## LIST OF CONTRIBUTORS

# AUTHORS, REVIEW EDITORS AND REVIEWERS

### Authors and Review Editors.<sup>1</sup>

#### Overview

Lead Authors		
Deborah M. Bartram	Eastern Research Group, Inc.	USA
Bofeng Cai	Chinese Academy for Environmental Planning	China
Eduardo Calvo Buendia	Universidad Nacional Mayor de San Marcos (UNMSM)	Peru
Hongmin Dong	Institute of Environment and Sustainable Development in	China
	Agriculture, Chinese Academy of Agricultural Sciences	
Amit Garg	Indian Institute of Management Ahmedabad	India
G. H. Sabin Guendehou	Benin Centre for Scientific Research and Innovation,	Benin
	Laboratory of Applied Ecology of University of Abomey	
	Calavii	
Bundit Limmeechokchai	Sirindhorn International Insitute of Technology, Thammasat	Thailand
	University	
James Douglas MacDonald	Environment and Climate Change Canada	Canada
Stephen Michael Ogle	Natural Resource Ecology Laboratory, Colorado State	USA
	University	
Deborah A. Ottinger	Climate Change Division, U.S. Environmental Protection	USA
	Agency	
Riitta Kristiina Pipatti	Statistics Finland	Finland
Yasna Rojas	Instituto Forestal de Chile (INFOR)	Chile
Daniela Romano	ISPRA - Institute for Environmental Protection and Research	Italy
Maria José Sanz Sanchez	BC3, Basque Centre for Climate Change	Spain
Rob Sturgiss	Department of the Environment and Energy	Australia
Kiyoto Tanabe	Institute for Global Environmental Strategies (IGES)	Japan
Marcelo Theoto Rocha	Fábrica Éthica Brasil	Brazil
Sirintornthep Towprayoon	King Mongkut's University of Technology Thonburi	Thailand
Melissa M. Weitz	US Environmental Protection Agency	USA
Tom Wirth	US Environmental Protection Agency	USA
Jongikhaya Witi	Department of Environmental Affairs	South Africa
Review Editors		
Dario Gómez	Comisión Nacional de Energía Atómica	Argentina
William N. Irving	US Environmental Protection Agency	USA
2		

### **Volume 1: General Guidance and Reporting**

#### **Coordinating Lead Authors**

Coordinating Lead Autho	<i>71</i> 5	
Daniela Romano	ISPRA - Institute for Environmental Protection and Research	Italy
Jongikhaya Witi	Department of Environmental Affairs	South Africa
Lead Authors		
Riccardo De Lauretis	ISPRA - Institute for Environmental Protection and Research	Italy
Simon Eggleston	Global Climate Observing System (GCOS) - WMO	GCOS
Shuangxi Fang	China Meteorological Administration	China
Michael Gillenwater	Greenhouse Gas Management Institute	USA
Veronika Ginzburg	Yu.A. Izrael Institute of Global Climate and Ecology	Russian Federation
Justin Goodwin	Aether Limited	UK
Chia Ha	Environment and Climate Change Canada	Canada
Kenza Khomsi	Direction de la Météorologie Nationale	Morocco
Shamil Maksyutov	National Institute for Environmental Studies	Japan
Suvi Johanna Monni	Benviroc Ltd.	Finland
Stephen Michael Ogle	Natural Resource Ecology Laboratory, Colorado State	USA
	University	
Newton Paciornik	Private consultant	Brazil
Klaus Radunsky	Umweltbundesamt	Austria
Yogesh Kumar Tiwari	Indian Institute of Tropical Meteorology	India

<sup>&</sup>lt;sup>1</sup> The names shown in the third column are of the entities that nominated the experts, unless requested otherwise by the experts themselves.

LoC.2

Francesco Nicola Tubiello FAO - Food and Agriculture Organization of the United **USA** Nations Konkuk University Jung Hun Woo Korea, Republic of **Contributing Authors USA** Cody Alsaker National Resource Ecology Laboratory, Colorado State University Sandro Federici Independent consultant San Marino Timo Tapio Kareinen Statistics Finland Finland University of Urbino Michela Maione Italy Alistair James Manning UK Met Office UK Suvi Johanna Monni Finland Benviroc Ltd. Stephen Michael Ogle Natural Resource Ecology Laboratory, Colorado State **USA** University IPIECA - International Petroleum Industry Environmental Cynthia Ann Randles **IPIECA** Conservation Association Melissa M. Weitz US Environmental Protection Agency **USA** Review Editors Michael Gytarsky Yu.A. Izrael Institute of Global Climate and Ecology Russian Federation William N. Irving US Environmental Protection Agency USA **Volume 2: Energy Coordinating Lead Authors Amit Garg** Indian Institute of Management Ahmedabad India Melissa M. Weitz US Environmental Protection Agency **USA** Lead Authors Christian Boettcher Umweltbundesamt Germany Paul Nzomo Mbuthi Ministry of Energy & Petroleum Kenya Steven J. Oliver Department of the Environment and Energy Australia Roberta Quadrelli OECD - Organisation for Economic Co-operation and **OECD** Development / IEA - International Energy Agency IPIECA - International Petroleum Industry Environmental Cynthia Ann Randles **IPIECA** Conservation Association Raquel Rodrigues de Souza Deutsche Gesellschaft für Internationale Zusammenarbeit Brazil (GIZ) GmbH Ajay Kumar Singh Private Consultant India Michael Strogies Federal Environment Agency Germany Kostyantyn Tadlya Resource Efficient and Cleaner Production Centre Ukraine Nina Uvarova Yu.A. Izrael Institute of Global Climate and Ecology Russian Federation John D. Watterson UK Ricardo plc Francis Davison Yamba Centre for Energy, Environment and Engineering Zambia Zambia (CEEEZ) / University of Zambia (UNZA) National Center for Climate Change Strategy and China Shengmin Yu **International Cooperation** Songli Zhu Energy Research Institute, National Development and China Reform Commission **Contributing Authors** Laura E. Dawidowski National Atomic Energy Commission Argentina Ukraine Oleksandra Kolmogortseva UNOPS Ukraine Teruo Okazaki Nippon Steel & Sumikin Research Institute Corporation Japan Ingrid Person Rocha e Pinho Ternium Brasil Brazil Steven C. Smyth Environment and Climate Change Canada Canada Jongikhaya Witi Department of Environmental Affairs South Africa Review Editors Dario Gómez Comisión Nacional de Energía Atómica Argentina

### Volume 3: Industrial Processes and Product Use

Union

Greet Janssens-Maenhout Joint Research Centre, European Commission, European

EU

Coordinating Lead Autho	prs	
Bofeng Cai	Chinese Academy for Environmental Planning	China
Deborah A. Ottinger	Climate Change Division, U.S. Environmental Protection	USA
2	Agency	
T 14 4		
Lead Authors	I CD C II	TIGA
Laurie S. Beu	Laurie S. Beu Consulting	USA
Kathrine Loe Bjønness	Norwegian Environment Agency	Norway
Yun Chung (Jack) Chang		USA
Michael Roger Czerniak	Edwards	UK
Laura E. Dawidowski	National Atomic Energy Commission	Argentina
Retno Gumilang Dewi	Center for Research on Energy Policy, Institut Teknologi Bandung	Indonesia
Lukas Dion	International Aluminium Institute / Rio Tinto – Arvida	IAI
	Research and Development Center	
Tomas Gustafsson	IVL Swedish Environmental Research Institute	Sweden
Katsuhiko Hirose	Toyota Motor Corporation	Japan
Francesca Illuzzi	ST Microelectronics	Italy
Junichi Ishikawa	Japan Fluorocarbon Manufacturers Association /	Japan
	Chemours K.K. / (DuPont-Mitsui Fluorochemicals Co., Ltd.)	1
Tetsuya Kitagawa	Japan Electronics and Information Technology Industries	Japan
, 8	Association (JEITA)	1
Oleksandra Kolmogortseva		Ukraine
María José López Blanco		Spain
Brian T. Mader	3M Company Environmental Laboratory	USA
Michela Maione	University of Urbino	Italy
Pernelle Nunez	International Aluminium Institute	IAI
Teruo Okazaki	Nippon Steel & Sumikin Research Institute Corporation	Japan
Natalya Parasyuk	PMR Ukraine Project	Ukraine
Ingrid Person Rocha e Pinho		Brazil
Sébastien Raoux	Transcarbon International	USA
Karen S. Schaffner	RTI International	USA
Håkon Frøysa Skullerud	Statistics Norway	Norway
Alexey Viktorovich Spirin		Russian Federation
Samir Tantawi	United Nations Development Programme (UNDP),	Egypt
D '10 1 W	Egyptian Environmental Affairs Agency (EEAA)	N. 7. 1. 1
David Sydney Wong	Light Metals Research Centre, University of Auckland	New Zealand
Andrea Zille	University of Minho	Italy
Contributing Authors		
Xin Bo	Appraisal Center for Environment and Engineering, MEP	China
Stephanie N. Bogle	U.S. Environmental Protection Agency	USA
Nigel Brandon	Faculty of Engineering, Imperial College London	UK
Richard Chahine	Electrical Engineering and Computer Engineering,	Canada
	Université du Québec à Trois-Rivières, Hydrogen Research	
	Institue	
Shoumian Chen	Shanghai Integrated Circuit R&D Center Ltd.	China
Xiping Chen	Central South University Institute (CSUI)	China
Jeffrey B. Coburn	RTI International, Research Triangle Park, NC.	USA
Roberto de Aguiar Peixoto	Maua Institute of Technology (IMT)	Brazil
Michalopoulou Eleni	University of Bristol	UK
Simon Gaboury	Energy Efficiency and Climate Change, Rio Tinto Aluminum	
Melissa Ann Gresham	INTEL Corporation	USA
Barbara Gschrey	Oeko-Recherche GmbH	
David Harman	Micron	Germany USA
Kyungah Kim	Samsung Electronics	Korea, Republic of
Joey (Ching-Hui) Lu	Industrial Technology Research Institute (ITRI)	Taiwan, Province of China
Youngsook Lyu	National Institute of Environmental Research	Korea, Republic of
Jerry Y. Marks	J Marks & Associates LLC	USA
Tetsuji Okada	Japan Refrigeration and Air Conditioning Industry	Japan
Chahai O	Association Miraba Information & Research Institute Inc.	Ioman
Shohei Oyama	Mizuho Information & Research Institute, Inc.	Japan
Andrey V. Panov	RUSAL ETC	Russian Federation

Jennifer Politsch	INTEL Corporation	USA
Brian K. Raley	GLOBALFOUNDRIES	USA
Jan Hendrik Reimink	World Steel Association	Netherlands
Winfried Schwarz	Öko-Recherche, Frankfurt am Main	Germany
Joseph Van Gompel	Applied Materials / Glade Consulting, LLC	USA
Hanno Vogel	TRIMET Aluminium Smelter	Germany
Gregory M. Watson	Arkema, Inc.	USA
Youming Yang	Jiangxi University of Science and Technology	China

Review Editors

Batouli Said Abdallah National Center of Documentation and Scientific Research Comoros

(CNDRS)

David Glen Thistlethwaite Ricardo plc UK

### **Volume 4: Agriculture, Forestry and Other Land Use**

Coo	rdina	ıtina	I oad	Author	c
	raina	uuuy	Leuu	Aumor	١

Coordinating Lead Authors				
	Institute of Environment and Sustainable Development in Agriculture, Chinese Academy of Agricultural Sciences	China		
	Environment and Climate Change Canada	Canada		
	Natural Resource Ecology Laboratory, Colorado State	USA		
	University			
	BC3, Basque Centre for Climate Change	Spain		
Marcelo Theoto Rocha	Fábrica Éthica Brasil	Brazil		
Lead Authors				
	Institute for Agro-Environmental Sciences, National	Japan		
	Agriculture and Food Research Organization	Japan		
	Natural Resources Institute Finland (Luke)	Finland		
	Leibniz Institute for Agricultural Engineering and	Germany		
	Bioeconomy (ATB)	Germany		
	CSIRO - Commonwealth Scientific and Industrial Research	Australia		
•	Organisation			
	Universidad Nacional de Colombia	Honduras		
	Federal University of Juiz de Fora	Brazil		
	TEMA Environmental Change, Linköping University	Sweden		
	United States Environmental Protection Agency	USA		
	FAO - Food and Agriculture Organization of the United	FAO		
	Nations			
Sumana Bhattacharya I	IORA Ecological Solutions	India		
	New Zealand Ministry for the Environment	New Zealand		
Leandro V. Buendia	Freelance Consultant	Philippines		
Ngonidzashe Chirinda (	CGIAR - Consultative Group on International Agricultural	CGIAR		
J	Research / International Centre for tropical Agriculture			
(	(CIAT)			
Nares Chuersuwan	Suranaree University of Technology	Thailand		
	The Mullion Group	Australia		
	BC3 - Basque Centre for Climate Change	Spain		
	U.S. Department of Agriculture, Forest Service	USA		
	Remote Sensing Technology Center of Japan (RESTEC)	Japan		
	Centre for Ecology and Hydrology	UK		
	Independent consultant	San Marino		
	Faculty of Agronomy, San Andres Major University	Bolivia		
	Université du Québec à Montréal	Canada		
	Tallinn University of Technology	Estonia		
	Global Change Impact Studies Centre (GCISC)	Pakistan		
Goheer	Hairrani da d Nicolana I Amerika I a Malina	D		
	Universidad Nacional Agraria La Molina	Peru		
	Joint Research Centre, European Commission, European Union	EU		
	Global Forest Observations Initiative (GFOI)	Australia		
	Federal Research and Training Centre for Forests,	Austria		
1	Natural Hazards and Landscape (BFW)			

Rehab Ahmed Hassan Rehab Research Martin Herold Wageningem University & Research Nettherlands Natural Resource Products Research Institute Japan Jap	Atle Harby	SINTEF Energi	Norway
Rehab Ahmed Hisssan         Higher Council for Environment and Natural Resources         Sudan           Kristell Hergoaulch         CIFOR - Center for International Forestry Research         Netherlands           Vasumusa Hirata         Froestry and Forest Products Research Institute         Netherlands           Joanna Isobel House         Stripatival Institute         UK           Stingchiro Ishizuka         Froestry and Forest Products Research Institute         Japan           Jonath Isobel House         FAO - Food and Agriculture Organization of the United Incombined         Belgium           Jonath San Kaimira         Kenya Forest Service         Kenya           Serah Kabui Kahuri         Kenya Forest Service         Kenya           Ayaka W. Mo Kisimotto         Kenya Forest Service         Kenya           Haruni Krisnawati         Forestry and Environmental Sciences, NARO         Japan           Haruni Krisnawati         Forestry and Forestry Centre (ICRAF) and the Oscar M Lopez         Canada           Werner Alexander Kurz         Rodel Diaz Lasco         Vond A grafoforestry Centre (ICRAF) and the Oscar M Lopez         Canada           Adrian Leip         Joint Research Centre, European Commission, European         EU           Adrian Leip         Joint Research Centre, European Commission, European         Brazil           Adrian Leip         Joint Resear	•		•
Kristell Hergoualch Wageningen University & Research   State			
Martin Herold Yasumas Hirata Richard (Skee) Houghton Joanna Isobel Houghton Serah Kalpin Ishizuka Inge Germaine Celestine Incorkinere Nations Serah Kabui Kahuri Mwangi James Kinyanjui			
Vasumasa Hirata   Kichard (Skee) Houghton   Voods Hote Research Center   USA	_		
Richard (Skee) Houghton Joanna Isobel House Shigehiro Ishizuka Inge Germaine Celestine Inge Germaine Celestine Jonckheere Sarak Sabiui Sahuri Serah Kabiui Sahuri Wangi James Kinyanjui Ayaka W. Mo Kishimoto Haruni Krisnawati Werner Alexander Kurz Rodel Diaz Lasco World Agricolture Factor, Michael Indiversity of Gothenburg Werner Alexander Kurz Rodel Diaz Lasco Center Aleksi Heikki Samuel Leitonen Adrian Leip Joint Research Centre, European Commission, European Union Magada Aparecida de Lima Roder William Matthews Brian G. McConkey Brin Nasses Perin Wasses Noroway Brin G. McConkey Brin Roses Sini Maaria Niinistö Serin Kasses Norway Ministry of Agriculture Alexibed Research (CCST/INPE) Walter Oyhanteabal Ministry of Agriculture, Livestock and Fishery, MGAP China Agricultural University of Environment of Environment and Sustainable Development Audital Fanda Space Applications Centre, Indian Space Research David Paré Himanshu Pathak Thomas Paul Swei Hans-Olof Petersson Yves T. Prairie David Paré Himanshu Pathak Hanne Lerche Raad University of Agriculture, Livestock and Fishery, MGAP China Agricultural University of Environment of Biological Sciences Department of Biological Sciences, University of Lay leat Mistural Resources Research Institute Ltd. Schon-New Zealand Forest Provoment of India National Institute for Space Research (CCST/INPE) David Paré Himanshu Pathak Thomas Paul Scien - New Zealand Forest Research Institute Ltd. Schon-New			
Josanna Isobel House Shigehiro Ishizuka Inge Germaine Celestine Jonekhere Serah Kabiu Sahuri Asa Kasimir Mwangi James Kinyanjui Ayaka W. Mo Kishimoto Haruni Krisnawati Orestry and Environmental Sciences, NARO Haruni Krisnawati Aleksi Heikki Samuel Lehtonen Adrian Leip Joint Research Centre, European Commission, European Union Magda Aparecida de Lima Rogers Ernest Malimbus Robert William Matthews Rogers Ernest Malimbus Robert William Matthews Robert William Matthews Firis Nesset Nimi Maria Nimisto Stain Kinsawati Leh Onhantabal Rometo Organization of the United Natural Resources Institute Finland (Luke)  Mattral Resources Canada, Canadian Forest Service Center Natural Resources Institute Finland (Luke)  Mattral Leip  Joint Research Centre, European Commission, European  Union  Magda Aparecida de Lima  Brazili  Australia  Swedish University of Queensland  Swedish University of Queensland  Swedish University of Queensland  Norway  Robert William Matthews  Robert William Matthews  Forestry Commission Research Agency  UK  Brinan G. McConkey  Ministry of Agricultura and Agri-Food  Lein Agricultural University  Maler Oyhantcabal  Ministry of Agriculture, Livestock and Fishery, MGAP  China Agricultural University  Ministry of Agriculture, Livestock and Fishery, MGAP  China Agricultural University  Maruni Agricultural Sciences  Norway  Norway  Ministry of Agricultural Experimentation  Australia  Mitonal Climate Change Division, Ministry of Environment  and Sustainable Development  Natural Resources Canada		•	•
Shigehiro Ishizuka   Forestry and Forest Products Research Institute   Japan   Belgium   Japan   Jap	` '		
Inge Germaine Celestine FAO - Food and Agriculture Organization of the United Script Nations Serah Kabui Kahuri Asa Kasimir University of Gothenburg Sweden Mwangi James Kinyanjui Karatina University of Gothenburg Sweden Haruni Krisnawati Foresty and Environment Research, Development and Innovation Agency, Ministry of Environment and Forestry Autural Resources Canada, Canadian Forest Service World Agroforestry Centre (ICRAF) and the Oscar M Lopez Center Aleksi Heikki Samuel Lehtonen Adrian Leip Joint Research Centre, European Commission, European Union Magda Aparecida de Lima Brazilian Agricultural Research Corporation - Embrapa Brazil Rogers Emest Malimbwi Sokonie University of Agriculture Agricultural Rossest Malimbwi Sokoline University for Agricultural Research Agency Firsh Nesset Sini Maaria Niinisto Statistics Finland, Greenhouse Gas Inventory Unit Finland Huntural Parka Ministry of Agriculture Livestock and Fishery, MGAP Uruguay China Agricultural University of Agriculture China Agricultural University of Agriculture			
Jonekheere   Nations   Seerah Kabuit Kabui	e e		
Serah Kabui Kahuri         Kenya Forest Service         Kenya           Asa Kasimiri         University of Gothenburg         Sweden           Mwangi James Kinyanjui         Karatina University         Kenya           Ayaka W. Mo Kishimoto         Institute for Agro-Environmental Sciences, NARO         Japan           Haruni Krisnawati         Forestry and Environment Research, Development and Innovation Agency, Ministry of Environment and Forestry         Canada           Worled Agroforestry Centre (ICRAF) and the Osear M Lopez Center         World Agroforestry Centre (ICRAF) and the Osear M Lopez Center           Aleksi Heikki Samuel         Lehtonen         Austural Resources Institute Finland (Luke)         Finland           Adrian Leip         Joint Research Centre, European Commission, European         Brazilian           Catherine Ellen Lovelock         University of Queensland         Australia           Mattias Lundblad         Swedish University of Agriculture         Swedish University of Agriculture         Tanzania           Robert William Matthews         Forestry Commission Research Agency         UK         UK           Brian G. McConkey         Ministry of Agriculture and Agri-Food         Canada           Brian Sarian Nimisto         Statistics Finland, Greenbouse Gas Inventory Unit         Finland           Luis Alberto Panichelli         Ministry of Agriculture Livestock and Fisher			Deigiain
Asa Kasimir University of Gothenburg Kenya Mwangi James Kinyanjui Ayaka W. Mo Kishimoto Haruni Krisnawati Institute for Agro-Environmental Sciences, NARO Japan Indonesia Innovation Agency, Ministry of Environment and Forestry Werner Alexander Kurz Rodel Diaz Lasco World Agrency Centre (ICRAF) and the Oscar M Lopez Center Aleksi Heikki Samuel Lehtonen Adrian Leip Joint Research Centre, European Commission, European EU Union Brazilian Agricultural Resources Canada, Canadian Forest Service Center Valenta Leip Joint Research Centre, European Commission, European EU Union Brazilian Agricultural Research Corporation - Embrapa Catherine Ellen Lovelock Mattias Lundblad Rogers Ernest Malimbwi Robert William Matthews Brian G. McConkey Erik Næsset Norway Sini Maaria Niinistö Sewdish University of Agriculture Tenzania Commission Research Querin Statistics Finland, Greenhouse Gas Inventory Unit Finland Walter Oyhanteabal Xuebiao Pan Mehul R. Pandya Space Applications Centre, Indian Space Research Urguay Zuez-Mans Paul Science Schophantabal Clara Agricultural University of Environment Agricultural Sciences (SLU) Statistics Finland, Greenhouse Gas Inventory Unit Finland Walter Oyhanteabal Xuebiao Pan Mehul R. Pandya Space Applications Centre, Indian Space Research Organisation (ISRO), Government of India National Climate Change Division, Ministry of Environment and Sustainable Development Natural Resources Canada (CAR) Australia National Climate Change Division, Ministry of Environment and Sustainable Development Natural Resources Canada (CAR) Norway Natural Resources Canada (CAR) Norway Singuali H. Ravindranath Shant Reddy Department of Biological Sciences, Université du Québee à Montréal (UQAM) Natural Resources Institute Finland (Luke) Finland Australia (Lara National Rice Research Institute Ltd. Secon Norway Department of Biological Sciences, Université du Québee à Montréal (UQAM) Natural Resources Institute Finland (Luke) Finland Australia (Papan Horsette European Lara de Science Sundar University of Parana Brazil Austra			Kenya
Mwangi James Kinyanjui         Karatia University         Kenya           Ayaka W. Mo Kishimot         Institute for Agro-Environmental Sciences, NARO         Japan           Haruni Krisnawati         Institute for Agro-Environment Research, Development and Innovation Agency, Ministry of Environment and Forestry         Canada           Werner Alexander Kurz         Natural Resources Canada, Canadian Forest Service         Canada           Aleksi Heikki Samuel         Lehtonen         Lehtonen           Adrian Leip         Joint Research Centre, European Commission, European         EU           Magda Aparecida de Lima         Brazilian Agricultural Research Corporation - Embrapa         EU           Mattias Lundblad         Swedish University of Queensland         Australia           Rogers Ernest Malimbwi         Sokoine University of Agricultural Sciences (SLU)         Sweden           Rogers Ernest Malimbwi         Forestry Commission Research Agency         UK           Brian G. McConkey         Forestry Commission Research Agency         UK           Brian G. McConkey         Forestry Commission Research Search (CCSTMPE)         Norway           Sini Maaria Niinistö         Statistics Finland, Greenhouse Gas Inventory Unit         Finland           Jean Pierre Ometto         Maintstry of Agriculture and Agri-Food         Norway           Walter Oyhantcabal         Minis		•	•
Ayaka W. Mo Kishimoto         Institute for Agro-Environmental Sciences, NARO         Japan           Haruni Krisnawati         Forestry and Environment Research, Development and Indonesia Innovation Agency, Ministry of Environment and Forestry         Indonesia           Rodel Diaz Lasco         World Agroforestry Centre (ICRAF) and the Oscar M Lopez Center         Philippines           Aleksi Heikki Samuel Lehtonen         Lehtonen         World Agroforestry Centre, European Commission, European         EU           Magda Aparecida de Lima Catherine Ellen Lovelock Mattias Lundblad         Brazilian Agricultural Research Corporation - Embrapa         Brazil           Adrian Keine William Matthews Pobert William Matthews Prisa G. McConkey         Sokodis University of Agriculture         Prisance (SLU)         Sweden           Robert William Matthews Prisa G. McConkey         Forestry Commission Research Agency         UK         Walter Oyhanteabal         UK           Sini Maaria Ninistö         Statistics Finland, Greenhouse Gas Inventory Unit         Pinland         Prisanga           Jean Pierre Ometto         Ministry of Agriculture, Livestock and Fishery, MGAP         Uruguay           Walter Oyhanteabal         Ministry of Agriculture, Livestock and Fishery, MGAP         Uruguay           Walter Oyhanteabal         Ministry of Agriculture, Livestock and Fishery, MGAP         Uruguay           Walter Oyhanteabal         National Climate Change Division, M			
Haruni Krisnawati Forestry and Environment Research, Development and Indonesia Innovation Agency, Ministry of Environment and Forestry Canada World Agroforestry Centre (ICRAF) and the Oscar M Lopez Center Natural Resources Institute Finland (Luke) Finland Adrian Leip Joint Research Centre, European Commission, European Union Brazilian Agricultural Research Corporation - Embrapa Brazil Catherine Ellen Lovelock Mattias Lundblad Kogers Emest Malimburi Robert William Matthews Brian G. McConkey Firk Naesset Norwegian University for Agricultural Sciences (SLU) Sweden Sokoine University of Agriculture and Agri-Pood Canada William Matthews Prish Robert William Matthews William Matthews Brian G. McConkey Ministry of Agriculture and Agri-Pood Canada Norwegian University of Ité Sciences William Matthews Prish Robert William Matthews William Matthews Prish Robert William Matthews William Matthews Prish Robert William Matthews Prish Robert William Matthews Prish Commission Research Agency UK Ministry of Agriculture and Agri-Pood Canada Norwegian University of Ité Sciences Norwegian University of Ité Science Norwegian University of Item Prish Robert Norwegian University of Robert Norwegian University of Item Prish Robert Norwegian University of Item Prish Robert Norwegian University of Item Prish Robert Norwegian Robert			•
Merner Alexander Kurz    Rodel Diaz Lasco   World Agroforestry Centre (ICRAF) and the Oscar M Lopez   Center			
Werner Alexander Kurz         Natural Resources Canada, Canadian Forest Service         Canada Philippines           Rodel Diaz Lasco         World Agroforestry Centre (ICRAF) and the Oscar M Lopez Center         Philippines           Aleksi Heikki Samuel Lehtonen         Jatural Resources Institute Finland (Luke)         Finland           Lehtonen         Joint Research Centre, European Commission, European Union         Brazilian Agricultural Research Corporation - Embrapa         Brazil           Mattias Lundblad         Brazilian Agricultural Research Corporation - Embrapa         Brazil           Robert William Matthews         Sokoine University of Agricultural Sciences (SLU)         Sweden           Robert William Matthews         Forestry Commission Research Agency         UK           Brian G. McConkey         Forestry Commission Research Agency         UK           Brian G. McConkey         Forestry Commission Research Agency         UK           Walter Oyhantcabal         Norwegian University of Life Sciences         Norway           Walter Oyhantcabal         Ministry of Agriculture, Livestock and Fishery, MGAP         Uruguay           Walter Oyhantcabal         Ministry of Agricultural University         China           Bavid Paré         Natural Resources Casace Research (CCST/INPE)         Brazil           Luis Alberto Panichelli         Natural Resources Canada         Canada	110101111111111111111111111111111111111		
Rodel Diaz Lasco Center  Aleksi Heikki Samuel Lehtonen  Adrian Leip Joint Research Centre, European Commission, European Union  Magda Aparecida de Lima Brazilian Agricultural Research Corporation - Embrapa Catherine Ellen Lovelock University of Queensland Australia Swedish University of Agriculture Rosearch Stulium Australia Swedish University of Agriculture Rosearch Stulium Australia Swedish University of Agriculture Rosearch Agency UK Forestry Commission Research Agency UK Ganada Norwegian University of Agriculture and Agri-Food Canada Norwegian University of Agriculture and Agri-Food Canada Norwegian University of Agriculture and Agri-Food Canada Norwegian University of Agriculture, Statistics Finland, Greenhouse Gas Inventory Unit Finland Statistics Finland, Greenhouse Gas Inventory Unit Finland Statistics Finland, Greenhouse Gas Inventory Unit Finland Space Research (CCST/INPE) Brazil University of Agriculture, Livestock and Fishery, MGAP Uruguay China Agricultural Livestock and Fishery, MGAP Uruguay China Agricultural University China Agricultural Agricultural University of Environment and Sustainable Development National Climate Change Division, Ministry of Environment and Sustainable Development National Climate Change Division, Ministry of Environment and Sustainable Development National Climate Change Division, Ministry of Environment and Sustainable Development National Research Institute Ltd. Sewen Hans-Olof Peterson National Rice Research Institute Ltd. Sewen Hans-Olof Peterson National Rice Research Institute Ltd. Sewen Hans-Olof Peterson Ostrolof Peterson Norwa Zealand Forest Research Institute Ltd. Sewen Hans-Olof Peterson Ostrolof Peterson Pepartment of Biological Sciences, Université du Québec à Montréal (UQAM)  Hanne Lerche Raadal Nijavalli H. Ravindranath Shanti Reddy Environment of Biological Sciences, Université du Québec à Montréal (UQAM)  Sotfold Research Institute Finland (Luke) Finland Finland Finland Finland Finland Finland Hindian Institute of Forest Ecosystems Germany Germany Peters	Werner Alexander Kurz		Canada
Center  Adrian Leip  Magda Aparecida de Lima Brazilian Agricultural Research Corporation - Embrapa Catherine Ellen Lovelock University of Queensland Rogers Ernest Malimbwi Robert William Matthews Brian G. McConkey Brian G. McConkey Almistry of Agricultura and Agri-Food Ganada Rogers Commission Research Agency Winstry of Agricultura and Agri-Food Canada Norwegian University of Life Sciences Sini Maaria Niinistö Jean Pierre Ometto Walter Oyhantcabal Xuebiao Pan China Agricultura, Creenhouse Gas Inventory Unit Jean Pierre Ometto Walter Oyhantcabal Xuebiao Pan China Agriculture, Livestock and Fishery, MGAP Cruguay China Agricultural University Agracy Applications Centre, Indian Space Research Organisation (ISRO), Government of India Argentina Adsustainable Development David Paré Himanshu Pathak Thomas Paul Scion - New Zealand Forest Research Institute Scion - New Zealand Forest Research Institute Ltd. Sven Hans-Olof Peterson Yves T. Prairie Pepartment of Biological Sciences, Université du Québec à Montréal (UQAM) Usachima Rock Thuenen-Institute of Science Department of Biological Sciences, Université du Québec à Montréal (UQAM) Ostfold Research Aligavalli H. Ravindranath Shanti Reddy Kristiina Regina Alatural Resources Institute Finland (Luke) Finland Joachim Rock Thuenen-Institute of Science Pepartment of Brotest Ecosystems Germany Germany Germany Kristiina Regina Alatural Resources Institute Finland (Luke) Finland Joachim Rock Thuenen-Institute of Forest Ecosystems Germany Germany Federal University of Parana Alsushi Sato Brazil Asushi Sato Brazil Alsushi Sato Alture Parana Alsushi Witsukishi UFJ Research and Consulting Co., Ltd. Japan Apara Alexandra Hungaria Forest Research Institute Hungary Kei Suzuki Alexandra Hungarian Forest Research Institute G			
Lehtonen Adrian Leip Adrian Leip Joint Research Centre, European Commission, European Union Magda Aparecida de Lima Catherine Ellen Lovelock Mattias Lundblad Rogers Ernest Malimbwi Robert William Matthews Brian G. McConkey Brian G. McConkey Brian G. McConkey Ministry of Agricultural Sciences (SLU) Sokoine University of Agriculture Forestry Commission Research Agency Winistry of Agriculture and Agri-Food Ministry of Agriculture and Agri-Food Walter Oyhantcabal Norwegian University of Life Sciences Walter Oyhantcabal Muler Oyhantc			r r
Lehtonen Adrian Leip Adrian Leip Joint Research Centre, European Commission, European Union Magda Aparecida de Lima Catherine Ellen Lovelock Mattias Lundblad Rogers Ernest Malimbwi Robert William Matthews Brian G. McConkey Brian G. McConkey Brian G. McConkey Ministry of Agricultural Sciences (SLU) Sokoine University of Agriculture Forestry Commission Research Agency Winistry of Agriculture and Agri-Food Ministry of Agriculture and Agri-Food Walter Oyhantcabal Norwegian University of Life Sciences Walter Oyhantcabal Muler Oyhantc	Aleksi Heikki Samuel	Natural Resources Institute Finland (Luke)	Finland
Magda Aparecida de Lima Brazilian Agricultural Research Corporation - Embrapa Australia Catherine Ellen Lovelock University of Queensland Australia Swedish University for Agricultural Sciences (SLU) Sweden Robert William Matthew Forestry Commission Research Agency UK Winistry of Agriculture and Agri-Food Canada Nimistry of Agriculture and Agri-Food Canada Norwegian University of Life Sciences Norway Stini Maaria Nimistö Statistics Finland, Greenhouse Gas Inventory Unit Finland Jean Pierre Ometto National institute for Space Research (CCST/INPE) Brazil Walter Oyhantcabal Ministry of Agriculture, Livestock and Fishery, MGAP Uruguay China Agricultural University of Life Sciences Norway Statistica Finland, Greenhouse Gas Inventory Unit Finland Pandhal Pandya Space Applications Centre, Indian Space Research Uruguay China Agricultural University of Environment and Sustainable Development Unit National Climate Change Division, Ministry of Environment and Sustainable Development Uruguay Sciences Agricultural Sciences Sweden St. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) St. Ves T. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) St. Ves Tinian Regina Natural Resources Institute Finland (Luke) Finland Montréal (UQAM) St. Ves Tinian Regina Natural Resources Institute of Science Department of the Environment and Energy Australia Frazilia Natural Resources Institute Finland (Luke) Finland Australia Resources Institute of Science Department of the Environment and Energy Australia Prazilia Natural Resources Institute Finland (Luke) Finland Research University of Parana Research Institute Mungary Japan Reservoir Doctors Pty Ltd. Australia Hungary Japan Reservoir Doctors Pty Ltd. Australia Hungary Japan Reservoir Doctors Pty Ltd. Australia Hungary Japan Prorest Technology Association Agrentian Hungary Japan Prorest Technology Association of Regional Consortiums Vazuez-Amabile Acceach ACCEA (Argentine Association of Regional Consortiums Vazuez-Amabile For A		()	
Magda Aparecida de Lima Brazilian Agricultural Research Corporation - Embrapa Australia Catherine Ellen Lovelock University of Queensland Australia Swedish University for Agricultural Sciences (SLU) Sweden Robert William Matthew Forestry Commission Research Agency UK Winistry of Agriculture and Agri-Food Canada Nimistry of Agriculture and Agri-Food Canada Norwegian University of Life Sciences Norway Stini Maaria Nimistö Statistics Finland, Greenhouse Gas Inventory Unit Finland Jean Pierre Ometto National institute for Space Research (CCST/INPE) Brazil Walter Oyhantcabal Ministry of Agriculture, Livestock and Fishery, MGAP Uruguay China Agricultural University of Life Sciences Norway Statistica Finland, Greenhouse Gas Inventory Unit Finland Pandhal Pandya Space Applications Centre, Indian Space Research Uruguay China Agricultural University of Environment and Sustainable Development Unit National Climate Change Division, Ministry of Environment and Sustainable Development Uruguay Sciences Agricultural Sciences Sweden St. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) St. Ves T. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) St. Ves Tinian Regina Natural Resources Institute Finland (Luke) Finland Montréal (UQAM) St. Ves Tinian Regina Natural Resources Institute of Science Department of the Environment and Energy Australia Frazilia Natural Resources Institute Finland (Luke) Finland Australia Resources Institute of Science Department of the Environment and Energy Australia Prazilia Natural Resources Institute Finland (Luke) Finland Research University of Parana Research Institute Mungary Japan Reservoir Doctors Pty Ltd. Australia Hungary Japan Reservoir Doctors Pty Ltd. Australia Hungary Japan Reservoir Doctors Pty Ltd. Australia Hungary Japan Prorest Technology Association Agrentian Hungary Japan Prorest Technology Association of Regional Consortiums Vazuez-Amabile Acceach ACCEA (Argentine Association of Regional Consortiums Vazuez-Amabile For A		Joint Research Centre, European Commission, European	EU
Magda Aparecida de LimaBrazilian Agricultural Research Corporation - EmbrapaBrazilCatherine Ellen LovelockUniversity of QueenslandAustraliaMattias LundbladSwedish University of Agricultural Sciences (SLU)SwedenRobert William MatthewsSokoine University of AgricultureTanzaniaBrian G. McConkeyFriestry Commission Research AgencyUKBrian G. McConkeyMinistry of Agriculture and Agri-FoodCanadaErik NæssetNorwegian University of Life SciencesNorwaySini Maaria NiinistöStatistics Finland, Greenhouse Gas Inventory UnitFinlandJean Pierre OmettoNational institute for Space Research (CCST/INPE)BrazilWalter OyhantcabalMinistry of Agriculture, Livestock and Fishery, MGAPUruguayXuebiao PanChina Agricultural UniversityChinaMehul R. PandyaSpace Applications Centre, Indian Space ResearchIndiaLuis Alberto PanichelliNational Climate Change Division, Ministry of Environment and Sustainable DevelopmentArgentinaDavid ParéNatural Resources CanadaCanadaHimanshu PathakICAR - National Rice Research InstituteIndiaTomas PaulScion - New Zealand Forest Research Institute Ltd.New ZealandSven Hans-Olof PeterssonSLU, Swedish University for Agricultural SciencesSwedenYves T. PrairieDepartment of Biological Sciences, Université du Québec à Montréal (UQAM)NorwayHanne Lerche Raadal Njiavalli H. RavindrananthIndian Institute of ScienceIndiaShatti Rèdedy </td <td>r</td> <td><u>.</u></td> <td></td>	r	<u>.</u>	
Catherine Ellen Lovelock         University of Queensland         Australia           Mattias Lundblad         Swedish University of Agriculture         Sweden           Rogers Ernest Malimbwi         Sokoine University of Agriculture         Tanzania           Robert William Matthews         Brian G. McConkey         Ministry of Agriculture and Agri-Food         Canada           Brian G. McConkey         Ministry of Agriculture and Agri-Food         Canada           Sini Maaria Niinistö         Statistics Finland, Greenhouse Gas Inventory Unit         Finland           Jean Pierre Ometto         National institute for Space Research (CCST/INPE)         Brazil           Walter Oyhantcabal         Ministry of Agricultural University         China           Kuebiao Pan         China Agricultural University         China           Mehul R. Pandya         Space Applications Centre, Indian Space Research         India           Organisation (ISRO), Government of India         Argentina           Luis Alberto Panichelli         National Climate Change Division, Ministry of Environment and Sustainable Development         Argentina           David Paré         Natural Resources Canada         Canada           Himanshu Pathak         ICAR - Natural Resources Canada         Canada           Thomas Paul         Scion - New Zealand Forest Research Institute Ltd.         New Zeal	Magda Aparecida de Lima		Brazil
Mattias Lundblad Rogers Ernest Malimbus Robert William Matthews Robert William Matthews Brian G. McConkey Brian G. McConkey Erik Næsset Norwegian University of Agriculture and Agri-Food Norwegian University of Life Sciences NorwayUKBrian G. McConkey Erik NæssetNorwegian University of Life Sciences Norwegian University of Life SciencesNorwaySini Maaria Niinistö Jean Pierre Ometto Walter Oyhantcabal Ministry of Agriculture, Livestock and Fishery, MGAP China Agricultural University Organisation (ISRO), Government of India National Climate Change Division, Ministry of Environment and Sustainable DevelopmentIndiaLuis Alberto Panichelli David Paré Natural Resources Canada Himanshu Pathak Thomas Paul Swen Hans-Olof Petersson Yves T. PrairieICAR - National Rice Research Institute Scion - New Zealand Forest Research Institute Ltd. SUL, Swedish University for Agricultural Sciences Swend Hans-Olof PeterssonSueden SwedenYves T. PrairieDepartment of Biological Sciences, Université du Québec à Montréal (UQAM)SwedenHanne Lerche Raadal Njjavalli H. Ravindranath Shanti Reddy Kristiina Regina Joachim RockOstfold Research Thuenen-Institute of Science Department of the Environment and Energy Natural Resources Institute Finland (Luke) Department of the Environment and EnergyAustraliaSebastian Rüter Carlos Roberto Sanquetta Alexsandr Trunov Jason Alan TullisThünen Institute of Wood Research Project Ecosystems GermanyGermanySebastian Rüter Carlos Roberto Sanquetta Aleksandr Trunov Jason Alan TullisAustralia Project Technology Association Japan Aleksandr Trunov Japan Forest Technology Associa			
Rogers Ernest Malimbwi Robert William Matthews Brian G. McConkey Erik Nesset Sini Maaria Niinistö Jean Pierre Ometto Ministry of Agriculture and Agri-Food Norwegian University of Life Sciences NorwayUK Ministry of Agriculture and Agri-Food NorwayJean Pierre Ometto Walter Oyhantcabal Austebiao Pan Hehul R. Pandya David Paré David Paré National Climate Change Division, Ministry of Environment and Sustainable Development National Climate Change Division, Ministry of Environment and Sustainable DevelopmentUruguayLuis Alberto Panichelli Himanshu Pathak Thomas Paul Scion - New Zealand Forest Research Institute Scion - New Zealand Forest Research Institute Ltd. Scion - New Zealand Forest Research Institute Ltd. Montréal (UQAM)New Zealand New Zealand Sciences Sweden CanadaHanne Lerche Raadal Njavalli H. Ravindranath Shanti Reddy Virstiina Regima Joachim RockOstfold Research Indian Institute of Science Department of the Environment and Energy Natural Resources Institute Finland (Luke) Finland Hennen-Institute of Forest Ecosystems GermanyAustralia GermanySebastian Rüter Carlos Roberto Sanquetta Kei SuzukiFederal University of Parana Aleksandr Trunov Ju.A. Izrael Institute of Global Climate and Ecology University of ArkansasJapan Australia Hungary JapanBradford Sterling Sherman Aleksandr Trunov Jason Alan Tullis Tony John van der Weerden Gabriel GustavoAACREA (Argentine Association of			Sweden
Robert William Matthews Brian G. McConkey Brian G. Canada India India India India India India G. Canada India Indi	Rogers Ernest Malimbwi		Tanzania
Brian G. McConkey Erik Næsset Norwegian University of Life Sciences Norway Sini Maaria Niinistö Statistics Finland, Greenhouse Gas Inventory Unit Jean Pierre Ometto National institute for Space Research (CCST/INPE) Walter Oyhanteabal Ministry of Agriculture, Livestock and Fishery, MGAP Xuebiao Pan China Agricultural University Mehul R. Pandya Space Applications Centre, Indian Space Research Organisation (ISRO), Government of India Luis Alberto Panichelli National Climate Change Division, Ministry of Environment and Sustainable Development  David Paré Natural Resources Canada Himanshu Pathak ICAR - National Rice Research Institute India Sven Hans-Olof Petersson Yves T. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) Hanne Lerche Raadal Nijavalli H. Ravindranath Nijavalli H. Ravindranath Nijavalli H. Ravindranath Sebastian Rüter Thüen Institute of Science Sebastian Rüter Thünen Institute of Forest Ecosystems Sebastian Rüter Atsushi Sato Mitsubishi UFJ Research and Consulting Co., Ltd. Japan Bradford Sterling Sherman Actusuki Acid Sterling Sherman Aleksandr Trunov Jason Alan Tullis University of Agricultural Experimentation) and University of La Plata Finland Vacquez-Amabile For Agricultural Experimentation) and University of La Plata Finland Argentina Finland Argentina Argentina Canda Canada Canada Canada Norway India New Zealand Seventhanse Canada Norway India Mehul R. Pandra Agreetina Argentina Carlos Roberto Sanquetta Atsushi Sato Mitsubishi UFJ Research and Consulting Co., Ltd. Japan Bradford Sterling Sherman Aleksandr Trunov Japan Forest Technology Association Japan Forest Technology Association Aleksandr Trunov Aleksandr Trunov Acker A (Argentine Association of Regional Consortiums Argentina For Agricultural Experimentation) and University of La Plata	_		UK
Erik Næsset Sini Maaria Niinistö Statistics Finland, Greenhouse Gas Inventory Unit Jean Pierre Ometto National institute for Space Research (CCST/INPE) Walter Oyhantcabal Xuebiao Pan China Agricultural University Mehul R. Pandya Space Applications Centre, Indian Space Research Organisation (ISRO), Government of India Luis Alberto Panichelli National Climate Change Division, Ministry of Environment and Sustainable Development David Paré Natural Resources Canada Himanshu Pathak ICAR - National Rice Research Institute Scion - New Zealand Forest Research Institute Ltd. Sven Hans-Olof Petersson Yves T. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) Hanne Lerche Raadal Nijavalli H. Ravindranath Shanti Reddy Department of the Environment and Energy Kristiina Regina Joachim Rock Sebastian Rüter Carlos Roberto Sanquetta Atsushi Sato Mitsubishi UFJ Research and Consulting Co., Ltd. Bradford Sterling Sherman Reservoir Doctors Pty Ltd. Via China Dian Panne Lerche Raesarch Narior Preservoir Doctors Pty Ltd. Aleksandr Trunov Jason Alan Tullis University of Agricultural and Engelonal Consortiums Vazquez-Amabile For Agricultural Experimentation) and University of La Plata Finland Argentina Pradford Sterling Gustavo AACREA (Argentine Association of Regional Consortiums For Agricultural Experimentation) and University of La Plata	Brian G. McConkey		Canada
Sini Maaria Niinistö Jean Pierre Ometto Walter Oyhantcabal Walter Oyhantcabal Xuebiao Pan China Agriculture, Livestock and Fishery, MGAP Xuebiao Pan China Agricultural University China Mehul R. Pandya Space Applications Centre, Indian Space Research Organisation (ISRO), Government of India Luis Alberto Panichelli National Climate Change Division, Ministry of Environment and Sustainable Development Natural Resources Canada Canada Himanshu Pathak Thomas Paul Scion - New Zealand Forest Research Institute Scion - New Zealand Forest Research Institute Ltd. Sven Hans-Olof Petersson Yves T. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) Hanne Lerche Raadal Nhijavalli H. Ravindranath Shanti Reddy Department of the Environment and Energy Kristiina Regina Joachim Rock Sebastian Rüter Carlos Roberto Sanquetta Atsushi Sato Bradford Sterling Sherman Zoltán Somogyi NARIC Hungarian Forest Research Institute Aleksandr Trunov Jason Alan Tullis University of Agricultural Science Japan Narural Resources Institute of Global Climate and Ecology Jason Alan Tullis University of Arkansas Vazquez-Amabile  Statistics Finland, Gerenany Germany Finland Argentina Brazil Argentina	•		Norway
Jean Pierre Ometto   Mational institute for Space Research (CCST/INPE)   Brazil			•
Walter Oyhantcabal Xuebiao PanMinistry of Agriculture, Livestock and Fishery, MGAP China Agricultural University Space Applications Centre, Indian Space Research Organisation (ISRO), Government of IndiaUruguay ChinaLuis Alberto Panichelli David ParéNational Climate Change Division, Ministry of Environment and Sustainable DevelopmentArgentinaDavid ParéNatural Resources CanadaCanadaHimanshu PathakICAR - National Rice Research InstituteIndiaThomas PaulScion - New Zealand Forest Research Institute Ltd.New ZealandSven Hans-Olof PeterssonSLU, Swedish University for Agricultural SciencesSwedenYves T. PrairieDepartment of Biological Sciences, Université du Québec à Montréal (UQAM)NorwayHanne Lerche RaadalOstfold ResearchNorwayNijavalli H. Ravindranath Shanti ReddyDepartment of the Environment and EnergyAustraliaKristiina ReginaNatural Resources Institute Finland (Luke)FinlandJoachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaMitsubishi UFJ Research and Consulting Co., Ltd.JapanAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and Ecolog	Jean Pierre Ometto	· · · · · · · · · · · · · · · · · · ·	Brazil
Xuebiao PanChina Agricultural UniversityChinaMehul R. PandyaSpace Applications Centre, Indian Space ResearchIndiaLuis Alberto PanichelliNational Climate Change Division, Ministry of Environment and Sustainable DevelopmentArgentinaDavid ParéNatural Resources CanadaCanadaHimanshu PathakICAR - National Rice Research InstituteIndiaThomas PaulScion - New Zealand Forest Research Institute Ltd.New ZealandSven Hans-Olof PeterssonSLU, Swedish University for Agricultural SciencesSwedenYves T. PrairieDepartment of Biological Sciences, Université du Québec à Montréal (UQAM)NorwayHanne Lerche RaadalOstfold ResearchNorwayNijavalli H. RavindranathIndian Institute of ScienceIndiaShanti ReddyOstfold ResearchNorwayKristiina ReginaNatural Resources Institute Finland (Luke)FinlandJoachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaAitsushi SatoBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSA<	Walter Oyhantcabal		Uruguay
Luis Alberto Panichelli Luis Alberto Panichelli David Paré Natural Resources Canada Himanshu Pathak ICAR - National Rice Research Institute India Thomas Paul Scion - New Zealand Forest Research Institute Ltd. New Zealand Sven Hans-Olof Petersson Yves T. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) Hanne Lerche Raadal Nijavalli H. Ravindranath Shanti Reddy Department of the Environment and Energy Kristiina Regina Joachim Rock Thuenen-Institute of Forest Ecosystems Sebastian Rüter Carlos Roberto Sanquetta Atsushi Sato Bradford Sterling Sherman Zoltán Somogyi Kaisunia Research NARIC Hungarian Forest Research Institute Missand Parian Nakinda Octobra Petersson Norway Norway India India Institute of Science India			
Luis Alberto Panichelli Luis Alberto Panichelli David Paré Natural Resources Canada Himanshu Pathak ICAR - National Rice Research Institute India Thomas Paul Scion - New Zealand Forest Research Institute Ltd. New Zealand Sven Hans-Olof Petersson Yves T. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) Hanne Lerche Raadal Nijavalli H. Ravindranath Shanti Reddy Department of the Environment and Energy Kristiina Regina Joachim Rock Thuenen-Institute of Forest Ecosystems Sebastian Rüter Carlos Roberto Sanquetta Atsushi Sato Bradford Sterling Sherman Zoltán Somogyi Kaisunia Research NARIC Hungarian Forest Research Institute Missand Parian Nakinda Octobra Petersson Norway Norway India India Institute of Science India	Mehul R. Pandya	Space Applications Centre, Indian Space Research	India
David Paré Natural Resources Canada Canada Himanshu Pathak ICAR - National Rice Research Institute India Thomas Paul Scion - New Zealand Forest Research Institute Ltd. New Zealand Sven Hans-Olof Petersson SLU, Swedish University for Agricultural Sciences Sweden Yves T. Prairie Department of Biological Sciences, Université du Québec à Montréal (UQAM) Hanne Lerche Raadal Ostfold Research Institute of Université du Québec à Montréal (UQAM) Hanne Lerche Raadal Ostfold Research Indian Institute of Science India Shanti Reddy Department of the Environment and Energy Australia Kristiina Regina Natural Resources Institute Finland (Luke) Finland Joachim Rock Thuenen-Institute of Forest Ecosystems Germany Sebastian Rüter Thünen Institute of Wood Research Germany Federal University of Parana Brazil Atsushi Sato Mitsubishi UFJ Research and Consulting Co., Ltd. Japan Bradford Sterling Sherman Reservoir Doctors Pty Ltd. Australia Zoltán Somogyi NARIC Hungarian Forest Research Institute Hungary Leis Suzuki Japan Forest Technology Association Japan Aleksandr Trunov Yu.A. Izrael Institute of Global Climate and Ecology Russian Federation Jason Alan Tullis University of Arkansas USA Tony John van der Weerden AgResearch (Argentine Association of Regional Consortiums Vazquez-Amabile for Agricultural Experimentation) and University of La Plata	•		
David ParéNatural Resources CanadaCanadaHimanshu PathakICAR - National Rice Research InstituteIndiaThomas PaulScion - New Zealand Forest Research Institute Ltd.New ZealandSven Hans-Olof PeterssonSLU, Swedish University for Agricultural SciencesSwedenYves T. PrairieDepartment of Biological Sciences, Université du Québec à Montréal (UQAM)CanadaHanne Lerche RaadalOstfold ResearchNorwayNijavalli H. RavindranathIndian Institute of ScienceIndiaShanti ReddyDepartment of the Environment and EnergyAustraliaKristiina ReginaNatural Resources Institute Finland (Luke)FinlandJoachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-AmabileFor Agricultural Experimentation) and University of La Plata	Luis Alberto Panichelli	National Climate Change Division, Ministry of Environment	Argentina
Himanshu PathakICAR - National Rice Research InstituteIndiaThomas PaulScion - New Zealand Forest Research Institute Ltd.New ZealandSven Hans-Olof PeterssonSLU, Swedish University for Agricultural SciencesSwedenYves T. PrairieDepartment of Biological Sciences, Université du Québec à Montréal (UQAM)CanadaHanne Lerche RaadalOstfold ResearchNorwayNijavalli H. RavindranathIndian Institute of ScienceIndiaShanti ReddyDepartment of the Environment and EnergyAustraliaKristiina ReginaNatural Resources Institute Finland (Luke)FinlandJoachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-AmabileFor Agricultural Experimentation) and University of La Plata		and Sustainable Development	
Thomas PaulScion - New Zealand Forest Research Institute Ltd.New ZealandSven Hans-Olof PeterssonSLU, Swedish University for Agricultural SciencesSwedenYves T. PrairieDepartment of Biological Sciences, Université du Québec à Montréal (UQAM)CanadaHanne Lerche RaadalOstfold ResearchNorwayNijavalli H. RavindranathIndian Institute of ScienceIndiaShanti ReddyDepartment of the Environment and EnergyAustraliaKristiina ReginaNatural Resources Institute Finland (Luke)FinlandJoachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-AmabileFor Agricultural Experimentation) and University of La Plata	David Paré	Natural Resources Canada	Canada
Sven Hans-Olof Petersson Yves T. PrairieSLU, Swedish University for Agricultural Sciences Department of Biological Sciences, Université du Québec à Montréal (UQAM)CanadaHanne Lerche Raadal Nijavalli H. Ravindranath Shanti ReddyOstfold ResearchNorwayIndian Institute of ScienceIndiaShanti ReddyDepartment of the Environment and EnergyAustraliaKristiina ReginaNatural Resources Institute Finland (Luke)FinlandJoachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata	Himanshu Pathak	ICAR - National Rice Research Institute	India
Yves T. PrairieDepartment of Biological Sciences, Université du Québec à Montréal (UQAM)CanadaHanne Lerche RaadalOstfold ResearchNorwayNijavalli H. RavindranathIndian Institute of ScienceIndiaShanti ReddyDepartment of the Environment and EnergyAustraliaKristiina ReginaNatural Resources Institute Finland (Luke)FinlandJoachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata	Thomas Paul	Scion - New Zealand Forest Research Institute Ltd.	New Zealand
Hanne Lerche RaadalMontréal (UQAM)Nijavalli H. RavindranathIndian Institute of ScienceIndiaShanti ReddyDepartment of the Environment and EnergyAustraliaKristiina ReginaNatural Resources Institute Finland (Luke)FinlandJoachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata	Sven Hans-Olof Petersson	SLU, Swedish University for Agricultural Sciences	Sweden
Hanne Lerche Raadal Nijavalli H. Ravindranath Shanti ReddyOstfold Research Indian Institute of ScienceNorwayShanti ReddyDepartment of the Environment and Energy AustraliaAustraliaKristiina ReginaNatural Resources Institute Finland (Luke)FinlandJoachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional Consortiums for Agricultural Experimentation) and University of La PlataArgentina	Yves T. Prairie		Canada
Nijavalli H. Ravindranath Shanti Reddy Department of the Environment and Energy Kristiina Regina Joachim Rock Thuenen-Institute of Forest Ecosystems Sebastian Rüter Carlos Roberto Sanquetta Atsushi Sato Bradford Sterling Sherman Zoltán Somogyi Kei Suzuki Aleksandr Trunov Japan Forest Technology Association Aleksandr Trunov Jason Alan Tullis Tony John van der Weerden Gabriel Gustavo Vazquez-Amabile  India			
Shanti Reddy Department of the Environment and Energy Rristiina Regina Natural Resources Institute Finland (Luke) Finland Joachim Rock Thuenen-Institute of Forest Ecosystems Germany Sebastian Rüter Thünen Institute of Wood Research Germany Carlos Roberto Sanquetta Federal University of Parana Brazil Atsushi Sato Mitsubishi UFJ Research and Consulting Co., Ltd. Japan Bradford Sterling Sherman Reservoir Doctors Pty Ltd. Australia Zoltán Somogyi NARIC Hungarian Forest Research Institute Hungary Kei Suzuki Japan Forest Technology Association Japan Aleksandr Trunov Yu.A. Izrael Institute of Global Climate and Ecology Jason Alan Tullis University of Arkansas USA Tony John van der Weerden AgResearch Gabriel Gustavo AACREA (Argentine Association of Regional Consortiums Vazquez-Amabile for Agricultural Experimentation) and University of La Plata			
Kristiina Regina Natural Resources Institute Finland (Luke) Finland Joachim Rock Thuenen-Institute of Forest Ecosystems Germany Sebastian Rüter Thünen Institute of Wood Research Germany Carlos Roberto Sanquetta Federal University of Parana Brazil Atsushi Sato Mitsubishi UFJ Research and Consulting Co., Ltd. Japan Bradford Sterling Sherman Reservoir Doctors Pty Ltd. Australia Zoltán Somogyi NARIC Hungarian Forest Research Institute Hungary Kei Suzuki Japan Forest Technology Association Japan Aleksandr Trunov Yu.A. Izrael Institute of Global Climate and Ecology Jason Alan Tullis University of Arkansas USA Tony John van der Weerden AgResearch ACREA (Argentine Association of Regional Consortiums Vazquez-Amabile for Agricultural Experimentation) and University of La Plata			
Joachim RockThuenen-Institute of Forest EcosystemsGermanySebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata			
Sebastian RüterThünen Institute of Wood ResearchGermanyCarlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata			
Carlos Roberto SanquettaFederal University of ParanaBrazilAtsushi SatoMitsubishi UFJ Research and Consulting Co., Ltd.JapanBradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata			•
Atsushi Sato Mitsubishi UFJ Research and Consulting Co., Ltd. Japan Bradford Sterling Sherman Reservoir Doctors Pty Ltd. Australia Zoltán Somogyi NARIC Hungarian Forest Research Institute Hungary Kei Suzuki Japan Forest Technology Association Japan Aleksandr Trunov Yu.A. Izrael Institute of Global Climate and Ecology Russian Federation Jason Alan Tullis University of Arkansas USA Tony John van der Weerden AgResearch AgResearch Gabriel Gustavo AACREA (Argentine Association of Regional Consortiums Vazquez-Amabile for Agricultural Experimentation) and University of La Plata			•
Bradford Sterling ShermanReservoir Doctors Pty Ltd.AustraliaZoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata	-		
Zoltán SomogyiNARIC Hungarian Forest Research InstituteHungaryKei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata			-
Kei SuzukiJapan Forest Technology AssociationJapanAleksandr TrunovYu.A. Izrael Institute of Global Climate and EcologyRussian FederationJason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata	_		
Aleksandr Trunov Jason Alan Tullis University of Arkansas Tony John van der Weerden Gabriel Gustavo Vazquez-Amabile  Yu.A. Izrael Institute of Global Climate and Ecology USA USA New Zealand Argentina Argentina Argentina Argentina			
Jason Alan TullisUniversity of ArkansasUSATony John van der WeerdenAgResearchNew ZealandGabriel GustavoAACREA (Argentine Association of Regional ConsortiumsArgentinaVazquez-Amabilefor Agricultural Experimentation) and University of La Plata			
Tony John van der Weerden AgResearch New Zealand Gabriel Gustavo AACREA (Argentine Association of Regional Consortiums Vazquez-Amabile for Agricultural Experimentation) and University of La Plata		••	
Gabriel Gustavo AACREA (Argentine Association of Regional Consortiums Argentina Vazquez-Amabile for Agricultural Experimentation) and University of La Plata			
Vazquez-Amabile for Agricultural Experimentation) and University of La Plata		•	
			Aigenulia
marma vitano isi ka - institute foi Environmentai i foteetion and Research Italy	=		Italy
	141411114 4 ITUIIO	151121 Institute for Environmental Flotection and research	ımıy

Stephen John Wakelin Changke Wang	Scion - New Zealand Forest Research Institute Ltd. National Climate Center, China Meteorological Administration	New Zealand China
Robert Michael Waterworth Yeni Widiawati	The Mullion Group Research Institute for Animal Production (IRIAP), Indonesian Centre for Animal Research and Development	Australia Indonesia
Chengyi Zhang	(ICARD) National Climate Center, China Meteorological Administration	China
Xunhua Zheng	Institute of Atmospheric Physics, Chinese Academy of Sciences	China
Jianhua Zhu	Institute of Forest Ecology, Environment & Protection, Chinese Academy of Forestry	China
Contributing Authors		
Cody Alsaker	National Resource Ecology Laboratory, Colorado State University	USA
Valerio Avitabile André Bannink	Joint Research Centre (JRC), European Commission (Ispra) Wageningen Livestock Research, Wageningen University & Research	Italy Netherlands
Karen A. Beauchemin	Agriculture and Agri-Food Canada	Canada
Luca Birigazzi	FAO - Food and Agriculture Organization of the United Nations	Italy
Rémi Cardinael	CIRAD (French Agricultural Research Center for International Development), UPR AIDA / University of Zimbabwe	France
Harry Clark	New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC), AgResearch Ltd.	New Zealand
Max Collett	National Inventory Systems and International Reporting Branch, Department of the Environment and Energy	Australia
Marife D. Corre	Faculty of Forest Sciences and Forest Ecology, Georg-August University of Göttingen	Germany
Bridget Deemer	U.S. Geological Survey, Grand Canyon Monitoring and Research Center	USA
Alistair Robert Grinham	University of Queensland	Australia
Ram B. Gurung	Natural Resource Ecology Laboratory, Colorado State University	USA
Mark E. Harmon	Department of Forest Science, Oregon State University	USA
Ermias Kebreab	University of California, Davis	USA
Sarian Kosten	Radboud University	Netherlands
Johannes Lehmann	Atkinson Center for a Sustainable Future Soil and Crop Sciences, School of Integrative Plant Science, College of	USA
April B. Leytem	Agriculture and Life Sciences, Cornell University USDA United States Department of Agriculture -	USA
Zhe Li	Agricultural Research Service (USDA-ARS) Chongqing Institute of Green and Intelligent Technology,	China
Ziic Li	Chinese Academy of Sciences	Cimia
Chang Liang	Environment and Climate Change Canada	Canada
Ronald E. McRoberts	U.S. Forest Service	USA
Akinori Mori	National Agriculture and Food Research Organization	Japan
Ngwa Martin Ngwabie	Department of Agricultural and Environmental Engineering, College of Technology, University of Bamenda	Cameroon
Alasdair Dewar Lowe Noble	AgResearch	New Zealand
Carolyn Imede Opio	UN Food and Agriculture Organization	Uganda
Michael Peacock	Swedish University of Agricultural Sciences	Sweden
Simone Rossi	European Commission, Joint Research Centre	Italy
Danaë M.A. Rozendaal	Wageningen University & Research	Netherlands
Marco Aurelio Santos	Energy Planning Program / COPPE / UFRJ	Brazil
Cindy Heather Shaw Yasuhito Shirato	Natural Resources Canada, Canadian Forest Service National Agriculture and Food Research Organization, Institute for Agro-Environmental Sciences (NIAES)	Canada Japan

Yowhan Son	Division of Environmental Science and Ecological Engineering, Korea University	Korea, Republic of
Victor Stepanenko	Lomonosov Moscow State University (MSU), Research Computing Center and Faculty of Geography	Russian Federation
Oliver van Straaten Andrew C. VanderZaag	Georg-August University of Göttingen Agriculture and Agri-Food Canada	Germany Canada
Edzo Veldkamp Theunis Valentijn Vellinga	Georg-August University of Göttingen Wageningen Livestock Research, Wageningen University & Research	Germany Netherlands
Louis V. Verchot	International Center for Tropical Agriculture (CIAT) - Headquarters and Regional Office for Latin America and the Caribbean	USA
Raul Abad Vinas Dominic Woolf	Joint Research Centre, European Commission Cornell University	Spain USA
Kazuyuki Yagi	Institute for Agro-Environmental Sciences (NIAES), National Agriculture and Food Research Organization (NARC	Japan
Xiaoyuan Yan	Institute of Soil Science, Chinese Academy of Sciences	China
<i>Review Editors</i> Fahmuddin Agus	Indonesia Soil Descend Institute Indonesian Agency for	Indonesia
-	Indonesia Soil Research Institute, Indonesian Agency for Agricultural Research and Development (IAARD)	
Marta Andrea del Carmen Alfaro Valenzuela	Instituto de Investigaciones Agropecuarias (INIA)	Chile
Dominique Blain Hendrik H.J. Vreuls	Environment and Climate Change Canada Netherlands Enterprise Agency (RVO.nl)	Canada Netherlands
Volume 5: Waste		
Coordinating Lead Author	ors	
Deborah M. Bartram	Eastern Research Group, Inc. King Mongkut's University of Technology Thonburi	USA Thailand
Lead Authors		
Amr Mohamed Osama Abdel-Aziz	Integral Consult	Egypt
Chart Chiemchaisri Yoshitaka Ebie	Kasetsart University National Institute for Environmental Studies	Thailand Japan
Juraj Farkaš	veQ s.r.o.	Slovakia
Qingxian Gao	Chinese Research Academy of Environmental Sciences (CRAES)	China
Céline Gueguen	CITEPA - Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique	France
Muhammad Ijaz	Global Change Impact Studies Centre (GCISC), Ministry of Climate Change	Pakistan
Tomonori Ishigaki	National Institute for Environmental Studies	Japan
Eui-Chan Jeon Seungdo Kim	Department of Environment & Energy, Sejong University Department of Environmental Sciences and Biotechnology,	Korea, Republic of Korea, Republic of
-	Hallym University	_
Karthik Manikavasagam Seini Nouhou Amadou	National Environmental Engineering Research Institute ECOWAS Centre for Renewable Energy and Energy Efficiency	India Niger
Gregory M. Peters	Chalmers University of Technology	Sweden
Chhemendra Sharma Sergii Shmarin	CSIR - National Physical Laboratory SE National Power Company "UKRENERGO"	India Ukraine
Michael Douglas Short	University of South Australia	Australia
Nuria Mariana Zanzottera	Ministry of Environment and Sustainable Development	Argentina
Contributing Authors		
Mark Edward Hunstone	Department of the Environment and Energy	Australia Thailand
Chalor Jarusutthirak	Faculty of Environment, Kasetsart University	i iiaiiaiiu
Sunil Kumar	Solid and Hazardous Waste Management Division, Council of Scientific and Industrial Research, National Environmental	India

Zhanyun Ma	Chinese Research Academy of Environmental Sciences (CRAES)	China
Shuhei Masuda	Department of civil engineering and architecture, National Institute of Technology, Akita Collage	Japan
Marco Ritzkowski	TuTech Innovation GmbH	Germany
Marianne Thomsen Komsilp Wangyao	Department of Environmental Science, Aarhus University The Joint Graduate School of Energy and Environment, King Mongkut's University of Technology Thonburi	Denmark Thailand
<b>Review Editors</b> Fatma Betül Demirok Anke Herold	Turkish Statistical Institute (TurkStat) Oeko-Institut	Turkey Germany

#### **Reviewers**

All expert reviewers listed below submitted their review comments for the Expert Review of the First Order Draft and/or for the Government and Expert Review of the Second Order Draft. Affiliations of expert reviewers presented in the list are as provided by them at the time of registration.

Argentina

Estela Santalla UNICEN - Universidad Nacional del Centro de la Provincia de Buenos Aires

Ernesto Viglizzo National Research Council Argentina (CONICET)

Australia

Max Collett Department of the Environment and Energy

Robert de Ligt The Mullion Group

Mark Hunstone Department of the Environment and Energy Senani Karunaratne Department of the Environment and Energy

Carolyn Maxwell Hydro Tasmania

Fabiano Ximenes New South Wales Department of Primary Industries

Austria

Yousef Alshammari University of Vienna

Michael Anderl Environment Agency Austria

Christoph Lampert Umweltbundesamt
Marion Pinterits Umweltbundesamt Vienna
Klaus Radunsky Umweltbundesamt

Guenther Schmidt Environment Agency Austria

Bangladesh

Sirajul Islam North South University

Belgium

Bruno Kestemont Statistics Belgium Tiffanie Stephani Fertilizers Europe

Benin

Bamikolé Jacques Kouazounde University of Abomey Calavi

Bolivia

Emilio Garcia-Apaza Universidad Mayor de San Andrés, Autoridad Plurinacional de la

Madre Tierra

Brazil

Alexandre Berndt Embrapa Southeast Livestock Irineu Bianchini Universidade Federal de Sao Carlos

Philip Fearnside National Institute for Research in Amazonia (INPA)

Stoécio Maia Federal Institute of Education, Science and Technology of Alagoas

Carlos Sanquetta Federal University of Parana Elizabeth Sikar Construmaq Sao Carlos

Canada

Remy Bargout International Development Research Centre
Ana Blondel Environment and Climate Change Canada
Marie-Eve Bonneau Environment and Climate Change Canada
Thomas Bruulsema International Plant Nutrition Institute

Patrick Coleman Black & Veatch Canada

Christine Dubois Alcoa

Doug King Carleton University
Emil Laurin Environment Canada

Reynald Lemke Agriculture & Agri-Food Canada

Nadia Morais Aluminerie Alouette Inc.

Frank Neitzert Environment and Climate Change Canada

Matthew Prescott Statistics Canada
Raul Salas Reyes University of Toronto

China

Zhiping An Chiyo Enterprises Limited

Guangcheng Chen

Third Institute of Oceanography, State Oceanic Administration

Xiangzheng Deng

Third Institute of Oceanography, State Oceanic Administration

Institute of Geographic Sciences and Natural Resources Research,

Chinese Academy of Sciences

Shenghui Han Institute of Atmospheric Physics, Chinese Academy of Sciences Institute of Atmospheric Physics, Chinese Academy of Sciences Yao Huang Institute of Environment and Sustainable Development in Agriculture, Xiaobo Qin

Chinese Academy of Agricultural Sciences

Institute of Agricultural Resources and Regional Planning, Changliang Shao

Chinese Academy of Agricultural Sciences

National Center for Climate Change Strategy and International Cooperation Mingshan Su Dan Yu Tian National Center for Cliamte Change Strategy and International Cooperation

Luhui Yan Carbonstop

Shanshan Yang National Center for Climate Change Strategy and International Cooperation

Costa Rica

Kendal Blanco Salas National Meteorological Institute

Cristobal Felix Diaz Morejon Ministry of Science, Technology and the Environment

Czech Republic

Eva Krtková Czech Hydrometeorological Institute

Milos Tichy Czech Technical University

Denmark

Steen Gyldenkærne Aarhus University Nicholas Hutchings Aarhus University

Land Use and Climate Change Company Peter Aarup Iversen

Ole-Kenneth Nielsen Aarhus University

**Dominican Republic** 

Oficina Nacional de Estadística Alma Vargas

Finland

Pia-Kristiina Forsell Statistics Finland Kari Grönfors Statistics Finland

Markus Haakana Natural Resources Institute Finland (Luke) Jaakko Heikkinen Natural Resources Institute Finland (Luke)

Päivi Lindh Statistics Finland

Natural Resources Institute Finland (Luke) Jouni Nousiainen Natural Resources Institute Finland (Luke) Paula Ollila Sanna Pitkänen Natural Resources Institute Finland (Luke) Tarja Tuomainen Natural Resources Institute Finland (Luke)

France

Valentin Bellassen INRA - Portail d'actus grand public

Frédéric Chevallier LSCE - Laboratoire des Sciences du Climat et de l'Environnement Céline Gueguen CITEPA - Centre Interprofessionnel Technique d'Etudes de la Pollution

Atmosphérique

CITEPA - Centre Interprofessionnel Technique d'Etudes de la Pollution Coralie Jeannot

Atmosphérique

Denis Loustau National Institute of Agricultural Research (INRA), UMR ISPA -

> Interactions Sol Plante Atmosphère Communications & Systemes

Astee répésenté par Valentin ASTEE - Association scientifique et technique pour l'eau et l'environnement

Germany

Brice Mora

Urs Berger Helmholtz Centre for Environmental Research - UFZ

Frank Brentrup Yara International ASA Umweltbundesamt Christian Boettcher

Ulrike Doering German Environment Agency Edgar Dullni

Asea Brown Boveri - ABB AG Thunen Institute of Climate-Smart Agriculture Roland Fuß Thunen Institute of Climate-Smart Agriculture Andreas Gensior Hans-Dieter Haenel Thunen Institute of Climate-Smart Agriculture

Anke Herold Oeko-Institut e.V.

Federal Environment Agency Kristina Juhrich Andrea Kaiser-Weiss Deutscher Wetterdienst (DWD) David Kuntze Umweltbundesamt Germany

Consultant Pauline Midgley

Jens Reichel German Environment Agency

Claus Rösemann Thunen Institute of Climate-Smart Agriculture Tanja Sanders Thuenen Institute of Forest Ecosystems

Michael Strogies German Environment Agency Klaus von Wilpert Forest Research Institute Freiburg

Greece

Vasiliki Assimakopoulos National Observatory of Athens Iordanis Tzamtzis ACCEL - I. Tzamtzis & Co G.P.

Hungary

Attila Buzasi Budapest University of Technology and Economics

Klára Tarczay Hungarian Meteorological Service

India

Malini Nair Christ University, Indian Institute of Science Karachepone Ninan Centre for Economics, Environment and Society

Vishwa Bandhu Pant HCL Technologies Limited

Tiwari Yogesh Indian Institute of Tropical Meteorology, Pune

Iran

Mostafa Jafari RIFR- AREEO, Macro National Strategies for Climate Change Research for

AREEO, Ministry of Agriculture

Raheleh Malekian National Strategic Research Center of Agriculture and Water

Seyed Muhammadreza Tabatabaei University of Tehran

**Ireland** 

Gerry Brady Central Statistics Office

Eugene Hendrick Department of Agriculture, Food and Marine (Retired)

Italy

Eleonora Di Cristofaro ISPRA - National Institute for Environmental Protection and Research Domenico Gaudioso ISPRA - National Institute for Environmental Protection and Research

Giuseppe Montanaro Università degli Studi della Basilicata

Japan

Takeshi Enoki Mitsubishi UFJ Research and Consulting Co., Ltd.
Yukio Haruyama Remote Sensing Technology Center of Japan (RESTEC)

Shoji Hashimoto Forestry and Forest Products Research Institute Elsa Hatanaka National Institute for Environmental Studies

Taka Hiraishi Institute for Global Environmental Strategies (IGES)

Hideshi Iki JXTG Holdings, Inc.

Tomonori Ishigaki National Institute for Environmental Studies
Hiroshi Ito National Institute for Environmental Studies
Hiroshi Ito Renesas Semiconductor Manufacturing Co., Ltd.
Kazumasa Kawashima Mitsubishi UFJ Research and Consulting Co., Ltd.

Koichi Kojima Toyota Motor Corporation

Naofumi KosakaNational Institute for Environmental StudiesAkihiko KuzeJapan Aerospace Exploration AgencyTsuneo MatsunagaNational Institute for Environmental StudiesKazunori MinamikawaInstitute for Agro-Environmental Sciences, NAROTakashi MorimotoMitsubishi UFJ Research and Consulting Co., Ltd.Ryo NakajimaToshiba Energy Systems and Solutions Corporation

Nobuhiro Natori Showa Denko K.K.

Osamu Ochiai Japan Aerospace Exploration Agency

Junichiro Oda Research Institute of Innovative Technology for the Earth (RITE)

Takefumi Oda National Institute for Environmental Studies Masami Onoda Japan Aerospace Exploration Agency

Atsushi Sato Mitsubishi ÜFJ Research and Consulting Co., Ltd.

Hideaki Tazawa Chiyoda Corporation

Takuji Terakawa Mitsubishi UFJ Research and Consulting Co., Ltd.

Kochi Tonosaki Organization for Landscape and Urban Green Infrastructure

Tsutomu Tsukada Kanken Techno Co., Ltd.

Masato Yamada National Institute for Environmental Studies
Masato Yano Mitsubishi UFJ Research and Consulting Co., Ltd.

Kenya

Ermias Betemariam World Agroforestry Centre

Korea, Republic of

Eui-Chan Jeon Sejong Uinversity

Dong Koo Kim

Raehyun Kim

Korea Energy Economics Institute
National Institute of Forest Science

Eunae Seo Korea Energy Agency

Jung-Sup UmKyungpook National UniversityJongsu YimNational Institute of Forest Science

Latvia

Anna Paturska Central Statistical Bureau of Latvia

Mauritius

Abdul Nayamuth Climagric Ltd.

Mexico

Poot-Delgado Carlos Antonio
Francisco Avina
Pablo Aviles Hernández
Adalberto Noyola

Instituto Tecnologico Superior de Champoton
Instituto Nacional de Ecología y Cambio Climático
Instituto Nacional de Estadística y Geografía (INEGI)
Instituto de Ingeniería, Universidad Nacional Autónoma de

México (UNAM)

Myanmar

Moe Aung Kyaw Ministry of Natural Resources and Envrionmental Conservation

Netherlands

Sarian Kosten Radboud University

Jan Peter Lesschen Wageningen University and Research

Hans Oonk
Tinus Pulles
OonKAY
Consultant

New Zealand

Joel Gibbs Ministry for Primary Industries

Donna Giltrap Landcare Research

Maya Hunt Ministry for Primary Industries

Nobert Nziramasanga Consultant

Stephen Wakelin Scion - New Zealand Forest Research Institute Ltd.

Nigeria

Chukwuma Anoruo Imo State University, Owerri

Norway

Henrik Åsheim Hydro Aluminium AS

Signe Kynding Borgen
Alice Budai
Norwegian Institute of Bioeconomy Research (NIBIO)
Norwegian Institute of Bioeconomy Research (NIBIO)
SINTEF - Stiftelsen for industriell og teknisk forskning

Erik Næsset Norwegian University of Life Sciences

Tormod Andre Schei Tormod Schei Climate and Environmental Advisor

Håkon F. Skullerud Statistics Norway

Aaron Smith Norwegian Institute of Bioeconomy Research (NIBIO)

Geir Taugbøl Energy Norway

Vigdis Vestreng Norwegian Environment Agency

Pakistan

Amanullah University of Agriculture Peshawar

Portugal

Ana Dias University of Aveiro

**Russian Federation** 

Georgii Alexandrov
Veronika Ginzburg
Irina Govor
Michael Gytarsky
Ekaterina Imshennik
A.M. Obukhov Institute of Atmospheric Physics
Yu.A. Izrael Institute of Global Climate and Ecology
Anna Romanovskaya
Yu.A. Izrael Institute of Global Climate and Ecology
Yu.A. Izrael Institute of Global Climate and Ecology

Ruwanda

Pius Nishimwe GreenMake LTD.

Slovakia

Lenka Zetochová Slovak Hydrometeorological Institute

Spain

Antonio Camacho University of Valencia
Alberto Sanz Cobeña Technical University of Madrid

Cristina Garcia Diaz Ministry of Agriculture and Fisheries, Food and Environment

César Pérez-Cruzado University of Santiago de Compostela

Sweden

Martin Bolinder Swedish University of Agricultural Sciences (SLU)
Mattias Lundblad Swedish University of Agricultural Sciences (SLU)
Ingrid Mawdsley IVL Swedish Environmental Research Institute

Gregory Peters Chalmers University of Technology

Hans Petersson Swedish University of Agricultural Sciences (SLU)
Klara Westling IVL Swedish Environmental Research Institute
Per-Erik Wikberg Swedish University of Agricultural Sciences (SLU)

Switzerland

Daniel Bretscher Agroscope

Stefan Reimann Swiss Federal Laboratories for Materials Science and Technology (Empa)

Regine Röthlisberger Federal Office for the Environment

Denise Fussen Yanque EBP Schweiz AG

Tanzania, United Republic of

Jamidu Katima
University of Dar es Salaam
Emmanuel Jonthan Mpeta
Meteorological Agency (Retired)

Thailand

Pornphimol Winyuchakrit Sirindhorn International Institute of Thailand, Thammasat University

**Turkey** 

Kadir AksakalTurkish Statistical InstituteFehmi Par BekciTurkish Statistical InstituteEray ÖzdemirGeneral Directorate of ForestrySebahattin SariTurkish Statistical Institute

Serhat Sensoy Turkish State Meteorological Service

Aynur Tokel Consultant

Ukraine

Sergii Shmarin SE National Power Company "UKRENERGO"

Nataliya Stranadko Portland State University

United Kingdom

Justin Bishop University of Cambridge
Hilary Kennedy Bangor University
Archie McCulloch University of Bristol

Anna Mikis Department for Business, Energy and Industrial Strategy

Petra Minnerop Dundee University

Amanda Penistone Department for Business, Energy and Industrial Strategy

David Reay University of Edinburgh

David Glen Thistlethwaite Ricardo plc

**United States of America** 

Onema Adojoh

Alison Adams University of Vermont - Rubenstein School of Environment and

Natural Resources University of Liverpool

Archis Ambulkar Jones and Henry Engineers, Ltd. Richard Birdsey Woods Hole Research Center

Stephanie Bogle United States Environmental Protection Agency (US EPA)

Jean Bogner University of Illinois at Chicago Mary Booth Partnership for Policy Integrity

Vincent Camobreco United States Environmental Protection Agency (US EPA)

Jeffrey Coburn RTI International

Ariane Coelho Brotto New York City Department of Environmental Protection

Philip DeCola University of Maryland

Mark de Figueiredo United States Environmental Protection Agency (US EPA)

Stephen Del Grosso United States Department of Agriculture, Agricultural Research Service

(USDA ARS)

Mausami Desai United States Environmental Protection Agency (US EPA)

Stephen Dettman Finite Carbon

Adam Eisele United States Environmental Protection Agency (US EPA)

Nancy French Michigan Tech Research Institute
Jason Funk Center for Carbon Removal

Ann Gallagher U.S. Dept. of the Interior National Park Service

Fiji George Cheniere Energy, Inc.
Ting Gilliand Teyes Instruments Income

Tina Gilliland Texas Instruments Incorporated
Paul Glaser University of Minnesota
Patrick Gonzalez University of California Berkele

Patrick Gonzalez University of California, Berkeley
William Hohenstein United States Department of Agriculture
Anny Huang California Air Resources Board (CARB)

William Irving United States Environmental Protection Agency (US EPA)

Cortney Itle Eastern Research Group

Jooil Kim Scripps Institution of Oceanography, University of California San Diego

Robert Lanza ICF International Inc.
Miriam Lev-On The LEVON Group, LLC
David Lyon Environmental Defense Fund
Eric Marland Appalachian State University
Gregg Marland Appalachian State University
Reid Miner National Council for Air and State University

Reid Miner National Council for Air and Stream Improvement, Inc. (NCASI)
Deborah Ottinger United States Environmental Protection Agency (US EPA)

Jennifer Politsch Intel Corporation

Ryan Radford California Environmental Protection Agency

Peter Riggs Pivot Point
Jeff Rudnik Intel Corporation

Neelam Singh World Resources Institute (WRI)

Kenneth Skog United States Department of Agriculture, Forest Service (Retired)

Mark Sperow West Virginia University

Melissa Weitz United States Environmental Protection Agency (US EPA)

Kewei Yu Troy University

Uruguay

Virginia Sena Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente

Venezuela

Dirk Thielen Instituto Venezolano de Investigaciones Científicas

Alicia Villamizar Universidad Simón Bolívar

#### **IGO**

#### **European Union (EU)**

Andrea Tilche

#### **International Aluminium Institute (IAI)**

Christopher Bayliss

#### International Energy Agency (IEA)

Roberta Quadrelli

#### Joint Research Centre of European Commission (JRC)

Valerio Avitabile Roland Hiederer Adrian Leip Simone Rossi Raul Abad Viñas

#### Organisation for Economic Co-operation and Development (OECD)

Florian Flachenecker

#### **NGO**

#### C40 Cities Climate Leadership Group

Mingming Wang

## Center for International Forestry Research (CIFOR), Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria (INIA)

Iciar Alberdi

#### **Global Change Impact Studies Center (GCISC)**

Muhammad Mohsin Iqbal

#### **Instituto Bem Ambiental (IBAM)**

Thiago Metzker

## International Center for Tropical Agriculture (CIAT), Consultative Group on International Agricultural Research (CGIAR)

Ngonidzashe Chirinda

#### International Institute for Applied Systems Analysis (IIASA)

Zbigniew Klimont

Wilfried Winiwarter

#### **WWF International (WWF)**

Nasikoa Aguilar-Amuchastegui

#### **Yale University**

Leehi Yona

#### **UN Bodies and Organizations**

#### Food and Agriculture Organization (FAO)

Sandro Federici Rocio Danica Condor Golec Francesco Nicola Tubiello

#### **United Nations (UN)**

Jessica Chan Julian Chow Wafa Aboul Hosn

#### **United Nations Development Programme (UNDP)**

Renata Grisoli

#### **United Nations Framework Convention on Climate Change (UNFCCC)**

Vitor Gois Ferreira Javier Marcelo Hanna Figueroa Dirk Nemitz Nalin Srivastava