

Forest loss and human health: focus on EU policies and practices

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ABSTRACT Forests make a huge contribution to human health. They provide food and medicine, and are an important component of traditional health systems. While it's widely known that forests play a key role in mitigating climate change, in conserving soil and water quality, awareness of the impact on human health due to forest devastation and the loss of these ecosystems is less widespread.

While the EU recognises the nexus between environment and health, the EU's 'environmental perspective' on health fails to fully address potential health risks from emerging hazards (climate change) and ecosystem disruption.

This briefing note outlines the role of forests in maintaining human health. It also underlines basic principles that should be followed in order to ensure EU policies contribute to the improvement of human health.

Published by FERN, April 2005.

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FERN works to achieve greater environmental and social justice, focusing on forests and forest peoples' rights in the policies and practices of the European Union.



Of all the terrestrial systems, forests constitute one of the most important in terms of biological diversity. Together they house the vast majority of the world's terrestrial species, while some 1.6 billion human beings worldwide – themselves an integral component of forest biodiversity – depend on forests economically, socially and culturally.

Both forest biodiversity, and the natural functioning of health forest ecosystems, contribute immensely to human health. Forest species contribute to balanced diets, and are a major component of traditional healthcare systems – which provide the primary healthcare for around two-thirds of the global population.¹ Moreover, chemicals and genes harboured by forest plants – which have already provided drugs for treating diseases such as malaria and leukaemia – look likely to provide many more potential new medicines.

And while plants and animals yield essential food and medicine, healthy forest ecology plays a key role in mitigating climate change, in conserving soil and water quality and in controlling the emergence of potential pests. Indeed, the drastic alteration of forest systems – through large-scale forestry and forest conversion – can open up opportunities for disease-causing pathogens, such as viruses or bacteria, to infect other organisms with which they have previously had no contact. Such events can directly contribute to the emergence of new diseases such as the Human Immunodeficiency Virus (HIV/AIDS) and Severe Acute Respiratory Syndrome (SARS);² two viruses that have recently 'jumped' the species barrier.

Severe forest disruption, combined with evolution (of pathogens), globalisation (in trade and travel) and changes in living patterns, can therefore lead – and has already led – to the loss of many forest goods and services, with profound implications for human health. Meanwhile health, poverty and forest degradation remain very closely intertwined, with many of the world's poorest people depending directly on a wide range of forest resources and services for their livelihoods. This includes more than 1.6 billion people who depend, to varying degrees, on forests for their livelihoods, and around 60 million indigenous people are almost wholly dependent on forests. A further 350 million people who live in, or adjacent to, dense forests depend on them to a high

Box 1: Forest fires and human health

The relationship between human health and forest fires is complex. While for many people fires have little or no health impact, some – especially more vulnerable groups such as the elderly, children, women and the poor – experience severe adverse health effects. In addition to its direct effect on human health, smoke produced by fires may also lead to animal – and pathogen – migrations.

For example, evidence suggests that smoke from Southeast Asia's massive forest fires of 1997/1998 – whose occurrence was in itself facilitated by forest degradation* – was the reason for the transmission of the deadly Nipah virus to humans.** After smoke prevented trees from flowering and producing fruits, the fruit bats – the carriers of the virus – began to feed on Malaysian fruit tree plantations, thus transmitting the virus to neighbouring pig farms. An outbreak of the disease in 1999 resulted in more than 265 people infected, of whom 105 died, and led to the massive destruction of Malaysian pigs and the demolition of many pig farms.***

* European Commission (1999) Forests and Development: the EC approach. Communication of 4 November 1999

** Chivian E (Ed.) (2002) Biodiversity: Its importance to human health. Harvard

*** WHO (2001) Nipah Virus. Fact Sheet No 262

degree for subsistence and/or income.³ Forest destruction therefore leads to some level of deterioration in livelihood for all these people.

While this relationship between poverty and forest dependence can be exacerbated further by the direct interrelationship between poverty and health, for the purpose of this briefing we focus specifically on the more direct impacts of forest loss on human health.

Forest loss: impacts on health

Forest loss can have significant direct and indirect impacts on human health. In direct terms, these impacts vary from loss of resources to the effects of forest fires (see Box 1); indirectly, these impacts include, for example, the effects of forest clearance on the survival and spread of both disease pathogens and the carriers of those diseases.



Box 2: Climate change and health

The relationship between forests, climate and health are both complex and alarming. Loss of forest – whether through clearance or through forest fires – leads to climate change, and this in turn leads to impacts on human health. Some of these impacts are direct, for example, through temperature-related illness and death, extreme weather events and air pollution; others may be indirect. Such indirect effects can occur due to the loss of natural 'goods and services' (through food and water shortages, and through food-borne diseases) and/or due to changes in the transmission patterns of infectious diseases. For example, climate change may favour disease transmission, both through greater pathogen reproduction and survival (because of increased temperature), and through reduced predators of disease vectors (because of loss of biodiversity).

Such changes are already a cause for concern and look set to become increasingly important in the future. For example, climate change is thought to have been responsible for approximately 2.4 per cent of diarrhoea worldwide, and for 6 per cent of malaria in some middle-income countries, in 2000.* Moreover, it is now estimated that a temperature rise of 1-2o C over the next 50 years could extend the territory of malarial mosquitoes northwards. This would significantly increase the proportion of the world's population at risk from malaria and other mosquito-borne diseases.** Other diseases whose current spread is believed to be due in part to global warming, include: dengue fever, certain forms of mosquito-borne and tick-borne encephalitis, and yellow fever, all of which could expand to regions where they previously did not exist.

* WHO (2003) Climate Change and Human Health: Risks and responses.

** WHO (1999) Report on Infectious Diseases: Removing obstacles to healthy development.

Today, 20 per cent of the total occurrence of disease in the developing world, and 34 per cent in sub-Saharan Africa, is associated with environmental degradation, with lack of access to safe, affordable water and sanitation constituting the major threat to health in these countries.⁴ Forest loss can contribute directly to the severity of these health problems through disruption of the water cycle and increased soil erosion, as well as indirectly –

though very significantly – through its effects on local and global climate change, which in turn can have a profound effect on the survival and spread of disease pathogens (see Box 2).

Forest loss also plays a significant role in influencing the direct and indirect⁵ impacts of natural disasters on human health. Forest coverage minimises the effects of disasters such as floods or landslides by slowing down and absorbing the flows of water, absorbing the energy of wind and waves, and preventing soil erosion. For example, coastal forests such as mangroves have been shown to act as a barrier against tsunamis,⁶ cyclones and hurricanes.⁷ Mangroves also prevent coastal erosion, protect coral reefs from silting up, and provide a source of timber, food and traditional medicines for local communities.⁸ Unfortunately, these unique ecosystems are now severely threatened by industrial shrimp aquaculture, tourism and urban expansion.

Deforestation is also probably the most important single factor in the spread of **vector-borne diseases** (diseases, such as malaria, that are transmitted from one type of organism by another). This assessment is backed by numerous references linking disease outbreaks to forest destruction – whether through logging, clearing for agriculture, road construction, mining, firewood collection, or building dams or settlements – which can significantly influence the relative success of both humans and other disease-carrying organisms (see Boxes 1, 2 and 3).

The roles that deforestation play in provoking changes in vector-borne diseases can vary. Due to changes in temperature (through increased sunlight), presence of stagnant water (through pools forming on exposed soil surfaces) and/or loss of biodiversity, deforestation may lead to the eradication, replacement and/or displacement of organisms transmitting diseases (vectors). But, more importantly, deforestation also fosters new or increased human contact with disease vectors – through population migrations to new clear-cut areas. This increases the risk of human exposure to pathogens, including those that may switch to human blood as an alternative source of food. Moreover, the rapid adaptation of vectors to exotic vegetation – including plantation species – may lead to an increased abundance of such organisms. In some cases the combined effects of the altered forest habitat and increased temperature that follows deforestation can result in disease epidemics.



One example of a disease that has been significantly impacted by forest loss is **malaria**, catalogued (together with HIV/AIDS and tuberculosis) by the World Health Organisation as one of the major public health challenges undermining development⁹. Each year, malaria causes at least one million deaths, and an additional 300 to 500 million clinical cases, the majority of which occur in the world's poorest countries.¹⁰ Despite the fact that 90 per cent of its occurrence is in sub-Saharan Africa, logging and/or changes in human behaviour have made this disease more common also in some Southeast Asian and Amazonian regions during the last decades. The high logging rates in these three regions increasingly expose their human populations to the disease, the environmental changes associated with deforestation (as outlined above) allowing an 8 per cent increase in malaria-bearing mosquitoes for every 1 per cent increase in deforestation.¹¹

Forests contributing to health

While forest loss has a clear impact on human health, forests themselves provide a vital **source of medicines** to much of the developing world. Today, less than 1 per cent of the world's tropical forest plants have been tested for pharmaceutical properties, yet at least 25 per cent of (US) prescriptions contain active principles obtained from higher plants – some which were

first used in traditional medicine.¹² Data from the US National Cancer Institute show that 70 per cent of all plants known to be active against cancer come from tropical forests, as do the 25 per cent of the active ingredients in today's cancer-fighting drugs.¹³

The global market value of pharmaceuticals derived from plant resources is currently more than US\$75 billion per year.¹⁴ These include such drugs as digitoxin (arrhythmias and heart failure), diosgenin (birth control pills, arthritis, asthma), vincristine (Hodgkin's disease, leukaemia, other cancers), emetine (bronchitis, dysentery), ouabain (heart medication), physostigmine (antiglaucoma), curare (muscle relaxant used in surgery), atropine (pre-anaesthesia), morphine (narcotic analgesic), reserpine (high blood pressure), D-tubocurarine (neuromuscular blocker), and quinine (malaria, pneumonia).

Almost two-thirds of the world's population relies on **traditional medicines** for their primary healthcare,¹⁵ and 85 per cent of traditional medicines derive from plant extracts. Medicinal plants have been used by forest dwellers for thousands of years to cure a wide range of illnesses: rheumatism, diabetes, muscle tension, malaria, heart conditions, skin diseases, arthritis or glaucoma are only some of them. Traditional medicines are cheaper than conventional medicines and generally readily available, especially

Box 3: Forest animals, emerging human diseases and EU Policy

Three-quarters of emerging human diseases – diseases previously not recognised in the human population – originate as diseases in other animals.* Such diseases include, among others, influenza, several viruses that can be transmitted from farm animals to humans, HIV/AIDS, SARS and Ebola.

Globalisation (trade and travel) and the global environmental crisis (climate change and deforestation) have, in recent decades, multiplied the opportunities for pathogens to jump across the species barrier. The demands of growing human populations for food, the building of roads in previously inaccessible forests, and increased pressure on agricultural resources have led to a rise in the hunting and consumption of bushmeat – wild forest animals – in many countries. Evidence suggests that the bushmeat trade in primates may have been responsible for the emergence of HIV/AIDS in humans (the virus' precursors – the Simian Immunodeficiency Viruses (SIVs) – most likely being transmitted to humans through exposure

to blood).** As these practices continue to increase, there is a considerable risk that other similar viruses may be passed from primates to people in the future. Bushmeat consumption has also been linked to outbreaks of Ebola, plague and anthrax.

Unnervingly, recent research shows that the European Union's fisheries policy is actively contributing to driving the bushmeat trade in Africa, as EU subsidies artificially increase the profitability of EU fleets operating in African waters.*** A key factor leading to dwindling fish stocks in the area, the EU is ensuring that fish supplies are decreasing. Given that fish provide a particularly important source of protein for poorer communities, this means that many must turn elsewhere for food and economic survival; in this case increasing the consumption of bushmeat.

* Chivian E (Ed.) (2002) Biodiversity: Its importance to human health. Harvard.

** BCTF (2003) Global Human Health. Bushmeat Crisis Task Force

*** Brashares J, et al. (2004) Bushmeat Hunting: Wildlife declines and fish supply in West Africa, Science 2004 306: 1180-1183



Box 4: EU action on forests and health

The COST* Action E39, Forests, trees and human health and well-being,** is an EU funded programme that seeks to explain the links between forests and health, and to explore how forests can best contribute to the health and well-being of people in Europe.

This 4-year programme commenced in 2004 and will focus on today's increasing incidence of poor health in Europe. Contributing factors that have been identified, all related to modern lifestyle, are: increasingly sedentary population, increasing levels of mental stress, and hazardous environments (e.g. air pollution). Natural spaces and natural elements such as forests and trees have been seen as providing opportunities to ameliorate such trends.

The outcomes of the programme are expected to contribute to health policy developments.

*Founded in 1971, COST is an intergovernmental framework for European Co-operation in the field of Scientific and Technical Research, allowing the co-ordination of nationally funded research at a European level.

** See: <http://www.forestresearch.gov.uk/fr/INFD-66LJNL>

in rural areas. In addition, while any trade in natural resources may have conservation implications, the associated trade in medicinal plants can provide a significant source of income for certain individuals or communities.

Recent research shows that large-scale logging has a dramatic impact on the availability of medicinal plants.¹⁶ The current rampant rates of forest loss – with illegal logging and poorly regulated 'legal' logging leading to massive over-harvesting – suggest that medicinal plants must be becoming scarcer. This increases the cost of treatment and means that poorer people do not have access to the medicinal plants they need. As a consequence the health – and sometimes the livelihoods – of the poor become threatened.

In addition to their role as a source of natural medicines, forests also play an important role in ameliorating problems of decreased air quality. Today, **air pollution** is a major health problem that kills three million people each year.¹⁷ Although it comes from natural sources, this pollution is mainly generated by the human

burning of fossil fuels, which has introduced – and continues to introduce – a steady flow of pollutants into the atmosphere. These pollutants, when inhaled, provoke respiratory diseases, cardiovascular diseases and cancer. The deposition of those pollutants further contaminates food and water.

Yet forests have the capacity to reduce air pollution by sequestering many of these toxins from the atmosphere. Substances that they can 'collect' from the atmosphere include oxides of nitrogen (NOx), sulphur dioxide (SO₂), ozone (O₃), carbon monoxide (CO) and particulate matter of ten microns or less (PM₁₀). Meanwhile, the role of forests in sequestering atmospheric carbon – about 60 billion tonnes each year¹⁸ – helps to mitigate the negative effects of climate change (see Box 2). Furthermore, forest canopies function to slow down the rate at which rainwater hits the ground, facilitating its absorption and helping to filter or break down water-soluble pollutants.

Finally, the 'modern lifestyle', with its sedentary habits and mental stress, is increasingly affecting human health. In this context, forests act to protect against **noise pollution** (an environmental stressor) by forming a sound buffer. Moreover, the recreational and relaxation values provided by forests help to promote exercise and a more active lifestyle, contributing to body fitness and decreased levels of psychological and physiological stress.¹⁹

EU Policy

Several EU documents acknowledge the nexus between environment and health and between poverty, environment and health.²⁰ To some degree, these linkages have been tackled through EU initiatives such as the new EU Research Action Programme on European forests and human health (COST Action E39) (see Box 4), the Tropical Forest Budget Line – which supports the conservation and sustainable management of forests in southern countries – and the Programme for Action, which encompasses poverty-related diseases. Yet, despite these provisions, in practice the EU's environmental perspective on health continues to focus on traditional hazards (air pollution, lack of drinking water and other chemical hazards), and fails almost completely to address either emerging hazards (climate change) or the potential health risks arising from biodiversity loss and/or desertification. FERN believes that, given the interdependence



between poverty, environment and health, and the gravity of the health situation in developing countries, it is essential that programmes such as Action E39 should be extended to EU co-operation actions.

Given that the role of ecosystem dynamics in maintaining human health is undeniable, the effective incorporation of environmental issues into EU policies, programmes and projects remains critical to ensuring real and sustainable results in improving human health, especially in developing countries.

EU policies should therefore:

- Ensure the protection of forest – including by halting unsustainable forestry practices – and the protection of forest peoples;
- Pay proper attention to global warming and to the maintenance of natural, well-functioning ecosystem services in EU health policies;
- Integrate forest policies and management strategies into EU health policies and programmes;
- Consider the effects on health of any practice involving the alteration of natural systems, and provide for the development of adequate means to mitigate and/or avoid the destruction and fragmentation of natural habitats whose demise represents an increased risk;
- Set up, in co-operation with civil society groups, structures and mandatory guidelines for the participation of civil society in the policy-making processes, both at the Commission and with its Delegations;
- Guide policy decisions on EU research on environmental policies and practices, such that they contribute to enhance healthy environments and to protect human health.

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