

Forest Management And Climate Change A Literature Review

This volume offers a scientific assessment of the effects of climatic variability and change on forest resources in the United States. Derived from a report that provides technical input to the 2013 U.S. Global Change Research Program National Climate Assessment, the book serves as a framework for managing U.S. forest resources in the context of climate change. The authors focus on topics having the greatest potential to alter the structure and function of forest ecosystems, and therefore ecosystem services, by the end of the 21st century. Part I provides an environmental context for assessing the effects of climate change on forest resources, summarizing changes in environmental stressors, followed by state-of-science projections for future climatic conditions relevant to forest ecosystems. Part II offers a wide-ranging assessment of vulnerability of forest ecosystems and ecosystem services to climate change. The authors anticipate that altered disturbance regimes and stressors will have the biggest effects on forest ecosystems, causing long-term changes in forest conditions. Part III outlines responses to climate change, summarizing current status and trends in forest carbon, effects of carbon management, and carbon mitigation strategies. Adaptation strategies and a proposed framework for risk assessment, including case studies, provide a structured approach for projecting and responding to future changes in resource conditions and ecosystem services. Part IV describes how sustainable forest management, which guides activities on most public and private lands in the United States, can provide an overarching structure for mitigating and adapting to climate change.

The Fourth Assessment Report issued by the Intergovernmental Panel on Climate Change (IPCC) on February 2, 2007 identified more clearly than any other Assessment Report that the observed increase in global average temperatures during the last half century is due to the increase in atmospheric greenhouse gases (GHGs). To avoid global warming that goes beyond 2 degrees above preindustrial levels, besides emission reduction other mitigation strategies have to be developed. The terrestrial biosphere already absorbs approximately one third of annual anthropogenic CO₂ emissions. Among others, forest management is a major contributing process. This thesis explored the impact of past and present management on the forest C stocks and fluxes and quantified the potential for climate change mitigation. The basic technical structure of the thesis splits into four issues: a) Development of a forest management model (Chapter Two), comprising the review of existing approaches of forest management carbon modeling, description of important processes that have to be considered in the design of such a model and formulation of algorithms. b) Application of the model to plot level (Chapter Three), comparing management options on a hectare basis neglecting area information and an evaluation of model uncertainty and sensitivities related to uncertain parameters (Chapter Four). c) Theoretical analysis of landscape level processes leading to carbon sinks and sources contrasted with accounting rules to incorporate them in a climate policy framework. (Chapter Five) d) Comparison of model scenarios with different assumptions on future management change and initial conditions to quantify potentials for mitigation and factor out drivers on landscape level (Chapter Four, Five and Six). The model FORMICA (FORest Management Impact on Carbon dynamics) is a dynamic inventory-based carbon tracking model. It aims to calculate carbon pool trajectories under current and changing forest management in exist.

Interactions between forests, climatic change and the Earths carbon cycle are complex and represent a challenge for forest managers they are integral to the sustainable management of forests. In this volume, a number of papers are presented that describe some of the complex

relationships between climate, the global carbon cycle and forests. Research has demonstrated that these are closely connected, such that changes in one have an influence not only on the other two, but also on their linkages. Climatic change represents a considerable threat to forest management in the current static paradigm. However, carbon sequestration issues offer opportunities for new techniques and strategies, and those able to adapt their management to this changing situation are likely to benefit. Such changes are already underway in countries such as Australia and Costa Rica, but it will probably take much longer for the forestry sector in the Pacific Northwest region of North America (encompassing Oregon, Washington, Montana, Idaho, British Columbia and Alaska) to change their current practices.

A Review of Assisted Tree Migration and Its Potential Role in Adapting Sustainable Forest Management to Climate Change

Forests and Global Change: Forest management opportunities for mitigating carbon emissions

Managing Forest Ecosystems: The Challenge of Climate Change

Climate change for forest policy-makers

Climate Change, Forests and Forest Management

The forested land in the United States is an asset that is owned and managed not only by federal, state, and local governments, but also by families and other private groups, including timber investment management organizations and real estate investment trusts. The more than 10 million family forestland owners manage the largest percentage of forestland acreage (35 percent) and the majority of the privately owned forestland (62 percent). The Forest Service of the United States Department of Agriculture, which is responsible for the stewardship of all of the nation's forests, has long worked with private owners of forestland on forest management and preservation. At a time when all forestland is facing intensified threats because of the long-term effects of global climate change, the Forest Service recognizes that family forestland owners play a key role in protecting forestland. It is working to identify optimal ways to engage this diverse group and support them in mitigating threats to the biologically diverse land they own or manage. Climate Change Education: Engaging Family Private Forest Owners on Issues Related to Climate Change is the summary of a workshop, convened by the National Research Council's Board on Science Education and Board on Environmental Change and Society as part of its Climate Change Education Roundtable series, to explore approaches to the challenges that face state foresters, extension agents, private forestry consultants, and others involved with private family forestland owners on how to take climate change into consideration when making decisions about their forests. The workshop focused on how findings from the behavioral, social, and educational sciences can be used to help prepare for the impacts of climate change. The workshop participants discussed the threats to forests posed by climate change and human actions; private forestland owners' values, knowledge, and dispositions about forest management, climate change, and related threats; and strategies for improving communication between forestland owners and service providers about forest management in the face of climate change.

Mediterranean forests provide a diversity of products such as wood, non-wood forest products including cork, fodder for livestock and aromatic plants and game, all of which are important for socio-economic or cultural development and contribute to food security and poverty alleviation in rural areas. But Mediterranean forests also are facing a mix of threats such as climatic change, agricultural expansion, tourism, urban development and other land use practices that are contributing to forest area losses. Mediterranean forests will be one of the most affected forest ecosystems in the near future as temperatures will increase and rain will decrease. This book aims to provide scientific knowledge for researchers, students, local managers and policy makers. The book is divided into eleven chapters covering not only ecological, but also economic and social perspectives on climate change and Mediterranean forest management. The authors provide information about different research projects and examples related to climate change and forest natural regeneration, genetic aspects of forest ecosystems, forest fires, environmental services, traditional markets and social perspectives on adaptation in forest management.

The protective function of forests for water quality and water-related hazards, as well as adequate water supplies for forest ecosystems in Europe, are potentially at risk due to changing climate and changing land-management practices. Water budgets of forest ecosystems are heavily dependent on climate and forest structure. The latter is determined by the management measures applied in the forestry sector. Various developments of forest management strategies, imposed on a background of changing climate, are considered in assessing the overall future of forest-water interactions in Europe. Synthesizing recent research on the interactions of forest management and the water regime of forests in Europe and beyond, the book makes an important contribution to the ongoing dialogue between scientists dealing with different scales of forest-water interactions. This collaborative endeavour, which covers geographic and climatic gradients from Iceland to Israel and from southern Spain to Estonia and Finland, was made possible through the COST Action "Forest Management and the Water Cycle (FORMAN)", which was launched in 2007 (<http://www.forestandwater.eu/>). The book will be of particular interest to the research community involved in forest ecosystem research and forest hydrology, as well as landscape ecologists and hydrologists in general. It will also provide reference material for forest practitioners and planners in hydrology and land use.

Climate-Smart Forestry in Mountain Regions

Considering Climate Change in Sustainable Forest Management

Sustainable Forest Management for Climate Change Mitigation

Climate Change and Forest Management in the Western Hemisphere

Forest Management for Climate Change Mitigation - Modeling of Forestry Options, Their Impact on the Regional Carbon Balance and Implications for a Future Climate Protocol

Sustainable Forest Management in a Changing World: a European Perspective

This open access book offers a cross-sectoral reference for both managers and scientists interested in climate-smart forestry, focusing on mountain regions. It provides a comprehensive analysis on forest issues, facilitating the implementation of climate objectives. This book includes structured summaries of each chapter. Funded by the EU's Horizon 2020 programme, CLIMO has brought together scientists and experts in continental and regional focus assessments through a cross-sectoral approach, facilitating the implementation of climate objectives. CLIMO has provided scientific analysis on issues including criteria and indicators, growth dynamics, management prescriptions, long-term perspectives, monitoring technologies, economic impacts, and governance tools.

This publication presents a review of the current state of knowledge of global climate change, as it applies to forest and forest management, in question and answer format. It addresses the dynamic nature of the earth's climate, the greenhouse effect, predicted effects of climate change, the global carbon cycle, trees and forests as sources and sinks of carbon, possible effects of climate change on forests, means of helping forests adapt to climate change and how forests can mitigate predicted effects of climate change. Contents: Chapter 1: The Earth's Climate: A Dynamics Entity; How Are Weather and Climate Defined?, To What Extent Has the Earth's Climate Changed During the Course of Geologic History?, What Changes Have Occurred in the Earth's Climate Since the Beginning of Recorded Human History?, What Factors Can Cause Changes in the Earth's Climate?, Chapter 2: The Greenhouse Effect; What is the Greenhouse Effect and How Does it Influence the Earth's Climate?, Which Gases are Considered to be GHGs and What are the Sources of These Gases?, What is the Significance of Human Sources of GHGs?, Do All GHGs have an Equal Warming Effect?, What Evidence Exists to Support the Idea that GHG Levels in the Atmosphere are Increasing?, Which Countries Presently Make the Greatest Contribution to Elevated Levels of GHGs?, How Can Aerosols Counteract the Effects of GHGs, Chapter 3: Predicted Changes in the Earth's Climate and Expected Effects; In General, What are the Predicted Effects of Increased Levels of GHGs on the Earth's Climate?, How are Changes in the Earth's Climate Predicted?, How Reliable are Present Predictions of Climate Change?, What Changes in Climate are Predicted with a Doubling of CO₂ from Pre-Industrial Revolution Levels?, Is the Climate of Some Regions of the World Expected to Change to a Greater Degree than Others?, What Changes in the Level of the Oceans are Expected Due to Climate Change?, How Will Plants, Including Trees, be Influenced by Changes in the Levels of GHGs in the Earth's Atmosphere and Resultant Changes in Temperature and Precipitation?, How Might Soils be Affected by Changes in Climate?, Is There Any Evidence Which Indicates That Climate Changes May Have Already Occurred Due to Increase in GHG Levels?, Chapter 4: The Global Carbon Cycle; What Processes Exist for the Exchange of Carbon Between the Atmosphere, the Oceans and the Land?, How are Exchanges of Carbon Expressed?, What is the Present Level of Carbon Exchange Between the Atmosphere, the Oceans and the Land?, Chapter 5: Trees and Forests as Sources and Sinks of Carbon; How Much of the Earth's Surface is Presently Covered by Forests and Other Woody Vegetation?, What Processes Occur in Trees and Forests Which Contribute to Changes in Levels of GHGs in the Earth's Atmosphere?, How Much Carbon is Released and How Much is Taken up Annually by Forests?, Do Different Forest Ecosystems Vary in their Capacity to Absorb and Store

Carbon?, Do Trees and Forests Remove Carbon from the Earth's Atmosphere at Different Rates During Different Stages in their Lives?, Which Human Activities in Forests and Woodlands Contribute to Increases in the Levels of GHGS?, What are the Current Rates of Deforestation in the World's Forests?, How are Forest Soils Affected by Deforestation?, Chapter 6: Possible Effects of Climate Change on Forests; What Changes in Growth and Yield of Trees and Forests Can be Expected as a Result of Climate Change?, What Changes Can be Expected in the Natural Ranges of Tree Species and Plant Communities Due to Climate Change?, What is the Likelihood that Climate Change Could Threaten Some Species or Plant Communities with Extinction?, How Might Climate Change Influence the Incidence and Intensity of Wildfires?, What are the Expected Effects of Climate Change on Forest Health Including Susceptibility to Pests and Disease or Decline?, Chapter 7: Helping Forests Adapt to Climate Change; How Can we Respond to Predicted Climate Change?, Do Natural Processes Exist Which Can Help Trees and Forests Adapt to a Changing Climate?, How Can Forest Management Help Forests Adapt to Climate Change?, What Can be Done to Help Forests Adapt to Increased Hazards of Wildfire and (or) Pest and Disease Outbreaks Which Could Result from Climate Change?, Chapter 8: The Role Forests in Mitigating the Effects of Climate Change; What Opportunities Do Forests and Forest Management Offer for Mitigating the Effects of Predicted Climate Change?, What Features Should Characterize Actions Taken to Mitigate Potential Effects of Climate Change?, What Additional Research is Needed to More Fully Understand the Potential Effects of Climate Change on Trees and Forests and Forestry and to Develop Adaptation and Mitigation Tactics?, Do International Agreements Exist Which Encourage Development and Protection of Forests to Enhance their Ability to Mitigate the Effects of Climate Change?, How Can the Tropical Forests action Programme (TFAP) Assist in Developing Forest Sector Programmes to Help Mitigate Effects of Climate Change?, Chapter 8A: Reducing Sources of Greenhouse Gases; What Actions Can be Taken to Reduce the Current Rates of Tropical Deforestation and How Might this Affect Emissions of GHGS from Forests?, What Can be Done to Reduce the Frequency and Scale of Forests and Savanna Woodland Consumed by Biomass Burning?, How Can Increasing the Efficiency of Burning Fuel Wood and Other Biofuels Reduce Emissions of GHGS?, How Can Use of Wood and Other Biofuels in Place of Fossil Fuels Help Reduce the Levels of GHGS in the Atmosphere?, How Can More Efficient Timber Harvesting Operations Reduce Emissions of GHGS from Forests?, Chapter 8B: Maintaining Existing Sinks of Greenhouse Gases; How Can Management and Conservation of Natural Forests Enhance their Capacity to Fix and Store Carbon?, What Uses of Forests and Forest Products are Most Desirable the Standpoint of Long Term Carbon Storage?, Chapter 8C: Expanding Sinks of Greenhouse Gases; How Much Carbon Can be Fixed in Wood and Soil on a Per Hectare Basis in Forest Plantations in Boreal, Temperate and Tropical Zones?, How Much Additional Area of Forest Plantations Would be Required to Fully Offset Present Annual Increases in GHG Levels from All Sources?, To What Extent are Suitable Lands Available for Afforestation and Reforestation? Where are They?, Other Than Availability of Land, What Other Constraints are there to Large Scale Afforestation Initiatives?, What Assistance is Available to Support Afforestation and Reforestation, Particularly at the International Level?, How Can Agroforestry and Urban Tree Plantings Contribute to the Mitigation of Climate Change?, Is the Planting of Trees Solely for CO₂ Absorption a Sound Policy Considering

Other Needs for Available Land?, What Forest Policies Should be Considered at the Country Level to Address the Threat of Climate Change?

Climate change shaped the political agenda during the last decade with three issues as hot topics: commonly making the headlines: carbon budgets, impact and mitigation of climate change. Given the significant role that forests play in the climate system – as sources, sinks, and through carbon trading – this book update the current scientific evidences on the relationships between climate, forest resources and forest management practices around the world. By including the forest scientists' expertise from around the world, the book presents and updates a depth analysis of the current knowledge, and a series of case studies focused on the biological and the economic impacts of climate change in forest ecosystems in Africa, Asia, Europe and North and South America. The book will form a valuable resource for researchers and advanced students dealing with sustainable forestry, climate change issues and the effects of climate change on natural resource management.

Forests in Climate Change Research and Policy: The Role of Forest Management and Conservation in a Complex International Setting

Climate Change, Carbon, and Forestry in Northwestern North America

Forest Management and Climate Change

Forest Management Strategies and Climate Change Scenarios

Climate Change Impacts on Tropical Forests in Central America

Climate Change and Forest Management Impacts on Tree Growth and Physiology

Yet another book on the topic of ' Sustainable Forest Management ' can only be justified by new information that is of direct relevance. The contents of this volume concentrate on the very latest factors and developments, thus, hopefully, contributing both to the book ' s attractiveness and to closing gaps in the discipline ' s database. This book is written for researchers in the field of forest management, international forestry, and climate change-related issues, legal and policy advisors, as well as for managers of private companies who deal with SFM. The authors of the various sections are scientists in the field of forestry and other environmental sciences. They represent different institutions, mainly universities and research agencies in Germany, but also high-level international institutions in development co-operation, such as the World Bank, FAO, and IIASA. The scope of the book is to refresh the meanings and perceptions of SFM against the background of the rapid changes in our natural and social environment. Climate change and the rapid increase of atmospheric CO concentration is a global process with negative impacts of different kinds, among others on natural ecosystems such as forests. A crucial issue therefore is how forest management can contribute to forest conservation in light of changing climatic conditions. Moreover, policy changes such as the introduction of certification schemes and the new emphasis laid on Non-Wood Forest Products justify the re-evaluation of the role of SFM in

delivering ecological goods and services from our forests.

The aim of this book is to provide an accessible overview for advanced students, resource professionals such as land managers, and policy makers to acquaint themselves with the established science, management practices and policies that facilitate sequestration and allow for the storage of carbon in forests. The book has value to the reader to better understand: a) carbon science and management of forests and wood products; b) the underlying social mechanisms of deforestation; and c) the policy options in order to formulate a cohesive strategy for implementing forest carbon projects and ultimately reducing emissions from forest land use.

Climate changes, particularly warming trends, have been recorded around the globe. For many countries, these changes in climate have become evident through insect epidemics (e.g., Mountain Pine Beetle epidemic in Western Canada, bark beetle in secondary spruce forests in Central Europe), water shortages and intense forest fires in the Mediterranean countries (e.g., 2005 droughts in Spain), and unusual storm activities (e.g., the 2004 South-East Asia Tsunami). Climate changes are expected to impact vegetation as manifested by changes in vegetation extent, migration of species, tree species composition, growth rates, and mortality. The International Panel on Climate Change (IPCC) has included discussions on how forests may be impacted, and how they may be used to mitigate the impacts of changes in climate, to possibly slow the rate of change. This book provides current scientific information on the biological and economical impacts of climate changes in forest environments, as well as information on how forest management activities might mitigate these impacts, particularly through carbon sequestration. Case studies from a wide geographic range are presented. This information is beneficial to managers and researchers interested in climate change and impacts upon forest environments and economic activities. This volume, which forms part of Springer 's book series Managing Forest Ecosystems, presents state-of-the-art research results, visions and theories, as well as specific methods for sustainable forest management in changing climatic conditions.

Stakeholder Perceptions

Climate Change Education

Adapting Sustainable Forest Management to Climate Change

Sustainable Forest Management and Global Climate Change

An approach for integrating climate change into national forest policy in support of sustainable forest management -
Version 2.0

Forestry and Climate Change

'Ironically, the threat of global warming damage provides us with one of the most powerful arguments for avoiding the

worst excesses of another global problem - deforestation. Dore and Guevara have assembled a very impressive set of essays that show just how important our forests are as carbon stores and sinks. Let us hope someone is listening.' - David Pearce, University College London, UK 'Global carbon emissions from the burning of fossil fuels seem destined to rise with adverse consequences for global warming and for sea-level rise. This book explores how and to what extent conservation and re-growth of tropical forests can ameliorate this problem, as well as placing economic values on such strategies. Individual contributions draw on the Americas experience to examine biophysical aspects of forestry relevant to sustainability, evaluate the economics of forest retention giving particular attention to non-market values, and assess forest policies in terms of their impacts on environmental conservation. . . . a readable holistic book accessible to a wide audience of economists, non-economists and policymakers, highlighting a major problem which refuses to go away.' - Clem Tisdell, University of Queensland, Australia The UN Framework Convention on Climate Change recognises that, in the formulation of a global strategy for reducing global emissions of carbon (the main factor in global warming) forests could play an important role. This book highlights that role and demonstrates how the forests of the world may be harvested judiciously and sustainably. The authors argue that the forests are more than just a source of timber and wood; they discuss the role that forests play in reducing global warming, in preventing soil erosion and in helping to minimise the loss of biodiversity. Drawing on the expertise of contributors associated with the analysis of forests, this book is an in depth and fascinating discussion as well as a policy guide for the sustainable management of forests.

Climate change is one of the greatest challenges we face - both in terms of its potential impact on our societies and the earth, and the scale of international co-operation that is needed to confront it. Emerging as a component of the international dialogue on the environment and climate, the role of forests in influencing earth systems will need to be assessed. Drawing together perspectives from researchers and policy makers, this book explores how forests will interact with the physical and natural world, and with human society as the climate changes. Also considered is how the world's forests can be managed to contribute to the mitigation of climate change and to maximize the full range of economic and non-market benefits. Providing an examination of the science, a detailed consideration of the science policy interface and the international frameworks and conventions, this book is valuable reading for all those interested in sustainable forest management, climate change and the associated environmental sciences.

The loss of biodiversity is a major environmental problem in nearly every terrestrial ecosystem on Earth. This loss is accelerating driven by climate change, as well as by other causes including agricultural exploitation, fragmentation and degradation triggered by land use changes. The crucial issue under debate is the impact on the welfare of current and future population, and the role of humans in the exploitation of natural resources. This is of particular importance in Central America, which it is amongst the richest and most threatened biodiversity regions on the Earth, and where the loss of ecosystems strongly affects its socio-economic vulnerability. This book addresses the impacts of climate and land-use change on tropical forest ecosystems in this important region, and assesses the expected economic costs if no policy action is taken, under different future scenarios and for different geographical scales. This innovative collection utilises both theoretical approaches and empirical results to provide a conceptual framework for an integrated analysis of climate

and land-use change impacts on forest ecosystems and related economic effects, offering insight into the complex relationship between ecosystems and benefits to humans. This important contribution to forest ecosystems and climate change provides invaluable reading for students and scholars in the fields of environmental and ecological economics, environmental science and forestry, natural resource management, agriculture and climate change.

Forest Management, Wildfire and Climate Change Policy Issues in the 11 Western States

Monitoring and Verification of Greenhouse Gases

Climate Change Forests and Forest Management: An Overview

Scenarios for Vulnerability Assessment

Climate Change and Forest Genetic Diversity

Implications for Sustainable Forest Management in Europe : Paris, France, 15-16 March 2006 : Summary Report of the Workshop

Conserve biodiversity with effective forest management practices! This valuable book examines integrated forest management in the Americas. *Climate Change and Forest Management in the Western Hemisphere* takes a close look at such important international issues as global warming and the destruction of the Amazon rainforest. It offers tested suggestions for combining productive economic use of forest products with sustainable, ecologically sound management practices. Here you will find case studies from representative forests in North, Central, and South America. This solidly researched book explores the barriers to integrating environmental and economic approaches to forest management. It also offers practical suggestions for overcoming those barriers, including economic incentives for sustainable use and the conservation of biodiversity. *Climate Change and Forest Management in the Western Hemisphere* also explores: the role of the Brazilian rainforest in the global carbon cycle sustainable use of rainforests the valuation of forests for carbon sequestration plant biodiversity in managed timber forests issues of deforestation and reforestation and much more! *Climate Change and Forest Management in the Western Hemisphere* offers a comprehensive overview of a vital subject. It is an essential resource for forestry specialists, environmental economists, and anyone interested in climate change or sustainable agriculture.

Maintaining sustainable forest management practices in Canada during the 21st century and beyond will be a major challenge, given the uncertainties of global socioeconomic development and multiple interacting consequences of global environmental change. Scenarios represent an important tool for decision makers to use in exploring the causes and effects of possible changes in future environmental conditions and the implications of those changes for forests and the social, environmental, and economic benefits that forests provide. Scenario analysis allows managers and other stakeholders to evaluate the consequences of plausible alternative futures for forest management and to develop robust adaptation strategies. This report addresses the origins of the scenarios that will be needed to assess the impacts of climate change and other stressors on managed forest systems. It examines how scenarios can be constructed for application at local scales (such as a forest management unit), using both top-down (downscaling from global and regional projections) and bottom-up (accounting for local trends and projections) approaches. Practical examples of using scenarios for impact assessment in forestry are briefly reviewed in four case studies from across Canada.--Document.

Forests and any other trees outside the forest play a relevant role all three great UN conventions on Climate Change, on Biodiversity, and on Combating Desertification. The policy processes to implement the measures in these conventions on sub-national, national, regional and

international level are extremely complex. And that complexity comes, among other factors, from a blend of different sectoral and national interests, from a large number of scientifically not yet entirely resolved issues and a wide range of different biophysical, social, cultural and political conditions all over the world. The 3rd International DAAD Workshop on "Forests in Climate Change Research and Policy: The Role of Forest Management and Conservation in a Complex International Setting" held in Dubai and Doha along the conference of the parties (COP18) from 28st November to 2nd December had a strong focus on the role of forests and their management in context of international conventions and recent international and national policy. The volume contains 20 papers that are grouped under the topics The Role of Forests and their Management under Climate Change, International Policy Processes, Technical Issues on Remote Sensing, and Country Cases on Forest Management under Climate Change.

Proceedings of a Workshop, November 14-15, 2001, Orcas Island, Washington

Selected Case Studies from the Americas

Forest Management and the Water Cycle

Forest Management and Climate Change: a Literature Review

National Forest Management Options in Response to Climate Change

A Review of International Experience

The critical role of forests in climate change mitigation and adaptation is now widely recognized. Forests contribute significantly to climate change mitigation through their carbon sink and carbon storage functions. They play an essential role in reducing vulnerabilities and enhancing adaptation of people and ecosystems to climate change and climate variability, the negative impacts of which are becoming increasingly evident in many parts of the world. In many countries climate change issues have not been fully addressed in national forest policies, forestry mitigation and adaptation needs at national level have not been thoroughly considered in national climate change strategies, and cross-sectoral dimensions of climate change impacts and response measures have not been fully appreciated. This publication seeks to provide a practical approach to the process of integrating climate change into national forest programmes. The aim is to assist senior officials in government administrations and the representatives of other stakeholders, including civil society organizations and the private sector, prepare the forest sector for the challenges and opportunities posed by climate change. This document complements a set of guidelines prepared by FAO in 2013 to support forest managers incorporate climate change considerations into forest management plans and practices.

Managing Forest Ecosystems: The Challenge of Climate Change Springer Science & Business Media

This edited open access volume explores the role of forest bioeconomy in addressing climate change. The authors put a particular focus on planetary boundaries and how the linear, growth-oriented economy, is coupled with climate change and environmental degradation. Biobased products and sustainable production paths have been developed, but how can they be scaled in order to lead to an economic paradigm shift? This and other questions are discussed throughout the volume. Since science indicates that climate change will continue this century, the authors also analyse how forests can be adapted to increasing forest disturbances that changing climate are expected to cause. The authors propose climate-smart forestry as useful approach for climate mitigation and adaptation of forests to

climate change, as well as sustainable increase of economic well-being based on forestry. The book illustrates the application of climate-smart forestry in the Czech Republic, Finland, Germany and Spain, i.e., in EU countries with quite different forests and forest sectors. This proactive and inspiring volume is an essential resource for Forest Management professionals, decision makers, scientists, and forestry students.

Climate Change and United States Forests

Building Alternatives for the Coming Future

Engaging Family Private Forest Owners on Issues Related to Climate Change: A Workshop Summary

Climate Change Guidelines for Forest Managers

An Overview

An Ecosystem-Based Approach

These guidelines have been prepared to assist forest managers to better assess and respond to climate change challenges and opportunities at the forest management unit level. The actions they propose are relevant to all kinds of forest managers--such as individual forest owners, private forest enterprises, public-sector agencies, indigenous groups and community forest organizations. They are applicable in all forests types and regions and for all management objectives. This document complements a set of guidelines prepared by FAO in 2010 to support policy-makers in integrating climate change concerns into new or existing forest policies and national forests programs.

An ecosystem service perspective

Forest Management Solutions for Mitigating Climate Change in the United States

Adapting Forest Management to Climate Change

Forest Management and Climate Change in the Caribbean

Human Dimensions of Adaptive Forest Management and Climate Change

Uncertainty in Adaptation to Climate Change in Forest Management