitiya* and *Tenna* denoted flat land at different elevations. There are many place names derived from them too. Even in rice cultivation, *goda* and *mada* were used to denote highland and lowland cultivations. *Wanaatha* is a cleared forest strip next to a rice field (Peiris 1956).

Wila designates a small inland freshwater ecosystem (natural) usually with hydrophytes and fish. In old dry zone villages such as Panama in eastern Sri Lanka *wila* is seasonal, whereas *pokuna* is a much smaller man-made one. A small water hole is known as *diya heba* or *heba or ebe*. A natural water spring (hot or cold) is *bubula*.

Whereas lagoon denotes a single brackish water wetland type (unique to the tropics) in modern terminology, the native system of the country recognizes at least two levels of this type. *Kalapuwa* usually means a common form of lagoon, while *kala* is considered a more extensive one spanning a larger area including some tidal flats of the eastern and southeastern Sri Lanka, such as *Panakala*, *Kunukala* and *Koholankala*. *Kalas* have been natural salterns of the country in early times. (which is a marine coastal wetland as shown in Table 4). The beach rock has been distinguished from the coral reefs in the local system as these two systems have two separate indigenous terms; the beach rock is *Kalapugala* as opposed to the *Hirigala* or *Hirigal Paraya* that denotes the coral reef. However, of the marine wetlands, the traditional systems have apparently overlooked the seagrass beds.

Villu (see Table 4) is a seasonally flooded grassland type (wetlands) of the dry zone floodplains, especially of the *Mahaweli Basin*. This indigenous term has been adopted in the modern writings. All these ecosystems or habitats harbor characteristic avifauna, mammals and fish etc. Although the estuaries (coming under wetlands) are not differentiated in the modern systems, the local nomenclature identifies them as *Moya*, *Moya Kata* and *Modera* as sub types of estuaries.

The streams have different levels of hierarchy. *Ganga* is usually a perennial river (Eg. Mahaweli Ganga, *Kalu Ganga*, *Kelani Ganga*) without a pronounced seasonal regime, as opposed to an *Oya* in the dry zone which is characterized by a seasonal regime (Eg. *Malvatu Oya*, *Yan Oya*). *Oya* in the wet and intermediate zones may also mean a tributary of a major river (e.g. *Badulu Oya*, *Kurundu Oya* and *Ritigaha Oya*). Creeks are differentiated by using terms such as *Ara*, *Dola*, *Kandura* etc.

In the modern systems, the cave ecosystems of the country have been apparently overlooked. Yet, the traditional system has seen them as *Guhawas* and *Lenas*. Examples are *Lunuhinda Guhawa*, *Wedilunu Guhawa* (Nitre Cave) and *Beli Lena*. A *Lena* seems to have been a place inhabited by people (lay or clergy) as opposed to a *Guhawa* infested with bats etc. Today in ecology, caves are considered unique 'habitat island' ecosystems according to the 'Theory of Island Biogeography' (Mac Arthur and Wilson 1967).

Kurulu paluwa is another important component of man made agro-ecosystem types. This means a strip of cultivated rice land adjacent to a highland forest primarily

dedicated to birds. Although it's exact function is not clear, it is probably left without harvesting for birds to feed on as bird damage area. This would have somewhat minimized avian crop damage in the main tracts. It would have also have minimized rice plant pests as birds feed on them, too. This is a fine example that shows how the early people knew through experience the importance of biodiversity and how to harness it while conserving it. In the west there is a belated realization of this value for modern practice.

Ecosystems also display some interesting cultural dimensions. With regard to mountain ecosystems, a hierarchy of nomenclature could be seen. They range from termite mounds to high mountains as could be seen in *Tumbasa* (ant hill), *goda* (Highland), *Hell* (Hills), *Wetiya or Heenna* (low ranges or spurs), *Kanda* (mountain), *Tenna* (plateau), *Hela* (Escarpment), *Giri or gira* (high mountain) etc. Folk poetry also assign different status to different mountains among which *Samanala Kanda* (Adams Peak) is assumed to be the leader of all mountains in Sri Lanka. (*Alata kanda beri alagalle kanda, bathata kanda beri batalegala kanda, hunata kanda beri hunnasgiri kanda, me kandu thunata nayake samanala kanda*)

Recommendations

- (a) Undertaking a comprehensive study of indigenous ecosystem nomenclature in order to understand the deeper relationship between the modern and traditionally identified ecosystems. This may also encompass the physiognomic, taxonomic and phenological characteristics of traditionally identified ecosystems.*
- (b) Preservation of some selected ecosystems such as Kandyan Forest Gardens, Talawas, Villus and Kurulupaluwas from modern development.*
- (c) Study the potential for utilizing the traditional ecological knowledge (TEK) associated with these ecosystems for sustainable development as in the case of agriculture, ecotourism etc.*
- (d) Preserve the localities with their ecosystem-based place names.*
- (e) Development of tree crop monocultures be based on the ecological principles behind the concept of natural groves such as aramba, golla, gommana etc.,*

Biodiversity in Traditional Agriculture

A Historical Perspective

Agriculture provided the base for human civilization in Sri Lanka for over thousands of years. For example when King Vijaya and his clan accidentally landed in the country, he found a knitting *Yakka* woman named Kuveni, who later became his first queen. Available documented evidence confirms the existence of a well-organized traditional agricultural system in the country for nearly 13,000 years, and of rice cultivation over 3000 years (Mohotti, 2002). This traditional agricultural system was practiced using locally available resources and indigenous knowledge, until early 1950's when the so-called "Green Revolution" was introduced (Mohotti, 2002).

To make traditional agriculture more effective, various systems of belief and rituals were also incorporated. However, the rural agricultural sector began to collapse with the abolition of the "*Rajakariya*" and intervention of Colbrook Commission in 1833 during the British rule. Since then with the introduction of new agricultural concepts, 263 insect species, 25 diseases, 16 weeds and 13 soil-related problems have been reportedly observed in cultivation (Samarakoon, 1993).

Types of Traditional Agriculture

Traditional agriculture is of two major categories; crop agriculture and animal agriculture. Crop agriculture has many sub-sectors; lowland (related to rice cultivation) and highland. In highland farming, traditionally, most important two are home gardens and *chena* cultivation.

Traditional rice farming in Sri Lanka is a diverse agricultural system. The practices from land preparation to product storage, varies with region, society and culture. Cattle or buffaloes mainly do land preparation. Depending on the type of plough, single animal or double animal power is used (Pannasekara, 2003). Buffalo is more common as a draught animal and in certain areas cattle are also used. Nearly, 2500 traditional rice varieties are found in Sri Lanka, and about 4000 varieties are conserved at the PGRC

(Pannasekara, 2003). In the traditional culture, different rice varieties were used for different purposes in human nutrition. For example "Maa Vee" varieties were given to pregnant women and "Heenati" varieties for patients and children. There were specific varieties also used for breakfast, lunch and dinner (Pannasekara, (2003).

BOX 1

Hetada Wee : *This is a traditional rice variety considered to yield in 60 days. Generally this is cultivated as catch crop during April to June, between the two major rice cultivation seasons, using the residual soil moisture and inter-monsoonal rains. This variety was commonly cultivated in Kegalle district. It had a wider distribution in the past covering areas such as Tissamaharama and Mihintale. Highly responsive to organic fertilizers such as compost, rice straw and green manure, and yields about 40 – 45 bushels per acre. Depending the soil moisture and fertility, it can be harvested in 60 – 65 days.*

The main cultivations seasons were traditionally referred to as *yala* and *maha*, the latter coinciding with the main rainy season. In years of abundant rainfall a *meda kanna* – a middle cultivation season was attempted with shorter duration varieties of rice such as the *heta da wee*. The life of the society, including that of budhdhist monks (as reflected in the *vas* season) was organized on the basis of these seasons based on the climatic rhythm. This helped the farmers, to get the maximum benefit from the rains and water use, but also from the rich biodiversity that moved with the climatic pattern. It ensured increased productivity as well as less damage from pests and diseases. It is clear that disregard for the traditional crop calendar resulted in heavy costs in farming and the destabilization of rural society. A judicious revival of the traditional crop calendar, and readjustment of human activity including those of the school system has a significant potential for improvement of productivity in the agricultural sector.

In any type of crop agriculture, manure from animals and green manure of plant origin were used. When green manure is added, the plants selected are high in plant nutrient and release them through de-competition at different rates. Use of artificial fertilizer, became toxic to soil organisms whereby natural soil fertility is hampered. Integrated Pest Management involves biological, chemical and physical means or their combination in controlling pests. Biological system played an effective role through natural parasites and predators. Mechanical methods and natural chemicals were used in place of synthetic chemicals. As natural chemicals, plant extracts and resins were used (Perera, MPTS).

BOX 2

Yams : *Traditionally, Yams are of two kinds; vine type (vel ala) and tree type (kiri ala). The tree types are Xanthosoma with 7 accessions, Collocasia with 9 accessions and the vine type Dioscorea with more than 20 accessions are found locally. Except very few, all are edible and can be grown in any part of the country, provided soil and environment conditions are right. The accessions are named according to the shape, inside colour and texture. Before the introduction of potato, these yams have been extensively used in traditional diets. Many have medicinal properties. They were used as food, some times for the major meal and even in desert preparations. (Department of Agriculture)*

In upland cultivation, many traditional cereal species, yams, vegetables and pulses were used. They provided food, oils, fiber, spices, fruits and medicines. These included 31 grains, 73 pulses, 89 vegetables, 37 leafy vegetables, 54 Banana and plantains, 62 fruits, 73 yams, 22 spices and around 400 medicinal plants (Mohotti, 2002). *Chena* cultivation is done purely as a mixed low input system, mostly for subsistence. *Chena* crops were highly drought tolerant but low productive. Most of the traditional vegetable species, fruits or grains have much therapeutic or medicinal value. Home gardens were a unique system with very high floral biodiversity ranging from food crops to timber trees. Often these floral populations are perennials, intentionally planted indiscriminately. Thus the *Kandyan Forest Garden* was recognized as one of the stable and oldest Agro-forestry systems in Asia, but presently, gradually changing.

In addition to cultivated crops, blessed with a rich biodiversity, many food items were also collected from natural forest as non-forest products for human consumption, e.g. Bee honey, fruits, mushrooms, greens etc (FAO, 1994).

Livestock had been with the Sri Lankans since the inception of ancient civilizations. The present day domesticated livestock such as cattle, buffalo, poultry and wild species such as gavara (now extinct), wild boar, jungle fowl have existed since pre-livestock times

BOX 3

Mushrooms : *There are more than 30 species of mushrooms in Sri Lanka and of them about 14 are edible. The rest are considered to be poisonous, but have a high potential of medicinal value. All these edible varieties are used as a vegetable. Mostly they grow on anthills, rice bunds, decaying logs, animal excreta, crop residues like straw and other organic matter rich places. The hyphae grow as long thin filaments and when the soil and environmental conditions are right the edible structure the spore bearing body emerge as an umbrella shaped or fan shaped. Some are large and some are tiny depending on the variety. These spore bearing bodies take various shapes and colours. By the shape, smell and the colour local people identify their suitability for consumption.*

(Deraniyagala). There is a record of a goat breed Called “Akyub” in Jaffana, but extinct to day. The present day livestock is either indigenous or introduced or a blend of both. There is a long history of the use of buffaloes in Sri Lankan traditional agriculture systems. Many references have been made in ancient rock inscriptions and chronicles including *Mahawansa* (Mahawansa, 1958).

Archaeological evidence has been found to confirm the existence of other livestock such as chicken, swine and poultry during pre-historic times. (Deraniyagala). Keeping livestock for milk was considered as a noble profession, especially cattle and buffalo and those were included high in the caste system such as “Patti”, and the official status was recognized as “Patti Vidane”. In a society, a person who owns large herds of cattle was “honoured by naming “Gambara” (Perera,) in some areas particularly in the South. Historically, livestock have been used for sports, as pets, and for transportation, food, fiber and also in combat (Deraniyagala).

Table 6: Some Traditional Vegetables

Vernacular Name	English Name	Scientific Name
Karawila (large)	Bitter gourd	<i>Momordica charantia</i>
Batu Karawila	Bitter gourd	<i>Momordica muricata</i>
Thumba Karawila (female)	Bitter gourd (natural)	<i>Momordica cochinchinensis</i>
Thumba Karawila (male)	Bitter gourd (natural)	<i>Momordica cochinchinensis</i>
Niyan Wetakolu	Luffa – chena type	<i>Luffa aegyptica</i>
Dara Wetakolu	Luffa – ridged type	<i>Luffa actangula</i>
Thiththa Wetakolu	Luffa – bitter type	<i>Luffa amara</i>
Alu Poohool	Ash pumpkin	<i>Cucurbita maxima</i>
Heen Kekiri	-	<i>Cucurbita momordica</i>
Hane Kekiri	-	<i>Cucurbita utilissima</i>
Pipingna	Cucumber	<i>Cucurbita stativas</i>
Pani Komadu	Sweet Melon	<i>Citrulus vulgaris</i>
Wattakka	Sweet Pumpkin	<i>Cucumis melo</i>
Seeni Kekiri	-	-
Diya labu	Goblet Melon	-

Recommendations

- (1) Traditional crop calendar should be revived while taking into consideration the on- going climatic changes, in order to benefit from the potential for increased productivity, control of pests and diseases and more efficient water management. School calendar in agricultural areas may also be adjusted to suit the climatic rhythm and the crop calendar with a shift from tri-mester to a symester system.**
- (2) Take action to popularize traditional grains and vegetables that are believed to have beneficial health effects, such as Kurakkan (Finger Millet), Kekiri, Thumba Karavila, Labu, button mushrooms, and traditional leaf vegetables etc.**
- (3) Reintroduce extinct farm animal species, and more robust cattle and buffaloe species that can withstand environmental stresses such as droughts**
- (4) Popularize short duration rice varieties such as Hetadavi (Sixty day rice variety) and those that are believed to have capacity to adjust to climatic stress and also better for health**
- (5) Revive region specific tree crops such as Oranges at Bibile, Wood apple, Mora, Tamarind, mango and cashew nuts in the dry zone, Kitul and talipot, in the wet zone, and palmyra in the North. These may grown at a commercial scale both for local consumption as well for sport.**

Society, Culture and Traditional Life Style

Introduction

It is the nature of traditional knowledge, that culture itself forms the main source of it. Indigenous knowledge is also often referred to as traditional knowledge or local knowledge that is embedded in the community and is unique in a given culture, location or society. It is often the basis of local agriculture, health care, food preparation, education, environmental conservation and a host of other spheres in life. Much of such knowledge is passed down from generation to generation, usually by word of mouth. With the processes of development and modernization much of this knowledge is lost or transformed beyond recognition. Any records of this knowledge are rare and scattered and therefore, in seeking such knowledge one has to depend of folklore or folk poetry or on systems of beliefs prevailing among the people themselves.

Focus areas

By its very nature, the theme, 'society, culture and life style' covers a wide area of knowledge and human experience and therefore, only a few aspects of it that have some bearing on biodiversity may be examined here. Thus the account given below confines itself briefly to the findings from three main focus areas:

- (i) Traditional knowledge on use of plant species for agricultural practices
- (ii) Preparation of traditional Foods related to biodiversity
- (iii) Bio-diversity and toponomy or the place names

In a more comprehensive treatment of the subject, traditional medical systems and their cultural usages have to be examined with particular reference to the medicinal plants and how they are connected to life styles in our culture. In addition, historical and archaeological aspects of the above mentioned areas in relation to inscriptions, archaeological evidence and *ola* leaf documentation were available for exploration. Furthermore, the extents to which these traditional medicinal plants are connected with modern life styles deserve to be identified.

It may also be observed that, the rich biodiversity of the Island is reflected in almost all spheres of life. Thus chewing of beetle leaf had been an age- old habit that required the combination arecanut and variety of spices. At one time those did not chew beetle were often treated with ridicule (*Bultah noke kata kiri vavulaye; Gili Maleth etha data suddo etc.*). Geeting important visitors with a sheaf of beetle, or in respecting the elders with beetle continue to be part of our culture today.

It could also be observed that, the traditional calendar too reflects the rich biodiversity of the Island. The national lunar calendar before the advent of the biblical western calendar, reflected the names of flowers, plants and agricultural seasons. Thus the months of *esala and binara* derived their names from flowers blooming during the respective seasons, while *vap and unduvap* came from the traditional agricultural calendar. Most other months were named after climatic seasons reflecting the life in harmony with nature.

Use of Plant Species in Traditional Agriculture

In an agrarian society with a long history, plants and animals are used as indicators of soil and water conditions. Traditional farmers in the rural areas decide on their cultivation practices in terms of their own soil classification. The most appropriate crops and their suitability to the soil condition were determined by the presence or absence of certain indicator plants. Some preliminary results of a survey carried out are given below: (Table 7)

Table 7 : Soil Type Indicator Plants

<i>Native Name</i>	<i>Botanical Name</i>	<i>Soil Type</i>
Heen kola Getapan Aligeta Borupan Getapan Halpan	<i>Pygmacus scirpus</i> <i>Capitatus scirpus</i> <i>Lateralis scirpus</i> <i>Globasus scirpus</i>	Swampy Soil
Lunuwila Indi	<i>Bacopa monniera</i> <i>Phoenix zeylanica</i>	Saline soil
Pila Nidikumba Diya siyambala Penithora	<i>Tephrosia purpuera</i> <i>Mimosa pudica</i> <i>Aeschynomene indica</i> <i>Cassia occidentalis</i>	Sandy soil
Attora Helamba	<i>Panicum repens</i> <i>Mitragyna Parvifolia</i>	Gravelly Soil

In the dry-zone Sri Lanka water was truly the life blood of the peasants. They had to depend heavily on limited irrigation water supplies. From the ancient times people have identified indicator plants which indicate availability of ground water in the location (Table 8). In addition to that the people determined the presence of underground small rivers (*uma ganga*) through the use of indicator plants.

Table 8 : Ground Water Indicator Plants

<i>Native Name</i>	<i>Botanical Name</i>	<i>Other associated features</i>	<i>Nature of Ground water</i>
Esala	<i>Cassia fistula</i>	A long row of trees	Underground water
Damba	<i>Azygium assimila</i>	Presence of an ant hill, two and half yards on the east	Underground Spring
Kumbuk + Beli	<i>Terminela arjuna</i>	12 yards west from the trees	Underground fountain
Maila	<i>Bahunia racemosa</i>	At 4 feet depth	Water spring
Midella	<i>Barringtonia speciosa</i>	At 5 feet depth	Water spring
Debara	<i>Zizyphus</i>	Under canopy of the tree	Water spring
Kotadimbula	<i>Ficus hispida</i>	Under canopy of the tree	Water spring
Wey	<i>Roxburghi</i>	Under canopy of the tree	Water spring
Thrasthwalu	<i>Operculma turpethum</i>	Associated with anthill	Water spring
Iramusu	<i>Operculum turpethum</i>	Associated with anthill	Water spring
Divipahuru	<i>Pes tigridis</i>	Associated with anthill	Water spring

Soil Alkalinity Indicator Plants

Farmers knowledge is of practical significance for the identification of soil fertility level through indicator plants. Some highland blocks are identified specially for hill or irrigated paddy or *chena* cultivation depending on soil fertility assessed through certain indicator plants (Table 9).

Table 9: Botanical Indicators of Soil Alkalinity

<i>Native Name of Plant</i>	<i>Botanical Name</i>
Kokmota	<i>Eviocaulin setaceum</i>
Tal	<i>Borassus flabelifer</i>
Indi	<i>Phoenix zeylanica</i>
Lunuwila	<i>Herpestis monniera</i>
Wel miris	
Maruk	<i>Panicum sp.</i>
Heen maruk	

The following plant varieties are believed to have the ability to absorb various mineral elements related to alkalinity (Table 10).

Table 10 : Alkalinity Absorbing Plant Varieties

<i>Native Name of Plant</i>	<i>Botanical Name</i>	<i>Material Used</i>
Mee	<i>Madhuca longifolia</i>	leaves
Ingini	<i>Potatorum</i>	ashes
Kumbuk	<i>Terminalia arjuna</i>	ashes
Madu	<i>Cycas civiuails</i>	ashes
Ganhadu		leaves
Karanda	<i>Pongamia pinnata</i>	leaves
Madau	<i>Cyzygium cumini</i>	leaves

According to farmers belief and experience, *Mee (Madluca longitolia)* is a multipurpose tree species having the ability to absorb soil elements related to alkalinity. If the soil is highly alkaline, loppings of the *Mee (Madluca longifolia)* trees are incorporated in to the soil.

The application of green manure is common in rural agricultural sector in Sri Lanka, and therefore, people have tried the use of a number of plant species for green manure. But apart from that, our research revealed an innovative means of preparation of liquid fertilizer from some specific plant species. According to the practical knowledge of rural farmers, liquid fertilizer helps rapid growth of the plants, specially leaf vegetables such as *Tampala (Amaranthus) Mukunuwanna (Alternatheve triandra) and Nivithi (Baseel alba)* etc (Table 11).

Table 11: Botanical Liquid Fertilizer Used in Crop Production

<i>Native Name of Plant</i>	<i>Botanical Name</i>	<i>Method of Preparation</i>
Kahambiliya	<i>Fleurya interrupta</i>	Leaves of these flora species are crushed and a pulp made.
Seru	<i>Cymbopogan citratus</i>	
Wanduru me	<i>Maluna nivea</i>	
Yakuwanassa	<i>Ballota distachya</i>	
Keppetiya	<i>Zeylanicum laciterum</i>	
Achariyapalu	<i>Macuna biflora</i>	

Botanical Pesticides

The use of botanical pesticides was the most popular pest control method in Sri Lanka before the green revolution. It took almost twenty or thirty years for the people to realize the hazardous effects of the commercial pesticides. There are several flora species used in different localities but the most popular botanical pesticides are indicated in the following table 12:

Table 12: Plants used for preparation of botanical pesticides

<i>Native and Botanical Name</i>	<i>Pest</i>	<i>Method of Use</i>
Kohomba (<i>Azadirachta indica</i>)	Grain weevils Grain months	Mix dried leaves with stored grain; mix <i>Kohomba</i> oil with grain
Kala (<i>Diospyros affinin</i>)	<i>Orceolia oryza</i> <i>Athrigona oryza</i>	Chop all these plants and put the mixture at the upper water inlet of the field.
Heeressa (<i>Cissus quadrangularis</i>)	Paddy stem borer	Hang pieces around the field
Daluk (<i>Suphorbia antiquorum</i>)	Paddy stem borer	Cut the stem into pieces and put into upper water inlet
Divikaduru (<i>Rejoua dichochoma</i>)	<i>Orceola oryzae</i>	Cut into small pieces and put into upper water inlet
Madu (<i>Cycas civiuails</i>)	Rice insects Paddy fly	Fix <i>madu</i> flowers on a stick in the field
Leimba	Paddy stem borer (moths)	Bury <i>Liimba</i> fruits in paddy field

Multiple uses of selected Plant species

In addition to farming, some plant species are used for other benefits that contribute to well being of the people such as to escape from lightening and attack by snakes (Table 13)

Table 13 : Multiple uses of selected Plant species

<i>Native Name of Plant</i>	<i>Botanical Name</i>	<i>Uses</i>
Koboneela	<i>Bahunia sp.</i>	Protect from lightning
Pethan	<i>Bahunia tomentosa</i>	Protect from lightning
Ruk attana	<i>Astonia scholaris</i>	Repel vipers
Andu	<i>Eryngium foetidum</i>	Repel cobras
Madara	<i>Cleistanthus collina</i>	Repel elephants
Habarala	<i>Alocasia</i>	Protect from white ants
Kiriwel	<i>Ichnocarpus</i>	Delay fruit ripening

According to the belief of some rural communities, ancient buildings such as temples, pagodas etc, were protected from lightening by the use of above plant material. Four sides of the pagoda are protected by cultivation of above trees. Similarly, some other plants like *Madara (C. collin) Giniandarara* are cultivated at elephants corridors close to their cultivation plots.

Before the advent of fuel oils and electricity, people used various oils and gums extracted from plants such as *Kekuna and Mee* for domestic lighting, as well as for incense. They were also useful in repelling mosquitoes and other insects.

Biodiversity – based Indigenous Food Varieties

In the process of human evolution, people have defined and given a cultural meaning to food production, preservation, preparation and consumption. In addition to cultural relativism, it has regional and provincial variations in terms of usage and practices. In Sri Lanka, with its rich biodiversity, people have traditionally developed an exceptionally high diversity of food they consumed. Even in a normal plate of rice and curry, the total number of ingredients easily exceeds ten or twelve. Before the advent of rice, *Kurakkan* (finger millet) grown on rain-fed *chena* lands, formed the staple diet of the people (Vitebsky). *Kurakkan* was prepared in several forms, as *rotie, pittu, talapa, helapa etc.* and was partaken with vegetables, fish, and meat or simply with a coconut salad (*pol sambol*).

In most rural areas, of the total diet, more than half is made up of green vegetables. The number of leaf vegetables consumed is very high. (*tora kola, gotukola, mukunu venna, sarana, anguna kola, thelkola, leekola, asamodagam, tampala, katuru kola, tala kola, penela kola, ala kola, genda etc.*) The varieties of fruits consumed are high by any standards and there is a significant variation even among the same type of fruits. Banana for example, has more than ten types even today (*Embul, kolikuttu, poovalu, parangivalu, rath kehel, seeni kehel, anamalu, embun, alu kehel, nethrapalam, etc.*) The number of ants or the birds that visit a rural household is also exceptionally high although they are not used for food due to various cultural reasons.

Kos (Jak fruit) had traditionally been a favourite meal both as a vegetable as well as a fruit. It is also consumed both as a main meal, a side dish or a dessert. It is also treated as a symbol of good fortune (*kiri gaha*) and saved people from starvation during times of war and famine. Every part of the jak tree is used for some practical purpose, be it for timber, elephant feed or to satisfy a pregnancy craze (*geta polos*). Preparation of jak fruit as an item of food had taken many forms (Table 14, 15).

Table 14: Some Jak Fruit Preparations

<i>Name of the Preparation</i>	<i>Processing Technology</i>	<i>Specificcations</i>	<i>Social Situation</i>
1. Polos Ambul	Tender Jak fruit cut into fairly large pieces and add coconut milk and spices; cook in a proper way	Uses tender fruits; can be preserved	For daily meals as well as for special ceremonies such as weddings or pilgrimages.
2. Polos Mallun	Tender Jak fruit cut into tiny slices; add spices and grated coconut and prepare "mallun"	This is a common preparation for eating with a rice meal.	Not suitable for social occasions; only for family use.
3. Kos migini	Half matured Jak bulbs without removing seed; skin boiled and eaten with scraped coconut.	Seed with skin, boiled.	It is a full meal for poor people.
4. Dandu Kos	Half matured Jak bulbs without removing seed skin boiled and eaten with scraped coconut	Seed with skin boiled	Average families in rural areas use as a full meal.
5. Ela hura	Jak bulb pieces without seed skin; add with spices; prepare as mallun as well as full meal.	Half yellow coloured bulb used.	Average family meal; Average family curry; not for social occasions
6. Boiled Jak	Bulb cut into thick slices and boiled in water with a little salt prepared as a side dish. But can be a full meal.	Matured, slightly yellow in colour; boiled together with the seeds separate.	Only for family use since it is highly starchy and heavy, it is used only for lunch.
7. Milk Jak or Kiri Kos	Very well matured small jak species cooked with spices and coconut milk. Becomes a thick paste when cooked.	Matured Jak bulb; small pieces with separate Jak seeds.	Only a family curry, and not used in functions such as wedding meals.

Table 15: By-products of the Jak Fruit

<i>Name of the Preparation and Preservation</i>	<i>Food Technology</i>	<i>Specificity and Social Occasion</i>
1. Atukos & atukos eta	Matured seeds and half boiled Jak bulbs dried in sun; stored for a few months.	1. This dried Jak seed is used as a fine meal; after boiling use as mallung as a seasonal food. 2. Sweet Kos (Pani kos): Fried Jak pieces with honey or sugar; consumed as a snack at evening tea.
2. Sibidi kos	Matured Jak seed's cover (sibidi) half boiled and dried and stored in a dry place.	1. After 8-9 months, use as fried curry (Badun) 2. Fried with honey: can be used as a snack at afternoon tea.
3. Weli kos-eta (Sandy seeds)	Dried Jak seeds kept covered under dry sand; after 8-9 months boiled and used as a full meal	Major meal in boiled form and other forms; It is only family food.
4. Bedi kos-eta	Skin removed and heated seeds chopped and fried.	Pocketed fried seeds can be used for only social occasions, first as a snack and commercially viable for use similar to gram or peanuts.

As in the case of Jak fruits, for *Del* fruits (Bread fruits) also Sri Lanka is noted for its varied preparations (Table 16).

Table 16: Breadfruit Preparations and Preservation Methods

<i>Name of the Preparation</i>	<i>Food Technology</i>	<i>Specificity and Social Occasion</i>
1. Del Tambuma (boiled Breadfruit)	Matured Breadfruit cut into about 1½ x 1½ inches pieces and boiled; then consume with grated coconut.	Can be major meal for poor people in rural area; lunch and dinner.
2. Del Malluma	Tender Breadfruit cut into tiny pieces, mixed with spices, fried with grated coconut as a dry curry.	Used only at family meals.

3. Del Niyambala	Matured Breadfruit cut into medium size pieces with necessary ingredients and finally cooked with coconut milk.	Only for family curry.
4. Peni Del	Matured small breadfruit pieces dried in sun, stored in a dry place; use after 6-8 months.	Fried and mixed with honey and jaggery mixture; use at tea time; can be prepared for sale.
5. Del Aluwa	Small pieces of butter fruit fried and then put into boiling honey, then mixed with rice flour, after thickening, cut into small pieces	Can be used for tea; and, can be used as a commercial product.

Sri Lanka is also known for its diversity of edible yams and tubers, and mush rooms, some of which are rarely seen or consumed in urban areas today. Different types of *ala* (yams) were so popular in the past that they are found even in many place and personal names too (Table 17).

Table 17: Methods of Yam Preparation

<i>Name of Yam</i>	Preserving Material	Duration of Storability
Katu ala, Thirithala, Gonala	Dried Sand	At least 6 months
Rajala, Angili-ala, Udala, Nataala	Coconut husks, ash, mango wood ash	Whole Year
Innala, Gahala, Hingurala, Kukulala, katuwala	Paddy husk	Whole year

Powdered Forms of Food Preservation

Among other preservation methods, several flour types are very popularly made and used by rural folks. Kitul boda and some yam varieties are thus sliced, sun-dried and ground to a powder. This flour is wrapped using a piece of cloth and kept above the hearth (*dummessa* – a fumigator) to enhance the keeping quality as well as to reduce pest damage (Table 18).

Table 18: Powdered Forms of Food Preservation

<i>Name of Plant</i>	<i>Preparation</i>	<i>Preservation</i>	<i>Uses</i>
1. Kitul	Sliced pieces powdered and flour separated	Powder wrapped in a cloth and stored in a dry place	Porridge and Thalapa
2. Tal	– do –	– do –	Porridge and Thalapa
3. Mango	– do –	– do –	Use for different food preparations
4. Manioc	– do –	– do –	Pittu and Rotti
5. Rajala	– do –	– do –	Thalapa, Porridge, Rice colouring

In addition to other uses of *Rajala*, people use the tuber to provide colours for various food items. Also there are other powdered forms used for colouring food items to make them more attractive and appetizing.

Varieties of Traditional Sweets

With the advent of western sweets, and the changing food habits and tastes particularly among those in the urban environments, Sri Lankan traditional sweets, except a few have become more rare. They are also known for their unparalleled variety benefiting from the rich biodiversity of the Island. Among their varied methods of preparation, there are a number of processing methods that are not widely known. Such preparations are often related to the availability, taste, preference, and the interest of the local producers (Table 19).

Table 19: Some Rare Traditional Sweets and their Preparations

<i>Name</i>	<i>Ingredients</i>	<i>Preparation & Use</i>
1. Muthulalu	Green gram powder, Rice powder, Cured Jaggery powder	Green gram powder and rice powder cook with cured; then put jaggery powder; after drying cut into pieces
2. Marada	Green gram powder, Rice powder carder	Green gram powder and rice powder cook with cured; then put honey; after drying cut into pieces and use.
3. Maharap	Black gram powder, coconut powder, Jaggery powder, cardamum and other ingredients	Mix Black gram powder with coconut and jaggery powder, then add cardamom and other ingredients; then make them into balls.

4. Kalingalalu	Woodapple, Pomegranate, Naran, Pepper, Ginger, Jaggery, Vanilla and rice flour.	Mix all ingredients and put the mixture into boiled jaggery mixture; then mix properly and cut into pieces.
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Meat Preparations

In our traditional society, various types of meat have also formed an important part of day to day meals. But most rural people did not eat beef or chicken until recent times. However, there is historical evidence that other types meat were widely consumed. Particularly the meats of wild animals (*dada-mas*) had been popular among the rural Communities. They also had a variety of recipes for preparing dishes (such as meat or fish curry, *karukkal* (*from wild bhor*), fumigated and dried meet).

The rural people who lived close to nature, also used different animal species as biological clocks to remind them the change of time. Almost every village had at least one rooster who had the 'duty' to wake up the village early in the morning. In the evenings the birds who return to their nests created much noise to herald the setting of the dusk. Certain birds like the nightingales use to arrive regularly before the traditional new year informing the people that the new year celebrations are around the corner. Culturally, the lack of hostility towards visiting birds encouraged their association with human settlements.

Recommendations

- (a) *Traditional food items based on the diversity of plants be promoted for culinary purposes for both locals and foreign visitors.*
- (b) *In soil conservation, groundwater development etc. potential use of traditional indicator plants may be investigated.*
- (c) *The exceptional variety of ingredients in traditional food, be investigated to ascertain their impacts on health and for other benefits.*
- (d) *The use of animal species traditionally as biological clocks as well as for weather forecasting deserves further investigation.*
- (e) *Investigations may be undertaken to study the traditional lighting oils and incenses.*

Toponymy and Biodiversity

Toponymy describes the place names including villages, townships and administrative divisions. These names often reflect the richness of culture as well as that of the nature. In countries like Sri Lanka with a long human history and an exceptionally high biodiversity, toponymy tends to reflect the richness of both.

From time immemorial, people of Sri Lanka living close to nature, preferred to adopt biodiversity related names to describe their villages, places and administrative divisions. They are even reflected in the traditional personal names that derive from the related ecosystems or from their lands and rice fields. The folklore, folk songs, literature and traditional poetry (such as the folk poetry of Uva) harbour a wealth of information related to biodiversity. Such knowledge may reveal distributions of species or even extinction of some of them. A knowledge of toponymy and community based knowledge may also have a potential for learning the secrets of sustainability.

With regard to toponymy, this study made an attempt to derive information from several data bases.

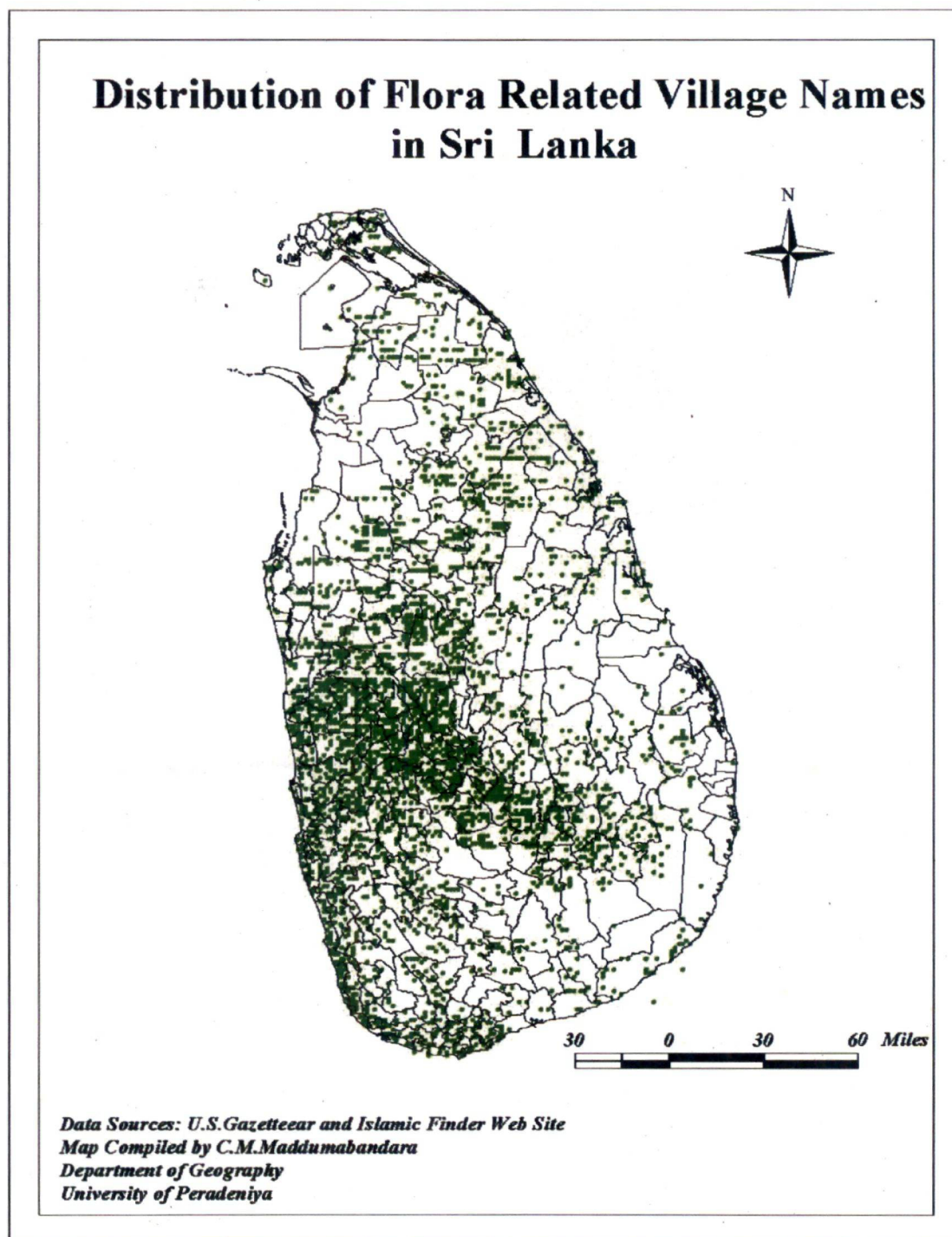
- (a) Official lists of village names in each Province around the time of Independence.
- (b) Topographic Maps of Sri Lanka
- (c) Data base of the survey conducted by the Ministry of Environment on biodiversity related village names
- (d) US Gazetteer of Village names
- (e) Islamic Finder Web.
- (f) Data base on village names available at the Plant Genertic Resources Centre at Getambe, Peradeniya

Of the above data bases, information collected by the Ministry of Environment comprising some 15,000 village names were mapped to identify any particular patterns. Despite various data limitations, the resulting maps indicate that the highest density of biodiversity related village names occur in the central highlands of Sri Lanka. An analysis of the names of Divisional Secretariat Areas seemed to reflect a similar patterns.

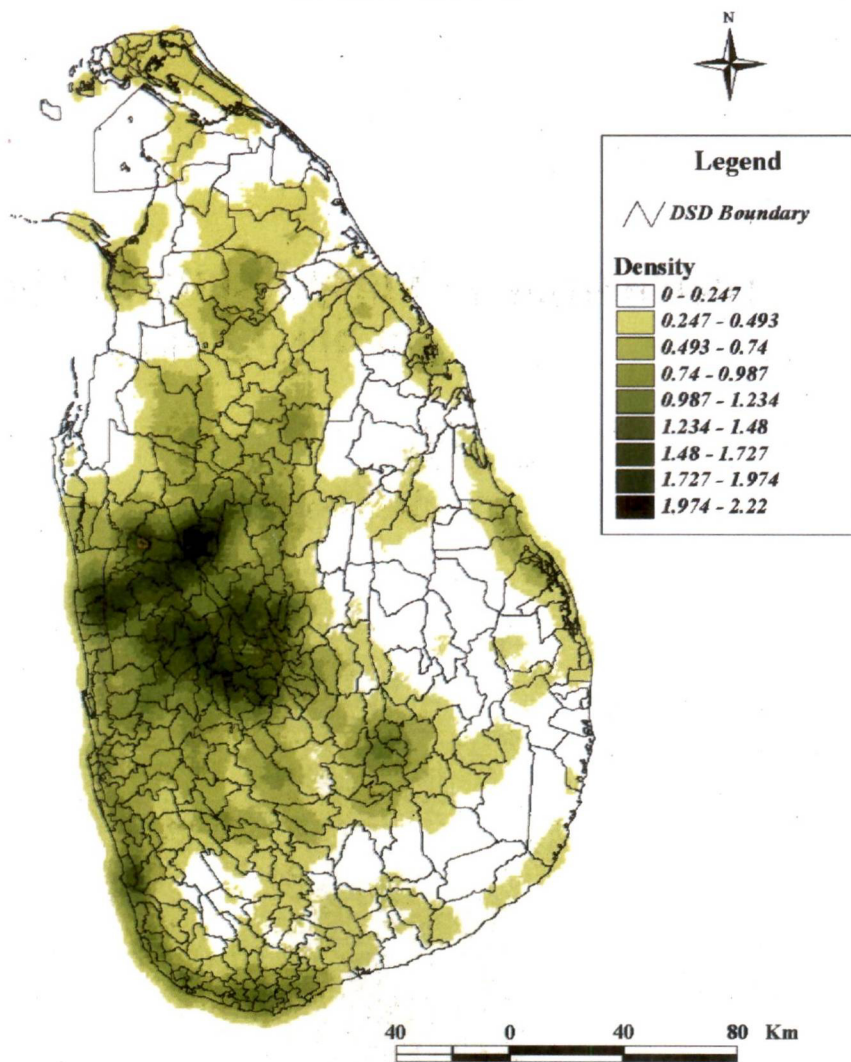
However, analyses of other data bases do not reflect the same pattern. A combination of the (d) & (e) data bases mentioned above shows that the highest density of biodiversity related village names occur in the North West Intermediate zone. Although biodiversity in general is higher in the wet zone, it is interesting to note that, cultural biodiversity is greater in the intermediate zone. This could be from maps depicting the density of flora related village names (Map I), as well as those depicting the combined densities of flora, fauna and ecosystems (MapII).

It is still not certain as to how these spatial patterns could be explained. Since these distributions also broadly tally with distributions of ancient inscriptions, one possibility is that most biodiversity related names are found in more ancient villages. This however, is an interesting issue that should be investigated more fully.

Map I



Density of Biodiversity Related Village Names in Sri Lanka



Data Sources: U.S. Gazetteer and Islamic Finder Web Site
Map Compiled By C.M. Maddumabandara
Department of Geography
University of Peradeniya

An attempt had also been made to identify plant and animal species who are most frequently used in place names. This indicated that Mora trees record the highest number among plant species while Sambhur or gona has the highest frequency among animal species. Does this mean that, these are the most common plant and animal species in the Island during the historic past. Have they been given due attention in deciding on the selection of national tree etc.

Table 20: Number of villages with plant related names

Local Name	Common Name	Scientific Name	Number of Villages
1. Mora		<i>Euphoria longana</i>	145
2. Siyambala	Tamarind	<i>Tamarindus indiaca</i>	106
3. Kos	Jak	<i>Artocarpus heterophyllus</i>	96
4. Amba		<i>Magifera sp</i>	90
5. Palu		<i>Manilkara hexandra</i>	87
6. Pol	Coconut	<i>Cocos nucifera</i>	87
7. Bo	Bo	<i>Ficus religiosa</i>	86
8. Mi		<i>Madhuca longifolia</i>	83
9. Divul	Wood apple	<i>Ferronia</i>	79
10. Kone		<i>Schleichera oleosa</i>	77

Table 21: Number of villages with animal related names

Local Name	Common Name	Scientific Name	Number of counts
1.Gona	Sambhur	<i>Cervus unicolor</i>	66
2.Ura	Pig	<i>Sus scrofa</i>	54
3.Bambara	Wasp	<i>Apis dorsata</i>	33
4.Kotiya	Leopard	<i>Panthera pardus</i>	25
5.Kadiya		<i>Odontomachus sp</i>	25
6.Kawuda	White-bellied Drongo	<i>Dicrurus caeruiescens</i>	20
7.Koka	Crane		22
8.Wandura	Monkey	<i>Semnopithecus spp.</i>	20
9.Nagaya	Cobra	<i>Naja najas</i>	19
10.Etha	Elephant	<i>Elephas maximus</i>	18

In recent times, the creation of new settlements and attempts to give them monotonous, exotic or even esoteric names had a diluting and swarming effect on the traditional system of nature-based naming of villages and settlements. Therefore, any attempt to encourage, retain and promote the use of biodiversity related natural place names may prove beneficial not only to the cause of biodiversity conservation but also to the very identity of the nation (Table 20, 21)

Toponymy Related Recommendations

- (a) Promote the use of nature based place names in naming new settlements while encouraging the maintenance of traditional place names.***
- (b) Place name- reflecting plants should be retained and protected at prominent places in the relevant areas and settlements.***
- (c) For animal- related place names, animal refuges be created in religious places of worship in the respective regions.***
- (d) A research study be undertaken to compile a comprehensive collection of folklore on the evolution of place names in each region.***
- (e) People with biodiversity related personal names be encouraged mobilized for the cause of biodiversity conservation.***

General Recommendations

Specific recommendations relating to each identified area have been presented above. The following are some recommendations covering the entire field of traditional knowledge as it relates to biodiversity.

- (i) A National Centre for Traditional Wisdom be established and cultural aspects of biodiversity may form an essential part of it.***
- (ii) A National Steering Committee be formed to serve as a watch dog body and for the mobilization of cultural practices in biodiversity conservation***
- (iii) Regional identities and sentimentalities be harnessed to biodiversity conservation and living in harmony with nature.***
- (iv) Encourage the infusion of biodiversity knowledge into arts, literature, technology and even politics.***

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