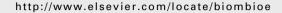


Available at www.sciencedirect.com







Review

Criteria and indicators for sustainable forest fuel production and harvesting: A review of current standards for sustainable forest management

Inge Stupak a,*, Brenna Lattimore b, Brian D. Titus c, C. Tattersall Smith b

ARTICLE INFO

Article history: Received 2 March 2010 Accepted 15 November 2010 Available online 13 December 2010

Keywords:
Bioenergy feedstock
Criteria and indicators
Forest Stewardship Council (FSC)
Programme for the endorsement of forest certification (PEFC)
Biomass

Sustainable forest management

ABSTRACT

Forest biomass is increasingly being considered as a source of sustainable energy. It is crucial, however, that this biomass be grown and harvested in a sustainable manner. International processes and certification systems have been developed to ensure sustainable forest management (SFM) in general, but it is important to consider if they adequately address specific impacts of intensified production and harvesting methods related to forest fuels. To explore how existing SFM frameworks address sustainable forest fuel production, criteria and indicators (C&I) from 10 different international processes and organizations and 157 international, national and sub-national forest management certification standards under the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) were reviewed. International processes include indicators that require identification or reporting of availability, harvested amounts, value, or share in energy consumption of forest fuels. Forest certification standards address several specific woodfuel issues, but not always in a consistent manner. It seems that developed countries more frequently address environmental consequences of harvesting residues or whole trees on soil fertility and biodiversity, while developing countries more frequently address social issues, such as local people's access to firewood and working conditions in charcoal production. Based on findings, options to improve SFM standards for sustainable forest fuel production are discussed. These options include clarification of terminology, systematic inclusion of important management impacts unique to forest fuel production, coordination of efforts with other related governance processes, including tools promoting sustainability at more integrated levels, such as landscape, supply chain and global levels.

© 2010 Elsevier Ltd. All rights reserved.

1. Introduction

Wood has been used for heating and cooking from time immemorial, and domestic fuelwood is still one of the greatest

uses for wood around the world, especially in developing countries [1,2]. The industrial bioenergy sector is also substantial in many countries and it is growing as regional and national government policies increasingly encourage the

^a Forest & Landscape Denmark, Faculty of Life Sciences, University of Copenhagen, Rolighedsvej 23, 1958 Frederiksberg C, Denmark

^b Faculty of Forestry, University of Toronto, Toronto, Ontario M5S 3B3, Canada

^c Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, Victoria, BC V8Z 1M5 Canada

^{*} Corresponding author. Tel.: +45 35 33 16 65; fax: +45 35 33 15 08. E-mail address: ism@life.ku.dk (I. Stupak).

use of domestically available and renewable energy sources that minimize fossil fuel consumption [2,3]. This industrial growth is accompanied by increasing concerns over whether or not environmental and social values are adequately ensured when biomass is grown, harvested, and converted to energy in both developing and developed countries. These concerns have resulted in increasing interest in the

development of criteria and indicators (C&I; see Table 1 for a list of abbreviations used in this paper) with which to measure and assess the sustainability of bioenergy production systems, including the sustainable production of bioenergy feedstock [4-10].

A variety of certification schemes currently exist and operate at different points along the bioenergy supply chain

Table 1 - Glossary of abbreviations.	
Abbreviation	Full name

International processes and organizations

ATO African Timber Organization

CIFOR Center for International Forestry Research

Dry Zone Africa The Dry-Zone Africa Process on Criteria and Indicators for Sustainable

Forest Management

Dry Zone Asia Regional Initiative for the Development and Implementation of National

Level Criteria and Indicators for the Sustainable Management of Dry Forests in Asia

ITTO International Tropical Timber Organization

Lepaterique Process of Central America on Criteria and Indicators

for Sustainable Forest Management

MCPFE Ministerial Conference on the Protection of Forests in Europe

PEOLG Pan European Operational Level Guidelines

Montreal The Montreal Process
Near East The Near East Process

Forest certification systems and standards

FSC Forest Stewardship Council

PEFC Programme for the Endorsement of Forest Certification

AFS Australian Forestry Standard
ATFS American Tree Farm System

CertFlor Certificação Florestal, Sistema Brazileiro de Certificação Florestal
CertForChile Sistema Chileno de Certificación de Manejo Forestal Sustentable

CSA Canadian Standards Association
MTCC Malaysian Timber Certification Council
PAFC Pan African Forestry Certification System

FCR Forest certification scheme by the Russian National Council for Forest Certification

SFI Sustainable Forestry Initiative
UKWAS UK woodland assurance standard

Selected FSC-accredited certifiers

IMOInstitut für MarktökologieSCSScientific Certification SystemsSGSSociété Générale de Surveillance

SW SmartWood

Schemes or standards for sustainable biomass or sustainable bioenergy

GGL Green Gold Label by the Control Union, Holland

Laborelec Laborelec, Belgium

RSB Roundtable for Sustainable Biofuels

Concepts

BMP Best Management Practices
C&I Criteria and Indicators
FMU Forest Management Unit
GHG Greenhouse gases

GMO Genetically Modified Organism
HCVF High Conservation Value Forest
NTFP Non-timber forest products
SFM Sustainable Forest Management
SLIMF Small and Low Intensity Managed Forest

WTH Whole-Tree Harvesting

Other

ILO International Labour Organization

TBFRA Temperate and Boreal Forest Resource Assessment by UNECE/FAO [13]

UBET Unified Bioenergy Terminology by FAO [12]

Download English Version:

https://daneshyari.com/en/article/678003

Download Persian Version:

https://daneshyari.com/article/678003

<u>Daneshyari.com</u>