Biodiversity Loss in Sumatra, Indonesia

VEGETATION FIRES: CAUSE OR SYMPTOM?

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"The Great Fire of Borneo". This describes the vegetation fires in Indonesia that first attracted international attention in 1982-83. Since then, fires and the smoke haze pollution they produced have hit the world headlines in 1987, 1991, 1994 and 1997-98. The common-factor in each of these years was a severe El Niño drought.

What is not generally realized is that thousands of vegetation fires occur every year. And it is these "routine" fires, rather than just those in El Niño years, that should alert conservation groups to the relentless destruction of natural habitats that is taking place year by year throughout Indonesia.

The European Union-funded Forest Fire Prevention and Control Project (FFPCP), which is based in Palembang, South Sumatra, has, in the five years since 1996, built up a detailed understanding of vegetation fires throughout the island. The GTZ Integrated Forest Fire Management Project based in Somarinda, East Kalimantan, has gained similar knowledge for the island of Borneo.

This article focuses on vegetation fires and the loss of biodiversity in Sumatra, myths that surround fires, the fate of protected natural areas in Sumatra; it will attempt to answer the question, "Are vegetation fires the cause or simply a symptom of biodiversity loss?"

Loss of Forest Cover in Sumatra

The diminution of forest cover in Sumatra has been quick in time and dramatic in extent. It began slowly. From the early 1900s to the end of the 1930s, the Dutch progressively established rubber plantations and agriculture around Medan, north of the island - the cultuurgebiet. But by today's standards the loss of forest was small. In the south, migrants from densely populated Java have settled in Lampung from early in the lost century and slowly expanded their farms. In this case the loss of forest was comparatively large but, again, the rate of conversion was relatively slow.

Forest loss accelerated significantly from the mid-1960s when government-sponsored transmigration schemes started to move large numbers of landless people from overcrowded Madura, Java and Bali to the pre-cleared forestland in Sumatra. The families come from urban areas, had no forming experience, and were settled on land known by local farmers to be unsuitable for agriculture. The failure of the schemes was predictable but efforts continued until the early 1990s, resulting in great destruction of the forest.

At the sometime, numerous logging licenses were issued to companies to harvest timber on a "sustainable" basis. The lack of effective supervision of the companies and their harvest operations also had a predictable outcome. All saleable timber was cut with no regard for the damage caused to the residual stand. The exploitation continued unabated for the next thirty years.

The final process of forest decline began in earnest in the late 1980s with the change of status of many of the heavily degraded woodlands from "Permanent Production Forest" to "Conversion Forest", i.e., the residual trees could be felled and the land used for agriculture. In the Sumatra context, agriculture usually equates with commercial oil palm estates.

Current, and perhaps generous, estimates for the virgin forest area left in Sumatra put the figure at around 5 million hectares, or just over 10% of the total land area. The conservation value of this remaining forest is reduced by its fragmented distribution, continuing illegal logging and encroachment. Almost all the lowland dipterocarp forest has been removed or heavily logged. Closed canopy forests are now largely confined to the least accessible parts of the Bukit Barison mountain chain and to the most distant corners of the east coast wetlands.

Ten major groups, abetted by numerous smaller companies, drive the expansion of oil palm estates within Indonesia. The government, mindful of the need to feed its people, increase export revenue and provide employment in rural areas, has encouraged the growth of the sector. The pulp wood plantations in

comparison play a much less dominant role within Sumatra.

The area planted to oil palm in Sumatra has increased dramatically from 144,000 ha in 1986 to 1.1 million ha in 1996, and to 1.98 million ha in 1998. Its current estimate is 2.5 million ha, which is perhaps conservative given that Riau province alone claims 2.1 million ha. Projections of palm oil consumption suggest that demand would continue to increase. Unless government policy changes, over one million hectares will be planted to oil palm in Sumatra over the next 20 years.

Indonesian Fire Myths

With the many internationally supported fire projects that have come and gone, it would seem reasonable to assume that the phenomenon of vegetation fire is widely understood in Indonesia. Sadly, this is not the case. It has been found that people cling to many false beliefs, either through ignorance, or equally often because it is politically expedient to maintain the lie rather than face the truth. The fire myths and the facts noted here relate to Sumatra, although, with some inter-island variations, are generally applicable throughout Indonesia.

Myth number one is that the fires in Sumatra are forest fires. This is not the case since fire prone environments in Sumatra are grasslands, re-growth scrub, and during severe droughts, heavily degraded secondary forest and smallholder forms. Virgin, lowland, and tropical forests, the primary vegetation of much of Sumatra, do not burn, even in El Niño years.

Why then is the term "forest fire" so widely used? It may be because 70% of land in Indonesia remains classified as "Forest Land" and thus any fire that occurs there is seen as "forest fire". Or maybe the term is emotive and attracts donors and their money, or maybe it is through ignorance. The term 'vegetation fire' is much more accurate and thus will be used in this article.

The second myth is that smallholder farmers are responsible for most of the fire damage. Here the commonly used term is "slash and burn", which brings to mind a relentless attack on virgin forests by an army of farmers who cut down the trees, burn them, form for a year and move on. This land use pattern does not occur in Sumatra and there is no evidence that it is still widely used anywhere in Indonesia. Instead, there are tens of thousands of small settled farmers who cultivate their land on a permanent but rotational basis. These smallholders, who commonly farm a two to four-hectare plot, do indeed use fire each year to clear grass and scrub from the half-hectare of their land that has been under follow. No effective and affordable alternative is available to them to prepare their plots for cropping. The reality is that there is a shortage of income to buy herbicides as well as labor to practice the "green" methods of cultivation advocated by idealists. However, through generations of continued fire use and an existence reliant on its use, smallholders are skilled fire users. Moreover, neighbors and the wider community cooperate to control the fire spreading beyond the intended boundary. It is unrealistic to entertain any notion that smallholder farmers can be persuaded to change their land preparation regime. Myths three and four relate to fire causes and are easily dismissed from local observation and international fire research. Myth three, which is that fires in Indonesia are started by lightning, is effectively refuted by a total lack of evidence. Myth four is that discarded cigarettes cause fires. Worldwide research shows that cigarettes start few fires. The tiny number of fires ignited by cigarettes is restricted to regions with highly specific weather and fuel conditions, and do not occur in the humid tropics. Myth five is that all fires need to be suppressed - a notion that is heavily promoted within the ASEAN Regional Fire and Haze Action Group. In all except El Niño years there have been no wildfires to suppress. However, under political pressure from its neighbors, Indonesia has signed on to a no-burn policy. Thus, the new low of 5 February 2001 bans the setting of all vegetation fires and makes the landholder responsible for the suppression of any fire that does occur.

Myth six is that the provision of fire equipment and some training to staff of government agencies based in Sumatra will eliminate the fire problem. This approach has been tried and has, in most cases, failed. What is needed is a fire management capability integrated within the current land management agencies. There is a desperate need for government agencies responsible for land-use policy and land-use planning to move from the present exploitative approach to natural re-sources, to one of sustainable development that takes into account the need to integrate fire management.

These six myths have too often shaped the proposals and the attempts to deal with vegetation fires in Indonesia. Failure to understand the underlying causes of vegetation fires and the inability to incorporate the knowledge already gained into fresh plans and new actions, means that there has been little improvement in the fire situation.

The Facts

With the fire myths exposed, what is factually known about vegetation fires in Sumatra? Essentially, research provides us with an estimate of what year, where and why fires occur, as well as the means to reduce their occurrence and the damage they cause.

The locations of fires - now widely known as "hot-spots" - are obtained from the interpretation of data captured during the thrice-daily overpasses of the National Oceanic and Atmospheric Administration (NOAA) satellites. There are some limitations to the locational accuracy of these data/ but when read as a time-series they provide a clear picture of fire numbers and distribution. When NOAA data is combined with the less frequent but highly detailed imagery obtained from SPOT satellites, an accurate and comprehensive story emerges. Incorporating Geographical Information Systems (GIS) data and extensive field visits would further enhance our understanding of the true fire situation.

Fire occurrence in Sumatra is controlled by seasonal rainfall, although the actual fire numbers in each of the island's eight provinces are heavily influenced by land-use. From 1996 to 2000 a wave of land clearance fires moved down Sumatra in a north to south direction. In the north, fire numbers peak before July, in central Sumatra from July to September, and in the for south, August to October; these peak months generally have the lowest rainfall occurrence in each province. Three pat- terns of fire occurrence, overlaid on the seasonal variations, are recognizable from the satellite imagery. The three can be best described as "scattered", "linear" and "block".

The scattered hot-spot pattern denotes a sprinkling of short-lived fires over a wide area. The pattern is typical of fires set by smallholders in permanent agricultural land. Such fires are not a threat to biodiversity conservation except in El Niño years. The linear hot-spot pattern is typical of fires that appear along new road lines and indicates the readiness of individuals to seize their chance and occupy a newly opened area as it becomes available. For the conservationist, the message is obvious: improved access causes forest loss. The block hot-spot pattern of burning seen in Sumatra is indicative of large fires that persist day and night over days, weeks and sometimes months. In majority of these cases, fires are the lost step in land conversion to estate crops, used mainly to eliminate residual vegetation.

When many fire blocks are found close together within a region, they constitute a "fire zone". There are currently seven such fire zones in Sumatra. Five of these are caused by commercial-scale land-clearance to develop oil palm estates. The sixth fire zone marks the progressive destruction of Berbak National Park aided by prawn aquaculture and forming carried out by Bugis migrants on the coastal margin, and by illegal logging throughout. The seventh fire zone, in South Sumatra, has arisen from a combination of failed transmigration schemes and legal and illegal logging. Five of the seven fire zones are in wetlands and are largely on peat soils. Peat soils burn slowly and were the source of the massive transboundary haze of 1997 and of the intermittent episodes in 1998, 1999 and 2000.

Protected Areas

By 1998 according to government lists, there were 302 National Forest Reserves and 138 Protection Forests in Sumatra, covering a total area of 544,000 ha, and proposed sanctuary areas totaling 597,000 ha. The International Union for the Conservation of Nature (IUCN notes on its website that within Sumatra there are: three Nature Parks, two Forest Parks, eight Wildlife Reserves, eight Nature Reserves, and six National Parks.

We know that of the six IUCN-listed National Parks - the showpieces of conservation effort - Way Kampas was swept by fires in 1997, Berbak, as noted above, is both fire damaged and heavily encroached, and Gunung Leuser is plagued with illegal logging. We can only guess the fate of the other Reserves, Protection Forests and Parks, but we can fairly assume that many now exist only in name.

Conclusion

We have shown that the massive loss of forests within the wetlands, the plains and in the mountains of Sumatra, with the inevitable wide-ranging loss of their associated biodiversity, have two primary causes. These can be summed up as unsustainable levels of timber harvesting, and the conversion of forest to agriculture. The first allows fire to invade the heavily modified forest; the second uses fire in the conversion process. In both instances, it is the chainsaw that precedes the fire. The vegetation fires of Sumatra are a signal or a symptom of forest destruction, and are not its cause.

The immediate challenge for biodiversity conservation is to work with and influence the government agencies responsible for land-use policy, land-use planning, and land administration. The first aim must be to prevent further loss of the few remaining undisturbed natural forest areas; the second, to protect the less degraded forests with the expectation that, given time, they will return to near their pre-disturbance state.

The omens are not promising.

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