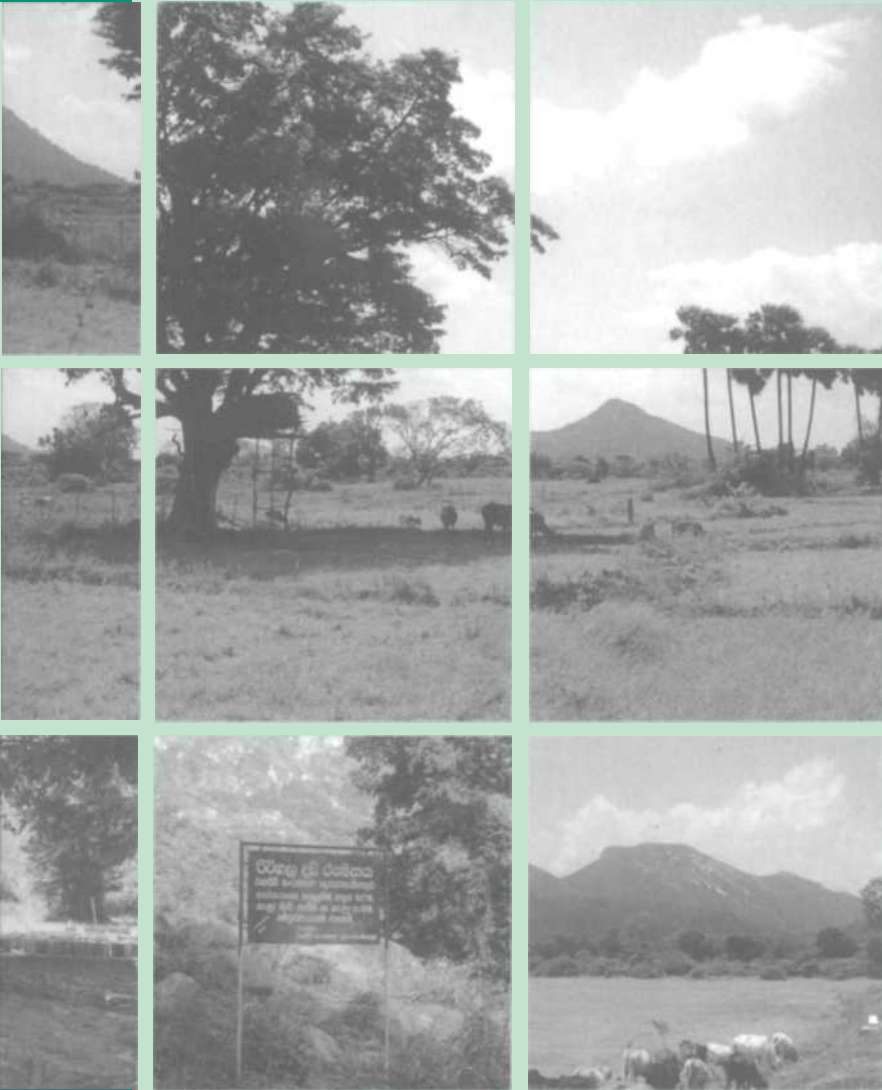


Conservation
Issues in Asia



Non-Timber Forest Products and Local Livelihoods

In Ritigala, Sri Lanka

| August 2002

Jill Blockhus, Anoja Wickramasinghe, Mike Nurse and Manuel Ruiz Pérez

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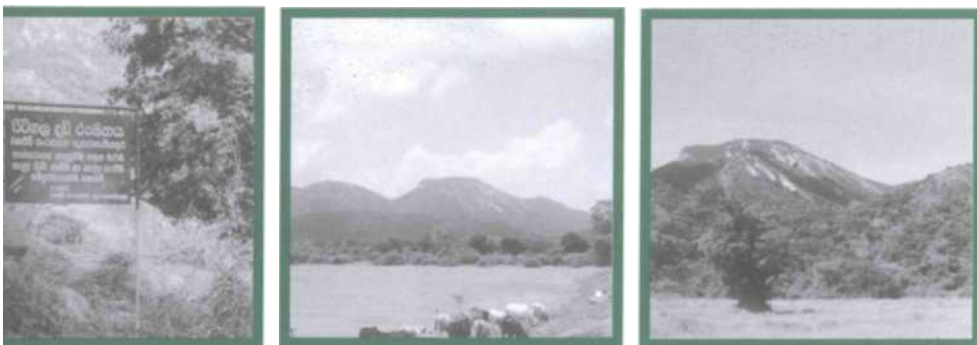
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Glossary

Collaborative forest management: A partnership between the state (as represented locally) and local forest users concerning the management of common property resources, usually owned by the state. The partnership recognises and builds on the indigenous management system. Authority and responsibility for forest management is handed over by the state to local communities as represented by user groups. Management arrangements may be described in a forest management plan that outlines the forest boundary, forest type, forest condition, user group membership, rules and sanctions of the user group, and authority, responsibility, and accountability of the partners.

Indigenous management of natural resources: Locally created arrangements for the improved management of natural resources. In this context, the resource is a common property resource. In the most productive and sustainable examples, management systems are sophisticated (silviculturally) and robust (institutionally).

Institution: A group of people with mutually acknowledged membership and common guiding principles and objectives. There may or may not be a committee, regular meetings, written articles of association, and/or a constitution.

User group: Groups of people with mutually acknowledged rights of use and access to forest products within a forest. The use rights are mutually acknowledged if claims to use specific products or sites in a particular area are regarded as legitimate by other people in the same area. The group that holds use rights over the same product or site is referred to as a user group (Ingles and Inglis, 1995).

Introduction

Forests provide a wealth of material outputs of subsistence or commercial value. A substantial number of rural households in developing countries (as well as many urban households) depend on plant and animal products from forests to meet some part of their food, shelter, and health needs. In addition, very large numbers of households generate some of their income selling forest products. Forests thus constitute an integral part of the habitat and of the social and cultural structure of those living nearby (Byron and Arnold, 1997).

In the past, the rationale for conserving forests was simply to sustain the forests' productive role for the timber industry. However, in many countries over the past 15 years, the pervading view that forests primarily provide timber for the national benefit is losing ground to a view that formally acknowledges the importance of local use of forests. With the rise of Extractive Reserves in Brazil, Community Forestry in Nepal, Joint Forest Management in India, and initiatives in many other countries, local people are gaining access to and significant benefits from non-timber forest products. Non-timber forest products are often common property resources, like fuelwood, fodder, charcoal, fencing, poles, medicinal plants, and a variety of foodstuffs, such as game, fruit and nuts, mushrooms, poles, fibre, and resins. According to Arnold:

It could be difficult to overstate the importance of non-timber forest products...[they] commonly contribute to meeting food and other basic needs, [provide] a source of input into the agricultural system, help households control exposure to risk of various kinds...A better understanding of the magnitude and nature of the role of non-timber forest products is therefore central to making decisions about forest management that adequately reflect society's demands upon the forest resource (Arnold, 1995:1).

Researchers are increasingly recognising the importance of non-timber forest product use in South and Southeast Asia (See Godoy and Lubowski, 1992; Malhotra et al., 1992; Godoy and Bawa, 1993; Fox, 1995; Ruiz-Perez, 1995; de Beer and McDermott, 1996). Non-timber forest products have attracted the attention of researchers in Sri Lanka, since the vast majority of the rural population is dependent on natural resources to meet daily energy requirements or to provide livelihoods. However, most of the research has been concentrated in the wet zone forests (See for instance, McDermott, Gunatilleke and Gunatilleke, 1990; Gunatilleke, Senaratne and Abeygunawardena, 1993; Gunatilleke and Gunatilleke, 1984; Gunatilleke, Gunatilleke and Abeygunawardena, 1993; Wickramasinghe 1995b). Apart from a series of botanical inventories (Jayasuriya, 1980; Jayasuriya, 1984; Jayasuriya, 1991), relatively little research has been conducted in the dry zone forests, despite their importance to the local economy. This study seeks to bring attention to local use of dry zone forests of the Ritigala Strict Nature Reserve.

There is a long-standing tradition of forest product use by communities throughout Sri Lanka. Certain households see the forest as their economic mainstay, while others see it as a supplementary source of household income, or means to meet subsistence needs. The most complete analysis to date is a national survey conducted by IUCN-Sri Lanka (1995b) on the "traditional use"¹ of forest products. This survey documents the nature and spatial patterns of forest use throughout the country and measures the degree of forest dependence by local people in 150 sample villages.

Case Study Objectives

The following case study is based upon fieldwork on patterns of use of forest products in Ritigala in 1994 and 1996. This research investigates the relationship between villagers' use of the forest for livelihood and patterns of non-timber forest product collection, as well as the institutional context of forest management by local communities.

To determine the role of forest products in a household livelihood system, we sought information on the collection of

1. Traditional use categories include collection of: wood and wood products, food and medicinal products, hunting, agricultural encroachment, traditional "chena" cultivation (swidden agriculture), and grazing of livestock.

non-timber forest products for subsistence and commercial sale. To distinguish between communities or users in terms of their participation in forest activities, we documented the use of certain forest products and attempted to measure the extent to which household labour is allocated to these activities.

The case study objectives were to:

- examine the role of non-timber forest products in the livelihood strategies of local communities in order to learn how forest use, farming, and other activities address household needs;
- investigate the cultural values and significance associated with the forest;
- examine the relative financial benefits to collectors of selected seasonal non-timber forest products;
- investigate the dynamics of forest resource collection, including the relative abundance of non-timber forest products, and seasonality of products; and
- explore the potential for collaborative forest management in Ritigala.

Overview

Section 1 provides an introduction to Ritigala, located in the North Central Province of Sri Lanka. Section 2 gives an overview of local livelihoods. The third section looks at the collection of non-timber forest products in two communities. Section 4 analyses institutional arrangements for forest management. The fifth section concludes with a discussion of the potential for collaborative forest management in the region.

Biophysical environment

Ritigala is a granitic mountain range of the northern dry lowlands, located in the District of Anuradhapura, North Central Province of Sri Lanka (see Figure 1). This range rises to 766 meters above sea level, extends 6.5 km from north to south, and varies in width from 2 to 5 km, covering a total area of 1,528 ha. Dense forest cover makes Ritigala a natural refugium for dry forest species. A high concentration of endemic species contributed to the declaration of Ritigala as a Strict Nature Reserve in 1941. Administrative authority for Ritigala is with the Department of Wildlife Conservation, in contrast to the neighbouring forest hills of Labunoruwa and Kumbukwalahinna, which are under the administration of the Forest Department as Forest Reserves.

Table 1 : Climatic zones and forest types in Sri Lanka

	Climatic zone		Forest types
	Mean annual rainfall (mm)	Number of months of dry season	
Lowlands below 1000 m			
Arid	< 1000	>5	Tropical thorn forest
Dry	>1000	>4	Tropical dry evergreen forests
Intermediate	>1400	>3	Tropical semi-evergreen forest
Wet	>2000	0	(Mixed Dipterocarp forests)
Highlands above 1000 m			
Intermediate	>1400	0	Montane subtropical broadleaved hill and wet temperate forests
Wet	>2000	0	

(Source: Gunatilleke and Ashton, 1987)

Table 1 shows the climatic zones and forest types in Sri Lanka. Although Ritigala is located in the heart of the northern dry zone, it is atypical of the dry zone². The elongated north-south orientation of the ridge serves as a natural barrier with climatic influences, affecting wind velocity and cloud flow. The north-east slopes act as a barrier to the north-east monsoons while the south-west slopes provide a barrier for south-western winds passing through the dry lowlands. Rainfall in the region tends to be orographic. Peaks of the Ritigala range retain clouds during dry spells, such that mean annual rainfall for Ritigala exceeds the regional average of 1483 mm. Rainfall occurs principally in two wet seasons, with the heaviest rains from October to December and then in April. Less than 13 percent of the annual rainfall occurs during the driest period of the year, from June to August.

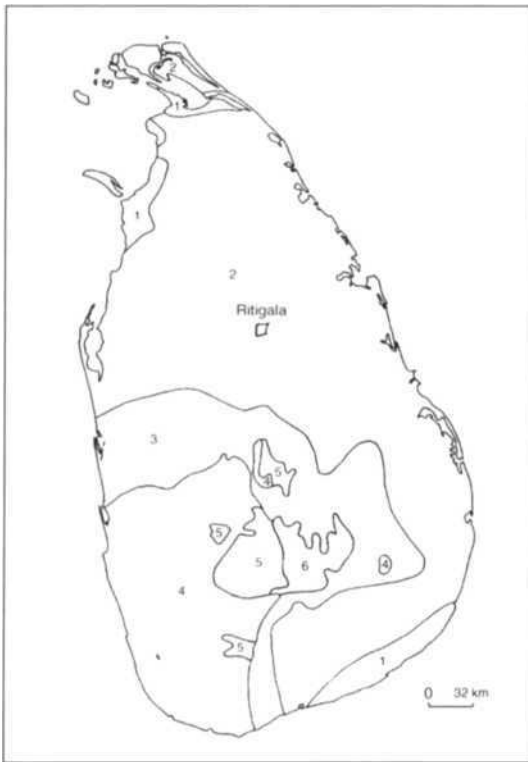


Figure 1 shows the climatic zones of Sri Lanka: Arid (1), Dry (2), Intermediate lowlands (3), Wet lowlands below 1000 m altitude (4), Wet highlands (5), and Intermediate highlands above 1000 m altitude (6). Ritigala is located in the dry zone.

2. Lowland dry zone forests in Sri Lanka are analogous to the tropical dry evergreen forests in the 1936 Champion classification of forests in former British India (Gunatilleke and Ashton. 1987).

Ecology of Ritigala forest

Ritigala's variation in altitude and exposure contribute to pockets of rich biodiversity. Different structural features throughout the range, combined with variations in climatic zones (ranging from dry to intermediate and wet) produce distinct forest types, which differ substantially from the southern slope to the western and eastern slopes. (See Figure 2, vegetation profiles and species lists of trees and shrubs in four different locations).

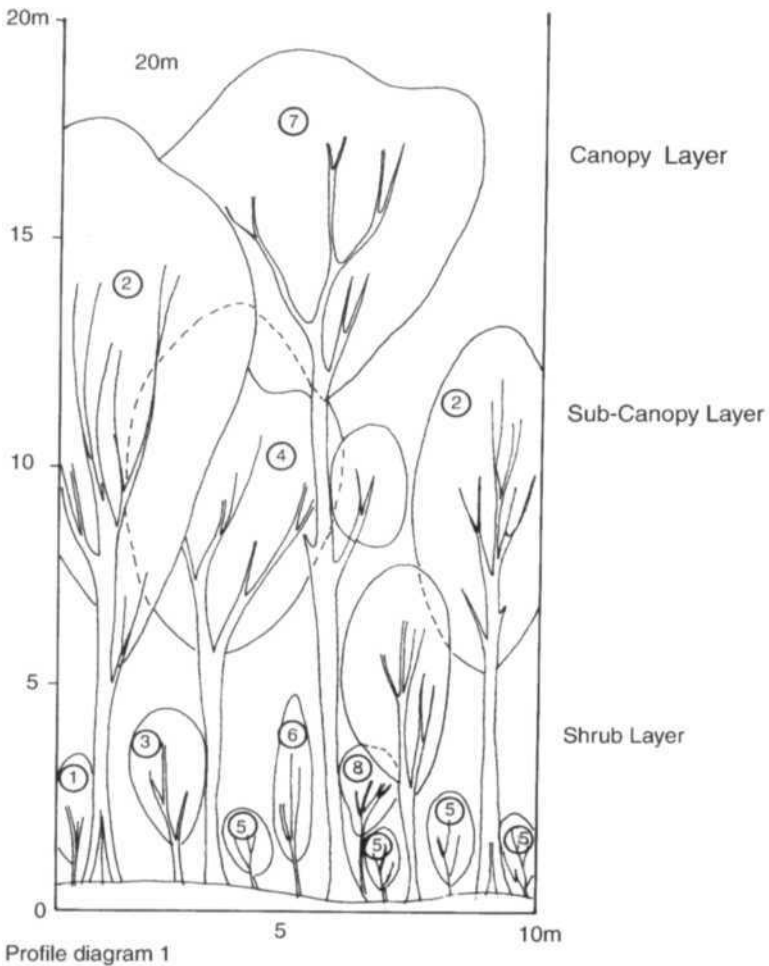
Survey work by Gunatilleke and Ashton (1987) showed *Drypetes sepiaria*, *Mischodon zeylanicus*, and *Euphoria longana* to be the three most prevalent tree species in the northeastern boundary of the archaeological reserve. Of 57 different tree species, Gunatilleke and Ashton measured floristic richness to be a 13 percent proportion of endemic species³ in primary forests. Secondary vegetation, predominately scrub, was comprised of 38 tree species, with a 6 percent proportion of endemic species. Figure 2 shows vegetation profiles and a sample species listing of common trees and shrubs gathered by the field team for this particular NTFP study.

The forest vegetation consists of hundreds of examples of flora used widely as medicinal species (Jayasuriya, 1991). As of the mid-1980s, 417 taxa were recorded for Ritigala, of which 51 were non-vascular. Vascular plants include 28 fern and fern allies and one gymnosperm, *Cycas circinalis*. Flowering plants (of which there are 337 in Ritigala) belong to 81 families and 260 genera. The most dominant families are *Euphorbiaceae* (29 species), *Orchidaceae* (29 species), *Poaceae* (23 species), *Rubiaceae* (19 species), *Moraceae* (14 species), *Acanthaceae* (13 species), and *Asteraceae* (10 species). The most common genera are *Ficus* (10 species), *Diospyros* (6 species), *Capparis* (4 species), and *Bulbophyllum*, *Commelina*, *Cyanotis*, *Hibiscus*, *Ipomoea*, *Mallotus*, *Mariscus*, *Memecyclon*, *Peperomia*, and *Sterculia* (each with 3 species) (Jayasuriya, 1991).

3. This proportion was compared to wet lowland sites of Gilimale (with 59 percent), Kanneliya (with 65 percent), Kottawa (with 67 percent); and intermediate zone sites of Barigoda (with 17 percent) and Moneragala (with 18 percent) (Gunatilleke and Ashton, 1987:321).

Figure 2a-2d depicts vegetation profiles and species lists of trees and shrubs in four different locations

Figure 2a



Species Shown in Figure 2a (Alagollewa) Inside Natural Reserve

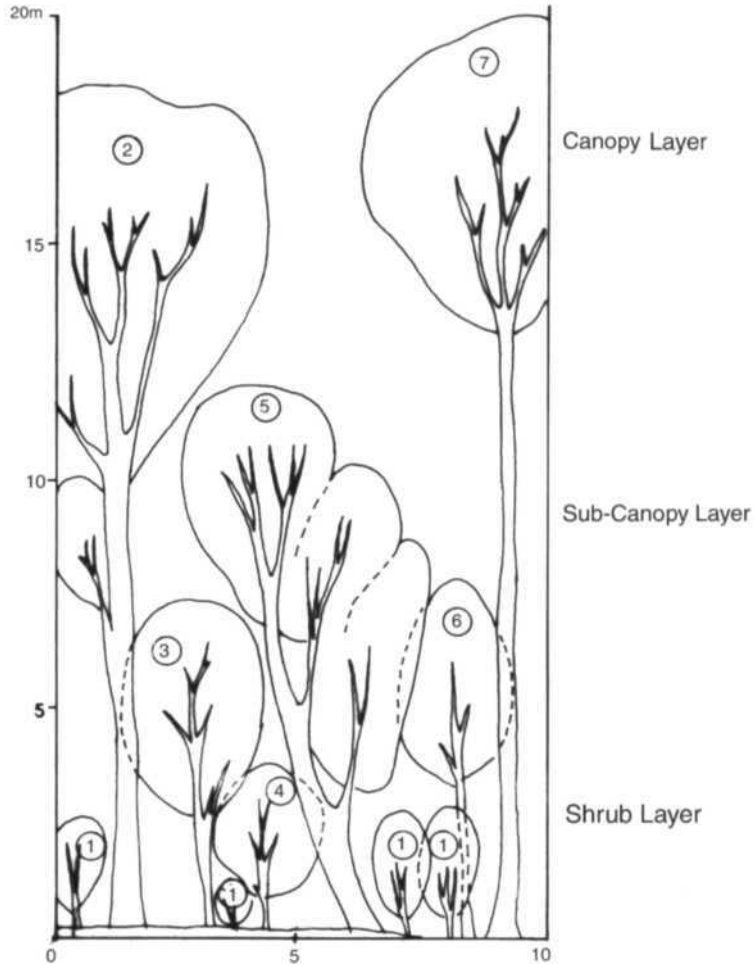
Latin name

1. *Memecylon umbellatum*
2. *Drypetessepiaria*
3. *Mischodon zeylanicus*
4. *Trycalysia dazellii*
5. *Glycosmis mauritiana*
6. *Myristica dactyloides*
7. *Diospyros ebemum*
8. *Glymophocalyx*

Local names

- Korakaha
 Weera
 Thammanna
 --
 Dodampana
 Malaboda
 Kaluwara
 Thenkuttiya

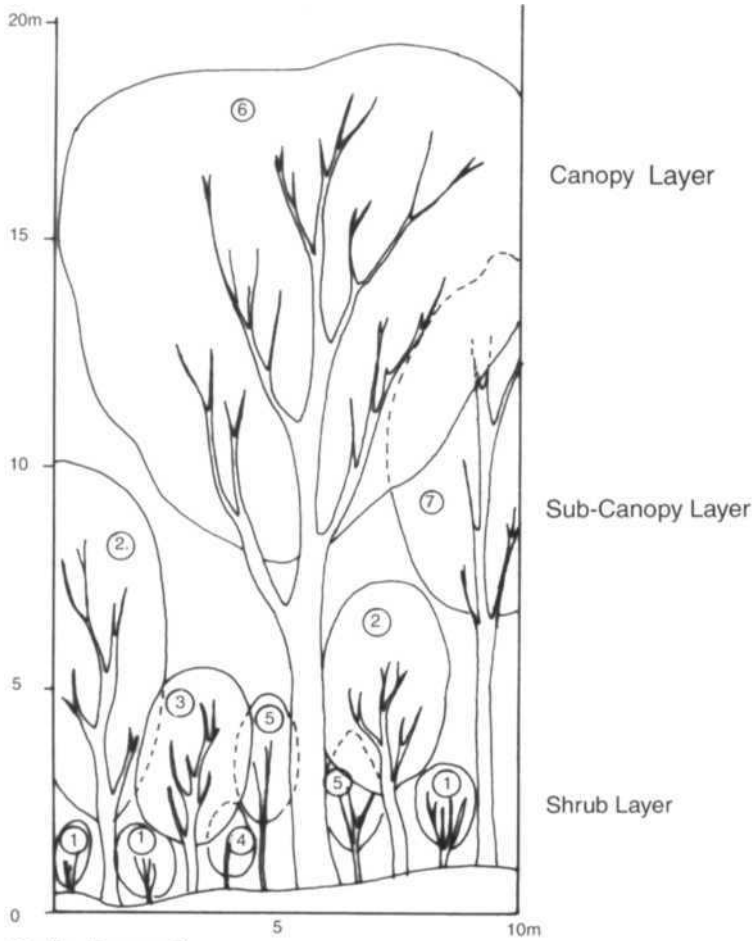
Figure 2b



Species Shown in Figure 2b (Alagollewa) Closer to settlements

Latin name	Local names
1. <i>Glycosmis mauntiana</i>	Dodampana
2. <i>Diospyros ebumum</i>	Kaluwara
3. <i>Diospyros ovalifolia</i>	Kunumella
4. <i>Glymophocalyx</i>	Thenkuttiya
5. <i>Vitex altissima</i>	Milla
6. <i>Dimocarpus longan</i>	Mora
7. <i>Pterygota thwaitesii</i>	Galnava

Figure 2c

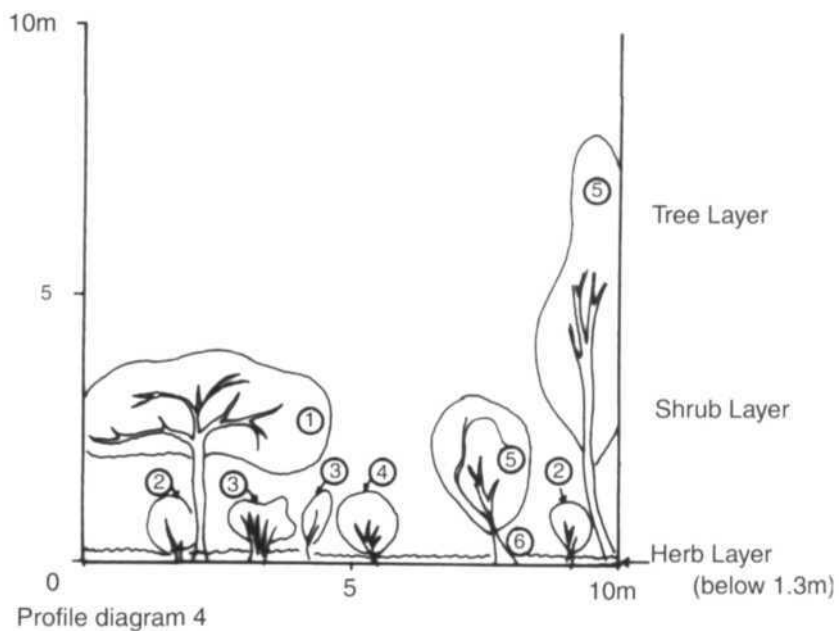


Profile diagram 3.

Species Shown in Figure 2c - Closer to the Ritigala Monastery (Inside Natural Reserve)

Latin name	Local names
1. <i>Glycosmis mauritiana</i>	Dodampana
2. <i>Lepisanthes senegalensis</i>	--
3. <i>Dimocarpus longan</i>	Mara
4. <i>Polyalthia korinti</i>	Meewenna
5. <i>Mallotus philippensis</i>	Halmilla
6. <i>Dialium ovoideum</i>	Gal-siyambala
7. <i>Diospyrosebenum</i>	Kaluwara

Figure 2d



Species Shown in Figure 2d - Shrubland Closer to KiriyaGaswewa (Outside Natural Reserve)

Latin name	Local names
1. <i>Bauhinia racemosa</i>	Maila
2. <i>Carissaspinarum</i>	Karamba
3. <i>Phyllanthus polyphyllus</i>	Kuratiya
4. <i>Fluggia leucopyros</i>	Katupila
5. <i>Pterospermum canescens</i>	Welan
6. <i>Derri scandens</i>	Kalawel

Social environment

The earliest settlements in the area date to 437 BC, during the period of King Pandukabhaya, who established a fortress in Ritigala. Subsequently during King Mahasen's rule (around 276 BC), numerous water tanks and temples were constructed in the area. Archaeological ruins inside the Strict Natural Reserve are from the 9th and 10th century AD. Evidence of past settlements is found in natural rock caves with inscriptions and the ruins of an ancient Buddhist monastery, representing the legacy of Sri Lanka's ancient civilisation, lasting from the 1st century BC until the 15th century AD. This civilisation thrived due to its intricate irrigation system, comprised of village tanks or water storage reservoirs feeding a network of canals, which brought water to paddy fields (Leach, 1959).

Local people associate the history of these villages and their housing clusters with the location of the water tanks. Tank-based community systems are still prevalent, except on the western slopes, where scattered housing has developed along the roadsides. Currently, most of the tanks have silted, reducing water storage capacity and leading to local flooding. Many of the former tanks have been converted into "deniyas" or agricultural lands.

Communities consist of "thulana" or clusters of small villages. Often thulana expand around a few households considered the roots of the community. Of the 16 villages in close proximity to Ritigala Strict Nature Reserve, ten are relatively close to its boundary. The total population of the ten villages is 6,538. The number of family members ranges from 4.8 to 7.8, with an average of 6.0. Table 2 provides basic demographic data of these ten communities. In terms of ethnicity and religion, Sinhalese Buddhists predominate in the region, except in Bamunugama and Uththupitiya, two entirely Muslim villages⁴. Ulpotha is unusual, as both Muslim and Sinhalese ethnic groups reside in the same village⁵. Of all of the nearby communities, only one is a Sinhalese Christian village, Alagollewa, located in the north-west.

4. In Sri Lanka, Muslims are considered to be a distinct ethnic group. According to 1989 census data, Sinhalese account for 74 percent of the population; Sri Lankan Tamils 12.6 percent; Sri Lankan Muslims 7.1 percent; Indian Tamils 5.6 percent; Burghers 0.3 percent and Malays 0.3 percent. Muslims are probably the descendants of Arab or Indian Muslim traders.

5. While some marriages took place between Sinhala Buddhist and Sinhala Catholics, no mixed marriages between Muslim and Sinhala people were reported.

Table 2: Demographic features of the Villages

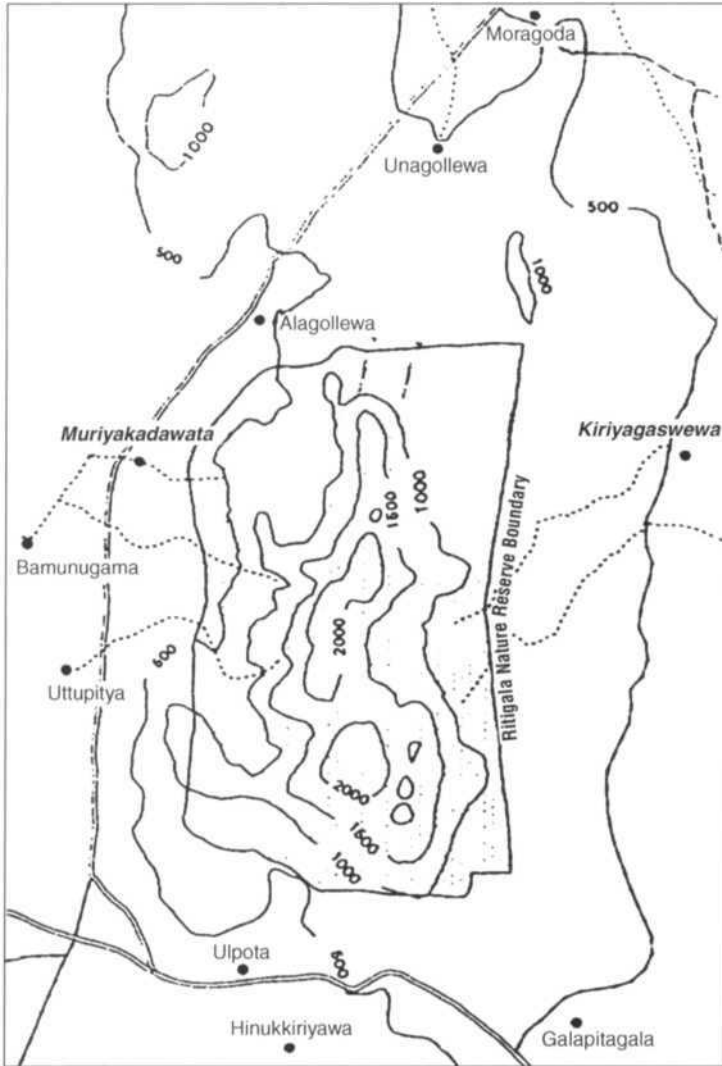
Village	Number of households	Total population	Average family size	Ethnicity	Religion
Murivakadawala	87	421	4.8	Sinhala	Buddhism
Alagollewa	145	750	5.2	Sinhala	Catholic
Moraqoda	160	800	5.0	Sinhala	Buddhism
Unagollewa	28	150	5.4	Sinhala	Buddhism
Kiriyagaswewa/ Kaluebe	108	550	5.1	Sinhala	Buddhism
Galapitagala	108	844	7.8	Sinhala	Buddhism
Hinukiriyawa	155	925	6.0	Sinhala	Buddhism
Ulpotha	98	686	7.0	Sinhala/ Muslim	Buddhism/ Islam
Bamunugama	132	900	6.8	Muslim	Islam
Uththupitiya	78	562	7.2	Muslim	Islam

Note: this data came from informal discussions with the Grama Niladari, a government administrative officer appointed to the low-level administrative division known as a Grama Sewaka area.

In at least three of the ten communities Kiriyagaswewa, Moragoda and Muriyakadawala - villagers claim indigenous origin. They identify themselves as descendants of the "Vannikaroyo," one of the forest-dwelling groups (also known as the "Vedda," ancient hunter-gatherers) dating to 437 BC. These villagers tend to be more dependent on the forest than people from other villages. The Vedda descendants practise the collective gathering of, and sharing of benefits from, forest products. They maintain a strong traditional belief system based on reverence towards the forest.

Two of the communities — Muriyakadawala and Kiriyagaswewa — were selected for a more detailed analysis of their people-forest interactions. Muriyakadawala is located below the western facis of the forest and Kiriyagaswewa is located below the northeastern facis of the Reserve (see Figure 3). There is a six-km-wide forested ridge between the two communities. Although no direct paths join the two communities through the forest, gatherers from the two communities do travel to the opposite side of the forest. By road, the distance from Muriyakadawala to Kiriyagaswewa is nearly 14 kilometres.

Figure 3 locates Muriyakadawala and KiriyaGaswewa in relation to Riligala Nature Reserve



Overview of field methods

A reconnaissance survey, using rapid appraisal, was conducted in the ten communities adjacent to the forest. The core research team held informal discussions with villagers in order to gain an initial impression of the history of community establishment, demographics, agricultural practices, and forest products collected. Following this survey, two communities (Muriyakadawala and Kiriya gaswewa)⁶ were selected for a more detailed study. The research team spent three months living in these two villages and interacting with local people on a daily basis. The people had three strong links to the forest: dependence on it for livelihoods, traditional beliefs and rituals related to the forest, and indigenous knowledge of forest types and species.

A follow-up visit was made to five villages⁷ in May 1996 to prepare participatory maps and to investigate institutional arrangements for forest management. Information was sought from individuals, households and groups in different places, such as the forest, farmlands, market places or informal gathering points (like water tanks and tea kiosks). The research team made an effort to meet individuals and groups while they were engaged in their daily activities, so they could actively combine field observation with topic-focused group discussions. Field observations were used to collect first hand experiences, further elucidate points brought up in larger group discussions, and validate information provided. A number of data collection methods were used during the field study. These methods are discussed further in Annex 1.

6. The rationale to compare and contrast two out of the ten communities was to minimise inter-village variability due to ethnic and historical factors, in order to concentrate on the differences related to forest product collection patterns.

7. The five villages were Kiriya gaswewa, Muriyakadawala, Alagollewa, Moragoda, and Galapitigala.

In rural parts of developing countries, household income is generally an unreliable indicator of well-being, since it is prone to fluctuation and seasonality⁸. Rather than estimating household income, the survey team sought to characterise household livelihood strategies. The livelihoods of villagers near Ritigala are formed around many activities that provide food, income, and security. This section provides an overview of livelihoods in the communities surrounding Ritigala, with a particular emphasis on Muriyakadawala and KiriyaGaswewa. Box 1 contains the major topics which formed the basis of village discussions.

In a survey article on household strategies and rural livelihood diversification, livelihood has been defined as encompassing "income, both cash and in kind, as well as social institutions (kin, family, compound, village and so on), gender relations, and property rights to support and sustain a given standard of living" (Ellis, 1998:4). Livelihood diversification is the process by which rural families develop a range of activities and social supports to survive and to improve their standard of living, including a desire to reduce the risk of income failure. This risk can be reduced by diluting the impact of failure of any single income source, reducing income variability by diluting the effect of seasonality, or by reducing the income variability that results from instability in agricultural production and markets (Ellis, 1998).

Ownership of and access to land and natural resources

In Asia, a prevalent feature of rural poverty is near or actual landlessness, such that poor households must rely on off-farm and non-farm income sources for survival. Land ownership

8. Income in rural households varies from year to year, depending on crop outcomes and prices. Income also varies greatly between seasons, which can make it difficult to measure.

affects the types of livelihood activities a household engages in, as well as labour allocation and the degree of dependence on the forest. Privately held land" was traditionally located in non-forested areas. Private hold lands include paddy fields, chena plots", and home-gardens (see Table 3 for a summary of land ownership). Many households acquired land through encroachment" outside the present demarcation lines of the Strict Nature Reserve. All households in the two villages studied maintain home-gardens, but there are wide variations in the amount of paddy and chena land. In Muriyakadawala, 22 percent of the households have no paddy lands, and 44 percent do not possess chena lands. In Kiriya gaswewa, 17 percent of

Box 1 : Livelihood profiles in Muriyakadawala and Kiriya gaswewa

Ownership of and access to land and natural resources:

- What is the tenure situation?
- What is the villagers' access to and use of non-titled resources?¹²
- What are the patterns of non-timber forest product usage?¹³

Sources of income:

- How do villagers derive their income?
- What are the average monthly earnings of households?

Labour allocation:

- What is the average household labour time allocation for collecting non-timber forest products?

Risks and seasonal conditions that affect resource use:

- What are the risks in the region?
- How does seasonality affect the intensity of farming activities?
- How do seasonality and availability of forest resources affect collection of non-timber forest products?

Gender specific activities:

What are the patterns of non-timber forest collection for men and women?

-
9. Most households possess official land deeds.
 10. Chena is a settled form of the traditional swidden agriculture system, practised on rain-fed plots.
 11. These encroached areas have been "regularised." or legally accepted by the government.
 12. Non-titled resources refer to resources without legal deeds. For a discussion of informally recognised access rights, see Section 4.
 13. See Section 3.

Table 3: Profile of land ownership (all households)

Category	Munyakadawala		KiriyaGaswewa	
	#of hh	%	# of hh	%
Paddy+chena	35	40	50	52
+home-garden				
Paddy+home-garden	33	38	30	31
Chena+home-garden	14	16	10	11
Home-garden alone	5	6	6	6
TOTAL	87	100	96	100

households are without paddy lands and 37 percent do not possess chena lands. A nearly equal proportion (5-6 percent in each community) of households in each community had no sizeable farm plots. These households keep home-gardens, where they plant chena crops.

Table 4: Average Size of Chena, Paddy and Livestock, with percentage of crops sold

Muriyakadawala				KiriyaGaswewa			
Paddy Area	# of hh with paddy	Average ha	% sold	Paddy Area	# hh with paddy	Average ha	% sold
15.4 ha	19	0.64	64.7 %	10.7 ha	20	0.50	18.8%
Chena Area	# of hh with chena	Average #	% sold	Chena Area	# hh with chena	Average ha	% sold
11.9 ha	23	0.45	32.2%	10.3 ha	24	0.43	7.1%
LIVESTOCK				LIVESTOCK			
Total # of cattle	# of hh with cattle	Average #	% sold	Total # of cattle	# of hh with cattle	Average #	% sold
23	6	1	-	33	5	1.4	-

Note: From a 24-household sample

Table 4 provides an indication of the average total land area owned by a sampling of 24 households in each of the two villages. In Muriyakadawala, the average agricultural area is estimated to be 1.1 hectares per household or 0.2 hectares per capita¹⁴. In KiriyaGaswewa, the average agricultural area is estimated to be 0.93 hectares per household or 0.18 hectares per capita.

14. The national average is closer to 0.5 hectares per capita.

Land tenure for agricultural lands, village forests, village tanks, state forests and the Strict Nature Reserve is described in Box 2. Villagers drew sketch maps (See Figure 4a and 4b¹⁵) of village forests, tanks, and agricultural lands to provide information

Box 2 : Background to Land and Natural Resource Tenure in the Ritigala Area

Agricultural lands (and livestock) are either privately owned or leased. Many villagers possess title deeds to paddy and annual permits for chena plots. There is little sharecropping. Goats are stall fed, but other types of livestock are not.

Village forests are small shrubland areas (typically no more than a few hectares) of common land over which the village has de facto ownership. Village forest lands are physically demarcated by the Survey Department (or are pending demarcation), with markers to represent established boundaries. While the state maintains de jure ownership of these lands, they are used for grazing and fuelwood collection.

Village tanks consist of the dam itself and the immediate surroundings. Tanks are common property resources, providing the main irrigation reserve for paddy lands and serving as the washing and bathing area for villagers. The state usually has de jure tenure over village tanks.

State forests surround the Strict Nature Reserve. These areas are more intensively used (mainly for grazing and fuelwood collection) than the forests in the Strict Nature Reserve. These forest patches are considered by villagers to be part of the state-protected area that makes up the reserve. Although tenure is de jure held by the state (the Forest Department, or the Land Commissioner's Department for areas less than 200 ha in the dry zone), the village has de facto ownership as common property.

Ritigala Strict Nature Reserve, the main forested area of Ritigala, is de facto a common property resource used by the village, while it is de jure owned by the state. The reserve is managed by the Department of Wildlife Conservation. Wildlife Department Officers impose sanctions on livestock owners when animals are found grazing in the reserve.

15. Sketch maps were compiled by 17 villagers in Muriyakadawala and 19 villagers in KiriyaGaswewa.

Figure 4a

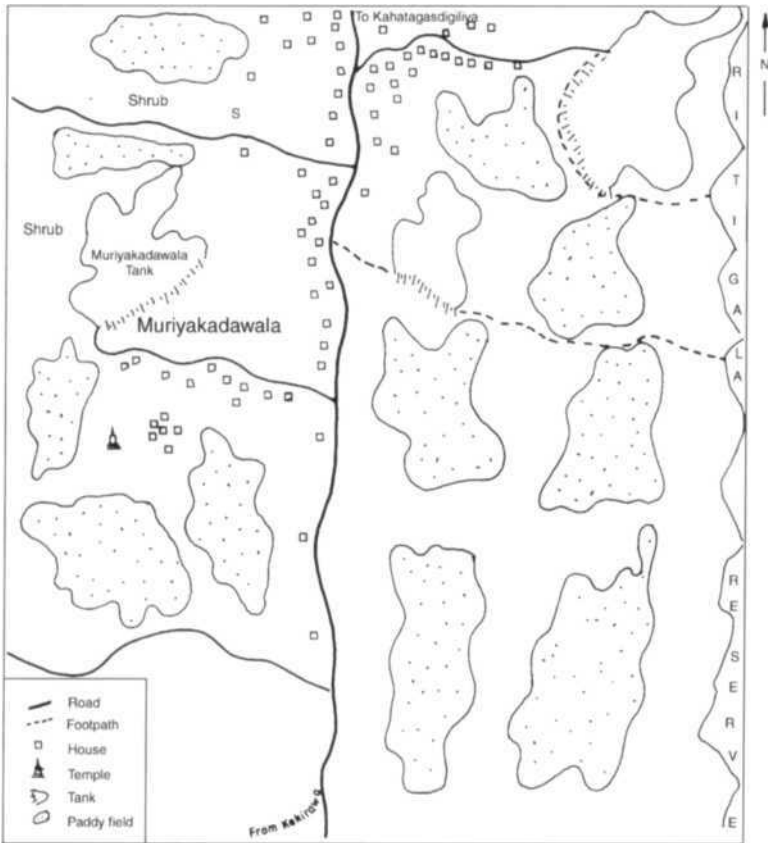
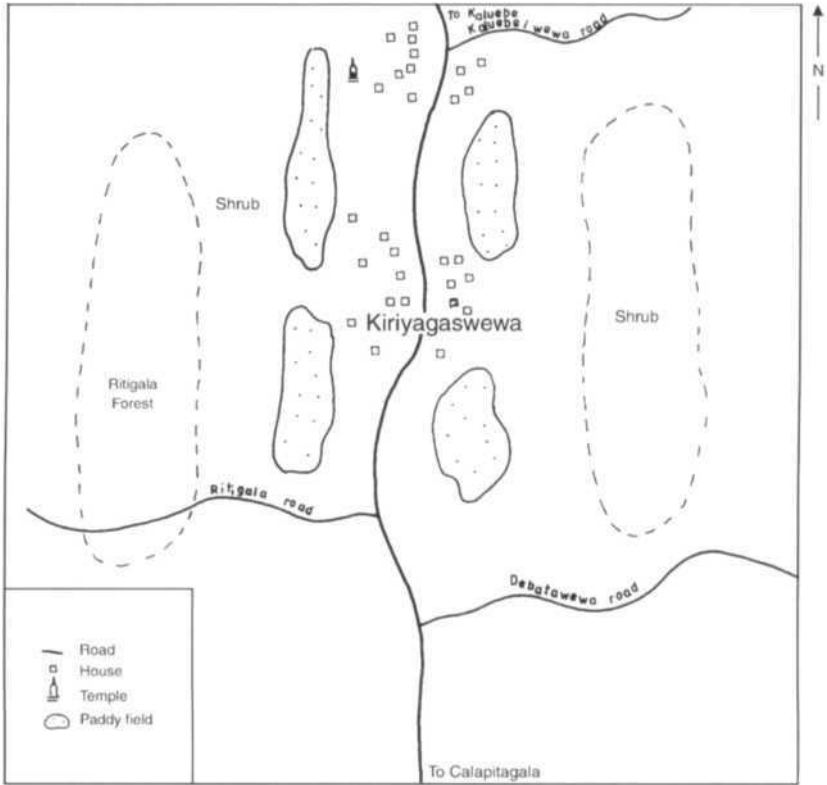


Figure 4b



about land tenure. On the western side (Muriyakadawala) the boundary between forest and village is characterised by a narrow strip of degraded forest. Kiriogaswewa is located two kilometres away from dense forest inside the reserve.

Sources of income

Diversification or carrying out a range of activities is a key dimension of livelihood security in many parts of the world (Chambers, 1983). Typically, income sources are divided into farm, off-farm, and non-farm categories; off-farm refers to wage or exchange labour on other farms and non-farm is tied to non-agricultural income sources. Near Ritigala, villagers diversify their income sources by farming, engaging in casual labour, and collecting forest products.

Farming

The peak agricultural season begins with the onset of the northeast monsoon ("Maha" season) around mid-September. Prior to the rains, paddy fields and any available land near peoples' homes are used to produce fast-growing vegetables. In contrast, during the southwestern monsoon ("Yala" season) very little cultivation takes place, with the exception of chilis when there is sufficient tank water available to meet irrigation needs. Chena plots are used to grow red chilis, aubergine, corn, melon, cowpea, sesame, coracana, and pumpkins. These crops are typically destined for the market, as many of these crops (except for coracana and sesame) cannot be stored for sale in the off-season. Paddy rice is typically sold after a sufficient amount is stored for family consumption.

Labour

During the peak agricultural season, demand for labour is high. Villagers exchange labour on a reciprocal basis in order to complete their harvests. Since farming is considered to be a household responsibility, however, hiring labour for farm work is uncommon. Exceptions were found in Uththupitiya and Kanduboda¹⁶ (two Muslim villages), where plot size ranged from 3 to 6 hectares and tractors were sometimes used for ploughing. Hired labour came predominantly from the neighbouring Sinhalese villages. As little local non-agricultural employment is available, men tend to migrate to urban centres (particularly Dambulla) in search of casual labour.

16. Kanduboda is not listed in Table 1, but is depicted in Figure 2.

Forest product collection

The forest is an integral part of villagers' livelihood strategies. A vast number of non-timber forest products are in common use (see Annex 2). The most important of these are medicinal products, fuelwood, food products, forest fibres, and wild game. While all households in the ten villages use the forest for at least some subsistence products (such as fuelwood, fruits and medicinal plants), the extent to which the forests are used depends on factors such as gathering practices, specific knowledge or skills tied to forest product collection, family size, and need. These factors are discussed in greater detail in Section 3.

Average monthly income

Income from hired labour is extremely irregular and unreliable, and the sale of crops and forest products provides the major source of income. Relative monthly income earnings were estimated by sampling households (24 households in each village, see Table 5). Both communities had a high proportion of

Table 5: Average monthly income of the households studied in Muriyakadawala and Kiriya gaswewa (Sample size 24 households in each community)

INCOME (monthly average Income of hh)	Muriyakadawala		Kiriya gaswewa	
	# of hh	%	# of hh	%
> Rps. 4000	2	8	0	0
3001 - 4000	0	0	0	0
2001 - 3000	4	17	2	8.5
1001 -2000	6	25	2	8.5
<Rps. 1000	12	50	20	83
TOTAL	24	100	24	100

Table 6: Households by primary sources of livelihood (all households)

Source category	Muriyakadawala		Kiriya gaswewa	
	# of hh	%	# of hh	%
Forest as a primary source	26	30	16	17
Farming as a primary source	53	61	69	72
Non-forest source	8	9	11	11
TOTAL	87	100	96	100

households with extremely low income. In Muriyakadawala, 50 percent of households reported a monthly income of less than Rps. 1000¹⁷, and 75 percent of the households earned less than Rps. 2000 per month. In Kiriagaswewa, 83 percent of households reported a monthly income of less than Rps. 1000, while 91.5 percent earned less than Rps. 2000 per month.

While 30 percent of all households in Muriyakadawala consider the forest as their primary source of livelihood, only 17 percent in Kiriagaswewa did so. Differences in distance from the forest and access to higher quality roads and possibilities for trade favour a greater interest in forest-derived income in Muriyakadawala (this is discussed in greater detail in Section 3). At the other end of the spectrum, nine percent of all households in Muriyakadawala and eleven percent in Kiriagaswewa do not derive their primary or secondary sources of livelihood from the forest. The main reason for this response was insufficient available labour (often due to labour migration or death of the male head of household), which prevented these households from engaging in forest gathering activities. Only a few households felt that their household income was sufficiently high to make supplementary income from non-timber forest product collection unnecessary.

Household labour time allocation

Between August and November at least 45 percent of the overall labour hours in Muriyakadawala and 55 percent in

Table 7: Average number of hours spent between August and November on forest-related activities

NTFP	Muriyakadawala (average hours per hh)	Kiriagaswewa (average hours per hh)
Gal-siyambala	146	125
Honey	113	132
Binding fibre **	34	46
Fuelwood	168	261
Medicinal products **	42	31
Wild leaves **	11	8
Hunting **	18	28
TOTAL	532	631

** = only rough estimates were made for these items

17. Based on US 1\$ = 49 rupees (October 1994).

Kiriyagaswewa were spent in collecting non-timber forest products. Forest-related activities consumed more labour time in Kiriyagaswewa than in Muriyakadawala, due to a greater distance from the village to the forest.

Data from Table 7¹⁸ show that two seasonally-determined products (gal-siyambala and honey) used approximately 49 percent of the labour hours in Muriyakadawala, and 41 percent in Kiriyagaswewa. During this same time period, at least 31.6 percent of the labour time in Muriyakadawala and 41.4 percent in Kiriyagaswewa was used to gather fuelwood.¹⁹

Risks that affect resource use

Risk is often cited as the primary motive for income diversification. Risk is the "subjective probability attached to individuals or by the household towards the outcomes of the various income generating activities in which they are engaged" (Ellis, 1998:12). Risk management is a deliberate household strategy to alleviate failures in certain activities by maintaining a spread of activities.

The most serious risk near Ritigala is fields being destroyed by wild elephants. Kiriyagaswewa is more at risk than Muriyakadawala, because of the gradual transition of the eastern slope to the surrounding flat land making the area a frequent route for wild elephants. The western side is rarely traversed by elephants, because of a nearby major road and the more abrupt gradient.

It is not unusual for wild elephants to destroy as much as half of a household's crops. In Kiriyagaswewa, many plots of land were abandoned because of destruction by wildlife. Between mid-October and early April, a substantial effort is made to protect crops from attack by wild boar and elephants. Village men rotate responsibility for staying overnight in watch-huts and maintain fires in chena plots to prevent wild animals from entering. During dry spells, damage from wild elephants is not limited to fields; elephants in search of grain caused significant damage to four local houses while this study was underway.

18. The data summarised in Table 7 was derived from detailed discussions with gatherers of non-timber forest products. Adjustments were made to account for gathering two items on one trip to the forest. In most cases, the time spent collecting per day was not uniform throughout a harvesting season.

19. A more detailed discussion of the use of labour time, reasons for collecting certain products and the returns to labour from collection are all covered in an article by Wickramasinghe, Ruiz-Perez, and Blockhus entitled "Non-timber Forest Product Gathering in Ritigala Forest (Sri Lanka): Household Strategies and Community Differentiation" appearing in *Human Ecology* in 1996.

Seasonality

All rural households confront seasonality as an inherent risk. An important motive for income diversification is reducing income instability and increasing earning opportunities. Since seasonal farming is the mainstay of the local economy, large variations in rainfall can lead to economic insecurity. In economic terms, seasonality means that returns to labour in both on-farm activities and off-farm labour markets vary during the year, with labour time switching from lower to higher return activities. Seasonality explains many of the patterns of diversity in rural household incomes, especially those involving on-farm diversity and off-farm agricultural wage earnings.

Near Ritigala, discussions revealed that households which consider forests to provide their primary source of income are careful to divide labour tasks within the household so that forest collection activities do not compromise farming tasks. For the most part, the intensive part of the non-timber forest product collection season occurred during the slack season in agriculture (this also coincided with the season when villagers have difficulty in finding outside work, producing crops, and therefore meeting household food needs). Brick-making provided another important supplemental economic activity during this time.

Non-timber forest products, like gal-siyambala (*Dialium ovoideum*), bee honey, goraka (*Garcinia cambogia*), mora (*Dimocarpus longana*), and binkohomba (*Munronia pumila*) have very specific collection seasons. Seasonality and the availability of some major non-timber forest products are given in Table 8.

Non-seasonally determined non-timber forest products include fuelwood, roots, barks, and leaves of various species of medicinal herbs, edible wild leaves, and leaves used in porridge and local beverage-making. Households tend to place a lower priority on non-timber forest products without a distinguishable peak collection season. Fuelwood, for example, which is gathered on a daily basis by women between early July and early September, is given a lower priority from September to February, when demand for time spent chena and paddy farming is critical. For other non-seasonal products, collection times are determined by acute demand or a gatherer's desire to diversify income.

Table 8: Seasonality and availability of important NTFP

Product	Collection season, ranging	
	From	To
Galsiyambala	Mid -July	Mid - October
Siyambala	Mid-May	Mid -July
Damba	August	Mid - October
Palu	Mid-May	July
Weera	Mid-May	July
Kohomba (seeds)	August	Mid - October
Mee (kernels)	Mid -July	October
Mora	December	Mid - February
Himbutu	January	March
Binkohomba	Mid-October	Mid - February
Bee-honey	Mid -June	October
Goraka	Mid -September	November
Divul	August	Mid - October

Gender specific activities

In order to better understand gender²⁰ diversification within households, the survey team asked about who in the household gathered specific products, how specific activities were divided among men and women, and how cultural factors affect men's and women's tasks.

The gender-specific data summarised in Table 9 indicate that men play a greater role than women in non-timber forest product collection. Experience in other developing countries indicates that men typically concentrate on commercial gathering and women on subsistence and household-related activities (Molnar and Schrieber, 1989). This is the case in Ritigala, where men are more concerned with collecting and selling gal-siyambala and honey, while women tended to collect products for direct household consumption (like fuelwood, seeds, and wild leaves).

Gender-specific patterns were determined by social norms and the conventional roles played by men and women in households. The "masculinity" or "femininity" of tasks was mainly influenced by the physical difficulty of the work.

20. The word "gender" is used here to describe the socially-defined roles of men and women.

Women are typically excluded from tree climbing, carrying heavy loads, or hunting. They tend to go less frequently to the forest than men, and they feel less secure there. If harvesting involves more so-called feminine tasks, like collecting tender leaves and twigs from low shrubs, or harvesting products from the ground, women are involved. They also gather fuelwood, and collect seeds from kohomba (*Azadirachta indica*) and mee (*Madhuca longifolia*). These products are not harvested in bulk, but as they fall to the ground, and gathering may be continued over several days or weeks.

Selling forest products varies for men and women as well. Men are typically more mobile than women, who tend to stay closer to home. Eighty percent of the villagers considered men to be responsible for transporting and selling non-timber forest products at markets. Women sell non-timber forest products from roadside stalls or to local traders who visit individual households.

Table 9 : Men and women and NTFP-related tasks

NTFP	Harvesting		Gathering		Carrying		Selling	
	Men	Women	Men	Women	Men	Women	Men	Women
Gal-siyambala	**	**	**	*	**	*	*	—
Honey	**	—	—	—	**	—	*	**
Kohomba	—	—	*	**	*	**	**	*
Mee	**	—	*	*	*	*	**	*
Binkohomba	—	—	*	*	*	*	*	*
Fuelwood	—	—	*	**	*	**	—	—
Binding Fibre	**	*	—	—	**	*	—	—
Collection of green leaves	*	**	—	—	*	**	—	—
Hunting	**	—	—	—	**	—	**	—
Medicinal products	**	*	*	*	*	*	*	*

** = Primary collector; * = Secondary collector.

3

Non-Timber Forest Product Collection in Two Indigenous Communities

This section provides an overview of the use of the forest by local communities²¹ for meeting household subsistence needs, and supplementing income by commercial sale of non-timber forest products. Many plant species are significant in villagers' daily lives; Annex 2 lists 74 important plant and animal non-timber forest products. A small sampling of important

Table 10 : Important plant species

	Local Name	Latin Name
Important species for medicinal purposes	pus	<i>Entada phaseoloides</i>
	kohomba	<i>Azadirachta indica</i>
	mee	<i>Madhuca longifolia</i>
	binkohomba	<i>Munronia pumila</i>
Favourite local fruits	gal-siyambala	<i>Dialium ovoideum</i>
	mora	<i>Dimocarpus longana</i>
	divul	<i>Feronia limonia</i>
	damba	<i>Syzygium gardneri</i>
	palu	<i>Manilkara hexandra</i>
	weera	<i>Drypetes sepiaria</i>
	himbutu	<i>Salacia reticulata</i>
Forest fibres	yakadawel	<i>Dalbergia pseudo-sissoo</i>
	kiriwel	<i>Merremia umbellata</i>
	rattan	(<i>Calamus sp.</i>)
	unabata	<i>Bambusa arundinacea</i>

plant species include those listed in Table 10. Villagers were asked to rank the most important non-timber forest products, both in terms of product preference²² in each village, and collection preferences by men and women (see Table 11). In Muriyakdawala, gal-siyambala and honey were the two most important products, while in Kiriogaswewa, wild game and honey were most important.

21. In Muriyakdawala and Kiriogaswewa, 24 households were selected as sample households.

22. Binkohomba may have rated higher if the collection season had coincided with the study time period.

Table 11 : Ranking of major NTFP

MTFP	Muriyakadawala			Kinyagaswewa		
	all interviewed	men	women	all interviewed	men	women
Gal-siyambala	1	1	1	3	3	2
Honey	2	2	2	1	2	1
Wild game	3 (tied)	3	4	2	1	3
Fuelwood	3 (tied)	4	3	4	4	4
Binkohomba *	5	5	5	5	5	5

(* off season)

Collection of major non-timber forest products

The five main non-timber forest products gathered by the two communities include gal-siyambala (*Dialium ovoideum*), binkohomba (*Munronia pumila*), honey, fuelwood and wild game. A brief description of the amounts gathered, relative market prices, and domestic use of these five products follows. Collection of the five products, as well as other important non-timber forest products, are covered in greater detail in Annex 3.

Gal-Siyambala

On average, ten groups (consisting of three to six members each) entered the forest regularly from four forest gates²³ located above Muriyakadawala to collect gal-siyambala. It was estimated that at least 13,400 kg²⁴ of fruit was collected in Muriyakadawala. By comparison, collection in KiriyaGaswewa was less intensive, where it was estimated that 20 villagers were regularly engaged in gathering gal-siyambala. The total amount of fruit collected (4200 kg) for KiriyaGaswewa was roughly one-third of that collected in Muriyakadawala for the season studied.

A mature gal-siyambala tree produces between 250-300 kg of fruit. Prices for gal-siyambala vary with the quality of the fruit. In the early part of the season, fruits are raw and green, and sell for Rps. 8-10/ kg. The best quality fruits, which are large and ripe, with an undamaged velvet skin, are found between mid-September and mid-October and sell for Rps. 20-25/kg. During the peak season, harvesters come out of the forest with sacks of fruits and immediately sell their harvest to local

23. "Gate" here means an access point to the forest.

24. Based on village forest gate estimates.

traders. Gatherers' income during the peak season averages between Rps. 400 and 500 per day, which is the local equivalent of prospecting for gold.

Binkohomba

Villagers collect small quantities of binkohomba, an important medicinal plant²⁵, for domestic consumption and store it after sun-drying. Binkohomba also contributes significantly to household incomes in the region. No estimates were made of amounts collected, since the time of the study did not coincide with the prime collecting season.

There is a year-round market for sun-dried binkohomba. One kilogram of dried binkohomba sells for Rps. 400-450/kg. Market prices in Colombo were nearly double this amount, averaging Rps. 750-800/kg.

Honey

Honey is prized for both its nutritional and medicinal qualities. It is collected mostly for sale to markets. Ritigala is renowned for very high-quality honey, so traders frequently come directly to villages to purchase it from individual households. Nearly 88 percent of the honey collected in Kiriya gaswewa is sold to traders, compared to roughly 60 percent of the honey collected from Muriyakadawala. Beeswax is another important product for the regional market.

Quantities of honey were monitored at four forest gates in Muriyakadawala, and two in Kiriya gaswewa. For the full collection season (from July²⁶ to September), 1338 pints were collected in Muriyakadawala and 948 pints in Kiriya gaswewa.

Fuelwood

Forest wood is the most preferred source of fuelwood, especially because it burns better than other available fuel sources. Wood found in croplands provides a secondary source of fuelwood. Villagers from Kiriya gaswewa used village forests (located outside the Strict Nature Reserve boundary) to meet one quarter of household fuelwood needs.

Because fuelwood collection is carried out to meet domestic cooking needs, it is not viewed by villages as an economic

25. Binkohomba is an ancient remedy for fever, dysentery, and contamination of the blood.

26. Collectors were asked to recall the amount they collected in July, since the survey did not begin until August.

activity. The exception is when fuelwood is collected and used as a source of energy for non-domestic activities, as in the case of the local brick-making industry. The average price offered for a cubic metre of wood was Rps. 250. Since formalised markets for fuelwood do not exist in the area, opportunities for gathering fuelwood for sale are limited.

Wild Game

Elk and mouse-deer hunting is concentrated in the dry season, while spotted-deer and sambur hunting can be as frequent as once a month. During the slack season in agriculture (the dry season), hunters allocate more time to hunting, particularly since household food needs are greater. Forest meat is consumed locally, and shared amongst the villagers. A portion of the meat is sold²⁷ immediately, while the remainder is typically sun- or smoke-dried. Processed meat is carefully concealed, since strict enforcement by Wildlife Officers makes it difficult to openly sell wild game.

Hunting in the forest adjacent to Muriyakadawala is risky, as the Wildlife Department office is located between the edge of the forest and the community. Kiriya gaswewa, with its relative locations of shrublands, village forests, and deniya lands, provides better opportunities for hunting. The most popular species hunted for local consumption include Wal-ura, Iththewa, Tith-muwa, Meeminna, Hawa, Wali-kukula, and Gona (See Table 12).

Table 12: Wildlife species commonly hunted by local communities*

Local Name	English Name	Latin Name	Rank
Thith-muwa	Spotted-deer	<i>Axis axis ceylonensis</i>	1
Gona	Sambur	<i>Rusa unicolor unicolor</i>	2
Wal-ura	Wildboar	<i>Sus scrota ceylanicus</i>	3
Mee-minna	Mouse-deer	<i>Moschiola meminna</i>	4
Iththewa	Porcupine	<i>Acanthian leucurus</i>	5
Hawa	Hare	<i>Lepus nigricollis sinhala</i>	6
Wali-kukula	Jungle-fowl	<i>Gallus lafayetii</i>	7

*This ranking was based on group discussions held in the two villages

27. A sambur or deer is worth around Rps. 3500 - 4500.

Financial value of non-timber forest products

Financial benefits²⁸ were estimated (See Table 13) for gal-siyambala, honey and fuelwood. The costs of non-timber forest product collection are equal to the opportunity cost of labour, since harvesting them does not require specific tools or implements. Labour costs are based on the prevailing labour wages in the region (equal to an hourly rate of Rps. 12 for agricultural work). By comparison, the relative rates of return per labour hour were Rps. 70.4 for gal-siyambala and Rps. 98.9 for honey in Muriyakadawala and Rps. 57.8 for gal-siyambala and Rps. 50.9 for honey in Kiriagaswewa.

Table 13: Financial benefits from NTFP in season

Muriyakadawala									
NTFP	# of hhs	Average () collected			labour cost per unit hr	Price per unit (Rps.)	Product (kilos x price)	product/hr	total income
		hours	days	amount					
GS*	15	7.3	20	25.7 kg	12	20	514	70.4	10,344
BH	12	7.5	15	7.4pt	12	100	742	98.9	11,146
FW	24	5.6	29.9	30 kg	12	0.35	10.5	1.9	312
Kiriagaswewa									
NTFP	# of hhs	Average (no of) collected			labour cost per unit hr	Price per unit (Rps.)	Product (kilos x price)	product/hr	total income
		hours	days	amount					
GS	8	8.3	14.6	24 kg	12	20	480	57.8	7021.4
BH	14	11	12	5.6 pt	12	100	560	50.9	6773
FW	24	9.3	27.8	30 kg	12	0.35	10.5	1.1	291

(*GS = Gal-siyambala; BH = Bee honey; FW = Fuelwood.)

Discussion: Analysis of the significance of non-timber forest product collection

Two major findings emerge from the survey results. First, the villagers make a rational choice by collecting gal-siyambala and honey, particularly during the months of low agricultural activity. The net return for non-timber forest product collection for commercial sale is as high as eight times the average wage for casual work (Wickramasinghe, Ruiz-Perez and Blockhus,

28. Financial benefits were restricted to the data gathered from the 48-household sample. Products gathered irregularly in small quantities are not included in the financial assessment.

1996). Similar labour allocation strategies are reported in other regions of the tropics (e.g. in Brazil see Haggblade and Hazell, 1989; in Ghana see Falconer, 1990). This conforms to the economic motivation for diversification cited in relation to seasonality, such that when the marginal return to labour time in farming for any individual falls below the wage rate or the return to self-employment attainable off the farm, then the household is better off switching that individual into off-farm or non-farm activities (Ellis, 1998:12).

Second, the proportion of households engaged in gathering marketable non-timber forest products varies between the two communities; 30 percent of households consider them a primary source of income in Muriyakadawala compared with 17 percent in Kiriyaqaswewa. Although nearly equal opportunities exist for villagers from either community to gather gal-siyambala from the forest,²⁹ substantial differences in net return per labour hour between the two communities persist because collection sites for users are not designated as pertaining to one village specifically. Other factors that serve to explain this difference in participation include:

- a) Differences between communities, including the:
 - proximity to the forest
 - forest condition
 - market orientation
- b) Differences within the communities (different household conditions)

The importance of each of these factors is discussed below.

Differences between communities

Proximity to the forest

The distance from the forest to collectors' homes influences the extent and type of use of the forest. To determine the effect of proximity to the forest³⁰, forest collection time was gauged. Collection time included the time spent in collecting products, the frequency of visits to the forest, and the average distance from the village to collection sites.

29. This topic is covered in more detail in Section 4.

30. In both communities, proximity to the forest was measured from a common meeting point in the community, rather than from the individual households.

Average distances walked and time spent in gathering³¹ varies greatly between the two villages. Collectors from Muriyakdawala have the advantage of living closer to the forest. On the eastern side, Kiriya gaswewa gatherers have to walk at least two km to enter the forest, so collection trips tend to be less spontaneous. Due to the greater time requirements, Kiriya gaswewa gathering groups do not enter the forest unless a full day is available for collection. This suggests that collectors from Kiriya gaswewa invest significantly longer hours per trip, particularly in the case of honey and fuelwood collection, while devoting fewer days to these activities than collectors from Muriyakdawala. The total quantities of non-timber forest products gathered in Kiriya gaswewa are, on average, smaller than those recorded in Muriyakadawala (See Table 13). Much of the difference in non-timber forest product collection in the two villages is due to the additional time it takes to enter the forest from Kiriya gaswewa. Thus, proximity to the forest affects the net return per labour hour.

Forest condition

Forest condition and product abundance can also affect the gathering of non-timber forest products. There is greater water stress on the eastern slopes near Kiriya gaswewa while conditions are closer to wet zone forests (richer in biomass) than dry zone forests on the western slopes near Muriyakadawala. This helps to explain the differences in natural abundance of forest products. Collectors found the forests on the western side of Ritigala to be in better condition (in terms of species composition and density) and richer in products like gal-siyambala and honey. Forests on the eastern side are relatively more degraded and so hunting provides the best economic prospects for villagers from Kiriya gaswewa. This relative abundance was confirmed by the ranking preference differences in the villages given in Table 11. Relative species abundance can also be influenced by conservation status or traditional management practices (such as enrichment planting with species of economic interest).

Market orientation

Three aspects differentiate the west from the east in terms of market orientation. First, the western side (near Muriyakadawala) has a good paved road that allows for quick access to Dambulla, the main town and market centre of the

31. See Table 12 for the average distance walked to collect gal-siyambala, honey and fuelwood, average number of hours per trip, and average number of days spent harvesting.

region, 18 km from the southern point of Ritigala. This area has traditionally enjoyed better transport infrastructure³² than the eastern side, which has a poor-quality, unpaved road.

Second, this road infrastructure brings other benefits: "improved rural roads reduce the costs of all types of spatial transaction, including labour, output, input and consumer markets" (Ellis, 1998:27). The western side offers better market opportunities for livestock, crops, and forest products. Market prices are higher on the main roadside, compared to average prices on minor interior roads (see price differences in Table 14). This effect is more pronounced for non-timber forest products that do not keep well; lower prices are paid for perishable goods (like fruits) originating in remote areas. Perhaps to compensate for this, Kiriya gaswewa gatherers have adapted by holding stocks of honey (when possible) to obtain a better price in the off-season.

Table 14: Daily collection and prices at local and regional markets

Product and village	Average daily collection	Village price (Rps.)	Dambulla price	Transport costs ³³	Net increment	Gross value/day
Gal-siyambala (kg)						
Muriyakadawala	25.7	20	25	9	119.5	514.7
Kiriya gaswewa	24.0	18	25	10	158.5	432.0
Honey (pints)						
Muriyakadawala	7.4	100	105	9	28	741.7
Kiriya gaswewa	5.6	100	105	10	18	564.3

Third, the newest communities (predominately Islamic and Catholic households) settled on the western side 50 years ago. The villages on the eastern side are longer established Sinhalese communities. The traditional traders in the region are the Muslims. The location of the Muslim villages, combined with better roads, also contribute to the predominance of a market-oriented economy in the western villages.

32. Relatively frequent bus service (with an interval of less than one hour) can guarantee a journey of just under 90 minutes (by express bus). By comparison, the trip from Kiriya gaswewa is on a very poor road for one-third of the time. Only three buses run per day from Kiriya gaswewa to Dambulla, and average travel time is 2 1/2 hours.

33. Fee per passenger in local bus.

Differences within the communities or intra-household conditions

One of the purposes of the study was to determine why certain households were heavily engaged in gathering non-timber forest products and others were not. The original assumption was that relatively better-off households would not participate. The evidence, however, showed that higher income households did engage in non-timber forest product collection. Three households (headed by women) reported that they did not gather gal-siyambala or honey, due to the lack of skilled labour (particularly males) needed to harvest beehives or join groups to harvest gal-siyambala. Labour is the key constraint. If labour is available³⁴, household members of different economic status are equally engaged in non-timber forest product collection.

Future research

This study covered only a fraction of a much broader picture of non-timber forest product collection in Ritigala. Had the initial three-month period been extended to cover a complete annual cycle, many more products (including important medicinal species) could have been studied. The study was unable to properly track the importance of more "minor" forest products — those that were collected in small quantities, as needed or in addition to major seasonal products (see the full listing of important local NTFP in Annex 2). A more detailed and rigorous recording process would be needed to estimate the contribution of these products. Household diaries of non-timber product collection would provide the best means of recording. Diaries would need to be initiated with local peoples' full willingness to cooperate and remain committed throughout a prolonged study period (Godoy and Lubowski, 1992).

34. In times of acute labour scarcity, children were sometimes encouraged to join groups to collect non-timber forest products.

4 | Forest Management Arrangements

This section considers the existing local management arrangements for forest use. Investigations were carried out to determine whether a common property management regime is in place for forest resources at Ritigala and, if so, how it is organized. The issues raised in Box 3 formed the basis of discussions with villagers on common property resource management. In addition to this set of questions, the survey team relied on informal discussions and other means of information gathering (discussed further in Annex 1) to better understand management decisions concerning use of the forest.

Box 3 : Issues in Common Property Resource Management at Ritigala

- Issue 1: Are there norms of behaviour or common practices in collecting certain products?
- Issue 2: Are boundaries in the forest recognised between different collectors or villages?
- Issue 3: Is there an identifiable group or organization existing that is responsible for forest resource management (e.g. a forest user group)?

Each issue is discussed in turn. Norms or examples of common practices that govern collection of forest products can indicate the level of management sophistication that a group of forest users possesses. These norms or practices can be informal or formal — if they are informal, they tend to be implicit or evident in behaviour, while formal practices are explicitly stated, often as management rules or guidelines which are formally agreed upon or written down (Fisher, 1993). An indication of distinct boundaries between various collectors or villages would signal a potentially more robust institution. A group or organization responsible for forest management would have some type of forum for decision-making.

Fisher (1991b) differentiates between the institutional and organizational elements of a management system. The first level is the institutional base, which consists of a "complex of norms and behaviours that persist over time by serving collectively valued purposes" (Fisher, 1993:6) (see Figure 5). This level corresponds to Issue 1 in Box 3. An example is indigenous practices of forest management (e.g. no cutting of green timber). On top of the institutional level may be an organizational superstructure - whether an identifiable group or organization is responsible for forest management (corresponding to Issue 3 in Box 3). Examples of organizational elements are village-level forest committees or forest user groups. According to Fisher:

The organizational superstructure, which may change over time, is inessential. The essential element is the institutional substructure because no effective system can function without it (Fisher, 1991b:8).

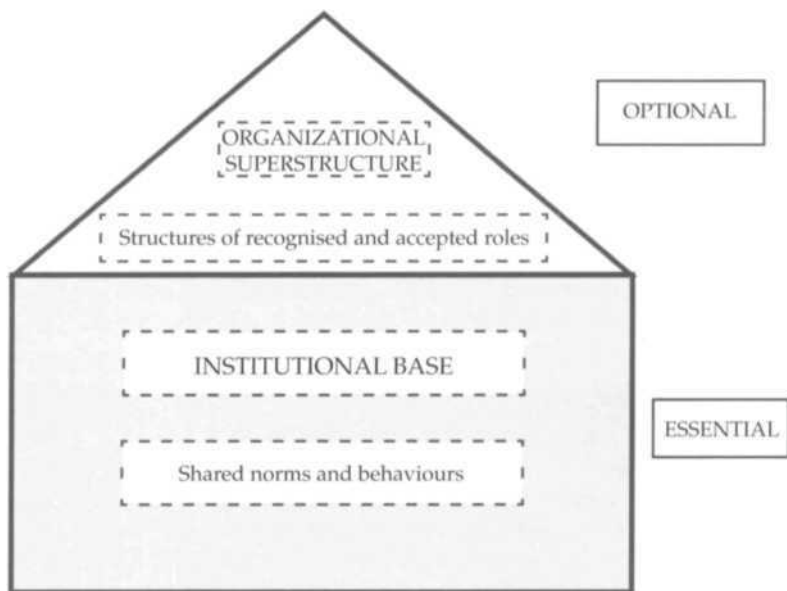


Figure 5. Fisher (1991b) differentiates between the institutional and organizational elements of a management system.

The following section will examine the institutional and organizational aspects of forest management in Ritigala.

Analysis of management arrangements

Institutional elements

The institutional elements analysed include beliefs, perceptions, and rituals, group gathering, sharing of benefits, indigenous knowledge, norms or accepted management practices, and sanctions.

Beliefs, perceptions, and rituals

Ritigala is viewed as a holy place by the indigenous communities. Elderly people refer to the forest with great respect and heartfelt feelings of gratitude. An interview with an elder reveals this sense of reverence for and dependence on the forests:

This excellency³⁵ is our life. I remember him from my childhood. He helped us during the periods of harsh droughts and hunger. He catches clouds passing above him and gives us rain. We would have died years ago if this excellency did not take care of and look after us. We don't want to destroy him, if we do so we will never be able to regain his sympathy and kindness extended to us over generations.

In Nepal, maintenance of use rights includes not only objectives for the continued access to forest products, but in certain cases, recognition of the forest for its ritual purposes (Fisher, 1991b, Ingles, 1995). Near Ritigala, the holiness of the forest is not restricted to the Buddhist monasteries located inside the reserve. Villagers believe that the forest is inhabited by gods³⁶ and they carry out specific spiritual rituals which have been passed down for generations.

Rituals are performed in order to appease the forest gods. It is felt that if villagers do not abide by certain practices, they will not be able to find their way home from the forest or their fields will be trampled by elephants. Certain activities - such as consuming alcohol or meat - are restricted prior to entering the forest. Women are prohibited from entering the forest during menstruation. Often, before entering the forest, villagers pray to the forest gods and hang twigs on branches to increase their chance of good harvests and collecting large quantities of non-timber forest products.

35. "This excellency", "him", and "he" all refer to Ritigala forest.

36. Local communities strongly believe in god Mahasen, the god of the forest, irrespective of their religion.

Reverence towards the forest is also linked to the forests' role in sustaining local livelihoods. Chambers refers to "the commons" as an important resource for subsistence when it provides "a major source of livelihood for the rural poor and a safety-net fallback source of food and income in bad times" (Chambers, 1994:18). This role of the forest was recognised by Jayatilake, a descendant of the hunter-gatherer groups, who stated that:

We don't have the experience of starvation. On days that we do not have anything to feed our children, I enter the forest after praying to the god - to keep us alive and help my children - I never come out of the forest with empty hands, the multitude of forest products enable me to get cash to purchase at least three or four measures of rice. When all the cultivated lands turn into a burning desert between June and September, the forest supports our lives.

Group gathering

In many villages surrounding Ritigala, groups (ranging from ten to twenty people) form to harvest non-timber forest products. There are five reasons for doing this. Collection groups provide greater personal safety in the forest, and lessen the risk of attack by wild elephants. There is a sense of identity with the village "group" - the idea of strong group cohesiveness. Linked to the idea of cohesiveness is the benefit of sociability when performing tasks - it is always more enjoyable to work with others when you can share jokes and pass the time together. A fourth reason is that for some tasks, specialist knowledge is required. A final reason is that gathering tasks are labour intensive³⁷ and a gathering group provides the benefit of shared labour. When collecting gal-siyambala, men climb the trees to prune the branches, while women and children collect branches and pick the fruits. Division of labour can also occur on a task-specific basis, with men as the primary honey collectors and women as the primary gatherers of fuelwood, leaves, seeds, and pods.

In Muriyakadawala, at least ten different groups regularly are formed to gather gal-siyambala and other important products. The leader, often the most skilled climber of the group, decides where to go to collect. Groups meet in the forest or at common entry points to the forest, and agree on which section of the forest to harvest. When group size exceeds twenty members, sub-groups are formed.

37. Sufficient labour is needed to reach economies of scale in collecting.

In Galapitagala, gatherer teams spread out along the forest boundary and enter the forest in parallel lines. The first person to find honey or gal-siyambala informs the others, then labour tasks are divided amongst team members. Leaders of the gatherer groups (identified as eight individuals in Galapitagala) are regularly consulted regarding resource decisions (e.g. seasonality of collection, or where to go in the forest).

Sharing benefits

When they return from collecting, gatherer groups share the proceeds. As mentioned in Section 3, sharing of wild game from hunting is a fairly common occurrence. Products gathered in large quantities are subject to equal sharing between households. When products are collected in small quantities (such as wild leaves and fuelwood), however, separate household consumption is recognised.

Sharing the proceeds fairly prevents conflicts from arising within gatherer groups and maintains social cohesiveness. In an analysis of common characteristics of village use of the commons, Runge (1992) speculates on this very issue:

A reason for survival and utility of common property is that close dependence on natural resources makes survival more subject to a variety of unpredictable natural events. By institutionalising a degree of fairness in the face of random allocation, common-use rights may contribute to social stability at the same time that they promote efficient adaptation to changing resource availability... [In addition] the right to be included in the group provides a hedge against individual failure (Runge, 1992:33, emphasis added).

Indigenous knowledge related to specific products

Collecting honey requires specific skills, which are passed on from one generation to the next as indigenous knowledge. Prior to harvesting, villagers try to locate honeycombs by listening for buzzing noises and following bees. Some collectors spend a significant amount of time in the forest locating prime collection sites. According to honey collectors, good sources of honey can be identified by taste³⁸. Villagers realise that honey harvests prior to the monsoon rains are more plentiful, since thunder, lightning and heavy rainfall cause bees to suck out stored honey, leaving behind empty combs. Although the

38. There is a wide variation in sweetness

potential honey harvest from each comb depends on size and maturity, collectors avoid smaller combs, which are housed by a small number of bees and not yet fully mature.

Norms or accepted management practices

We found that in Ritigala, use of the forest was governed by a number of mutually recognised norms or practices (Issue 1, Box 3) for guaranteeing adequate supply of products and serving to protect regeneration of young stock. Villagers learn of these practices from their mothers and fathers. These practices reflect accepted norms or patterns of behaviour, which the villagers have, in their judgement, formulated as "ideals" related to best management or as guidelines. They are similar to the instructions in McKean's example on harvesting:

Everyone would be expected to abide by the village headman's instructions about leaving so much height on a cut plant so that it could regenerate, or only taking a certain portion of a cluster of similar plants to make sure the parent plant could propagate itself, or collecting a certain species only after flowering and fruiting (McKean, 1992:77).

In Ritigala, the following practices were commonly identified:

Gal-siyambala. Collectors tend to leave the branches with fewer fruits behind, so that unpruned branches will produce a good crop the following year. Pruning is accepted as a way to obtain better fruit and more regular fruit. If pruning does not take place the fruits get progressively smaller and less desirable. Pruning is a way of ensuring a regular harvest each year. When all the branches are pruned, collector must wait four years before the next harvest.

Mora. A similar branch pruning practice is undertaken with mora, although there is some question as to whether this results in more productive harvests³⁹. The villagers do not prune the whole tree, just certain branches. They will refrain from harvesting the tree again for four years, using a rotation cycle.

Binkohomba. Collectors take leaves from larger shrubs, leaving smaller shrubs for subsequent harvests.

39. As mentioned in Annex 3, over-frequent branch pruning may not be conducive to fruit maturity.

Honey. Villagers view the act of gathering honeycombs as regenerating the system by renewing the supply. If left untouched for several years, the combs will rot and bees will not return. Collectors avoid smaller combs, which are not fully mature, and the honey supply appears to be constant from year to year.

Fuelwood. No green wood or standing tree is cut. Fallen timber or dead trees provide the main sources of harvested fuelwood.

Sanctions to ensure compliance with common practices

In Nepal, villagers do not allow green wood to be cut from the forest. When this rule is broken, first time offenders are subject to fines, while more frequent offenders have their goods confiscated or are reported to the District Forest Officer. McKean (1992) also reports a system of graduated sanctions for villagers who do not comply with commonly accepted harvesting practices.

There appeared to be a limited use of sanctions against offenders in Ritigala. If a villager fells a tree for his household, this is considered to be his right. However, if a villager were to fell several trees or leave the forest with a cartload full of fuelwood (obviously for sale), government officials would intervene. Villagers relied on government officials (Forest or Wildlife Officers) to impose sanctions when there was a serious offence. By only occasionally imposing sanctions, government officials seem to implicitly accept a subsistence level of harvesting for fuelwood or timber.

In Ritigala, where a strong sense of community identity was found to exist in many of the ten villages studied (see Annex 1), villagers were reluctant to punish each other because of the importance of maintaining social stability - thus, the reliance on local external authority figures when punishment was deemed necessary. Forest collectors expressed a strongly felt sense of obligation to the other members of their collection group to adhere to the rules and not destroy the resource. Obviously, by forming collecting groups, group members serve as de facto monitors of the behaviour of others in the group. One villager proudly offered his view that since nobody breaks the rules in his village, sanctions were unnecessary. McKean also points to the fact that community identity and social cohesiveness can enhance adherence to harvesting practices:

[The villages] small size, their very strong community identity, and a sense of mutual interdependence was reinforced by a formal structure of collective responsibility that almost certainly enhanced their ability to make any regulatory scheme work (McKean, 1992:86).

Organizational elements

The organizational issues analysed include boundaries, use rights, recognition of intrusion by outsiders, and user group membership.

Boundaries and use patterns

Much of the common property research took place in group meetings with the forest users of five forest dependent villages (Kiriya gaswewa, Muriyakadawala, Alagollewa, Moragoda and Galapitagala). Non-timber forest product collectors were asked to draw (on a prepared schematic map) their entry points to the forest, areas visited, and products collected. Villagers pointed out important areas in the forest and told of patterns of harvesting. Based on discussions and mapping exercises in the five villages, a participatory map (see Figure 6) was constructed. There was evidence of the following:

Classification of forest types. Different intensities of use were associated with each forest type, including the "Mahakele" (the forest interior), the "Imelanda" (the degraded strip of forest extending parallel along the edge), the "Gan-kelewa" (the village forest or common lands located between the forest and the villages) and the "Pitiya / Deni" (the flatlands located either near adjoining water irrigation tanks or grassland patches near paddy fields). These categories are based on forest cover and the villagers' patterns of land use.

A local perception of the important, resource-rich areas of the forest. When villagers spoke of where they went in the forest, reference was often made to prime collection sites known for species in great abundance or of high economic value. Some of the local names included: "Una-kanda," referring to the "bamboo hill," and "Wanni-kanda," or alternatively "Aushada-kanda," referring to "medicine hill," where many medicinal plants were found.

Forest gates and important paths through the forest. At least four paths from the west, two from the south, and another three

in the eastern slopes, were located as primary entry points into the forest. However, none of these paths fully traverse the forest. In addition to the human-created paths, a number of well-established paths ("Alimankada") created by wild elephants were noted⁴⁰.

Streams named after flora. "Na-ela" in the west, which begins in Maha-degala gully, is an example of a stream named after flora abundant on the mountain. This stream traverses groves of "na" (*Mesua nagasarium* - formerly *Mesuaferrea* or ironwood), the national tree of Sri Lanka ("ela" is stream in Sinhala). The "Etamba-gaha-ela" stream, draining south, is another example, relating to the location of old stands of "etamba" (*Mangifera zeylanica*).

The forest sub-areas names, products collected within sub-areas and primary village users are shown as Table 15. The participatory map (Figure 6) shows a number of forest sub-areas that are important for specific products and named either for those products or an early user of the site. More interviews would probably have yielded information about other important areas within the forest.

Internal boundaries (Issue 2 in Box 3) in the forest are generally not observed, since villagers do not stake claims on the forest on an individual or household basis. Villagers maintain that the forest is part of their common heritage.

- Binkohomba is located throughout the forest on skeletal soils. "Kodi gala" is a favoured collecting site as deer eat the leaves at lower elevation sites.
- Gal-siyambala is also located below rock outcrops throughout the forest, but users tend to collect from areas closest to residence.

In more sophisticated forest management systems, use patterns may grow more formalised as boundaries become mutually recognised by neighbouring groups. The boundaries then define a number of users who share rights of access to that set of sub-areas as a forest user group. As observed by Uphoff (1992) and Ostrom (1990; 1994), when user groups are not clearly defined and boundaries overlap, the system is weak.

40. To a great extent, wild elephants remain on their traditional paths when crossing the non-forested land. The local people tend to avoid the Alimankadas from sunset onwards due to the risk of attack.

Table 15: Patterns of Use for by Ritigala Forest Users (refer to Figure 6)⁴¹.

Number of site ⁴²	Local name of site (if given)	Products collected	Primary village(s) using site
1	wewal tenna	<i>Calamus</i> sp. (rattan)	Kiriyagaswewa, Galapitagala
2	ausadah kanda	medicinals	Kiriyagaswewa, Muriyakadawala, Moragoda (site west of ridge)
3	una kanda	bamboo	Kiriyagaswewa
4	andia	kanda	Kiriyagaswewa
5	kitul hinna	<i>Caryota urens</i> sap (toddy)	Kiriyagaswewa
6	pataliya hinna	fibres	Kiriyagaswewa
7	kodi gala, pallattiuru kanda	binkhomba, mango (<i>Mangifera zeylanica</i>), bamboo <i>Calamus</i> sp.	Kiriyagaswewa, Muriyakadawala, Alagollewa Muriyakadawala, Alogollewa
9		<i>Cariota urens</i> , <i>Garcinia</i> sp.	Muriyakadawala, Alogollewa
10	na bokha	<i>Mesua ferrea</i>	Muriyakadawala, Galapitagala
11		halmilla trees	Muriyakadawala, Moragoda, Galapitagala
12	halmilla kele	halmilla trees	Alagollewa
13	karamba hinna	<i>Carissa spinarum</i>	Alagollewa
14	bet lali wele kanda ⁴³	medicinals	Alagollewa
15	ruk atamba wala	atamba (<i>Mangifera zeylanica</i>)	Alogollewa
16	tituvel palasa	fibres	Alogollewa
17		bamboo	Alogollewa, Galapitagala
18		kaluwara (ebony)	Moragoda
19	area cleared of timber by contractors in 1935	mora (<i>Dimocarpus longana</i>), gal-syambala (<i>Dialium oroideum</i>)	Moragoda
20	etamba gaha ela	atamba (<i>Mangifera zeylanica</i>)	Galapitagala
21	kadam wala	hunting (waterhole)	Galapitagala

Note: Honeycombs are distributed throughout the forest, commonly in dead tree hollows.

Without a clear indication of social and geographical patterns of use, exclusive usufruct rights are hard to define. Further, the users' stake in a particular sub-area for protection and

41. Based on limited data from informal group discussion in five forest-adjacent villages: Kiriyagaswewa, Muriakadawala, Alogollewa, Moregoda and Galapitagala; should be considered indicative only.

42. See Figure 6: Participatory map showing patterns of use by Ritigala Forest User Groups.

43. Name given after the name of a local traditional herbalist, some 40 years ago.

management is weakened, and consequently, their incentive to devote time to more sophisticated management lessens. In Ritigala, despite the lack of recognition of internal boundaries, current use patterns could form the basis for a more sophisticated management system (this prospect is discussed further in Section 5).

Use rights

Use rights and patterns are often based either on residency or kinship (Fisher, 1989). The survey team concluded that use patterns were strongly residence-based — that users tend to go to areas of the forest to gather products that are close to their home village, although there was evidence of collecting in areas further from home when products were located only in those areas. The forest users from Muriyakadawala and Alagollewa, for example, stated that "for convenience" they tended to stay mainly on the western side of the forest. The Kiriyagaswewa users correspondingly tended to stay on the eastern side of the forest. Occasionally users would travel to the other side, and this was considered acceptable under the current use rights regime. This pattern of use is common in indigenous management systems in many parts of the world, such as in Nepal (Gilmour, 1990) and Cameroon (Nurse, McKay, Young and Asanga, 1994).

Another factor in use patterns is a collector's desire to return home before nightfall to minimise the risk of encountering elephants. This desire to return within one day can also be considered an indication of a residence-based use pattern (Gilmour, 1990). Such use patterns could conceivably be used as a basis for more formal boundaries between village-based collection groups.

Recognition of intrusion by outsiders

Villagers mentioned occasions when outsiders (people not from the surrounding villages) came to collect forest products. In one case, three people from Colombo came to collect binkohomba in January to February. Although these visits were irregular, one stay (lasting seven to ten days) allowed the outside collectors to gather Rps. 4000 worth of plants (roughly 82 US\$). The villagers refrained from prohibiting collection by these outsiders, despite the fact that they were outraged by their actions.

Another example of outside interference brought a different response, however. According to a villager in Muriakadawala: [About five years ago] binkohomba was stolen by a group of outsiders from Kurunegala [40 km from Kandy]. The villagers

told them to leave, and that the forest resources were protected [by the local villagers]. These outsiders have not returned.

Defining user group membership

While non-timber forest product collectors from the ten forest-adjacent villages recognise their usufruct rights, those from the "Vedda" communities of KiriyaGaswewa and Muriyakadawala appear to defend these rights more strongly. According to these indigenous collectors, collectors from the Muslim communities (such as Bamunagama and Utipitia) do not observe any harvesting guidelines when they go to the forest. When in the forest, the Muslim and Sinhalese groups do not join common gathering groups. It did not appear, however, that Vedda communities have tried to influence Muslim collectors to harvest differently.

As most forest products are still considered to be in abundance, there appears to be little interest on the part of users to make decisions that may change their simple management arrangements. Collector groups do meet to share resources, but the participatory map (see Figure 6) indicates no internal boundaries within the forest that might suggest the existence of sub-group enclosures utilised by smaller user groups. Once users judge that difficulties in resource collection are sufficient to threaten livelihood, through resource scarcity or conflict, for example, it is likely that they will decide to form smaller user groups and negotiate internal boundaries within the forest.

Analysis: Open access use of forests or a common property management regime?

Runge (1992) provides a useful discussion of some of the important distinctions in the ways that natural resources are viewed and treated by villagers in situations such as those which prevail at Ritigala.

In much of the developing world, common property provides a complex system of norms and conventions for regulating individual rights to use a variety of natural resources, including forests, range, and water... As an institution, common property is to be distinguished from free and open access, where there are no rules regulating individual use rights. Often, what appears to the outside observer to be open access may involve tacit cooperation by individual users according to a complex set of rules specifying rights of joint use. This is common property...(Runge, 1992:17-19).

There is evidence of common property management of the forests in Ritigala. First, there is a significant oral history of the forest. Second, there is indigenous knowledge as well as management norms or practices described for many products. This would suggest that the forest is governed by a common property management regime, since the norms protect regeneration and young stock. These norms form the basis for "institutions" according to Fisher's criteria (Fisher, 1991a, Fisher, 1991b). Third, these elements contribute to a locally recognised management system, which is adhered to mainly through a strong sense of mutual obligation, rather than because of sanctions. Fourth, there is a common practice of ensuring equity in sharing the benefits of products collected. Fifth, there is a strong sense of ownership and right to use the forest on the part of certain villages. This sense of ownership has ancient origins, and has been passed down to the descendants of hunter-gatherer groups living in the area. It was evident when outsiders come to collect forest products. It is now worth exploring this sense of ownership further, as it affects the relationship between non-timber forest product collectors and the state. This relationship is discussed in Section 5.

5 | The Potential for Sustainable Management of Ritigala's Forests

This section will explore the state's management responsibilities, the relationship between non-timber forest product collectors and the state, the current management status, and prospects for future management arrangements (which may involve villagers and the government working in collaboration). The existing legal and policy framework in Sri Lanka is discussed briefly. In conclusion, recommendations are made for future management of forest resources at Ritigala.

State responsibilities

In Sri Lanka, all natural forest is owned by the state and managed by different state agencies and departments. Under the Fauna and Flora Protection Ordinance (1937, amended by the Fauna and Flora Amendment Act of 1993), a series of national parks, strict natural reserves, nature reserves, and sanctuaries were declared. Approximately 8,700 sq. km of forests are protected by the Department of Wildlife Conservation (DWLC⁴⁴). Other remaining forests are categorised as forest reserves, proposed forest reserves, and other state forests, which along with the protected areas add up to over 20 percent of the country's land area. The Forest Department (FD) is responsible for the management of all existing and proposed forest reserves. The largest other state forests are administered by the FD, while the smaller ones are under the management of Divisional Secretaries (IUCN-Sri Lanka, 1995b).

Throughout Sri Lanka, the DWLC and FD have largely adopted an enforcement attitude towards management. Until recently, the prevalent attitude was that communities living around forests and other ecosystems were threats. The most common

44. The DWLC is charged with the responsibility for the scientific management of Sri Lanka's rich wildlife heritage. The Department has recently developed a new national wildlife policy, which was endorsed by the Government, and which outlines the responsibilities of the Department and clarifies the objectives of wildlife conservation and management in Sri Lanka.

interaction between DWLC and FD officers and communities involves poaching or removal of timber without permits (Jayatilake, Pallewatta and Wichramanayake, 1998).

The Department of Wildlife Conservation has management responsibility for Ritigala, but with its limited staffing, it is unable to effectively guard the forest. Incidents similar to that described in the quote below have occurred locally. Villagers noted an increase in timber felling and pit-sawing inside the forest after the boundaries were demarcated (from 1994 to 1995). This was the result of a group of ebony fellers (wielding strong political influence), who managed to bypass all legislative barriers, and whose actions contributed to serious forest degradation. The fact that the state did not resist these powerful and influential people exploiting valuable timber was a disappointment for the villagers.

[While] the authorities always blamed the inadequacy of laws for their failure to punish major offenders who violated the laws, often with political patronage. This attitude of the enforcement agencies has led to the development of major distrust among communities (Jayatilake, Pallewatta and Wichramanayake, 1998:175).

The issue of ownership: The relationship between non-timber forest product collectors and the state

Ritigala forest is located in "Vannikare," a remote area where traditional ways are maintained. These traditions are associated with the forest's sustaining villagers' lives, as was clear from the evidence of households who chose to spend a considerable amount of their time collecting products there (see Section 3). For these people, resource use practices are passed on to succeeding generations and the tradition of forest use is "inherited." This feeling of inheritance and local ownership by the communities was discussed at focus group meetings.

Moragoda was established as a village settlement more than 300 years ago. Since that time, traditional boundaries between settlements and agricultural lands have been recognised. The concept of owning agricultural land differs from the sense of ownership of the forest. According to villagers, there is a feeling of community with respect to the forest — referred to as *ape*

kele (meaning "our forest") — which is considered a shared resource between the forest adjacent communities. Villagers believe that usufruct rights are passed down from one generation of users to the next. The following quote sums up this viewpoint on the tenure status of *ape kele*:

We don't have to talk [further] about our concerns, but the state must be aware of the words of Mihindu Thera (the Buddhist monk, who in 236 BC came to deliver Buddhism). He told King Devanampiyatissa that, "this land belongs to its people and animals, you are only the administrator."

Villagers mentioned a number of actions by the state that have threatened this sense of collective ownership of the forests:

- Timber cutting in 1935 — forest users were angered by harvesting in their forest, but realised that they were powerless to intervene as the contractors had permits from the government;
- Forest Department guards chasing villagers away from the forest in the 1970s;
- Establishment of a Wildlife Conservation post in 1993, with officers maintaining a permanent presence and imposing sanctions on villagers; and
- Demarcation of the forest boundary of the Strict Natural Reserve in 1994 by DWLC Officers. Brightly painted concrete poles were positioned along the boundary and signs were posted displaying the following message: "Entry into the reserve, hunting, setting fire, and forest clearance are completely prohibited without permission."

Conflict of interests are apparent, since villagers will not accept strict enforcement of the reserve demarcation and the Department of Wildlife Conservation will continue to have insufficient policing capacity to protect the reserve from local use. For instance, the Ihala-karambewa and Kiriya-gas-wewa tanks (which are part of the Natural Reserve) are used daily for bathing and washing, while the "pitiya" lands of the adjoining tanks are still used for grazing. It would be extremely difficult for the state to prohibit these uses because the tanks are part of village life. The complete exclusion of inhabitants from these adjacent lands could lead to unresolved conflicts between Wildlife Officers and local inhabitants.

Nonetheless, the current status quo, with management authorities tolerating "illegal" harvesting of forest products,

could easily change if a stronger emphasis on protection comes about. This gives rise to a sense of unease between the villagers (who see the Wildlife Officers as opposing their traditional uses and rights) and the management authorities, and can be exploited easily by the latter in an effort to "control" the former. More importantly, the tension makes it difficult for the two sides to engage in an open discussion about ensuring the future integrity of the forest while still allowing a certain degree of utilisation on a sustainable basis.

The perception that people are a threat to the surrounding natural resources and wildlife officers are hostile to villagers has to change if local people are to be involved in effective conservation and management of forests. A more realistic, adaptable and functional strategy is needed. A positive way forward would be for an NGO to provide support in breaking down the barriers that exist between the officers and local communities, establishing and strengthening a rapport between them, and increasing the ability of local people to manage traditional forest use in a cooperative and sustainable manner. Building up mutual trust between wildlife officers and villagers is an essential first step for villagers participating in forest management.

Current management status

While the law⁴⁵ does not permit any access by villagers within the boundaries of the reserve, there is de facto access; villagers are allowed into the reserve to collect non-timber forest products (and timber) for household use and the local market. Although villagers are legally prohibited from managing the forest, they remain users of it. The reason that wildlife officers allow people to use the forest for non-timber extraction is possibly because they think that local use is not detrimental, and because their mandate is to restrict hunting. However, there have been a few cases where local people were taken to court after they were caught in the forest cutting stakes (used to support crops). This reflects the tension between legislation⁴⁶ (not always enforced) and local acceptance of customary rights.

45. It is evident that a considerable quantity of products is harvested on a regular basis, even though such harvesting is, in the strict interpretation of the law, illegal.

46. In Sri Lanka, several Supreme Court judgements have refused to recognise traditional communal ownership of natural resources and have clearly demonstrated an aversion to excluding "outsiders" from using these resources (Nanayakkara, 1996). The fact that communities do not have the legal right to exclude outsiders is a major constraint to the sustainability of co-management efforts (DeCosse and Jayawickrama, 1998).

Villagers living adjacent to the forest have traditionally used the forest⁴⁷ to meet their needs. If plans to conserve the forest are to succeed, it seems essential that villagers be allowed to use the forest for purposes that are essential to them and not destructive of the forest. As long as there are management practices in place to encourage sustainable use,⁴⁸ villagers ought to be legally permitted to collect forest products.

In Ritigala, a strong indication of interdependence is clear: the villagers base a significant part of their livelihood on the forest and the forest could be effectively managed with the active collaboration of the villagers. This interdependence has been acknowledged — it should now be accepted and legalised, by encouraging the current users to become joint managers of the forest. Important forest product collectors could take responsibility for forest management because they are knowledgeable about all aspects of the forest. Without their cooperation it would be difficult, if not impossible, to implement a programme for forest conservation.

Local communities often lack opportunities and incentives to participate in the sustainable use of natural resources. Villagers will not actively participate on a sustained basis unless they derive some benefit. In cases where access rights are granted, villagers conserve resources because they have a vested interest in the long-term sustainability of them (Pimbert and Pretty, 1995; Western and Wright, 1994; Gilmour and Fisher, 1991). According to de Beer and McDermott, extractive reserves, community forestry, and other forms of community management of forest resources share one aspect:

[all] have in common... the fact that community rights to the forest resource are formalised and legally enshrined and thereby provide a basis for their defense against encroachment and a sound incentive for sustainable management (de Beer and McDermott, 1996:125).

Usufruct or customary rights should be recognised and made legitimate; it is increasingly recognised that without the active involvement of forest-dwelling communities and, consequently, without respecting traditional tenure, forest conservation efforts are doomed to fail. Very often, the best incentive for sustainable management of forests is a long-term guarantee of harvesting

47. They consider this as a right, a consideration strengthened by actions such as the regularisation of almost all encroachments in the past.

48. We could not analyse sustainability in the limited amount of time.

benefits through the allowing of access rights (Caldecott, 1988). Vesting ownership or management control of forests in the communities that inhabit or surround them provides this incentive.

Forest management by traditional forest dwellers in particular is strengthened on the grounds of both their ethical entitlement to the forest and their culturally-embodied knowledge regarding the nature, location, management and use of its resources. For all rural communities in forest areas, the guarantee of some long-term interest in the forest would seem necessary given their proximity to the resource, their dependence on it and the resultant difficulty of excluding them (de Beer and McDermott, 1996:124).

Policy Framework for Community Involvement

According to DeCosse and Jayawickrama, policy makers at the DWLC and FD have been slow to incorporate the bottom-up approach into their policies and plans, though they are beginning to recognise its importance. The authors contend that: The National Forest Policy (NFP) and Forestry Sector Master Plan (FSMP), both adopted in 1995, constitute the first coherent, long-term framework for forest development in Sri Lanka, and are a far cry from the production and regulation-oriented "keep people out" approach reflected in previous forest laws and policies (DeCosse and Jayawickrama, 1998:202).

For example, the National Forest Policy acknowledges that the government has not been effective in managing all forest lands and that local communities do not have the rights and incentives to use forests sustainably. This policy suggests that, in the protection and management of natural forests and forest plantations, the state "will, where appropriate, form partnerships with local people, rural communities, and other stakeholders, and introduce appropriate tenurial arrangements" (Forestry Planning Unit, 1995). Likewise, the Forest Sector Master Plan identifies security of tenure as one of the most important incentives for sustainable forest management.

In the area of wildlife and protected area management, an analysis in 1998 found that existing DWLC policies emphasised

enforcement of regulations to exclude people from PAs and provided little encouragement for collaborating with local communities (DeCosse and Jayawickrama, 1998). There have been recent attempts to comprehensively review and revise the existing policy and planning framework. The wildlife policy was revised in 1999, recognising collaborative management as a policy goal; however, legal provisions needed to make this a reality are still not in place.

The potential for collaborative forest management

State control of protected areas through enforcement alone is not practical or financially viable. However, there are many aspects to investigate when making a preliminary evaluation of the suitability of a collaborative management approach - much depends on the nature of the locally resident population and their connection to, and use of, the forest. The extent and nature of forest dependence are important factors in deciding whether or not a collaborative management approach is likely to be successful. These are some of the key elements which may affect the success of collaborative management:

- a large proportion of the population is heavily dependent on the forest;
- dependence on the forest is culturally linked;
- there is some level of dependence on the forest for income generation; and/or
- there is unlikely to be significant reduction in forest dependence in the future (Scott, 1998).

It appears that all of these elements are present in Ritigala. Therefore, it would be helpful to be able to distinguish further between household users in terms of their participation in forest activities - to be able to categorise which users are very dependent on the forests and which of them draw on forests indirectly - in order to identify which groups to target for joint management.

There are few examples⁴⁹ of joint management of forest resources in Sri Lanka. However, several management plans recently developed for forests and protected areas have potential. Of the management plans for nine conservation forests in the wet zone, seven include detailed strategies for engaging local communities in resource-management activities. The state needs to build on indigenous practices and create

49. Emerging examples are at Knuckles, Kalugala forest, where a small community of 12 families inside the forest harvest Caryota and medicinals; and at Adam's Peak, Waleboda, also based on Caryota tappers (A.Wickramasinghe, 1995b).

collaborative management systems in order to conserve Sri Lanka's remaining natural heritage.

The Forestry Sector Master Plan (FSMP 1995) prescribes local participation in the management of protected areas for non-timber forest products, soil and water conservation, and the protection of biodiversity (see for example, pages 67, 69 and 70). Although the NFP and the FSMP both provide a very supportive framework for co-management, they include little detail on how the relevant policies and plans are to be implemented. It would therefore be useful to establish pilot projects that show the opportunity to develop a partnership between government and communities. The aim of this partnership would be to improve the livelihoods of forest-adjacent communities and maintain or enhance the ecological integrity of the forest in perpetuity. Ritigala is an appropriate site for such a project, but its designation as a Strict Nature Reserve may need to be reconsidered. Table 16 covers key features of institutional sustainability of the current user group.

Successful collaborative forest management derives from the potential of an existing common property management regime to protect the forest resource while satisfying villagers' livelihood requirements. In countries such as Nepal and India, this has been accomplished by handing over control of and responsibility for the management of forests to local communities' forest user groups (see Gilmour, 1990; Fisher, 1991a; Fisher, 1991b; Fisher, 1989). While this may not happen in Sri Lanka, the study found a number of key positive factors that could contribute to collaborative management:

- The users have a strong sense of community and a desire to retain the forest commons;
- There is recognition of customary use though local usufruct rights. Practices concerning use rights have been and continue to be handed down from one generation to the next;
- The users have simple, enforceable norms and practices which are upheld by a sense of mutual obligation within the gatherer groups⁵⁰; and
- There are equitable and fair benefit distribution arrangements, with no significant household or inter-village disputes over resource rights.

There are a number of problems, however. The most pressing of

50. As collecting is a group activity, individual actions are witnessed by other members of the gatherer group. This simplifies monitoring requirements.

them would make a transition to a collaborative management scheme difficult:

- There is some uncertainty about how to handle gatherers from outside;
- Currently simple rules protect regeneration and most growing stock, but more sophisticated silviculture (based on participatory monitoring) would be required to ensure ecosystem health;
- There are no other supporting institutions that can provide independent guidance to a forest user group in partnership with the state. Such supporting institutions, as federations of user groups or other development-oriented NGOs are considered essential for the long-term sustainability of collaborative forest management (Hobley, 1996);
- The relationship between the users and the state is not well defined, and has contributed to a weak sense of ownership in the current users; and
- There appear to be few organizational elements⁵¹ to the current management system.

Table 16: Summary of Key Features in Institutional Sustainability of the Ritigala Forest User Group⁵²

Category	Issue	Analysis of Ritigala Forest User Group	Sustainability Index ⁵³
1. User Group	Size	Large (1099 households)	0 ⁵⁴
	Mutually agreed membership?	Yes, all households in the 10 peripheral village settlements	1
	Are boundaries well defined?	Yes, for the entire forest. However, no internal boundaries are recognised, although most use is residence dependent.	1
	Desire to retain the commons (rather than sub-group enclosures or private property)	High	1

51. For example, there is no clear identification of user group(s), or sub-enclosures within the forest that might form the basis of a number of separate forest user groups.
52. Based on limited data from informal group meetings in five villages, so should be considered indicative only.
53. An index that judges the sustainability of the user group and the resource in institutional and ecological terms. 0 = problem area needing further investigation and/or intervention; 1 - moderately sustainable, but may require monitoring to assess future needs for intervention, 2 = likely to be sustainable without intervention.
54. Large groups (more than 30-40 members) are likely to fail in the long term (Hobley and Shah, 1996).

	Existing arrangements for discussion of common problems	Institutions emerging in some villages. Arrangements exist for other resources (e.g. the tank)	1
	Extent to which users are bound by mutual obligations?	Strong within the gatherer groups	2
	Sense of ownership	Weak, as ownership has been transferred to the state	0
	Sense of community	Strong sense of community identity within villages	2
	Recognition of customary use rights ('sense of inheritance')	Strong consensus. Usufruct rights are transferred through generations	2
	Transfer of knowledge	Good, through generations, orally	2
	Benefit sharing	Equitable and fair. No disputes	2
	Decision making	Only within gatherer groups (6-10 users) to identify areas for harvesting. Gatherer leaders recognised at village level. Village level fora for decision making are emerging	1
2. Resource management rules	General status of rules	Simple, unambiguous and easily enforceable	1
	Do rules encourage sustainable management?	Simple rules protect regeneration and young stock, though not overexploitation	1
	Can the user group amend the rules in response to changes in the resource or the economic environment?	No, as there is no forum for decision making for the whole group	0
	Are there sanctions?	Yes, but they are generally weakly developed, as there have never been disputes or conflict. Sanctions (usually against outsiders) are mostly enforced by the state	1
3. Relationship between resources and the user group	Location base?	Yes, only forest adjacent communities have rights	2
	Forest area/household	1.4 ha/household. Small, but no resources in shortage (sic)	1
	Trees on private land?	Home gardens generally have non forest species. Timber trees are planted on boundaries	1

	Level of demand	High, though resources are reportedly being sustained	1
	Need for the resource	Vital for subsistence and income generation	2
	User's knowledge of sustainable yields	Moderate for harvested products ⁵⁵	1
	Do users monitor the resource condition?	No, an assessment may be made at the time of harvesting	1
4. Authority and enforcement	Are roles of government and users clearly defined and agreed?	No. The state has control. Most user group activities are tolerated but illegal.	0
	Have mechanisms been defined for mediation and conflict resolution within the user group?	No, there has never been any conflict within the user group.	1
5. Nested Enterprises	Are there other supporting institutions?	None known.	0

Sources for categories and issues include Hobley and Shah (1996), Ingles and Inglis (1995)

Likely scenarios and risks

There are several scenarios for the future management of forests in Ritigala. These include: a) increased protection which disempowers locals and makes collaborative management more difficult to achieve or b) further relaxation of controls by government without targeted assistance to villagers, which could lead to a free-for-all if outsiders took advantage of the situation by heavily exploiting forest resources. The problems inherent in either of these scenarios include the sustainability and institutional risks highlighted in the questions posed in Table 16. A third scenario would be to lay the groundwork for collaborative management of forests in Ritigala.

Recent literature on the practice of community-based conservation in Sri Lanka from Jayatilake, Pallewatta and Wichramanayake (1998) provides some guidance. Three general recommendations are made. First, the government should facilitate the formation of partnerships among local authorities, community organisations, and private sector entities. Second, as there is still some resistance among government officials towards people's involvement, re-orientation programmes for natural resource management staff should be developed "to introduce them to the social dimensions of conservation and

55. No verification was possible of information on the sustainability of timber harvesting or hunting.

make them aware of people's aspirations" (Jayatilake, Pallewatta and Wichramanayake, 1998:187). Third, pilot programmes are needed to give greater attention to the issue of community ownership as well as social, economic and ecological sustainability during implementation.

A pilot project could form the basis for a collaborative management initiative between the state and the villagers in Ritigala. It could consist of a few integrated policy and participation components, which would be undertaken by adopting a learning-by-doing approach. First and foremost, the pilot project should further develop the role of the local communities in the conservation of the forest in perpetuity, through a partnership with the state (the Departments of Wildlife and Conservation and Forests). The state may wish to obtain support from a donor organization to undertake this activity. The pilot project could examine the current condition of the forest by developing, in partnership with local communities, a biophysical monitoring system that is simple, robust, participatory, and sustainable. This component of the project would seek to monitor the resource, particularly the impact of local forest use, and use the information gained to provide advice to user groups on improved ecologically sustainable forest management. A significant focus of the monitoring role might be the documentation of local medicinal knowledge and the promotion of this knowledge.

We suggest that the pilot project considers three components: one that differentiates forest users and species of conservation concern, one that focuses on bottom-up planning and institutional strengthening, and one that monitors institutional development. A brief discussion of these components follows.

Pilot Project Component 1: Differentiating Forest Users and Species of Conservation Concern

For future work on collaborative management, it would be useful to be able to distinguish between household users in terms of their participation in forest activities. This could be done in a number of different ways. One way, proposed by Byron and Arnold, (Byron and Arnold, 1997) would be to categorise which users are very dependent on the forests (such as hunter-gatherers, shifting cultivators, farmers), those who periodically draw on inputs from the nearby forest, and those who draw on forests indirectly (by consuming fuelwood or medicinal plants). Once different types of users are categorised, then the more forest-dependent user groups could be targeted for joint management.

For hunter-gatherers and shifting cultivators, forests provide their main source of livelihood and usually have great cultural importance. Any change in the extent and quality of the forest, or in access to traditional forest areas, is likely to be very disruptive of traditional use and activity patterns (Byron and Arnold, 1997). Farming communities tend to draw on the forest for inputs that cannot be produced on-farm or that can be efficiently obtained from off-farm resources. Within this category, there is a difference between wealthier farmers and landowners (who may benefit from marketing forest products) and poor farmers and landless families (who tend to use the forest as a buffer in hard times). The third category of users (artisans, traders and small enterprise entrepreneurs) make their livelihoods from commercial activities based on forest products. Table 17 spells out the criteria for assessing the importance of and degree of reliance on forest outputs.

Table 17: Assessing the importance of/degree of reliance on forest outputs

Criterion	Indicator	Example
Participation in Forest Output Activity (labour allocation)	Year round	Forest use and management is a full-time activity (e.g. carpenter, trader, employee) or a continuous part-time component of household activities
	Periodic	To fill seasonal gaps or to exploit seasonal availability
	Temporary	By new farmers establishing farms
	Occasional	Forests are a buffer in hard times, meeting one-off costs (like weddings)
Role in system	Central-fundamental	Forest-dwelling hunter-gatherer and livelihood subsistence (true shifting cultivation) populations
	Major-important	Forests provide a substantial share of household inputs, an important supplementary role (seasonal income, dietary inputs), and/or are a basis for livelihood enhancement (e.g. more profitable activity)
	Minor, but significant	Forest products improve the palatability of diets, and/or opportunities/a windfall source of inputs/income
	Risk limitation	Forests act as a subsistence and economic buffer in hard times, as a safety net/last resort source of income, and diversify the household input base

	Declining	Items falling out of household consumption patterns, unprofitable activities being abandoned as better alternatives become available
Impact of reduced access to forests	Critical	Threatens the existence of a community in its present form
	Severe	Causes serious worsening of livelihood situation at least temporarily; e.g. in availability of subsistence forest foods, availability of income opportunities, in time of shocks and stresses/when a major activity is based on a forest based raw material
	Modest (transitional)	Can switch to a source outside the forest (bush, fallow, etc.) or can substitute a forest based activity/product
	Minimal/none	Users already moving away from involvement with forest products, e.g. products are no longer competitive or better alternatives are now available
Likely future importance of forest outputs	Could increase (or at least stay as important as at present)	There are no better options for income (low skill, stagnant economy) or there is a depletion of non-forest raw material and/or "dependence" on forest products
	Changes in structure use concentrated	There is growth in the use of selected products (providing opportunities for on fewer products using others); or domesticated and non-forest resources become more important
	Declining, but still important as buffer	In the earlier yet unstable stages of evolution to a higher income, the forest acts more as emergency relief, however avoidance measures are still not adequate
	Not important	Users phasing out (most) forest product activities, due to lack of demand for many forest products, - forest sources may no longer be competitive, domesticated sources or substitutes may be available, or better livelihood alternatives.

Source: Based on Byron and Arnold, 1997:9

In regard to collaborative management, the future importance of forest products will likely be linked to the issue of sustainability. For example, devolution of responsibility for forest management to local communities would not make sense in circumstances where the importance of forest products is likely to decline. The most important target groups are those for whom forests continue to be central to livelihood systems; in such cases local people are or should be principal stakeholders

in forest areas. Meeting their needs is likely to be the principal objective of forest management, and control and tenure arrangements should be centred on them.

For other groups, forest products play an important supplementary role; users need security of access to resources, but are often not the only users in that forest area. In this case forest management and control is likely to be based on resource-sharing arrangements among several stakeholder groups. There is a third type of user for whom forest products play an important role but are more effectively supplied from non-forest sources, such as planting forest species near the home (Byron and Arnold, 1997). These different types of users were apparent from initial field work in Ritigala.

An alternative way to distinguish users is suggested by DeCosse and Jayawickrama (1998) who propose four primary types of relationships between people and forests (these four types were briefly analysed with respect to their implications for co-management).

The first category is where the community **realises little or no value from the resource**, in spite of living next to it. In such cases, co-management is not an appropriate approach since the community has little incentive (apart perhaps from an emotional attachment to or reverence for the resource) to ensure that it is managed sustainably. To the extent that resource degradation occurs, it is likely the result of actions by outsiders. Resource management plans should therefore focus on this group rather than the community.

The second type of relationship is where a **significant benefit or cost of the resource is realized by only a few members** of the community. In such a case, co-management is not likely to be appropriate, since it implies involvement by all or most members of the community. DeCosse and Jayawickrama suggest that:

If the members of the community who benefit from the resource can be identified, then it may be sufficient to train or educate these few in sustainable resource management methods to ensure better management of the resource (DeCosse and Jayawickrama, 1998:196).

The third type is where the **benefits or costs derived from the resource are small, but are widely distributed** across the

community. In this case, community-based co-management has great potential for success, because nearly everyone can gain. Even when the value of forest products is not great, the communities recognise that the forest gives them something they cannot get elsewhere.

The fourth type of relationship **exists when a significant cost or benefit of the resource is realized by a broad cross-section of the community**. Here the opportunity for community-based co-management is very good, since the entire community has a large stake. For instance,

When the community has a strong sense of its relationship to the resource, including some established social rules for resource management, then the opportunity to establish private communal ownership may be good. Introduction of alternative income generation activities should be done only with a careful prior assessment of the opportunity costs to the community of giving up use of the resource (DeCosse and Jayawickrama, 1998:196).

Both systems for categorising users (Byron and Arnold and DeCosse and Jayawickrama) are helpful and could be used for future research in Ritigala. However, care is needed to promote joint management or collaborative management, since there are a number of risks. Some of these risks include creating unrealistic expectations in communities, having unintended negative consequences from intervention, or breakdown of existing indigenous systems.

Just as it is useful to target user groups, it is also important to identify the sustainability of various forest product species to determine which of them will support continued harvesting. The study was not able to analyse the sustainability of harvesting non-timber forest products; future research would need to explore this issue. Scott (1998) suggests a system by which species could be divided into one of three categories: a) those unlikely to constitute a conservation issue, b) species which possibly pose an issue and should be further investigated, and c) those most likely to be a conservation priority and therefore the focus of investigation.

Categories were determined by ranking species from 1 to 4 use values (corresponding to low, intermediate, high and very high). Collection levels of species rated 4 (very high

consumption level, typically greater than 50 trees and or 100 stems per parish per year) were most likely unsustainable. Despite the fact that a biodiversity inventory and land-use mapping exercise were conducted in the same study area (Mount Elgon, Uganda) around the same time, links were not made between the studies to determine harvesting levels. Further research is recommended to determine more about species ranking at high and intermediate levels of consumption, by further investigating scientifically determined sustainable harvesting levels for each species.

Pilot Project Component 2: Bottom-up planning and institutional strengthening

Another component of the pilot project may be development of bottom-up processes in government, through institutional strengthening that supports policy, legal, and institutional reform to enable collaborative management.

As one of important factors in Table 16 was group membership, and as internal boundaries in Ritigala SNR are not well recognised, another purpose of the pilot project could be the careful development of appropriate nested enterprises⁵⁶ (generally small groups linked together in a larger network) at local and regional and national levels to enable pluralistic planning⁵⁷ and strengthen the autonomy of local institutions. One possible alternative is the Ritigala-based NGO called RITICO⁵⁸, which coordinates conservation, collection, processing, and ex-situ cultivation of certain non-timber forest products, especially medicinal plants.

Pilot Project Component 3: Monitoring institutional development

The project could develop a system, in partnership with local communities, to monitor the institutional aspects of the forest user group (or groups and/or representative organisations such as committees). A major task would be to investigate and consider mitigation to address areas of critical weakness as outlined earlier in this section.

56. Nested enterprises would allow for small groups to make effective decisions on resource use, and representatives of each enterprise/community could meet periodically to coordinate and monitor activities.

57. Pluralistic planning is based on the genuine involvement of local communities in policy reform and national level decision making, discussed in Sheri, Cassels and Gilmour, 1994.

58. While this NGO has been active for past few years, this report did not contain an analysis of its current activities. Future work could explore the issues of joint forest management with RITICO.

Collaborative Management Activities Near Ritigala Since 1996⁵⁹

In the 1800s, Sri Lanka was almost entirely covered by natural forest. By the 1990s, however, forest cover had declined to 24 percent. Planned and unplanned agricultural production has increased at the expense of forest cover. Since the early 1970s, in response to loss of forest cover, the government has implemented reforestation programmes. A programme of enforcement has also been practised, in response to encroachment of forested areas (often traditional chena lands) and illegal timber extraction from state forests. The protection and enforcement programmes have not resulted in fully effective forest conservation or management (Nurse and Hitinayake, 2001).

Of the remaining dry zone forests, especially lowland forests, almost all have been cleared for chena cultivation and village settlement. Very little lowland forest remains. Much is seriously degraded ecologically, and consists of scrub forests (about five m in height) with very little timber value, mainly used as grazing land for free range cattle owned by farmers in the area. However, remnants of some of the midland forests are still found on isolated scattered mountains of the dry zone (known as "island forests"). Although the canopy is relatively intact, there are usually no large trees of high value timber species because they have been illegally felled (Nurse and Hitinayake, 2001). Ritigala is one of the few remaining examples of dry zone island forests.

Recent experiences in Sri Lanka strengthen the possibilities of successful collaborative management approaches in the dry zone. As the Forest and Wildlife departments recognise that forest resources are depleting, they (particularly the Forest Department) become more interested in collaborative management approaches.

59. This postscript was prepared by Mike Nurse on 31 January, 2001.

For some time, it has been widely known that the Sri Lankan home garden system is extremely sophisticated, combining agricultural crops, fruit, and multipurpose tree species to make the best use of land close to the homestead. It is also understood that remnant natural forest helps provide timber and non-timber forest products for homesteads. To date, however, there have been no successful examples of collaborative management of these common pool resources, despite the existence of indigenous knowledge being applied to home gardens on private land.

There are several examples of indigenous institutions (e.g. the death donation and temple societies) and externally sponsored institutions (e.g. supported by government agencies and NGOs) in villages⁶⁰. Many of the indigenous institutions are inactive, however.

There are several options for institutional partnerships at the village level. Few of the possibilities for linking indigenous institutions or organisations in the village have been explored by external agencies, either government or non-government. This apparent failure to utilise the strengths provided by existing village-based institutions has led to problems in the sustainability of external interventions to date.

It is clear that participatory approaches work but have been difficult to get underway in Sri Lanka. There are many reasons for this. Foremost is the fact that a fully sustainable participatory approach has yet to be tried. Many previous project approaches have been "top down," based on blueprint plans with targets, and linked to traditional extension activities. The IFAD/GTZ Dry Zone Participatory Development Project (DZPDP), for example, in Kurunegala District, has been successful in developing technologies that are technically appropriate and socially acceptable, and an extension approach that is fully participatory; however, as it draws to a close, it is apparent that the project has difficulties with respect to institutional sustainability.

The study in Ritigala documents an example of indigenous management. If this situation is common in the rural areas of the dry zone (and indications are that it is) then there is strong

60. Indigenous institutions are those that developed internally within the village, without external support. Sponsored institutions are those that are formed with external support within the village, e.g. by a government agency or project. Many co-management schemes work through use of indigenous institutions.

potential to establish a partnership with the Forest and Wildlife Departments for collaborative management.

Two developments since the Ritigala study give good reason to be optimistic about the future of forest conservation and management in Sri Lanka. First is the discovery of other latent indigenous institutions for forest management at the village level, which could provide a basis for sustainable institutional support to rural farmers in the dry zone. The second is the current enthusiasm at the most senior levels in the Forest Department for collaborative management and for a pilot project approach.

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Annex 1 Survey Procedure and Methodology

The core research team consisted of the principal investigator (a geographer), three botanists, a geographer, and an economist. Occasional visits were made by an ecologist, a resource economist, and a participatory rural appraisal specialist. Research proceeded in the following stages:

1) Preparatory work

Preliminary discussions were held to familiarise the research team members with the objectives of the study. Research team members conducted a review of current map sources and secondary material available on Ritigala Forest.

2) Preliminary visit

An effort was made from the start to develop a good rapport between the team members and the local people. As a consequence, doubts and suspicions that could have emerged about the intent of the study were minimised. Informal discussions were held spontaneously with villagers about their communities, farmlands, and use of forest products. The villagers displayed a willingness to discuss their experiences, guide the survey team into the forest and surrounding lands, and host them during the field study period.

3) The reconnaissance

A field reconnaissance, or rapid appraisal, was conducted in ten communities adjacent to the forest. This overview of the settlements on the forest periphery allowed for an initial impression of the history of community establishment, community composition, local livelihood strategies, farming systems, forest products collected, and local beliefs and rituals.

4) Selection of communities for detailed investigations

Following the reconnaissance survey, two communities were selected for detailed investigation in order to gather more information on the nature of the people-forest interactions. As the primary aim was to study use of non-timber forest products, communities with strong links to the forest were selected. This was due to their dependence on the forest for livelihoods, their practice of traditional beliefs and rituals related to the forest, and their indigenous knowledge. The two communities selected were Muriyakadawala and Kiriyaaswewa. The research team spent three months living in the villages and interacting with local people on a daily basis. The results from this study period are covered in Section 3. A follow-up visit was made to five villages (including Muriyakadawala and Kiriyaaswewa) in May 1996 to prepare participatory maps and investigate the institutional arrangements for forest management. Discussion of these findings (and the participatory map) is found in Section 4.

Identification of field methods

Based on the experiences gained during the initial few weeks in the field, team members identified appropriate field methods. Field methods varied according to participants and locations. Methods included targeting knowledgeable and experienced villagers, collating records of field observation, enumerating the flow of forest output at forest "gates," and engaging villagers in participatory resource mapping.

Information was sought from individuals, community groups and households at different locations, in farmlands, in the forest, at the market places, or other informal gathering points like water tanks and tea kiosks. A genuine attempt was made to meet individuals or groups while they were engaged in their primary activities. This approach enabled the team to actively combine field observation with group discussions. Team members collected people's first-hand experiences to elucidate points brought up in larger group discussions and validate other sources of information. Data gathered on collection patterns of non-timber forest products, marketing of products, farming, and home maintenance tasks were verified by combining these methods.

Data collection methods

A number of data collection methods were adopted during

the field investigation. These included:

1) Questionnaire

A questionnaire was developed to gather household-based information, since the household was judged to be the place where decisions were made on livelihood strategies. The questionnaire was used to gather information on the following:

- Demographic structure of households;
- Household income, resources, and other measures of wealth (e.g. quality of housing materials);
- Livelihood strategies;
- Patterns of resource allocation;
- Importance of forest to a household's livelihood;
- Access rights to the forest;
- Patterns of forest product collection; and
- Use patterns for common property resources (including village forest, water tanks, and common lands).

2) Focus group discussions

Focus groups were normally organized according to people who share a common use objective, such as binkohomba collectors, women, etc. Focus groups elicited information about non-timber forest products gathering, including periods at which certain products were available, gathered and consumed or marketed. Another similar exercise was undertaken for farming to better understand seasonal patterns, division of farming tasks according to gender, and how farming is combined with forest gathering.

3) Key informant discussions

Based on the preliminary visits, eight individuals from each village were identified as sources of primary information. Informants' knowledge ranged from what they could recall of their ancestors' use of the forest, to their current gathering practices and forest-related rituals.

4) Participatory observation

This information was obtained when research team members followed various group activities. By joining the forest gatherers on their visits to the forest, the team could identify specific collection practices. Researchers also participated as observers of non-forest activities in order to develop household activity profiles relating to farming and household maintenance.

5) Socio-economic profiles and activity ranking

For the more detailed studies of Muriyakadawala and KiriyaGaswewa, villagers contributed to the development of a socio-economic profile at the community level. In addition, economic activities were ranked in order to relate them to a household's income.

6) Participatory mapping

Participatory mapping was used to evaluate the distribution of forest resources and forest use patterns. Group meetings were held with forest users in five of the forest adjacent villages: KiriyaGaswewa, Muriyakadawala, Alogollewa, Moregoda, and Galapitagala. Villagers were asked to draw on a prepared schematic map their entry point to the forest, areas visited, and products collected. Any names of forest sub-areas, patterns of harvesting and rules for collection were also elicited. The resulting participatory map is shown as Figure 6. For a detailed discussion of the methodology for participatory mapping, see Jackson, Nurse and Singh (1994).

7) Key informant's records

Women from two households in each village were asked to maintain diaries, recording the time they spent on daily activities. This task was undertaken to determine how time was allocated by household members to gathering, processing, and marketing non-timber forest products, relative to farming or other household tasks. These records enabled the team to gain a better understanding of the division of labour within households, and complemented other data sources.

8) Gauging non-timber forest products offtake at forest gates

From mid-August to the end of October 1994, the amount of non-timber forest products crossing the Strict Natural Reserve boundary was recorded from four forest gates on the western slope into Muriyakadawala and two forest gates into KiriyaGaswewa.

Annex 2 NTFP Widely used by Villagers

Local Name	Latin Name	Uses
Ankenda	<i>Acronychia pedunculata</i>	Medicinal
Aralu	<i>Terminaliachebula</i>	Medicinal
Ashoka	<i>Saracaindica</i>	Medicinal
Attikka	<i>Ficus racemosa</i>	Medicinal, Fruit, Food
Atamba	<i>MangiferaZeylanica</i>	Medicinal, Fruit
Bakmi	<i>Naucleaorientalis</i>	Medicinal
Bee - honey		Medicinal, Food
Binkohomba	<i>Munronia pumila</i>	Medicinal
Bolpana	<i>Dimorphocalyx glabellus</i>	Medicinal
Bombi	<i>Litsea glutinosa</i>	Medicinal
Burutha	<i>Chloroxylon swietenia</i>	Medicinal,
Damba	<i>Syzygium gardneri</i>	Medicinal, Fruit
Divul	<i>Feronia limonia</i>	Medicinal, Fruit
Dummella	<i>Trichosanthescucumerina</i>	Medicinal, Binding
Ehala	<i>Cassia fistula</i>	Medicinal
Gal-siyambala	<i>Dialium ovoideum</i>	Fruit, Timber, Fuelwood, Medicine
Gas-keliya	<i>Butea monosperma</i>	Medicinal
Gammalu	<i>Pterocarpus marsupium</i>	Medicinal
Goraka	<i>Garcinia tinctoria</i>	Medicinal, Food
Gurulu-raja		Medicinal
Hathawariya	<i>Asparagus racemosus</i>	Medicinal, Food
Hiressa	<i>Cissusquadrangularis</i>	Medicinal
Heenkenda	<i>Xylopia nigricans</i>	Medicinal
Himbutu	<i>Salaciareticulata</i>	Fruit
Hondala	<i>Ademia palmata</i>	Medicinal, Food
Ira-raja	<i>Zeuxine regia</i>	Medicinal
Iramusu	<i>Hemidesmus indicus</i>	Medicinal, Food, Beverage
Jatamansa	<i>Nardostachys jatamansi</i>	Medicinal
Kaduru	<i>Strychnos nux-vomica</i>	Medicinal, Fuelwood
Kandulesa	<i>Drosera indica</i>	Medicinal
Karamba	<i>Carissa spinarum</i>	Fruit
Katu-ala	<i>Dioscoreapentaphylla</i>	Food
Kalu-welangiriya	<i>Capparis horrida</i>	Medicinal

Local Name	Latin Name	Uses
Keliya	<i>Grewia microcos</i>	Medicinal
Kitul	<i>Caryotaurens</i>	Food
Katakela	<i>Bridelia retusa</i>	Medicinal
Kiriwel	<i>Merremia umbellata</i>	Medicinal
Kidaran	<i>Amorphophallus campanulatus</i>	Medicinal, Food
Koon	<i>Schleicheraoleosa</i>	Fruit
Kohomba	<i>Azadirachta indica</i>	Medicinal, Pest control, Mulch
Kuda-hedaya	<i>Lycopodium squarrosum</i>	Medicinal
Kiri-Koon	<i>WalsuraPiscidia</i>	Medicinal
Madan	<i>Syzygium cumini</i>	Medicinal, Fruit
Makaramba	<i>Corissacarandas</i>	Fruit
Mahakenda	<i>Macarangapeltata</i>	Medicinal
Maha-hedaya	<i>Lycopodium phlegmaria</i>	Medicinal
Mee	<i>Madhuca logifolia</i>	Food, Medicinal, Pest control
Mora	<i>Dimocarpus longana</i>	Fruit
Munamal	<i>Mimusops elengi</i>	Medicinal
Miminnan	<i>Trichosanthes cucumerina</i>	Medicinal, Binding
Mavahandi	<i>Euphorbia tirucalli</i>	Medicinal
Niyagala	<i>Gloriosa superba</i>	Medicinal
Panan-beduru	<i>Drynaria sp.</i>	Medicinal
Panam	<i>Drymoglossum piloselloides</i>	Medicinal
Palu	<i>Manilkara hexandra</i>	Medicinal
Pus-wel	<i>Entadaphaseoloides</i>	Medicinal, Binding, Food
Ranawara	<i>Cassiaauriculata</i>	Medicinal, Beverage, Food
Sanda-raja	<i>Zeuxine regia</i>	Medicinal
Siyambala	<i>Tamarindusindica</i>	Medicinal, Fruit
Unabata	<i>Bambusaarundinacea</i>	Binding, Raw material
Wana-raja	variety of <i>Zeuxine sp.</i>	Medicinal
Weera	<i>Drypetes sepiaria</i>	Fruit, Timber, Fuelwood
Wembadanga	<i>Ventilagomaderaspatana</i>	Medicinal (adulterated bee's honey)
Wal-keppettiya	<i>Croton laccifer</i>	Pest control, Mulch

Local Name	Latin Name	Uses
Wewal	<i>Calamus</i> sp.	Binding, Raw material
Watapath-beduru	<i>Asplinium nidus</i>	Medicinal
Yakadawel	<i>Dalbergia pseudo-sissoo</i>	Binding

Dhadamas (Bush meat):

Wildboar	<i>Sus scrofa ceylanicus</i>	Food
Porcupine	<i>Acanthion leucurus</i>	Food
Spotted-deer	<i>Axis ceylonensis</i>	Food
Mouse-deer	<i>Moschiola meminna</i>	Food
Hare	<i>Lepus nigricollis sinhala</i>	Food
Jungle-fowl	<i>Gallus lafayettii</i>	Food
Sambur	<i>Rusa unicolor</i>	Food

Annex 3 Main non-Timber Forest Products

The forests near Ritigala are the source of a wide range of non-timber forest products (Annex 2 lists 74 different species of common use). The most important products gathered include medicinal products, fuelwood, food products (particularly fruits and honey), forest fibre⁶¹, and wild game. A short description of these products follows.

Medicinal products

Local households, local herbal healers, and physicians are the direct users of medicinal products. Over generations, villagers have used forest species to treat ailments and prevent the spread of disease. The practise of indigenous herbal medicine is widespread in the area, with some "prescriptions" derived from local experimentation.

Ritigala benefits from the presence of the famous Horiwila Medical Centre (located six km southeast of the area), which tests medicinal products. In addition, 12 herbal healers live near the forest. All of them use local forest products to treat rheumatism, snake bites, sprains, and fractures. Local contractors regularly supply herbal healers with common medicinal varieties. When an emergency arises, herbal healers send their own collectors to find products from the forest.

All parts of the medicinal plants are used: roots, flowers, buds, climbers and lianas, leaves, twigs, nuts, seeds, barks, resins, and pods. Varieties that can be sold fresh are collected in season, while other species are dried and stored. Certain species, such as pus (*Entada phaseoloides*), kohomba (*Azadirachta indica*) and mee (*Madhuca longifolia*), are collected fresh and their seeds stored for use throughout the year. Prices vary depending on the variety. One of the most sought-after species, with a correspondingly high market value, is binkohomba (*Munronia pumila*).

61. Raw materials to make utensils, mats, baskets, winnowing fans, dividing mats, and furniture.

Binkohomba

Binkohomba plants emerge during the rainy season, from as early as November and December, with the prime harvest season occurring between December and February. Binkohomba is an ancient remedy for high fever and dysentery and is also used to purify the blood. There are two problems related to availability. One is competition from deer, who browse the young plants (binkohomba is widely available at higher altitudes, where deer cannot easily reach). Another problem is extremely low rates of seed production and germination.

Fuelwood

The proportion of forest wood that supplies domestic fuelwood needs ranges between 68 and 86 percent, according to field observations. Forest wood is the most preferred type according to the users, due to its higher burn temperature and the fact that it is less smoky (thus cleaner) to cook with than crop residue. Fuelwood from the forest is also preferred for its larger size; most of the fuelwood in shrubland areas consists of small twigs.

Gatherers split the dead wood inside the forest. Actual gathering time is short, relative to the tasks of splitting and carrying (which takes about 60-80 percent of the total collection time). Once split, bundles of wood are brought out of the forest in headloads.

Food products

Oils

Traditionally, oil is extracted from mee and kohomba seeds. Mee oil is used for cooking and medicinal purposes, whereas kohomba oil is not edible and is only used for medicinal purposes. Despite widespread knowledge of the oil extraction process, it is not common, since it is so time-intensive⁶². Seeds are typically sold to local dealers or taken to Dambulla for sale at market. Fresh seeds are widely sought after by traditional herbalists.

Fruits

The most widely available varieties of fruit-producing species are gal-siyambala (*Dialium ovoideum*) and mora (*Dimocarpis longana*).

62. Extraction is not feasible (due to high time demands) during the main farming season. If oil extraction is practised, it occurs when farm labour demands are low.

Gal-siyambala

Gal-siyambala, endemic to the area, flourishes in dry conditions. The trees regenerate through self-germination. With the depletion of gal-siyambala outside the Strict Nature Reserve, villagers collect from trees within the reserve boundary. Due to its relative scarcity and national popularity, gal-siyambala fruits command high prices in outlying markets.

The fruit producing cycle begins in late August and extends until mid-October. Special effort is made to harvest trees before the rainy season begins, because rainfalls bring insects which attack the fruits. There are multiple uses for gal-siyambala: the fruits are edible, the flowers are a source of nectar for bees, the fruits, leaves, and bark⁶³ are medicinal (the bark is used as a substitute for arecanut or betel nut), the branches are a source of fuelwood, and the trunks are used for timber.

Mora

Flowering occurs annually from July to August. Mora trees follow a seven year cycle to produce fruits. This cycle either corresponds to a mast fruiting or phenological cycle, or is a result of branch cutting practices while harvesting. If over-cutting is the cause of the cycle, it could possibly destroy the chances for more frequent fruiting. The forest canopy has opened up due to timber felling; this exposes the trees to extreme heat, and collectors believe that it causes flowers to drop and reduces the potential for fruit-bearing.

Mora collection season is from December to mid-February. The villagers consider mora to be as "good as gold", with a selling price of Rps. 30 per kilo.

Other fruits

Divul (*Feronia limonia*), available in August and September, is often sold in small quantities along roadsides or to local traders. Occasionally collectors opt to sell it directly at Dambulla market. Since divul is particularly relished by wild elephants, it is difficult to find enough fruit available to market. Other fruits, like damba (*Syzygium gardneri*), palu (*Manilkara hexandra*), weera (*Drypetes sepiaria*), and himbutu (*Salacia reticulata*) are gathered when found, primarily for domestic consumption.⁶⁴

63. Although the bark is stripped off during collection, villagers claim that stripping is limited, and this practise has not led to tree deaths.

64. None of these fruits were quoted with reference to market prices, because no markets exist for them.

Honey

Mature beehives are found towards the end of the dry season, corresponding to the tail end of the flowering season in the forest (falling between April and June). Flowers of many of the fruits mentioned above — mora, palu, weera, damba and tala (*Sesamum indicum*) — provide the best sources of nectar for bees. The fullness of a flowering season directly affects the number of combs available.

Honeycombs located in tree hollows (70 - 80 percent of all combs) are harvested by widening the hollows, so it is conceivable that damage is incurred while harvesting. According to the collectors, hollowed trees have a short life span. Life spans do vary with different tree species, however, since certain species are more resilient to minor damage.

The potential honey harvest from each comb depends on size and maturity. Collectors avoid the small combs, which have only a small number of bees and are not fully mature. The minimum harvest is typically four pints, with maximum harvests reaching 15-17 pints.

Forest fibres

Forest fibre is one of the most important non-timber forest products for household use. Fibres tend to be gathered in the forest at the same time as other products. The most common types of forest fibres include binding lianas such as "yakadawel" (*Dalbergia pseudo-sissoo*) and kiriwel (*Merremia umbellata*), rattan (*Calamus sp.*), and unabata (*Bambusa arundinacea*).

The peak season for collection is from September to November, when ropes are made to tether animals. Until May, villagers do not openly graze their livestock, so large amounts of "yakadawel" (which translates to "iron lianas") are used. In September and October, forest fibre is used to make fences.

There is a high potential demand for rattan, and rattan products availability is a concern, since rattan is limited to small pockets in the forest. Binding fibre is primarily collected for local use. Ropes, baskets and some household utensils made from forest fibre have limited market potential, since most households collect their own raw materials and make their own products. Many of the household utensils like winnowing fans, drying mats, and smoke trays last for a few years, so collection times for these fibres are infrequent.

Wild game

Hunting frequently occurs outside the Strict Nature Reserve, when animals descend to water at the tanks. In order to safeguard these animals, the Wildlife Department included tanks located at the edge of the forest within the boundaries of the Reserve. This has not greatly curbed hunting, since the hunters carefully gauge animal movements for the best opportunities.

Due to restrictions on the possession of guns, hunting methods have been modified. A few skilled villagers make local shotguns ("Gal-tuwakku") but they were not willing to discuss the topic at length. Trap hunting is not commonly practised, as the chances of getting caught with traps in open shrub areas are quite high.

Villagers understand the illegality of hunting. If hunters are caught, they face an offence that is punishable in court. In initial discussions, none of the villagers were willing to admit that they hunt, yet everyone claimed that wild game meat was highly prized. Villagers are equally aware that all non-timber forest product gathering in the Strict Nature Reserve is prohibited by legislation. Nevertheless, they openly discussed their usufruct rights to the forest, methods for collecting non-timber forest products and how non-timber forest products relate to their livelihoods.

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