



Agenda Item 1

Montreal Process Technical Advisory Committee Meeting

Tokyo, Japan 3 – 7 Dec. 2012

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Soil and Water Workshop - Land Use Change, Forests and Water

For Discussion

Recommendations

1. That participants:
 - **note** that this paper has been developed in response to Annex 6, Issue 3 of Aide Memoire to 13th TAC meeting.
 - **consider** proposed points for consideration to address possible gaps in the Technical Notes for Criterion 4 to account for change in land use (especially from non-forest to forest) and subsequent potential impacts on water availability.
 - **discuss** potential amendments to criterion four of the third edition of the Technical Notes (2009).

Issues

2. There is little mention of the link between water quantity and forest management activities in the Technical Notes. This is especially apparent in the introductory section of Criterion 4 – Conservation and maintenance of soil and water resources.
3. A number of member countries are faced with changing forestry landscapes and the potential impacts on both water and soil. These issues may not be adequately addressed in the current technical notes.
4. The opportunity to communicate the impact of change in land use, especially the conversion of land from non-forest to forest, on water quantity and availability is limited in the Criterion 4 indicators.
5. There is no differentiation between native forests and plantation in the Criterion 4 Technical Notes, nor any reference to prior land use. The inclusion of these categories may provide countries with the opportunity to better describe programs and policies related to forest management activities and water availability.

Background

6. In many parts of Australia between 2000 and 2009 severe drought conditions led to significant concern about water supply, use and availability for agriculture and domestic consumption.
7. The area of plantations in Australia expanded by 33 per cent between 2000 and 2010, predominantly on agricultural land. This expansion coincided with the drought, thereby compounding the issue of change in land use from non-forest to forest and water availability in some regions.

Attachment A: Technical Notes for Criterion 4 – Conservation and maintenance of soil and water resources

8. Increased competition for water resources drew attention to the effect of land use and land use change on water availability. In particular, attention at a catchment level was given to the effect of land use change from non-forest to forest.
9. Despite representing only 0.2% of land use in Australia, plantations and their expansion have become an issue because in some circumstances they use more water than agricultural land uses such as pastures and therefore reduce surface runoff, stream-flow and access to groundwater. The proportion of plantations in a catchment, as well as their species mix, age-class structure, management, and spatial configuration, are all important in determining water-use and thus impacts on stream-flow (water quantity).
10. In some regions, provincial and local governments have introduced or are in the process of introducing planning regulations and zoning to control the effects of plantations on water availability.
11. The effect of land use change on water availability was identified as an issue by Australian, Argentinean and New Zealand representatives at the 13th Montreal Process Technical Advisory Committee meeting in Moscow and Suzdal 2012. Participants agreed that the existing Technical Notes did not provide for adequate discussion on the matter of water quantity and availability, especially on land converted from non-forest to forest.

Attachments

Attachment A: Technical Notes for Criterion 4 – Conservation and maintenance of soil and water resources

CRITERION 4 – CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES

Soil and water underpin forest ecosystem productivity and functions. Forest ecosystems play an important role in the regulation of surface and groundwater flow and, together with associated aquatic ecosystems and clean water, they are essential to the quality of human life.

The interaction of soil, water and topography influence the character and health of streams and rivers flowing through and from forests. Monitoring change in the chemical, physical, and biological characteristics of soil, water and aquatic systems provides valuable information to support sustainable forest management.

Forest management activities can significantly alter forest soils, water quality and associated aquatic habitats. Inappropriate management may result in soil compaction, the loss of the soil A horizon, loss of riparian buffering capacity, increased sediment loads in streams, degradation and destruction of aquatic habitats and altered flow regimes. Change in water flow can also create an increased risk of flooding or the complete desiccation of streams. Both have harmful implications for human safety, property, and economies.

Soil and water resources may be protected through the allocation of land for that purpose or through appropriate management regimes and best management practices.

Points for consideration:

- Increase the focus on water quantity and the link to forest management activities including establishment of new forests and implications for other land uses.

4.1 PROTECTIVE FUNCTION

Healthy and productive forests depend on the maintenance of the soil and water resource. Forests also regulate these resources by moderating the flow of water, controlling erosion and preventing catastrophic events such as flooding, avalanches and mudslides.

Attachment A: Technical Notes for Criterion 4 – Conservation and maintenance of soil and water resources

INDICATOR 4.1.a Area and percent of forest whose designation or land management focus is the protection of soil or water resources

Rationale

The area and percent of forest designated or managed primarily for the protection and regulation of soil and water reflects the importance of these resources to society, including the trade-offs made between other uses.

Approaches to measurement

When reporting, countries may wish to categorise the areas designated or managed for soil and water protection. Categories may include important catchments or designated watersheds, areas set aside due to sensitive or erosion prone soils, stream buffers, riparian zones, steep slopes and areas prone to avalanches and mudslides.

Data may be obtained from watercourse hierarchy inventories, topographic maps, designated avalanche risk-zones and areas identified as vulnerable to erosion. Data might be available from sub-national stream and soil resource assessments and protection standards. Lands managed for multiple uses but where the primary management goal is to conserve soil and water values should also be included.

Useful data may be obtained from government, university and research organisation sources.

Points for consideration:

- Countries may wish to report by native forests and plantation forests separately.
- Countries may wish to include areas managed for water and soil salinity prevention and amelioration.
- Data could include areas planted for the purpose of protecting soil and water. This could include plantations established for salinity prevention and amelioration.

4.2 SOIL

Forest soils support forest productivity and other ecological and hydrological functions through their ability to hold and supply water and nutrients, store organic matter and provide habitats for plant roots and for a wide range of soil organisms. Not maintaining the soil resource may result in a decline and degradation in forest health and the provision of other environmental services.

Attachment A: Technical Notes for Criterion 4 – Conservation and maintenance of soil and water resources

INDICATOR 4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources

Rationale

This indicator provides information about the extent to which soil resource protection, legislation and best management practices have been identified and integrated into forest management activities. Inappropriate activity may result in the loss of soil nutrients, forest productivity and other ecosystem services that soils provide.

Approaches to measurement

Data sources may include harvest administration data and enforcement agency records. Random sampling of forest management activities and operators may provide useful information. Statistical soil sampling of forests under active management (e.g. site preparation and harvesting) may reveal data about soil change over time and the causes of that change.

Reporting should be expressed as the percentage of management activities, operators and forest area that conform to best management practices and legislation. Different jurisdictions within countries are likely to have different standards and approaches to measure compliance. A method of normalising regional differences may also be required.

Interpretation of this indicator may be supported by a brief summary of relevant best management practices and legislation, including efforts and measures taken to monitor compliance.

Useful data may be obtained from government, university, industry and research organisation sources.

INDICATOR 4.2.b Area and percent of forest land with significant soil degradation

Rationale

This indicator provides information on the extent of significant soil degradation in forests likely to affect productivity, hydrology, ecosystem processes or social and cultural benefits. This indicator is primarily concerned with degradation caused directly or indirectly by human activity.

Approaches to measurement

It is recognised that most countries do not have comprehensive national reporting systems in place to monitor change in soil quality as a result of human activity. Subnational data relating to soil degradation may be obtained by comparing undisturbed sites with sites that have a known intensity and frequency of human use. Countries may wish to report using case studies to highlight current experience of soil degradation in forests. It may also be possible to establish random national soil test plots to collect statistically relevant data.

Degradation includes the processes of soil compaction, erosion and contamination by chemicals, heavy metals and radioactive substances.

Useful data may be obtained from government, university, industry and research organisation sources.

4.3 WATER

Water is one of the most valuable of forest ecosystem services. Forests and how they are managed, influence the quantity, quality and timing of surface and ground water flows. Changes to water quality and flow can have a severe impact on forest resources as well as human wellbeing. In addition, associated forest aquatic and riparian habitats are some of the most biologically diverse and productive forest ecosystems.

The quality and quantity of water flowing from forested areas is commonly regarded as an indicator of the quality of forest management. Water quality is widely understood to be a measure that captures many potential impacts on forest sustainability and a good indicator of overall ecosystem health.

Points for consideration:

- Countries may wish to include a description of the impact of land cover change from non-forest to forest on water availability over time or since the last reporting period.

Attachment A: Technical Notes for Criterion 4 – Conservation and maintenance of soil and water resources

INDICATOR 4.3.a Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources

Rationale

This indicator provides information about the extent to which water resources have been identified and safeguarded during forest management. This indicator is primarily concerned with activities that may affect riparian zones, water quality, quantity and flow rather than the designation of land for water-related conservation. The protection of the water resources and associated forest and aquatic ecosystems is vital for the human populations dependent on them.

Approaches to measurement

Management standards commonly address road design standards, watershed or catchment disturbance limits, recreational site design, in-stream management and livestock grazing regimes.

Reporting should be expressed as the percentage of management activities, operators and forest area that conform to best management practices and legislation. Different jurisdictions within countries are likely to have different standards and approaches to measure compliance. A method of normalising regional differences may also be required.

A low percentage of compliance or an absence of water-related best management practices and legislation indicates that management may be having, or will have, serious impacts on water and aquatic resources. A high level of compliance should suggest that the effects of management practices are being considered and minimised.

Interpretation of this indicator may be supported by a brief summary of relevant best management practices and legislation, including efforts and measures taken to monitor compliance.

Useful data may be obtained from government, industry, university and research organisation sources.

Points for consideration:

- Members to note that this indicator includes reference to water quantity and flow, and activities that may affect these values. Activities could include change of land use from non-forest to forest.

Approaches to measurement:

- Countries may wish to include a description on the impact on water availability of land use change from non-forest to forest
- Countries may wish to report separately on native forests and plantations
- Countries may wish to include areas converted from non-forest land use to forest land use over time or since the last reporting period
- Countries may wish to include data on the effect of land cover change on water availability
- Countries may wish to include reference to planning regulations that might influence the establishment of plantations on non-forested land.

Attachment A: Technical Notes for Criterion 4 – Conservation and maintenance of soil and water resources

INDICATOR 4.3.b Area and percent of water bodies, or stream length, in forest areas with significant change in physical, chemical or biological properties from reference conditions

Rationale

This indicator provides information relating to water quality in forests. Significant changes in the physical, chemical or biological properties of water in forest lakes, rivers and streams may reveal the extent to which management activities or natural events are affecting water quality. Maintaining water quality is important for human use and consumption and to support healthy forest and aquatic ecosystems. Where water quality is being adversely affected by human activity, forest management practices may be adapted to protect water values.

Approaches to measurement

Water quality data may be available from national and sub-national government bodies and other sources including wildlife and fish management agencies. Other data may be obtained from monitoring stations for stream volume, flow rates and timing, historic and current water quality data for disturbed and undisturbed watersheds and the reconstruction of historic data for water storage facilities. Reporting should comment on the area and percentage of water bodies and watercourses in forests where significant change has occurred

Water quality may be adversely affected by turbidity (cloudiness), changes in chemical composition including dissolved oxygen and nutrient enrichment, temperature, pH values and by harmful algae and other organisms. When reporting, countries may wish to categorise the agents of change in water quality and their causes. Reference conditions may be based on historic variation, baselines, targets or thresholds. Where data to support reference conditions are not available, trends may be used as a substitute.

Countries may wish to highlight specific case studies in which water quality is affected by changes in its physical, chemical and biological properties and the implications for forest management.

Useful data may be obtained from government, university, industry and research organisation sources.