

## Forest threats

Forests have long been threatened by a variety of destructive agents. Today, the frequency, intensity and timing of fire events, hurricanes, droughts, ice storms and insect outbreaks are shifting as a result of human activities and global climate change, making forest ecosystems even more prone to damage. This issue of *Unasylva* examines the threats posed by a number of biotic and abiotic agents and some of the measures for overcoming them.

Natural threats such as fire, insects and diseases are integral to forest dynamics. However, they can disrupt the flow of goods and services from forests by affecting tree growth and survival, water quality and yield, and biodiversity. Also considered are alien invasive species – pests, microorganisms or trees that are non-native to a particular ecosystem and whose introduction causes, or is likely to cause, economic or environmental harm. Many introduced tree species have high socio-economic and environmental value, but they can give cause for concern when insufficient consideration is given to the context of their use and management. Measures to protect forests from all threats must be an integral part of sustainable forest management.

Wildfire is among the most dramatic threats to forests. Since fire does not respect national borders, the first article, by J.G. Goldammer, describes the role of international and regional collaborative efforts in reducing the negative impacts of fire on people and the environment. Next, V. Mosoti and A. Mekouar provide an overview of national legislation enacted by many countries to prevent or address forest fire situations more effectively.

National and international efforts to develop mitigation strategies for wildfires also need to address human causes of fire. A key to this is ensuring the participation of local people in forest fire management planning. M. Jurvélius describes a community-based fire management approach that has been effective in reducing the number and spread of wildfires in southern Africa.

Forest threats can be interlinked. In Central America, areas affected by recent bark beetle outbreaks, where dead trees augmented fuel loads, became the focus for extensive wildfires. R.F. Billings and co-authors explore the causes and impacts of the bark beetle outbreaks in five countries, also examining the role of fire – with an emphasis on new prospects for integrated pest management.

When an insect outbreak reaches epidemic proportions, aerial application of biopesticides is sometimes the only

resort to treat the infestation effectively. But high costs are an obstacle to large-scale treatment in developing countries and countries with economies in transition. G. Allard *et al.* describe how a technical cooperation intervention involving transfer of technologies and equipment has helped the Republic of Moldova cope with a catastrophic outbreak of defoliating moths. A shorter article by J. Novotný describes a participatory strategy involving small farmers, large private forest owners and forest enterprises in protection of spruce stands against insect pests and fungal diseases in Slovakia.

Increasing movement of seeds and plants and international trade and travel have increased the risk of accidental introductions of forest pests. A short article by M. Keiran and E. Allen notes the particular risk associated with wood packaging materials, and the adoption of a global standard for treating these materials.

Next, S.S. Lee illustrates the threat that diseases can pose to forest plantations: in Malaysia, the long-term success of *Acacia mangium*, once generally considered the country's most promising forest plantation species, may be threatened by vulnerability to heart rot, root rot and phyllode rust.

*Prosopis* species, introduced in parts of Africa to control desertification, have become controversial, as they have been perceived as invasive. Based on studies in the Niger and Yemen, D. Geesing, M. Al-Khawlani and M.L. Abba conclude that introduced *Prosopis* species can be invasive; yet with the required silvicultural inputs, and with their exploitation for fuelwood, fodder and food, they can provide benefits, including enhanced food security.

It is not yet possible to conclude whether genetically modified organisms (GMOs) are a forest threat. M.H. El-Lakany points out that research and deployment of GMOs are not yet widespread in the forest sector, and little reliable information is available. With most of the world's forest area likely to remain natural or semi-natural, the area planted with genetically modified forest trees is likely to remain relatively small. Yet, since this new tool may be used, regulatory frameworks for testing, monitoring and managing GMOs and protocols for evaluating the associated risks are essential.

Finally, a short piece by D.A. Taylor addresses a particular human threat to forests: violent conflict. With their often rich natural resources and remoteness from centres of government, forests have frequently been the hub of disputes. When violence occurs in forest areas, the forest often, but not always, suffers negative consequences.

FAO, in collaboration with its many partners, provides advice on prevention, legislation and long-term strategies to countries and supports regional collaboration in dealing with forest threats. It provides technical assistance and information networking. Systematic information is critical for dealing effectively with emerging threats to forest health and productivity and for reducing reliance on ad hoc responses. ♦