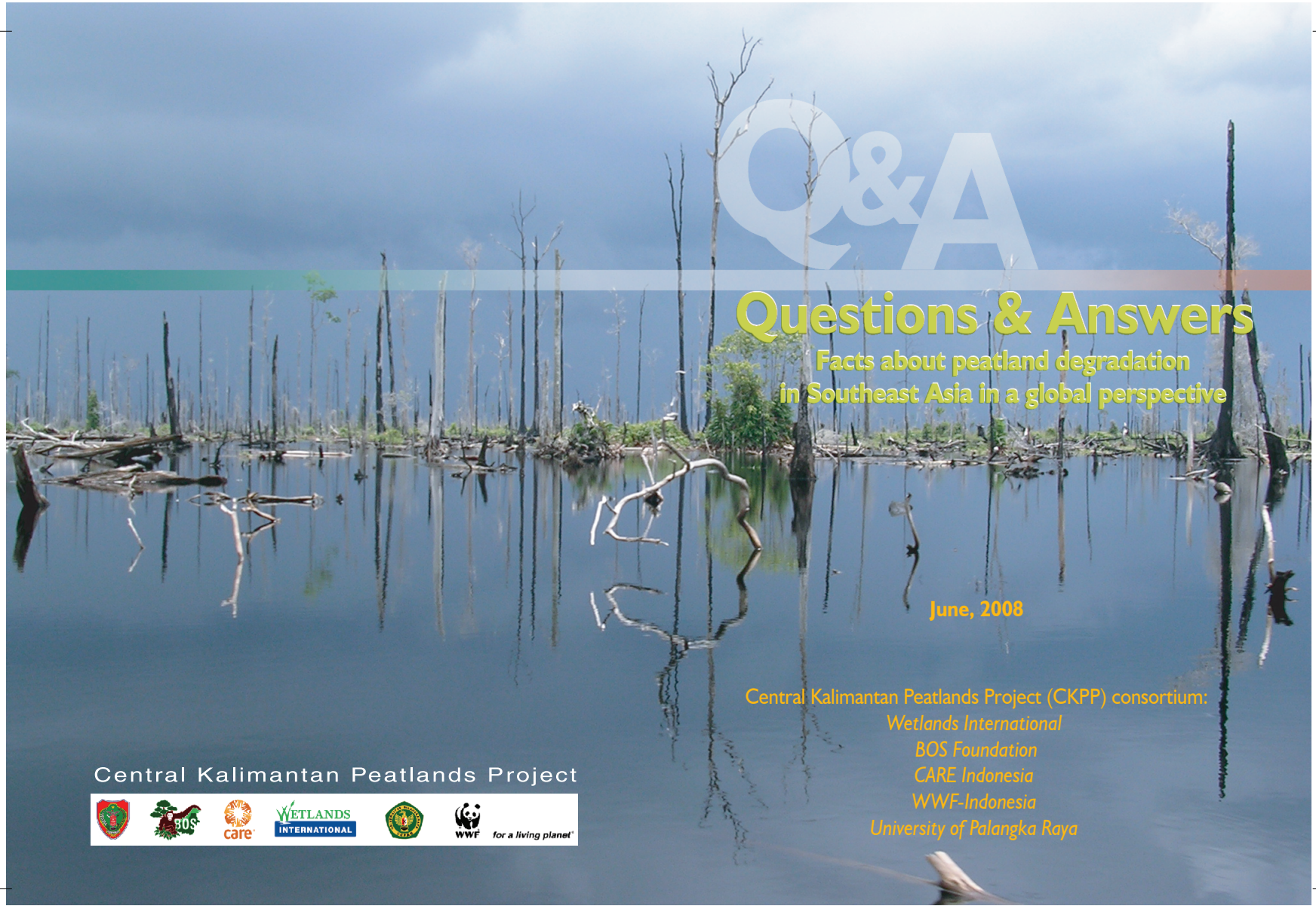


Questions & Answers

Facts about peatland degradation in Southeast Asia in a global perspective

June, 2008

Central Kalimantan Peatlands Project (CKPP) consortium:
Wetlands International
BOS Foundation
CARE Indonesia
WWF-Indonesia
University of Palangka Raya

Central Kalimantan Peatlands Project

Introduction

Introduction

This pocket-size booklet from the Central Kalimantan Peatlands Project (CKPP) provides you with the most crucial Questions & Answers on the values and problems of the tropical peatswamp forests of Southeast Asia, and the package of solutions necessary for the conservation, restoration and wise use of peatlands as successfully piloted in CKPP.

The tropical peatswamp forests of Southeast Asia host thousands of plant and animal species. Many people depend on the wood and plant resources that these forests deliver.

The enormous quantity of carbon stored in the peat soils of these forests is of extreme importance. The current degradation of the peatlands causes massive emissions from these carbon stocks, with global implications for our climate.

We hope that this Question & Answers booklet will help you to understand the great importance these areas possess.

If you have any further questions, please contact us or visit www.ckpp.org / www.ckpp.or.id

Yours sincerely,

The CKPP Consortium

The Central Kalimantan Peatlands project (CKPP) is providing support to the authorities and local stakeholders in Central Kalimantan in the conservation of remaining peatswamp forests, including the Sebangau National Park, and the restoration of a vast area of logged and burnt former peatswamp forest.

Annual peat fires that cause huge greenhouse gas emissions and smog are prevented through implementing an integrated approach of hydrological restoration (i.e. closing drainage canals), reforestation and supporting sustainable livelihood development.

The project is managed by Wetlands International and locally implemented by a consortium of Wetlands International-Indonesia, BOSF, CARE-Indonesia, WWF-Indonesia and the University of Palangka Raya, working in close cooperation with the local authorities and communities.

The project is financed by DGIS/Ministry of Foreign Affairs of The Netherlands.

Index

1

Introduction to peatlands

What is peat?

Peat is dead organic material that has been formed on the spot. Peat exists for 90% of water and for 10% of plant remains. Peat is formed under conditions were dead plant material is conserved for thousands of years due to permanent water saturation, low oxygen levels and a high acidity.

What are peatlands?

Areas with peat soils are called peatlands. The thickness of the peat layer varies, but in Southeast Asia it can reach up to 25 meters.

As the key feature (peat) is located underground, peatlands are often overlooked.

Where are peatlands found?

Peatlands are found in almost every country of the world. They cover over 4 million km^2 worldwide, or 3% of the world's land area, and represent half of the global wetlands.

What are the different types of peatlands?

Peatlands may be naturally forested or naturally open and vegetated with mosses, sedges or shrubs.

Examples of naturally forested peatlands are the Alder peat forests in Europe and the lowland humid tropical peatswamp forests in Southeast Asia. Tropical peatlands are widely distributed throughout the world. Small tracts are found in parts of Latin America, Africa and the Caribbean. The vast majority, however, is found in Southeast Asia, covering 60% of the total tropical peatland area and over 85% of tropical peatland carbon storage.

Examples of naturally open peatlands are the permafrost areas of Russia and Canada, the Everglades in North America, and the high mountain peatlands (*Paramos*) of the Andes and Himalayas.

What is the importance of peatlands?

Carbon storage

Peatlands globally contain at least 550 Gigatonne carbon: equivalent to all other terrestrial biomass (forests, grass and shrublands, etc.) and twice as much as all carbon stored in the world's forests.

In the sub (polar) zone, peatlands contain on average 3.5 times more carbon per hectare than above-ground ecosystems on mineral soil; in the boreal zone 7 times more; and in the humid tropics over 10 times the amount of carbon stored in above-ground habitats.

Water retention

Due to their capacities to store and maintain large quantities of water, peatswamp forests play an important role in flood mitigation and ensure a continuous supply of clean water throughout the year. Especially mountain peatlands, of for instance the Himalayas, Tibetan Plateau and the Andes, play a crucial role in reducing extremes in water flow and reducing floods or droughts.

Biodiversity

Peat soils often possess very nutrient-poor soils, and tend to be the poorest areas for agriculture. Although the total species richness in peatlands in temperate climates is low, peatlands are the only available habitat for many plant and animal species.

Peatlands in the tropics are a different story altogether; despite the lack of nutrients, they represent a high biodiversity ecosystem with thousands of species.

Agriculture and forestry, fisheries

Peatlands are very poor agricultural areas and generally support only low population densities. Despite this, millions of people live in and depend on the world's peatlands for herding cattle, fish catch, reed harvesting, farming specific crops and in forested peatlands, forestry.

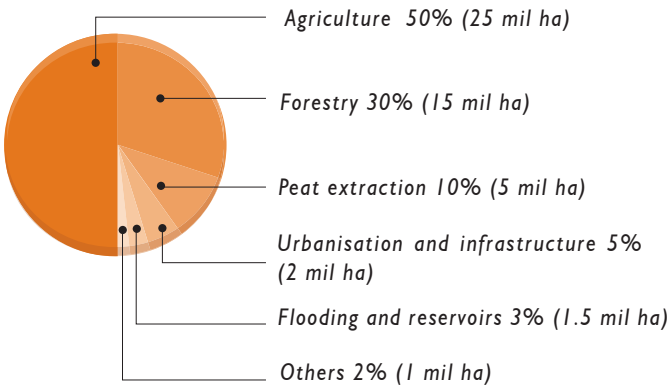
Efforts to improve the production in peatlands by conversion, drainage and fertilizing the soils are often very unsustainable. These areas often turn into wastelands within decades when their just bare mineral soils are left or when the ground level has subsided below the water table.

What is the state of the world's peatlands?

Human exploitation has destroyed 25% of the peatlands on earth.

The enormous peatlands of Northern America or Russia are often still relatively unaffected. Even if degraded, decomposition processes in the cold northern peatlands and southern peatlands of Argentina or Chile take place at a much slower rate than in the tropics.

The contribution of different human activities to peatland losses *(Parish, et al.,2008)*



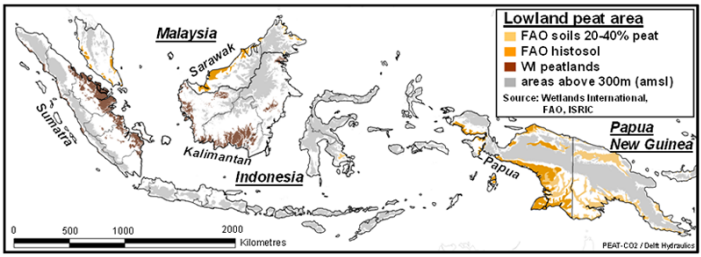
What happens if we would lose the world's peatlands?

The magnitude of especially boreal peatlands in Canada or Russia is enormous. If these are lost, global greenhouse gas emissions will rise dramatically as these areas contain over 50 times more carbon than all global annual fossil fuel emissions.

Threats like climate change itself are alarming and could lead to massive emissions of organic peat carbon. With the melting of the permafrost of Canada and Russia, large peatland areas will 'come out of the fridge' and will decompose during dry seasons. The combination of relative young (seasonal) vegetation and temporary flooding leads in boreal peatlands to production of methane, a very potent greenhouse gas. In addition, there is a risk that fossil methane stores under the permafrost areas will be released (read more about methane in the chapter about climate change).

2

Peatlands in Southeast Asia



How much peat can be found in Southeast Asia?

Peatlands make up 12% of the Southeast Asian land area (defined as Indonesia, Malaysia, Brunei and Papua New Guinea). This equals some 27 million hectares. Indonesia harbours 22,5 million hectares, Malaysia 2 million and Papua New Guinea 2.6 million.

An average peat thickness of 3-5 meters is assumed for western Indonesia and 1-2 meters in East Indonesia, 3 meters for Malaysia and Brunei and 1,5 meters for Papua New Guinea.

How were tropical peatswamp forests formed in Southeast Asia?

How was the Southeast Asian peat formed?

Formation of most peatswamp forests in Indonesia started approximately 5,000 to 8,000 years ago in wet areas, often river floodplains. Peatswamp forests grow on a thick layer of organic matter that has accumulated over time at a rate of several millimetres per year. The 'peat' layer consists of dead plant material like roots, leaves, branches and even complete tree trunks.

These layers only are formed under very special circumstances. Normally, dead plant materials are rapidly decomposed by fungi, bacteria and other organisms. Due to the extreme anaerobic, acidic and nutrient poor conditions in tropical peatswamp forests, however, the process of biodegradation is significantly reduced.

What is the specific importance of Southeast Asian peatswamps?

Carbon storage

In South-east Asia, almost all lowland peat is derived from forest vegetation and has a high wood and, therefore, carbon content. Most studies consider a value in the order of 60 kgC/m^3. Based on this assumption, as well as on the peat extent-and thickness, Asian peatlands store at least 42,000 Mt of carbon. This is only a small portion of the carbon stored in all peatlands around the world (550 Gt).

The loss of Southeast Asian peatlands is enormous and counts for approximately two thirds of all carbon losses from peatlands.

Coastal fresh water buffer

Peatlands in Southeast Asia's coastal areas, such as the vast peatland areas on the east coast of Sumatra, can act as freshwater buffers against saltwater intrusion and thus protect valuable agricultural areas on clay soils between the peat and the sea.

Biodiversity

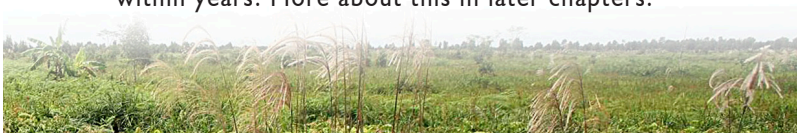
Southeast Asian peatland forests are among the last vast tracks of rainforest in the area. These areas are of particular importance for the survival of the *Orang Utan, Sumatran Tiger, Sumatran Rhinoceros,* as well as less well-known rare species such as *the White-winged Duck, Storm's Stork* and *False Gavial* which have small populations that are mainly restricted to peatswamp forests.

The tropical black (peat) water habitats present a tremendously rich biodiversity of fish and other aquatic animals.

Agriculture, forestry, fisheries

Southeast Asian peatlands are hardly suitable for agricultural use and hard to access. This has resulted in low population densities. Still, the areas are important to millions of people for production of specific crops like rattan, for fisheries, hunting, and last but not least for forestry. The world's most precious timber resources with *Meranti, Rahmin* and *Ironwood* trees are found in these peatlands.

Efforts to improve the productivity of the areas by large scale logging and drainage have generally resulted in shocking failure, resulting in wastelands within years. More about this in later chapters.



What are the consequences of peatland loss in Southeast Asia?

The disturbance of the peatlands has far-reaching consequences for the potential of the peatswamp forest for flood control, carbon storage and biodiversity. Peatland loss in Southeast Asia is a global problem due to the loss of precious peatswamp forests and the huge carbon dioxide emissions.

Are the peatlands in Southeast Asia threatened?

Already over 90% of Southeast Asian peatswamp forests have been affected by drainage, conversion or logging. Between 1985 and 2005, Southeast Asian peatlands were deforested at an average rate of 1.3% per year;the highest value is found in East Kalimantan (2.8%) and the lowest in Papua (0.5%). This is twice the rate of deforestation in other forest types.

Moreover, some 45% of the peatswamp forests in Southeast Asia have already been severely affected by large scale developments, drainage, deforestation and (often illegal) logging. Another 45% has been impacted by selective logging and some drainage. Many millions of hectares have been burnt. There are very few relatively intact peatswamp forests remaining (less than 10%), but even these - including the less than 5% that are officially protected - are generally affected by illegal logging and encroachments.

What is the land use of the peatlands in Indonesia?

The peatlands on the islands with the largest peatland resources, being Sumatra, Kalimantan and Papua, have the following status (source: 2006, peat-CO2). This status is alarming.

Total peatlands	**22.5 mln ha**
Of which:	
Forest: mostly logged	61%
Burnt	7%
Scrubland (no forest left,degraded)	24%
Cultivated / managed	5%

Of the total area of peatlands, around 23% is under concession (palm oil, timber), used or not yet used. These areas are often severely degraded, but difficult to restore without the cooperation of concession holders.

3

Peatlands in Central Kalimantan

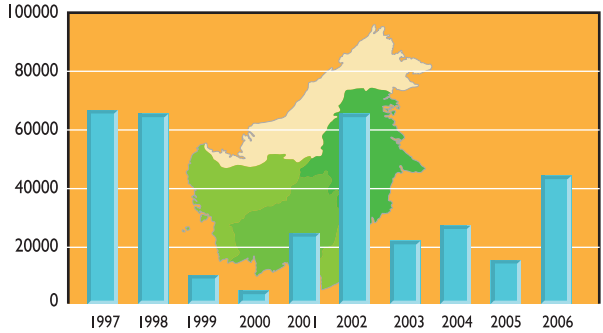
How much peat is found in Central Kalimantan?

Central Kalimantan with 30,000 km^2 holds around 13,5% of Indonesia's peatlands with an average depth of 3 meters. One fifth of this Indonesian province exists of peatland.

How severe are the peat problems in Central Kalimantan?

Central Kalimantan is one of the areas where peatland problems are most severe. The area of Central Kalimantan has suffered drastically from forest and peat fires and over-drainage. Poverty rates in Central Kalimantan peatlands are very high. A high risk of fires places constraints on the usual economic development possibilities and opportunities.

Number of Fires



Source: 2006, Hooijer, et al

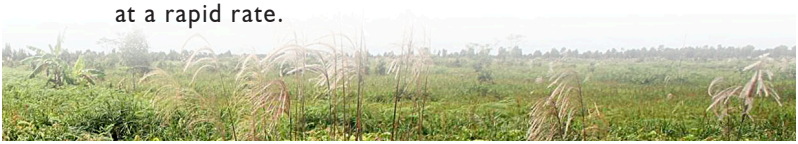
What has caused the peat problems in Central Kalimantan?

Logging of peatswamp forests in a primary cause of peatland loss. The drainage canals to enable access and transport in the areas destroy the peatsoils. Recovery of the forests becomes impossible.

The largest and most disastrous example is the Ex-Mega Rice Project (Ex MRP) in Central Kalimantan. In the mid nineties this large scale reclamation project attempted to convert 1.5 million ha of peatswamp forest into agricultural areas for rice production, despite many warnings of scientists and nature conservationists that this would not be possible. Thousands of people moved to the area, many as part of transmigration schemes.

Rice production appeared to be possible on less than 2% of the total area. Income was derived mainly from logging in and around the Ex MRP area. Many people moved away, but villagers that stayed in the peatlands were increasingly coping with floods as a result of soil subsidence.

Today, the drained and logged-over areas are the scene of annual peat fires. Besides this visible form of degradation, more invisible subsiding and decomposing (oxidation) of the peat takes place at a rapid rate.



Is something being done to halt the degradation of the peatlands in Central Kalimantan?

The Indonesian government has recently taken an important first step in announcing a Presidential Instruction (No.2/2007) regarding the conservation and sustainable development of the 1.5 million ha Ex Mega Rice project area. The provincial government, in the meanwhile, started a Master Planning process for the area, with the aim to rehabilitate one of the largest degraded peatland areas in Indonesia.

The Central Kalimantan Peatlands Project (CKPP) provides independent advice to the Indonesian government on this Master Plan.

CKPP has worked together with local authorities and communities to protect some of the most important remaining peatswamp forest areas of Indonesia (Sebangau National park and the Mawas area) and to pilot restoration of peatlands in some severely degraded areas in the Ex Mega Rice area. See more about CKPP in chapter 8.

4

Impacts of peatland loss

What is the impact of peatland degradation for local people?

Peatland turns into wasteland

Decomposition of the peat lowers the land surface with on average 10% of the drainage depth; in some areas this can be as much as 8 centimetres a year. As areas with soil subsidence become relatively lower than surrounding non-drained areas, they become more prone to flooding. With continued drainage over a period of several years to several decades the resulting soil subsidence will result in increased and often severe flooding risks during the wet season and even in relatively wet dry seasons.

In the coastal areas of Sumatra and Kalimantan, salt water intrusion will occur as a result, turning large areas into wastelands.

Health problems

The people in Southeast Asia, and - particularly but not only - those living in the peatlands, suffer from the annual peat fires; smog is causing health problems and impacts on people's daily lives, work and schooling. In years with major fires, hundred thousands of related hospitalisations have been recorded; millions of work and school days are lost. Over 30% of children of an age of 0-5 years that live in peatland regions suffer from respiratory diseases and stunted growth.

Decrease of water retention capacity
In intact condition, peatlands can store and maintain large quantities of water. Diminishing this capacity due to peatland deforestation, degradation and subsidence, results in increased risks of floods and droughts, including also downstream agricultural and urban areas.

What are the problems of peatland loss for the region of, Southeast Asia?

Annual peat fires in Indonesia cause dense smog and air pollution even in other parts of Southeast Asia like Singapore and Malaysia, impacting on the transport and tourism sectors, as well as public health. This creates also international political tensions.

Failure of development, removal of potentially productive forests and biodiversity and degradation of the ecosystem services of peatlands, is an issue of national and international proportions.

What are the impacts of peatland degradation in Southeast Asia on a global level?

The degradation of peatland areas in Southeast Asia has a negative impact on a global level. In Indonesia alone, 2000 mega tonnes of carbon dioxide are emitted due to peatland degradation and fires. This is an equivalent to 8% of all global fossil fuel emissions. Central Kalimantan is one of the main areas causing this problem.

Important populations of globally threatened and vulnerable species are impacted by the peatswamp forest destruction, including well known species such as *the Borneo Orang Utan, Malaysian Tapir* and *the Sumatran Tiger*, but also less known species that depend on the peatswamp forest as their primary habitat.

5

Peatlands & Climate Change

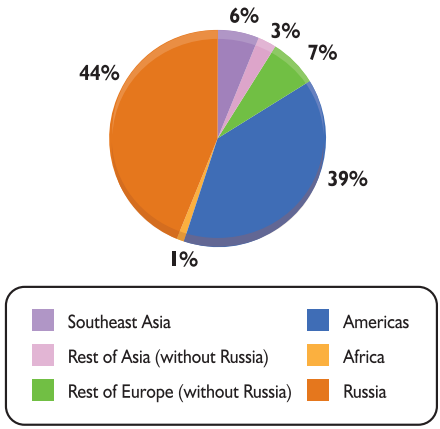
Climate change in general

Mainly due to the use of fossil fuels for transport, power generation and industries, the world's atmosphere is containing more and more carbon dioxide. Carbon dioxide is expected to raise global temperatures and in its turn will influence the entire climate. Climate is expected to become more extreme for humanity: more storms, extremes in rainfall, longer and unpredictable periods of droughts.

What is the carbon stock of the world's peatlands?

Peatlands globally contain at least 550 Gigatonne carbon: equivalent to all other terrestrial biomass (forests, grass and shrublands, etc.) and twice as much as all carbon stored in the world's forests.

Global carbon stocks in peat equal 550,000 million tonnes



How large are the peat-carbon stocks compared to fossil coal?

The accessible fossil coal reserves are around 585 gigatonnes. This is enough for 200 years according to the current use. The fact that the world's peat carbon is quite similar is a shocking fact.

What is the contribution of peatland loss to climate change?

Globally, peatland degradation contributes to over 3000 million tonnes of carbon dioxide emissions per year. This is an amount equal to 11.5% of all global fossil fuel emissions (26.000 million tonnes carbon dioxide).

In Southeast Asia alone, more than 2000 million tonnes of carbon dioxide are emitted per year due to peatland loss, of which 90% originate from Indonesia.

Annual carbon dioxide emissions from Southeast Asian peatlands (Mt/y)

	Decomposition	Fires	Total
Indonesia	516	1400	1916
Malaysia, PNG, Brunei	116	unknown	116
Total	632	1400	**2022**

Delft Hydraulics e.a. 2006. Average annual emissions in the period 1997-2006

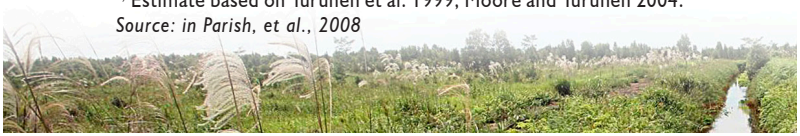
This is equal to 8% of all global carbon dioxide emissions from fossil fuels. These emissions from degraded peatlands have rapidly increased since 1985 and are expected to further increase in the coming decade unless remedial action is taken.

How large are the peat-carbon stocks compared to other ecosystems?

An average area of peatland contains much more carbon than any other ecosystem on mineral soils; just because of the carbon stored in peat. See the next table for a comparison.

	(Tonne Carbon per Hectare)				
Ecosystem type	**Vegetation**	**Litter**	**Soils**	**Peat**	**Total**
Peatland	25 [1]	0	50 [2]	1375	1450
Giant Conifer Forest	350	256	120	n.a.	726
Warm Temperate Forest	190	36	145	n.a.	371
Cool Temperate Forest	160	25	140	?	325
Tropical Rain Forest	210	10	100	?	320
Main Taiga	82	15	219	?	320
Southern Taiga	140	15	135	n.a.	290
Tropical Montane Forest	130	15	130	?	275
Moist Steppe	10	0	250	n.a.	260
Forest Steppe	10	11	220	n.a.	241
Lowland Tundra	10	0	210	?	220
Forest-Tundra	11	20	166	?	197
Open Boreal Woodland	50	15	129	?	194
Mediterranean Forest	100	8	80	n.a.	188
Mditeranian Scrub	40	5	60	n.a.	105
Temperate Scrub	45	5	45	n.a.	95
Tropical Savanna	35	0	55	n.a.	90
Dry Steppe	6	0	70	n.a.	76
Temperate Semi-Dessert	4	0	56	n.a.	60
Montane/Dry Tundra	5	0	50	n.a.	55
Desert	1	0	0	n.a.	1

[1] Global average from solely moss-covered peatlands to tropical rain forest swamps with high trees,cf.Gorham 1991;
[2] Estimate based on Turunen et al. 1999, Moore and Turunen 2004.
Source: in Parish, et al., 2008

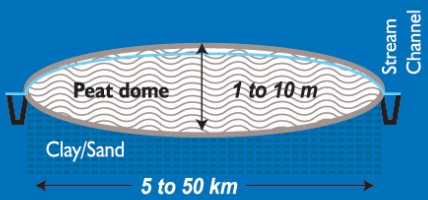


How are these peatlands emitting carbon dioxide?

The carbon stored in the peat is being released through two mechanisms; drainage and peat fires:

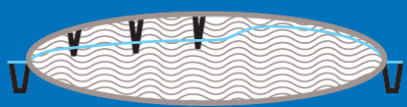
- Normally, peat is wet and the peatsoil and vegetation in this area will not burn.
- In Southeast Asia but also in Northern regions, peatlands are drained to enable logging of the swampy rainforest or to enable agriculture. The drainage canals are also used for transport of equipment and removal of logs. The drainage continues after the loggers have left.

- In Southeast Asia, peatlands are increasingly used for plantations. Drainage is often intensified to a depth of 60 centimetres or more, to enable commercial production of perennial crops such as rubber, palm oil or pulp wood.
- Drained peat starts decomposing. Due to drainage, the peat is exposed to the air. Oxidation of the organic carbon into carbon dioxide is the result. Under the warm tropical conditions this process happens more rapidly than in temperate or boreal zones.
- Drained peatlands also become vulnerable to fires. Fires are used to clear plantations or to prepare peatlands for annual crops. Even a small camp fire in a desiccated forested or cleared peatland area can cause a huge peat fire. In Indonesia such fires have frequently covered millions of hectares in one dry season. Such fires can last for weeks or months, burning thick layers of peat over large areas and causing enormous emissions of carbon dioxide.
- Under tropical conditions, drainage can lead to an annual subsidence of around 10% of the drainage depth, as a result of water and carbon loss and compaction. Depending on the specific carbon content, one meter drainage may lead to carbon dioxide emissions of 90 tonnes per hectare per year.



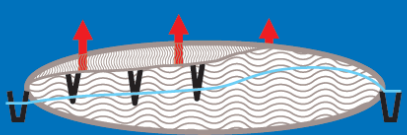
Natural Situation:

- Water table close to surface
- Peat accumulation from vegetation over thousands of years



Drainage:

- Water tables lowered
- Peat surface subsidence and CO_2 emission starts



Continued Drainage:

- Decomposition of dry peat: CO_2 emission
- High fire risk in dry peat: CO_2 emission
- Peat surface subsidence due to decomposition and shrinkage

End Stage:

- Most peat carbon above drainage limit released to the atmosphere within decades,
- Unless conservartion/ mitigation measures are taken

Schematic illustration of CO_2 emission from drained peatlands
(Delft Hydraulics, Wetlands International. Alterra, 2006)

Are peatlands causing methane (CH4) emissions?

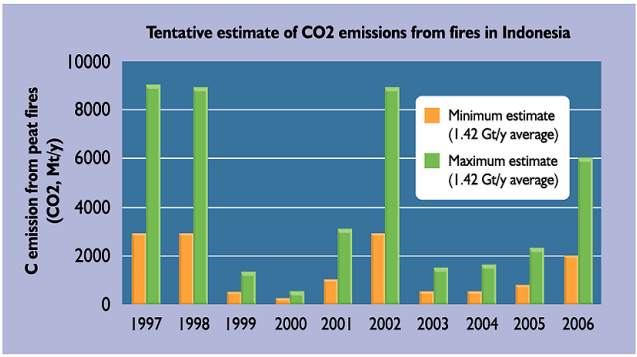
Peatswamps and other water bodies with low oxygen levels emit methane gas (CH4). Methane is a very powerful greenhouse gas.

Peatlands are currently contributing 3-5% to the tota global methane emissions. Peatlands have always been emitting methane, but such emissions should be considered part of the natural baseline. Larger global emissions are released by agricultural activities such as grazing and rice cultivation.

The overall climate impact of natural peatlands has been a net cooling. However, especially in temperate and boreal zones peatland development and management, including changed inundation patterns, may lead to increased methane emissions. In natural and degraded tropical peatlands methane emissions appear to be negligible.

Are these peat emissions continuously taking place?

Carbon dioxide emissions due to decomposition of peat are steadily increasing as more and more peatlands are drained. Peat fires in Indonesia, accounting with 1400 MT CO2 on average for almost half of the global emissions, fluctuate strongly from year to year. This is largely a result of precipitation fluctuations.



Tentative estimate of annual and average annual carbon emissions due to peatland fires, determined on the basis of hotspot counts for Borneo (see figure above) and the carbon emissions calculated by Page et al for 1997 (NATURE, 2002). Better estimates are being prepared for publication by Page, Siegert and others

Source: Hooijer, et al.2006

What is the potential financial carbon value of peat losses?

Globally over 3000 million tonnes of carbon dioxide is annually released due to peatland degradation (decomposition and peat fires). The global price of carbon is around 15 Euro for each annually emitted tonne of carbon dioxide. The carbon value of carbon that is lost in this way is thus around 45 billion Euros annually.

Even on the voluntary carbon market, with current prices between US$ 2-5 per tonne carbon dioxide, an amount of US$ 6 to 15 billion is going up in smoke and down the drain. If compared to climate mitigation investments made in some energy saving schemes, which may be over 750 $ per tonne CO_2, the value is beyond imagination.

What are the costs related to effectively reducing emissions from peatlands?

Especially Indonesia takes the large share of carbon dioxide emissions; from relatively limited areas (i.e. about 12 million ha of severely degraded peatlands, or less than 0.1% of the global land surface). In these areas the cost-effectiveness of restoring peatlands is highest. Costs largely depend on the access of organisations like those participating in the Central Kalimantan Peatlands Project consortium (CKPP, see chapter 8) to degraded areas and permission for restoration activities.

Restoration activities (blocking drainage canals and reforestation) are very cost effective; involving investments of around 15 eurocents to 1 Euro for every avoided tonne of carbon dioxide emissions.

Such investments have to incorporate costs of awareness campaigns and provision of alternative, sustainable livelihoods. Including these costs, the Central Kalimantan Peatland Project was able to restore peatlands at initial costs of 1 Euro / tonne CO_2 in many degraded and logged areas.

6

Tropical Peatlands and Palm Oil

What is the contribution of palm oil to the degradation of peatlands?

With growing global demands for vegetable oil and biofuels, millions of hectares of palm oil have been planted on peatlands, and even more have been allocated or are being planned on peat and remaining forests. An important reason for this is that these areas are still under government jurisdiction, which facilitates large scale developments without tenure conflicts with local people. In addition, companies can get some windfall profits from the initial deforestation, in contrast to the fallow 'alang alang' fields (wastelands), which are usually owned by local communities.

Currently about 25% of Indonesian oil palm concessions are on peatlands: totalling 1,5 million hectares, roughly causing emissions of over 150 million tonnes CO_2 a year from drainage only, which is more than the total emissions of an industrialised country like the Netherlands. This excludes emissions from deforestation and fires. However, plantation areas are often cleared of shrubs and forest remnants using fire.

Currently, over 50% of 6 million hectares of newly planned oil palm plantations in Indonesia have been allocated on peatlands, which in the next 20 years would lead to an average of about 300,000 hectares of peatland conversion and peat forest clearance per year. Much of this will be for biofuel production.

Malaysia has at least 8% of their 4,24 mln ha palm oil plantations on peat, but often under better water management conditions. Still, this drainage results in emissions of at least 20 – 30 mln tonnes CO_2 per annum. Possible expansion of palm oil on peatlands in Sarawak remains a concern.

How does palm oil as a bio-energy compare to fossil fuels?

Palm oil produced on peat leads to large amounts of carbon dioxide emissions as drainage of the peat is necessary. The annual emissions vary from 50 to over 100 tonnes per hectare. In contrast, palm oil yields are only three to six tonnes per hectare per year. If we would use fossil fuels instead this yield per hectare, we would have carbon dioxide emissions of a magnitude of roughly 10 to 20 tonnes. As a result, the use of the product as a biofuel will result in 3 to 10 times more emissions than if fossil fuels would be used. This even excludes emissions that go hand in hand with palm oil production, such as transport and fertilization.

Is it possible to sustainably grow palm oil on peatlands?

Palm oil cannot be sustainably produced on peatlands; it has a very negative CO_2 balance in comparison to fossil fuels, threatens globally important biodiversity, and will in the long term create increased flood risks in the plantation areas and downstream.

Palm oil should preferably be produced on mineral soils, and not on peat. Existing palm oil plantations on peat should raise and maintain water levels at maximum height for this crop. This still would lead to emissions of 40 or 50 tonnes of carbon dioxide per hectare per year. In the long term, to halt further peatland degradation, plantations on peat should be encouraged to move to mineral soils and apply restoration techniques to conserve the degraded peatlands.

The CKPP consortium partners WWF and Wetlands International are member of the *Round Table on Sustainable Palm oil (RSPO)* and are advocating for sustainable palm oil; excluding the use of peatlands.

7

Solutions to peatland loss

What can be done to halt the problems associated with peatland loss in Southeast Asia?

Technically, we found solutions to stop further decomposition and to prevent wild fires. We are now able to build dams in the drainage canals and to restore the protective vegetation cover the area. These methods have been applied with success in Russia, the Himalaya region and South-east Asia.

In the absence of economic alternatives for local people it is impossible to ensure sustainable peatland conservation and management, or to make credible investments in peatland restoration. Therefore, integrated conservation and development projects are required to address the poverty-environment nexus. With innovative approaches such as carbon financing and biodiversity off-sets, poverty reduction and peatland conservation can be mutually supportive.

What can the international community do?

United Nations Climate Convention (UNFCCC):

Contracting parties should ensure that carbon dioxide emissions from peatland degradation are addressed in climate change mitigation strategies.

Current situation

Emissions due to peatland loss (and forests) do not fall under the Kyoto emission reduction agreements. The 2007 UNFCCC summit in Bali agreed to address loss of forests ánd their associated carbon stocks like peat soils in the decision on Reducing Emissions from Deforestation in Developing countries (REDD). This issue is also included in the agenda for a new climate treaty; the 'Bali Roadmap'.

What needs to be done

1. While this is a good start, emissions from non forested and deforested peatlands should also be explicitly included in a new climate treaty.

2. Incentives to *Reduce Emissions from Deforestation and Degradation (REDD)* of peatlands now need to be developed. This requires pilot and demonstration projects, especially also in peatland areas. Being a huge but also concentrated problem, tropical peatswamp forest degradation and resulting emissions is one of the lowest hanging fruits on the REDD tree and should be considered highest priority for investment.

3. Under the Kyoto Protocol, emissions from the use of biofuels and biomass are currently not accounted for. Especially biofuels produced on organic soils like peatlands cause more emissions than fossil fuels for producing the same energy.

   These rules under the Kyoto Protocol provide substantial incentives for the use biomass in developed countries, even if the production of these are unsustainable. The greenhouse gas emissions of producing non-fossil fuels remain uncounted. This should change. A global greenhouse gas accounting system must be developed for biomass.

Other multilateral conventions

Conventions such as the Convention on Biological Diversity (CDB) and the Ramsar Convention on Wetlands, as well as development oriented policy platforms such as the Commission on Sustainable Development (CSD) should coordinate their work with the UNFCCC to enable joint policy development to promote solutions for peatland degradation in climate change mitigation, biodiversity conservation and poverty reduction strategies.

World Bank

To address climate change due to forest loss, the World Bank has started the Forest Carbon Partnership Facility (FCPF), which has already received substantial commitments from the bilateral donor community. This facility should prioritise investment in peatswamp forest conservation and restoration in view of the disproportionately high potential for achieving substantial emission reductions with relatively minor investments.

National governments / conventions: Restricting trade in unsustainable products from peatlands

Individual countries, regional authorities (like the EU) and international conventions should establish legislation and ensure credible certification to curtail imports of products like peat for gardens, horticulture of for fuel, timber, pulp and palm oil from vulnerable peatland areas.

8

Central Kalimantan Peatlands Project (CKPP)

What is CKPP?

CKPP, the Central Kalimantan Peatland Project is a project of a consortium with the organisations BOS Foundation, CARE Indonesia, the University of Palangka Raya, WWF Indonesia with Wetlands International as lead partner. The project works closely together with the government of the Central Kalimantan province. Financial support comes from the Ministry of Foreign affairs in the Netherlands.

Using the specific expertise of all partners, the projects aims to restore the degraded peatlands of the province in the Ex Mega Rice Project area and to protect the remaining natural peatswamp forests of Mawas and Sebangau.

Where does the project work?

The Central Kalimantan Peatlands Project (CKPP) is working in a specific area in Central Kalimantan to mitigate peatland problems.


INDONESIA
CKPP TARGET VILLAGE
Legend :
CKPP Target Village
Block / Park Boundary
Provincial Boundary
District Boundary
River
Block of MRP / Park
Sea
Barito River
Kahayan River
Kapuas River
Kalahlon
Madara
Lungkuh Layang
Timpah
Lawang Kajang
BARITO SELATAN
Batampang
Teluk Betung
KAPUAS
BLOCK-E
(MAWAS)
PALANGKA RAYA
KATINGAN
Karuing
BLOCK-B
Katunjung
Tumbang Nusa
Sei Ahas
Katimpun
BLOCK-A
Kalumpang
Mantangai Hulu
Mantangai Hilir
Pulau Kaladan
Mantangai Tengah
SEBANGAU
Tumbang Bulan
PULANG PISAU
Gohong
Pahgl
Paduran Mulia
Sebangau Jaya
Sebangau Mulia
Mendawai
Paduran Sebangau
BLOCK-D
BLOCK-C
SOUTH
KALIMANTAN
Scale 1 : 1,250,000 in A4 Paper Size
Data Source :
- CARE International Indonesia - Central Kalimantan
- Consultant Team of E-MRP
- Environmental Information Center - Central Kalimantan
- WWF Central Kalimantan

The project consortium works in the Ex-Mega Rice Project and the adjacent areas of Mavas and Sebangau (national park). The first areas are heavily degraded; Mavas and Sebangau do still have some pristine rainforest areas left. The whole area of the Ex-Mega Rice Project is huge; over one million hectare. The project is working to restore tens of thousands hectares, showing what can be done to restore this disaster area and the many similar logged areas in Kalimantan and Sumatera.

What is the approach of CKPP?

Hydrological restoration

Blocking drainage canals is the most important practical way to reduce drainage. The first step towards this is to raise awareness among local communities of the need for such action, since many of the canals in the area are owned and operated by local villagers and are intensively used to transport forest products.The project, therefore, works with local communities to construct and maintain dams in the canals.

Fire prevention

The project established 25 community-based fire brigades in different villages throughout the area, and initiated the development of an early warning system that facilitates a rapid response by these fire brigades. The brigades are trained and equipped with communication tools and fire fighting equipment.

Reforestation

Additional to reducing emissions from drainage and fires are the efforts by CKPP for carbon sequestration by reforestation of the rewetted areas. Natural regeneration through reforestation is a good way to restore both ecological and economical values of these areas. A vegetation cover is also an essential protection of the peatsoils. CKPP has replanted about 1500 hectares with 750,000 seedlings of indigenous peatswamp tree species, all of which have commercial value.

The Jelutung tree (*Dyera lowii*) is a key example of a tree species indigenous to the peatswamps that has a high international commercial value; it produces latex used in the production of chewing gum.

Supporting local communities

The project aimed at supporting the local communities.

Local people were rewarded for project activities like reforestation, nurseries and closing drainage canals.

The project was also able to provide alternative and sustainable livelihoods such as creating fish ponds behind dams and planting commercial peatswamp species.

People were trained to form fire brigades, and create wells. Public health facilities were set up.

All activities together helped the local people by ending further subsidence of the peatland and by the reduction of annual fires. These affect the health of people and threaten farmlands and villages.

Improvement of public health

The project improved health facilities and services in 14 villages. CARE-Indonesia has provided equipment, training and guidance for volunteers and health workers, and has assessed water quality and the availability of clean drinking water.

Biodiversity Conservation

Two areas with relatively intact peatswamp forests in Central Kalimantan (Sebangau and Mawas) have been recognized as important reserves of biodiversity. However, their conservation is threatened by illegal logging, drainage and fires. To combat these threats, the project partners WWF-Indonesia and BOSF have supported the Sebangau National Park's for development of management facilities and helped to develop management planning and provided the authorities with eguipment (posts, boats).

Other CKPP efforts have included actions by WWF-Indonesia to successfully prevent construction of a road through the Sebangau National Park.

Training

CKPP has organized many workshops and training courses and exhibits to make local people aware of the causes and effects of peatland degradation. The project has supported capacity building of the University of Palangka Raya,including the establishment of a knowledge centre focusing on peatland issues, compiling and improving access to scientific and 'grey' literature on peatland issues and solutions, and helping local scientists and students to become actively involved in peatland research and monitoring.

Awareness raising and policy development

CKPP managed to raise a lot of media coverage of the peatland problems in South-east Asia and at a global level.The project has also established a local radio station with information about peatland restoration.

CKPP has helped to improve the local, national and international policies that deal with tropical peatlands in general and the Central Kalimantan peatlands in particular.

The Provincial Government of Central Kalimantan is committed to developing and implementing a Green Government policy, and has prioritised peatland conservation, restoration and sustainable development of peatlands.

At national level, we work closely with the Indonesian Government to restore the area in Central Kalimantan and to explore other options for peatland restoration and protection in the country.

At a global level, the CKPP project consortium has been working to put the alarming issue of peatland degradation on the agendas of the United Nations Climate Convention (UN-FCCC), the Convention of Biological Diversity (CBD), the Ramsar Convention on Wetlands and the World Bank.

Sustainable financing

The project has identified options and supported the development of interest in the global donor community for peatland conservation and restoration.

Another option that CKPP has helped to develop is the use of private-sector interests who wish to offset their carbon emissions by investing in peatland restoration and reforestation. Wetlands International has launched The Global Peatlands Fund as a facility to capture such interests in order to support the work being done in areas like the Central Kalimantan peatlands.

Bio-rights approach

CKPP is also piloting the Bio-rights approach (www.bio-rights.org), which provides local people with access to micro-credits for sustainable development in return for community-based environmental management including the conservation of biodiversity and carbon stores. Successful environmental restoration and biodiversity conservation count as payment of interest over the micro-credits.

Cooperation with authorities

The Central Kalimantan Peatlands Project has worked in close cooperation and coordination with the provincial and local authorities (districts) and the provincial government to conserve some of the remaining peatswamp forests and restore some of the most severely degraded peatland areas in Central Kalimantan.

Demonstrating a wider peatlands restoration

The lessons of CKPP are used to promote and support the conservation, restoration and sustainable development of other peatland areas in South-east Asia. CKPP lessons learned can also contribute to improving local, national and international policies in relation to peatland management and climate change mitigation.

What are the achievements of CKPP?

Hydrological restoration

The project has built 16 large dams and hundreds of small dams by working with local people. This has resulted in the restoration of 10,000 hectares of peatland in the Sebangau National park and over 50,000 hectares in the former Mega Rice area and buffer zones of Mawas. We have substantially increased water levels in these areas to near natural levels, thus reducing emissions from peat oxidation and decreasing fire risks.

Fire prevention
The rewetted areas have not seen major fires as there were in the past, during the last dry season.

Reforestation
CKPP has replanted about 1500 hectares with 750,000 seedlings of indigenous peatswamp tree species, all of which have commercial value.

Supporting local communities
All activities together helped the local people by ending further subsidence of the peatland and by the reduction of annual fires. These affect the health of people and threaten farmlands and villages.

Thanks to the CKKP activities, 17 villages have now also better access to health facilities. Of the around 40,000 people in the area, thousands have received additional incomes through work for the project or through alternative livelihoods created by CKPP.

Preventing carbon dioxide emissions

Provisional estimates of related emission reductions amount to 50 - 100 tonnes of carbon dioxide per ha/year in the drained areas. In total we estimate that we have achieved a reduced emission of at least 5 million tonnes CO_2 per annum.

Increased policy support for tropical peatland restoration

At national level, the Indonesian Government has issued a *Presidential Instruction No2/2007*, which states that most of the former Mega Rice area should be restored and conserved.

Thanks to the advocacy activities of CKPP at a global level, clear acknowledgement of the problem and need to take action has been achieved at the level of the UN Climate Change Convention, Convention on Biological Diversity, by IPCC and World Bank. At UN-FCCC COP 13 (2007), CBD COP 9 in 2008, clear decisions have been taken that will support peatland restoration and protection.

See for all activities of
the Central Kalimantan Peatlands Project:
www.ckpp.org / www.ckpp.or.id

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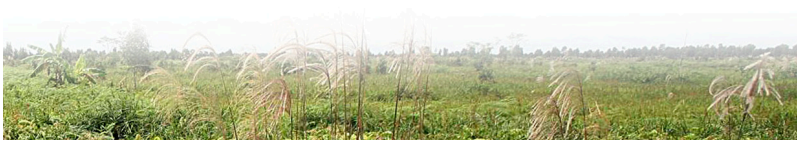

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