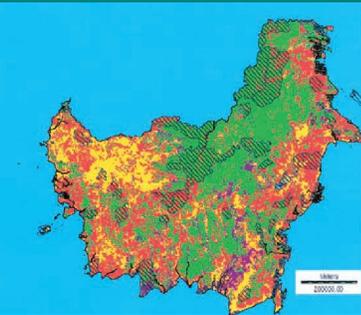


Promoting Environmental Security and Poverty Alleviation in the Peat Swamps of Central Kalimantan, Indonesia



Prototype EnviroSecurity Assessments

Kalimantan, Indonesia
Part 1: Case Study

Jeanna Hyde Hecker

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Commissioned by the Institute for Environmental Security

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1 Introduction

Environmental security is the current and future availability of goods and services from a healthy environment for humankind and nature. The availability is reduced when there is environmental destruction. Environmental destruction leads to scarcity and scarcity triggers conflict which can develop into violence. Thus, environmental security is vital to human security and well being. Conflict or violence can also be caused by the availability of abundant rather than scarce environmental goods or natural resources. The situation could also be reversed in that, for reasons other than scarcity or abundance of environmental services and goods there is conflict or violence. This conflict or violence can then lead to environmental destruction - as wars often do - and as a result there is scarcity which results in conflict and the cycle continues.

The study area lies on the Indonesian side of the island of Borneo. The focus is on two peat swamp forest areas in Central Kalimantan, namely Mawas and Sebangau. These areas were selected because the Borneo peat swamp forest ecoregion is considered to be one of the most species rich in the region. They host many animal species, some of which occur in higher densities in the peat swamp forests than they do in lowland rainforests. Other animals are rare, near endemic, endemic, and/or threatened. The peat in some places can be 10's of meters thick forming over centuries. Once disturbed there is a great loss of carbon storage, resulting in millions of tons of carbon gas emissions into the atmosphere further contributing to global warming and climate change. Other environmental services and goods which peat swamp forests provide are, for instance, fresh water storage, flood prevention and livelihoods for communities.

As the peat swamp forest areas provide many environmental services and goods not only regionally but also internationally, it is no surprise to learn that they are overexploited to the point of destruction. Both Mawas and Sebangau faced the same ill-fate as did other peat swamp forests in Kalimantan such as that of the exMega Rice Project. Despite the disastrous repercussions of the mega project both Mawas and Sebangau were being targeted in similar ways. They were already being logged, drained and used for agriculture, all of which were done both legally and illegally.

This study area demonstrates the situation of having abundant environmental goods and services that are abused. This abuse includes not only the overexploitation of natural resources but also the unequal access to, or distribution of these natural resources by the authorities. When this demonstration of poor governance leads to fewer resources for the excluded groups of the population the ramifications include violence inflicted by the marginalized stakeholder groups on the more relatively well off ones. If this situation is not mitigated there will be continued deforestation and peatland destruction. Such environmental destruction will negatively impact local communities, the country and the global community on a whole.

This case study attempts to describe the problems in the area and identify causal relationships among them in order to generate a comprehensive understanding of the

situation. Before recommendations are made stakeholders are identified and an analysis of areas for mitigation is carried out.

2 Background

2.1 The Role and Global Importance of Peatlands

Peatlands are globally an important and fragile ecosystem. They are found in all continents and cover about 3% of the earth's surface, that is about 400 million ha (Environment and Heritage Service, 2004). A peatland is an area where peat is produced. Peat is partially decomposed vegetation or organic material. As peatlands are normally wet, this partial decomposition occurs when the organic material is briefly exposed to air (oxygen) before sinking and fully submerging into the wet layers. For the peat to form the amount of partially decomposed organic material that is collected must be more than the amount that decomposes (Andriessse, 1988).

Carbon content and emissions

The state of the peat remains the same even for thousands of years as virtually no more changes occur (Andriessse, 1988). For this reason peatlands have been described before as "living history books" revealing much information about past civilizations or occurrences as even organic material is preserved. In general, peatlands can contain about 20-35% of terrestrial soil carbon (Page et al., 2002 cited in Wiken et al., 2004). Their destruction, therefore, leads to large amounts of carbon emission into the atmosphere contributing to the greenhouse effect and the potential for climate and sea-level change (PEAT Portal, 2004).

Water storage and filter

Peatlands also play an important role in storing water. They store up to 20% of the world's liquid freshwater (*Global Peatland Initiative*, 2004), prevent floods and act as freshwater reservoirs for dryer periods. They also filter out excess nutrients and other chemicals from water, thus, improving water quality (Environment and Heritage Service, 2004). Compared to a sponge a peatland in its natural state can contain up to 85 – 95 % water (Environment and Heritage Service, 2004).

Biodiversity

Dependent on the type of peatland, the flora and fauna are usually either high in species diversity (variety of species and number of individuals per species) or high in species with special adaptations. Peatlands such as fens are productive and thus have many different species of plants and animals. Peatlands, such as bogs or peat swamps, are water logged, nutrient poor and have very acidic soils, thus, they are often not very species rich. They are nonetheless, very important ecosystems as they do host rare (not found in many other locations, or found in low densities) and endemic species (species

restricted to a small region) (Environment and Heritage Service, 2004). As peatlands all over the world are continuously overexploited these rare and endemic species become threatened species (Environment and Heritage Service, 2004).

Peatland exploitation and destruction

In addition to these ecosystem services, for centuries peatlands have been used for many other purposes, for instance, as agricultural land, for forestry, and energy (*Global Peatland Initiative*, 2004). Without the proper management, however, use has increasingly led to destruction. Destruction of peatlands with depths up to 10's of meters are difficult to undo as the formation of peat is a very slow process and can take up to 10 years for only 1cm to form (Environment and Heritage Service, 2004).

2.2 The Role and Importance of Indonesian Peatlands

There are different types of peatlands but this study focuses on tropical peatlands, peat swamps. Peat swamps are important ecosystems in Indonesia. Indonesia has almost 30 million ha¹ of intact peatland, which is the largest area in SE Asia (Siegert, 1997 cited in Muhamad, 2001) and about 7.5% of all peatlands on earth. Kalimantan is one of three regions in Indonesia that has most of this peatland area (Muhamad, 2001). In Kalimantan alone before 1996, there were about 3 million ha of peatlands (Boehm & Siegert, 2001).

According to Tie and Lim (1976, cited in Andriessse, 1988) the peat swamps on the Malaysian portion of Borneo contain up to 20 to 38% peat while in Indonesia, peatlands contain approximately 50% peat. Also, surface layers of deep peat contain more carbon than those of shallow peat soils (Andriessse, 1988). Peat in Indonesia can be up to 10's of meters thick.

According to the WWF Terrestrial Ecoregions description (WWF 1a), although peat swamp forests do not have as many species as neighbouring lowland rain forests, the Borneo Peat swamp Forest ecoregion is one of the most species rich in the region.

Flora

(Wikramanayake et al., 2000a)

Peat swamp forests encompass a sequence of forest types distributed from the perimeter to the centre of each swamp. Six forest communities that have a distinct structure, physiognomy, and flora are discernible (Anderson 1983; Whitmore 1984b). The first type of forest is similar to, yet less rich than, lowland dipterocarp (some species are the world's most valuable hardwoods (Barber et al., 2002)) evergreen rain forests that occur on mineral soils. These forests are dominated by Gonystylus bancanus (the single most valuable timber species and

¹ Different sources claim different figures for tropical peatlands. For example, Andriessse (1988) in FAO Soils Bulletin 59 claimed that all of South East Asia has 20.26 million ha and Indonesia has 17 million ha.

target for illegal loggers since the 1990's (Barber et al., 2002)), Dactylocladus stenostachys, Copaifera palustris, and four Shorea species (Anderson 1983). For a description of the other forest communities please refer to the WWF site.

Few plant species are endemic to peat swamp forests, mainly because of their recent formation. Many species found in the most acidic central portion of peat swamp forests also occur in heath forests (Sundaland Heath Forests). Brüinig (1973) found 146 species common to both forest types. More than thirty palm species are found in peat swamp forest, including the red-stemmed sealing wax palm, Cyrtostachys lakka.

Fauna

(Wikramanayake et al., 2000a)

Many animal species occur in peat swamp forests, but only the bat, Hipposideros doriae, and two birds, the Javan white-eye (Zosterops flavus) and the hooked-billed bulbul (Setornis criniger), are considered near endemic. Long-tailed macaques (Macaca fascicularis) and silvered langurs (Presbytis cristata) have higher densities in peat swamp forests than in lowland rain forests, but only along rivers (Wilson and Wilson 1975; Marsh and Wilson 1981; Davies and Payne 1982; MacKinnon 1983). Forest productivity is higher at the river's edge, with additional nutrient and light inputs. With only two exceptions, monkeys, gibbons, and orangutans are all found in Borneo's peat swamp forests, but at lower densities than in lowland rainforests. The proboscis monkey (Nasalis larvatus) is endemic to the peat swamp forests of Borneo.

Bird species diversity tends to be lower in peat swamp forests than in the surrounding lowland rain forests. However, in Tanjung Puting National Park, a freshwater and peat swamp reserve in Kalimantan, more than 200 bird species were recorded.

One of the most desirable and rare aquarium fish, the arowana (Scleropages formosus), is found in deep pools in peat swamp rivers. These rivers also support other typical riverine fauna such as otters, waterbirds, false gavials, crocodiles, and monitor lizards (Giesen 1987).

3 Study Areas Description

3.1 Location of study area

The Borneo Island, third largest in the world, is comprised of Malaysian and Brunei territories and for the most part the Indonesian provinces of Kalimantan. Kalimantan is approximately 543,900 km² or 73% of Borneo and has a population of 11.3 million (Badan Pusat Statistik, 2000). It is mainly low lying but has mountains in the north. Its

industries include petroleum, rubber, coffee, copra (dried coconut flesh yielding coconut oil), pepper and timber (Dresner, 1999). It is divided into four provinces: Kalimantan Barat (West Kalimantan), Kalimantan Tengah (Central Kalimantan), Kalimantan Selatan (South Kalimantan), and Kalimantan Timur (East Kalimantan). The focus of this study is on two peat swamp areas within Central Kalimantan, Mawas and Sebangau.

3.2 Mawas

Mawas is east of Palangkaraya, the capital city of Central Kalimantan, and overlaps with part of the land that was incorporated in the Mega Rice Project (MRP). The MRP is explained later on especially in section 4.1.1. According to the Borneo Orangutan Survival Foundation (BOS), this area is approximately 377,000 ha (Sowards, 2004). More than 80% of the area is peat swamp forest and is also the habitat for approximately 3,000 orangutans (*Mawas Reserve*, 2005). In September 2003, the provincial parliament in Central Kalimantan approved a new land use plan that designated the area to be managed for conservation by BOS (*Mawas Reserve*, 2005). The provincial law states that for any activities to occur in Mawas they must be approved by BOS (*Mawas Reserve*, 2005).

3.2.1 Block AB

Block AB in the south end of the Mawas Reserve was expanded to compensate for the removal of Block 05 at the north end of the Mawas reserve. In June 2003, the Ministry of Forestry decided that Block 05 would be changed from conservation status and used for timber production while in September 2003 the provincial parliament of Central Kalimantan decided to add about 13,000 ha to Block AB which would also be used for ecotourism activities. The total size, 377,000 ha, mentioned above is the result of these changes (Sowards, 2004).

3.3 Sebangau

The Sebangau peat swamp lies between Kahayan and Katingan Rivers and south of Palangkaraya, in Central Kalimantan. It is the catchment of the Sebangau and Bulan Rivers covering approximately 9,000 km². It is predominantly forested peat swamp but has a unique vegetation zone and the diversity and abundance of plant and animal species is the highest recorded for deep – peat swamp forests. The ecosystem hosts endangered, vulnerable and near threatened animal species as well as the largest population of approximately 6,900 endangered orangutans (2003 estimate), that is 12.5% of the estimated world orangutan population.

3.4 Population of Central Kalimantan

In Central Kalimantan, there are approximately 1.8 million people with a density of 12 per km² (Badan Pusat Statistik, 2000). It is generally accepted that the indigenous people, collectively called Dayaks, live mainly in the peatland areas. These forest-dwelling indigenous people depend on the peat swamps and rivers to sustain themselves through forestry, agriculture (shifting cultivation) and fishing activities. They have done this for hundreds of years and were able to live sustainably with nature. Their communities have little infrastructure to support community developments. As there are few roads and people live in small settlements located along the rivers, the rivers and streams provide the main transportation routes in the area (Muhamad, 2001).

The non-indigenous people, mainly migrants, came to Central Kalimantan mainly to work on transmigration agriculture and forestry projects but many have also established themselves in commerce in urban areas (Program on Humanitarian Policy and Conflict Research). Some, Madurese in particular, now own timber companies, petrol stations and hotels (International Crisis Group, 2001). They also work in the local shipping industries that provide the area with basic trade and supply services.

Enterprises based on tourism and local handicraft products are not well developed in Kalimantan and few viable industries exist but the milling of logs in small operations along rivers and the illegal logging of trees in peat swamp forests occur extensively (Wiken et al., 2004).

4 Analysis of Situation

4.1 Problem Overview

Communities used peatlands extensively for centuries with no significant effect on the environment (Boehm & Siegert, 2001). With rampant natural resource overexploitation, such as, illegal logging; peat drainage; runaway fires initiated to make way for big oil palm, plywood and pulp plantations; inappropriate land use policies; and, unequal rights for different groups of the population, however, there has been increase in environmental destruction, poverty, conflicts and violence.

4.1.1 Poor Governance

The government of Indonesia has been notorious for its involvement in projects and economic activities which result in acquisition of wealth for the already wealthy class, tribulations for the poor and unsustainable utilization or destruction of natural resources. There is also a general attitude that peatlands are 'idle' land that is economically worthless. There is no governmental body that manages peatland ecosystems but their management is dependent on the type of land use after they are converted. The land use should be economically productive and socially useful (Muhamad, 2001). The idea of

economically productive, however, usually refers to uses that give immediate financial return, such as logging concessions plantations or settlements (Muhamad, 2001). In the end of 1995 the government's 5 year 'Development of Peat Swamp Areas for Agriculture in Central Kalimantan' Mega Rice Project (MRP) started. The original plan was to convert 5.8 million ha of peat swamp forests to rice fields but then the ministers settled on 1.7 million ha (Kleden et al., 1999 cited in Muhamad, 2001). Its purpose was to make Indonesia once again a rice-producing self-sufficient country. The project was planned and started without any environmental impact assessments (EIA's) to assess the peatlands' capacity for rice production or to review the peatland conversion plan for the type of infrastructure development. Carrying out an EIA before the project started could have revealed that the project was not feasible or needed more preparation time (Muhamad, 2001). Also, many of the people who benefited from the logging of the peat swamp forests were related in some way to Soeharto, the President at the time (Muhamad, 2001). In addition, while transmigrants were promised homes in the area, the logged wood was transported outside of the new settlement, leaving a shortage of wood and making it difficult to fulfil this promise. Out of the MRP only the first year's harvest was successful and due to the lack of planning there was widespread environmental destruction some details of which can be found in the environmental destruction section below.

Despite the disastrous results of the MRP other mega projects were planned and peat swamp forests in other areas were targeted. The pristine forests of the Sebangau region, for instance, were targeted by illegal loggers who no longer could depend on the forests of the MRP area but could benefit from the demand for legal or illegal wood to build homes for transmigrants (Muhamad, 2001). Mawas which was saved from conversion to oil palm plantation in 1997 (*Mawas Reserve*, 2005), was also targeted for three new land use plans: the development of an industrial plantation, an oil palm project, or logging (*Mawas Reserve*, 2005). If any of these proposals were to be selected there would be peatlands cleared of forest; and, peat drained and destroyed or left vulnerable to destruction. Furthermore, forest destruction would entail destruction of habitat for specially adapted species in the region including orangutans. In addition, one of the plans was for logging but in September 2003 all logging concessions expired or were cancelled by the Ministry of Forestry. Regardless of the new official declarations, however, about one third of the Mawas was classified as production forest.

There have been many reports on this matter of government infidelity toward its duties to appropriately manage the country's resources; and, provide infrastructure and facilities for the progress of its people. This poor governance is attributed to the unwillingness as well as the inability of the government to execute its duties. Soeharto's reign is over and a new administration governs but to eradicate the unjust actions which have thrived, permeated all branches of government and trickled down into the rest of society will take generations. The first move must, however, come from the authorities. There needs to be transparency and demonstration of a just system.

4.1.2 Environmental Destruction

Regardless of the multiple environmental services and other importance of peatlands their use has increasingly led to their destruction. Destruction of peatlands with their unique biodiversity and peat depths up to 10's of meters are difficult to undo as the formation of peat is a very slow process and can take up 10 years for only 1cm to form (Environment and Heritage Service, 2004).

1. Peat swamp forest destruction:

– Deforestation by fire

Fires in East Kalimantan during 1982 and 1983 burned 2.7 million ha of tropical forest, including peat swamp forest. Fires have been occurring for thousands of years in Kalimantan but this amount of forest burned was unprecedented at the time (Barber et al., 2002). It occurred at a time of El Niño droughts but a comprehensive study carried out from 1983 to 1989 showed that the drought was not the reason for the widespread destruction but rather the wasteful and destructive logging practices utilized in the area (Barber & Schweithelm, 2000). Fires of 1997 and 1998 burned 1.12 million ha of peat swamp forest areas (Page et al., 2000 cited in Muhamad, 2001).

Every year there are forest fires along the edges of the Sebangau ecosystem. In 1997 12% and in 2002 3% of forest was burned. During peak dry season up to 600,000 ha of peat is dry to a depth of 1 m .

– Deforestation by logging

Indonesia loses approximately 2 million ha of forest each year (Barber et al., 2002). At this rate it has been estimated that by 2010 dipterocarp forests, the most targeted commercial species of wood, and speciose forest, will disappear from Sumatra and Kalimantan (Holmes, 2000 cited in Barber et al., 2002). In the exMRP and Sebangau areas there was a 44% increase or a total area of 160,775 ha in peat swamp forest logged between 1997 and 2000 (Boehm & Siegert, 2001). According to Boehm and Siegert (2001), field checks found evidence that most of the increase could be attributed to illegal logging. They also discovered that in 2000 most of logging was carried out in the Sebangau area as there were not much more commercially valuable forests left in the exMRP area after the 1997 fires (Boehm & Siegert, 2001).

In spite of this new conservation classification in September 2003 for the Mawas area, in March 2004 illegal logging activity was detected inside the Mawas reserve. With the aid of remote sensing technologies evidence was gathered and local authorities used this information to make field visits. As a result, the illegal logging activities were stopped, equipment confiscated and the operator jailed (SarVision, 2004).

2. Biodiversity and habitat Loss

– Endangered Orangutan

Orangutans, *Pongo abelii* and *Pongo pygmaeus*, are found only in Sumatra and in Borneo, respectively (Eudey & Members of the Primate Specialist Group 2000, 2004). Like the proboscis monkey, the Borneo orangutan is an endangered species and was added to the U.S. Endangered Species list in 1970 (Wikramanayake et al., 2000b), while the primate specialist group of the IUCN recently designated it as one of its top 25 most endangered primates (Barber et al., 2002). This designation classifies orangutans as facing a very high risk of extinction in the wild due to a suspected reduction of at least 50% within the next 10 years or three generations, whichever is longer (Eudey & Members of the Primate Specialist Group 2000, 2004). *Pongo pygmaeus* is also a CITES I species which means it is considered one of the most endangered CITES species to be protected from overexploitation through international trade (*CITES Appendices*, 2005). Regardless of the international protection classification and efforts, orangutan numbers continue to decline. The main threats to the population are habitat loss and destruction; and, hunting for food, pet trade, cultural, scientific or leisure activities (Eudey & Members of the Primate Specialist Group 2000, 2004; Yeager 1999 cited in Wikramanayake et al., 2000b; *CITES Appendices*, 2005).

3. Land conversion without appropriate planning

It is crucial to carry out suitability assessments before implementing large forestry or agricultural projects in peat swamp forest ecosystems. Peat soils have a fragile environment and react differently than mineral soils do. For instance, soils containing 100% peat have low marginal potential for agricultural development. Furthermore, the more minerals contained in peat soils the better the agricultural potential (Andriess, 1988). Thus, without investigating the peat content an agricultural project in an area with high peat content can lead to failure.

The exMRP, for example, was a mega project spread out across an area larger than 1 million ha of vulnerable peat swamp without the appropriate planning. Another example would be the ongoing conversion of pristine forests to oil palm plantations. Oil palms can just as successfully grow on already deforested or degraded lands (Silvius & Suryadiputra).

4. Loss of environmental services and goods

Peat swamps and peat swamp forest destruction leads to loss of many environmental services and goods. In Sebangau the more than 30,000 residents along the rivers depend on the ecosystems for their survival. Peat swamps provide freshwater even during dry seasons and by soaking up the excess water during rainy seasons they prevent flooding. The forests provide timber and non-timber products such as rattan, rubber and gemur. Forests are also used as hunting grounds for wild animals and also act as breeding

grounds for fish. Fish provides approximately 80% of the animal protein consumed by local communities .

5. Peat Destruction

The peat itself from peat swamps is also destroyed. For extracting illegal logs from the peat swamp of Sebangau, canals are dug as deep as 1.5m and 1 to 2 m wide . Logs are then floated out of the peatlands via the canals. These canals in addition, drain the water out of the peatland. In some areas enough was drained out to cause peat domes to collapse. This draining is destructive to the ecosystem as peat swamp forests are characteristically wet, thus, resulting in many changes. One such change has even global significance. Peatlands are a major store of carbon but when they are drained they are exposed to air or even fires. Consequent oxidation of the peat releases carbon dioxide, further contributing to the greenhouse effect and the potential for climate and sea-level change .

4.1.3 High levels of green house gases

The peat swamp of the exMRP which was for the most part inaccessible and a fragile ecosystem was drastically transformed. The peat swamp forests, including unique and protected species, were removed both illegally and somewhat legally. The peatland itself was drained and the remaining vegetation were burned away to prepare for agriculture. Such drastic changes and the addition of the El Niño Southern Oscillation (ENSO) phenomenon led to fires burning across the vulnerable peatlands.

Estimates of peatland area and vegetation burned as well as carbon dioxide emitted from the fires vary depending on the sources. For instance, according to the local Central Kalimantan government 27,000 ha of land burned of which 10,000 ha were in the ex-MRP area (Kompas, 1997g cited in Muhamad, 2001). In a report from UNEP and UNESCO's GRASP, it was stated that 1 million ha, 20% of Central Kalimantan, was burned in the same fires . While in a proceedings paper for the International Peat Congress, Page et al. (2000 cited in Muhamad, 2001), claimed that fires of 1997 and 1998 burned 80% of approximately 1.4 million ha of peatlands in the exMRP area. From the peat that burned in the exMRP area, it was estimated that between approximately 0.167 to 0.367 gigatonnes of carbon was emitted within a few months (Muhamad, 2001). Another source claimed that drained peat and vegetation in Kalimantan burned to release between 0.81 and 2.57 gigatonnes of carbon, the amount equivalent to 13% to 40% of the mean annual global carbon emissions from fossil fuels (PEAT Portal, 2004; *Sebangau Ecosystem Restoration Project*).

4.1.4 Transmigration, Violence and IDP's

Transmigration in Indonesia was executed for several reasons: for relocating residents to work on large agricultural projects in other areas; to relieve population pressures in the more populated islands, such as Madura, Bali and Java; and, to develop the economies of less populated islands such as Kalimantan. Transmigration has been occurring in

Indonesia since the Dutch colonial rule but until the Soeharto Government were the numbers of transmigrants substantial (International Crisis Group, 2001). Before 1980 there were about 13,000 transmigrants relocated to Central Kalimantan. Between 1979 and 2000 when the transmigration program ended, there were almost 180,000 migrants, or 21% of the population, in Central Kalimantan (International Crisis Group, 2001).

Soeharto's plan for the MRP was to relocate approximately 1.7 million people to the peat swamp area to plant rice and other crops. If this plan were to follow through the indigenous Dayaks would have become a minority in the province.

New migrants to Central Kalimantan were given land grants, opportunities to work on transmigration agriculture and forestry projects or established themselves in commerce in urban areas (Program on Humanitarian Policy and Conflict Research). Madurese in particular, now own timber companies, petrol stations, hotels, and transport companies (International Crisis Group, 2001). The Dayaks, on the other hand, who depend on the forest for their livelihood and for hundreds of years have lived in harmony with nature found that they were being pushed further into the interior by logging and plantation activities. Due to a change in law, Soeharto's Basic Forestry Law 1967 and Mining Law of 1968 allowed the government to take away indigenous territories and give to logging and mining companies. Perhaps this disregard of the government at the time for the Dayak people stemmed from the government's belief that indigenous people are "backward' and in need of development" (Linder, 1997). The land was taken away from the indigenous people, they were chased away and no compensations returned to them.

The combination of the neglect and marginalization of the Dayaks and the progress of the Madurese along with cultural stereotypes between the two are believed to be the impetus for the violence that evolved out of years of escalated tension. During 1996 and 1997, it is estimated that about 500 Madurese were killed by Dayaks, however, others believe that the range is from 300 to 3,000 (Human Rights Watch/Asia, 1997 cited in International Crisis Group, 2001). In 1999, the official record of Madurese killed is 186. By early March, 2001 about 469 were killed of which 456 were Madurese (Tempo, 2001 cited in International Crisis Group, 2001). In addition, almost 2000 homes and many vehicles were destroyed (Jakarta Post, 2001 cited in International Crisis Group, 2001).

By 2000, more than 50,000 Madurese IDP's were in camps in West Kalimantan while many others had returned to Madura (Kompas, 2000 cited in International Crisis Group, 2001). The Madurese had fled to avoid any more attacks by the Dayaks.

4.2 Problem Linkages

The problems in the region are manifold and complex. The problem linkage described here and demonstrated in Figure 1., is a simplified version of the situation and it aims at giving a clear understanding through cause and effect relationships. There might be other factors not included here that may lead to some of the problems listed or depending on the reader's interest a different core problem could be identified which could also lead to a rearrangement of the problems. The linkages are based on literature research of related

documents and input from the local counterparts. They are used in further analysis of what the region needs.

As the IES' objective is to promote environmental security it recognizes the core problem in the study area as environmental destruction. That includes, for instance, peat swamp destruction, deforestation, illegal logging and habitat destruction.

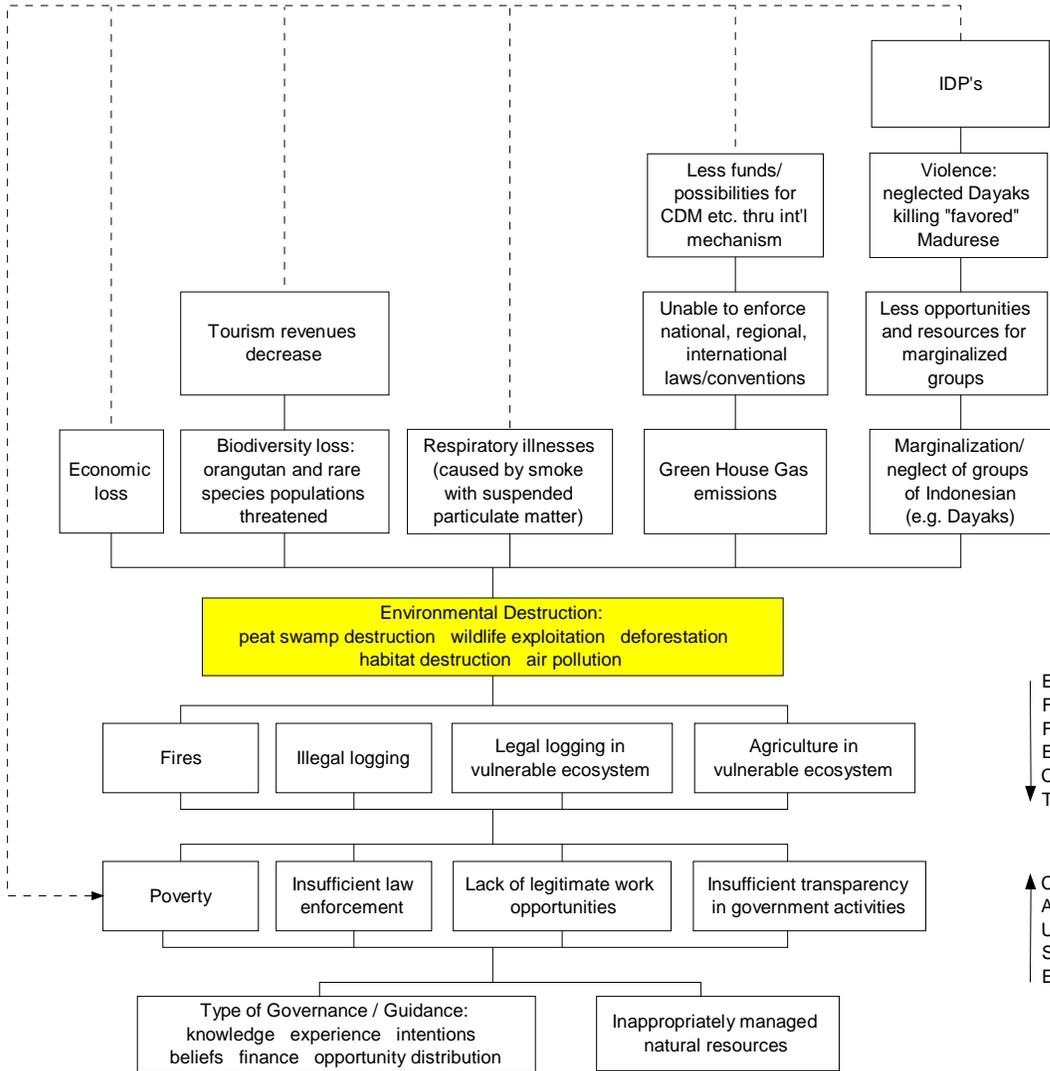


Figure 1. Problem tree (cycle) showing cause and effect relationships among the problems identified in the region

4.3 Stakeholders

In order to address the problems appropriately it is important to have an understanding of each group's concerns. As there are many different stakeholders in the region, in some instances categories were developed to make consideration of as many stakeholder

groups feasible for this study. The following stakeholders are in some way related to the problems above.

Stakeholders	Objectives, Goals, Needs	Environmental & Natural Resources Interests	Entitlements
1. Local Dayak communities	Livelihood	Fish, animals to hunt, land to farm, trees to log	Traditional rights taken away
2. Central Kalimantan Government	Environmental Protection, stable economy, people's welfare	Forest, Peat swamps, biodiversity	Authority over lands in this area
3. German and Dutch Government (and other potential donors with similar intent)	Environmental Protection in Kalimantan; meeting environmental quotas in own countries as targeted	Forest, peat swamp and biodiversity protection, less GHG	Environmental conservation activities agreed to under Debt for Nature Swap
4. Illegal loggers	Livelihood (and high profits)	Forest to log, peat to drain for extraction of log	No part of the area
5. Oil company	Offset of Carbon thru Mawas reserve conservation	Designated areas of Mawas to be reforested, and/or currently forested	According to carbon offset agreement: a specified area of Mawas to be protected
6. Industrial Plantation Investors	Livelihood and high profits	Deforestation by fire, peat swamp drainage	None granted at the moment
7. Oil palm Project Investors	Livelihood and high profits	Deforestation by fire, peat swamp drainage	None granted at the moment
8. Loggers	Livelihood and high profits	Forest to log, peat to drain for extraction of log	None granted at the moment
9. BOS	Orangutan protection through habitat conservation + local community education + alternative livelihood implementation	Orangutans, forest, peat swamp and biodiversity protection	Conservation status for at least 377,000ha of Mawas
10. International Community (e.g. potential tourists, nature lovers, conservationists)	Environmental protection; longevity of orangutan populations; reduction in GHG emissions and air pollution	Peat, forest, orangutans and other charismatic species	Generally, external observer only.
11. NGO's	Orangutan protection through habitat conservation + local community education + alternative livelihood implementation	Orangutans, forest, peat swamp and biodiversity protection	Varies

Table 1. Overview of stakeholders needs and interests

4.4 Conflicts

Conflicts are mainly between parties who exploit and parties who conserve. In addition, within the conservation aspect there are also conflicts. For instance, conflict among NGO's stem from the desire for certain roles, such as managing funds or making decisions. Among those interested in exploiting resources, because there is still lack of planning, enforcing laws and monitoring, many take advantage of the situation. For instance, there are illegal loggers, plantation owners that plant beyond their official boundaries or those that start fires without taking precautions. As a result of taking advantage of the insufficiently managed natural resources, the nature of business or daily life for the indigenous people, becomes one of lawlessness, greed and unaccountability.

For an overview of the conflicts between stakeholders please refer to the *Conflict Matrix*, in Annex1.

5 Attention Areas for Mitigation

As a result of completing the identification of the stakeholders, their needs and interests assessment followed by a current or potential conflict assessment a few areas of attention have emerged.

1. Education about the value of the environment (including biodiversity, ecosystems and their services, endangered and threatened species) not only for preservation but for the long term availability for the people themselves.
2. Government can delegate responsibility as well as authority where necessary to ensure sustainable management of natural resources. E.g. BOS
3. Human rights education
4. Educate people that environmental protection should help alleviate poverty for the long term and not exacerbate it. Government development plans must incorporate this as part of its core.
5. Monitoring of land use/land cover for maintaining contracts, law enforcement, and ecological observations.
6. Land registration system
7. Land suitability assessment and results availability to government and public.
8. System for ongoing communication among stakeholders where relevant, for developing a rapport and providing information on plans, changes, objectives etc.

9. System for communication among competing stakeholders: for reviewing objectives and stating new changes etc. esp. e.g. BOS and international community.
10. Eradicate government corruption
11. Government must have capacity to enforce law, respect agreements, and enforce not only local laws but international (environmental) conventions.
12. Government should submit long term socioeconomic environmental plans for development to a capable and independent agent for approval when development involves natural resources that are related to international environmental conventions.
13. EIA's should be compulsory for development projects of certain scales or certain locations.
14. Improve judicial system to withstand biases and political influence.
15. Alternative livelihoods for the local people so they do not need to exploit vulnerable ecosystems.
16. Improve forest management to prevent runaway fires like those of 1982/83 and 1997/98.
17. Strengthen Indonesia's capacity to prevent or combat fires.

6 Recommendations

Attention Area	How to Address
<p>1. Governance/Guidance</p> <p>a. Obtaining finances</p> <p>b. Obtaining education & training</p> <p>c. Law enforcement - environmental protection</p> <p>d. Independent evaluations of development projects before implementation</p> <p>e. Checks and balances for intra government transparency</p>	<p>a. Environmental services valuation & financial mechanisms adaptation^I</p> <p>b. Establish relationships with international training institutes^{II}</p> <p>c. With funds obtained in a. and with assistance of remote sensing for monitoring^{III}</p> <p>d. With funds obtained in a. and paid directly from external donors to non Indonesian non profit entity with no conflict of interest in working with Indonesia, to evaluate projects</p> <p>e. Research, select and adopt most appropriate from those in practice else where</p>

1. Payments for ecosystem services should provide alternatives for ecologically detrimental activities such as illegal logging and the conversion of High Conservation Value forests into plantations. The proposed contract between Mawas and an outside energy industry to pay for a long-term carbon credit scheme can be a model for those areas with still existing forests.
2. Since under the Kyoto Protocol's Clean Development Mechanism (CDM) in the field of forest management it is only possible to sell credits by re- or afforestation, those situations where this is possible should be inventoried and submitted to the (difficult) CDM procedure, with the help of outside technical assistance.
3. Indonesia should promote that in the second Kyoto commitment period, standing natural forests should qualify under the CDM, on the basis of well-monitored commitments to keep deforestation below a certain agreed level.
4. Commercial alternatives in the field of agriculture, certified timber and palm oil production and eco-tourism should be encouraged with the assistance of international NGOs working in these fields. (A promising initiative is the Roundtable on Sustainable Palm Oil).
5. Long-term financial security is essential for the management of ecosystems. It is recommended to use a multi-donor trust fund construction as now proposed for the protected areas in Colombia by the GEF/World Bank also for the peat swamp forests on Kalimantan and use this as a model for the other parts of Indonesia. A key component of this construction is an endowment, the proceeds of which are to be used for recurrent costs. The filling of such an endowment could typically come from a debt-for-nature swap. The existing options within the Indonesian context in this respect should be considered.

○ **Legal Aspects**

6. As Party to the Convention on Biological Diversity, Indonesia - one of the "mega-biodiversity" countries in the world – is required to adopt and apply the ecosystem approach. Its National Biodiversity and Strategy and Action Plan should be made legally binding and should be implemented in practice.
7. Indonesia is Party to the Climate Convention and the Kyoto Protocol. Although it has no reduction obligations under the Protocol, it is bound by the objectives of the Convention and should refrain from activities aggravating the global climate problematique. From this legal perspective it should be encouraged to adopt effective policies to combat illegal logging and fires – during the burning season the fires make Indonesia one of the major emitters of greenhouse gases in the world.
8. The ASEAN Agreement on Transboundary Haze Pollution of 2002 has not yet been ratified by Indonesia. It is urgent to do so.

9. A thorough analysis should be made of the *de facto* situation with respect to the local rights of access to natural resources in the case-study area in the face of outside threats.
10. Environmental Impact Assessments should be used not only as technical reports, but also as a process to promote participation and good governance

II. Establish relationships with international training institutes

III. With funds obtained in a. and with assistance of remote sensing for monitoring

1. As a component of ensuring environmental security monitoring is essential. Both the monitoring of biophysical and man made aspects of the region as well as monitoring of the administration and effectiveness of projects is important. Regarding the former, we recommend the implementation of a permanent monitoring system aimed at detecting land use and land cover changes. The existing radar-based monitoring system for the Mawas area should be extended to the Sebangau area and to the other peat swamp and peat forest areas of Kalimantan in order to be used to detect illegal logging; illegal canals and roads; illegal deforestation for plantations; fires; and, to help enforce existing legislation and regulation. Results can be used to prevent further peat swamp forest destruction or to monitor parameters that need to be regulated as part of contractual agreements between local forest owners and outside buyers of carbon credits based on forest conservation or restoration or outside parties interested in the maintenance of forest-based biodiversity. A crucial part of monitoring is being able to compare new findings with the past or with other types of data, thus a compilation of baseline data is important. Other data types can include cadastral boundaries, land use zoning plans, and maps of land suitability assessment.

The local communities, authorities and executing agencies should be fully involved in operating the system and the juridical follow-up of the data received and interpreted. Adequate training courses should be developed and conducted.

2. Since the system is of great importance also for other parts of Indonesia (Sumatra!), it should be embraced by the relevant ministries and national authorities and used for the obligatory reporting by Indonesia as Party to the Convention on Biological Diversity (CBD) to the Conference of the Parties.
3. The system should also be used in the preparation of meetings of the Parties to the ASEAN Haze Agreement, both to assessment the performance of the Parties in preventing haze pollution in the region and to prepare effective programmes for the future.
4. Maps updated by the monitoring system and applying GIS, should be made showing the ecological state of affairs, the threats and the (potential) conflicts –see attached

map. A very important purpose of these maps would be to demonstrate where certain activities can take place and where not. This is especially relevant for the concession policy in the field of logging and plantations.

2a. Local Community Empowerment

1. As mentioned above, training in using modern monitoring techniques is important to protect the local communities and the ecology against the threats of logging and fires. This training should especially assist the local police and judiciary in enforcing the law. Also, training in preventing and combating fires and in economic alternatives is essential.
2. The Indonesian military and diplomacy have to be made aware that the logging and fires on Kalimantan and increasingly now also on Sumatra pose a serious environmental security threat to their neighbours and to the rest of the world and constitute a violation of binding international agreements. They should be encouraged to make a paradigm shift here and become a country that is leading on the international environmental scene and earn a large part of their foreign exchange by selling carbon credits, making their unique biodiversity available to tourists and the pharmaceutical industry, and by exporting certified commodities such as timber and palm oil.

IV. Funds from 1a. above & joint technical capacities

A joint capacity is similar to 2. above except the local experts would be working alongside foreign experts of the same field to build infrastructure in rural areas. The benefits would be a transfer of modern expertise at the same time as infrastructure development.

7 Contribution to Progress

The IES participated along with other organizations of the Netherlands conservation community in lobbying the Dutch Government for assistance geared toward conservation, restoration and poverty alleviation of Central Kalimantan's peat swamp ecosystem. As a result, the Minister of Development Corporation adopted an amendment to the Dutch budget for 2005. This amendment allocates €5 million in 2005 and structural funding of €10 million per each following year. Funding starting in 2006 will be of a structural nature. The Ministry's intention is to provide long term funding and to seek other donors for the establishment of a Multi-donor Trust Fund.

8 Conclusion

Past peatland events in Kalimantan help to show that an unchanged approach is disastrous for the environment, biodiversity and humans, not only at a local or regional scale but also at a global scale. Indonesia has signed and ratified all the major environmental related conventions. While there are organizations presently addressing many of the problems we have identified as priority there needs to be investigation on how much is planned and for what is there already funds allocated. Indonesia has also been fortunate up until now in receiving funds and long term investments for accomplishing these goals. The challenge now is to channel these funds appropriately and transparently without duplication to alleviate peat swamp ecosystems destruction as well as local poverty and the high levels of GHG's emissions. To accomplish this Central Kalimantan needs to focus its efforts on enforcing the law, planning effectively while incorporating sound information and monitoring.

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10 Acronyms

BOS	Borneo Orangutan Survival Foundation
EIA	Environmental Impact Assessment
GHG	Green House Gas
IDP	Internally Displaced People
IES	Institute for Environmental Security
MRP	Mega Rice Project
NGO	Non Governmental Organization

11 Annex 1: Conflicts and Alternatives Matrix

	Local Dayak communities	Central Kalimantan Government	German and Dutch Government	Illegal loggers	Oil company	Industrial Plantation Investors	Oil palm Project Investors	Loggers	BOS	International Community
Local Dayak communities	Internal conflicts?	Alternatives, Education	Alternatives, Education	Alternatives, Education, monitor for prevention, law enforcement	Alternatives, Education, monitor for prevention, law enforcement	Alternatives, Education, monitor for prevention, law enforcement	Alternatives, Education, monitor for prevention, law enforcement	Alternatives, Education, monitor for prevention, law enforcement	Alternatives, Education, monitor for prevention, law enforcement	Alternatives, Education, monitor for prevention, law enforcement
Central Kalimantan Government	Trees, land, biodiversity. Comm, Collab., Coor ??	internal conflicts?	Less corruption in govt= checks and balances, anti- nepotism. - env. Prot. Must generate income or don't take away income	if large scale/ wealthy logger then law enforcement if poor logger, then less punishment and alternative and education Monitoring needed	need reliable Land Regis. Sys. to avoid chaos - govt must respect contracts, no corruption	Land Regis. Sys. - Respect agreements - Scientific input on Land suitability	Land Regis. Sys. - Respect agreements - Scientific input on Land suitability	Land Regis. Sys. - Respect agreements - Scientific input on Land suitability	Land Regis. Sys. - Respect agreements - Scientific input on Land suitability, - give authority not only responsibilities	Land Regis. Sys. - Respect agreements - Scientific input on Land suitability, - give authority not only responsibilities. Less corruption in govt= checks and balances, anti- nepotism. - env. Prot. Must generate income or don't take away income
German and Dutch Government	Trees, land, biodiversity, GHG emissions. Comm, Collab., Coor via BOS + NGO's	Corruption in Indonesian gov't: undermines env. Protection, community welfare, possibly contracts for env. Prot. + GHG reduction	internal conflicts?	if large scale/ wealthy logger then law enforcement if poor logger, then less punishment and alternative and education. Monitoring needed	in sync	local govt must enforce Land suitability restrictions - EIA - Provide alternative areas with less vulnerability, - enforce intl. conventions - submit long term socio econ, env. Plan to capable + independent agent	local govt must enforce Land suitability restrictions - EIA - Provide latern areas with less vulnerability, - enforce intl. conventions - submit long term socio econ, env. Plan to capable + independent agent	Local govt must enforce Land suitability restrictions - EIA - Provide latern areas with less vulnerability, - enforce intl. conventions - submit long term socio econ, env. Plan to capable + independent agent	in sync	in sync
Illegal loggers	Trees, habitat of hunted animals, land for farm. Comm, Collab, Coor.??	trees, peatland, habitat, biodiversity	forest, peatland, habitat loss, other ecosystem services lost	internal conflicts?	if large scale/ wealthy logger then law enforcement if poor logger, then less punishment and alternative and edu. Monitoring needed	if large scale/ wealthy logger then law enforcement if poor logger, then less punishment and alternative and edu. Monitoring needed	if large scale/ wealthy logger then law enforcement if poor logger, then less punishment and alternative and edu. Monitoring needed	if large scale/ wealthy logger then law enforcement if poor logger, then less punishment and alternative and edu. Monitoring needed	if large scale/ wealthy logger then law enforcement if poor logger, then less punishment and alternative and edu. Monitoring needed	if large scale/ wealthy logger then law enforcement if poor logger, then less punishment and alternative and edu. Monitoring needed

Oil company	Trees (esp. reforested ones) (could become conflict in future) Comm, Collab, Coord. Via Bos + NGO's	Corrupt in Indonesian govt: undermines possibly contract for carbon offset	not a conflict but note possibility: how to make sure govt no sell same credits to many donors. What about rule that transactions go thru one indpndt, neutral org.	Trees (could become conflict in future)	internal conflicts?	Land Regis. Sys. - Monitoring (if keep within bndries then ok.)	Land Regis. Sys. - Monitoring (if keep within bndries then ok.)	Land Regis. Sys. - Monitoring (if keep within bndries then ok.)	Land Regis. Sys. - Monitoring (if keep within bndries then ok.), explicit objs. + meets to ensure everything is as planned	in sync
Industrial Plantation Investors	Trees, habitat of hunted animals, land for farm. Comm, Collab, Coord.??	None: b/c govt gives permission	NR: trees, peat land, habitat	Trees: investors use land for plantation meaning less trees for illegal loggers. Also if loggers cut from plantation= probs.	only if both get same land to use	Internal conflicts?	Land Regis. Sys. - Monitoring (if keep within bndries then ok.)	Land Regis. Sys. - Monitoring (if keep within bndries then ok.)	if govt. does its part should be no conflicts, - monitor Proj if within vicinity of BOS territory	if govt. does its part should be no conflicts, -monitor Proj if within vicinity of BOS territory
Oil palm Project Investors	Trees, habitat of hunted animals, land for farm. Comm, Collab, Coord.??	None: b/c govt gives permission	NR: trees, peat land, habitat	Trees: legal loggers pay for use of areas and illegal loggers don't	only if both get same land to use	If development plans appropriate and areas are separate should be no conflicts	Internal conflicts?	Land Regis. Sys. - Monitoring (if keep within bndries then ok.)	if govt. does its part should be no conflicts, - monitor Proj if within vicinity of BOS territory	if govt. does its part should be no conflicts, -monitor Proj if within vicinity of BOS territory
Loggers	Trees, habitat of hunted animals. Comm, Collab, Coord.??	None: b/c govt gives permission	NR: trees, peat land, habitat	Trees: investors use land for plantation meaning less trees for illegal loggers. Also if loggers cut fromplantation = probs.	only if both get same land to use	If development plans appropriate and areas are separate should be no conflicts	If development plans appropriate and areas are separate should be no conflicts	Internal conflicts?	if govt. does its part should be no conflicts, - monitor Proj if within vicinity of BOS territory	if govt. does its part should be no conflicts, -monitor Proj if within vicinity of BOS territory
BOS	orangutan safety, trees, land, biodiversity. Comm, Collab, Coord. Direct + existent	Does govt give BOS what they need now or there are conflicts? - govt's inability to manage + prot. land is abused by others	should be in sync = no conflicts	forest, peat, habitat + biodiversity loss, endangered orangutan	contract between 2 must state explicitly LU for prot. Purposes, other wise conflict	forest, peat, habitat + biodiversity loss, endangered orangutan	forest, peat, habitat + biodiversity loss, endangered orangutan	orangutan habitat loss, forest destruction, biodiversity loss	Internal conflicts?	in sync, -review objectives + state new ones or changes

 Conflicts  Alternatives

IES EnviroSecurity Assessments

A major proportion of the world's ecosystems and the services they perform for society and nature is being degraded or used unsustainably. This process affects human wellbeing in several ways. The growing scarcity of natural resources creates a growing risk for human and political conflicts and hinders sustainable development and the poverty alleviation that depends on it. Situations involving resource abundance can also be related to serious environmental degradation, increased community health risks, crime and corruption, threats to human rights and violent conflicts – in short, to a decrease of security.

The overall objective of IES EnviroSecurity Assessments is to secure the natural resource livelihood basis on the local, regional and international level. IES pursues this objective along the following mutually related lines: (1) the conservation of ecosystems and their related services, (2) the implementation of the international legal order, (3) the provision of economic incentives for maintenance of ecosystem services, and (4) empowerment of relevant actors and dissemination of results.

About the Institute

The **Institute for Environmental Security** (IES) is an international non-profit non-governmental organisation established in 2002 in The Hague, The Netherlands with liaison offices in Brussels and Washington, D.C.

The **Institute's** mission is: *"To advance global environmental security by promoting the maintenance of the regenerative capacity of life-supporting ecosystems."*

Our multidisciplinary work programme - **Horizon 21** - integrates the fields of science, diplomacy, law, finance and education and is designed to provide policy-makers with a methodology to tackle environmental security risks in time, in order to safeguard essential conditions for sustainable development.

Key objectives of the **Horizon 21** programme are:

- **Science:** Create enhanced decision tools for foreign policy makers, donors and their target groups on regional, national and local levels;
- **Diplomacy:** Promote effective linkages between environment, security and sustainable development policies.
- **Law & Governance:** Contribute to the development of a more effective system of international law and governance;
- **Finance:** Introduce new and innovative financial mechanisms for the maintenance of the globe's life supporting ecosystems; and
- **Education:** Build the environmental knowledge capital of people and organisations.

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