



HAKGALA STRICT NATURAL RESERVE: is forest loss drying up our water?

It is an indisputable fact that without water, no human life is possible. It has also been apparent for some time that Sri Lanka is facing a looming water crisis. As water shortages become more and more common and as the quality of water received declines further and further, we must question what impacts these trends will have on the future wellbeing of the country, its economy and its population.

Meanwhile both our government and its foreign donors have long been claiming that they prioritise water as a top issue on the development agenda. Most recently we have seen a renewed focus on water as Sri Lanka attempts to meet the eight Millennium Development Goals that today seem to drive most domestic policymaking, development focus, and donor rhetoric.



But — we are forced to ask — has all this talk really made a difference? Will the policy reforms and investments that we are promised be able to effect tangible improvements in the access Sri Lanka's citizens require to clean, secure and affordable water supplies?

There is an ever-present danger that time will show that the answer to these questions will be a resounding "No". This is because there remains an outstanding gap in water thinking — one which concerns natural ecosystems, and specifically the forests that provide vital services to the nation because they sustain water supplies, uphold their quality, and regulate their flows. Yet such natural water infrastructure is rarely considered when decisions are made, policies are formulated or investments planned.

Long ago, Sri Lanka had the foresight to declare as Protected Areas certain parts of the country that are especially valuable in conservation terms, or are particularly ecologically sensitive. A comprehensive body of legislation has since been enacted that supports the maintenance of Protected Areas and biodiversity, and controls the pressures that these ecosystems and their component species are subjected to.

Sri Lanka's Protected Areas are global biodiversity hotspots. They also serve a number of vital functions because they safeguard certain goods and services that are indispensable for human wellbeing, livelihoods and economic security. In many cases, water is one of the essential goods that Protected Areas help to secure and maintain.

Yet our nation's Protected Areas are being rapidly degraded, and their land and resources are being flagrantly abused — with scant regard for existing laws, impacts on water security, or on the provision of other vital biodiversity goods and services. Encroaching and degrading Protected Areas is not just illegal, it also constitutes economic and development suicide.

This begs the question why — and how — the degradation of critical biodiversity and ecosystems can possibly be allowed to continue to happen? It is clear that such disregard for the law and oversights in decision-making may ultimately act to undermine the very goals that development policy, including the water sector, claims to want to achieve — sustainable, secure and equitable development for all.

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Analysis of the evidence: how forest loss is drying up our water

- Sri Lanka's water is a vital and precious resource. It is also finite in supply, and is being subjected to growing demands and pressures.
- In Sri Lanka, almost all rivers and streams rise in the highlands and uplands. These water resources are in turn protected by the forests that grow naturally in these areas, and which form an essential part of water infrastructure.
- A well-conserved forest, with intact biodiversity and good tree cover, minimises runoff and releases water gradually (rather than as wet season peaks and floods and dry season low flows and shortages), prevents silt and sediment from entering streams and rivers, and filters out other contaminants and nutrients that would otherwise run off into water courses.
- The natural forests and protected areas that cover some 10,000 km² or 14% of the country's total land area are also the repository of some of the rarest and most unique biodiversity in the world.
- Over the last century the area under forest in Sri Lanka has been reduced drastically as the result of human actions. Today, closed canopy forest accounts for less than 20% of total land area; much of this area is seriously degraded and fragmented.
- The loss and degradation of forest biodiversity and ecosystems is jeopardising the country's water supplies. We are seeing an increase in the incidence of floods in the wet season and droughts in the dry season. Water shortages have already become commonplace, and the water that people receive is of declining quality.
- A complex body of policies set out the government's intention to conserve forests for biodiversity and watershed protection services, and comprehensive laws exist to enforce these safeguards. Yet, despite their importance for biodiversity and water services in local, national and global terms, Sri Lanka's forests are being encroached and degraded at an alarming rate.
- For example Hakgala Strict Natural Reserve, which contains a high number of endemic plant and animal species and unique biodiversity, as well as protecting the catchment of the Uma Oya, has lost almost a fifth of its area since it was gazetted as an SNR.
- Many parts of Hakgala Strict Natural Reserve have been invaded. These encroachers have cleared land for farms, and constructed permanent and semi-permanent dwellings within its boundaries.
- Although HSNR is tiny in terms of the land it covers (just 0.02% of Sri Lanka's land area, 0.12% of the national Protected Area estate, and less than 0.1% of total closed canopy forest cover in the country), its value in ecological, hydrological and economic terms is immense.
- Like Hakgala Strict Natural Reserve, most other biodiversity hotspots, ecologically critical areas and watersheds in Sri Lanka, are being encroached with blatant disregard for the law. In many cases local authorities are actively encouraging this destruction.
- Encroaching and degrading forests is not just illegal, it is also economic and development suicide because it destroys valuable and irreplaceable biodiversity and ecosystem services, such as water.
- Forest encroachment stems from a fundamental greed — for votes, and for the accumulation of wealth — using the poverty of the electorate as an excuse to justify land grabbing by a powerful elite.
- In order to safeguard vital goods and services, and to sustain the future development of the nation, EFL calls for an immediate halt to the encroachment of all Protected Areas, biodiversity hotspots, ecologically sensitive zones and watersheds in Sri Lanka.



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The need to recognise ecosystems as water infrastructure

Access to clean, secure and adequate water supplies is a basic human need, and a fundamental human right. Without water, no human life would be possible. Inadequate water supplies and sub-standard water quality undermine people's health, their economic status, quality of life and ability to survive and prosper — at every level, from the individual and the household right up to large-scale corporations and industries, and even the nation itself.

National and global commitments to securing water for all

It is hardly surprising that Sri Lanka's policy agenda has long focused on water as a cornerstone of national socio-economic development. Massive investment funds have been poured into water supply schemes, and water currently provides a major focus of policy and legal reform processes. At the same time a series of global agreements and targets, which Sri Lanka and her donors claim to have bought into, focus heavily on improving water supplies. Most influential are the eight Millennium Development Goals, the seventh of which aims to improve access to safe water supplies at the same time as ensuring environmental sustainability.

Water shortages in Sri Lanka: a worsening trend

According to the Food and Agriculture Organisation of the UN (FAO), the total water demand for Sri Lanka in 2000 was estimated to be 10.92 km³ of which 90 percent was for agriculture, 7 percent for domestic purposes and 3 percent for industrial purposes. As shown in Box 1, FAO estimates the nation's water resources at some 50 km³ per year. Only part of this water is available for human use, at the right time in the right place, and a still smaller amount is potable (just about half of the population have access to safe drinking water).

	km ³ /year
Precipitation	112.3
	↓
Surface water (a)	49.2
Groundwater (b)	7.8
Less overlap (c)	-7.0
Total (a+b-c)	50.0

Box 1: Sri Lanka water resources

Even after all this national and international debate, spending and policy focus, a large proportion of the country's population remains in a situation where it has insufficient water. Over recent years we have seen worsening water shortages, and declining water quality. These shortages affect households (that require water for drinking, cooking, washing and irrigating their crops) and also impact on most of the country's industries (including vital sectors such as hydropower and commercial agriculture). Such problems are not likely to go away. In fact they will inevitably worsen in the future as water supplies become more and more overstretched, and human water demands grow. Some time ago FAO also forecast that, by 2000, demand for water will outstrip supply in Sri Lanka — a prediction which, unfortunately, seems to be all too true.

Natural ecosystems: a potentially fatal omission in water thinking

Sri Lanka's water is a vital and precious resource. It is also finite in supply, and is being subjected to growing demands and pressures. But at the moment, despite all the rhetoric and the efforts that are ostensibly being made to improve the water supply situation, there remains a notable gap in thinking. This gap concerns the natural environment. Natural ecosystems are a critical natural part of water infrastructure. The forests that protect our watersheds form a vital (and yet largely unrecognised) part of the nation's water supply chain.

Yet ecosystems continue to be degraded and lost — in many cases deliberately and with the full knowledge of the decision-makers and authorities who are charged with ensuring equitable and sustainable development in Sri Lanka. And the conservation of our natural water infrastructure rarely — if ever — figures in the thinking, discourse, investments, policy reform and legal enforcement focus that is accorded to the water sector. As we will examine in this paper, the omission of ecosystems from water thinking may prove disastrous, and will almost certainly undermine the very goals that development policy generally, including the water sector, claim to want to achieve — sustainable, secure and equitable development for all.



Sri Lanka’s natural forests: why are they important?

A global biodiversity hotspot

Sri Lanka is named as one of the world’s 34 biodiversity hotspots¹, meaning that not only does it contain an exceptionally high number of unique plant and animal species, but also that at least 70% of the natural habitats that these species inhabit have already been lost. According to IUCN — the World Conservation Union and the World Resources Institute, almost a fifth of Sri Lanka’s 850 or so known vertebrate animal species² and more than a quarter of its 3,300 plant species are endemic. This means that they are found nowhere else on earth.

Forest ecozone	Where found	Area (ha)	% total
Wet montane	Wet zone 1,500-2500 m altitude	3,108	0.2%
Wet sub-montane	Wet zone 1,000-1,500 m altitude	68,616	3.4%
Tropical wetlowland evergreen	Wet zone 0-1,000 m altitude	141,506	6.9%
Tropical moist evergreen	Intermediate zone	243,886	11.9%
Tropical dry mixed	Dry lowlands	1,090,981	53.4%
Riverine	River banks	22,435	1.1%
Mangrove	Coastal areas	8,688	0.4%
Closed canopy		1,579,220	77.3%
Open canopy		464,076	22.7%
Total		2,043,296	

Box 2: Forest ecozones in Sri Lanka

Forest ecosystems, and the plant and animal species that are found in them, are of particular importance to Sri Lanka’s biodiversity. The country has a striking variety of forest types due to the spatial variation in rainfall, altitude and soil. As shown in Box 2, seven forest ecozones have been defined for the country³. In each of these ecozones wide variation is observed regarding both the species and forest composition.

Natural forests generate many goods and products for Sri Lanka’s population. At the local level they provide fuel, construction materials, fodder, medicines and wild foods. They support tourism. They provide raw materials and inputs for industry. All of this provides subsistence, income and employment — as long as forests are used sustainably. Forests also have an aesthetic and heritage value. In some cases they have cultural and religious significance.

Provision of vital water services

But perhaps most importantly of all, the functions or biophysical processes that take place within forest ecosystems in turn generate particular life-support services for humankind. Ecosystem services are the conditions and relationships through which natural ecosystems (and the species that make them up) sustain and fulfil human life. Forest ecosystem services include microclimate regulation (they control local temperature and rainfall), carbon sequestration (they mitigate against the effects of global warming), nutrient cycling (they filter out contaminants from the earth and water), air quality regulation (they absorb and neutralise pollutants in the air) and erosion control (they minimise soil erosion, landslides and downstream siltation and sedimentation).

Box 3: Forest ecosystem water services

- **Water supply and flow regulation.** Forest cover helps to break the impact of rainfall, and forest vegetation takes up the water, meaning that it percolates steadily into the soil or runs off into streams and rivers gradually. Forest soils also usually have a higher water storage capacity than non-forest soils. By slowing the rate of runoff, forests can help to minimise flooding and may sometimes also increase minimum stream flows during the dry season.
- **Silt and sediment control.** Ground cover, understorey forest vegetation and leaf litter protect the soil from the impact of rain that falls through the canopy. Extensive root systems help hold soil more firmly in place and resist landslides. This generally acts to minimise the sediment and silt loads carried downstream by watercourses.
- **Water quality.** Forest soils are more waterlogged than most other soils and contain more nutrients, allowing them to filter out contaminants. Clearing and cultivating forest soils tend greatly to accelerate decomposition and to release large amounts of nutrients that leach into groundwater, surface water runoff, and streams.

¹ As defined by Conservation International (CI). CI have found that overall, the world’s 34 biodiversity hotspots once covered 15.7 percent of the Earth’s land surface. In all, 86 percent of the hotspots’ habitat has already been destroyed, such that the intact remnants of the hotspots now cover only 2.3 percent of the Earth’s land surface.

² Animals with a backbone, including mammals, birds, reptiles, amphibians and fish.

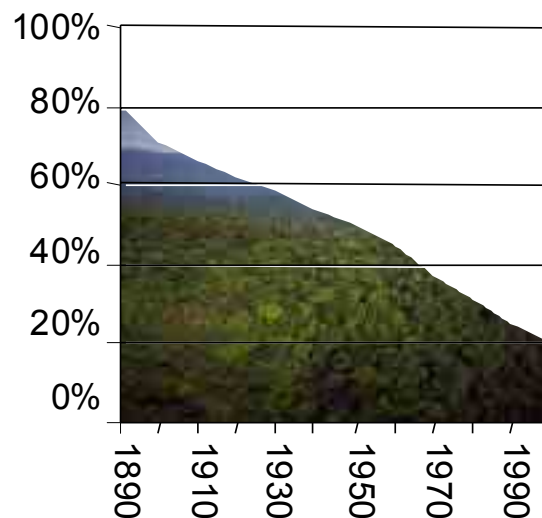
³ Box contains data from *Biodiversity Conservation in Sri Lanka: A Framework for Action*. Ministry of Forestry and Environment, 1999



As shown Box 3⁴, one particularly critical ecosystem service that is provided by Sri Lanka's forests is that they safeguard the quality and quantity of water, and stabilise and regularise its flow downstream. In Sri Lanka, almost all rivers and streams rise in the highlands and uplands. These water resources are in turn protected by the forests that grow naturally in these areas. A well-conserved forest, with intact biodiversity and good tree cover, minimises runoff and releases water gradually (rather than as wet season peaks and floods and dry season low flows and shortages), prevents silt and sediment from entering streams and rivers, and filters out other contaminants and nutrients that would otherwise run off into water courses.

Forest loss: worrying trends and impacts

In turn, the loss or degradation of natural forests leads to the loss of unique and irreplaceable biodiversity, and undermines its ability to provide goods and services (such as water) that are vital for human wellbeing. The rate of deforestation in Sri Lanka gives cause for grave concern. At the end of the 19th century, more than 80% of the country was covered by forest; by the beginning of the twentieth century this had reduced to 70%; in 1950 only half of the land area was forested; and by the beginning of the 1990s forests covered less than a quarter of the country (see Box 4)⁵. According to the government, forest cover has shrunk a further 5% over the 1990s⁶.



Box 4: Forest loss over time

Loss of forest area is not the only concern. Within natural forests, every component of biodiversity matters. Each plant and animal is inextricably linked to each other, and support each other (consider, for example, the rare birds that nest in particular trees, or the pollinating insects that allow plants to multiply while in turn extracting food resources from these plants for their own survival). Reducing (or worse still, removing completely) one species has knock-on effects on the functioning, services and overall health of the whole ecosystem — including some impacts that we can't possibly guess or predict, and that may ultimately prove to be fatal to the forest as a whole.

And here, too, the picture is not an encouraging one. Populations of many of Sri Lanka's forest animals and plants have dropped dramatically, often as a result of indiscriminate harvesting or over-use, and some have become extinct. Today, according to IUCN — The World Conservation Union, which maintains a global "Red List" of threatened species, 7% of Sri Lanka's vertebrate animals and 8% of plants are considered threatened (including nearly half of the amphibians described for the island, a quarter of the country's mammals and more than a tenth of bird species). It is alarming to note that the country has already lost 19 species of amphibians in the past century — and all of these species are known to have occurred in the wet zone of Sri Lanka. If these trends continue, forest biodiversity will continue to be eroded — and important and unique species may well be lost altogether.

⁴ From Emerton, L, and E. Bos, 2004, Value: Counting Ecosystems as Water Infrastructure. IUCN — The World Conservation Union, Gland.

⁵ Bogahawatte, C., 1999, Sri Lanka - Forestry Policy, Non-Timber Forest Products and The Rural Economy In The Wet Zone Forests. Environment and Economics Programme for Southeast Asia (EEPSEA) Research Report, IDRC, Ottawa.

⁶ NPPD, 2002, National Physical Planning Policy. National Physical Planning Department, Ministry of Western Region, Colombo.



Forest degradation: a threat to water supplies

The degradation of forest biodiversity and ecosystems compromises severely their ability to generate goods and services for humankind. In particular, this ongoing degradation means that forests are no longer able to provide the same level of water services. Every hectare of forest that is cleared, and every species population that declines or is lost, potentially impacts on water supplies.

Most of the planning for water-based developments in Sri Lanka has been based on projections of water availability that were made in the past, when forest cover in watersheds was much greater than it is today. The lawlessness that has resulted in forest degradation, and its effects on water supply and quality, were simply not predicted when these calculations were made. As a result the operations and effectiveness of water-based developments, and their ability to deliver on projected benefits, have been severely reduced. Already, many of the effects of forest degradation have become all too apparent in people's daily lives. We are seeing an increase in the incidence of floods in the wet season and droughts in the dry season. Water shortages have already become commonplace, and the water that people receive is of declining quality.

We already know that loss of forest ecosystems and biodiversity have had devastating consequences on our water supplies. For example, we can look at the rapid siltation of the Victoria Reservoir (and many other waterbodies) that has occurred over recent years — and the costs this has incurred to the hydropower industry and to electricity consumers. Most rural dwellers can point to at least one formerly permanent stream or river that has now become seasonal — or in some cases has dried up altogether. Villagers are having to dig deeper, and walk further, to access domestic water supplies. There are also other, less obvious, effects that are impacting heavily on people's lives and livelihoods. One case in point is the way in which inadequate river flows have affected coastal mangroves (the survival of which depends vitally on them receiving sufficient fresh water), which in turn has impacted on the prawns and other commercially valuable fish which live and breed in them.

National policy and law: a stated commitment to protect watersheds

Although the importance of conserving Sri Lanka's forests for water has long been admitted, action to address deforestation in order to secure downstream water supplies was really only prompted once forests had already been lost on a large scale, and water had started to become scarce. Today there is a firm policy commitment — on paper at least — to conserving forests for the water services they provide.

The importance of protecting watershed forests was recognised as far back as the late nineteenth century, when the then Colonial government made a decision to preserve areas above an altitude of 5,000 feet. In the mid 1950s, the Land Commission recommended that forest reserves should be demarcated in order to preserve watersheds and upper catchments, and the Water Resources Board Report of 1969 underlined that damage to watersheds constituted "the destruction of natural storehouses of water conservation".

This basic awareness of the links between natural forests and water supplies continues today, and is reflected in many of the policies and laws that are currently in force.

Environment sector policy and law

The importance of ensuring that ecosystem water services are adequately conserved is reinforced in the **Caring for the Environment 2003-2007**, which lays out the government's current strategy and targets for environmental conservation. It also gives as a reason the protection of critical watersheds in its call for a review of Sri Lanka's Protected Area Network. Accordingly, the **National Environment Act No 47 of 1980** provides for natural resources management, under which there are provisions for land use planning and protection of watersheds. The Central Environment Authority, in



consultation with the Environmental Council and the Ministry in charge of soil conservation, is mandated to recommend soil conservation programmes, including the identification and protection of critical watershed areas.

Preservation of watershed functions is one of the stated reasons for the maintenance of the national forest estate, as articulated in the 1995 **Forestry Policy**. The **National Wildlife Policy** of 2000 likewise recognises, in justifying the existence of National Reserves, that “natural ecosystems ... help maintain supplies of fresh water, and protect people from floods, land slides and soil erosion”, and contains as one of its primary objectives “to maintain ecological processes and life sustaining systems, with particular regard to ... hydrological balance”.

Protected Areas are established and defined, and restrictions on certain land and resource uses within them are listed, in the **Flora and Fauna Protection Ordinance** No. 2 of 1937, which is mandated “to provide for the protection, conservation and preservation of the fauna and flora of Sri Lanka, for the prevention of the commercial exploitation of such Fauna and Flora and to provide for matters connected therewith and connected thereto”. The **Forest Ordinance** No.16 of 1907 also provides for the Minister to declare an area of State land as a forest reserve where certain controls such as restrictions on felling and cutting of trees are imposed.

Other sectoral policies and laws

Policy outside the environmental sector also makes some mention of the importance of conserving watersheds, and of maintaining the natural ecosystems that protect them. For example, the third **Land Commission** of 1985 studied the subject of watershed management in great detail and its first interim report was entirely dedicated to watershed management. The **National Physical Planning Policy** of 2002, too, dares to support the protection of ecosystems in the central region, because it constitutes the prime watershed of the country. Mobilising resources to conserve catchments is mentioned in relation to watersheds in the **National Agriculture and Livestock Policy** of 2003.

A variety of legislation exists to back up and enforce these policy goals in relation to watershed protection. Most basically, the **Crown Lands Ordinance** of 1840 (**State Lands Ordinance** No 8 of 1947) provides for protection of the source, course or bed of any public stream, of springs, tanks channels, and prevention of erosion of the soil. It also allows for the identification and protection of critical watershed areas, as well as prohibiting the leasing or disposition of any State Land above 5,000 feet.

The **Soil Conservation Act** No 25 of 1951 provides for the conservation of soil resources and for the mitigation of soil erosion. It also gives power to the Minister to declare critical areas as “erodible” areas within which certain restrictions are imposed on land use to control erosion, and prohibits the cultivation of agricultural crops in all areas above 1,500 metres in elevation. The **Agrarian Development Act** No 46 of 2000 stipulates that the bank of a water course shall include a reservation area extending up to 33 feet from the edge of its bank. The **Mahaweli Authority Act** No 23 of 1979 contains some provisions relating to watersheds. Section 13 states that the Authority has the authority to take measures that may be necessary for watershed management and control of soil erosion within or in relation to any “special area”. It also allows that Authority to assume the powers of other legislation such as the Forest Ordinance or the Flora and Fauna Protection Ordinance.

Emerging water policy and legislation makes some mention of the importance of natural ecosystems for water supplies, although it should be noted that these aspects remain very weak — the overriding focus and goal being water abstraction, storage and distribution through man-made infrastructure. The draft **National Water Resources Policy** recognises, at the start of its preamble, that “watersheds are being degraded, resulting in sedimentation of reservoirs and more serious droughts and floods”. It also states that “poor land use policy is threatening critical watersheds”. Objective 4.12 is to “conserve, develop and manage watersheds to ensure optimum land use in relation to social well-being”. The **Draft Water Resources Act** includes the provision that a water resources plan will be implemented that will contain measures and programmes for the restoration and management of watersheds.



The National Watershed Management Policy

These cross-cutting concerns are reflected by the approval, in 2004, of a **National Watershed Management Policy**. This has the objectives “To conserve, protect, rehabilitate, sustainably use and manage the watersheds while maintaining their environmental characteristics with the involvement of people; to rationalise investments through continued provision of funds in the national budget or otherwise, on sustainable watershed management by evaluating the services provided by watersheds; and to co-ordinate and monitor all activities in watershed areas and secure a system of integrated management.”

The National Watershed Management Policy articulates very clearly a number of policies that explicitly call for the conservation and protection of ecosystems that provide water services (these are summarised in Box 5).

There is no law that is concerned specifically with protecting watersheds. Rather, legal provisions and mandates to conserve watersheds and secure essential ecosystem water services are spread over other sectoral policies and laws, as outlined in the paragraphs above. It is enforcement of these laws, some of which have been in existence for over a century, that is required.

Box 5: Reference to ecosystem protection in the Watershed Management Policy

- 2.1 Watersheds or segments of watersheds be classified as strictly protected watersheds and protected watersheds.
- 2.2 All encroached and disturbed lands in critical watersheds in the central highlands be surveyed and demarcated and recovered where appropriate.
- 2.3 Individuals and Institutions be held responsible for the protection of hydrologic reservations and for the implementation of existing provisions in all current enactments and regulations in force and any new provisions that may be made from time to time. Failure to implement regulations be considered an offence against the State.
- 2.4 All undeveloped, steep and sensitive lands situated above 1500 masl, shall not be released except for conservation purposes or strictly for natural restoration.
- 2.5 High risk landslide prone areas be declared as strictly protected areas and medium and low risk areas as protected areas.
- 3.3 Compliance with existing laws and regulations be ensured at all times to prevent further degradation of critical watersheds.

Protected Areas: mechanisms to preserve biodiversity

The National Protected Area estate

Protected Areas (PAs) are defined as “areas of land and/or sea especially dedicated to the protection and maintenance of biodiversity, and of natural and associated cultural resources, and managed through legal or other effective means”⁷. They lie at the core of global efforts to conserve biological diversity — on a global scale more than 200 different designations are used to describe PAs, which are currently estimated to cover some 13.6 million km² or 10.1% of the world's terrestrial area⁸.

	No	Area (ha)
Department of Wildlife Conservation		
Strict Natural Reserves	3	31,573
National Parks	17	524,660
Sanctuaries	52	256,902
Nature Reserves	3	38,720
Jungle Corridors	1	10,364
Forest Department (natural forest only)		
Natl Heritage Wilderness Areas	1	11,187
Conservation Forests	33	74,690
TOTAL	110	948,096

Box 6: Sri Lanka's Protected Areas

There are more than 100 PAs in Sri Lanka, covering just under 10,000 km² or some 14% of the country's total land area (see Box 6⁹). Sri Lanka's National Reserves (all under the jurisdiction of the Department of Wildlife Conservation) are legally defined under the provisions of the Fauna & Flora Protection Ordinance No 2 of 1937. Forest Reserves fall within the authority of the Forest Department, Fisheries Reserves lie under the purview of the Department of Fisheries and Aquatic Resources, and Archaeological Reserves are controlled by the Director General of Archaeology.

⁷ Chape, S., Blyth, S., Fish, L., Fox, P., and Spalding, M. (compilers) 2003. United Nations List of Protected Areas. IUCN, Gland, and UNEP-WCMC: Cambridge.

⁸ WCMC, 2001, Global Database of Protected Areas. World Conservation Monitoring Centre, Cambridge

⁹ Statistical Compendium on Natural Resources Management 2000, Ministry of Forestry and Environment. Note: includes areas under Department of Wildlife Conservation and Forest Department only. Latter includes only natural forest reserves designated as conservation forests.



Sri Lanka's PAs aim to be representative (i.e. to cover the full range of ecosystems and biogeographic zones found in the country), as well as to target areas where there is particularly high biodiversity and endemism. Protected Areas have also been gazetted for the purposes of protecting critical watersheds, so as to maintain essential hydrological services.

As shown on the map in Box 7, several PAs have been established in the highland areas where the nation's rivers originate, or are located so as to protect key rivers and streams.

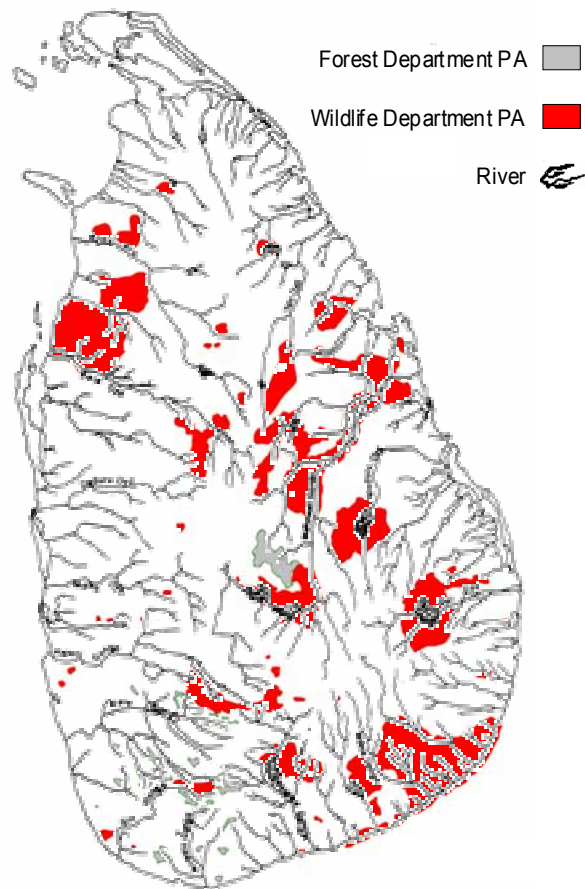
Strict Natural Reserves: the only hope for halting biodiversity loss?

The different categories of PA that exist in Sri Lanka range from those which are strictly protected (and allow few or no human uses) to those which incorporate some level of human activity and sustainable use.

The most protective PA management regime is manifested in Strict Natural Reserves (SNRs), which fall within Category I of IUCN's Global Protected Area Categories as "PAs managed mainly for science or wilderness protection (Strict Nature Reserves and Wilderness Areas)". No extractive land or resource use activities are allowed in SNRs, which are protected as pure natural systems where fauna and flora is preserved in its natural state (Box 8).

There exist just three Strict Natural Reserves in Sri Lanka: Hakgala, Ritigala and Yala Central, covering a combined area of only 316 km² or 3% of natural Protected Areas in the country. All contain exceptional and endangered biodiversity, and the first two also exist as SNRs at least partly because of their watershed catchment protection functions.

Given the critical state of the country's forests and biodiversity, and the intense pressure they are under from human activities, SNRs — where no form of interference at all is permitted — offer an absolutely crucial mechanism for securing ecosystem goods and services. In fact, due



Box 7: Major watersheds, river systems and PAs

Box 8: Nature Reserves: what is prohibited and permitted?

The Fauna and Flora Protection Ordinance states that "no person shall be entitled to enter any SNR or Natural Reserve, or in any way disturb the fauna and flora therein", and that "no animal shall be hunted, killed or taken, and no plant shall be damaged, collected or destroyed in a Strict Natural Reserve". It further lists the following activities as prohibited:

- Fell, girdle, lop, tap, burn or in any way damage or destroy any plant, or take, collect, or remove any plant there from.
- Clear or break up any land for cultivation, mining or for any other purpose.
- Kindle or carry any fire.
- Make any fresh clearing.
- Except under the authority of a permit issued in that behalf by the prescribed officer, erect any building, whether permanent or temporary, or occupy any building so erected.
- Construct or use any road or path so constructed by him.
- Construct or manage any tourist hotel or provide any services or facilities similar to the services or facilities provided by a tourist hotel.
- Hunt, shoot, kill, wound or take any wild animal or have in his possession or under his control and wild animal whether dead or alive or any part of such animal.
- Take or destroy and egg of any bird or reptile or any nest of that bird.
- Fire any gun or do any other act which disturbs or is likely to disturb any wild animal or interfere with its breeding place.

In an SNR, entry can only be permitted for scientific research, and even these must take place under the supervision and control of the DWLC.

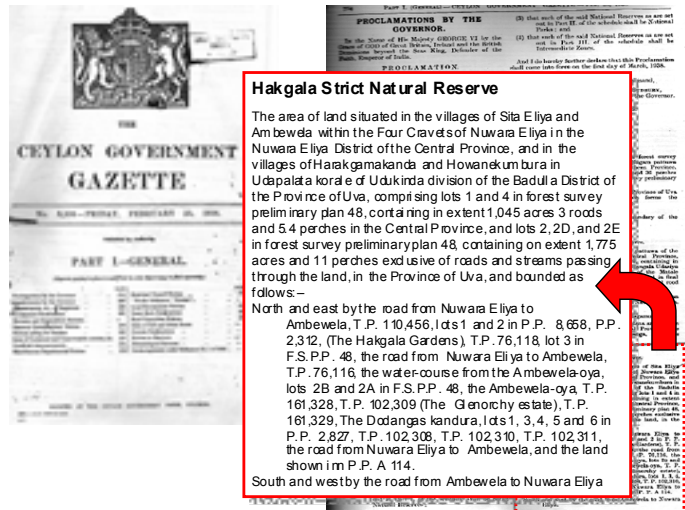


to the now urgent need for protection, SNRs may well be the only option that is left to ensure that biodiversity is maintained, and conservation laws enforced.

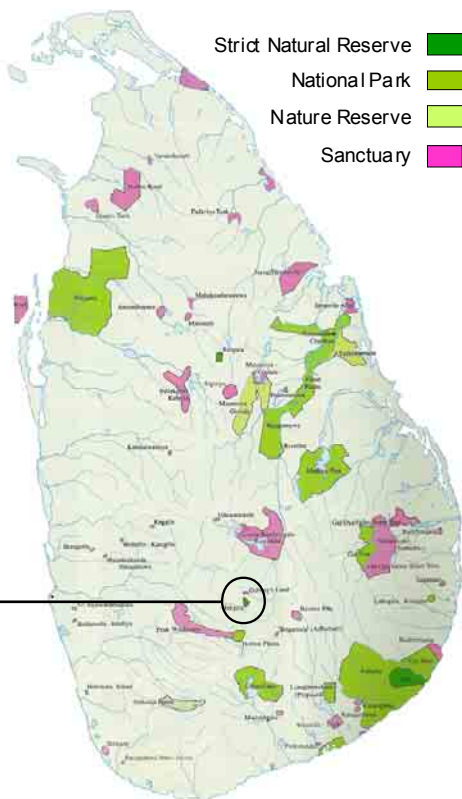
Yet, as the sections below illustrate, even these few supposedly strictly protected areas are under severe and escalating threat. And if these threats are permitted to continue unabated, and deforestation is allowed to continue in SNRs, then the consequences for biodiversity of global significance, and the water services that depend on it, will be devastating.

Hakgala: a source of biodiversity and water

Gazetted in 1938, Hakgala was the first Strict Natural Reserve to be established in Sri Lanka. It is situated in Nuwara Eliya and Badulla Districts of Central and Uva Provinces, just southwest of Nuwara Eliya Town (Box 9). Hakgala Strict Natural Reserve (HSNR) covers an area of 1,142 ha and extends between an altitude of 1,650 and 2,178 metres (or 5,400-7,150 feet). It receives a mean annual rainfall of 2,400 mm.



Hakgala – gazetted in 1938



Biodiversity

HSNR lies in the wet montane forest ecozone of Sri Lanka, and is classified as a Ceylonese Monsoon Forest. Wet zone forests such as Hakgala are exceptionally rich in biodiversity and high in endemism. On a national level, all of the endemic genera and over 90% of woody endemic species occur in these forests, as well as about three quarters of the endemic animals found in Sri Lanka¹⁰ and over a third of endemic trees, shrubs and herbs¹¹. The WorldWide Fund for Nature refers to Sri Lanka's montane rainforests as "super hotspots", on a global scale, in terms of their endemism.

In common with other wet zone montane forests in Sri Lanka, and as emphasised by the United Nations Environment Programme's World Conservation Monitoring Centre (UNEP-WCMC), Hakgala supports an outstandingly high species diversity, including several endemic species, and is thus extremely important in biodiversity terms. Box 10 summarises some of the more noteworthy species of plants and animals that are found in

Box 9: Sri Lanka's PAs, including HSNR

¹⁰ Ministry of Forestry and Environment *op cit*.

¹¹ WorldWide Fund for Nature



Hakgala¹², and underlines the fact that HSNR can be considered a unique and species-rich forest with a very high conservation value. Many of the endemic vertebrate species in Hakgala are also “geographic relicts”, and reflect ancient environments which used to prevail in Sri Lanka — this further emphasises the evolutionary significance of HSNR.

The National Conservation Review, carried out by the Forest Department and IUCN in the mid 1990s, has identified the Central Highland Region, including HSNR, as one of the eight units of contiguous forest that harbours much of the species diversity in the island.

In terms of plants, recent research shows that HSNR contains 88 plant species, 65 genera and 36 families — there is a high species diversity which is rich in endemic woody flora. Nearly 45% of the species enumerated are endemic¹³. In the overstorey forest vegetation, 18 species of 13 genera and 8 families have been recorded, of which 61% (11 species) are endemic and 17% (3 species) are medicinally important. The understorey forest vegetation contains 41 species of 35 genera and 25 families, of which 32% (20 species) are endemic and 12% (5 species) are medicinally important¹⁴.

Data collected¹⁵ also show high species diversity, and endemism, for mammals, amphibians and birds. HSNR contains at least two endemic monkeys, a number of rare and endangered mammals, 8 endemic frogs and toads, 9 endemic reptiles and 8 endemic birds.

Box 10: Biodiversity of Hakgala SNR

Vegetation consists of botanically-rich montane cloud forest which is noted for its endemic archaic Monimiaceae *Hortonia floribunda* and abundance of orchids. Common species are keena *Calophyllum walkerii*, *Syzygium irotundifolium* and *Elaeocarpus montanus*. The undergrowth consists of various species of niloo *Strobilanthes*. Two forest types have been described: dwarf forest, characterised by low-growing species such as *Osbeckia buxifolia*; and a taller forest (10-20m), comprising *Rhododendron zeylanicum* and *Actinodaphne speciosa*.

Fauna Mammals include a variety of endemics such as purple-faced langur *Trachypitecus vetulus*, toque macaque *Macaca sinica*, Sri Lanka spiny rat *Coelomys mayori*, Sri Lanka bi-coloured rat *Srilankmys ohiensis*, Kelaart's long-tailed shrew *Feroculus feroculus*, Sri Lanka long-tailed shrew *Crocidura miya* and Pearson's long-clawed shrew *Solsorex pearsoni*. Other mammals include leopard *Panthera pardus* (T), fishing cat *Felis viverrina*, wild boar *Sus scrofa*, sambar *Cervus unicolor*, highland flying squirrel *Ratufa macroura*, large Sri Lanka flying squirrel *Petaurista petaurista* and grizzled pipitrel *Pipistrellus mordax*. Elephant *Elephas maximus* (E) was still present in 1939.

Amphibian species include endemics such as *Bufo kelaarti*, *Rhacophorus cruciger*, *R. microtypanum*, *Philautus schmaradanus*, *Ramanella palmata* and *Microhyla zeylanica*, along with *Fegervarya limnocharis* and *Hylarana temporalis*. Among the noteworthy reptiles are the following endemics: *Uropeltis melanogaster*, *Rhinophis blythi*, *Aspidura brachyorthas*, *A. trachyrocta*, pit viper *Hypnale nepa*, lizards such as *Calotes nigrilabris*, *Cophotis ceylanica* and *Ceratophora stoddarti*, and skinks such as *Sphenomorphus striatopunctatus*.

Avifauna is varied and of high endemism. Noteworthy species include mountain hawk eagle *Spizaetus nipalensis*, endemic junglefowl *Gallus lafayetti*, wood pigeon *Columba tomingtoni*, highland nightjar *Caprimulgus indicus*, endemic blue magpie *Urocissa omata*, endemic yellow-eared bulbul *Pycnonotus penicillatus*, endemic brown-capped babbler *Pellomeum fuscocapillum*, endemic rufous babbler *Turdoides rufescens*, endemic dusky-blue flycatcher *Muscicapa sordida*, endemic Sri Lanka warbler *Bradypterus palliseri*, endemic Sri Lanka aranga *Myiophonus blighi*, spotted-winged thrush *Zoothera spiloptera*, blackbird *Turdus merula* and endemic hill white-eye *Zosterops ceylonensis*. Commoner birds include orange minivet *Pericrocotus flammeus*, small minivet *P. cinnamomeus*, black bulbul *Hypsipetes madagascariensis*, common scimitar babbler *Pomatorhinus horsfieldii*, grey-headed flycatcher *Culicicapa ceylonensis*, pied bush chat *Saxicola caprata* and scaly thrush *Zoothera dauma*. A large number of migrant bird species visit the area, of which the most interesting include India pitta *Pitta brachyura*, brown flycatcher *Muscicapa tatirostris*, Kashmir red-breasted flycatcher *M. subrubra*, Indian blue chat *Erithacus brunneus*, pied ground thrush *Zoothera wardii*, hill munia *Lonchura kelaarti* and large-billed warbler *Phylloscopus magnirostris*.

¹² From United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)

¹³ M G Punyalal and D M S H Ranasinghe, 1996, Floristic Diversity of Woody Perennials in the Hakgala Strict Natural Reserve, paper presented at Forestry Symposium, Department of Forestry and Environmental Science University of Sri Jayewardenpura

¹⁴ R M W Rathnayake, S M Solangarachchi and L R Jayasekera, 1996, A Quantitative Study of Pigmy Forest Vegetation of Hakgala Natural Reserve (Elevation 2000 M), paper presented at Forestry Symposium, Department of Forestry and Environmental Science University of Sri Jayewardenpura

¹⁵ Bambaradeniya, C.N.B. and Ranawana, K.B., 1998, Composition of the Vertebrate Fauna in Montane Zone Protected Area of Sri Lanka, Rathnayake et al op cit, Punyalal and Ranasinghe op cit.



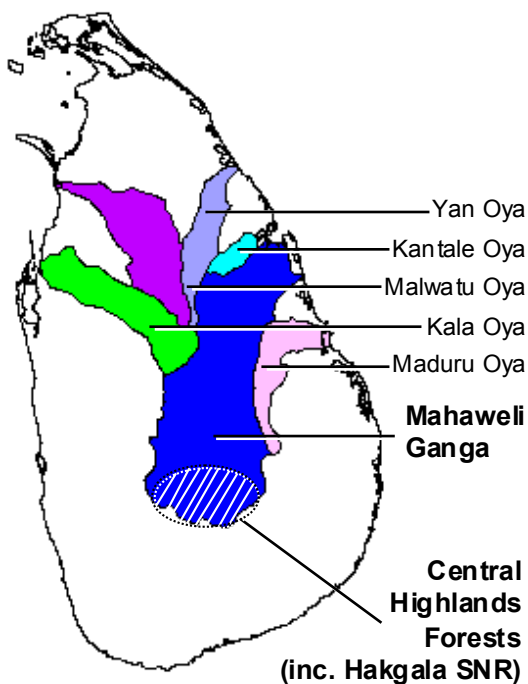
Water services

Hakgala is a montane cloud forest (a widely adopted broad definition of cloud forests is “forests that are frequently covered in cloud or mist”¹⁶).

One of the unique characteristics of cloud forests is the role that they play in the hydrological cycle. They capture or trap the many tiny fog droplets that condense on their vegetation through a process called “horizontal precipitation”. This increases gross precipitation, because of “crown drip” and “stem flow”, adding “extra” water to the hydrological cycle, which is not measured by standard rain gauges.

This often occurs in the dry season, and even on days without rainfall. For example studies conducted for Horton Plains found that fog interception by high altitude forest accounted for almost half of total precipitation during dry months, and summed up that there was “conclusive evidence that the increase in tree cover could positively contribute to the water yield in the catchments in addition to its protective role of the environment”¹⁷.

It is also believed that cloud forests play a very significant role in the regulation of streamflow over time, and especially in the maintenance of dry season flows. Although very little research has been carried out in this area, deforestation of montane cloud forests such as Hakgala has been shown to decrease streamflow during the dry season¹⁸.



In addition to its unique role as a cloud forest, Hakgala also provides other water supply services. The National Conservation Review identified Hakgala (as part of the Central Highlands) as a site of highest national importance in terms of watershed protection. At least 5 major water courses rise in and around HSNR, which are tributaries of the Uma Oya. The Uma Oya is estimated¹⁹ to have a total catchment area of 740 km², and forms one of the main tributaries of the great Mahaweli Ganga (Box 11).

It has been estimated that erosion rates from smallholder mixed vegetable farming in the Uma Oya catchment range between 100-280 tonnes of soil loss per hectare per year²⁰, as compared with just 0.3 tonnes/ha/year for dense forest in Nuwara Eliya District²¹. Forest cover physically protects this important upper watershed and thereby guarantees the quality and quantity of water produced, minimises downstream floods and low dry season flows, prevents silts and sediments from entering water courses, and filters out contaminants and nutrients before they enter water.

Box 11: Mahaweli and adjacent river basins

¹⁶ Hamilton, L.S., Juvik, J.O. & Scatena, F.N. eds. (1995) Tropical Montane Cloud Forests. Ecological Studies 110, Springer Verlag, New York

¹⁷ De Silva, R.P. and M. Chandrasekera, 2002, Impacts of land use changes on hydrological regime — a case study of Randeniigala and Kotmale Catchments in Sri Lanka. GISdevelopment.net.

¹⁸ Brown, M., de la Roca, I., Vallejo, A., Ford, G., Casey, J., Aguilar, B. and R. Haacker, 1996, A Valuation Analysis of the Role of Cloud Forests in Watershed Protection. RARE Centre for Tropical Conservation, Fundación Defensores de la Naturaleza and Fundación Ecologista “Hector Rodrigo Pastor”

¹⁹ S.M.B. Makadawara, Vetiver for Uma Oya catchment protection.

²⁰ ADB, Upper Watershed Management Project Document

²¹ Ministry of Forestry and Environment *op cit*.



Hakgala: a shrinking resource

For some time now, the land use situation in and around HSNR has been giving extreme cause for concern. It has become apparent that unless rapid and decisive actions are taken, the forest and its biodiversity may soon disappear altogether — along with the vital water services that this ecosystem provides.

Hakgala is under severe and increasing threats. Biodiversity is being lost, and the ecosystem degraded, at an alarming rate. A review of trends over time shows that by the early 1990s 16% (or over 180 ha) of the total forest area in the SNR had been lost, mostly due to creeping encroachment inside its boundaries, and the conversion of cleared land to agriculture²². By now this figure is far higher — and the encroachment shows no sign of abating.

Illegal encroachment and land clearance

The root of the Hakgala's problem lies in the rampant encroachment that it has been, and continues to be, subjected to. Many parts of the Strict Natural Reserve have been invaded by small-scale cultivators. These encroachers have cleared land for farms, and constructed permanent and semi-permanent dwellings within the boundaries of the PA.

In many parts of HSNR (for example above the Meepilimana Senananda Maha Vidyalya, in front of Ambewela Railway Station, and around Sita Eliya) forest and steep slopes have been cleared and encroached upon by small-scale cultivators to a distance of several km inside the gazetted boundary, and roads have also been cut leading further into the SNR. The area bordering the Warwick Estate has been cleared for tea.



The fence marks the supposed boundary of HSNR.

Gradually and insidiously, human encroachers are creeping further and further into HSNR. More and more land is being cleared, more and more biodiversity is being lost, and vital watershed protection services are being compromised.

Destructive land use practices

Clearance of land for agriculture is, in itself, highly destructive to Hakgala's forest and its rare and valuable species — no matter how, where or by whom it is carried out in the SNR. But these problems are exacerbated still further by the kinds of land management practices that are followed in creating and managing farms.

Perhaps most seriously, encroachers have deforested steep slopes and other ecologically sensitive areas in the Reserve. This, in turn, has resulted in severe soil erosion, meaning that critical watershed protection services have been seriously compromised.



Fire spreads rapidly and destructively into forest.

Use of fire to clear bush and scrub for farming and grazing has caused serious forest fires. Not only does this reduce tree cover, and destroy biodiversity, but it spreads easily into intact parts of the forest and opens up land to invasive species.

Farming practices, too, are unsustainable. High-intensity cropping and poor land use management is leading to topsoil loss, reducing soil fertility, and increasing run-off. Again, watershed protection services are being undermined, and downstream water supplies and quality are suffering. Meanwhile the artificial pesticides and fertilisers that are used in farming are leaching into the soils and water running off from the reserve area, polluting the rivers and streams that run out of the SNR.

²² Bogahawatte, *op cit*.



Box 12: Areas of severe encroachment in Hakgala Strict Natural Reserve

- **Meepilimana:** The situation is especially bad in the Meepilimana, situated north west of the HSNR, where areas above the Meepilimana Senananda Maha Vidyalaya have been encroached upon. A distance of up to one kilometre into the forest from the gazetted boundary have been cleared and encroached upon by cultivators. These cultivations extend nearly up to two kilometres parallel to the boundary demarcated in the original gazette notification. In this area with its 30-40 degree angle, recent clearing activities are evident and in certain parts of the forest, entire sections of hills have either been cut out. Roads have also been cut leading further in to the SNR.
- **Ambewela:** In the Ambewela area, situated south of the HSNR, 600m inwards and 1 ½ kilometres parallel starting in front of the Ambewela Railway Station have been cleared for cultivations. The 20-25 degree angle in the area have been used for cultivations.
- **Warwick Estate:** In the area bordering the Warwick Estate, situated south east of the HSNR, nearly 4 ½ kilometres spreading towards Nuwara Eliya and 1 kilometre in to the HSNR have been cleared for planting tea. The 45-50 degree angle, ideal for tea, has been used by the encroachers with no regard to the damage it causes to the HSNR. Large areas of abandoned land are found scattered in this area. They have been identified as land once used for cultivations but since abandoned. No remedial measures to reintegrate the soil back in to the HSNR has been done and in many of the places invasive species have taken over these abandoned lands.
- **Alakolagala (Rendapola):** In the Alakolagala area with its 45-50 degree slope, situated on the eastern border of the HSNR, nearly 2 ½ kilometres inwards from the border and 2 kilometres parallel have been cleared for cultivations. In this area too large sections of land has been abandoned and the invasive plant *Lantana camara* or Gandapana have taken over.
- **Sita Eliya:** In Sita Eliya, situated on the north east of the HSNR, nearly 2 kilometres inwards from the border and 3 kilometres parallel have been cleared for cultivations. The area with its 30-50 degree slope, there is evidence of recent disturbances to the mountain slopes as freshly cut soil and large gaping holes in the forest have been observed. Here too, large areas of abandoned deforested land have been taken over by *Tithonia diversifolia*.

Poaching of natural resources

The plant and animal species in Hakgala are not only rare, unique and endangered: many also have a high commercial value.

For decades now, there has been systematic cutting of trees for timber, and in some places extensive clearfelling has taken place. Other commercially valuable species have also been over-harvested, including medicinal and ornamental plants. Certain animals, particularly mammals, have shown a marked decline in populations as a result of hunting.

Spread of invasive alien species

Opening up and clearing forest land leaves it vulnerable to colonisation by alien invasive species. Alien invasive species are plants and animals are those which are introduced from other areas, or countries. They are often fast growing, and spread rapidly, taking over and choking off natural vegetation and competing over scarce resources with indigenous animals — or even, in some cases, preying on them.

Several species of invasive alien plants have invaded into the Hakgala SNR, causing adverse impacts to native plant species. These include *Lantana camara*, *Ulex europaeus*, *Eupatorium riparium*, *Cestrum aurantium*, *Wedelia trilobata*, *Psidium littorale* and *Pteridium aquilinum*²³. Animals, too, have become a problem. Populations of dogs, cats and buffalo have all escaped from farms and bred (or deliberately been turned loose in the forest), causing untold harm to naturally-occurring wildlife and plants.

Hakgala: why it is being degraded

Data show that almost a fifth of the total area of the “protected” Hakgala SNR has been lost to encroachers. Similar trends can be observed in the larger Uma Oya catchment. By the mid 1990s, it was estimated that some 80km² of land in the catchment had either been encroached, or comprised state land that had been alienated for housing and agriculture²⁴. These encroachments continue to escalate at a worrying rate.

The encroachment, land clearance and destructive land and resource use practices that have taken place over the years in HSNR and the Uma Oya catchment have resulted in forest degradation and biodiversity loss on a massive scale. In turn deforestation has seriously jeopardised downstream water supplies.

²³ Bambaradeniya, C.N.B., 2002, The status and implications of invasive alien species in Sri Lanka. Zoos' Print Journal, 17(11): 930-935.

²⁴ ADB *op cit*.



These direct causes of forest biodiversity loss are not hard to observe — they are occurring right in front of our eyes. But destructive actions such as encroachment, land clearance and unsustainable land and resource use practices are, in turn, allowed (even encouraged) to take place because of much deeper and more pervasive reasons that result in the law not being enforced.

The root causes of forest biodiversity loss and ecosystem degradation are largely political in nature, and stem from a fundamental greed — for votes, and for the accumulation of wealth — using the poverty of the electorate as an excuse to justify land grabbing.



Human settlement is steadily invading HSNR

Even though there is repeated reference in national policy to the importance of forests for water supplies, and a stated commitment to protect and conserve watersheds and other ecologically sensitive areas, it is all too apparent that little has actually been done to translate these noble statements and good intentions into practice. Under current conditions, and based on the evidence of past actions, there is also little hope that they will be taken seriously in the near future unless immediate action is taken to restore some semblance of the Rule of Law.

Encroachment: the real causes and impacts

A basic fact: encroachment is illegal

Encroachment is “invasion; any entry without right or permission; entry into an area that was not previously occupied, is another’s property, or into which entry is forbidden”. It is by definition illegal. It is carried out in disobedience to the laws, statutes and regulations of Sri Lanka.

The Constitution itself states that “the State shall protect, preserve and improve the environment for the benefit of the community”. Furthermore, it is the duty of all public servants (including the Sri Lanka Police) to safeguard public property. In this regard, the State and its officials have patently failed in its duty, and have seriously let down the citizens of Sri Lanka.

Whereas it would be unthinkable for the landless to be encouraged to encroach into the Grand Canyon (let alone to consider the length of their illegal occupation to be a criterion for devolving rights over this land to them), in Sri Lanka we are fast reaching a point where encroachment is considered a fundamental right of those who wish to acquire land. This is an absurd concept, and is intrinsically unsustainable — in whatever terms sustainability is defined. Human beings have unlimited wants that must be satisfied from a scarce resource base. In such a densely populated country as Sri Lanka, the land available for human occupation is in particularly short supply. This is a fact, a basic reality, and there is no escaping from it.

Land that is rich in biodiversity, and provides essential ecosystem services such as protecting water supplies, is already considered a national asset — and is protected as such. Whereas most people would like to have as much land as they want, the vast majority of Sri Lanka’s population does not resort to encroachment as a means of acquiring property. In fact, and in the face of the powerful forces behind this massive land grab, they have little option but to look on in despair at the blatant violation of their rights and their hopes for a sustainable livelihood.



The hypocrisy of using poverty as an excuse to justify encroachment

Particularly since 1979, illegal activities have been rewarded by alienating state land to those who have encroached upon it. This has ostensibly been done to overcome the “landlessness” of “poor and disadvantaged communities”. And this, in turn, is justified on the basis of the convenient (but utterly false) premise that the mere act of giving land to the “landless” will allow them control over their own asset base and means of production, thereby guaranteeing food security, generating income, creating employment and alleviating poverty.

There is much political mileage to be had from allowing “poor and disadvantaged communities” on to the rich farmland that is so scarce in all parts of the country. But who truly gains from encroachment, and who really achieves access and ownership to this scarce and valuable asset base? There undoubtedly exist short-term political and economic gains from destroying biodiversity in areas such as Hakgala. More significantly there is enormous potential for income from exploiting the land for quarrying, mining, removal of earth and setting up hotels in places of scenic beauty. And there are powerful vested interests, both domestic and foreign, who stand to gain from illegal encroachment.

But are the beneficiaries of land grabbing really the “poor and disadvantaged communities” who the real encroachers are trying to use as an excuse to justify, and whitewash, their past actions?

How encroachment widens the poverty gap

Encroached areas of Hakgala will initially generate food, income and employment. But at the same time, whoever they accrue to, the benefits from using forest land and natural resources in such a manner cannot be sustained for anything more than a very short period of time. HSNR has already been denuded of many of its commercially valuable species — very soon they will be used up altogether, and unable to generate income for anyone. A similar situation holds for the land that has been cleared for agriculture. Hakgala’s rich and fertile soils are being rapidly depleted and over-used: soil fertility is declining, crop yields are decreasing, and land is becoming exhausted. Cleared areas are being abandoned, and encroachers are being forced either to move on and clear additional land, or to use more and more chemicals to maintain their output. The net result is further destruction, and a progressive slide into poverty.

There is a huge gap between what people believe they will gain by encroaching land for cultivation, and the benefits that can actually be sustained. Over the past 50 years we have allowed people to squat on state lands and degrade the environment. This has resulted in a situation where the environment is less and less able to provide essential goods and services — the demands for which have become ever more intense (and which continue to multiply) in the light of the population’s fast-changing needs and aspirations for what is now deemed an acceptable standard of living. People remain in poverty, and the younger generation aspire to move into cities, work in garment factories, or — if they are “lucky” enough — to go to the Gulf States and work there.



Intensive farming around Hakgala — yielding short-term gains, at best

The benefits of encroaching Hakgala certainly do not accrue to the “poor and disadvantaged communities” who merely act as hired labour for the land grabbers who live far away in Sri Lanka’s towns and cities or who have sought citizenship in other countries. We have seen the establishment of a new form of absentee landlordism where a politically and economically powerful elite have found a mechanism by which state land can be alienated. At the same time we also see the perpetuation of an underclass who are forced to work as hired labour on land that belongs to the state, and has been grabbed by this elite — with little benefit to the workers themselves, or to their long term security and socio-economic improvement.



In reality, encroachment has done little to help “poor and disadvantaged communities” — even worse, it has acted to perpetuate and worsen their economic and social marginalisation, and to drive a wedge which effectively prevents the poverty gap ever being closed.

Why encroachment is fundamentally inequitable

Encroachment is not only inequitable in terms of perpetuating an underclass of “poor and disadvantaged communities”. It is also inequitable — and costly — in terms of the general economic balance of the country, and the wider distribution of income. Subsidies are handed out to farm on encroached land — both in terms of the “free” allocation of the land itself, as well as the budgetary support and subsidies that are provided for agriculture – from the public budget. For SNRs such as Hakgala, the best use of land has already been decreed to be conservation in order to sustain the supply of economically important biodiversity goods and services. In many cases land is not even suitable for agriculture. To compound these inequities, once the ownership for encroached land is devolved (as, ultimately, it inevitably is) it becomes a marketable asset which can be bought and sold in the very markets that the rich and powerful land grabbers already control.

In fact, the encroachment of Hakgala constitutes a glaring example of gross inequity, involving a seriously skewed distribution of costs and benefits. On the one hand, as mentioned above, it is not the poor and landless who are being served — it is their rich and powerful masters who are being allowed to plunder the lands and resources of the SNR. At the same time, any short-term gains that this elite minority are able to garner are far outweighed by the long-term ecological and economic effects they give rise to for a far larger section of the population. In effect it is the local residents, downstream water users and the country as a whole who are bearing the costs that the actions of this minority give rise to — and are effectively subsidising their wealth accumulation by being forced to give up essential goods and services such as water.



Hakgala – a rapidly changing landscape

The general public should not be put in a position where they are penalised in order to uphold the illegal actions and blatant land grabbing of the few. In most cases the general public cannot afford to bear such costs, at either the level of the individual or the country. Consider, for example, the economic effects of the encroachment and degradation of HSNR on the tens of thousands of downstream households which lack clean and adequate water supplies, the numerous hectares of agriculture that now lack dry season irrigation water, or the many gigawatt hours of electricity that power people’s homes and vital industries. The costs to the government of illegal encroachment in HSNR should also be emphasised. For instance, it is the State which must take remedial actions to counter the health and other effects of loss of water supply and quality. Meanwhile the local government agencies have to spend money to clean up water supplies and invest in additional water storage due to siltation.

Using electoral politics as an excuse to undermine the Rule of Law

District and Provincial politicians are seemingly under severe pressure to give out state land and Protected Areas to their patrons and benefactors. They use this as a pretext to disregard national interests and to undermine the Rule of Law. We see a situation where there is a serious lack of checks and balances, and separation of powers, that are supposed to be inherent to the so-called “Westminster Model” of democracy that the country claims to follow. These have been whittled down to such an extent that a privileged few are considered to be—and considered themselves to be—above the law. Some government officials now have strong affiliations to particular political parties, and — regardless of the party that is in power at any one time — continue to allocate land



Denuded land of an illegal farm in HSNR

illegally in order to maintain the voter base of the faction to which they are affiliated, and ensure the continued support of their powerful patrons.

Yet in Hakgala, as in many other places, it is illegal for any person (be they a politician, a government official or a private individual), to allocate land or to issue permits that would allow land and resources to be used within the SNR. All National Reserves come under the jurisdiction and control of the Director General of Wildlife Conservation. Yet, regardless, permits have been handed out by the local authorities for people to cultivate and occupy the HSNR. Any corrupt official who undermines or deliberately flouts this authority must be bought to book.

There is an urgent need to uphold the Rule of Law — especially in today's climate of widespread poverty and growing globalisation. Surely the government of Sri Lanka cannot afford to indicate that it cannot enforce or uphold the country's laws, for to do so would be tantamount to admitting to a failure to carry out even its most basic function, or to safeguard the most basic rights of the population.

Failure of the Department of Wildlife Conservation to protect Hakgala

Hakgala is a Strict Natural Reserve. This means that it is protected. Human interference — including cultivation, as well as most other land and resource uses — is clearly prohibited. Yet there appears to be a serious lack of will on the part of decision-makers to enforce these regulations, or to support the multiple policy statements on biodiversity protection and watershed conservation. Actions speak louder than words — and here there is resounding silence as regards dealing with the perpetrators of encroachment, or enforcing the laws that they are breaking. In the face of such inaction, perhaps it is hardly surprising that land continues to be allocated and used illegally, with scant regard or respect for the laws that govern (and are meant to protect) HSNR.

The Department of Wildlife Conservation (DWLC) is mandated to manage, control and oversee SNRs. In Hakgala, little is being done by the DWLC to live up to this responsibility or to take this legal mandate seriously. Encroachment continues unabated, often with the full knowledge (and in some cases overt support) of the authorities — despite the legal and administrative mechanisms that are in place to curb such activities, and to control the errant behaviour of the public officials who knowingly allow it to happen.

Almost 70 years after Hakgala was first gazetted as a Strict Natural Reserve, the DWLC has still not managed to enforce its protected status. In many cases houses have been built, and farms cleared, right across the boundary as mapped. Access to the SNR is laughably easy, either to encroach the land or to illegally poach the natural resources that are contained within it. The DWLC has instituted a number of illegal encroachment cases — but this number is negligible compared to the magnitude of the problem.

It is an unfortunate reality that there is weak financial, technical and institutional capacity in the Department of Wildlife Conservation to enforce the law. The Department is desperately understaffed, and funds available for protection activities are virtually non-existent. Low morale among staff is further exacerbated by low budgets for even the most basic operational management and enforcement activities, poor salaries, and — again and again — an almost complete failure by other authorities to provide the necessary support to the DWLC's actions.

The DWLC's incapacity to enforce the law and prevent encroachment in HSNR is undoubtedly exacerbated by lack of support from the other organs of the state who are meant to aid in conserving biodiversity. But, even without this broader support, it would be reasonable to expect the DWLC to



carry out the work which they have been mandated to do — the conservation of biodiversity in Protected Areas such as Hakgala. Unfortunately, this is not the case.

In some cases, the DWLC and other government authorities act as passive bystanders who watch encroachment happen, often justifying it through a misplaced sense of public duty which is based on the belief that lands coming under state purview should be alienated to “poor and disadvantaged communities”. But, far worse, in some cases it would seem that Local Authorities are acting in direct contravention of the law, and actually aiding and abetting illegal settlement. For example licenses for cultivation within the SNR have been handed out by local government officials and others, and utilities such as electricity connections have been provided to squatters. All of these actions would appear to reinforce, encourage, and legitimise encroachment into Hakgala, as well as directly undermining the DWLC.

Weak capacity cannot however be taken as defence for inaction on the part of the DWLC. It is a constraint, but not an excuse. There is little evidence that the DWLC has taken visible steps to rectify their financial, technical and institutional shortcomings, or to bring them to the attention of the higher authorities who could help to overcome them. In the long run, such failures will serve merely to strengthen the already-existing calls for the DWLC’s functions and mandates to be devolved and privatised, perhaps hastening the handing over the entirety of Sri Lanka’s wildlife estate to the powerful groups and national and international interests already tightening their stranglehold and demands on the country’s precious land and biodiversity.

Why we need to halt forest biodiversity loss

The case of just one protected forest, Hakgala Strict Natural Reserve, points to a number of dire consequences, and presents a damning indictment of the State’s inability to safeguard vital biodiversity goods and services. Although HSNR may be tiny in terms of the land it covers (just 0.02% of Sri Lanka’s land area, 0.12% of the national Protected Area estate, and less than 0.1% of total closed canopy forest cover in the country), its value in ecological, hydrological and economic terms is immense. Hakgala is a repository of some of Sri Lanka’s and the world’s rarest biodiversity. It is also one of only a few Protected Areas that lies at the top of river basins and protects their upper catchments; it is clearly absolutely vital to the very fabric of the country’s water supplies. We are forced to stand by and watch the land and resources of Hakgala being shamelessly grabbed, as our nation’s water supplies steadily dwindle, and socio-economic inequities worsen.



A rich biodiversity: but for how much longer?

Unfortunately we can see a similar picture of wanton destruction and rampant encroachment occurring all over the country — not just in the forests that form a part of Central Highlands Region, but in many other ecologically sensitive areas, biodiversity hotspots and watersheds. Every hectare of forest land that continues to be illegally encroached, cleared, and converted to agriculture, and every plant or animal population that is depleted or lost, undermines the provision of essential goods and services. And these goods and services are irreplaceable — once they are gone, they cannot be regained, and will be lost for ever.

The connectivity of biodiversity is vital not just within a single ecosystem as Hakgala, where the loss of even one species will impair the functioning of the SNR, but also between ecosystems and forest areas. Each component of our national forest and wildlife estate, however small, is essential to the functioning of the whole country — and to the provision of vital goods and service such as water supplies and unique biodiversity.



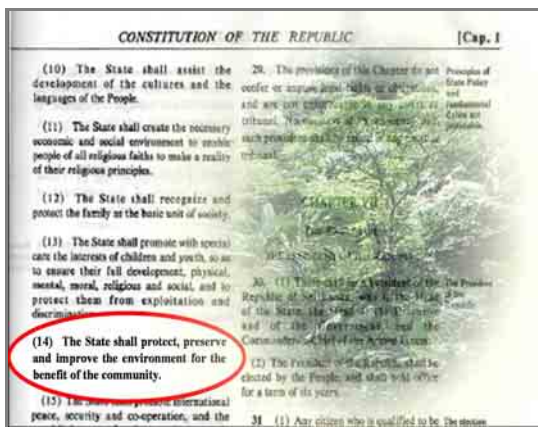
Clean and adequate water:
a basic Human Right?

Forest biodiversity loss is not just short sighted in ecological and conservation terms, it will almost inevitably prove disastrous for Sri Lanka in economic and development terms. As pointed out by IUCN — the World Conservation Union, ecosystem conservation is much more cost-effective than employing artificial technologies or taking mitigative measures when essential goods and services are lost²⁵. Conserving an upstream forest, for example, typically costs far less than investing in new water filtration and treatment plants for cities, or undertaking expensive de-siltation activities in reservoirs and hydroelectric dams, when these services are lost.

Declining future profits, increasing future costs, and additional remedial measures are all more expensive for water investors. They are also costs that are typically passed on to the consumers or end-users of water products (including not just water itself, but other water-dependent commodities such as hydropower or irrigated food crops) in terms of higher charges and fees or lower quality services. In reality, almost nobody gains, over the long-term, from ecosystem loss and degradation.

Even in a developed country, it is cheaper to maintain an ecosystem as it is than to destroy it or take action to mitigate the impacts. Overall, it is estimated that about 13% of the world's land area is needed to protect water supplies, an area which will grow as the world's population increases²⁶. This target is nowhere near being met – even though there would be significant economic benefits from doing so. For example, in Portland Oregon, Portland Maine and Seattle Washington it has been found that every US\$ 1 invested in watershed protection can save anywhere from US\$ 7.50 to nearly US\$ 200 in costs for new water treatment and filtration facilities²⁷. Through conserving upstream forests in the Catskills range, New York City hopes to have avoided investing an extra US\$ 4-6 billion on infrastructure to maintain the quality of urban water supplies²⁸.

In Sri Lanka, the situation is even more extreme and the costs are even higher. We are clinging desperately on to the few natural ecosystems we have left. Poverty is rampant, the rural-urban income gap is growing, and more and more people are finding themselves in a situation where they have no access to a secure form of livelihood. In many cases, it is biodiversity and ecosystems which sustain these livelihoods, and guarantee essential services such as water that are so poorly provided by the government.



Environmental protection:
a basic Constitutional Right?

Development has largely taken place at the expense of the environment, and we have found ourselves unable to rectify environmental mistakes without incurring yet more debt. Our country's biodiversity constitutes one of our most valuable sources of natural capital which, if conserved and managed wisely, can yield economic benefits in perpetuity, for the general public and for the development of the country.

Depleting this biodiversity, and destroying these ecosystems, will almost certainly undermine the very goals that development policy generally, and the water sector specifically, claim to want to achieve — sustainable, secure and equitable development for all.

²⁵ Emerton and Bos *op cit*.

²⁶ Johnson, N. White, A. and D. Perrot-Maitre, 2001, Developing Markets for Water Services from Forests: Issues and Lessons for Innovators, Katoomba Group, World Resources Institute and Forest Trends, Washington DC

²⁷ Reid, W.V., 2001, Capturing the value of ecosystem services to protect biodiversity. In Managing human-dominated ecosystems, eds. G. Chichilensky, G.C. Daily, P. Ehrlich, G. Heal, J.S. Miller. St. Louis: Missouri Botanical Garden Press

²⁸ Isakson, R. S. 2002, Payments for Environmental Services in the Catskills: A Socio-Economic Analysis of the Agricultural Strategy in New York City's Watershed Management Plan, Fundación PRI SMA, San Salvador.



EFL's call for action: Hakgala, a first step to halting the destruction

Encroachment is illegal, there can be no prescriptive rights to any state land. Yet at the moment we are faced with a situation where certain interests are wilfully encroaching valuable natural ecosystems and blatantly flouting the law — in many cases with the direct support of the authorities. We are left with a state of affairs where the government and people of Sri Lanka are unable to preserve even 0.02% of the land area for the greater good of the country. This gives us little hope. The case of Hakgala Strict Natural Reserve is being repeated again and again, in all parts of the country — to the detriment of the national economy, and to the cost of much of the country's population. We cannot stand by and allow this ecological and economic suicide to continue.

EFL therefore requests the Government of Sri Lanka, and especially the Department of Wildlife Conservation, **to take immediate and urgent action to halt all encroachment into Hakgala Strict Natural Reserve:**

- **Every encroacher must be evicted**, irrespective of the size and economic output of the land that they have occupied, or the length of time they have occupied it.
- **No new encroachers should be allowed to enter** Hakgala Strict Natural Reserve, and **all existing and past encroachers must be prevented** from re-entering.
- A public notice should be released informing everybody that **land allocation in Hakgala Strict Natural Reserve is an illegal act**, and forbidden by law.
- Each and every individual who is engaged, or implicated, in the illegal encroachment of Hakgala should be **publicly named and punished**, as must those who encourage and facilitate them — regardless of their political or economic position.
- The **practice of rewarding illegal activities** in Hakgala must be stopped, and the Rule of Law re-established and reinforced.
- The **Department of Wildlife Conservation should be held accountable** for enforcing protection in Hakgala Strict Natural Reserve, and must be strengthened, and supported in this task.
- The Department of Wildlife Conservation should **review all permits** that have been issued for Hakgala Strict Natural Reserve, and **institute legal or administrative action** against the officials who issued them, wherever they may be now.
- There must be **consensus among all political parties** to enforce and support an immediate end to encroachment.
- Laws relating to the environment must be **clearly, strictly and fairly enforced**, with no exceptions allowed.
- There must be concrete efforts made to **translate into practice the intentions that are stated in national policy** concerning biodiversity conservation and watershed protection.
- The government, and its foreign donors, must make every effort to recognise the value of natural forests generally, and protected areas specifically, for water, and to reflect this role by **accorded an adequate policy focus and investment funds to ecosystem protection for water supplies.**



Glossary of terms used in the paper

Alien Invasive Species:	a plant or animal species occurring outside its natural range that becomes established in other natural or semi-natural ecosystems or habitat, is an agent of change, and therefore threatens native biodiversity.
Biodiversity:	the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.
Cloud Forest	forests that are frequently covered in cloud or mist.
Biodiversity Hotspot:	a biogeographic region that is both a significant reservoir of biodiversity, and is threatened with destruction.
Ecosystem:	a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.
Encroachment:	invasion; any entry without right or permission; entry into an area that was not previously occupied, is another's property, or into which entry is forbidden.
Endemic species:	a species that is only found in a given region, country or location and nowhere else in the world.
Geographic Relict:	a species or ecosystem that remains from an earlier geological time when environmental conditions were different than at present.
Habitat:	the place or type of site where an organism or population naturally occurs.
Hydrological Cycle:	the process encompassing the evaporation of water from the earth's surface, its condensation in the atmosphere, and its return to the surface through precipitation.
Montane Forest:	forest occurring in high altitudes or on mountain slopes.
Protected Area:	an area of land and/or sea especially dedicated to the protection and maintenance of biodiversity, and of natural and associated cultural resources, and managed through legal or other effective means.
Vertebrate Animal:	any animal having a backbone.
Watershed Catchment:	an area that is occupied by a drainage system, consisting of a surface stream, river or waterbody together with all its tributary surface streams, rivers and waterbodies.

Environmental Foundation Ltd (EFL)

is a non-profit public interest law group, whose mission is the conservation and enhancement of the natural environment through legal means.

Since 1981 EFL has established itself as a driving force in promoting environmental justice for the people of Sri Lanka, particularly poor and disadvantaged communities, through the provision of mediation, representation and advocacy services, and legal and scientific support, in environmental matters.



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