

## CBFiM and climate change

The Intergovernmental Panel on Climate Change, established by the World Meteorological Organization and the United Nations Environment Programme, defines climate change as “any change in climate over time, whether due to natural variability or as a result of human activity”. Wildfire contributes to significant levels of deforestation, degradation and atmospheric emissions in many parts of the world. An increased number of wildfires in the last two decades has been attributed, in part, to a changing climate (Westerling *et al.*, 2006); specifically, warmer temperatures and reduced precipitation are some of the factors that may be resulting in this global increase.

Fire is a significant threat to the ecological health and subsequent sequestration ability of many tropical forests. Fire-sensitive ecosystems typically have not evolved along with fire as a significant recurring process. Species in these areas lack the adaptations necessary to respond to fire, and mortality is high even when fire intensity is very low. Unmanaged or poorly managed fire is a key component in the process of deforestation and degradation for many of these fire-sensitive ecosystems and can often result in significant greenhouse gas (GHG) emissions. Fires in densely forested ecosystems can produce emissions of up to 113 tonnes/ha (Bonnicksen, 2008). Indonesia has experienced levels of deforestation and peatland degradation that has resulted, in part, from forest fires and that, according to some assessments, has put it among the top three largest emitters of GHGs in the world. Emissions resulting from deforestation and forest fires in Indonesia are almost five times as high as those resulting from non-forestry emissions, which illustrates the magnitude of this problem (PEACE, 2007). This situation is not unique to Indonesia. Fires, wherever they occur, in addition to their potential negative effects to ecosystem health, may contribute to global warming via significant emissions of GHGs (Shlisky *et al.*, 2007).

The global pattern of fire occurrence, fire as a contributor to GHG emissions, and fire’s contribution to forest degradation and destruction, all underscore the need for the development and implementation of more effective fire management approaches. To be effective, fire management strategies must recognize the integral role that fire plays in shaping ecosystems and its links with the inhabitants of those systems. Fire may be better managed by employing approaches that support and recognize the legitimacy of fire use by communities and rural populations. This awareness, in turn, can result in a significant reduction in GHG emissions.

In addition to reduced emissions, forests that are not burned can also continue to act as valuable carbon stocks. A number of projects have been implemented in recent years that place an emphasis on reducing emissions from deforestation and forest degradation (REDD). The majority of these projects seek to trade carbon on the voluntary carbon markets as opposed to the regulatory or compliance markets.

One example of a carbon-related project that contains an element of fire management is the Sofala Community Carbon Project in Gorongosa National Park (Annex 5). Envirotrade is a Mauritius-based company that operates projects involving the sale of carbon offsets to support the conservation and management of existing forests and the planting of new ones. It is piloting a poverty alleviation model in the buffer zone of the Gorongosa National Park in central Mozambique on land owned and managed by the communities around the park. A focus on land-use change in the buffer zone of the protected area has resulted in reduced pressure on threatened natural resources within the park.

The project works closely with communities to rehabilitate the forests on their land and to introduce new, sustainable farming practices. Verified Emission Reductions (VERs) produced for sale to date is 1 106 044 tonnes of carbon dioxide equivalent (tCO<sup>2</sup>e). Fire management is a component of the project.

Annual burning of the bush by communities was one of the significant threats to the forest resources in the project area. Communities in and around the park continue to use fire to achieve a number of objectives. These objectives include: using fire to reduce hazardous fuels that build up over the course of the growing season; traditional bee keeping; herding wild animals as a hunting tactic; and burning grass to improve grazing for domesticated animals, such as goats, and to attract game. Fire is most commonly used to clear semi-permanent farmland plots.

Envirotrade has supported Natural Resource Management Committees, which develop and coordinate fire management training for local community members. This training includes both the preparation of a prescribed-burning plan and readiness for fire suppression activities in the project area. Locals often need very little fire management training because of their experience and comprehensive understanding of fire behaviour in the Miombo woodland ecosystem. Fire and its management is integral to the communities that have traditionally inhabited the landscape and is therefore a factor in project-management activities. Incentives for responsible fire use by local community members include well-established and officially documented land ownership based on traditional tribal boundaries and the receipt of payments for carbon credits, with a set of indicators in place that if breached result in carbon credits not being issued to the project.

The threat of fire may not have been addressed sufficiently in the planning or implementation of some REDD projects and activities. Over 90 percent of fires are caused by humans, and large fires, such as those in Indonesia in 1997 and 1998, have the potential to wipe out all the gains achieved through REDD globally. Many REDD projects are located in areas of the world where fire plays a significant role as both a land-management tool and as a primary agent of forest loss. In these instances, fire is an important risk factor that should be addressed in the development of an effective REDD mechanism. Without appropriate and effective fire management consideration that also addresses community involvement in planning and implementation, this objective may be significantly compromised.