Leuser at a Crossroads

The locally, nationally and globally important Leuser Ecosystem risks being catastrophically damaged if comprehensive restrictions on forest conversion and road construction are not immediately implemented and enforced.

Written by David Jay for the Leuser Ecosystem Alliance
Executive Summary

The Leuser Ecosystem is a unique and globally important forest, and one of the largest intact forests left in Southeast Asia.

- It has been designated as a National Strategic Area for its Environmental Protection Function, with over 4 million people living in the wider landscape relying upon the services it provides.
- It is a vital habitat for many rare and threatened species including the Critically Endangered Sumatran orangutan, Sumatran rhinoceros, Sumatran tiger and Sumatran elephant.
- It is an important carbon store, with peat swamps in particular holding huge amounts of carbon in the layers of peat that have been laid down over thousands of years.
- It is a crucial watershed for the wider area, providing local people, agriculture and industry with protection from flooding and drought, including flash floods, landslides, fires and related environmental disasters.
- As an intact forest it holds significant potential value from activities such as eco-tourism and carbon trading.

The natural forests of Leuser are still being cleared, and the integrity of the ecosystem is at risk of collapsing.

- Illegal logging is ongoing, as well as forest clearance in concessions and plantations that have been authorised locally, in direct contravention of its National Strategic Area status.
- The current Spatial Land Use Plan of Aceh Province sets out many areas for forest clearance and the construction of roads that will lead to further degradation: if it is implemented the Leuser Ecosystem will be devastated.
- Activities by local conservation groups are limiting the damage but cannot stop the destruction without high level political will and a long term vision for sustainable development.

If decisive action is not taken immediately the impacts on the entire ecosystem and the surrounding population will be disastrous and irreversible.

- Forest loss will lead to species extinctions and soil degradation, ultimately making forest restoration impossible.
- Large amounts of stored carbon will be released into the atmosphere.
- Peat swamps will dry out, releasing further carbon and leading to persistent fires and haze, and potentially causing large areas to be contaminated by sea water.
- Watershed functions will be lost leading to declining agricultural productivity and fish stocks due to erratic water supply, and to increased incidence of flooding, drought, landslides and fires.
- Preservation values of the forest from tourism, carbon trading and low-level local utilisation will also be lost.
- The controversial Aceh Spatial Land Use Plan breaches many national laws and regulations. As such it has not been accepted by National Government but is still being implemented at Provincial level. The plan makes no mention of the Leuser Ecosystem National Strategic Area, despite its inclusion in the plan being required by law.

Key actions that need to be taken without delay are:

- Officially revoke the illegally enacted Aceh Spatial Land Use Plan and replace it with a sustainable development plan for the area that respects the Leuser Ecosystem’s National Strategic Area status.
- Law enforcement efforts need to be maintained and enhanced to end illegal land clearance.
- Responsible development and income generation needs to be promoted, especially in the case of income potential from tourism and carbon trading.

Source: Hansen/UMD/Google/USGS; Laumonier et al. 2010; Margono et al. 2014
A Place Like No Other

The Leuser Ecosystem is both spectacular and globally unique. Ranging from coastal mangrove swamp to high altitude cloud forests, it is one of the largest continuous expanses of forest in Asia, and the only place in the world that is home to Sumatran orangutans, tigers, rhinoceros, elephants, clouded leopards and sun bears. It provides vital resources and services for the human population that lives within and around it, and has huge potential for tourism, research, carbon trading and other income generating opportunities.

Located at the northern end of the island of Sumatra in Indonesia, 85% of the Leuser Ecosystem falls within the province of Aceh with the remainder in North Sumatra province. Covering a total of over 2.6 million hectares, it mostly consists of rainforest from the sea level coastal peat swamps of Tripa, Singkil and Kluet up to the summit of Mt Leuser at over 3,000m. It also encompasses large areas of lowland rainforest as well as beaches, mangrove forests, meadows, heathlands, lakes and rivers, and crucial transition zones between the main habitat types.

The ecosystem is home to over 100 mammal species, 380 birds and over 95 reptiles and amphibians, as well as the tallest and the largest flowers in the world. In addition to the Critically Endangered Sumatran orangutan, tiger, rhino and elephant, many other rare, threatened and endangered species are found here including the siamang, lar gibbon, white-winged duck, masked finfoot, salt-water crocodile and countless others. Many of these species are endemic to Sumatra and found nowhere else in the world. Many are also specialists, and even more restricted in their distribution, such as the numerous peat swamp species that do not inhabit dryland forests and many high altitude montane species. According to the World Heritage Convention at least 92 local endemic species have been identified within its boundaries, as well as over two thirds of the 50 bird species unique to the Sundaland Biodiversity Hotspot.

The critical significance of the Leuser Ecosystem has long been recognised and acknowledged by several national and international designations. It falls within the Sundaland Biodiversity Hotspot identified by Conservation International for its exceptionally high levels of biological diversity. The Gunung Leuser National Park falls entirely within the wider Leuser Ecosystem making up one third of its total area, and is designated as a UNESCO Man & Biosphere Reserve and a part of UNESCO’s Tropical Rainforest Heritage of Sumatra World Heritage Site. In 2008 the entire Leuser Ecosystem was designated a National Strategic Area by the Indonesian government because of its Environmental Protection Function. More than 4 million people living across the landscape are dependent on the resources and services that the ecosystem provides.

Tragically, this amazing place is under immense and mounting threat from legal and illegal activities and from radical land use plans which could see much of its wonder, natural resources and economic benefits irreversibly destroyed in just a few years. In order to understand what a loss that would be to local people, the national interest, the international community and the world as a whole, it is essential to fully appreciate the diverse range and significance of benefits derived from the Leuser Ecosystem.

Profile

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Biodiversity

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Nature from Sumatran elephant, which is under immense threat from habitat loss, persecution due to human-wildlife conflict and poaching across the island. As well as the importance of these and myriad other species for the global natural heritage, their persistence carries with it ongoing potential for revenue generation from industries such as tourism, scientific research and bioprospecting (developing new medicines and other products derived from natural sources).

Describing an area as an ‘ecosystem’ suggests that its main significance is in the preservation of habitats and wildlife, and indeed Leuser’s biodiversity is unparalleled in the region. Beyond this, however, the Leuser Ecosystem provides many natural services, of huge economic value to local people and communities. These even reach the global level, due to its role in carbon storage and climate stabilisation. The Leuser Ecosystem also provides resources that local communities use directly, to underpin many of their subsistence and commercial activities.

Ecosystem services

The global significance of the Leuser Ecosystem is not just for biodiversity conservation, it is also a very important area for climate change limitation due to the substantial amount of carbon stored within the forests and in the peat swamps and soil layers on which these forests stand. Of particular importance are carbon stores within the peat swamp forests, where deposits have built up over thousands of years – recent studies in the Tripa peat swamps estimate they are storing around 1,300 tonnes/ha of carbon below ground, in the peat itself, compared to 110 tonnes/ha above ground in the trees, vegetation and living creatures. The potential economic value of the Leuser Ecosystem as a whole in regulating climate and storing carbon has been estimated at over $400 million per year. This global environmental service offers substantial potential for income generation through carbon credits. A 2011 UNEP report calculated that the potential value of the Leuser peat swamps for oil palm plantations is significantly less than the value they currently already have for carbon storage and ecosystem services, whilst for the rest of Leuser’s forests the oil palm plantation value fell just within the lower limit of estimated carbon storage and ecosystem service values.

Carbon storage

The highest densities of Sumatran orangutans ever recorded are in the Leuser Ecosystem’s peat swamp forests, namely Singkil, Klueu and Tripa, which by themselves hold nearly one third of the remaining wild population. Any substantial degradation of the Leuser Ecosystem is likely to condemn this incredible species, one of mankind’s closest relatives, to inevitable extinction. The forests are also crucial for the Sumatran tiger, a Critically Endangered subspecies of this Endangered mammal. Fewer than 500 Sumatran tigers are thought to survive today with around 70 of these found in Leuser, but the ecosystem is thought to be capable of holding up to 250 individuals. Moreover it is a key location for the Critically Endangered Sumatran rhino, of which only around 100-150 are believed to survive in the wild in three locations, with Leuser providing the largest habitat block. It is also within the range of the Critically Endangered Sumatran elephant, which is under intense threat from habitat degradation and climate stabilisation. The Leuser Ecosystem also provides resources that local communities use directly, to underpin many of their subsistence and commercial activities.

Wildlife

The figureshead species for the conservation of the Leuser Ecosystem is the Sumatran orangutan, listed by the International Union for Conservation of Nature (IUCN) as Critically Endangered in their Red List of Threatened Species. With only an estimated 6,600 individuals surviving in the wild the Sumatran orangutan is also now listed as one of the “World’s Top 25 Most Endangered Primates”. Extensive surveys have shown that over 75% of this species’ range falls within the Leuser Ecosystem. The highest densities of Sumatran orangutans ever recorded are in the Leuser Ecosystem’s peat swamp forests, namely Singkil, Klueu and Tripa, which by themselves hold nearly one third of the remaining wild population. Any substantial degradation of the Leuser Ecosystem is likely to condemn this incredible species, one of mankind’s closest relatives, to inevitable extinction. The forests are also crucial for the Sumatran tiger, a Critically Endangered subspecies of this Endangered mammal. Fewer than 500 Sumatran tigers are thought to survive today with around 70 of these found in Leuser, but the ecosystem is thought to be capable of holding up to 250 individuals. Moreover it is a key location for the Critically Endangered Sumatran rhino, of which only around 100-150 are believed to survive in the wild in three locations, with Leuser providing the largest habitat block. It is also within the range of the Critically Endangered Sumatran elephant, which is under intense threat from habitat degradation and climate stabilisation. The Leuser Ecosystem also provides resources that local communities use directly, to underpin many of their subsistence and commercial activities.

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Ecosystem services

The Leuser Ecosystem also performs a wide range of extremely valuable environmental services at the local and regional level. Again the peat swamps are special. After the devastating tsunami struck Aceh in 2004 it was shown that the coastal forests in Tripa prevented the wave from reaching further inland, whilst in areas where the coastal forests had been cleared entire villages were destroyed and many lives lost. In addition, when drained for oil palm plantations the peat degrades and the land itself subsides, which can lead to sea water flowing into these areas and contaminating forests, crops and freshwater fish stocks.

Lowland and upland forests are also vital as watersheds, ensuring that rainwater drains gradually downhill providing a steady supply to streams and rivers, rather than washing down rapidly causing erosion, landslides, flooding and periods of water shortage. The steady supply of water is crucial for residents, for agriculture, and for industries in the areas surrounding the Leuser Ecosystem. Freshwater fisheries are a major subsistence and commercial activity in the area, and also depend upon a stable, reliable fresh water supply. Small scale hydro-electricity generation is used in several locations and can be seriously impacted by irregular water supply or high levels of sediment caused by increased erosion. Many established agricultural plots at all scales - from subsistence cultivation of rice and vegetables to rubber and huge oil palm plantations - rely on irrigation fed from the forests, and are also vulnerable to nutrient depletion, erosion, droughts and floods.

Through these many and varied roles the Leuser Ecosystem clearly has a huge value for the local economy, as well as both nationally and internationally, and yet these benefits are frequently undervalued, precisely because of their range and diversity. An economic valuation of the Leuser Ecosystem in 2002 concluded that over a 30-year period conservation of the entire area would produce a far greater total economic value than either large scale forest clearance or selective utilisation of the landscape. The authors concluded that continuing pressure to convert forests was due to ‘the power of the logging and plantation industries’ and ‘the wide dispersion of the main beneficiaries of conservation’. Hence this valuable and productive landscape is still under considerable threat.

Other values

Further economic activities depend upon the integrity of the Leuser Ecosystem in other ways. Local and international tourism is a significant source of income, with huge potential for expansion, which relies heavily on the preservation of the natural landscape and biodiversity to continue and to expand. Local populations also exploit the existing forests in ways that can be maintained sustainably, through the low level collection of wood for fires or construction and the use of many ‘non-timber forest products’ including honey, rattan and bamboo. As mentioned above, the outstanding biodiversity of Leuser also attracts funding from conservation research and intervention projects, and could in the future secure income from bioprospecting enterprises.
Paradise in Peril

Sadly the Leuser Ecosystem is still being degraded and eroded on a daily basis. Some of this activity is supposedly legal but much is clearly illegal. Some is a gradual progression of seemingly minor disturbances and some the product of landscape level operations. Some is enabled by a lack of resources for enforcement and some by high level land use planning decisions. But all of the destruction is contributing to the ultimate collapse of this unique ecosystem and the loss of the numerous essential services it provides.

Roads

The construction of new roads also represents an ongoing threat to Leuser. As well as direct wildlife deaths from roadkill, roads affect the movement and behaviour of wild animals for many kilometres. They also divide previously continuous wildlife populations, potentially splitting large, viable breeding populations into smaller non-viable ones whose eventual extinction is inevitable. Roads also facilitate access to previously unexploited forest, leading to a sharp increase in forest conversion, illegal logging, hunting and trade in wildlife and forest products. There is also evidence from Indonesia that road creation increases the risk of forest fires. Whilst cleared patches of forest can be left to regenerate, public roads are rarely closed, so their detrimental impacts continue and are compounded over time.

Land use plans

Key to the expansion of logging and plantation concessions and the construction of new roads are government land management policies such as Aceh Province’s current Spatial Land Use Plan, first proposed in 2013. Whilst the plan remains an illegal document which fails to recognise the status of the Leuser Ecosystem as a National Strategic Area and has not been approved by Indonesia’s central government, it has been enacted into law at the provincial level and is being implemented on the ground. It allocates extensive areas for forest clearance and industrial development, and effectively endorses numerous new roads, many of which have already been illegally cut through the forests. Experts agree that the effects of this plan on the Leuser Ecosystem will be catastrophic unless it can be immediately revoked. Dr Ian Singleton of the Sumatran Orangutan Conservation Programme has warned that if the plan goes ahead “the Sumatran elephant, tiger, rhino and orangutan will be pushed to the very brink of extinction in as little as 10 to 15 years, and the environmental services provided by the ecosystem will be fundamentally compromised”.

In the face of these formidable threats the Leuser Ecosystem is gradually being lost, piece by piece. Fortunately there are conservation groups and advocates dedicated to protecting it.

Defending the Wilderness

Naturally the Leuser Ecosystem is not without its defenders. Several brave and visionary groups and individuals are taking a stand to protect this uniquely precious environment from the many threats it faces. Acting on the ground, with communities, through local political channels, and at the international level, these friends of Leuser are working to minimise the ongoing damage, and ensure that existing protection mandates are fully implemented and enforced.

Field activities

Activities on the ground take many forms, and can make a crucial difference to sensitive areas and situations. Community support is vital for conservation efforts, so local organisations such as Yayasan Ekoistem Lestar (YEL) and Orangutan Information Centre (OIC) undertake outreach with nearby villages to explain the importance of the ecosystem for people’s livelihoods, and develop local conservation action plans. Others directly challenge those responsible for forest loss, such as Forum Konservasi Leuser which works with local villagers and police to identify and evict illegal oil palm plantations, including by chaining up illegally planted palms and facilitating forest regrowth and regeneration. Forum Konservasi Leuser also conduct regular anti-poaching patrols within the Leuser Ecosystem, collaborating with local forest police and communities to actively support and strengthen law enforcement. Taking a more political approach, in October 2015 an alliance of local Acehnese people announced their intent to file a class action lawsuit against the Aceh Governor and Aceh Parliament, as well as the Indonesian Minister for Home Affairs, for failing to take decisive action to invalidate the Aceh Spatial Plan.

Law enforcement

Working with local authorities is critical to success, and members of the Leuser Ecosystem Alliance work with Indonesian government bodies to support the development and enforcement of land use policies and regulations. Government authorities at all levels need to lead the way in dealing with illegal activities, as in the case against PT Kallista Alam, a major palm oil company convicted in 2015 of illegal use of fire to clear land in the Tripa peat swamp forests, in a case that resulted in an unprecedented fine of over $26 million and prison terms for the company’s Director and Operations Manager.

International action

On the international stage campaigns by various NGOs are putting pressure on forest conversion industries to end destructive practices and on local and national governments to strengthen and enforce protection measures. There have also been a number of studies and projects aimed at securing funding for Leuser’s management and protection from the global carbon market (for instance through the Reducing Emissions from Deforestation and Degradation (REDD) platform).

Reforestation

These efforts may have only slowed down the rate of destruction in the Leuser Ecosystem to date, but they are not in vain. So far the damage remains relatively limited in extent and impact, and some previously damaged natural habitats are still able to regenerate. Over the 1999-2005 period of civil unrest in Aceh many established plantations were abandoned and natural forest began rapidly regenerating by itself. Since 2008 the Orangutan Information Centre has also been working to actively restore damaged forests in the Leuser Ecosystem and have planted more than 1.5 million trees to successfully restore degraded areas. Forum Konservasi Leuser is currently restoring 3000 ha of a critical wildlife corridor reclaimed from illegal oil palm operations. In fact with comprehensive protection some parts of Leuser could actually become even more healthy and productive than they are now – for instance the Tripa swamps, where only a few hundred orangutans survive now, could hold many more, even thousands, if degraded peat swamp forests can be reclaimed and restored.

It is certainly not too late to save the Leuser Ecosystem, but the window of opportunity to do so is gradually closing. If the destruction continues, a critical point will soon be reached beyond which recovery and long term protection would be much harder to achieve, and cycles of degradation and ecological collapse will become entrenched.
A Fragile Future

If the loss of natural habitat in the Leuser Ecosystem continues, the outlook for wildlife, local people and the global climate is bleak. Environmental disruptions will exacerbate the damage creating a vicious cycle of ecological and economic collapse, and sustained long term economic development in surrounding areas will become impossible.

Ecology
As larger blocks of forest are lost the numbers of most wildlife species will decline, especially larger mammals. Currently viable populations will be increasingly fragmented into smaller non-viable ones, isolated and unable to persist over time. Local extinctions will occur and ultimate extinction of entire species and subspecies will inevitably follow. Forest regeneration processes will be steadily undermined through loss of seed dispersers, loss of seed banks within the soil, erosion of fertile soils and increasing distance of cleared areas from their nearest natural forest patches. A time will come when restoring the rich, complex ecological community that now exists is effectively impossible.

Carbon
At the same time, the clearance of the forests will release substantial amounts of carbon dioxide into the atmosphere through burning and decay of vegetation and animals. In the peat swamp areas this will be much more pronounced as drying of the peat allows oxidation of the carbon stored over thousands of years, releasing huge amounts of CO2 into the atmosphere. Drying the peat also leads to more frequent and more devastating fires, with their immeasurable effects on wildlife and human health as well as massive economic losses. Whether deliberately set or accidental, these will accelerate the release of carbon and lead to local crises of uncontrolled burning and extensive smoke and haze (as seen across Indonesia in 2013 and 2015).

Peatlands
Furthermore, the drying of peatlands causes the peat domes themselves to collapse, with the oxidised peat subsiding by around 2.5m in the first 25 years. Since Leuser’s peatlands are all along the coast, and already very close to existing sea level, this could result in salt water intrusion. This would kill off any remaining areas of natural habitat and destroy household and agricultural fresh water supplies, with devastating effects on annual and perennial crops such as rice and oil palm, and freshwater fisheries. This would be a local disaster, destroying the main subsistence and commercial activities for inhabitants and industry, leaving thousands of people without livelihoods or even fresh water. Subsidence of these coastal peatlands ultimately risks huge areas of current “land” also being eroded and, exacerbated by current predictions of rising sea levels, eventually disappearing into the sea with massive environmental, humanitarian and economic consequences.

Ecosystem services
Similar situations will unfold in the rest of the ecosystem. Deforested areas will not capture and diffuse rainfall, making flooding much more common and more catastrophic, together with landslides, erosion, loss of fertile soils and build-up of sediments. Water flow in rivers and irrigation systems will become more erratic, leading to increased incidence not only of flooding but also of drought and fires. These factors will seriously impact agricultural production rendering commercial ventures unproductive and local farming inadequate to reliably meet basic needs. Local food supplies will be further undermined by declines in freshwater fish stocks due to disrupted water supplies. The short-term economic gains that drive current land clearance in Leuser will not last into the medium- or long-term. A valuation of the Leuser Ecosystem published in 2002 shows clearly how the continuing removal of natural habitat may lead to improved income for some sectors for a limited period, but will lead to rapidly declining benefits over the long-term, including the removal of many vital ecosystem services and the loss of opportunities from activities such as tourism and carbon trading. Urgent action needs to be taken now to ensure the preservation of the Leuser Ecosystem, its biodiversity and its critical local and global environmental functions.

A Natural Legacy

In order to preserve the properties, benefits and future opportunities of the Leuser Ecosystem, immediate and decisive steps need to be taken. The situation on the ground constantly works in favour of ongoing forest conversion and environmental degradation.

Focussed efforts are therefore essential to turn the tide and prevent this precious natural heritage from slipping through our fingers. At the same time, large-scale land management plans and concession deals could do irreparable damage virtually overnight if their repercussions are not fully considered.

1) Land management plans need to emphasise the importance of maintaining the Leuser Ecosystem and maximising the long-term productivity of the landscape through conservation and sustainable income generation. The illegally enacted Aceh Spatial Land Use Plan needs to be abandoned in the light of scientific evidence about its future effects on the area and the concerns and aspirations of the local people. Existing national policies and laws protecting the area need to be observed and upheld.

2) Law enforcement efforts need to be maintained and enhanced in order to reduce and eventually end illegal land clearance throughout the Leuser Ecosystem. Local and international NGOs and civil society groups need to collaborate with and support law enforcement authorities for maximum efficiency and impact.

3) Responsible development and income generation needs to be promoted through actions such as identifying non-forested land available for new plantations outside of the Ecosystem, using emerging technology and techniques to maximise productivity within existing plantations and other cultivation areas, and encouraging sensitive, locally-based tourism opportunities to improve local incomes.

4) The potential for funding from carbon trading markets needs to be explored and realised, so that the acknowledged contribution of the ecosystem to both local and global climate stability can be monetised into a genuine and significant economic benefit for the region.

As a 2011 UNEP report on the economics of Sumatra’s forests concluded, “the development of a Green Economy can lead to a win-win situation where orangutan habitat is conserved, ecosystem services maintained and economic growth continued”. We now understand that whilst conservation is incompatible with short term destruction of natural resources for quick profits, sustained long-term economic growth in Aceh and North Sumatra fundamentally depends upon the conservation of natural forests and wildlife habitats. The Leuser Ecosystem is at a crossroads. The signs are clear. Together we must choose the path that leads to prosperity, not catastrophe.
The Leuser Ecosystem Alliance is a coalition of local, national and international NGOs dedicated to the protection and restoration of the Leuser Ecosystem in Sumatra, Indonesia. One of the world’s “Most Irreplaceable Protected Areas”, the Leuser Ecosystem is the last place on earth where Sumatran orangutans, tigers, elephants and rhinos coexist in the wild. The Leuser Ecosystem also provides life support and protection from environmental disasters for over 4 million people. The Leuser Ecosystem Alliance is working to protect this precious ecosystem and counter the growing threat of its destruction.

The Leuser Ecosystem Alliance is comprised of Forum Konservasi Leuser (FKL), Hutan Alam dan Lingkungan Aceh (HAKA), Orangutan Information Centre (OIC), PanEco Foundation, Sumatran Orangutan Society (SOS), and Yayasan Ekosistem Lestari (YEL).

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GRID Arendal - http://www.grida.no/graphic/conservation-areas-and-the-leuser-ecosystem_16e9a


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