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Global progress toward sustainable forest management ☆

Kenneth G. MacDicken [a,*], Phosiso Sola [b], John E. Hall [c], Cesar Sabogal [a], Martin Tadoum [d], Carlos de Wasseige [e]

[a] Food and Agriculture Organization of the United Nations, Rome, Italy
[b] Center for International Forestry Research, Nairobi, Kenya
[c] Natural Resources Canada, Ottawa, Canada
[d] Central African Forest Commission, Yaounde, Cameroon
[e] Observatory for Forests of Central Africa, Yaounde, Cameroon

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ABSTRACT

Sustainable forest management (SFM) is many things to many people – yet a common thread is the production of forest goods and services for the present and future generations. The promise of sustainability is rooted in the two premises; first that ecosystems have the potential to renew themselves and second that economic activities and social perceptions or values that define human interaction with the environment are *choices* that can be modified to ensure the long term productivity and health of the ecosystem. SFM addresses a great challenge in matching the increasing demands of a growing human population while maintaining ecological functions of healthy forest ecosystems. This paper does not seek to define SFM, but rather provides analyses of key indicators for the national-scale enabling environment to gain a global insight into progress in implementing enabling and implementing SFM at the national and operational levels. Analyses of the Global Forest Resources Assessment 2015 (FRA) country report data are used to provide insights into the current state of progress in implementing the enabling conditions for SFM. Over 2.17 billion ha of the world's forest area are predicted by governments to remain in permanent forest land use, of which some 1.1 billion ha are covered by all of the SFM tools investigated in FRA 2015. At the global scale, SFM-related policies and regulations are reported to be in place on 97% of global forest area. While the number of countries with national forest inventories has increased over that past ten years from 48 to 112, only 37% of forests in low income countries are covered by forest inventories. Forest management planning and monitoring of plans has increased substantially as has forest management certification, which exceeded a total of over 430 million ha in 2014. However, 90% of internationally verified certification is in the boreal and temperate climatic domains – only 6% of permanent forests in the tropical domain have been certified as of 2014. Results show that more work is needed to expand the extent and depth of work on establishing the enabling conditions that support SFM over the long term and suggests where those needs are greatest.

1. Introduction

Forests cover some 30% of the world's land area (Keenan et al., 2015) and it is difficult to think of individuals that do not depend on forest products and services in some form on a regular basis. In addition a large number of people depend on forests for at least part of their livelihood and well-being (EC, 2003; FAO, 2006; Jacek et al., 2005; UNFF, 2007).

Forests can make significant contributions to the economy and provide multiple products and services that support livelihoods and protect the environment. However, the challenge is to manage the forest's regenerative capacity in a way that produces benefits now without compromising future benefits and choices. This idea is at the core of most views of SFM. Recognition that the production and protection functions of forests must be sustained by sound management practice is not new. From the earliest times, thoughtful people have encouraged the wise use of forests. Emperor Da Yu was the first Chinese emperor of the Xia Dynasty (21st century BC) to pay special attention to the sustainable management of natural resources and forests (Anonymous). In seventeenth century Europe, Evelyn (1664) and Colbert (1669 as reported in Brown, 1883) noted the negative influence of forest over-utilization on sustained provision of forest goods and services. The tax accountant von Carlowitz (1713) describes how

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* Corresponding author.
E-mail address: kenneth.macdicken@fao.org (K.G. MacDicken).

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Saxonian forest regulation was used as an important principle of forest management in the early 18th century. Hartig (1795) described sustainable yield based on the quantity of increasing timber volume which was an important step in the quantitative regulation of harvest volumes. In the early 20th century, Gifford Pinchot recognized that clear and convincing evidence was needed to demonstrate that sustainable forest management would return a profit. He also noted that sustainable forestry was not possible without the consent and active participation of the public (Schmithüsen, 2013). Zon and Sparhawk (1923) demonstrated how globally available data on forest resources provides professionals and the public with information vital to effective strategies for sustaining forest values. They also note the gaps in this data that constrain management – some of which remain unfilled in the early 21st century. The Global Forest Resources Assessment (FRA) was created to provide a continuing assessment of forest resources and how they are changing (MacDicken, 2015).

SFM has been encouraged as an important guiding principle in managing forests (ITTO, 2006; EC, 2003). The concept provides guidance on how to manage forests to provide for today's needs (as best as possible) and not compromise (i.e. reduce) the options of future generations (Forest Principles, UN Rio, 1992). The tools available for encouraging SFM begin with policy and regulations that support those who are practicing forest management. They also include inventories, monitoring, forest management certification, stakeholder involvement and forest management plans. Where there is a clear understanding of the ecological circumstances of the forests being managed an appropriate regulatory framework can establish the enabling conditions for SFM.

Criteria and indicators (C&I) of SFM have been developed through the work of many actors – including governments, research organizations, non-governmental organizations and private companies (MCPFE, 2001; Prabhu et al., 1998). This includes work by countries involved in the Montréal Process (MP), FOREST EUROPE (FE), the International Tropical Timber Organization (ITTO) and the Food and Agriculture Organization (FAO). These C&I are used to define SFM and to measure and report progress towards its implementation (Canadian Council of Forest Ministers, 2008). These international and regional initiatives and research efforts have made good progress in using science, commerce and social values to devise their indicators. Supportive national legal, policy and institutional frameworks can make SFM practices cost-effective and when effectively applied encourage the practices needed for SFM (Keeton and Crow, 2009; FAO, 2010; Lovrc et al., 2010). Forest management certification provides independent, third-party verification of adherence to a defined set of management standards that promote and measure SFM (CEPI, 2006).

The main focus of this paper is to present factors that are needed for and provide support to long-term sustainable forest management. By presenting a sub-set of data relevant to SFM derived from the Global Forest Resources Assessment 2015 (www.fao.org/forestry/fra) the reader is provided with information that can help determine where and how much progress is being made towards establishing and maintaining the enabling conditions for SFM. FRA 2015 was designed in part to provide this information by asking questions under two broad categories:

Enabling environment (national scale):

- What forest policy and regulatory framework exists to support implementation of sustainable forest management?
- Is there a national platform that promotes stakeholder participation in forest policy development?
- What is the forest area intended to be in permanent forest land use now and how has it changed over time?
- How is progress toward SFM measured and reported?

Operational scale progress toward SFM

- What is the area of forest under a forest management plan and how is this monitored?
- How are stakeholders involved in management decisions for publicly-owned forests?
- What is the area of forest under one or more independently verified forest certification schemes?

2. Methods

The methods, definitions and approaches used in FRA 2015 are discussed and referenced in greater detail in MacDicken (2015) and www.fao.org/forestry/FRA/2015/Methods. FRA 2015 data were extracted from the Forest Resources Information System (FRIMS) as described in www.fao.org/forestry/fra2015. All data used in this paper except international forest management certification was provided by countries or through desk studies carried out by FAO. Other than for international certification, country reports from government-appointed National Correspondents contributed data representing some 99% of global forest area. International certification data was provided by the Forest Stewardship Council (FSC) and the Programme for Endorsement of Forest Certification (PEFC) for July in each of the reporting years[1]. Enabling environment-related data were collected on policies, legislation and regulations supporting SFM, presence of a national stakeholder platform and the types of forest resource monitoring information and progress reporting available. Progress at the operational level was measured as forest area under Forest Management Plans (FMP), including an assessment of how the content of these plans are monitored and how frequently and if stakeholder inputs are required and the extent of both international and domestic forest management certification. Statistical summaries and analyses were done for all variables using Microsoft Excel and Systat (Ver. 13) and relationships described by national income category, climatic domain and sub-region (see MacDicken, 2015). Reported values were clustered into four nested categories: legal framework, national data reporting, management planning and stakeholder involvement plus certified forest area.

3. Results and discussion

3.1. When do the conditions exist to enable sustainable forest management?

It depends on where you set the threshold – if the presence of a regulatory framework is deemed adequate, then the conditions exist when policies and regulations are in place. The most rigorous set of enabling conditions includes the legal framework, national data reporting, the availability of quality forest inventory data, management planning, effective stakeholder involvement and regular monitoring and reporting. Measuring and reporting these data at the national scale and sharing the results through the FRA is an important step in understanding progress to SFM and where it or is not occurring.

Using the SFM related data collected through FRA 2015, it is possible to begin with the area of permanent forest land[2] and evaluate how much forest land is covered by successive indicators. Fig. 1 presents this progression of the application of these "SFM

[1] July was used as a mid-point for the annual data and is important because monthly certification values change throughout the year as additional forest area is certified or previously certified forest are decertified.

[2] Permanent forest land is defined in FRA 2015 as the area of state-owned forest designated to remain permanently as forest (i.e. the permanent forest estate) plus an estimate by governments of the portion of privately-owned forest expected to remain permanently in forest land use.