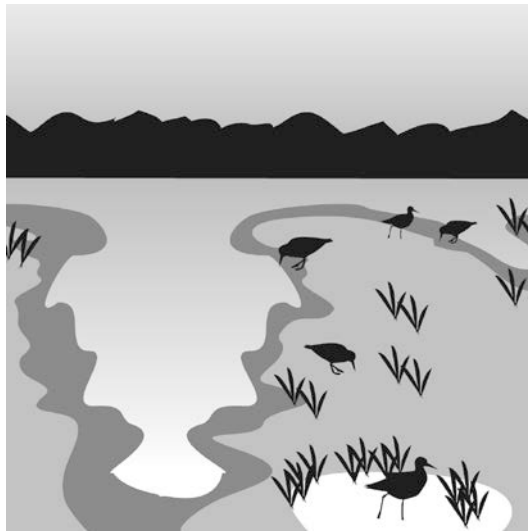


# **2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands**

**Methodological Guidance on Lands with Wet and Drained Soils,  
and Constructed Wetlands for Wastewater Treatment**

Edited by  
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**Task Force on National Greenhouse Gas Inventories**

A report prepared by the Task Force on National Greenhouse Gas Inventories of the IPCC and accepted by the Panel but not approved in detail.

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Published by the Intergovernmental Panel on Climate Change.

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When using this report please cite as:

IPCC 2014, 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands, Hiraishi, T., Krug, T., Tanabe, K., Srivastava, N., Baasansuren, J., Fukuda, M. and Troxler, T.G. (eds).  
Published: IPCC, Switzerland.

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Printed in Switzerland

ISBN 978-92-9169-139-5

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## Foreword

Recognizing the problem of global climate change, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) co-established in 1988 the Intergovernmental Panel on Climate Change (IPCC). One of the IPCC's activities is to support the UN Framework Convention on Climate Change (UNFCCC) through its work on methodologies for national greenhouse gas inventories.

This report, the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement)*, is the culmination of over two years of work by the IPCC Task Force on National Greenhouse Gas Inventories (TFI) to supplement the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*<sup>1</sup> (*2006 IPCC Guidelines*). The *Wetlands Supplement* has been produced in response to the conclusions of *IPCC Expert Meeting on HWP, Wetlands and Soil N<sub>2</sub>O*<sup>2</sup> and to an invitation from the Subsidiary Body for Scientific and Technological Advice (SBSTA) of the UNFCCC at its 33<sup>rd</sup> Session in Cancun (December 2010) to prepare additional guidance on wetlands.

In response to this invitation by the SBSTA, the IPCC held a scoping meeting in Geneva (30 March - 1 April, 2011). This meeting produced a draft Terms of Reference, including annotated chapter outline, and a draft work plan which were approved by the IPCC at its 33<sup>rd</sup> Session in Abu Dhabi (May 2011). This work plan was revised by the IPCC at its 35<sup>th</sup> Session in Geneva (June 2012) so that it aimed to complete the task by October 2013. According to this work plan, the work on the production of the *Wetlands Supplement* was carried out by the TFI from 2011 to 2013. The Overview Chapter of the *Wetlands Supplement* was adopted and the entire report was accepted at the 37<sup>th</sup> Session of IPCC held in Batumi, Georgia (October 2013).

The *Wetlands Supplement* extends the content of the *2006 IPCC Guidelines* by filling gaps in the coverage and providing updated information reflecting scientific advances, including updating of emission factors. It covers inland organic soils and wetlands on mineral soils, coastal wetlands including mangrove forests, tidal marshes and seagrass meadows and constructed wetlands for wastewater treatment. The coverage of the *2006 IPCC Guidelines* on wetlands was restricted to peatlands drained and managed for peat extraction, conversion to flooded lands, and limited guidance for drained organic soils.

The development of this report has depended on the expertise, knowledge and cooperation of the Coordinating Lead Authors, Lead Authors and Contributing Authors – a total of 90 authors worldwide. A total of 15 Review Editors oversaw the IPCC review process. We wish to thank them for their commitment, time and efforts in preparing this report. As with all the IPCC Methodology Reports, this report has built upon the work of the previous IPCC Methodology Reports including, among others, the *2006 IPCC Guidelines* without which the task would have been much more demanding. We are pleased to acknowledge our debt with all those who contributed to those reports.

The Steering Group, consisting of IPCC TFI Co-Chairs Takahiko Hiraishi (Japan) and Thelma Krug (Brazil) together with Dominique Blain (Canada), Rizaldi Boer (Indonesia), Simon Eggleston (TFI Technical Support Unit (TFI-TSU), until January 2013), Sergio González Martineaux (Chile), William Irving (USA), Alex Krusche (Brazil), Emmanuel Jonathan Mpetta (Tanzania), Jim Penman (UK), Riitta Pipatti (Finland), Robert Sturgiss (Australia), Kiyoto Tanabe (TFI-TSU) and Sirintornthep Towprayoon (Thailand), has guided the development of the *Wetlands Supplement*, ensuring consistency across all chapters and continuity with the guidance it supplements. We therefore wish to thank them for their valuable and considerable efforts in leading and guiding the preparation of this report. We express a high appreciation to the IPCC Task Force Bureau on National Greenhouse Gas Inventories (TFB) for their overall guidance and oversight.

Author and expert meetings were held in Hayama (Japan), Edinburgh (Scotland), Victoria Falls (Zimbabwe), Dublin (Ireland), Freising (Germany) twice and Manaus (Brazil). We would therefore like to thank the host countries and agencies for organizing these meetings. We would also like to thank all governments that

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<sup>1</sup> Intergovernmental Panel on Climate Change (IPCC 2006). *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, Prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan.

<sup>2</sup> IPCC 2011, *IPCC Expert Meeting on HWP, Wetlands and Soil N<sub>2</sub>O*. Eggleston H.S., Srivastava N., Tanabe K., Baasansuren J., and Fukuda M. (eds). Meeting Report of the IPCC Expert Meeting on HWP, Wetlands and Soil N<sub>2</sub>O, Geneva, Switzerland, 19-21 October, 2010, Published: IGES, Japan 2011.

supported authors and reviewers for their contributions, without which the production of this report would not have been possible.

A comprehensive review is an important element of the IPCC process. The *Wetlands Supplement* underwent two rounds of review, followed by a round of submission of written comments by governments in 2012 and 2013. The first, expert review of the First Order Draft, produced over 5000 comments from 128 expert reviewers. The second, government and expert review of the Second Order Draft, resulted in an additional 3740 comments from 112 expert reviewers and 14 governments. The Final Draft received over 300 comments from 14 governments. The efforts of the reviewers and their comments have contributed greatly to the quality of the final report and we wish to thank them accordingly.

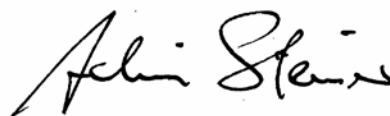
In addition, the TFI-TSU (Head: Kiyoto Tanabe; Deputy Head: Nalin Srivastava; Programme Officers: Baasansuren Jamsranjav, Maya Fukuda and Tiffany Troxler; Administrative Assistant: Koh Mikuni; Secretary: Eriko Nakamura; and IT Officer: Toru Matsumoto) has made an invaluable contribution to the development of the *Wetlands Supplement* by providing guidance and assistance as well as technical and organisational support for the project. Apart from working tirelessly to organise meetings and reviews, they worked extensively with the authors especially in the editing of the various drafts and preparation of the final version, and we wish to congratulate them for their exemplary work. Thanks are also due to the former TSU Head, Simon Eggleston, who led the TSU work on the development of the *Wetlands Supplement* in its early stages. We would also like to express our gratitude to the Government of Japan, for its generous support of the TFI-TSU, without which this report might not have been completed. We would also like to thank the Institute for Global Environmental Strategies (IGES) for hosting the TFI-TSU.

We would also like to thank the IPCC Secretariat, led by the Secretary, Renate Christ, for their assistance and support in enabling this project to meet its tight deadlines.

Finally we would like to thank the IPCC Chair Rajendra Pachauri for his support and guidance.



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## Preface

The *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement)*, extends the content of the *2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 IPCC Guidelines)* by filling gaps in the coverage and providing updated information reflecting scientific advances.

This report assists countries in compiling complete national inventories of greenhouse gases to include significant land-use and management activities occurring in lands with wet and drained soils, and constructed wetlands for wastewater treatment. The guidance has been structured so that any country, regardless of experience or resources, should be able to produce reliable estimates of emissions and removals of these gases. In particular, default values of various parameters and emission factors required are supplied, so that, at its simplest, a country need only supply national activity data. Following the approach of the *2006 IPCC Guidelines*, the *Wetlands Supplement* also allows countries with more information and resources to use more detailed country-specific methodologies and country-specific data while retaining comparability and consistency between countries. The *Wetlands Supplement* guidance also integrates *good practice* to include augmented coverage of wetlands in inventory compilation so that the final estimates are neither over- nor under-estimates as far as can be judged and uncertainties are reduced as far as practicable.

The IPCC Task Force on National Greenhouse Gas Inventories (TFI) also manages the *IPCC Emission Factor Database (EFDB)*. The EFDB was launched in 2002, and is continuously updated as a resource for inventory compilers to use to assist them by providing a repository of emission factors and other relevant parameters that may be suitable for use in more country-specific methodologies.

The *Wetlands Supplement* is the latest step in the IPCC development of guidelines for national greenhouse gas inventories. In the opinion of the authors, the *2006 IPCC Guidelines* supplemented by this report provide the best, widely applicable default methodologies and, as such, are suitable for global use in compiling national greenhouse gas inventories. They may also be of use in more narrowly-defined project-based estimates, although here they should be used with caution to ensure they correctly include just the emissions and removals from within the system boundaries and with particular attention to applicability and representativeness of those project conditions.

We would like to thank all the authors as well as reviewers, Review Editors, the Steering Group and the Task Force Bureau for their contributions and experience. We would also like to thank all the governments who contributed by hosting meetings (Hayama, Japan; Edinburgh, Scotland; Victoria Falls, Zimbabwe; Dublin, Ireland; Freising, Germany - twice; and Manaus, Brazil) as well as those who supported authors and other contributors. Finally we would like to express our gratitude to the TFI Technical Support Unit and the IPCC Secretariat for their invaluable support throughout the entire process of drafting and producing this report.



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