

The Freiburg Declaration on Tropical Fires

The Freiburg Declaration on Tropical Fires was released by the participants of the 3rd International Symposium on Fire Ecology held at Freiburg University, Federal Republic of Germany, 16-20 May 1989.¹

The Role of Fires in Tropical Ecosystems

Fires in the forest and other vegetation of the tropics and subtropics and the changing tropical land use have increasing regional and global impact on the environment. The smoke plumes from tropical biomass fires carry vast amounts of atmospheric pollutants, including CO₂, CO, NO_x, N₂O, CH₄, non-methane hydrocarbons, and aerosols. Smog-like photochemistry produces ozone concentrations comparable to those found in the industrialized regions. These perturbations of the tropical atmosphere are on such a scale that they can be easily detected by remote sensing from space. Alterations of the hydrological regimes can have severe environmental and human consequences for the regions being burned and in neighboring regions. The consequences of biomass burning, such as the aggravation of the greenhouse effect, affect non-tropical regions most strongly. The catastrophic fires on the island of Borneo in 1982/83 indicate the danger that possible climatic changes pose to the survival of the tropical forests themselves.

On the other hand, fires play a central role in the maintenance of many natural ecosystems and in the practice of agriculture and pastoralism. The various types of savannas are burned frequently both by human- and nonhuman-caused fires. Burning is used as a tool in maintaining tree plantations and natural forests, especially in the subtropics. Forests in the moist tropics have long been used in shifting cultivation to support low population densities of traditional agriculturalists without degrading either the forest or the productive potential of the soil. This situation has changed radically by accelerating shifting cultivation cycles under the influence of market economies and because of increasing population pressure, both from demographic growth and from reduced access to land. Non-sustainable slash-and-burn pioneer agriculture, without the long fallows of traditional systems, is practised by populations that are either attracted to or forced to migrate to tropical forest areas, or that are transported to these regions under government colonization or transmigration programs. Both shifting cultivation and pioneer farmers depend on burning to produce crops at acceptable labor input intensities. Burning is also the key process in maintaining the cattle pastures that are replacing tropical forest in vast areas of tropical Latin America. In the enormous areas of savannas – especially in Africa – where burning is a part of the natural cycle, the frequency of fires has greatly increased, and with this the impact of uncontrolled fires is more and more detrimental. The dual role of fire must be recognized, being both a natural agent of ecosystem maintenance and a potentially disastrous cause of ecosystem destruction.

Where do we Stand?

Fire control has been the traditional fire policy in many parts of the world. An increasing number of countries have adopted fire management policies instead, in order to maintain the function of fire in removing the accumulation of fuel loads that would otherwise lead to damaging wildfires, and in order to arrest succession at stages that are more productive to

¹ Note: The original publication of the Freiburg Declaration is included in the volume: Goldammer, J.G. (ed.) 1990. Fire in the tropical biota. Ecosystem processes and global challenges. Ecological Studies 84, Springer-Verlag, Berlin-Heidelberg-New York, 497 p.

humans than are forests that would predominate in the absence of fire. Frequently, inappropriate choices are made – often because decisions are influenced by other regions where conditions differ. Such influence may come through misguided international aid programs, through visiting consultants and researchers, or through the temperate-zone bias of local technical staff trained abroad. Researchers and policy-makers must be sensitive to the different functions of fire in each ecosystem and to the needs of the people who depend on it.

When current burning practices are correctly identified as damaging, as in the case of the recent explosion of deforestation and burning in lowland Amazonia, the measures taken are often ineffective. Prohibiting burning, and attempting to enforce this through inspection and punishment, is bound to fail.

The motives for burning must be removed, such as land speculation, tax or other incentives, and land documentation criteria that reward deforestation. Migration of farmers to infertile rain forest areas must not be facilitated by highway construction and must not be augmented by policies that expel populations from other regions through land tenure concentration and through lack of employment alternatives. Sound policies to bring the use of fire under rational control must be based on an accurate understanding of why burning is done, what its costs and benefits are, and who enjoys the benefits and suffers the impacts of present and alternative practices.

An Action Plan

Both more research and immediate action are needed. Education must begin now to bring about long-term changes in attitudes towards fire and nature. Global monitoring systems must be expanded and coordinated. For example, the rain forests of the Congo Basin have so far been almost untouched by fire, but must be watched because the situation could change rapidly, as it has in other tropical areas. Temperate zone countries can contribute greatly to research efforts through financial contributions and by participating in intellectual exchange with tropical countries. The International Geosphere-Biosphere Programme (IGBP) offers a promising channel for international cooperation in fire research and the Intergovernmental Panel on Climate Change (IPCC), under the auspices of the United Nations Environmental Program (UNEP), will provide response strategies to these environmental threats. It is essential, however, that the IGBP focus its resources on the large ecosystems that play major roles in global geochemical processes. Tropical rain forest, for example, must be understood in the Brazilian Amazon and in Equatorial Africa rather than being studied primarily in isolated remnants of forest in Puerto Rico, Panama, Costa Rica, or Hawaii.

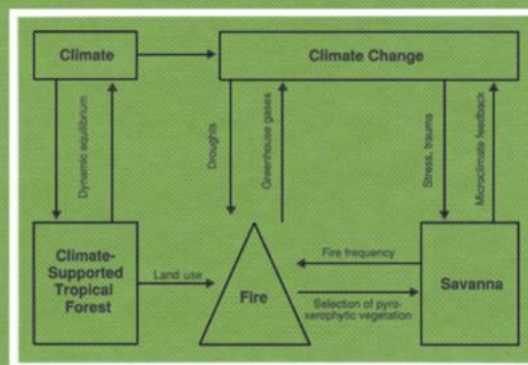
Without waiting for further results, much could be done to translate what we already know into action. These actions include reforming the policies of international lending institutions and development assistance programs to give greater consideration to the environmental impacts of policies that either provoke or eliminate fires. Recent increase in the environmental review capabilities of the World Bank is a hopeful sign, but it is only a tiny beginning. Institutional mechanisms must be developed to distribute fairly – both within and between nations - the costs and benefits of changes in fire policy. The questions of "fire for whom?" and "fire control for whom?" must be answered clearly if sound and fair policies are to be formulated. Policies must respect national sovereignties. Fortunately, the interests of different nations almost always point in the same direction: limiting deforestation is not only in the long-term interest of the people of the tropical countries where forests are being cleared, but is also beneficial to other nations concerned by the loss of biodiversity and by the danger of atmospheric impacts in temperate latitudes.

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Ecosystem Processes and
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