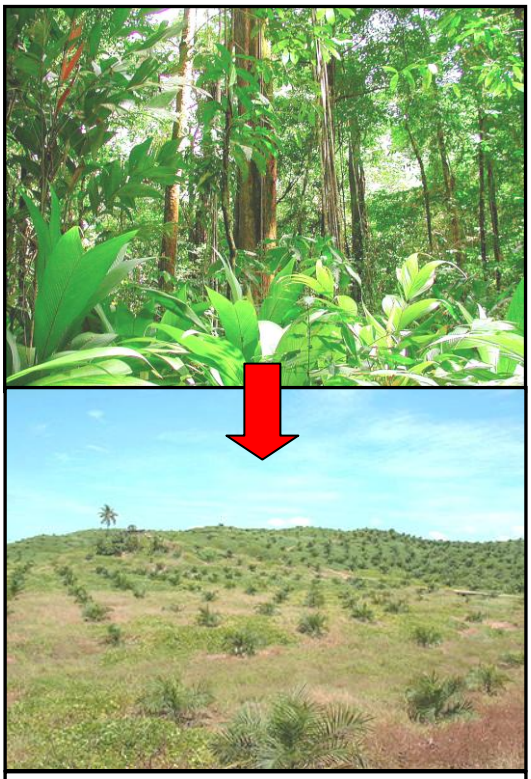
BITING THE HAND THAT FEEDS US

The destruction of tropical rainforest for oil palm cultivation is severe and unrelenting. Palm oil is a cheap alternative to other oils and is used in many household food products. Many consumers are unwittingly supporting the industry and its deleterious impacts on biodiversity and human well being.

Why does it all matter?

As well as its intrinsic and cultural values, biodiversity provides us with a wealth of ecosystem goods and services. These include such benefits as food, fuel, clean water, clean air, carbon sequestration, flood prevention, disease prevention and the list goes on. It has been estimated that these services are worth over $30 trillion each year. One billion people, primarily from developing countries, are fully dependent on these provisions for survival.

The Millennium Ecosystem Assessment (2005) estimated that current rates of extinction are around 1000 times faster than expected and over 40% of known species are now categorised as endangered on the IUCN red lists. Such losses of biodiversity equate to losses of around $2 trillion in ecosystem services every year. Anthropogenic activities such as land use change and over-exploitation are responsible for this. Population growth is continuously intensifying these activities, particularly in developing countries. Given that these countries already suffer high levels of socio-economic stress, looming losses of biodiversity and ecosystem services are even more significant. The simple fact is this: Our current activities can inflict widespread negative impacts on human well being. Regions that are home to the World's poorest people can expect significant loss of life.



Stark contrasts: Pristine tropical rainforest (above) and an oil palm plantation (below).

Tropical rainforests

Tropical rainforests are the most diverse biome on Earth. Despite covering just 6% of the Earth's surface they are home to over 50% of its species. However, they are also one of the most threatened. Shifting agriculture results in the destruction of 30km^2 of rainforest every day. Land use change removes the complex structure of the rainforest and its wide variety of niches, which enables rainforests to hold such a high diversity of species. The agricultural plantations that replace rainforests severely lack structural complexity and provide few habitat niches. This not only results in species loss but also in the loss of an important functioning ecosystem. Rainforests are massive carbon stores and they have responded to our increases in CO_2 emissions by increasing their rate of uptake. These ecosystems have been succeeding in mitigating our emissions where we have failed, yet we continue to destroy them for short term monetary gains. Rainforest destruction is estimated to contribute 25% of global warming. Their preservation is therefore of particular importance.

Oil palm

Oil palm plantations currently span over 13 million hectares, primarily in South-East Asia. These plantations are cultivated to produce palm oil. Indonesia and Malaysia are the biggest producers, exporting hundreds of millions of tonnes of palm oil every year. The rising global population and wide range of uses for palm oil mean demand is ever increasing. It is not surprising that such a massive industry is being actively exploited; the increases in demand have lead to the implementation of monoculture techniques that maximise yield. However, these techniques are also highly detrimental to biodiversity. Many alternative agroforestry crops are grown as polycultures, which include a variety of floral species such as 'shade' trees. These grow above the level of the crop meaning some of the structure and diversity of the original rainforest habitat is retained. The problem is that this reduces the amount of sunlight available to the crop, and yields are not as high as in monoculture plantations. In a monoculture the target crop is grown in the absence shade trees allowing direct sunlight for the entire plantation. Faster rates of photosynthesis and growth are the result.

Another reason for the use of monocultures is that the additional flora in polycultures compete with the crop for nutrients, further reducing yield. Considering rainforest soils are highly infertile, it is unsurprising that cultivators make efforts to reduce competition. In fact, the demand for high yield plantations is now so extreme that it has also lead to the increased use of pesticides, herbicides and fertilizers. Hence, as well as the initial loss of biodiversity following deforestation, cultivators are also actively removing any remaining species. The low fertility of the soil is another factor that promotes high diversity in rainforests as it prevents a single fast growing species from dominating. However, the use of fertilizer often means that the crop is surrounded only by grasses, which provide little in the way of biodiversity. One of many studies on the impacts of oil palm is given by Finn Danielsen (2009). It was demonstrated that species richness is depleted by around two thirds in monoculture plantations. Oil palm is perhaps now the most deleterious of agroforestry crops.

What have you eaten today?

Palm oil is a cheap alternative to other oils and has a wide range of uses. Despite being a saturated fat, palm oil is cholesterol free meaning it has a massive market in the food industry. The oil is used as an additive in many products and is often involved in the processing of crisps and instant noodles. Many well known brands have been found to contain palm oil such as KitKat, Hovis, Persil and Flora. Up to half of European food products contain palm oil. In fact, the chances are that many of the products you have consumed today contained palm oil, from your shower gel to your cereal. However, retailers make it difficult for consumers to avoid foods containing palm oil as it is listed under vegetable oil. As such, many people in the Western World are unwittingly supporting the oil palm industry.

Feeling peckish? These are a handful of the products that have been found to exploit the oil palm industry. Avoid them (they are bad for you anyway!).

The other increasingly popular use for palm oil is as a biofuel. Such fuels are obtained from within the current carbon cycle and therefore do not add carbon to the system when burned, unlike fossil fuels which are taken from within the Earth's crust. There is a huge market for biofuels as we enter a new 'greener' era, meaning further support from the West is anticipated. However, it would be incorrect to describe a palm oil biofuel as environmentally friendly as the losses of carbon sequestration following deforestation would negate any positive aspects. Four percent of carbon emissions can be attributed to Indonesian deforestation alone. Such impacts of deforestation have been well documented, yet the industry is also responsible for direct socio-economic issues. Many communities of farmers that once cultivated small scale oil palm plantations to support their families have now been displaced by wealthy corporations.

What can be done?

Economics is the primary inhibiting factor in the regulation of oil palm practices. Palm oil is a massive industry in South-East Asia meaning conservationists are hard tasked to gain support from governing bodies. In these developing countries, any successful industry is encouraged, with socio-economic gains a primary target. Many farmers still depend on agriculture for income meaning governments are unwilling to implement any new sustainability policies against them. Including the giant corporations, over three million people are involved in the Indonesian oil palm industry alone, which provides further logistical challenges in the control of the industry.

One promising conservation strategy that endeavours to reduce deforestation is **REDD+** (**R**educing **E**missions from **D**eforestation and Forest **D**egradation). It aims to promote the sustainable management of forests, with special focus on the conservation and enhancement of carbon stocks. Many countries have agreed to participate in this strategy. Participants were each assigned the task of providing estimates of their total forest area and rates of deforestation, allowing an estimate of their emissions to be made. The principal behind this strategy is that those countries that can reduce their emissions and increase carbon stocks would receive funding to compensate any economic sacrifice. This should help alleviate deforestation and encourage the sustainable development of palm oil production.

Oriental Dwarf Kingfisher (Ceyx erithaca): Common in densely shaded rainforests.

REDD+ therefore takes a somewhat reactive approach to deforestation by attempting to reduce or reverse damage which has already been done. To supplement this it is important to take additional proactive approaches to preserve areas that are yet to be affected. These involve such ventures as the establishment of protected area networks. These can target concentrated areas of species richness and endemism to give a good representation of the regions biodiversity. Many species such as the kingfisher pictured left, can not inhabit agricultural plantations meaning their survival depends on proactive efforts to preserve the habitats in which they can exist. With effective management and legislation within these protected areas, deforestation and species loss can be inhibited. Protected area networks can combine with REDD+ to conserve our

current biodiversity and to defend it against future losses, whilst also allowing the regulated persistence of the industry. Deforestation can still be expected but this is perhaps the only realistic strategy currently available due to the reluctance of government bodies to cooperate, as well as the lack of awareness at regional scales.

Critical: A mother with her new born in Brookfield Zoo. Captive breeding may now be the only hope for orang-utans.

Many individual NGO's are making efforts to increase awareness of deforestation and the palm oil industry. One such example is the **SOS** (**S**umatran **O**rangutan **S**ociety). Orangutans are critically endangered in South-East Asia making them particularly vulnerable to future habitat degradation. One of the current campaigns supported by the SOS is to 'Clear Labels, Not Rainforests'. Attempts are being made to provide legislation which forces food companies in the EU to clearly label their palm oil containing products. This will allow the public to make decisions on what they eat, as well as increasing awareness of the dangers of the oil palm industry. To play your part, visit the webpage below and send the email provided to the MEP responsible for making the decision in your country and show your support for the campaign.

Biting the hand that feeds us

Biodiversity has provided us with food and shelter since our existence. We are now becoming greedy and taking more than is sustainable. If we continue in our current vein, we can expect severe socio-economic and health related impacts. Significant loss of life can be expected in developing countries where dependence on ecosystem services is highest. Given that organic and fair trade food products are now of such importance to so many people, it is a wonder that products containing palm oil are still so accepted. The likely explanation is the lack of information. It is difficult to quantify and appreciate something that is happening thousands of miles away, in a far removed environment. It is however imperative that we do as much as possible, be it from policy makers or from public donations to conservation projects, the time to act is now.

***Clear Labels, Not Rainforests*:** http://www.call4.org/take-action/?campaign=937

Further Reading:

Millennium Ecosystem Assessment 2005. Available from http://www.millenniumassessment.org/. Accessed March 2011.

Danilesen, F., Beukema, H., Burgess, N.D., *et al.* 2009. Biofuel plantations in place of forested lands: Double jeopardy for biodiversity and climate. Conservation Biology 23:348-358.

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