

## **Theme: Environment & Social**

**Task No: 2.1.3**  
**Milestone Number: 2.03.1**

**Report No. FFR- ES011**

# **International Perspectives of New Zealand's Sustainable Forestry**

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Date: 5 May 2010

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## EXECUTIVE SUMMARY

The New Zealand forestry sector needs to be able to convince international markets, tourists and other interest groups that forestry practices in New Zealand are sustainable. A workshop was held to help understand preferences and priorities of such international interest groups. The aims of the Wellington workshop on 15 February 2010 were to:

1. present recent research and international insights into indicators for sustainable forestry;
2. define and prioritise what sustainable forestry means to different international stakeholders; and,
3. identify future directions and priorities for research on indicators for sustainable forestry.

Improving the ability to demonstrate sustainable forestry in New Zealand facilitates international market access.

The workshop comprised three sessions:

1. overviews on the status of research and practice on the use of indicators for sustainable forest management both in New Zealand and internationally, with particular insights from Australia and Canada;
2. a role-play exercise to explore perceptions and priorities of different international stakeholders; and,
3. a concluding discussion.

This report combines observations and the priorities for the roles worked through at this event.

The first part of the event highlighted that there are significant international imperatives for improved monitoring of forest sustainability in New Zealand. The key frameworks in place that promote sustainable forestry are the Montréal Process (MP) reporting and the Forest Stewardship Council (FSC). Monitoring and communication examples from other Montréal Process countries such as Australia and Canada were considered useful not only for demonstrating sustainable forestry internationally, but also as providing opportunities for internal demonstrations of sustainability, to address significant policy inconsistencies within New Zealand.

The role play exercise emphasised that different stakeholders have very different views of indicators of sustainable forestry. Some of the incompatibilities between plantation forestry and the MP and FSC frameworks' criteria developed for permanent forests were considered. The exercise also highlighted a need for indicators that address the value of forests in a broader sense rather than focusing only on the forest estate, e.g. governance for all lands. Finally, there was keen interest from two stakeholder roles in the stability and credibility of management institutions and the regulatory environment.

The role play also highlighted the need for greater understanding of offshore stakeholder perspectives; this could be of relevance to, and be explored by, government interests.

The workshop identified four clusters of research need and opportunity related to forestry sustainability criteria and indicators:

1. improved understanding of international stakeholder views on sustainability;
2. improved understanding of the role and relevance of sustainability indicators beyond the established reporting frameworks;
3. better communication of indicators; and
4. ways to adapt the application of indicators to New Zealand.

Four key research questions were identified:

- How can the New Zealand relevance and credibility of Montréal Process indicators be enhanced?
- How can the specification of forest sustainability indicators be improved?
- How can the communication of these indicators to a non-science audience be made more compelling?
- How can these sustainability indicators be used across different types of forestry practices and different land uses?

The understanding and priorities developed from this workshop contribute toward the prioritisation of indicator research in the FRST programme “Protecting and Enhancing the Environment through Forestry” (PEEF).

## INTRODUCTION

New Zealand forest owners and managers face a number of expectations and obligations relating to the sustainable use of the land and forests. The goal of sustainable management has been widely embraced by industry sectors, consumers, government agencies and communities, and is expressed in a range of statutes, policies and agreements. However the practical definition and application of the concept of sustainable management remains challenging. One continuing focus of concern is the way in which sustainability can be expressed and monitored through the use of criteria and indicators.

This report summarises the findings of a workshop organised by Scion aimed at furthering understanding of indicators for sustainable forestry and defining and prioritising what sustainable forestry means to different international stakeholders. The intended outcome of the workshop was to identify future directions and priorities for research.

## METHODOLOGY

A workshop was held on 15 February 2010 in Wellington. Approximately 30 participants from a range of sector groups, and two international speakers, attended.

The workshop comprised three sessions; a series of overviews on the status of research and practice in the use of indicators for sustainable forest management both in New Zealand and internationally, with particular insights from Australia and Canada; a role play exercise to explore perceptions and priorities of different international stakeholders; and a concluding discussion.

For the role play exercise, participants characterised their role, identified and prioritised their respective roles' drivers and priorities for sustainable forestry in New Zealand, and aligned these to two international frameworks for forestry that are relevant to New Zealand. The role play helped fill some knowledge gaps of external stakeholder perceptions and attitudes towards New Zealand forestry.

Insights were drawn out of each of these sessions, with sources of particular insights noted as footnotes. The role play exercise was analysed for key indicators of sustainability of each role. As a final step, the potential research needs and opportunities were identified.

# RESULTS

## Insights from the Session on Recent Research

The Montréal Process (MP) provides an international reference framework for the development of criteria and indicators for sustainable forestry within New Zealand. Originating in 1994, the MP specifies seven criteria and 67 indicators that can be used by its 12 member countries for the conservation and sustainable management of their temperate and boreal forests. These countries, which include New Zealand, are collectively responsible for 90% of the world's temperate and boreal forests, 60% of total forests, and 45% of world trade in forest products (Ministry of Agriculture and Forestry, 2006).

There are a number of international drivers for the use of forest sustainability criteria and indicators. These include the obligations of international environmental conventions (such as the Convention on Biodiversity), compliance requirements arising from trade agreements, product certification systems such as the Forest Stewardship Council (FSC), and the emerging market in carbon credits. All of these require credible evidence of the sustainability outcomes of forest management, expressed in an internationally comparable form<sup>1</sup>.

In New Zealand, there is also a range of obligations and drivers for the development and use of practical and credible indicators of sustainable forest management. These include the statutory requirements of the Resource Management Act; a range of sector accords and agreements (including the Forest Accord, the Principles of Plantation Management, The Environmental Code of Practice, the Primary Sector Water Partnership)<sup>2</sup>; and the commercial desire on the part of forest owners to retain market access through membership of certification schemes. There are also more general iwi and community expectations expressed in documents such as Iwi Management Plans and Long Term Council Community Plans.

Research by Scion (Barnard, *et al.* 2010) identified eight key forest values recognised by New Zealand stakeholders and communities: Access, Soil and water, Biodiversity, Forests as part of local communities, Involvement in the planning of forest management, Productivity, Carbon sinks, and Forests as landscape features. All except landscape are included in both the MP and FSC frameworks. The top community priorities are for access, soil and water, and biodiversity (Hock and Barnard, 2010a), whilst the forest sector questions the relevance of some indicators and the costs of compliance (Hock and Barnard, 2010b).

The two international comparisons presented at the workshop focused in particular upon the integrated use of criteria and indicators across different scales of government and management, within the overall MP framework. In Australia<sup>3</sup>, the coordinating role of the Montréal Process Implementation Group, the 5 yearly State of Forests reporting process, and State Forest Agreements were highlighted. In Canada<sup>4</sup>, The inter-provincial Canadian Committee of Forestry Ministers and the Canadian Forest Strategy provide coordination mechanisms, and Model Forests provide practical exemplars. In both Australia and Canada there continue to be issues of how to ensure local sensitivity and relevance of indicators, and there is an underlying question of policy impact – did the use of monitoring criteria and indicators actually change forest management practices?

A particular contrast between the Australian and Canadian situations and the New Zealand approach is the lack of a comprehensive New Zealand national forest inventory<sup>5</sup>. Whilst New

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<sup>1</sup> Presentation by Tim Payn, Scion

<sup>2</sup> *Op. cit.*

<sup>3</sup> Reported by Claire Howell, Bureau of Rural Sciences, Australia

<sup>4</sup> Reported by John Hall, Canadian Forest Service, Canada

<sup>5</sup> Noted by Chris Goulding, Scion

Zealand has inventory systems aimed at different dimensions of forests (e.g. MAF plantation age and area statistics, and the LUCAS carbon inventory), but they do not provide a comprehensive or internationally comparable system for all forests – in particular the institutional split in New Zealand between indigenous conservation forests and exotic plantation forests creates significant definitional and classification challenges when reporting within international frameworks. These issues are amplified by limited institutional and technological resources and by the episodic nature of New Zealand production forests. There is also significant difference in the way in which New Zealand statutory processes treat sustainable forestry, firstly with the focus upon effects rather than land use, and second in the inconsistency with which different territorial local authorities deal with the sustainable management of forests as a resource, in the absence of any national policy guidance (Brown and Swaffield, 2009).

In summary, there are significant international imperatives for improved monitoring of forest sustainability in New Zealand. Forestry is a less contentious policy issue within New Zealand than it was during the 1980s and 1990s, and both community and sector values align well overall with the core criteria of the Montréal Process. There is now a set of cooperative frameworks in place to promote different aspects of sustainable management, both through the Montréal Process and through other systems such as FSC. However, there continue to be significant inconsistencies at a local level in New Zealand, and challenges in aligning New Zealand monitoring and management practices with other Montréal Process countries such as Australia and Canada in which more coordinated systems have evolved.

## Exploring Stakeholder Perspectives

The second part of the workshop used a role play exercise to investigate how international stakeholders' perspectives align to the MP and FSC indicator frameworks. Participants adopted one of four personas:

- German tourist (ecotourist),
- Asian product buyer,
- International ENGO member, and
- International investor/financier.

Each 'persona' group identified their priorities for monitoring, and assessed whether they were adequately covered in the MP and FSC frameworks (as detailed in the next section).

The 'ecotourists' highlighted the importance of the integrity of sustainable management systems, judged them by comparison with their own country, and emphasized measures of naturalness, access and the quality of tourist infrastructure. Their view was characterized by a 'whole of forest' perspective, which is best-served by aggregated indices of some type.

'Asian buyers' also made comparative judgements, but with competing suppliers. They had a dominant cost focus, with little interest in detailed sustainability indicators, as long as the overall product was certified, and sought stability and certainty in institutional arrangements.

'NGOs' were focused upon the health of indigenous forests, and were antagonistic towards New Zealand systems of plantation forests. They had particular interests in biodiversity and water quality, participation and access, and were concerned about the management of pests and weeds, and use of chemicals.

'Investors' had little interest in the details of a monitoring system, being more concerned with overall risk management of their investment, which highlighted a preference for stability and integrity of governance and good accessibility to relevant knowledge.

These were 'imagined' persona, and cannot be used to predict real stakeholder perspectives. However they highlighted two things. First, the differences in the frames of reference of different



stakeholders: one indicator system does not fit all expectations, just as it does not fit all local circumstances. Second, there are several 'gaps' in the international systems in relation to the New Zealand forest sector, some of which have already been noted. In particular, there is a measure of incompatibility between the New Zealand approach to plantations as short rotation crops and the overall frameworks developed for permanent forests. As a consequence there is a potential lack of acceptance of the trade-offs needed between biodiversity goals that require control of exotic pests and weeds, and the use of chemical systems. There is also a desire by some for 'whole of forest', aggregate indicators – indicators that address the value of forests in a broader sense than focusing only on the forest estate, e.g. governance for all lands. Finally, there was keen interest from two stakeholder personae in the stability and credibility of forest management institutions and the regulatory environment.

The role play has identified several areas that deserve further investigation, and in so doing also highlighted the need for greater understanding of actual offshore stakeholder perspectives. These research needs were integrated with other insights from the workshop to develop the research directions described later in this report.

## Stakeholder Priorities Linked to MP and FSC

As part of the role play exercise, participants aligned the drivers and priorities identified for their respective roles with the criteria and indicators of the MP<sup>6</sup> and FSC<sup>7</sup> frameworks for forestry in use in New Zealand. The MP criteria and indicators selected by the participants are in:

- German tourist (ecotourist) – Appendix C
- Asian product buyer – Appendix D
- International ENGO member – Appendix E
- International investor/financier – Appendix F

The FSC principles and criteria selected by the participants are in:

- German tourist (ecotourist) – Appendix G
- Asian product buyer – Appendix H
- International ENGO member – Appendix I
- International investor/financier – Appendix J

An example summary of the MP indicators selected for each role is shown in Table 1.

**Table 1. Priorities identified for each of the four personas aligned with the criteria and indicators of the Montréal Process**

Montréal Process (key concept)	ENGO member	Eco-tourist	Investor	Asian buyer
<b>Criterion 1 Biological diversity</b>				
.1.a forest ecosystem type				
1.1.b protected areas				
1.1.c fragmentation				
1.2.a species numbers				
1.2.b species at risk				
1.2.c conservation efforts				
1.3.a genetic risk				
1.3.b genetic diversity				
1.3.c genetics conservation				
<b>Criterion 2 Productive capacity</b>				
2.a wood production land				

<sup>6</sup> MP specifies seven criteria and a total of 54 indicators for these criteria.

<sup>7</sup> FSC specifies 10 principles and a total of 56 criteria for these principles.



Montréal Process (key concept)	ENGO member	Eco-tourist	Investor	Asian buyer
2.b growing stock				
2.c exotic species				
2.d annual harvest wood products				
2.e annual harvest non-wood products				
<b>Criterion 3 Health</b>				
3.a biotic processes and agents				
3.b abiotic processes and agents				
<b>Criterion 4 Soil and water</b>				
4.1.a protection of soils and water				
4.2.a best management soil				
4.2.b soil degradation				
4.3.a best management water				
4.3.b changed water				
<b>Criterion 5 Carbon</b>				
5.a forest ecosystem carbon				
5.b forest product carbon				
5.c avoided fossil fuel				
<b>Criterion 6 Socio-economic</b>				
6.1.a wood and wood products				
6.1.b non-wood products				
6.1.c environmental services				
6.1.d consumption of wood				
6.1.e consumption of non-wood products				
6.1.f exports and imports wood				
6.1.g exports and imports non-wood products				
6.1.h as share of products				
6.1.i recycling				
6.2.a capital investment				
6.2.b research and extension investment				
6.3.a employment				
6.3.b wages; injury rates				
6.3.c resilience				
6.3.d subsistence				
6.3.e revenue distribution				
6.4.a recreation and tourism				
6.4.b visits				
6.5.a cultural, social and spiritual				
6.5.b importance of forests to people				
<b>Criterion 7 Legal</b>				
7.1.a legislation for sustainability				
7.1.b cross sectoral				
7.2.a taxation				
7.3.a tenure and property rights				
7.3.b enforcement of laws				
7.4.a supporting sustainable management				
7.4.b research and technologies				
7.5.a partnerships				
7.5.b public participation				
7.5.c monitoring and assessment				

A number of approaches were used to combine the role-based criteria and indicators into an overall priority ranking across all the personae. One approach was to analyse how many of the roles selected an indicator. Another approach considered how highly the role-playing groups ranked an indicator, with a consistently high ranking interpreted as indicating the importance of the indicator across a range of interests. An example of these two approaches appears in Appendix K which shows the top priority MP indicators, and Appendix L shows the top priority MP environmental-only indicators.

There is a different number of indicators to each MP Criteria, hence weighting the frequency counts and rankings to standardise selections to the MP Criterion level was also explored. Similarly there is a variable number of criteria to each FSC Principle, and the same weighting approach was used to explore selections to the FSC Principle level.

The MP indicators and FSC criteria that occurred most frequently and that were consistently highly ranked across all the stakeholder roles, with and without standardisation, were considered to represent the issues most important to international stakeholders, as viewed by the workshop participants.

### **Results for MP Indicators**

The MP indicators considered of **highest importance across all stakeholders** represented in the role playing are shown below (in the order that they are listed within MP).

- 7.1.a Legislation and policies supporting the sustainable management of forests
- 7.3.a Clarity and security of land and resource tenure and property rights
- 7.3.b Enforcement of laws related to forests

Considering only the Montréal Process indicators that have an **environmental or social focus**, the indicators considered of highest importance across all stakeholders represented are shown below (in the order that they are within MP).

- 1.1.a Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure
- 1.1.b Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage
- 1.2.b Number and status of native forest-associated species at risk, as determined by legislation or scientific assessment
- 3.a Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive species) beyond reference conditions
- 3.b Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions
- 4.1.a Area and percent of forest whose designation or land management focus is the protection of soil or water resources
- 4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources
- 4.2.b Area and percent of forest land with significant soil degradation
- 4.3.a Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water-related resources.
- 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
- 6.4.a Area and percent of forests available and/or managed for public recreation and tourism
- 6.5.a Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values
- 6.5.b The importance of forests to people

### **Results for FSC Criteria**

The FSC criteria considered of **highest importance across all stakeholders** represented in the role playing are shown below (in the order that they are in FSC).

- 1.1 Forest management shall respect all national and local laws and administrative requirements
- 1.5 Forest management areas should be protected from illegal harvesting, settlement and other unauthorized activities.
- 2.1 Clear evidence of long-term forest use rights to the land (e.g. land title, customary rights, or lease agreements) shall be demonstrated.
- 2.2 Local communities with legal or customary tenure or use rights shall maintain control, to the extent necessary to protect their rights or resources, over forest operations unless they delegate control with free and informed consent to other agencies.
- 3.1 Indigenous peoples shall control forest management on their lands and territories unless they delegate control with free and informed consent to other agencies.
- 3.2 Forest management shall not threaten or diminish, either directly or indirectly, the resources or tenure rights of indigenous peoples.
- 3.3 Sites of special cultural, ecological, economic or religious significance to indigenous peoples shall be clearly identified in cooperation with such peoples, and recognized and protected by forest managers.
- 7.1 The management plan and supporting documents shall provide: Management objectives; Description of the forest resources to be managed, environmental limitations, land use and ownership status, socio-economic conditions, and a profile of adjacent lands; Description of silvicultural and/or other management system, based on the ecology of the forest in question and information gathered through resource inventories; Rationale for rate of annual harvest and species selection; Provisions for monitoring of forest growth and dynamics; Environmental safeguards based on environmental assessments.

Considering only the FSC criteria that have an **environmental or social focus**, the criteria considered of highest importance across all stakeholders represented are shown below (in the order that they are in FSC).

- 5.5 Forest management operations shall recognize, maintain, and, where appropriate, enhance the value of forest services and resources such as watersheds and fisheries.
- 6.1 Assessment of environmental impacts shall be completed – appropriate to the scale, intensity of forest management and the uniqueness of the affected resource – and adequately integrated into management systems. Assessments shall include landscape level considerations as well as the impacts of on-site processing facilities. Environmental impacts shall be assessed prior to commencement of site-disturbing operations.
- 9.1 Assessment to determine the presence of the attributes consistent with High Conservation Value Forests will be completed, appropriate to scale and intensity of forest management.
- 9.3 The management plan shall include and implement specific measures that ensure the maintenance and/or enhancement of the applicable conservation attributes consistent with the precautionary approach. These measures shall be specifically included in the publicly available management plan summary.
- 9.4 Annual monitoring shall be conducted to assess the effectiveness of the measures employed to maintain or enhance the applicable conservation attributes.

## Research Directions

The overviews, role plays, and subsequent discussions in the workshop identified four clusters of research need and opportunity related to forestry sustainability criteria and indicators: improved understanding of the role and relevance of indicators beyond the established reporting frameworks; improved specification of indicators; enhanced communication of indicators; and ways to adapt the application of established frameworks to New Zealand. These are now examined in turn.

## Understanding the Role and Relevance of Sustainability Indicators

The Montréal Process developed its framework of criteria and indicators as international benchmarks to enable cooperation between countries. The FSC framework is an example of an indicator system used to enhance market access. The workshop also identified three further dimensions that are less well understood.

First, whilst the Montréal Process establishes an overall framework intended to express a collective understanding and interest in sustainable forestry, it does not specify a particular public good in sustainable forestry. Policy makers and regulators within New Zealand need to work within the priorities established by statute and in public policy at various levels, and there is scope to further investigate the alignment of MP criteria and indicators with specific public policy priorities in New Zealand, and to demonstrate their relevance and credibility.

Second, the established indicator frameworks are focused upon management of the forest estate, and do not particularly address the wider land use context of the forests, which can be significant in New Zealand. There is a need to investigate how indicators can be linked to other land use sectors. Cross-sectoral comparisons could then be undertaken, for example with other land uses such as dairy, and the sustainability outcomes of plantation forests better placed in the overall context of integrated resource management required by the RMA.

Third, the role plays highlighted the need to better understand the distinctive interests and concerns of stakeholders from outside New Zealand. Understanding the priorities of a particular set of interests contributes to building the multi-faceted meaning of sustainability. Also of importance is that the relevance of different indicators is better understood.

## Specification of Indicators

Specification of indicators has been an important focus of forest sustainability research, but a number of questions still remain.

First, there are technical issues relating to the cost effectiveness of different indicators, their sensitivity, protocols for measurement, and underlying scientific validity. Do they actually measure what they claim to indicate? There is also a desire by some stakeholders for better indicators relating to institutional stability.

Second, there is a need for improved understanding of the relevance of indicators in different forestry contexts – particularly the comparability between indigenous and exotic forests, and of their transferability to other land use sectors.

Third, there is a need to better understand how the MP and FSC indicators relate to wider public good and public policy priorities in New Zealand, and what qualities of indicators best ensure that they are compelling to decision makers and wider communities.

## **Communication of Indicators**

The need for indicators to provide compelling evidence to a wide audience highlights a third set of research priorities. Namely, how to effectively translate science based indicators to a wider less specialist audience, and also how to express them in ways that are accessible to small forest owners and non-specialist managers and regulators.

## **Application of Established Frameworks to New Zealand**

Finally there are several emerging needs relating to the application of existing indicator frameworks in the New Zealand context. These include how to deal with the contrasts between indigenous and exotic production forests within a single indicator framework, the identification of core indicators that have relevance across sectors, and the development of ways to aggregate indicators and provide cumulative measures.

Underlying all these questions is the critical issue of how to achieve a best fit between the specific conditions and requirements of New Zealand forests and the international frameworks.

## CONCLUSION

Emerging research issues relating to the principles, criteria and indicators of forest sustainability for New Zealand include the integration of indicator frameworks such as MP and FSC with the wider policy and land use context of forest management.

Specific indices need to be connected to policy priorities at a range of different levels of governance, and across both public and private sectors. They need to be adapted to and tested within different land use contexts and different types of forest. In the New Zealand context, this poses a particular challenge, with the different nature of the extensive state-owned and managed indigenous conservation forests, and the privately owned and managed exotic production forests. Instead, production forests are typically more closely related spatially and functionally with other exotic production systems, or with indigenous forest remnants on private land.

Different stakeholders have different expectations of indicator systems, and these need to be understood if indicators are to provide real policy, market and management relevance.

Four sets of research question have been identified:

- How can the New Zealand relevance and credibility of Montréal Process indicators be enhanced?
- How can the specification of indicators be improved?
- How can the communication of indicators to a non science audience be made more compelling?
- How can indicators be used in a cross cutting way across different types of forestry practices and different land use contexts?

## ACKNOWLEDGEMENTS

We gratefully acknowledge the contributions of all the workshop presenters and participants; and Mary-Anne Gloyne for capturing all the written comments of the participants.

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# APPENDICES

## APPENDIX A

### Montréal Process Criteria and Indicators

#### Criterion 1: Conservation of biological diversity

- 1.1.a Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure
- 1.1.b Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage
- 1.1.c Fragmentation of forests
- 1.2.a Number of native forest-associated species
- 1.2.b Number and status of native forest-associated species at risk, as determined by legislation or scientific assessment
- 1.2.c Status of on site and off site efforts focused on conservation of species diversity
- 1.3.a Number and geographic distribution of forest-associated species at risk of losing genetic variation and locally adapted genotypes
- 1.3.b Population levels of selected representative forest-associated species to describe genetic diversity
- 1.3.c Status of on site and off site efforts focused on conservation of genetic diversity

#### Criterion 2: Maintenance of productive capacity of forest ecosystems

- 2.a Area and percent of forest land and net area of forest land available for wood production
- 2.b Total growing stock and annual increment of both merchantable and non-merchantable tree species in forests available for wood production
- 2.c Area, percent, and growing stock of plantations of native and exotic species
- 2.d Annual harvest of wood products by volume and as a percentage of net growth or sustained yield
- 2.e Annual harvest of non-wood forest products

#### Criterion 3: Maintenance of forest ecosystem health and vitality

- 3.a Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive species) beyond reference conditions
- 3.b Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions

#### Criterion 4: Conservation and maintenance of soil and water resources

- 4.1.a Area and percent of forest whose designation or land management focus is the protection of soil or water resources
- 4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources
- 4.2.b Area and percent of forest land with significant soil degradation
- 4.3.a Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources.
- 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

#### Criterion 5: Maintenance of forest contribution to global carbon cycles

- 5.a Total forest ecosystem carbon pools and fluxes
- 5.b Total forest product carbon pools and fluxes
- 5.c Avoided fossil fuel carbon emissions by using forest biomass for energy

#### Criterion 6: Maintenance and enhancement of long-term multiple socio-economic benefits

- 6.1.a Value and volume of wood and wood products production, including primary and secondary processing

- 6.1.b Value of non-wood forest products produced or collected
- 6.1.c Revenue from forest based environmental services
- 6.1.d Total and per capita consumption of wood and wood products in round wood equivalents
- 6.1.e Total and per capita consumption of non-wood products
- 6.1.f Value and volume in round wood equivalents of exports and imports of wood products
- 6.1.g Value of exports and imports of non-wood forest products
- 6.1.h Exports as a share of wood and wood products production and imports as a share of wood and wood products consumption
- 6.1.i Recovery or recycling of forest products as a percent of total forest products consumption
- 6.2.a Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest-based environmental services, recreation and tourism
- 6.2.b Annual investment and expenditure in forest-related research, extension and development, and education
- 6.3.a Employment in the forest sector
- 6.3.b Average wage rates, annual average income and annual injury rates in major forest employment categories
- 6.3.c Resilience of forest-dependent communities
- 6.3.d Area and percent of forests used for subsistence purposes
- 6.3.e Distribution of revenues derived from forest management
- 6.4.a Area and percent of forests available and/or managed for public recreation and tourism
- 6.4.b Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available
- 6.5.a Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values
- 6.5.b The importance of forests to people

**Criterion 7: Legal, institutional and economic frameworks for forest conservation and sustainable management**

- 7.1.a Legislation and policies supporting the sustainable management of forests
- 7.1.b Cross sectoral policy and programme coordination
- 7.2.a Taxation and other economic strategies that affect sustainable management of forests
- 7.3.a Clarity and security of land and resource tenure and property rights
- 7.3.b Enforcement of laws related to forests
- 7.4.a Programmes, services and other resources supporting the sustainable management of forests
- 7.4.b Development and application of research and technologies for the sustainable management of forests
- 7.5.a Partnerships to promote the sustainable management of forests
- 7.5.b Public participation and conflict resolution in forest-related decision making
- 7.5.c Monitoring, assessment and reporting on progress towards sustainable management of forests

## **APPENDIX B**

### **FSC Principles and Criteria**

#### **PRINCIPLE 1**

##### **COMPLIANCE WITH LAWS AND FSC PRINCIPLES**

Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC Principles and Criteria.

- 1.1 Forest management shall respect all national and local laws and administrative requirements
- 1.2 All applicable and legally prescribed fees, royalties, taxes and other charges shall be paid.
- 1.3 In signatory countries, the provisions of all binding international agreements such as CITES, ILO Conventions, ITTA, and Convention on Biological Diversity, shall be respected.
- 1.4 Conflicts between laws, regulations and the FSC Principles and Criteria shall be evaluated for the purposes of certification, on a case by case basis, by the certifiers and the involved or affected parties.
- 1.5 Forest management areas should be protected from illegal harvesting, settlement and other unauthorized activities.
- 1.6 Forest managers shall demonstrate a long-term commitment to adhere to the FSC Principles and Criteria

#### **PRINCIPLE 2**

##### **TENURE AND USE RIGHTS AND RESPONSIBILITIES**

Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.

- 2.1 Clear evidence of long-term forest use rights to the land (e.g. land title, customary rights, or lease agreements) shall be demonstrated.
- 2.2 Local communities with legal or customary tenure or use rights shall maintain control, to the extent necessary to protect their rights or resources, over forest operations unless they delegate control with free and informed consent to other agencies.
- 2.3 Appropriate mechanisms shall be employed to resolve disputes over tenure claims and use rights. The circumstances and status of any outstanding disputes will be explicitly considered in the certification evaluation. Disputes of substantial magnitude involving a significant number of interests will normally disqualify an operation from being certified.

#### **PRINCIPLE 3**

##### **INDIGENOUS PEOPLE'S RIGHTS**

The legal and customary rights of indigenous peoples to own, use and manage their lands, territories, and resources shall be recognized and respected.

- 3.1 Indigenous peoples shall control forest management on their lands and territories unless they delegate control with free and informed consent to other agencies.
- 3.2 Forest management shall not threaten or diminish, either directly or indirectly, the resources or tenure rights of indigenous peoples.
- 3.3 Sites of special cultural, ecological, economic or religious significance to indigenous peoples shall be clearly identified in cooperation with such peoples, and recognized and protected by forest managers.
- 3.4 Indigenous peoples shall be compensated for the application of their traditional knowledge regarding the use of forest species or management systems in forest operations. This compensation shall be formally agreed upon with their free and informed consent before forest operations commence.

#### **PRINCIPLE 4**

##### **COMMUNITY RELATIONS AND WORKER'S RIGHTS**

Forest management operations shall maintain or enhance the long-term social and economic well being of forest workers and local communities.

- 4.1 The communities within, or adjacent to, the forest management area should be given opportunities for employment, training, and other services.
- 4.2 Forest management should meet or exceed all applicable laws and/or regulations covering health and safety of employees and their families.
- 4.3 The rights of workers to organize and voluntarily negotiate with their employers shall be guaranteed as outlined in Conventions 87 and 98 of the International Labour Organization (ILO).
- 4.4 Management planning and operations shall incorporate the results of evaluations of social impact. Consultations shall be maintained with people and groups (both men and women) directly affected by management operations.
- 4.5 Appropriate mechanisms shall be employed for resolving grievances and for providing fair compensation in the case of loss or damage affecting the legal or customary rights, property, resources, or livelihoods of local peoples. Measures shall be taken to avoid such loss or damage.

## **PRINCIPLE 5**

### **BENEFITS FROM THE FOREST**

Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.

- 5.1 Forest management should strive toward economic viability, while taking into account the full environmental, social, and operational costs of production, and ensuring the investments necessary to maintain the ecological productivity of the forest.
- 5.2 Forest management and marketing operations should encourage the optimal use and local processing of the forest's diversity of products.
- 5.3 Forest management should minimize waste associated with harvesting and on-site processing operations and avoid damage to other forest resources.
- 5.4 Forest management should strive to strengthen and diversify the local economy, avoiding dependence on a single forest product.
- 5.5 Forest management operations shall recognize, maintain, and, where appropriate, enhance the value of forest services and resources such as watersheds and fisheries.
- 5.6 The rate of harvest of forest products shall not exceed levels which can be permanently sustained.

## **PRINCIPLE 6**

### **ENVIRONMENTAL IMPACT**

Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest.

- 6.1 Assessment of environmental impacts shall be completed – appropriate to the scale, intensity of forest management and the uniqueness of the affected resources – and adequately integrated into management systems. Assessments shall include landscape level considerations as well as the impacts of on-site processing facilities. Environmental impacts shall be assessed prior to commencement of site-disturbing operations.
- 6.2 Safeguards shall exist which protect rare, threatened and endangered species and their habitats (e.g., nesting and feeding areas). Conservation zones and protection areas shall be established, appropriate to the scale and intensity of forest management and the uniqueness of the affected resources. Inappropriate hunting, fishing, trapping and collecting shall be controlled.
- 6.3 Ecological functions and values shall be maintained intact, enhanced, or restored, including:
  - a) Forest regeneration and succession.
  - b) Genetic, species, and ecosystem diversity.
  - c) Natural cycles that affect the productivity of the forest ecosystem.
- 6.4 Representative samples of existing ecosystems within the landscape shall be protected in their natural state and recorded on maps, appropriate to the scale and intensity of operations and the uniqueness of the affected resources.

- 6.5 Written guidelines shall be prepared and implemented to: control erosion; minimize forest damage during harvesting, road construction, and all other mechanical disturbances; and protect water resources.
- 6.6 Management systems shall promote the development and adoption of environmentally friendly non-chemical methods of pest management and strive to avoid the use of chemical pesticides. World Health Organization Type 1A and 1B and chlorinated hydrocarbon pesticides; pesticides that are persistent, toxic or whose derivatives remain biologically active and accumulate in the food chain beyond their intended use; as well as any pesticides banned by international agreement, shall be prohibited. If chemicals are used, proper equipment and training shall be provided to minimize health and environmental risks.
- 6.7 Chemicals, containers, liquid and solid non-organic wastes including fuel and oil shall be disposed of in an environmentally appropriate manner at off-site locations.
- 6.8 Use of biological control agents shall be documented, minimized, monitored and strictly controlled in accordance with national laws and internationally accepted scientific protocols. Use of genetically modified organisms shall be prohibited.
- 6.9 The use of exotic species shall be carefully controlled and actively monitored to avoid adverse ecological impacts.
- 6.10 Forest conversion to plantations or non-forest land uses shall not occur, except in circumstances where conversion:
  - a) entails a very limited portion of the forest management unit; and
  - b) does not occur on high conservation value forest areas; and
  - c) will enable clear, substantial, additional, secure long term conservation benefits across the forest management unit

## **PRINCIPLE 7 MANAGEMENT PLAN**

A management plan – appropriate to the scale and intensity of the operations – shall be written, implemented, and kept up to date. The long-term objectives of management, and the means of achieving them, shall be clearly stated.

- 7.1 The management plan and supporting documents shall provide:
  - a) Management objectives.
  - b) Description of the forest resources to be managed, environmental limitations, land use and ownership status, socio-economic conditions, and a profile of adjacent lands.
  - c) Description of silvicultural and/or other management system, based on the ecology of the forest in question and information gathered through resource inventories.
  - d) Rationale for rate of annual harvest and species selection.
  - e) Provisions for monitoring of forest growth and dynamics.
  - f) Environmental safeguards based on environmental assessments.

## **PRINCIPLE 8 MONITORING AND ASSESSMENT**

Monitoring shall be conducted – appropriate to the scale and intensity of forest management – to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.

- 8.1 The frequency and intensity of monitoring should be determined by the scale and intensity of forest management operations as well as the relative complexity and fragility of the affected environment. Monitoring procedures should be consistent and replicable over time to allow comparison of results and assessment of change.
- 8.2 Forest management should include the research and data collection needed to monitor, at a minimum, the following indicators:
  - a) Yield of all forest products harvested.
  - b) Growth rates, regeneration and condition of the forest.
  - c) Composition and observed changes in the flora and fauna.
  - d) Environmental and social impacts of harvesting and other operations.
  - e) Costs, productivity, and efficiency of forest management.



- 8.3 Documentation shall be provided by the forest manager to enable monitoring and certifying organizations to trace each forest product from its origin, a process known as the “chain of custody.”
- 8.4 The results of monitoring shall be incorporated into the implementation and revision of the management plan.
- 8.5 While respecting the confidentiality of information, forest managers shall make publicly available a summary of the results of monitoring indicators, including those listed in Criterion 8.2.

## **PRINCIPLE 9**

### **MAINTENANCE OF HIGH CONSERVATION VALUE FORESTS**

Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.

- 9.1 Assessment to determine the presence of the attributes consistent with High Conservation Value Forests will be completed, appropriate to scale and intensity of forest management.
- 9.2 The consultative portion of the certification process must place emphasis on the identified conservation attributes, and options for the maintenance thereof.
- 9.3 The management plan shall include and implement specific measures that ensure the maintenance and/or enhancement of the applicable conservation attributes consistent with the precautionary approach. These measures shall be specifically included in the publicly available management plan summary.
- 9.4 Annual monitoring shall be conducted to assess the effectiveness of the measures employed to maintain or enhance the applicable conservation attributes.

## **PRINCIPLE 10**

### **PLANTATIONS**

Plantations shall be planned and managed in accordance with Principles and Criteria 1 - 9, and Principle 10 and its Criteria. While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world's needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests.

- 10.1 The management objectives of the plantation, including natural forest conservation and restoration objectives, shall be explicitly stated in the management plan, and clearly demonstrated in the implementation of the plan.
- 10.2 The design and layout of plantations should promote the protection, restoration and conservation of natural forests, and not increase pressures on natural forests. Wildlife corridors, streamside zones and a mosaic of stands of different ages and rotation periods, shall be used in the layout of the plantation, consistent with the scale of the operation. The scale and layout of plantation blocks shall be consistent with the patterns of forest stands found within the natural landscape.
- 10.7 Measures shall be taken to prevent and minimize outbreaks of pests, diseases, fire and invasive plant introductions. Integrated pest management shall form an essential part of the management plan, with primary reliance on prevention and biological control methods rather than chemical pesticides and fertilizers. Plantation management should make every effort to move away from chemical pesticides and fertilizers, including their use in nurseries. The use of chemicals is also covered in Criteria 6.6 and 6.7.
- 10.8 Appropriate to the scale and diversity of the operation, monitoring of plantations shall include regular assessment of potential on-site and off-site ecological and social impacts, (e.g. natural regeneration, effects on water resources and soil fertility, and impacts on local welfare and social well-being), in addition to those elements addressed in principles 8, 6 and 4. No species should be planted on a large scale until local trials and/or experience have shown that they are ecologically well-adapted to the site, are not invasive, and do not have significant negative ecological impacts on other ecosystems. Special attention will be paid to social issues of land acquisition for plantations, especially the protection of local rights of ownership, use or access.

- 10.9 Plantations established in areas converted from natural forests after November 1994 normally shall not qualify for certification. Certification may be allowed in circumstances where sufficient evidence is submitted to the certification body that the manager/owner is not responsible directly or indirectly of such conversion.



## APPENDIX C

### Preferences of the role 'German tourist (ecotourist)' matched to MP C & I

Montréal Process (key concept)	Naturalness/aesthetics	Accessibility/infrastructure	Summary
<b>Criterion 1 Biological diversity</b> 1.1.a forest ecosystem type 1.1.b protected areas 1.1.c fragmentation 1.2.a species numbers 1.2.b species at risk 1.2.c conservation efforts 1.3.a genetic risk 1.3.b genetic diversity 1.3.c genetics conservation	relevant relevant relevant relevant relevant relevant	relevant relevant relevant relevant relevant relevant	relevant relevant relevant extremely relevant extremely relevant extremely relevant relevant
<b>Criterion 2 Productive capacity</b> 2.a wood production land 2.b growing stock 2.c exotic species 2.d annual harvest wood products 2.e annual harvest non-wood products			
<b>Criterion 3 Health</b> 3.a biotic processes and agents 3.b abiotic processes and agents	relevant relevant		relevant relevant
<b>Criterion 4 Soil and water</b> 4.1.a protection of soils and water 4.2.a best management soil 4.2.b soil degradation 4.3.a best management water 4.3.b changed water	relevant relevant relevant relevant relevant		relevant relevant relevant relevant relevant
<b>Criterion 5 Carbon</b> 5.a forest ecosystem carbon 5.b forest product carbon 5.c avoided fossil fuel			
<b>Criterion 6 Socio-economic</b> 6.1.a wood and wood products 6.1.b non-wood products 6.1.c environmental services 6.1.d consumption of wood 6.1.e consumption of non-wood products 6.1.f exports and imports wood 6.1.g exports and imports non-wood products 6.1.h as share of products 6.1.i recycling		relevant	relevant

Montréal Process (key concept)	Naturalness/aesthetics	Accessibility/infrastructure	Summary
6.2.a capital investment	relevant	relevant	extremely relevant
6.2.b research and extension investment		relevant	relevant
6.3.a employment			
6.3.b wages; injury rates			
6.3.c resilience			
6.3.d subsistence			
6.3.e revenue distribution			
6.4.a recreation and tourism	relevant	relevant	extremely relevant
6.4.b visits		relevant	relevant
6.5.a cultural, social and spiritual	possibly relevant	relevant	highly relevant
6.5.b importance of forests to people	relevant		relevant
<b>Criterion 7 Legal</b>			
7.1.a legislation for sustainability		relevant	relevant
7.1.b cross sectoral			
7.2.a taxation			
7.3.a tenure and property rights		relevant	relevant
7.3.b enforcement of laws		relevant	relevant
7.4.a supporting sustainable management	relevant	relevant	extremely relevant
7.4.b research and technologies			
7.5.a partnerships			
7.5.b public participation			
7.5.c monitoring and assessment			

## APPENDIX D

### Preferences of the role 'Asian product buyer' matched to MP C & I

Montréal Process (key concept)	Cost (*)	Stability & supply	Certifica- tion	Respect / history of relationship	Institutional stability	Systems	Summary
<b>Criterion 1 Biological diversity</b> 1.1.a forest ecosystem type 1.1.b protected areas 1.1.c fragmentation 1.2.a species numbers 1.2.b species at risk 1.2.c conservation efforts 1.3.a genetic risk 1.3.b genetic diversity 1.3.c genetics conservation							
<b>Criterion 2 Productive capacity</b> 2.a wood production land 2.b growing stock 2.c exotic species 2.d annual harvest wood products 2.e annual harvest non-wood products	relevant (*) relevant (*) relevant (*) relevant (*) relevant (*)						extremely relevant extremely relevant extremely relevant extremely relevant extremely relevant
<b>Criterion 3 Health</b> 3.a biotic processes and agents 3.b abiotic processes and agents							
<b>Criterion 4 Soil and water</b> 4.1.a protection of soils and water 4.2.a best management soil 4.2.b soil degradation 4.3.a best management water 4.3.b changed water							

Montréal Process (key concept)	Cost (*)	Stability & supply	Certifica- tion	Respect / history of relationship	Institutional stability	Systems	Summary
Criterion 5 Carbon <b>5.a forest ecosystem carbon</b> 5.b forest product carbon 5.c avoided fossil fuel							
<b>Criterion 6 Socio-economic</b> 6.1.a wood and wood products 6.1.b non-wood products 6.1.c environmental services 6.1.d consumption of wood 6.1.e consumption of non-wood products 6.1.f exports and imports wood 6.1.g exports and imports non-wood products 6.1.h as share of products 6.1.i recycling 6.2.a capital investment 6.2.b research and extension investment 6.3.a employment 6.3.b wages; injury rates 6.3.c resilience  6.3.d subsistence 6.3.e revenue distribution 6.4.a recreation and tourism 6.4.b visits 6.5.a cultural, social and spiritual 6.5.b importance of forests to people		relevant					relevant
<b>Criterion 7 Legal</b> 7.1.a legislation for sustainability 7.1.b cross sectoral		relevant			relevant  possibly relevant   relevant		relevant  possibly relevant   relevant

Montréal Process (key concept)	Cost (*)	Stability & supply	Certifica- tion	Respect / history of relationship	Institutional stability	Systems	Summary
7.2.a taxation		relevant			relevant		highly relevant
7.3.a tenure and property rights		relevant			relevant		highly relevant
7.3.b enforcement of laws		relevant			relevant		highly relevant
7.4.a supporting sustainable management					relevant		relevant
7.4.b research and technologies						relevant	relevant
7.5.a partnerships			relevant				relevant
7.5.b public participation			relevant				relevant
7.5.c monitoring and assessment			relevant				relevant
Not a MP indicator: Relationships (businesses, country; history of relationships)				relevant			relevant

(\*) This issue was considered overall to be the most important one, more important than all the other issues, hence the “extremely relevant” categorisation in the summary column

## APPENDIX E

### Preferences of the role 'International ENGO member' matched to MP C & I

Montréal Process (key concept)	Protec- tion of water ways	Legal protec- tion	Tradi- tional rights	Conser- vation and bio- diversity	No planta- tions	Public access	Indepen- dent auditing & com- pliance	Summary
<b>Criterion 1 Biological diversity</b> 1.1.a forest ecosystem type 1.1.b protected areas 1.1.c fragmentation 1.2.a species numbers 1.2.b species at risk 1.2.c conservation efforts 1.3.a genetic risk 1.3.b genetic diversity 1.3.c genetics conservation				relevant relevant relevant relevant relevant relevant relevant relevant	relevant relevant			highly relevant highly relevant relevant relevant relevant relevant relevant relevant
<b>Criterion 2 Productive capacity</b> 2.a wood production land 2.b growing stock 2.c exotic species  2.d annual harvest wood products 2.e annual harvest non-wood products					relevant  relevant			relevant  highly relevant
<b>Criterion 3 Health</b> 3.a biotic processes and agents 3.b abiotic processes and agents				relevant  relevant				highly relevant  relevant
<b>Criterion 4 Soil and water</b>								

Montréal Process (key concept)	Protec- tion of water ways	Legal protec- tion	Tradi- tional rights	Conser- vation and bio- diversity	No planta- tions	Public access	Indepen- dent auditing & com- pliance	Summary
4.1.a protection of soils and water	relevant							relevant
4.2.a best management soil	relevant							relevant
4.2.b soil degradation	relevant							relevant
4.3.a best management water	relevant							relevant
4.3.b changed water	relevant							
<b>Criterion 5 Carbon</b> 5.a forest ecosystem carbon 5.b forest product carbon 5.c avoided fossil fuel								
<b>Criterion 6 Socio- economic</b> 6.1.a wood and wood products 6.1.b non-wood products 6.1.c environmental services 6.1.d consumption of wood 6.1.e consumption of non-wood products 6.1.f exports and imports wood 6.1.g exports and imports non-wood products 6.1.h as share of products 6.1.i recycling 6.2.a capital investment 6.2.b research and extension investment 6.3.a employment 6.3.b wages; injury								



Montréal Process (key concept)	Protec- tion of water ways	Legal protec- tion	Tradi- tional rights	Conser- vation and bio- diversity	No planta- tions	Public access	Indepen- dent auditing & com- pliance	Summary
rates 6.3.c resilience 6.3.d subsistence 6.3.e revenue distribution 6.4.a recreation and tourism 6.4.b visits  6.5.a cultural, social and spiritual 6.5.b importance of forests to people	   relevant  relevant  relevant  relevant		  relevant  relevant  relevant  relevant			   relevant  relevant  relevant		   extremely relevant highly relevant highly relevant extremely relevant
<b>Criterion 7 Legal</b> 7.1.a legislation for sustainability 7.1.b cross sectoral 7.2.a taxation 7.3.a tenure and property rights 7.3.b enforcement of laws 7.4.a supporting sustainable management 7.4.b research and technologies 7.5.a partnerships 7.5.b public participation 7.5.c monitoring and assessment		relevant          relevant				   relevant     relevant		relevant          highly relevant relevant       extremely relevant relevant
Not a MP indicator: Controls on (and purpose of) chemical use e.g. in NZ: for control of alien species; pests								relevant

## APPENDIX F

### Preferences of the role 'International investor/financier' matched to MP C & I

Montréal Process (key concept)	Regulatory framework	State of knowledge	Risk & mitigation	Summary
<b>Criterion 1 Biological diversity</b> 1.1.a forest ecosystem type 1.1.b protected areas 1.1.c fragmentation 1.2.a species numbers  1.2.b species at risk 1.2.c conservation efforts 1.3.a genetic risk 1.3.b genetic diversity 1.3.c genetics conservation		relevant relevant  relevant	relevant  relevant	relevant relevant  highly relevant
<b>Criterion 2 Productive capacity</b> 2.a wood production land 2.b growing stock 2.c exotic species 2.d annual harvest wood products 2.e annual harvest non-wood products		relevant relevant relevant relevant		relevant relevant relevant relevant
<b>Criterion 3 Health</b> 3.a biotic processes and agents 3.b abiotic processes and agents			relevant relevant	relevant relevant
<b>Criterion 4 Soil and water</b> 4.1.a protection of soils and water 4.2.a best management soil  4.2.b soil degradation 4.3.a best management water 4.3.b changed water		relevant relevant  relevant	relevant  relevant relevant relevant	relevant relevant highly relevant relevant relevant relevant
<b>Criterion 5 Carbon</b> 5.a forest ecosystem carbon 5.b forest product carbon 5.c avoided fossil fuel		relevant		relevant
<b>Criterion 6 Socio-economic</b> 6.1.a wood and wood products 6.1.b non-wood products 6.1.c environmental services 6.1.d consumption of wood 6.1.e consumption of non-wood products 6.1.f exports and imports wood 6.1.g exports and imports non-wood products 6.1.h as share of products		relevant  relevant relevant relevant relevant		relevant  relevant relevant relevant relevant

Montréal Process (key concept)	Regulatory framework	State of knowledge	Risk & mitigation	Summary
6.1.i recycling 6.2.a capital investment 6.2.b research and extension investment 6.3.a employment 6.3.b wages; injury rates 6.3.c resilience 6.3.d subsistence 6.3.e revenue distribution 6.4.a recreation and tourism 6.4.b visits  6.5.a cultural, social and spiritual 6.5.b importance of forests to people		relevant relevant relevant relevant	  relevant relevant	relevant relevant relevant relevant  relevant  highly relevant
<b>Criterion 7 Legal</b>				
7.1.a legislation for sustainability	relevant		relevant	highly relevant
7.1.b cross sectoral	relevant		relevant	relevant
7.2.a taxation	relevant		relevant	relevant
7.3.a tenure and property rights	relevant		relevant	relevant
7.3.b enforcement of laws	relevant		relevant	relevant
7.4.a supporting sustainable management	relevant			relevant
7.4.b research and technologies		relevant		relevant
7.5.a partnerships			relevant	relevant
7.5.b public participation			relevant	highly relevant
7.5.c monitoring and assessment		relevant	relevant	relevant
Not MP indicators: Long term volatility of country business terms, of laws/legality; stability of constraints Corruption levels Business environment (constraints/ease of doing business, etc)	relevant relevant  relevant		relevant	highly relevant relevant  relevant

## APPENDIX G

### Preferences of the role 'German tourist (ecotourist)' matched to FSC P & C

FSC Principles and Criteria (key concept)	Naturalness aesthetics	Accessibility infrastructure	Summary
<b>PRINCIPLE 1 COMPLIANCE WITH LAWS AND FSC PRINCIPLES</b> 1.1 respect laws 1.2 fees paid 1.3 international agreements binding 1.4 conflicts evaluated 1.5 protected from illegal 1.6 commitment to FSC	relevant  relevant  relevant	relevant  relevant	extremely relevant  relevant  extremely relevant
<b>PRINCIPLE 2 TENURE AND USE RIGHTS AND RESPONSIBILITIES</b> 2.1 use rights 2.2 tenure/use control 2.3 resolve disputes		relevant relevant	relevant relevant
<b>PRINCIPLE 3 INDIGENOUS PEOPLE'S RIGHTS</b> 3.1 indigenous peoples' control 3.2 indigenous peoples' rights 3.3 indigenous peoples' special sites 3.4 indigenous peoples' knowledge		relevant relevant relevant	relevant relevant relevant
<b>PRINCIPLE 4 COMMUNITY RELATIONS AND WORKER'S RIGHTS</b> 4.1 community opportunities 4.2 health and safety 4.3 workers rights 4.4 social impact evaluations 4.5 resolve grievances			
<b>PRINCIPLE 5 BENEFITS FROM THE FOREST</b> 5.1 economic viability 5.2 local processing 5.3 minimise waste 5.4 local economy 5.5 forest services 5.6 harvesting rate	relevant  relevant	relevant relevant	relevant relevant extremely relevant
<b>PRINCIPLE 6 ENVIRONMENTAL IMPACT</b> 6.1 environmental impacts 6.2 rare, threatened & endangered species 6.3 ecological functions 6.4 representative ecosystem samples 6.5 guidelines 6.6 non-chemical 6.7 chemical waste disposal 6.8 biological agent use 6.9 exotic species 6.10 forest conversions	relevant relevant relevant relevant relevant  relevant relevant relevant	relevant relevant relevant relevant relevant	extremely relevant extremely relevant extremely relevant extremely relevant extremely relevant relevant  relevant relevant relevant
<b>PRINCIPLE 7 MANAGEMENT PLAN</b> 7.1 management plan coverage 7.2 management plan revisions 7.3 worker training 7.4 management plan publication	relevant	relevant	extremely relevant

<b>FSC Principles and Criteria (key concept)</b>	<b>Naturalness aesthetics</b>	<b>Accessibility infrastructure</b>	<b>Summary</b>
<b>PRINCIPLE 8 MONITORING AND ASSESSMENT</b> 8.1 monitoring frequency 8.2 monitoring coverage 8.3 tracing forest product 8.4 use of monitoring 8.5 publication of monitoring		relevant relevant	relevant relevant
<b>PRINCIPLE 9 MAINTENANCE OF HIGH CONSERVATION</b> 9.1 high conservation value 9.2 conservation consultation 9.3 conserving conservation 9.4 monitoring conservation	relevant  relevant relevant	relevant relevant relevant relevant	extremely relevant relevant extremely relevant extremely relevant
<b>PRINCIPLE 10 PLANTATIONS</b> 10.1 management objectives 10.2 plantations and natural forests 10.3 diversity 10.4 species selection 10.5 natural forest restoration 10.6 soils 10.7 pests, diseases, fire, invasive plants 10.8 ecological and social impacts 10.9 natural forest conversions	relevant relevant relevant  relevant	relevant relevant  relevant relevant	relevant extremely relevant relevant relevant  extremely relevant relevant

## APPENDIX H

### Preferences of the role 'Asian product buyer' matched to FSC P & C

FSC Principles and Criteria (key concept)	Market access	Stability & supply	Certification	Respect / history of relationship	Institutional stability	Systems	Summary
<b>PRINCIPLE 1 COMPLIANCE WITH LAWS AND FSC PRINCIPLES</b> 1.1 respect laws 1.2 fees paid 1.3 international agreements binding 1.4 conflicts evaluated 1.5 protected from illegal 1.6 commitment to FSC	relevant	relevant	relevant		relevant		extremely relevant extremely relevant extremely relevant extremely relevant extremely relevant extremely relevant
<b>PRINCIPLE 2 TENURE AND USE RIGHTS AND RESPONSIBILITIES</b> 2.1 use rights 2.2 tenure/use control 2.3 resolve disputes	relevant	relevant	relevant		relevant		extremely relevant extremely relevant extremely relevant
<b>PRINCIPLE 3 INDIGENOUS PEOPLE'S RIGHTS</b> 3.1 indigenous peoples' control 3.2 indigenous peoples' rights 3.3 indigenous peoples' special sites 3.4 indigenous peoples' knowledge	relevant	relevant	relevant				extremely relevant extremely relevant extremely relevant extremely relevant
<b>PRINCIPLE 4 COMMUNITY RELATIONS AND WORKER'S RIGHTS</b> 4.1 community opportunities 4.2 health and safety 4.3 workers rights 4.4 social impact evaluations 4.5 resolve grievances	relevant		relevant				highly relevant highly relevant highly relevant highly relevant highly relevant
<b>PRINCIPLE 5 BENEFITS FROM THE FOREST</b>							

FSC Principles and Criteria (key concept)	Market access	Stability & supply	Certification	Respect / history of relationship	Institutional stability	Systems	Summary
5.1 economic viability	relevant		relevant				highly relevant
5.2 local processing	relevant		relevant				highly relevant
5.3 minimise waste	relevant		relevant				highly relevant
5.4 local economy	relevant		relevant				highly relevant
5.5 forest services	relevant		relevant				highly relevant
5.6 harvesting rate	relevant		relevant				highly relevant
<b>PRINCIPLE 6 ENVIRONMENTAL IMPACT</b>							
6.1 environmental impacts	relevant		relevant				highly relevant
6.2 rare, threatened & endangered species	relevant		relevant				highly relevant
6.3 ecological functions	relevant		relevant				highly relevant
6.4 representative ecosystem samples	relevant		relevant				highly relevant
6.5 guidelines	relevant		relevant				highly relevant
6.6 non-chemical	relevant		relevant				highly relevant
6.7 chemical waste disposal	relevant		relevant				highly relevant
6.8 biological agent use	relevant		relevant				highly relevant
6.9 exotic species	relevant		relevant				highly relevant
6.10 forest conversions	relevant		relevant				highly relevant
<b>PRINCIPLE 7 MANAGEMENT PLAN</b>							
7.1 management plan coverage	relevant		relevant			relevant	extremely relevant
7.2 management plan revisions	relevant		relevant			relevant	extremely relevant
7.3 worker training	relevant		relevant			relevant	extremely relevant
7.4 management plan publication	relevant		relevant			relevant	extremely relevant
<b>PRINCIPLE 8 MONITORING AND ASSESSMENT</b>							
8.1 monitoring frequency	relevant		relevant				highly relevant
8.2 monitoring coverage	relevant		relevant				highly relevant
8.3 tracing forest product	relevant		relevant				highly relevant
8.4 use of monitoring	relevant		relevant				highly relevant
8.5 publication of	relevant		relevant				highly relevant



FSC Principles and Criteria (key concept)	Market access	Stability & supply	Certification	Respect / history of relationship	Institutional stability	Systems	Summary
monitoring							relevant
<b>PRINCIPLE 9 MAINTENANCE OF HIGH CONSERVATION</b>							
9.1 high conservation value	relevant		relevant				highly relevant
9.2 conservation consultation	relevant		relevant				highly relevant
9.3 conserving conservation	relevant		relevant				highly relevant
9.4 monitoring conservation	relevant		relevant				highly relevant
<b>PRINCIPLE 10 PLANTATIONS</b>							
10.1 management objectives	relevant		relevant				highly relevant
10.2 plantations and natural forests	relevant		relevant				highly relevant
10.3 diversity	relevant		relevant				highly relevant
10.4 species selection	relevant		relevant				highly relevant
10.5 natural forest restoration	relevant		relevant				highly relevant
10.6 soils	relevant		relevant				highly relevant
10.7 pests, diseases, fire, invasive plants	relevant		relevant				highly relevant
10.8 ecological and social impacts	relevant		relevant				highly relevant
10.9 natural forest conversions	relevant		relevant				highly relevant

## APPENDIX I

### Preferences of the role 'International ENGO member' matched to FSC P & C

FSC Principles and Criteria (key concept)	Control exotic	Water	Legal	Traditional	Biodiversity	No plantations	Access	Compliance	Summary
<b>PRINCIPLE 1 COMPLIANCE WITH LAWS AND FSC PRINCIPLES</b>									
1.1 respect laws			relevant						relevant
1.2 fees paid									
1.3 international agreements binding			relevant						relevant
1.4 conflicts evaluated									
1.5 protected from illegal			relevant						relevant
1.6 commitment to FSC								relevant	relevant
<b>PRINCIPLE 2 TENURE AND USE RIGHTS AND RESPONSIBILITIES</b>									
2.1 use rights			relevant	relevant			relevant		extremely relevant
2.2 tenure/use control			relevant	relevant			relevant		extremely relevant
2.3 resolve disputes				relevant			relevant		highly relevant
<b>PRINCIPLE 3 INDIGENOUS PEOPLE'S RIGHTS</b>									
3.1 indigenous peoples' control			relevant	relevant			relevant		extremely relevant
3.2 indigenous peoples' rights		relevant	relevant	relevant			relevant		extremely relevant
3.3 indigenous peoples' special sites			relevant	relevant			relevant		extremely relevant
3.4 indigenous peoples' knowledge			relevant	relevant					highly relevant
<b>PRINCIPLE 4 COMMUNITY RELATIONS AND WORKER'S RIGHTS</b>									
4.1 community opportunities									
4.2 health and safety			relevant						relevant
4.3 workers rights			relevant						relevant
4.4 social impact							relevant		relevant

<b>FSC Principles and Criteria (key concept)</b>	<b>Control exotic</b>	<b>Water</b>	<b>Legal</b>	<b>Traditional</b>	<b>Biodiversity</b>	<b>No plantations</b>	<b>Access</b>	<b>Compliance</b>	<b>Summary</b>
evaluations									
4.5 resolve grievances				relevant					relevant
<b>PRINCIPLE 5 BENEFITS FROM THE FOREST</b>									
5.1 economic viability							relevant		relevant
5.2 local processing									
5.3 minimise waste									
5.4 local economy									
5.5 forest services							relevant		relevant
5.6 harvesting rate									
<b>PRINCIPLE 6 ENVIRONMENTAL IMPACT</b>									
6.1 environmental impacts		relevant			relevant			relevant	extremely relevant
6.2 rare, threatened & endangered species					relevant				relevant
6.3 ecological functions					relevant				relevant
6.4 representative ecosystem samples					relevant				relevant
6.5 guidelines		relevant				relevant			relevant highly relevant
6.6 non-chemical waste disposal	relevant					relevant			highly relevant
6.8 biological agent use						relevant			relevant
6.9 exotic species	relevant					relevant			highly relevant
6.10 forest conversions	relevant					relevant			highly relevant
<b>PRINCIPLE 7 MANAGEMENT PLAN</b>									
7.1 management plan coverage								relevant	relevant
7.2 management plan revisions								relevant	relevant
7.3 worker training									
7.4 management plan								relevant	relevant

<b>FSC Principles and Criteria (key concept)</b>	<b>Control exotic</b>	<b>Water</b>	<b>Legal</b>	<b>Traditional</b>	<b>Biodiversity</b>	<b>No plantations</b>	<b>Access</b>	<b>Compliance</b>	<b>Summary</b>
publication									
<b>PRINCIPLE 8 MONITORING AND ASSESSMENT</b>									
8.1 monitoring frequency								relevant	relevant
8.2 monitoring coverage								relevant	relevant
8.3 tracing forest product								relevant	relevant
8.4 use of monitoring								relevant	relevant
8.5 publication of monitoring								relevant	relevant
<b>PRINCIPLE 9 MAINTENANCE OF HIGH CONSERVATION</b>									
9.1 high conservation value					relevant				relevant
9.2 conservation consultation					relevant				relevant
9.3 conserving conservation					relevant				relevant
9.4 monitoring conservation					relevant				relevant
<b>PRINCIPLE 10 PLANTATIONS</b>									
10.1 management objectives								relevant	relevant
10.2 plantations and natural forests	relevant							relevant	highly relevant
10.3 diversity	relevant							relevant	highly relevant
10.4 species selection	relevant							relevant	highly relevant
10.5 natural forest restoration								relevant	relevant
10.6 soils		relevant						relevant	highly relevant
10.7 pests, diseases, fire, invasive plants								relevant	relevant
10.8 ecological and social impacts								relevant	relevant
10.9 natural forest conversions								relevant	relevant

## APPENDIX J

### Preferences of the role 'International investor/financier' matched to FSC P & C

FSC Principles and Criteria (key concept)	Regulatory framework	State of knowledge	Risk & mitigation	Summary
<b>PRINCIPLE 1 COMPLIANCE WITH LAWS AND FSC PRINCIPLES</b> 1.1 respect laws 1.2 fees paid 1.3 international agreements binding 1.4 conflicts evaluated 1.5 protected from illegal 1.6 commitment to FSC		relevant relevant relevant relevant relevant relevant	relevant relevant relevant relevant relevant relevant	extremely relevant extremely relevant extremely relevant extremely relevant extremely relevant extremely relevant
<b>PRINCIPLE 2 TENURE AND USE RIGHTS AND RESPONSIBILITIES</b> 2.1 use rights 2.2 tenure/use control 2.3 resolve disputes	relevant relevant	relevant	relevant relevant relevant	extremely relevant extremely relevant extremely relevant
<b>PRINCIPLE 3 INDIGENOUS PEOPLE'S RIGHTS</b> 3.1 indigenous peoples' control 3.2 indigenous peoples' rights 3.3 indigenous peoples' special sites 3.4 indigenous peoples' knowledge			relevant relevant relevant relevant	relevant relevant relevant relevant
<b>PRINCIPLE 4 COMMUNITY RELATIONS AND WORKER'S RIGHTS</b> 4.1 community opportunities 4.2 health and safety 4.3 workers rights 4.4 social impact evaluations 4.5 resolve grievances		relevant relevant relevant relevant relevant	relevant relevant relevant relevant relevant	extremely relevant extremely relevant extremely relevant extremely relevant extremely relevant
<b>PRINCIPLE 5 BENEFITS FROM THE FOREST</b> 5.1 economic viability 5.2 local processing 5.3 minimise waste 5.4 local economy 5.5 forest services 5.6 harvesting rate				
<b>PRINCIPLE 6 ENVIRONMENTAL IMPACT</b> 6.1 environmental impacts 6.2 rare, threatened & endangered				

<b>FSC Principles and Criteria (key concept)</b>	<b>Regulatory framework</b>	<b>State of knowledge</b>	<b>Risk &amp; mitigation</b>	<b>Summary</b>
species 6.3 ecological functions 6.4 representative ecosystem samples 6.5 guidelines 6.6 non-chemical 6.7 chemical waste disposal 6.8 biological agent use 6.9 exotic species 6.10 forest conversions				
<b>PRINCIPLE 7 MANAGEMENT PLAN</b> 7.1 management plan coverage 7.2 management plan revisions 7.3 worker training 7.4 management plan publication	relevant relevant relevant relevant			relevant relevant relevant relevant
<b>PRINCIPLE 8 MONITORING AND ASSESSMENT</b> 8.1 monitoring frequency 8.2 monitoring coverage 8.3 tracing forest product 8.4 use of monitoring 8.5 publication of monitoring				
<b>PRINCIPLE 9 MAINTENANCE OF HIGH CONSERVATION</b> 9.1 high conservation value 9.2 conservation consultation 9.3 conserving conservation 9.4 monitoring conservation				
<b>PRINCIPLE 10 PLANTATIONS</b> 10.1 management objectives 10.2 plantations and natural forests 10.3 diversity 10.4 species selection 10.5 natural forest restoration 10.6 soils 10.7 pests, diseases, fire, invasive plants 10.8 ecological and social impacts 10.9 natural forest conversions				

## APPENDIX K

### MP indicators considered most important to international role-played stakeholders

MP indicators important to international role-played stakeholders	Selected by all groups	Ranked important by the groups
1.1.a Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure		x
1.1.b Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage		x
1.2.a Number of native forest-associated species		x
1.2.b Number and status of native forest-associated species at risk, as determined by legislation or scientific assessment		x
2.c Area, percent, and growing stock of plantations of native and exotic species		x
3.a Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive species) beyond reference conditions		x
4.2.b Area and percent of forest land with significant soil degradation		x
6.2.a Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest-based environmental services, recreation and tourism		x
6.4.a Area and percent of forests available and/or managed for public recreation and tourism		x
6.5.a Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values		x
6.5.b The importance of forests to people		x
7.1.a Legislation and policies supporting the sustainable management of forests	x	x
7.1.b Cross sectoral policy and programme coordination		x
7.2.a Taxation and other economic strategies that affect sustainable management of forests		x
7.3.a Clarity and security of land and resource tenure and property rights	x	x
7.3.b Enforcement of laws related to forests	x	x
7.4.a Programmes, services and other resources supporting the sustainable management of forests		x
7.5.b Public participation and conflict resolution in forest-related decision making		x
7.5.c Monitoring, assessment and reporting on progress towards sustainable management of forests		x

## APPENDIX L

### Environmental-only MP indicators considered most important to international role-played stakeholders

Environmental MP indicators important to international role-played stakeholders	Selected by at least 3 groups	Ranked important by the groups
1.1.a Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure	x	x
1.1.b Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage	x	x
1.2.a Number of native forest-associated species		x
1.2.b Number and status of native forest-associated species at risk, as determined by legislation or scientific assessment	x	x
2.a Area and percent of forest land and net area of forest land available for wood production	x	x
2.c Area, percent, and growing stock of plantations of native and exotic species	x	x
3.a Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive species) beyond reference conditions	x	x
3.b Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions	x	x
4.1.a Area and percent of forest whose designation or land management focus is the protection of soil or water resources	x	x
4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources	x	x
4.2.b Area and percent of forest land with significant soil degradation	x	x
4.3.a Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources.	x	x
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	x	x
6.2.a Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest-based environmental services, recreation and tourism		x
6.4.a Area and percent of forests available and/or managed for public recreation and tourism	x	x
6.5.a Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values	x	x
6.5.b The importance of forests to people	x	x