

Session 3. Impacts of altered regimes of extreme abiotic events

Summary report

Participants considered a number of recent changes in forest ecosystems and discussed whether they could be attributed to climate change. They considered the following evidence in particular.

- Temperate and boreal forests subject to increasing temperatures (less snow and permafrost) and greater incidence of extreme weather events (droughts, increased precipitation/floods, higher temperatures, high winds, snow storms) that impact forests by greater incidence and impact of fires, windfall and landslides, that cause changes in species composition and associations in forests that can cause predisposition to other biotic events (insects, diseases and other pests).
- The impacts of climate change on forests will differ by forest type and region. The tropical dry forest ecosystem in southern India, discussed in the session, showed that they are impacted by droughts and high temperatures which can cause delayed mortality depending upon the species, diameter classes, severity of the extreme weather event and other pests. In the African savannah ecosystem in Cote d'Ivoire, earlier dry seasons are bringing about changes in fire use resulting in less intense fires which in turn results in a shift from grasslands to wooded lands. In Mongolia there has been a 4 million ha loss of forests during the last century, caused by a combination of climate change, extreme weather events, fire, insects and diseases and unsustainable land-use practices, including animal grazing, illegal logging and illegal migration. Historical indicators showed an increase in forest fires following years of decreased precipitation. Indicators of a decrease in the incidence of forest fires were correlated with a 16th century Mongolian King's decision to manage a forested area. In Korea, the very young nature of the forests makes it difficult to separate effects of climate change from changes associated with natural succession. In central Europe, there are now more dead trees (mostly caused by drought) than at the peak of the period associated with «Waldsterben» (forest decline).
- Decline in mangroves which is possibly related to the changes in the salinity of the water could be due to a decrease in the in flow of fresh water by decreased precipitation or the increase in the addition of salt water caused by an increase in the number of hurricanes. Correlation is not easy to determine.
- Effects of a combination of extreme weather conditions and possible changes in climatic trends are complexly linked (i.e. increased wind with or without increased temperatures)
- There is a complex link between abiotic and biotic events but they are difficult to disassociate.

Session participants noted the following when discussing the possible future impacts of climate change on forests.

- Correlating longer term climate change and the incidence and impact of extreme weather events on fire, windfall, floods, landslides etc. that impact forests and forest management, are difficult to predict
- Increased frequency of events like hurricanes may decrease the resilience of forests to recover and may in fact have impacts on regenerative species and the distribution of biomass.
- Climatic changes may expose some ecosystems to new risks that they are not well adapted for.
- The diversity of both the species in a forest and the management practices used to manage the forest will all have varying effects on the forest thus making it harder to predict future outcomes.
- Some of these changes might have an affect on the operational aspects of harvesting, such as less frost decreasing access to forested areas and not enabling equipment to be moved.

The future impacts of climate change on people and institutions were discussed and the following points were noted.

- The majority of speakers highlighted the greater incidence and impact of fires and the resulting change in seasons that these fires create in forest, savannah and grassland ecosystems exacerbated by extreme weather events (drought, higher temperatures and wind) that impact the lives and livelihoods of communities.
- The relationships between people, forests and climate change are very complex and the impacts on people and institutions are difficult to model or predict in future scenarios, but in a Central American study there is anticipated to be less high fire risk areas and more moderate fires risk areas (this includes climate and socio-economic and behavioural changes).
- There was insufficient past research in assessing climate change and extreme weather events to predict future impacts on people and institutions with confidence.
- The human adaptation to changing seasons is that fires are being used by different land-users at different seasons for different reasons, with a change in advocacy of burns.
- The point was made that greater variation in weather events is expected. Coping with this will increase the costs of forest management, and traditional means of costing forestry projects may become inappropriate.
- Questions were asked about the reality of predicting the future impacts and how much would be attributed to climate change.

In considering adaptation measures, participants noted the forest management risk assessment needs to recognize instances where: response options are not necessary; management response to the risk is worthwhile; and a management response option is not possible. There may be a need to explore more diverse harvesting regimes including selective logging and encourage breeders to select for other factors than fast growth. Participants also suggested that forest managers not plant monocultures.

Session participants noted that more investment in forest research in developing countries is needed as many adaptation options are hindered by a lack of knowledge. It was noted that it must be recognized that policies must vary for different conditions, such as natural forests vs. planted and managed forests. It was also noted that local peoples must be involved in any policy-making process as they will be the ones ultimately impacted by such policies. Global policies may be needed to support the forests of the world particularly in developing countries where resources are more difficult to obtain.