Proceedings of the 12th Workshop on Greenhouse Gas Inventories in Asia (WGIA12)

- Capacity building for measurability, reportability and verifiability -

4-6 August 2014, Bangkok, Thailand

Greenhouse Gas Inventory Office of Japan (GIO), CGER, NIES

Center for Global Environmental Research

National Institute for Environmental Studies, Japan

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Contents

Foreword

The international community now recognizes increases in anthropogenic emissions of greenhouse gases (GHGs) as the primary cause of climate change and its impacts. The 5th Assessment Report published by the Intergovernmental Panel on Climate Change (IPCC) in 2013 stated that "the atmospheric concentrations of the greenhouse gases carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) have all increased since 1750 due to human activity." Moreover, since 2012, many GHG observatories including Mauna Loa Observatory in Hawaii have noticed that the daily mean concentration or monthly mean concentration of CO_2 surpassed 400 parts per million (ppm) in May for the first time. In order to address mitigation and adaptation to climate change, all of us on the globe have been making more efforts than ever in both scientific and political fields.

Furthermore, "measurement, reporting and verification", abbreviated as MRV, are important for ensuring the transparency and accuracy of each country's mitigation actions by quantifying anthropogenic GHG emissions. In this respect, national GHG inventories, which provide information on GHG emissions and their trends over time, play a critical role as a basis for decision makers to design and implement strategies of their countries' mitigation actions for reducing GHG emissions.

In order to support the enhancement of capacities for national GHG inventories in Asian countries, the National Institute for Environmental Studies (NIES) has been organizing the "Workshop on GHG Inventories in Asia" (WGIA) annually since November 2003 with the support of the Ministry of the Environment of Japan (MOEJ). This workshop supports government officials, compilers, and researchers in the Asian countries to develop and improve their GHG inventories through enhancing regional information exchange. The Greenhouse Gas Inventory Office of Japan (GIO), affiliated with the Center for Global Environmental Research (CGER), NIES, has functioned as the Secretariat for this workshop since its first session.

This CGER report serves as the proceedings of the 12th WGIA, which was held on August 4-6, 2014, in Bangkok, Thailand. We hope that this report will be useful for all those who work in the field of GHG inventory as well as climate change, and will contribute to the further progress of inventory development in Asia.

Hitoshi Mukai

Director
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Preface

An important lesson that we have learned from experience in the history of the UNFCCC is the importance of "measuring, reporting and verifying" (MRV). This includes measuring the effects of emissions reduction initiatives; reporting the results of the measurement on the international stage; and verifying the status of reductions. MRV ensures the transparency and accuracy of reports on each country's mitigation actions.

For steady implementation of MRV, it is essential to develop national systems for preparation of national greenhouse gas (GHG) inventories and to improve the accuracy of the inventories. While frequent reporting of national GHG inventories as stated in the Cancun Agreements and Durban Outcomes encourages all Parties to consider improving their inventory quality and developing appropriate institutional arrangements and inventory preparation processes, the GHG inventories are also being accepted more and more as being valuable because the inventories support transparency and accuracy of implementation of the national mitigation actions in a MRV manner. Furthermore, GHG inventories also help form the basis for Intended Nationally Determined Contributions.

Since its first session in 2003, WGIAs have been held twelve times so far. WGIAs have contributed significantly to the construction and consolidation of a network of officials involved in GHG inventory preparation in Asian countries and other institutes, and to the identification and solution of common issues of relevance to the inventories.

This time, the 12th WGIA (WGIA12) was held from 4 to 6 August, 2014 in Bangkok, Thailand, as a capacity building workshop for MRV. The items set out for this workshop by taking into consideration the current situation of the member countries were all essential for the improvement of their inventories.

The outcomes of the WGIA12 are summarized in this report as Proceedings. It is our hope that this report will be found useful and will contribute to the further improvement of the GHG inventories of the WGIA-member countries.

In conclusion, we would like to thank all the attendees for their participation and active contribution to the success of the workshop.

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List of Acronyms and Abbreviations

AD	Activity Data
AFOLU	Agriculture, Forestry and Other Land Use
AIM	Asia-Pacific Integrated Model
APN	Asia-Pacific Network for Global Change Research
ASEAN	Association of South‐East Asian Nations
BAU	Business as Usual
BR	Biennial Report
BUR	Biennial Update Report
CDM	Clean Development Mechanism
CEOS	Committee on Earth Observation Satellites
CGE	Consultative Group of Experts
CGER	Center for Global Environmental Research
CH_4	Methane
CITC	Climate Change International Technical and Training Center
CO_2	Carbon dioxide
COP	Conference of the Parties
CS-EF	Country-Specific Emission Factor
EF	Emission Factor
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization of the United Nations Statistics Division
FFPRI	Forestry and Forest Products Research Institute
F gases	Hydrofluorocarbons, Perfluorocarbons, and Sulphur hexafluoride
GEF	Global Environmental Facility
GFOI	The Global Forest Observations Initiative
GHG	Greenhouse Gas
Gg	Giga gram (10^9 g)
GIO	Greenhouse Gas Inventory Office of Japan
GIZ	The Deutsche Gesellschaft für Internationale Zusammenarbeit
GPG	Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories
GPG-LULUCF	Good Practice Guidance for Land Use, Land-Use Change and Forestry
HEAT+	The Harmonized Emissions Analysis Tool *plus*
HFCs	Hydrofluorocarbons
IAP-CAS	Institute of Atmospheric Physics, Chinese Academy of Sciences
ICA	International Consultation and Analysis
ICLEI	International Council for Local Environmental Initiatives
IGES	Institute for Global Environmental Strategies, Japan
IGES KUC	IGES Kitakyushu Urban Centre
INC	Initial National Communication

INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IPCC TFI-TSU	IPCC, Task Force on National GHG Inventories, Technical Support Unit
IP	Industrial Processes
IPPU	Industrial Processes and Product Use
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
KECO	Korea Environment Corporation
KP	Kyoto Protocol
LCS	Low-carbon Society
LDC	Least Developed Country
LEAD Program	USAID Low Emissions Asian Development Program
LoCARNet	Low-Carbon Asia Research Network
LULUCF	Land Use, Land-Use Change and Forestry
ML	Mutual Learning
MOEJ	Ministry of the Environment of Japan
MURC	Mitsubishi UFJ Research and Consulting Co., Ltd., Japan
MRV	Measurability, Reportability, and Verifiability / Measurement, Reporting, and Verification
N_2O	Nitrous oxide
NAI	Non Annex I
NAMA	Nationally Appropriate Mitigation Action
NC	National Communication
NEDO	New Energy and Industrial Technology Development Organization
NIES	National Institute for Environmental Studies
NIR	National Inventory Report
NFMS	National Forest Monitoring Systems
ONEP	Office of Natural Resources and Environmental Policy and Planning, Thailand
PFCs	Perfluorocarbons
QA	Quality Assurance
QC	Quality Control
RA	Reference Approach
REDD	Reducing Emissions from Deforestation and forest Degradation in developing countries
REDD+	Reducing Emissions from Deforestation and forest Degradation, and the Role of Conservation, Sustainable Management of Forests, and Enhancement of Forest Carbon Stocks
REL	Reference Emission Level
RL	Reference Level
RS	Remote Sensing
SA	Sectral Approach
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice

SEA	South East Asia
SEA GHG Project	Regional Capacity Building Project for Sustainable National Greenhouse Gas Inventory Management Systems in Southeast Asia
SF_6	Sulphur hexafluoride
SIDS	Small Island Developing States
SIGN center	Sistem Inventarisasi Gas Rumah Kaca Nasional (National Greenhouse Gas Inventory System) center
SNC	Second National Communication
TGO	Thailand Greenhouse Gas Management Organization (Public Organization)
TNC	Third National Communication
TTE	Team of Technical Experts
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
USEPA	United States Environmental Protection Agency
WGIA	Workshop on Greenhouse Gas Inventories in Asia
WRI	World Resources Institute
1996 IPCC GLs	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
2006 IPCC GLs	2006 IPCC Guidelines for National Greenhouse Gas Inventories

Photos of the Workshop

Welcome Address

Overall Chairperson

Closing Remarks

Mr. Suphot Tovichakchaikul

Dr. Yukihiro Nojiri

Dr.Natthanich Asvapoositkul

Registration

Meeting Room for Plenary Sessions

Mutual Learning Sessions

Energy

Agriculture

LULUCF

Reception

Chairpersons for Plenary Sessions

Opening Session

Mrs. Prasertsuk
Chamornmarn

Session I

Dr. Retno Gumilang Dewi

Session II

Dr. Baasansuren Jamsranjav

Session III WG1

Asst. Prof. Dr. Bundit
Limmeechokchai

Session III WG2

Dr. Rizaldi Boer

Session IV

Dr. Sumana Bhattacharya

Discussions in the Plenary Sessions

Information Exchanges in Tea Breaks

1. Executive Summary of WGIA12

1. Executive Summary of WGIA12

The Ministry of the Environment of Japan (MOEJ) and the National Institute for Environmental Studies (NIES) convened the 12th Workshop on Greenhouse Gas (GHG) Inventories in Asia (WGIA12) on 4-6 August 2014 in Bangkok, Thailand, as a capacity building workshop for Measurability, Reportability and Verifiability (MRV). Ever since 2003 the workshops have aimed at supporting Non-Annex I (NAI) Parties in Asia to develop and improve their GHG inventories. The 12th workshop was attended by over 120 experts from fourteen WGIA-member countries (Cambodia, China, India, Indonesia, Japan, the Republic of Korea, Lao P.D.R., Malaysia, Mongolia, Myanmar, Philippines, Thailand, Singapore, and Vietnam), as well as the representatives of the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC), Technical Support Unit of the IPCC Task Force on National Greenhouse Gas Inventories (IPCC TFI-TSU), the Regional Capacity Building Project for Sustainable National Greenhouse Gas Inventory Management Systems in Southeast Asia (SEA GHG Project), United Nations Environment Programme (UNEP), Food and Agriculture Organization of the United Nations (FAO), The Global Forest Observations Initiative (GFOI), Asia-Pacific Network for Global Change Research (APN), the U.S. Agency for International Development (USAID), the U.S. Environmental Protection Agency (USEPA), and relevant Japanese institutes. The Greenhouse Gas Inventory Office of Japan (GIO) at the Center for Global Environmental Research (CGER) of NIES functioned as the WGIA12 Secretariat.

The objectives of the workshop were:
- To enhance sector-specific capacity for inventory compilation (mutual learning)
- To facilitate periodical national GHG inventory preparation for national communications (NCs) and biennial update reports (BURs)
- To discuss the possibility of inventories as a supporting tool for mitigation measures/NAMAs
- To explore issues on measurability, reportability and verifiability (MRV) at various levels.

In this WGIA12, Biennial update reports (BURs) which will be submitted by Non-Annex I countries in the end of this year and International Consultation and Analysis (ICA) of BUR were discussed. To conduct consultation and technical analysis of BUR in its ICA procedure, the necessity of making more accurate GHG Inventories and the importance of QA/QC activities were recognized.

Also the importance of MRV at various levels, such as region and city levels, for verification of implementation and planning for NAMA was confirmed. In the AFOLU sector, the necessity of consolidating stable systems of GHG inventory for applying high cost benefit technology and continuous communication with inventory compilers and researchers who provide new technology was pointed out.

Through this WGIA12, the capacity development of participants' countries for MRV and the network to make BUR were enhanced aiming at making BUR, conducting ICA and implementing the intended nationally determined contributions (INDCs).

WGIA 13 will be held in Indonesia, and BURs which have been submitted by Non-Annex I Parties in this year will be presented by the participants. In addition, Mutual Learning and discussions about ICA will be conducted in the next WGIA.

The presentations and discussions on each subject are summarized below.

Opening session

WGIA and Japan's climate change policies as well as the current situation of Japan were presented. Next, Thailand's climate change mitigation policies were presented by Thailand as the host country. Enhancement of MRV activities using accurate inventories for NCs and BURs will contribute to planning and verifying Nationally Appropriate Mitigation Actions (NAMAs). This will also help form the basis for Intended Nationally Determined Contributions (INDCs) which all Parties are required to make after 2020.

Mutual Learning of each sector's GHG Inventories

The purpose of Mutual Learning is to improve GHG inventories by providing details of methods and data for GHG emission/removal estimation between two countries and exchanging comments on the methods and data. In this WGIA12, Mutual Learning sessions for the energy sector (Indonesia and Myanmar), agriculture sector (China and Mongolia) and LULUCF sector (Vietnam) were conducted.

The participating countries of Mutual Learning said that they identified good practices of each other, and that the experience of attendance would contribute to future inventory improvement which is a part of BUR. Also, sharing the background information of GHG Inventory in detail contributes the productive discussions.

Progress on National Communication, Biennial Update Report and International Consultation and Analysis

Non-Annex I Parties will submit BURs every two years, and the first BUR will be submitted by December, 2014. Therefore, the UNFCCC Secretariat presented NCs, BURs, and the framework and roles of the Team of Technical Experts (TTE) for ICA of the first BUR which was decided in COP 19 last year via Skype. Furthermore, UNEP presented UNEP-GEF support programmes and projects to support the building of the countries' capacity to make GHG Inventories continuously. The components of submitted BURs and the procedure of ICA were discussed.

Quality Assurance/ Quality Control (QA/QC) Activities in Preparation of NCs and BURs

The representative of IPCC TFI-TSU pointed out that QA/QC of inventories needed to consider the balance between time constraints and cost benefit. He also noted that the ICA process of BUR had a similar nature to QA in that it is conducted by a third party, although it may not be regarded as QA. He mentioned that ICA would give non-Annex I Parties which lack sufficient human resources of QA new opportunities to improve the quality of their GHG inventories.

The QA/QC support program for NCs by UNEP, the database for the AFOLU sector by FAO, QA/QC activities in the capacity development project and experience of QA/QC activities for NCs by Lao P.D.R. were presented. The necessary QA/QC activities for preparation of NCs and BURs were discussed for ICA which is conducted after the BUR submission. The importance of archiving the process for QA/QC in terms of transparency which is the objective for ICA was confirmed.

Working group 1: GHG Inventories at Various Levels

IGES, ICLEI and NIES mentioned the relationships between GHG inventories at regional/city level and ones at the national level, and noted GHG inventories at regional/city level played a role of the future GHG emission/removal projection.

The achievement and gaps of making the GHG Inventories at regional/city level were reported by Thailand, Indonesia, Korea and India. Participants noted that local inventories would be important to highlight the co-benefits, how it would contribute decision-making in policy development, and that there would be more chances to attract funding.

Working group 2: AFOLU Sector

The agendas regarding making inventory in AFOLU sector were reported by Vietnam, Malaysia, and Cambodia; probable ways of support by Donor sides (FFPRI, FAO, GFOI) including Japan were suggested.

Hokkaido University and USAID mentioned technical discussions regarding calculation of GHG emissions from soil which contains soil peat accompanied by many problems. As a result, to ensure consistency of international data, it was suggested that reviewing definitions of forest which differs from country to country, making an accurate and cost-effective inventory which consistent with REDD$^+$, and utilizing cost-effective new technologies including remote sensing method would be necessary.

Enhancement of Network for Supporting Measurement, Reporting and Verification (MRV) at Various Levels

IGES reported cases of actions for sharing of knowledge by Low-Carbon Asia Research Network (LoCARNet) and of research partnership and MRV support by APN in Asia-Pacific region. Then, they noted many other cases of actions including implementation of MRV at regional/city level in Kitakyushu City, planned support activities by Thailand, a guidebook to promote understanding of MRV by IGES, and support activities by NEDO at Joint Crediting Mechanism (JCM) projects. Through discussions, it was recognized that enhancing the exchange of information at various levels would play a crucial role to plan on NAMA projects and monitor the state of implementation of them, and would also contribute to make INDCs which every nations are required to draw framework after 2020.

2. Workshop Report

2.　Workshop Report

Please note that all presentation materials can be downloaded from the website of GIO:
http://www-gio.nies.go.jp/wgia/wg12/wg12index-e.html

2.1　Mutual Learning

Overview of the Mutual Learning

Mutual Learning (ML) is an activity to improve the individual countries' inventories through a series of processes: 1) exchanging inventories between two countries, 2) learning from a partner's inventory, and 3) exchanging comments on each other's inventories. The primary purpose of the ML is to improve GHG inventories by providing details of methods and data for GHG emission/removal estimation between two countries and exchanging comments on the methods and data. The ML is also expected to foster and strengthen a cooperative relationship among GHG inventory experts. Since the aim of the ML is not criticism or audit, participants can conduct a two-way communication, not a one-way communication like an examiner versus an examinee.

The first Mutual Learning was held on the waste sector between GIO and Korea Environment Corporation (KECO) in the annual workshop in 2008. The Secretariat of WGIA introduced this activity in WGIA8 in 2010. With the participants' agreement, ML has been held in the following WGIAs as one of the sessions.

Table 1 History of Mutual Learning

	2008	2009	2010	2011	2012	2013	2014
Outside WGIA	JPN-KOR (Waste)	JPN-KOR (Waste)	JPN-KOR (Whole inventory)	-	-	-	-
	WGIA6	WGIA7	WGIA8	WGIA9	WGIA10	WGIA11	WGIA12
WGIA activity	-	-	Introduction of ML (as hands on training)	IDN-MNG (Energy)	KHM-THA (Energy)	LAO-THA (Energy)	IDN-MMR(Energy)
				-	IDN-JPN (IP)	-	
				-	IDN-VNM (Agriculture)	CHN-MMR (Agriculture)	CHN-MNG (Agriculture)
				JPN-LAO (LULUCF)	-	-	VNM (LULUCF)
				IDN-KHM-KOR (Waste)	CHN-KOR (Waste)	MYS-VNM (Waste)	

* CHN = China, IDN = Indonesia, JPN = Japan, KHM = Cambodia, LAO = Lao P.D.R., MMR = Myanmar, MNG = Mongolia, MYS = Malaysia, KOR = Republic of Korea, THA = Thailand, VNM = Vietnam.

Participants

In December 2013, the WGIA Secretariat advertised the ML to the participants of WGIA, and received applications from 29 teams from 8 parties. Considering the requirements of the applicants and an appropriate balance among sectors and the feasibility of implementation, the WGIA Secretariat set up two pairs (Indonesia and Myanmar on energy sector, China and Mongolia on agriculture sector, and Vietnam on LULUCF sector) on April 2014.

Preparation

A few months before WGIA12, the chosen participants in the ML submitted the materials of their inventories to the WGIA Secretariat, including worksheets used for estimating emissions and reports describing details of methodologies, and exchanged the materials among partner countries through the Secretariat. Through studying the materials provided by each partner country, the participants found good points as well as shortcomings of each other's inventory. They also found issues to clarify by questions. Thus, participants wrote such comments and questions to their partner countries into "Question and Answer Sheets". After that, the "Question and Answer Sheets" were shared with the partner countries through the Secretariat. The partner countries responded to these comments and questions before WGIA12.

Table 2 Preparation Process of Mutual Learning

Process	Schedule
Submission of materials	Late April – Late May
Material Exchange	Early June
Studying the materials	During June
Comment exchange	July
Answers to comments	July
Sessions	4th August 2014

Discussions

In the WGIA12, the participants split into three sessions (Energy, Agriculture and LULUCF) and discussed sector-specific issues based on preliminary comment exchanges. In order to encourage a frank discussion and to ensure confidence, these sessions were closed.

Through the discussions, Participants studied partner countries' methodologies to estimate GHG emissions which were different from their own methods, and found out hints to improve their own inventories from the partner country's questions. They also shared their own technical issues (e.g. data collection, adoption of emission factors, national system, etc.) with the partners to overcome the obstacles.

Several participants who attended past MLs expressed that they had improved their inventories through the experience of MLs. They also emphasized that the ML programme was very effective to refine the inventory before its official submission to the UNFCCC such as NCs and BURs and was a good exercise for International Consultation and Analysis (ICA) of BUR. The participants of WGIA12 recognized the efficacy of ML in improving their inventories, and agreed to continuous implementation of ML in future WGIAs.

The points of discussion and outcomes of each individual ML session are summarized in the following sections (2.1.1 - 2.1.3).

2.1.1 Energy Sector

Sector Overview

Indonesia and Myanmar participated in a ML session for energy sector. The general information of the two countries was shown in Table 3:

Table 3 Sector Overview

	Indonesia	Myanmar
National total GHG emissions (Gg-CO$_2$ eq.)	665,543.89 (in 2005, without LUCF and peat fire)	33,996.4 (in 2000, without LUCF)
GHG emissions in the energy sector (Gg-CO$_2$ eq.)	369,799.88 (in 2005)	7,863.47 (in 2000)
Responsible agency for the inventory	Ministry of Environment	Ministry of Environmental Conservation and Forestry
Origin of estimation method in the energy sector	2006 IPCC Guidelines Tier 1	2006 IPCC Guidelines Tier 2 for CH$_4$ and N$_2$O estimation method in some area of transport category, and Tier 1 for the other categories
Source of emission factors	2006 IPCC Guidelines default values	2006 IPCC Guidelines default values
Source of activity data	Energy balance tables	Acquired and requested basis data mainly, and some official statistics

Materials Used

In order to prepare for the ML session in WGIA12, both countries exchanged their documents relevant to GHG emission estimation of the sector each other two months before the workshop. The exchanged documents were as follows:

Indonesia:
- Second National Communication 2011
- Emission estimation sheet (Excel)
- Energy balance tables (Excel)
- Emission summary and RA vs. SA tables (Excel)

Myanmar:
- Initial National Communication 2012
- Activity data sheet (Excel)

Questions and Answers

After receiving the materials described above, both countries studied them and provided questions and comments to their partner country approximately one month before the workshop. The classification and the number of the questions were as follows.

Table 4 Classification of Questions

Classification of question	Number of questions	
	from Myanmar to Indonesia	from Indonesia to Myanmar
Estimation method	3	1
Activity data	2	4
Other	1	1

Outcomes of the Mutual Learning Session

Through the mutual learning, several issues and good practices in the participating countries' preparation of GHG inventory have been identified.

➢Issues and solutions

Indonesia:

      The issues raised for Indonesia were: 1) there was difficulty in applying Tier 2 method due to a complexity of data collection; 2) some calculation errors are found in the inventory and the improvement of QC system might be necessary.

      In Indonesia, there are a lot of cities, provinces and industrial entities, and the using conditions of cars in urban area and in rural area are quite different. These make the application of Tier 2 method difficult.

Myanmar:

      The issues raised for Myanmar were: 1) the collection of activity data is insufficient; 2) the emission estimation process has not been verified by others and establishment of QC system is necessary.

➢Good Practices

Indonesia:

      The good practices identified for Indonesia were: 1) a good institutional arrangement has been already established and is functioning; 2) the energy balance tables are fully developed. The fully developed energy balance tables are effective to minimize the discrepancy between reference approach and sectoral approach.

Myanmar:

      The good practices identified for Myanmar were: 1) Tier 2 method is already adopted in some area of transport category; 2) a good institutional arrangement of the energy sector is planned and some committees for energy management have been established; 3) the reference approach and sectoral approach are used and compared to compensate insufficient data to each other.

➢Possible follow-up activities

      Indonesia may be able to help in creating energy balance tables of Myanmar, and once Myanmar have developed the energy balance tables, cross-check of the GHG estimates using energy balance tables and Tier 2 method between two countries would be possible.
Both countries also can communicate regarding how to develop and implement QA/QC system.

➢Suggestions for future ML and WGIA

      It may be a good learning opportunity if ML focuses on how to develop and improve AD, EF and calorific values, and there is a possibility to develop and use the same EF values if some fuels are exported or imported among the participating countries. Also, it's better to use 1st BUR for the next mutual learning materials.

Table 5 List of Participants in the Mutual Learning on Energy Sector

Country	Name	Organization	Title
Indonesia	Mr. Dida Migfar RIDHA	SIGN Center, Ministry of Environment	Head of SIGN Center
	Dr. Retno Gumilang DEWI	Center for Research on Energy Policy – Institute of Technology, Bandung	Head
	Ms. Siti Ina Malayni KAMIL	Climate Mitigation and Atmospheric Function Preservation, Ministry of Environment	Staff
	Ms. Nela Anjani LUBIS	SIGN Center, Ministry of Environment	Technical Assistant for the Capacity Development for Developing National GHG Inventory in Indonesia
Myanmar	Mr. Than AYE	Environmental Conservation Department, Ministry of Environmental Conservation and Forestry	Director
	Prof. Myo NYUNT	Environmental Committee Myanmar Engineering Society	Central Executive Committee Member
	Mr. Myint SOE	Pollution Control Department, Ministry of Environmental Conservation and Forestry	National Project Coordinator
Japan	Mr. Akira OSAKO	GIO	GHG Inventory Expert
	Mr. Naofumi KOSAKA		
	Mr. Hiroshi ITO		
	Mr. Tomoki TAKAHASHI	Environment and Energy Dept., MURC	Analyst
	Mr. Yu KAMEI	Low-carbon Society Promotion Office, Global Environment Bureau, Ministry of the Environment	Chief Official

2.1.2 Agriculture Sector

Sector Overview

China and Mongolia participated in the Mutual Learning in the Agriculture Sector. The general information of the two countries is as follows.

Table 6 Sector Overview

	China	Mongolia
National total GHG emissions (Gg-CO_2 eq., without LUCF)	7,467,090 (in 2005)	15,628 (in 2006)
GHG emissions in the Agriculture Sector (Gg-CO_2 eq.)	819,970 (in 2005)	6,462 (in 2006)
Responsible agency for the inventory	National Development and Reform Commission	Ministry of Environment and Green Development
Entity in charge of GHG emission calculation	Chinese Academy of Agricultural Sciences and IAP-CAS	Climate Change Coordination Office, the Ministry of Environment and Green Development
Origin of estimation method in the Agriculture Sector	GPG (2000) and country-specific models	Revised 1996 IPCC Guidelines
Source of activity data	Yearbooks	National statistics
Emission Factors	Mainly, CS-EFs constructed from domestic research papers and default EFs in GPG (2000)	Mainly, CS-EFs and default EFs described in revised IPCC Guidelines

Materials Used

In order to prepare for the Mutual Learning, both countries submitted their estimation documents of the sector and exchanged their documents with each other three months before the session in the WGIA12. The exchanged documents are as follows.

China:
-The Second National Communication of Climate Change of China
-GHG emissions from China croplands
-Research papers (6 papers, for rice cultivation, agricultural soil and livestock)
-Number of Livestock (Excel)

Mongolia:
-Document for Agriculture Sector
-Number of Animals (Excel)
-Mongolia's GHG Inventory Excel Spreadsheets_1990-2006 (Calculation files)
-Document for agriculture sector of tentative new inventory
-Mongolia's GHG Inventory Excel Spreadsheets_1990-2012 (Calculation files) (of tentative new inventory)

Questions and Answers

After receiving the estimation documents, both countries studied them and submitted questions and comments to the partner country approximately two months before the session.

The answers to the questions were provided prior to the session. The classification and the number of the questions are as follows.

Table 7 Classification of questions

Classification of question	Number of questions	
	from Mongolia to China	from China to Mongolia
Acquisition of activity data	4	2
Adoption of emission factors or parameters	0	3
Estimation method	0	3
Institutional arrangement	2	1
Others	0	3

Outcomes of Mutual Learning

In the session of WGIA12, Mongolia made a short presentation for the tentative new inventory which included a new estimation method and EFs. Basically, questions and answers and discussions were made for their new tentative inventory in the session. On the other hand, China made a short presentation for national system, crop soils and livestock, and discussion was made for the exchanged inventory and these presentations. Through the ML, several issues and good practices of the GHG inventory have been pointed out for both countries.

➢**Issues and solutions/ Other points for discussion**

In the question and answer sheets and discussion of the session, a lot of information was exchanged. Key discussion points for issues and solutions, and other points for discussion are as follows:

1) For Mongolia's AD, national statistics with some assumptions by expert judgment for disaggregation were used. These expert judgments were documented in a report (in Mongolian).
2) For Mongolia's EFs, default EFs described in the revised 1996 IPCC guidelines and country-specific EFs which were induced by Tier 2 methods with country-specific parameters were used.
3) For Mongolia, disaggregation in the cattle category may improve estimation methods by reflecting the country's specific situation.
4) For Mongolia's manure management, it may be better to remove "Goats" from "Others" and calculate it as an independent sub-category for clarification.
5) China estimated CH_4 from enteric fermentation by using the Tier 2 method described in the GPG (2000) with country-specific parameters to calculate gross energy.
6) China estimated CH_4 and N_2O from manure management by using the Tier 2 method with EFs described in the GPG (2000) and province-level data.
7) China's manure management data at the province level in similar climate conditions with Mongolia may be a good reference for Mongolia.
8) China used updated models to estimate CH_4 from rice cultivation (CH4MOD model) and N_2O from agricultural soil (IAP-N model).
9) Characterization of cattle such as species, size, milk yield, and feed practice, which relate to CH_4 emission estimation for enteric fermentation, was discussed deeply in the session.
10) For institutional arrangements in China, the National Development and Reform

Commission (NDRC), which belongs to the government, is in charge of National Communications. In addition, each sector's inventory is developed sector by sector. There are several research groups involved in developing China's GHG inventory, such as research institutes and universities.

➢**Good Practices**

Some good practices were pointed out through the Mutual Learning. They are as follows

1) Generally, Mongolia uses spreadsheets based on the revised 1996 IPCC guidelines for its inventory. The usage of spread sheets described in the Guidelines makes it easy for us to understand.

2) China uses country specific data for manure management. It may reflect the particular national situation more effectively.

3) Mongolia conducted recalculation in the tentative new inventory with newly developed EFs and corrected their mistake of estimation. It is a Good Practice because it leads to consistency and continuous improvement.

4) Mongolia prepared time series emission data from 1990 to 2012.

5) China's estimation methods and CS-EFs for rice paddy fields and agricultural soils were developed using a model based on actual measurement data which had been collected across China. This information is documented in the academic papers which were attached as materials for this Mutual Learning.

➢**Possible follow-up activities**

Mongolia is planning to describe detailed information for CS-EFs calculation data in their reports for livestock. In addition, Mongolia would recheck some points described above which may improve their inventory. Chinese and Mongolian experts including those who did not participated in this session will discuss about CS-EFs calculations.

➢**Suggestions and comments for future ML and WGIA**

The participants' suggestions for future Mutual Learning were as follows:

1) Background information exchange for CS-EFs helps to make more fruitful discussions.

2) It is a good opportunity for each country to understand each other's situation.

3) It may be better to prepare a short presentation material for the session warming-up.

4) Mongolia had some difficulty with the schedule for the exchange of question and answer sheets, because of overlap of the schedule for the preparation of the tentative new inventory. However, it provided a meaningful chance to check its new inventory. Finally, in the session, China and Mongolia considered that the time schedule of Mutual Learning from material exchange to this meeting was appropriate.

Participants

Country	Name	Organization	Title
China	Dr. Shenghui Han	State Key Laboratory of Atmospheric Boundary Layer Physics and Atmospheric Chemistry, IAP-CAS	Associate Professor
	Dr. Wen Zhang	State Key Laboratory of Atmospheric Boundary Layer Physics and Atmospheric Chemistry, IAP-CAS	Assistant Professor
	Dr. Zhiping Zhu	Institute of Environment and Sustainable Development in Agriculture, Chinese Academy of Agricultural Sciences	Associate Professor
Mongolia	Ms. Tegshjargal Bumtsend	Ministry of Environment and Green Development	Officer for GHG Inventory
	Ms. Sanaa Enkhtaivan	Ministry of Environment and Green Development	Officer for GHG Inventory
Facilitators	Mr. Kohei Sakai (Chair)	GIO	GHG Inventory Expert
	Dr. Junko Akagi	Kitakyushu Urban Centre, Institute for Global Environmental Strategies	Task Manager
	Mr. Kazumasa Kawashima	Environment and Energy Dept., Mitsubishi UFJ Research and Consulting Co., Ltd.	Chief Analyst
	Dr. Akinori Mori	Institute of Livestock and Grassland Science, National Agriculture and Food Research Organization	Senior Researcher

2.1.3 Land Use, Land-Use Change and Forestry Sector

Sector Overview

Vietnam participated in the mutual learning session for Land Use, Land-Use Change and Forestry sector. Experts of the GHG inventory-related matters for the LULUCF sector also participated in this ML session in order to provide comments for the improvement of Vietnam's GHG inventory. The general information of Vietnam was shown in Table 8.

Table 8 Sector Overview

	Vietnam
National total GHG emissions (Gg-CO$_2$ eq., without LUCF)	Not provided
GHG emissions/removals in the LULUCF sector (Gg-CO$_2$ eq.)	-30.535 (in Draft NIR 2010)
Responsible agency for the inventory	Ministry of Natural Resources and Environment Vietnam
Origin of estimation method in the LULUCF sector	GPG-LULUCF *
Source of emission factors	・The default values of GPG-LULUCF and 2006 IPCC GLs ・Country-specific parameters
Source of activity data	・Forest area by province from the Forestry Protection Department ・Forest area and volume in each forest type for eight eco region from Forestry Inventory and Planning Institute ・Area of perennial crop from General Statistics Office ・Area of land conversion were calculated from the land use matrix of the General Department of Land Administration ・Land use map from General Department of Land Administration in 2000 and 2010 ・Soil map from Soil Fertilizer Research Institution

* GPG-LULUCF: IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry

Materials Used

In order to prepare for the mutual learning session in WGIA12, Vietnam provided their documents relevant to GHG emission/removal estimation for the sector to Secretariat two months before the workshop. The provided documents were as follows:

- 4_LULUCF_estimation_2010.xlsx (Excel)
- 9_LULUCF_170520_WorkShop_final_rev.pptx (Power Point)
- NIR 2005 LULUCF (Eng) (need to update for 2010).docx (Documents)
- NIR 2010 LULUCF_09MAY.docx (Documents)

Outcomes of the Mutual Learning Session

Through the mutual learning, several issues and good practices in Vietnam's GHG inventory have been identified.

➤**Issues and solutions**

For forest land area, un-published data are used in Vietnam. The statistics data was prioritized for official use in estimating GHG emissions. Use of the satellite data may be the point of future improvement. In order to implement the GHG inventory for LULUCF in accordance with GPG-LULUCF, the Vietnamese country-specific land use categories were reorganized into six land use categories as defined by GPG-LULUCF.

In final 2010 report, estimations for mineral soil are being prepared; land use on organic soil calculation is to be considered; parameters for the Gain-Loss method (especially losses of carbon of firewood) need a little more consideration.

➢**Good Practice**

The good practices identified in the 2010 inventory compared to that for 2005 were: 1) the provided materials were transparent; 2) Emissions from dead organic matter associated with deforestation are newly calculated; 3) Non-CO_2 gas emissions due to on-site burning of biomass associated with deforestation are newly calculated; 4) Tier 2 method described in IPCC Guidelines were used in forest land remaining forest land.

➢**Possible follow-up activities**

Vietnam experts will discuss the use of IPCC Guidelines such as the 2013 Supplements to the 2006 IPCC Guidelines.

➢**Suggestions for future mutual learning and WGIA**

Vietnam will modify their inventories with focus on carbon stock change in soil, and wants to participate in Mutual Learning in the next WGIA. Efforts to improve consistency of data used for REDD and the GHG inventory can be considered.

Table 9 List of Participants in the Mutual Learning on LULUCF Sector

Country	Name	Organization	Title
Vietnam	Mr. Hung Trong NGUYEN	GHG Emission Monitoring and Low Carbon Economy Department of Meteorology, Hydrology and Climate Change, Ministry of Natural Resources and Environment	Official
	Mr. Song Lan BACH	Land Statistics Department of Land Registration, General Department of Land Administration, Ministry of Natural Resources and Environment	Deputy Head
	Ms. Trang Minh DAO	Climate Change Research Center Institute of Meteorology, Hydrology, and Environment	Deputy Head
Facilitator	Dr. Midori YANAGAWA (Chair)	GIO, NIES	GHG Inventory Expert
	Ms. Elsa HATANAKA		
	Prof. Mitsuru OSAKI	Research Faculty of Agriculture Hokkaido University	Professor
	Dr. Rizaldi BOER	Centre for Climate Risk and Opportunity Management of Bogor Agriculture University (CCROM-IPB)	Director
	Dr. Simon EGGLESTON	Group on Earth Observations, Global Forest Observation Initiative	GFOI Office Coordinator
	Mr. Atsushi SATO	Environment and Energy Dept., Mitsubishi UFJ Research and Consulting Co., Ltd.	Senior analyst
	Ms. Takako ONO	Institute for Global Environmental Strategies (IGES)	Task Manager on Asia Low Carbon Strategy

2.2 Opening Session

The opening session was chaired by Mrs. Prasertsuk Chamornmarn (TGO, Thailand), and the rapporteur was Ms. Elsa Hatanaka (GIO).

The welcome address was delivered by Mr. Yu Kamei, officer of the Low-Carbon Society Promotion Office, MOEJ, followed by the welcome address delivered by Mr. Suphot Tovichakchaikul, Deputy Permanent Secretary Minister of Natural Resources and Environment of Thailand.

Dr. Takefumi Oda (GIO) gave an overview of WGIAs and introduced the organization of WGIA in progress, objectives, participants, and the agenda of WGIA12. The objectives of WGIA12 were:

- To enhance sector-specific capacity for inventory compilation,
- To facilitate periodical national GHG inventory preparation for national communications (NCs) and biennial update reports (BURs),
- To explore good practice for further improvement of QA/QC activities of future GHG inventory compilation,
- To promote regional GHG inventory preparation and Measurement, Reporting and Verification (MRV) activities.

He emphasized that enhancement of MRV activities using accurate inventory of NCs and BURs will contribute to planning and verifying Nationally Appropriate Mitigation Actions (NAMAs). He also stressed that this will also help form the basis for Intended Nationally Determined Contributions (INDCs).

Mr. Yu Kamei made a presentation on Japan's climate change policies as well as the current situation of Japan. He reported Japan's achievement of the target for the CP1 of the Kyoto Protocol (-6 % below the base year level), and showed the next target of 3.8% emission reduction in 2020 from the 2005 level which has not yet taken into account the emission reduction effect resulting from nuclear power. He also stressed Japan will pursue the goal of 80% reduction in GHG emissions by 2050 in order to fulfill the responsibility as an industrialized country, as is stated in the fourth Basic Environmental Plan (revised in April 2012).

Dr. Natthanich Asvapoositkul (ONEP) made a presentation on Thailand's climate change mitigation policies. She overviewed the draft Climate Change Master Plan (2013-2050) as the vision of Thailand on Climate Change Policy and Plan from 2013 to 2050. In this master plan, she showed the political goals for adaptation and mitigation on various time scales; short-term goal to 2016 (e.g. establishment of NAMAs and MRV systems), medium-term goal to 2020 (e.g. 40% growth in forest cover and 7-20% reduction of GHG emissions from the energy and transport sectors, relative to BAU), and long-term goal to 2050 (e.g. 25% reduction in energy intensity relative to BAU). She also talked about Thailand's NAMAs toward 2020.

In the discussion, the WGIA participants actively inquired about details of each presentation with great interest, and presenters answered to these questions.

2.3 Session I: Progress of National Communication (NCs), Biennial Update Reports (BURs) and International Consultation and Analysis (ICA) for BUR

This session was chaired by Dr. Retno Gumilang Dewi (Indonesia) and the rapporteur was Ms. Elsa Hatanaka (GIO).

Non-Annex I Parties are to submit BURs every two years, and the first BUR will be submitted by December in 2014. An ICA for the first BUR will be conducted in 2015. Therefore, the UNFCCC Secretariat presented NCs, BURs, and ICA of the first BUR to share the latest information via Skype. In this session, UNEP presented UNEP-GEF support programmes and projects to support the building of the countries' capacity to make GHG

2. Workshop Report

Inventories continuously.

Mr. Hiroshi Ito (GIO) made an introductory presentation of this session. He overviewed relevant articles of the Convention for NCs, first BUR and ICA of BUR. He also pointed out challenges for NAI Parties in NC and BUR preparation.

Ms. Alma Jean (UNFCCC) made a presentation for Measurement, Reporting and Verification Framework for non-Annex I Parties under the Convention. She explained that the BURs are subjected to ICA, which increases the transparency of mitigation actions and their effects, through analysis by technical experts in consultation. Her presentation also contributed to the enhancement of knowledge with the relevant context on the Convention, an overview of the MRV framework including REDD-plus MRV.

Mr. Conrado Heruela (UNEP) made a presentation for UNEP-GEF Programmes and Projects for Supporting Capacity-Building in Climate Change Mitigation. He explained that the global support programmes implemented by UNEP and funded by GEF were aimed to support LDCs and SIDs to comply with their commitments to the UNFCCC. These programmes and projects may integrate components to build the countries' capacity to formulate and establish NAMAs.

In the discussion, the contents of BUR which must be submitted by December 2014 and the necessary support for continuous inventory submission were discussed.

2.4 Session II: Quality Assurance/Quality Control (QA/QC) activities in Preparation of NCs and BURs

This session was chaired by Dr. Baasansuren Jamsranjav (IPCC/TFI/TSU) and the rapporteur was Ms. Elsa Hatanaka (GIO).

The topic of quality assurance and quality control (QA/QC) was first raised in WGIA9 in the Inventory (QA/QC) Working Group of Session III. In WGIA12, the topic of BURs was raised again in this session, in light of the closely approaching submission deadline of December 2014 of the first BURs and subsequent ICA processes. Representatives of international organizations shared relevant information, and methods of ensuring good quality of the inventory were introduced.

Mr. Kiyoto Tanabe (IPCC/TFI/TSU) made a presentation on QA/QC activities and international consultation and analysis (ICA). He argued that GHG inventories needed to be of high quality so that they would be credible and believable. He noted that the ICA process had a similar nature to QA although they may not be regarded as QA. He mentioned that ICA would give non-Annex I Parties new opportunities to improve the quality of their GHG inventories.

Mr. Conrado Heruela summarized QA/QC activities in ASEAN countries by citing the national communications of these countries. He introduced the CGE training materials of QA/QC.

Mr. Francesco N. Tubiello (FAO) briefly introduced the FAOSTAT emissions database for

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the AFOLU sector. It includes the emissions data with country details from 1961. He demonstrated a new tool for QA/QC in the database. Inventory compilers can compare their own emissions estimates with those estimated by FAO through the tool. The tool will be launched near future. He also explained several activities on capacity development for regional, sub-regional and national levels.

Lastly, Ms. Thounheuang Buithavong (Lao P.D.R.) introduced the second national communication submitted to the UNFCCC last year. Although she mentioned that Lao P.D.R. had no system for QA/QC for GHG emissions at that time, some approaches were used to ensure good quality of the inventory. The approaches included sharing the results of recalculation among all stakeholders, participating in the Mutual Learning held in the past WGIA, external review by UNDP and the review by the National Steering Committee.

During the session, participants raised the question whether the National Steering Committee could serve as a quality QA authority. It was pointed out that it depended on whether the Committee was directly involved in the compilation of the inventories.
The chair emphasized that ICA did not replace but only supplement the nationally organized QA, though ICA had a similar nature to QA. Since QA/QC is not included in the requirements of the NC reporting guidelines, it cannot be said that countries which did not mention QA/QC in their NC did not conduct any QA/QC. On the other hand, the BUR reporting guidelines do not prevent non-Annex I parties from reporting additional information. There was a comment that it was a good practice to include QA/QC activities in the BUR since other countries could take that into consideration. Lastly, the chair highlighted the importance of archiving the QA/QC processes.

2.5 Session III: Working Group Session 1, Cross-cutting (GHG Inventory at various levels)

With the increasing need and interest in taking action to reduce GHG emissions at the sub-national level, interest to capture the current state of GHG emissions has also risen in recent years. In this session, WGIA member countries and external experts gave presentations and exchanged information on examples of GHG inventories at various levels.

This working group session was attended by 57 participants, from eight member countries (India, Indonesia, Malaysia, Myanmar, Philippines, Republic of Korea, Singapore, and Thailand) and also from Japan (MOEJ, IGES, ICLEI Japan, NEDO, MURC, Oriental Consultants, NIES) and IPCC TFI-TSU. The chairperson of the session was Dr. Bundit Limmeechokchai (Thailand) and the rapporteur was Dr. Chalor Jarusutthirak (Thailand).

Dr. Takefumi Oda (GIO) introduced the background for the session, agenda, and possible points for discussion during the session.

Dr. Junko Akagi (IGES Kitakyushu Urban Centre) started off the session with a presentation entitled "GHG inventories at national and regional/city level." She explained that as opposed to national GHG inventories that are mandatory requirements under UNFCCC/KP articles/decisions, local inventories are not international requirements, and are voluntary if not domestically mandated. Methodology and principles for estimation in local inventories can be similar to national inventories, but sometimes adjustments can be made to better suit the needs for local mitigation action. She concluded that information exchange among the

governments preparing the two inventories would help improve skills, such as in collection of data and institutional arrangements.

Following this, Ms. Michie Kishigami (ICLEI Japan) talked about ICLEI's activities on GHG inventories at the regional or city level. She introduced ICLEI's 1) Global Protocol for Community-Scale GHG Emissions for standardized estimation and reporting, 2) HEAT+, an online GHG emissions inventory tool that has also enables forecasting and preparing action plans, and 3) *Carbonn* Cities Climate Registry, a voluntary on-line reporting system for local and sub-national governments, and how these tools have helped to establish the cycle to analyze, act, and accelerate to establish low carbon cities.

Dr. Shuichi Ashina (NIES/AIM) presented on the roles of GHG inventories at the regional or city level for developing future GHG emission/removal projection. He stressed the importance of low-carbon development in Asia, and introduced examples of developing methodologies for the design of low-carbon society (LCS) scenarios and actions at the regional/city level. In doing so, he noted that establishing methodologies for estimating/formulating regional/city Energy Balance Tables and GHG inventories are essential for designing LCS scenarios.

In the Q&A following these presentations, a question was raised on how to get quality data for local inventories or models for local emission scenarios by Mr. Ridha. On the latter, Dr. Ashina introduced the NIES-AIM snap-shot model. On the former, Dr. Akagi commented that it was important to start and gradually improve data quality. Ms. Recabar and Dr. Bhattacharya noted the co-benefits of capturing information for each country in the form of GHG inventories, and the purpose they serve in informed decision-making. Dr. Akagi also noted that there are more chances to attract funding with the preparation of local inventories.

Mr. Chessada Sakulku (TGO, Thailand) followed, by kicking off for the series of presentations on examples of local level inventories from WGIA member countries. He presented on Thailand's GHG inventories at the municipal level, newly addressed by the National Strategy on Climate Change through support to be provided towards low-carbon cities. TGO, in response to this has initiated pilot projects in Lampang, Chiang Rai, and Nong Samrong to support the preparation of GHG inventories, mitigation action, and low-carbon development at the municipal level. They have found that data quality is limited and gaps and overlaps between other municipalities occur, and that preparation of GHG inventories in itself is a capacity building tool to better understand GHG emission-related issues in general.

Mr. Dida Migfar Ridha (Indonesia) presented on Indonesia's GHG inventories at the regional level. He explained that inventory preparation at the regional level is mandated under Presidential Decree No. 71/2011 for the preparation of the national inventory, in that they would provide activity data and emission factors for the national inventory. The role of inventories at the regional level is also becoming more important since every province has compiled a Regional Action Plan for GHG Emission Reduction ("RAD-GRK"). He noted that the challenges for regional inventories to be; 1) avoiding trans-boundary double-counting, 2) ensuring consistency in methodology especially with regard to AD, and 3) capturing the variability of local emission factors at the national level calculation.

Mr. Tae-Hoon Kim (KECO, Republic of Korea) followed with a presentation entitled "National GHG Inventory in 2011 and Local GHG Inventory." He explained that KECO is responsible for drawing up the national waste sector inventory report and the local

government GHG inventory report, and that currently the former has been estimated mainly based on the 1966 IPCC Guidelines while the latter has been estimated using the 2006 IPCC Guidelines. Through this process, the activity data, EFs, and methodology for the local inventories are also checked for whether they are in accordance with IPCC Guidelines. Local GHG inventories are prepared with the intention of helping local governments to develop strategies to reducing emissions.

Dr. Sumana Bhattacharya (India) wrapped up the presentations by speaking on India's GHG inventories at regional and city level. She explained how India's voluntary pledge as part of the Copenhagen Accord to reduce its GHG emission intensity by 20-25% by 2025 compared to 2005, will mainly be achieved through India's national climate policy, and state action plans for climate change, although the SAPCCs often lack base line assessment. There are, however, new cases such as the ICLEI-WRI-UNEP-UN Habitat initiative where about 40 cities have assessed their GHG emission inventory base lines.

Following the above presentations, Dr. Towprayoon raised a question on how regional level inventory data are used in the national inventory for Indonesia. Mr. Ridha explained that in the case of agriculture and waste sectors the data can be used in the national inventory. Mr. Sakulku noted that from what is observed in TGO's pilot projects, local inventory data requires quality improvement before considering use at the national level, since data has generally been collected only in a centralized manner in Thailand. Dr. Akagi asked the opinion of the participants on how they perceive the reactions of the local governments when asked to prepare inventories. Dr. Bhattacharya noted that responses heavily depended upon who was the leader of the municipality.

Participants noted that, if local inventories were to be promoted, it would be important to highlight the co-benefits, or how it would serve informed decision-making in policy development, or that there would be more chances to attract funding. The differences between national and local inventories were also acknowledged, but it was also noted that certain parts of local inventories can be used directly in the national inventories, or possibly used as QC or verification tools for the national inventory.

Participants:	Dr. Sumana BHATTACHARYA	India
	Mr. Dida Migfar RIDHA	Indonesia
	Dr. Retno Gumilang DEWI	Indonesia
	Ms. Nela Anjani LUBIS	Indonesia
	Dr. Nadia Mei Lin TAN	Malaysia
	Mr. Myint SOE	Myanmar
	Ms. Sandee G. Recabar	Philippines
	Mr. Chang-Hoon LEE	Republic of Korea
	Mr. Seung Ju MOON	Republic of Korea
	Mr. Tae-Hoon KIM	Republic of Korea
	Ms. Jin-Young CHO	Republic of Korea
	Mr. Sung-kyun KIM	Republic of Korea
	Mr. Kwangon KIM	Republic of Korea
	Mr. Hochul SHIN	Republic of Korea
	Ms. Wan Yin SEE	Singapore
	Dr. Sirintornthep TOWPRAYOON	Thailand
	Mr. Sivach KEAWCHAROEN	Thailand

Dr. Dares KEAWKET	Thailand
Ms. Thanyathorn SAWATDIWONG	Thailand
Ms. Seetala CHANTES	Thailand
Ms. Thipawan PHOTIWUT	Thailand
Mr. Jetnipit SUDTONGKUNK	Thailand
Dr. Bundit LIMMEECHOKCHAI	Thailand
Dr. Kraichat TANTRAKARNAPA	Thailand
Dr. Chalor JARUSUTTHIRAK	Thailand
Ms. Chirapaporn LAIMA	Thailand
Mr. Chessada SAKULKU	Thailand
Dr. Nattapong CHAYAWATTO	Thailand
Ms. Nareerat THANAKASEM	Thailand
Ms. Apaphatch HUNSIRITRAKUN	Thailand
Ms. Bongkoch KITTISOMPUN	Thailand
Mr. Pathom CHAIYAPRUKSATON	Thailand
Mr. Wisanu PHONPHO	Thailand
Mr. Nattaphon KUESUWONG	Thailand
Ms. Wararat CHA-UMKRUEA	Thailand
Mr. Kiyoto TANABE	IPCC TFI-TSU
Dr. Baasansuren JAMSRANJAV	IPCC TFI-TSU
Dr. Nina E. UVAROVA	IPCC TFI-TSU
Ms. Naima OUMOUSSA	IPCC TFI-TSU
Mr. Daisuke WATANABE	MOEJ
Mr. Kazuhisa KOAKUTSU	IGES (CE)
Dr. Junko AKAGI	IGES (KUC)
Ms. Teoh SHOM	IGES (Thailand)
Ms. Michie KISHIGAMI	ICLEI Japan
Mr. Tomoki TAKAHASHI	MURC
Mr. Genichiro SAWAMURA	NEDO
Mr. Masahiko FUJIMOTO	Oriental Consultants
Mr. Wataru MORIMOTO	JICA expert team
Mr. Tetsuya YOSHIDA	JICA expert team
Dr. Shuichi ASHINA	NIES/AIM
Ms. Elsa HATANAKA	NIES/CGER/GIO
Dr. Takefumi ODA	NIES/CGER/GIO
Ms. Masako WHITE	NIES/CGER/GIO
Mr. Akira OSAKO	NIES/CGER/GIO
Mr. Naofumi KOSAKA	NIES/CGER/GIO

2.6 Session III: Working Group Session 2, Agriculture, Forestry and Other Land Use (AFOLU)

This session was chaired by Dr. Rizaldi Boer (Indonesia), and the rapporteur was Dr. Wasinee Wannasiri (Thailand).

In this session, WGIA member countries made presentations on the National GHG inventories' situation in AFOLU sector with focused on forest, forest soil and wetland, and that international organization and developed countries give presentation for various support

projects to improve GHG inventory and relevant activities.

The purposes of this session are:
· To explore the national GHG inventories' activities on AFOLU sector in WGIA member countries,
· To exchange information on achievement, gap and necessary supports,
· To share information and enhance network for supporting GHG inventory in AFOLU sector.

Ms. Dao Minh Trang (Vietnam) reported Vietnam's GHG inventories on forest land category in LULUCF sector. She explained that the Government of Vietnam designated the Ministry of Natural Resources and Environment as a national focal point for preparing national GHG inventories which were a part of National Communications submitted to the UNFCCC. Vietnam has already submitted its INC and SNC with the 1994 and 2000 GHG inventories, respectively. Vietnam also compiled its 2010 GHG inventory, which will be included in its first BUR. Vietnam is presently developing its GHG inventory compilation system and implementing capacity building for its national staffs and agencies who related in GHG inventory with JICA supports.

Dr. Elizabeth M.P. Philip (Malaysia) explained Malaysia's GHG inventories on AFOLU sector, including its achievements, gaps and necessary supports for the inventories. According to her presentation, the Forest Research Institute of Malaysia or Forest Research Institute Malaysia is assigned to report the GHG emissions in the AFOLU sector of Malaysia. At present, they are preparing the BUR and TNC to report in 2015 and 2017 while they are applying the QA/QC process in the BUR to reduce the uncertainty of activity data at regional level. For their achievement, they are already developed the manual of GHG inventory for compliers and completed the GHG inventory in 2005-2010.

Dr. Chuop Paris (Cambodia) presented Cambodia's GHG inventories on AFOLU sector. He explained that Cambodia submitted the INC in 2002 and plans to submit the SNC in 2014. Moreover, the technical staff and the expert in GHG inventory of Cambodia were attended in the capacity building on GHG inventory and MRV programme. In addition, Cambodia's National MRV/REL team of Cambodia expected to develop National Forest Monitoring System Plan, Satellite Land Monitoring System for REDD+, National Forest Inventory, Cambodia RLs/RELs framework, and REDD+ related GHG Reporting System.

From the presentations mentioned above and discussions during the session, gaps and barriers for preparing GHG inventories on AFOLU sector were revealed. First, Vietnam needed to establish its legal framework on periodical national GHG inventory preparation, which would make it possible to smoothly implement data collection for the inventories. Second, Malaysia needed to overcome lacks of technical knowledge of GHG inventories and activity data pre-2000. Finally, for Cambodia, technical capacity on GHG inventory, climate change scenario, modeling for climate change mitigation and adaptation, coordination and communication with line ministries/agencies, and resources to transfer policy papers into actual activities/result are necessary.

In order to provide information on supporting activities for developing countries to overcome their gaps and barriers against appropriate preparation of GHG inventories on AFOLU sector, the following five presenters made presentations on various support projects to improve GHG inventory and relevant activities by international organization and developed

countries.

Dr. Misuo Matsumoto (FFPRI, Japan) introduced a "REDD-plus Cookbook" which was prepared and published by REDD Research & Development Center of Forestry and Forest Products Research Institute, Japan. He mentioned that REDD+ has become one of the hottest issues in the international discussions and negotiations on climate change. REDD+ is a mechanism to give incentives to emission reductions and removals by REDD+ activities; hence, National Forest Monitoring Systems (NFMS) and Measurement, Reporting and Verification (MRV) systems are required for appropriate estimation of emission reductions and removals. However, most developing countries as host countries of REDD+ do not have NFMS and MRV systems for REDD+, and capacity building for building them are being promoted with international cooperation. The "REDD-plus Cookbook" contributes to enhancement of capacities on NFMS and MRV systems for REDD+.

Mr. Francesco N. Tubiello (FAO) presented the supporting to WGIA member countries on activity data and GHG estimation for the AFOLU sector. He explained that FAO introduced international activity data sources, such as FAOSTAT and Forest Resource Assessment that contain official data through questionnaires and reported by member countries of FAO. FAO has long maintained global datasets on Agriculture and Forest and produced Agricultural statistics (FAOSTAT) and Forestry statistics. The new activity data produced from geo-spatial datasets are available through FAOSTAT for estimating the emission from cultivated organic soils and biomass burning.

Dr. Simon Eggleston (GFOI) presented supporting activities on sectoral MRV issues for AFOLU sector. GFOI supports countries' national efforts to implement the national forest monitoring systems in accordance with relevant international standards, including UNFCCC and IPCC, by providing a platform for coordinating observations by working with space agencies (CEOS) in order to assure the systematic, sustained and worldwide acquisition and supply of forest observations. In addition, GFOI provides assistance and guidance on utilising observations in collaboration with national institutions and international bodies such as the FAO and World Bank.

Prof. Mitsuru Osaki (Hokkaido University, Japan) made a presentation on estimation of carbon flux and stock in tropical peatland by applying integrated MRV system. He explained that the project developed the Monitoring-Sensing-Modeling system of carbon in peatland by using the various kind of remote sensing data and technique to measure the key activity in tropical peatland in Indonesia.

Dr. Amornwan Resanond introduced the USAID LEAD program that have the objective to builds capacity within developing Asian countries to achieve a sustainable, climate-resilient economic growth. The program supports planning and implementation of Low Emission Development Strategies through improved analytical and modeling capabilities, greenhouse gas (GHG) inventories, carbon market readiness and regional cooperation. The training was delivered through the Asian Greenhouse Gas Management Center, a new capacity building initiative based in Thailand established through the LEAD program.

Through presentations and discussions in this session, the participants in WGIA12 got the following outputs on the AFOLU issues:
● Difference of the forest definition in each countries:
  − Consistency of forest definitions used in a respective country in GHG inventory

and REDD+ should be considered.
- Consistency in methodologies between GHG Inventory for AFOLU and REDD+:
    - There are differences in estimation results between Gain – Loss method and Stock Change method. We need to consider how to ensure consistency of estimation results on carbon stock changes between AFOLU sector in GHG inventories and REDD+ because COP decision on REDD+ requires the consistency.
- Land use categorization and data inconsistencies:
    - There are differences of land-use categorization between the IPCC/international categorization and each country's national official categorization.
    - Inconsistency between land-use data and land cover data from different sources in a country also exists.
    - It is necessary to develop national standard for adjusting each country's official national land-use categorization to the IPCC/international categorization in order to ensure consistency of land-use categories in GHG inventories in line with the IPCC/international categorization.
- Establishment of clear linkage between MRV system of REDD+ and that of national GHG inventories:
    - The linkage should be established in order to ensure consistency between these two MRV systems.
- Cost effective method for forest carbon monitoring:
    - We should consider possible use of remote sensing technology such as LiDAR for measuring biomass.
- Development of future IPCC Guidelines taking into account scientific advances, including the advancement of remote sensing capabilities in monitoring the dynamics of terrestrial carbon:
    - Developing and promoting the use of RS technologies to monitor not only forest cover change but also terrestrial carbon stock changes would be helpful for improving GHG inventories on AFOLU sector.
    - It is considered that the RS approach could be useful for JCM which supports REDD+ program.

Participants: Dr. Paris CHUOP   (Cambodia)
                 Dr. Tapan Kumar ADHYA   (India)
                 Ms. Siti Ina Malayni KAMIL   (Indonesia)
                 Dr. Rizaldi BOER   (Indonesia)
                 Ms. Thounheuang BUITHAVONG   (Lao P.D.R.)
                 Mr. Bounthee SAYTHONGVANH   (Lao P.D.R.)
                 Dr. Elizabeth M.P. PHILIP   (Malaysia)
                 Ms. Tegshjargal BUMTSEND   (Mongolia)
                 Ms. Sanaa ENKHTAIVIAN   (Mongolia)
                 Mr. Than AYE   (Myanmar)
                 Dr. Myo NYUNT   (Myanmar)
                 Dr. Sirintornthep TOWPRAYOON   (Thailand)
                 Dr. Natthanich ASVAPOOSITKUL   (Thailand)
                 Mr. Wisarut SUPANNAFAI   (Thailand)
                 Ms. Athitaya CHANGDUANG   (Thailand)
                 Mr. Pongsuk AUESSUWANNA   (Thailand)
                 Mr. Suwan PITAKSINTORN   (Thailand)

Dr. Ladawan PUANGCHIT	(Thailand)
Dr. Patthra PHENGTHAMKEERATI	(Thailand)
Ms. Anna KIEWCHAUM	(Thailand)
Ms. Prangvalai BOUASAN	(Thailand)
Dr. Wasinee WANNASIRI	(Thailand)
Mr. Song Lan BACH	(Vietnam)
Ms. Trang Minh DAO	(Vietnam)
Mr. Hung Trong NGUYEN	(Vietnam)
Ms. Mausami DESAI	(USA)
Dr. Amornwan RESANOND	(US LEAD Program)
Mr. Radtasiri WACHIRAPUNYANONT	(US LEAD Program)
Mr. Leandro Valmonte BUENDIA	(SEA GHG Project)
Mr. Francesco Nicola TUBIELLO	(FAO)
Dr. Simon EGGLESTON	(GFOI)
Mr. Atsushi SATO	(Japan)
Mr. Kohei SAKAI	(Japan)
Mr. Hiroshi ITO	(Japan)
Ms. Takako ONO	(Japan)
Mr. Takahiko HIRAISHI	(Japan)
Dr. Mitsuo MATSUMOTO	(Japan)
Mr. Yu KAMEI	(Japan)
Dr. Mitsuru OSAKI	(Japan)
Dr. Akihiro MORI	(Japan)
Mr. Kazumasa KAWASHIMA	(Japan)
Dr. Midori YANAGAWA	(Japan)
Dr. Yukihiro NOJIRI	(Japan)
Mr. Satoshi IEMOTO	(JICA (TGO CITC Project))

2.7 Session IV: Enhancement of Network for Supporting Measurement, Reporting and Verification at Various Levels

This session was chaired by Dr. Sumana Bhattacharya (India) and the rapporteur was Ms. Elsa Hatanaka (GIO).

The topic of enhancing the network for supporting MRV at various levels was taken up in WGIA11 in Session V.

In WGIA12, this topic was taken up again in Session IV, to provide an overview of what support and networks are available to enhance MRV at various levels undertaken at the research/policy interface and at the practitioner's level, and to explore what the challenges are and what might be done to deal with them. In this session, external experts gave presentations and participants exchanged information on enhancing MRV at various levels.

Ms. Elsa Hatanaka (GIO) introduced the background for the session, agenda, and possible points for discussion during the session.

Dr. Shuzo Nishioka (IGES, LoCARNet) started off the session with a presentation entitled "Promoting Knowledge-based Systems for Scientific Low Carbon Development Policy-Making in Asia: The Growing Importance of Inventory Work." He introduced LoCARNet's

work, which facilitates the formulation and implementation of science-based policies for the low-carbon development in Asia, through its open network of researchers and research organizations. He explained that there is a strong need to minimize the use of the remaining carbon budget and move to a low carbon society, and stressed that Asia needs to be a key actor in the action, and also noted that good quality inventories contribute to achieving a low carbon Asia.

Following this, Dr. Jariya Boonjawat (APN) talked about APN's supporting activities Related to MRV. She introduced APN-supported projects such as the project on 1) MRV systems for REDD+, which aimed at scaling up REDD+ MRV systems from the project level to the national level for Lao P.D.R. and Vietnam, and 2) capacity building for implementing a MRV Model in a mid-sized Thai municipality, and how APN's support for regional cooperation in global change research strengthens science/policy dialogue, and improves the scientific and technical capabilities in the region - including that for GHG inventories and MRV systems.

Dr. Junko Akagi (IGES KUC) presented on the capacity building support of MRV for local governments implemented by IGES/KUC. She stressed the importance of addressing GHG emissions from cities which account for over 70% of global energy-related CO_2 emissions, even though cities only account for below 2% of global land area. She noted that city governments play an important role for sustainable and low-carbon city development, and capacity building is needed, including that for GHG inventories. In this regard, she also noted that national governments could help, with their experience and support.

Dr. Jakkanit Kananurak (TGO) followed, by presenting on the newly established Climate Change International Technical and Training Center (CITC) in 2014. He explained that CITC was established as a one-stop technical and training center for climate change mitigation and adaptation in the South-east Asia region, with the support of Japan International Cooperation Agency (JICA). It is offering knowledge in 1) GHG inventory management, 2) Mitigation mechanisms, 3) Low carbon society development, and 4) Sustainable GHG management, to target groups such as governmental agencies, academic institutions, private companies related to mitigation and adaptation, and the general public, both inside and outside of Thailand.

Mr. Kazuhisa Koakutsu (IGES) made an introduction to MRV Guidebooks newly released by IGES in 2013, with the cooperation of various experts in the field. He explained that the MRV Guidebooks for developing countries, and for policy makers are now both available, with the latter being a jointly-collaborated product between IGES and GIZ. They are intended to strengthen the understanding of existing MRV schemes, since future MRV schemes will surely be built on existing ones. They include Q&A sections and best practices, with editions to be continuously updated.

Mr. Genichiro Sawamura (NEDO) followed with a presentation entitled "What's the Next Step? - For Joint Credit Mechanism (JCM) Emission Reduction Through MRV Methodology." He explained that the Joint Crediting Mechanism (JCM) aims at contributing to sustainable development, by facilitating diffusion of leading low carbon technologies and implementing mitigation actions. Feasibility studies that include establishing methodologies for the evaluating emission reductions and assessing financial feasibility, and demo projects are on-going.

Following the above presentations, some comments were presented and questions were

raised. Dr. Nishioka stressed that energy-use and economic growth needed to be decoupled, and stated that Japan succeeded at doing this during the oil crisis to a certain extent, and hopes to support other Asian countries so that the opportunity to choose low-carbon development paths isn't lost. Mr. Conrado Heruela (UNEP) noted that MRV might be different by the size/type of municipality. Mr. Paris Chuop (Cambodia) asked what are possible for co-benefits of local mitigation actions, and Dr. Akagi (IGES KUC) and Mr. Leandro Buendia (SEA Project) noted that improvement in waste management, traffic management, and the health sector etc., would be some. Mr. Sung-kyun Kim (Republic of Korea) asked how reference scenarios are verified for JCM projects, and it was noted that the JCM Joint Committee for each country will approve it, and a third party entity will check it against guidelines whether it is appropriate. Mr. Francesco Tubiello (FAO) asked how NAMA projects etc., under the UNFCCC would coincide with JCM reference scenarios, and it was noted by Mr. Koakutsu (IGES) that JCM is at the project level and is different from NAMA reference levels. Dr. Nadia Mei Lin Tan (Malaysia) asked whether there are preferences of sectors for JCM projects, and Mr. Koakutsu (IGES) explained that the JCM Joint Committee for each country will take the decision. Mr. Taka Hiraishi (IGES) posed the question of how harmonization can be done for local and national level inventories/mitigation actions. Dr. Sumana Bhattacharya (India) noted that this was difficult, but that national level policy implemented at the local level may be captured, or IPCC guidelines and software intended for national level-use may be used at the local level.

Generally, a strong interest was shown by the participants on the details of support available and the specifics of MRV implemented, together with interest for the harmonization between local and national, where local-level actions are reflected in national level inventories and low-carbon development decision-making. This knowledge-sharing will contribute to the planning and verification of NAMAs, and also help form the basis for Intended Nationally Determined Contributions (INDCs).

2.8 Wrap-up Session

This session was chaired by Dr. Yukihiro Nojiri (GIO). In this session, the rapporteurs from the Mutual Learning session, plenary sessions and working groups provided summaries of the discussions including findings and recommendations, which were followed by the final discussion to conclude the workshop. The following is a summary of this workshop.

Summary of the Mutual Learning
Mr. Hiroshi Ito (GIO) presented the background of Mutual Learning, i.e. objectives, history, and outcome of past Mutual Learning programmes. He also summarized the Mutual Learning held in WGIA12. He concluded that the Mutual Learning programme can be a supplement to a nationally organized QA activity and regional communication is a good way to improve inventories.

The participating countries in the Mutual Learning said that they identified good practices of each other and the experience of attendance would contribute to the improvement of future inventories. They expressed that it was a good opportunity to attend the Mutual Learning and they looked forward to attending a Mutual Learning next year with another country. They said that submitted BURs or regional inventories may be used for materials of a Mutual Learning next year. Especially, by studying submitted BURs, participants can identify what good practices are and what elements were missing that should be reported in future

BURs and inventories.

Summary of the Plenary Sessions (Opening Session and Sessions I, II and IV)

Ms. Elsa Hatanaka (Japan), the rapporteur of the plenary sessions, reported the summary of presentations, questions raised and points noted in the opening session and sessions I, II, and IV.

The discussion after her report is summarized as follows.

According to decision 2/CP.17, BUR1 should be submitted by December 2014 and shall cover the inventory no more than four years prior to the date of the submission. The UNFCCC Secretariat states that if a BUR is submitted after 2014, the inventory year should be adjusted to be consistent with the decision. GEF funding supports for preparing NCs and BURs were also introduced.

Summary of Session III

Working Group 1 (GHG Inventories at Various Levels)

Dr. Chalor Jarusutthirak (Thailand), the rapporteur of working group 1, reported the summary of presentations, questions raised and points discussed.

The discussion after her report is summarized as follows.

Regarding regional inventories, the importance of step-by-step improvements of the quality was stressed. It was pointed out that local data obtained through compiling regional inventories were worthy of considering for utilization for other purposes, such as national inventories, in order to improve the data quality. It was also discussed how to motivate local governments to compile their inventories. There was an opinion that showing the activities of top runners like ICLEI may be an incentive for these governments.

Working Group 2 (AFOLU)

Dr. Wasinee Wannasiri (Thailand), the rapporteur of working group 2, reported the summary of presentations and issues discussed.

The chair casted the question what was needed for utilizing highly sophisticated technologies introduced in this working group, such as satellite observations and advanced on-site measurements, for GHG inventories. Some participants answered that sustainable institutional arrangements were needed and cost-effectiveness should also be considered. The necessity of keeping communication between researchers and inventory compilers in future WGIAs was confirmed.

The closing remarks were delivered by Ms. Raweewan Bhuridej, Deputy Secretary General, ONEP, Thailand and Dr. Yukihiro Nojiri, Manager of GIO, Japan. They thanked all participants for their presentations and contributions to the fruitful discussions in the workshop. They stated that WGIA was a good platform to share information and exchange thoughts on BUR preparation and submission.

3. Abstracts

3.1 Opening Session

Overview of WGIA 12

Takefumi Oda
Greenhouse Gas Inventory Office of Japan (GIO/CGER/NIES), Japan

Abstract

Non-Annex I (NAI) Parties under the United Nations Framework Convention on Climate Change (UNFCCC) are required to prepare Greenhouse Gas (GHG) inventories as a part of National Communications (NCs) and Biennial Update Report (BURs) to be periodically submitted to the Conference of the Parties (COP) under the UNFCCC. Under the international circumstances, it becomes important to develop reliable GHG inventories of NAI countries and to enhance their further improvement.

To support developing and improving GHG inventories of NAI Parties in Asia, the Workshop on GHG Inventories in Asia (WGIA) was organized by the Ministry of the Environment of Japan (MOEJ) and the National Institute for Environmental Studies (NIES), and has been held annually since 2003.

The upcoming 12th Workshop on GHG Inventories in Asia (WGIA12) is to be held on 4-6 August 2014 in Bangkok, Thailand. The WGIA12 aims: 1) to enhance sector-specific capacity for inventory compilation, 2) to facilitate periodical national GHG inventory preparation for NCs and BURs, 3) to explore good practices for further improvement of QA/QC activities on future GHG inventory compilation, 4) to promote regional GHG inventory preparation and Measurement, Reporting and Verification (MRV) activities.

Over 110 participants are expected to be present in this 12th workshop. The participants are government officials and researchers from 14 countries in Asia (Cambodia, China, India, Indonesia, Japan, Republic of Korea, Lao P.D.R., Malaysia, Mongolia, Myanmar, Philippines, Singapore, Thailand and Vietnam) and experts from international organizations (UNFCCC, the Technical Support Unit of the IPCC Task Force on National GHG Inventories (IPCC/TFI/TSU), the Regional Capacity Building Project for Sustainable National GHG Inventory Management Systems in Southeast Asia (SEA GHG Project), the United Nations Environment Programme (UNEP), the Food and Agriculture Organization (FAO), the Global Forest Observations Initiative (GFOI), the Asia Pacific Network (APN), and US Agency for International Development (USAID)).

Access to relevant information

http://www-gio.nies.go.jp/wgia/wgiaindex-e.html

Japan's Climate Change Policies

Yu Kamei

Ministry of the Environment, Japan

Abstract

The Ministry of the Environment, Japan (MOEJ), with the cooperation of relevant ministries, agencies and organizations, prepares Japan's national inventory and compiles supplementary information required under Article 7.1, which is annually submitted to the Conference of the Parties through the UNFCCC Secretariat in accordance with the UNFCCC and the Kyoto Protocol.

Last April, Japan has submitted its National Greenhouse Gas Emissions in fiscal year (FY) 2012 in accordance with the Act on Promotion of Global Warming Countermeasures. Total emissions in FY2012 were 1,343 million tonnes of carbon dioxide equivalents (Mt CO_2 eq.), a 6.5% increase compared to those of the base year under the Kyoto Protocol. The five-year average for total emissions during the first commitment period of the Kyoto Protocol (FY2008-FY2012) was 1,278 Mt CO_2 eq. (1.4% increase from base year), and the five-year average for removals by forest and other carbon sinks that can be used toward achieving the target was 48.7 Mt CO_2 eq. (3.9% of base year) Consequently, if the Kyoto mechanisms credits are taken into account, the five-year average shows an 8.4% decrease compared to the base year; therefore, Japan will have achieved its target for the first commitment period of the Kyoto Protocol (-6 % below base year level).

Last November, Japan has submitted its quantified economy-wide emission reduction target for 2020; 3.8% emission reduction in 2020 compared to the 2005 level. This was a target at that point, which had not yet taken into account the emission reduction effect resulting from nuclear power, given that the energy policy and energy mix, including the utilization of nuclear power, were still under consideration. A firm target, based on further review of the energy policy and energy mix will eventually be set.

In accordance with the Cancun Accord and the Durban Decision under the UNFCCC, last December, Japan has submitted its 1st Biennial Report (BR1) and 6th National Communication (NC6) based on its new greenhouse gas emission reduction target.

My presentation will show the outline of Japan's greenhouse gas emissions trends, policies and measures toward sustainable low-carbon society.

References

Ministry of the Environment, Government of Japan

Access to relevant information

http://www.env.go.jp/en/index.html

Workshop on GHG Inventories in Asia
– Thailand's Climate Change Policies –

Natthanich Asvapoositkul
Climate Change Management and Coordination Division (CCMC),
Office of Natural Resources and Environmental Policy and Planning (ONEP), Thailand

Abstract

By the year 2013, the population of Thailand was 68,229,000 people, which represents an increase of 1,443,999 people compare to 2012. The majority of people live in rural, agriculture areas. Agriculture employs 49% of the population and contributes 10% of GDP. The capital city, Bangkok, is home to 15% of the country's population and serves as the economic, political and social center of Thailand. Climate change threatens all important sectors of Thailand's economy, e.g., agriculture, tourism, and trade.

The effect of climate change, including floods, droughts, severe storms and sea level rise, have been damaging to agriculture, coastal tourism, infrastructure especially the capital city. In 2011, several regions of Thailand including the capital city, Bangkok, were flooded by severe storms. This consequence of climate change had enormous economic, cultural and environmental impacts to Thailand.

As a party of United Nations Framework of Climate Change (UNFCCC) since 1994, Thailand has been dedicating immense efforts in order to limit GHG concentration in the atmosphere and adapt to the severe impacts of climate change in harmonizing with sustainable social and economic development. In order to integrate multiple and diverse actors for implementation of climate change, Thailand has established Climate Change Management and Coordination Division (CCMC) under ONEP which is focal and responsible for formulating climate change policies and plans for Thailand. Draft Climate Change Master Plan (2013-2050) has been developed by CCMC, ONEP, for solving climate change issues. This master plan composes of two key components which are adaptation and mitigation. Such measures, however, would require an extensive period of time for implementation. In order to ensure the continuation and effectiveness of implementation, along with meaningful participation of all stakeholders in combating with climate change, this plan was separated into three periods of time, which are short, medium and long term plans. In addition, the features of this plan will flexible and will need evaluation every five years.

The vision of this master plan is for Thailand to be resilient to climate change impacts and becomes a low-carbon economy in accordance with a sustainable development approach. In order to deliver this vision and to ensure the plan achieves the ultimate goal, we are focusing on 4 key challenges; to develop long term climate change management framework, to use as policy framework, to provide framework for all relevance agencies aimed at their climate change action plan development, and to ensure the same understanding and effective cooperation among related agencies and stakeholders.

By tackling these 4 key challenges, we also deliver 4 missions which are (1) to create database and body of knowledge on climate change impacts to support sustainable climate change adaptation and low carbon development, (2) to increase climate change adaptive capacity to the national development by pushing forward and integration of climate change adaptation approaches and measures to stakeholders at all levels, (3) to reduce national GHG emission and develop a sustainable low-carbon growth mechanism, and (4) to build capacity and awareness of development partners at all levels so that they are capable of climate change related policies and plans implementation.

My presentation will cover the overview of draft Climate Change Master Plan (2013-2050);

show the vision of Thailand on Climate Change Policy and Plan from 2013 to 2050; and overview of activities related to this master plan.

<u>References</u>

- Draft Climate Change Master Plan (2013-2050) – Climate Change Management and Coordination Division, Office of Natural Resources and Environmental Policy and Planning
- Office of National Economic and Social Development Board

3.2 Session I

"Measurement, Reporting and Verification Framework for Non-Annex I Parties under the Convention"

Alma Jean,
Programme Officer, Non-Annex I Support, Mitigation, Data and Analysis (MDA)
United Nations Framework Convention on Climate Change (UNFCCC)
Twelfth Workshop on Greenhouse Gas Inventories in Asia (WGIA12) and the GHG inventory
workshop, Bangkok, Thailand, 4-7 August 2014

Abstract

National governments submit to the Conference of the Parties (COP), national reports on action taken to implement the United Nations Framework Convention on Climate Change (UNFCCC) and to facilitate discussions on such implementation. These actions promote transparency and accountability.

For developing countries, national communications and biennial update reports (BURs) are submitted, both of which include sections on national greenhouse gas (GHG) inventories. Further, the BURs are subjected to international consultation and analysis (ICA), which increases transparency of mitigation actions and their effects, through analysis by technical experts in consultation with the concerned government and through a facilitative sharing of views. It is therefore critical that developing countries build their capacity to prepare and submit good quality reports.

The presentation will contribute to enhancing the knowledge of workshop participants with the relevant context on the Convention, an overview of the MRV framework for developing countries, including at the international and domestic levels, as well as REDD-plus MRV. However, the content will focus on the BURs and the ICA process, through the technical analysis and the facilitative sharing of views.

UNEP-GEF Programmes & Projects for Supporting Capacity-Building in Climate Change Mitigation

Conrado Heruela
– WGIA12 – August 4, 2014

Abstract

The presentation describes the global support programs implemented by UNEP and funded by GEF to support LDCs and SIDs to comply with their commitments to the UNFCCC. UNEP is implementing three global support programs to support preparation of National Communications. UNEP is now processing the approval of the GEF for global support program to assist LDCs and SIDs prepare their BURs. In addition, UNEP, as an implementing agency, assist countries access their STAR allocations to execute GEF CC mitigation projects. These projects may integrate components to build the countries' capacity to formulate and established NAMAs.

3.3 Session II

QA/QC Activities and ICA

Kiyoto Tanabe
Technical Support Unit of the IPCC Task Force on National Greenhouse Gas Inventories

Abstract

National greenhouse gas inventories need to be reliable and of high quality, attaining the sufficient level of transparency, comparability (with other countries' inventories), consistency (over time), completeness and accuracy (TCCCA). To this end, quality assurance and quality control (QA/QC) procedures are considered important and integral parts of the inventory development process. Detailed guidance on QA/QC procedures is given in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC, 2006).

Planning and implementation of QA/QC procedures may not be easy for many developing countries. In particular, QA seems difficult because it is not easy to find and involve "personnel not directly involved in the inventory compilation/development process" as defined in the *2006 IPCC Guidelines*. Under such circumstances, non-Annex I Parties to the UNFCCC may be able to take advantage of the International Consultation and Analysis (ICA) of Biennial Update Reports (BURs) that will start in 2015 following the decision taken at COP17 (UNFCCC, 2011) with a view to improving the quality of their national greenhouse gas inventories, in view of the fact that the ICA process has a similar nature to that of QA.

The aim of the ICA is to increase the transparency of mitigation actions and their effects in the BURs. The ICA is to be conducted in a manner that is non-intrusive, non-punitive and respectful of national sovereignty. The ICA consists of two steps: (1) a technical analysis of BUR by a team of technical experts (TTE) (UNFCCC, 2013) and (2) a facilitative sharing of views in the form of workshop under the Subsidiary Body for Implementation (SBI) of the UNFCCC. In both steps, the non-Annex I Party whose BUR is undergoing the ICA needs to interact with the third parties (with TTE in the first step and with the other Parties in the second step) through questions and answers about its BUR.

Interaction with the third parties help non-Annex I Parties to detect and correct errors in their inventory, to improve its transparency, etc. Many non-Annex I Parties have not had opportunities for such interaction with others so far. The ICA is expected to give them such opportunities and to greatly help them in improving the quality of their inventories.

References

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.

UNFCCC 2011, Decision 2/CP.17 "Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention" (FCCC/CP/2011/9/Add.1)

UNFCCC 2013, Decision 20/CP.19 "Composition, modalities and procedures of the team of technical experts under international consultation and analysis" (FCCC/CP/2013/10/Add.2)

Access to relevant information

http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html
http://unfccc.int/2860.php

QA/QC Activities for CC Enabling Activities under UNEP Global Support Programmes

Conrado S. Heruela
United Nations Environment Programme, Regional Office for Asia & the Pacific, Bangkok, Thailand

Abstract

The first part of the presentation reviews the most recent National Communications (NATCOMS) to the UNFCCC submitted by the ASEAN countries. These focused on the four countries supported by the "GEF-UNEP Global Support Programmes to Support Preparation of NATCOMS" (Cambodia, Lao PDR, Myanmar and Vietnam). The five other ASEAN countries were also included in the review (Indonesia, Malaysia, Philippines, Singapore and Thailand). The review showed that except for the Lao PDR NATCOM, there were no discussions of QA/QC activities conducted as part of the GHG Inventory done under the preparation of the NATCOM in the other countries. But at least three other countries mentioned about QA/QC - Indonesia, Malaysia and Thailand, discussing about future activities and capacity building needs. Part 2 of the presentation consist of slides excerpted from the introductory training course conducted by CGE on QA/QC. These are included as reference materials for the participants.

References

1. National Communications submissions from countries (see links below)
2. CGE training materials (see links below)

Access to relevant information

1. UNFCCC website, link to Non-Annex 1 countries national reports – http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php
2. IPCC Good Practice Guidance and Uncertainty Management in National GHG Inventories
3. http://www.ipcc-nggip.iges.or.jp/public/gp/english/
4. GEF project list – Enabling Activities - www.thegef.org/gef/project_list

QA/QC Activities under Projects on FAOSTAT by FAO

Francesco N Tubiello
FAO, Italy

Abstract

FAO supports its member countries identify, assess and report their greenhouse gas (GHG) emissions from AFOLU, in support of key UNFCCC processes including National GHG Inventory, BUR submission, NAMA and REDD+ development. FAO's focus is on improving rural statistics addressing both technical and institutional gaps. The relevant FAO activity is the Monitoring and Assessment of GHG Emissions and Mitigation Potential Project (MAGHG).

The FAOSTAT Emissions database represents the key tool used by FAO in support of its member countries national inventory processes. Used as the basis for the AFOLU chapter analysis of the recent IPCC AR5 WGIII Report, it is available online, providing updated estimates using IPCC 2006 Tier 1 estimates for Agriculture (1961-2011, plus projections to 2030 and 2050) and Tier 1 Approach 1 estimates for Land Use (1990-2010). As an internationally available global database of emissions estimates, it can be used in the processes of QA/QC and verification of GHG National Inventories, according to the IPCC Guidelines.

The FAO presentation will illustrate live online the main features of the FAOSTAT Emissions database, including new QA/QC tools to perform GHG regional and national analyses, develop data comparisons and build of relevant indicators.

References

Tubiello et al., 2013. The FAOSTAT Emissions database. *Environmental Research Letters*, 8 doi 015009

FAO, 2014. Agriculture, Forestry and Other Land Use Emissions by Sources and Removals by Sinks: 1990-2011 Analysis. FAO, Rome, Italy

IPCC 2014. Ch. 11: AFOLU. Smith, P. et al., in Intergovernmental Panel on Climate Change Fifth Assessment Report, WGIII –Mitigation.

Access to relevant information

1. Monitoring and Assessment of GHG Emissions and Mitigation Potential Project, FAO:
   http://www.fao.org/climatechange/micca/ghg/en/
2. FAOSTAT Emissions database:
   Agriculture: http://faostat3.fao.org/faostat-gateway/go/to/browse/G1/*/E
   Land Use: http://faostat3.fao.org/faostat-gateway/go/to/browse/G1/*/E
3. Statistical Data at FAO for GHG Estimation:
   http://www.fao.org/news/story/en/item/216137/icode/
4. FAO GHG Infografix
   http://www.fao.org/assets/infographics/FAO-Infographic-GHG-en.pdf
5. IPCC AR5 WGIII AFOLU
   http://www.ipcc.ch/pdf/unfccc/sbsta40/AR5WGIII_Tubiello_140606.pdf

3. Abstracts

Experience on Quality Assurance/Quality Control (QA/QC) Activities in Preparation of the Second National Communication (SNC)

Ms. Thounheuang BUITHAVONG
Department of Disaster Management and Climate Change, MONRE
Lao PDR

Abstract

The Government of Lao PDR ratified the UNFCCC in 1995 and the Kyoto Protocol in 2003. The national greenhouse gas inventory (GHGI) is a key element of the national communication on climate change. The GHGI for the first national communication (FNC) of Lao PDR was conducted in 1997 using 1990 as the base year as mandated. The inventory was completed and compiled in the FNC. The FNC of Lao PDR was submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in November 2000.

In the Second National Communication (SNC), the GHGI was prepared using year 2000 as the base year. Under the support of GEF and UNDP, the Ministry of Natural Resources and Environment (Formerly Water Resource and Environment Authority), in collaboration with relevant agencies, carried out the task and submission to UNFCCC in 2013.

The inventory examines the emission by sources and removal by sinks of Greenhouse Gases (GHGs) of the following five sectors, namely energy, industrial process, agriculture, land use change and forestry, and waste. The inventory is estimated in units of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) including carbon monoxide (CO) and nitrous oxides (NO_x), Non-Methane Volatile Organic Compounds (NMVOCs) and sulphur dioxide (SO_x). Hydrofluorocarbons (HFCs), Perflourocarbons (PFCs) and sulphur hexafluoride (SF_6) are not included because the data are inadequate and the consumption and emissions are likely to be negligible.

The national GHGI preparation follows the technical guidance of the IPCC. The activities carried out include preparation and planning, introductory workshops for the stakeholders, establishment of technical working groups (TWG), training, collecting, compiling, verifying and analyzing data and drafting the report. The draft report was circulated to all TWG members and stakeholders for accuracy and consistency check, comments and endorsement. After consultation with relevant parties of the sectors, the first draft inventory report was revised and the second consultation was conducted. Through the United Nation's Development Programs (UNDP), international experts reviewed and provided the comments to the draft report. The draft report was then finalized.

In year 2000, the Lao PDR emitted a total CO_2 of 43,811 Gg and removed about 2,047 Gg. The country hence, emitted a net CO_2 of about 41,764 Gg in the year 2000. The amount increased substantially compared to the net sink of 104,570 Gg in the year 1990. This was partly due to the socio-economic drivers and partly due to the improvement of technical capacities and data availability.

The total CO_2 emission, nearly all was emitted by land-use change and forestry. For methane, the Lao PDR emitted a total of 306.7 Gg in 2000. Agriculture sector produced about 251.4 Gg or about 82% of the total. Another key GHG, N_2O is mainly emitted from land use management. In 2000, Lao PDR emitted about 8.4 Gg of N_2O. In addition to the three key GHGs, the Lao PDR also reported CO, NO_x, NMVOC and SO_x, as shown below. In general, the Lao PDR emitted relatively insignificant amounts of these gases.

In aggregate, for the year 2000, land-use change and forestry sector was the single most important source of CO_2 emission and agriculture was the most important emitter of CH_4 and N_2O.

References

Lao's Second National Communication on Climate Change (2013) under the UNFCCC

Access to relevant information

N/A

3.4 Session III WG1 Cross cutting

Workshop on GHG Inventories in Asia
– ICLEI's Activities on GHG Inventories at Regional or City Level –

Michie Kishigami
ICLEI-Local governments for Sustainability, Japan Office

Abstract

As association of local governments which commit to take tangible actions for sustainable development, ICLEI assumes 3 roles: connecting leaders, accelerating actions through pilot programs and projects, and gateway to solutions by facilitating exchange of experiences and developing useful tools for local governments. ICLEI implements these inter-related activities to achieve our ultimate goals.

Making GHG inventory is the first indispensable step to take any GHG reduction measure at local government level as well. It could be the base of setting a GHG emission reduction goal, making their action plan and monitoring the progress.

ICLEI has long track record of performance based program since early 1990's. ICLEI developed and disseminated the GHG emission quantification tool for local governments in USA, Canada, Australia, followed by Asian, African and South American countries.

Currently ICLEI provides 3 universal tools for low carbon city agenda, namely Global Protocol for Community-Scale GHG emissions, HEAT+ and *carbonn* Cities Climate Registry.

Global Protocol for Community-Scale GHG emissions is a global framework for accounting city and community scale GHG emissions, developed in partnership with ICLEI, WRI, C40, World Bank, UNEP and UN-Habitat. A standard rule could help cities to compare the performance with other cities, show the credibility of their GHG emission data and transparency. After the first draft version has been reviewed by experts and 35 cities worldwide, the improved second version is now open for public comment.

HEAT+ is an online software for local governments. It is designed to make their base year emissions inventory, define emissions reduction target, forecast emissions, select measures to meet the target and generate action plan report. ICLEI could make a country version of HEAT+ and organize training of trainers. We hope it helps more local governments to establish their action plan, implement measures with monitoring scheme in many countries.

carbonn Cities Climate Registry is a global voluntary online reporting system for local and sub-national governments. Required items are compliant with IPCC guidelines and the above tools as well. Launched in 2010, it becomes now the world's largest global database of local climate actions. The aggregated data proves how local governments have already established their climate strategy and achieved the tangible results globally.

Access to relevant information

http://www.iclei.org/our-activities/our-agendas/low-carbon-city/gcc.html
http://www.ghgprotocol.org/feature/GPC_2.0_public_comment
http://heat.iclei.org
http://citiesclimateregistry.org

Roles of GHG Inventories at Regional or City Level for Developing Future GHG Emission/removal Projection

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National Institute for Environmental Studies, Japan

Abstract

Greenhouse gas (GHG) emissions from Asia accounted for approximately 38% of global emissions in 2005. Considering the rapid economic growth expected in the coming decades, emissions from Asia in 2050 are projected to be double the 2005 levels if efforts are not made toward achieving Low Carbon Societies (LCSs). The reduction of emissions in Asia is imperative for the transition by 2050 to an LCS worldwide that has halved GHG emissions. As the energy consumption is expected to grow continuously with economic development, the reduction of CO_2 emissions from fossil fuel burning is an important goal. In addition, as the GHG emissions other than CO_2 emissions from fossil fuel burning account for approximately 40% of the Asian GHG emissions, it is equally important to reduce them by actions like stopping deforestation, increasing CO_2 absorption from forestry, and decreasing such emissions from farmland and livestock.

Taking measures toward the realization of an LCS may also lead to the resolution of other key developmental challenges such as improving energy access, reducing local pollution, and eradicating poverty. The LCS transition by Asian countries will not be an easy task. In order to accomplish this transition, it is vital that mobilizing countries as well as region/city to Low Carbon Society with a focused and common vision of the society we/they wish to achieve, while cooperating with one other and being aware of the roles they need to play.

In order to motivate our society to shift low carbon one, it is inevitable for designing concrete visions and roadmaps toward the LCSs both in national scale and regional/city scale. GHG inventories are one of key information for the LCS design. The GHG inventories bring not only current situation but also indications which sectors/areas should be drastically changed for reducing GHG emissions in the future. Although overall methodology for designing LCS has been almost established both for national scale and regional/city scale, designing regional/city scale visions and roadmaps faces a big issue on arrangement of GHG inventories.

In the past several years, our team, AIM modeling team (Asia-Pacific Integrated Modeling), have been tried to formulate regional/city scale inventory from national GHG inventory and other relevant statistical information for some cities in Japan and Asia, such as for Kyoto, Fukushima, Ahmedabad, Bhopal, Guang Zhou and Iskandar Malaysia. In the presentation, we would like introduce our approach for estimation of regional/city scale GHG inventories and share experience on developing future GHG emission/removal projection in Iskandar Malaysia and Fukushima-area in Japan as examples.

Access to relevant information

Overview of Low Carbon Society Research: http://2050.nies.go.jp/
Low Carbon Society Scenarios: http://2050.nies.go.jp/LCS/
Overview of AIM Project: http://www-iam.nies.go.jp/aim/

3. Abstracts

Thailand's GHG Inventory at Municipal Level

Chessada Sakulku
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Abstract

Thailand had launch the Eleventh National Economic and Social Development Plan (2012-2016) which address a strategy to develop an efficient and sustainable economy by upgrading production and services based on technology, innovation and creativity using effective regional links, by improving food and energy security, and by upgrading eco-friendly production and consumption toward a low-carbon society. In addition, the National Strategy on Climate Change also address to support municipal development toward "Low Carbon City". To response those policies, TGO has initiated the GHG Inventory at Municipal Level project as a tool to transfer national strategy and policy to practical work. Together with TGO's intention to promote the market mechanism as a financial tool to support the implementation of mitigation project especially the small project at municipal level. As the preliminary assessment the capabilities of municipal governors, they would like to emphasize the local development plan toward Low Carbon City but the capacity building is still needed for enhance understand on emission, mitigation, and removal of GHG.

March'2014, TGO launch a capacity building project to aid the municipal governor to accounting the GHG emission in their city/town area. There were three pilots municipal engaged to this project; Lampang, Chiang Rai, and Nong Samrong - Udornthani. The project aim is not only focus on the GHG accounting but expand to help municipal governor assess the potential to implement mitigation project and also prepare the capacity for monitoring the progressive of such mitigation plan. Meanwhile, the progress of this project, World Bank gave another support program by using the Tool for Rapid Assessment of City Energy (TRACE) to evaluating the current energy efficiency situation in municipal and suggest some possible measure to improve city energy efficiency.

The lesson learn from this project; (1) there are some limitation on data quality to give an accurate emission report, (2) the gap and overlapping between neighboring municipals of gathering data still existing so it is not suitable to include to these emission report to the national level, (3) training on GHG inventory is a good capacity building tool for better understanding on GHG emission.

Access to relevant information

- http://www.nesdb.go.th/Default.aspx?tabid=395
- http://www.iclei.org/our-activities/our-agendas/low-carbon-city/gpc.html
- http://esmap.org/TRACE

Indonesia's GHG Inventories at Regional Level:
Achievements, Gaps and Necessary Supports

Dida Migfar Ridha

Head of GHG Inventory Division, Ministry for Environment, Republic of Indonesia,
Bangkok, Thailand, August 2014

Abstract

GHG inventory in regional level is mandated under President Decree No. 71/2011 regarding implementation of National GHG inventory. Each province is responsible for performing GHG inventory at provincial level and to coordinate the implementation of GHG inventory at its city and district area.

GHG inventory at regional and city/district levels has important role in implementation of national GHG inventory, especially to provide activity data and development of local emission factor. The role of GHG inventory at regional level is becoming increasingly important since every province has compiled Regional Action Plan for GHG Emission Reduction or known as "RAD-GRK"

GHG inventory activities that have been conducted in 33 Provinces in Indonesia has resulted historical actual data that is used to prepare RAD-GRK in every province. It has been assigned under Governor Regulations in each province in Indonesia. In 2014, GHG inventories at regional level will be targeted to obtain the level of GHG emissions up to year N-2.

Through cooperation with JICA, Indonesia has conducted several pilot studies under the Project of Capacity Development for Climate Change Strategies in Indonesia. One of the activities is pilot project on waste sector in North and South Sumatera to collect and develop data for improving the accuracy of GHG inventory, monitoring any mitigation action in waste sector and increase the effectiveness of waste management practices in national and regional sectors. The results of these pilot activities are Indonesia has local values for waste composition and dry matter content data. Currently it is focused to obtain waste stream data and development of local EF from domestic and industrial wastewater.

Challenges in implementing GHG inventory at regional level is within the framework of fulfillment the TACCC (Transparency, Accuracy, Completeness, Comparability and Consistency) principle. Hence each province has developed their plain of improvement to provide a better inventory.

Capacity development in implementing GHG inventory at regional level is necessary to improve man power in each province for implementing GHG inventory in accordance with IPCC GL 2006.

National GHG Inventory in 2011 and Local GHG Inventory

Tae-Hoon Kim
Department of Climate Change Action, Korea Environment Corporation, Korea

Abstract

The 1996 and 2006 IPCC Guidelines for National Greenhouse Gas inventories are the International standards for national GHG emissions estimation. The international community is considering the implementation of the 2006 IPCC Guidelines beginning in 2015.

Although Korea is classified in non-Annex Ⅰ group, the government and GIR(Greenhouse gas Inventory & Research center)are in the effort of establishment of GHG inventory.

As a result of the effort, Inventory Report on waste sector is being annually prepared by Ministry of Environment and submitted to GIR.

And also the local governments are required to prepare 「local government's green growth plan」 including GHG inventory and quantified GHG emission.

Korea Environment Corporation (KECO) is responsible for drawing up IR on waste sector and Local government GHG inventory report.

Therefore, KECO is in the process of development of GHG Inventory procedure to estimate National and Local inventory

At the moment, National GHG Inventory has been estimated mainly by the 1966 IPCC Guideline and Local GHG inventory has been estimated by the 2006 IPCC Guideline.

Achievements of local GHG Inventory is enable us to compare national and each local Governments in a quantitative and reliable way. And we would utilize GHG inventory as basic data for defining emission sources and establishing a reduction strategy for local government. Also, Local Government will play an important role in developing 'National green growth strategy' with the help of KECO

India's GHG Inventories at Regional and City Level: Achievements, Gaps and Necessary Support Required

Sumana Bhattacharya

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Abstract

The Indian government, being a party to the UNFCCC, has been involved since the last one and a half decade in generating its national GHG inventory. A network of Institutions operating under the Indian Network for Climate Change Assessment (INCCA) have been the basis of this work. The national GHG inventory is being developed at sectoral level, using IPCC methodologies and with activity information from various government agencies that govern the management of the sectors. The emission profile thus emerging also forms the basis for ascertaining mitigation action needed to fulfil its voluntary pledge taken, in 2009, as a part of the Copenhagen Accord. According to this pledge, India aims to reduce its GHG emission intensity by 20-25% by 2025 with respect to 2005.

The target pledged will be mainly achieved through the missions articulated in India's national climate policy (the NAPCC), which also has strategized Adaptation actions. The implementation of these targets will be done at state level, and state action plans for climate change (SAPCC) are being drawn up by each state government. That means the actions have to be carried out down the line at city level, community level, industrial park/cluster level, and at industrial units directly. A base line assessment of GHG inventory is required at various levels of agglomeration, to track the emission reduction achieved across time due to implementation of the actions as a part of the NAPCC/SAPCC mandates.

More than 15 states now have SAPCCs approved by the MoEF. The guidelines for SAPCC though mentions GHG inventory base line development, but this has not been encouraged, and therefore most of the SAPCCs do not have the base line assessment reported. About 40 cities in India, have assessed their GHG emission inventory base lines, prepared as a part of the ICLEI_WRI_UNEP_UN habitat initiative. These do not include all the urban agglomerates, nor all the cities. With more than 53% growth in number of cities and 24% growth in number of urban agglomerates (mega cities + continuous urban spread) between 2001 and 2011, it is necessary to update these assessments annually. Industrial cluster level assessments again have been made, but do not yet cover all industrial clusters. Industries are disclosing their emissions as a part of the C disclosure project following the WRI protocol.

This presentation discusses the steps required to operationalise the GHG inventory preparation at these levels of agglomeration and identified the steps required to do the same.

References:

1st and 2nd National Communication of India

NAPCC, 2008

Bhattacharya, Sumana. 2014. Improving activity data and emission factors for national GHG inventory- Case Study India. MAPT National Inventory Case study series. A WRI project.

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3.5 Session III WG2 AFOLU

Vietnam greenhouse gas inventory: LULUCF

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Abstract

This presentation will give an overview about Vietnam GHG inventory in 1994, 2000, 2005 and 2010, with a closer look on 2005 and 2010 GHG inventory on LULUCF and analyze the improvements and existing challenges in LULUCF GHG inventory. Over 1994 – 2010, LULUCF has transformed from emission source to sink owing the change of calculation methodology, the increase of forest area and the improvement in data collection. In the Initial and Second National Communications of Vietnam to the UNFCCC, Vietnam applied the revised GL 1996 to conduct GHG inventory for LULUCF sector in 1994 and 2000. In 2014, with the support of JICA experts, Vietnam deployed GPG LULUCF 2003 to estimate the emission and removals of LULUCF in 2005 and 2010. Gain-loss method with Tier 2 is applied to estimate the carbon stock change in living biomass in category "Forest land remaining forest land" for the year 2005 and 2010 owing to the availability of country-specific parameters taken from the UN-REDD programme report. For the remaining categories, Tier 1 is applied using IPCC defaults. Key challenge of LULUCF includes lack of a legal framework on national GHG inventory in Vietnam, which leads to the difficulties in data collection. Other challenges include the missing of country-specific parameters, and capacity and experience of GHG inventory experts.

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Access to relevant information

Malaysia's GHG Inventories on AFOLU Sector: Achievements, Gaps and Necessary Supports

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Abstract

Malaysia is currently preparing her Biennial Update Report (BUR) by 2015 and the Third National Communications (TNC) by 2017. As per the UNFCCC decision, the BUR will update the Greenhouse Gas (GHG) inventory report in the Second National Communications (NC2), while the TNC will reflect the improvements both in the GHG inventory. This paper will highlight the progress made thus far, challenges and potential support that the Network could provide to the AFOLU team.

The GHG inventory has been institutionalised, continuous capacity building and engagement of the team members were undertaken post NC2. However, the challenge remains, trained personals moves on in their careers. Currently, a manual on GHG inventory for Compilers are being developed as a step to overcome the changes in manpower.

A number of improvements have been suggested to the GHG inventory activity data and emission factors. While these improvements are being worked upon, but they will not be reflected in the BUR but in the TNC. However, one of the major improvement being undertaken in BUR is on the QA/QC process. The QC process covers a more rigorous exercise where all relevant sub regional stakeholders will be consulted throughout the process. This will reduce the uncertainty in activity data. In addition, all activity data will be validated with the land use maps at the sub regional level. The QA process will remain the same as the NC2 process for the AFOLU/LULUCF sector.

Uncertainty assessment provides opportunities for improvement in data measurement, data collection, and calculation methodology and emission factors. It is only by identifying elements of high uncertainty can methodological changes be introduced to address them. A guidance on uncertainty assessment for the AFOLU is being planned.

Having institutionalise the GHG - LULUCF process, gaps still remain in terms of technical capacity. There are also gaps in activity data especially pre 2020. In addition, the verified land use statistics and map has a lag time of two and half years. This will affect the GHG inventory work.

Some of the potential support that the network could provide are developing local emission factors for agriculture soil and manure management. Besides this, facilitate a discussion on harvested wood products the, the pro and cons in including this into the GHG inventory. Additionally, experience could be shared on how the GHG inventory is achieved in a sustainable manner.

3. Abstracts

Cambodia's GHG Inventories on AFOLU Sector

H.E. Mr. Paris Chuop, PhD
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Ministry of Environment, Cambodia

Abstract

Greenhouse Gas (GHG) inventory is an accounting of GHG emitted to or removed from the atmosphere over a period of time. It is important for policy makers to establish a baseline for tracking emission trends, developing mitigation strategies and policies, and assessing progress. The Royal Government of Cambodia (RGC) acknowledges the importance of GHG inventory, which is part of sustainable natural resources management.

As results, "Sustainable Management of Natural Resources" is remained in the Government Priorities namely Rectangular Strategy phase III. National Forest Programme (2010-2029), National Strategic Development Plan (2014-2018) and Cambodia Climate Change Strategic Plan (2014-2023) have been developed. National Climate Change Committee and Cambodia REDD+ Taskforce have been created. In addition, Cambodia submitted the Initial and Second National Communications in 2002 and 2014 respectively. The Third One is expected to be finalized by end of 2014, and the Biennium Undated Report is considered to develop. With regard to capacity building, several training programmes related to GHG inventory and MRV have been conducted for national technical staff/experts from key line ministries. Under the UN-REDD porgramme, the National MRV/REL Team is expected to develop (1) National Forest Monitoring System (NFMS) Plan; (2) Satellite Land Monitoring System (SLMS) for REDD+ related activities; (3) National Forest Inventory (NFI) for emission and removal factors for REDD+ related activities; (4) Cambodia RLs/RELs framework; and (5) REDD+ related GHG Reporting System.

However, gaps are still existed including technical capacities on GHG inventory, Climate Change Scenario, Modelling for Climate Change Mitigation and Adaptation; coordination and communication with line ministries/agencies; and resources to transfer policy papers into actual activities/results at the ground.

Therefore, additional professional trainings on GHG inventory and related issues; regional workshops and fora; and programmes/projects to support the Cambodia Climate Change Strategic Plan (2014-2023) and other related policies are much needed.

In conclude policy papers and implementing mechanisms are in place with operation. However, technical capacities, coordination and financial resources are big challenges, which should be converted into opportunities to gain technical knowledge, mutual understanding and necessary resources to address problems being happened and to be happened. Further knowledge and experiences sharing at sub-national, national, regional and global levels would be extremely important.

References
1. National Strategic Development Plan (2014-2018)
2. Reports of the Ministry of Environment and Forestry Administration

Access to relevant information
http://www.moe.gov.kh

REDD+ Cookbook :
How to Systematically Deal with Estimation on GHG Emissions and Removals in Forest Land Sector

Mitsuo Matsumoto

Forestry and Forest Products Research Institute, Japan

Abstract

REDD+ has become one of the hottest issues in the international discussions and negotiations on climate change. Deforestation and forest degradation are the second largest source of greenhouse gases emissions after the use of fossil fuel. As one of the measures to address this issue, REDD+ has a big potential to reduce such emissions. At the same time, REDD+ could contribute to biodiversity, local economy, and local people's livelihood.

Because REDD+ is a mechanism to give incentives to emission reductions and removals by REDD+ activities, National Forest Monitoring Systems (NFMS) and MRV (Measurement, Reporting and Verification) systems are required for appropriate estimation of emission reductions and removals. However, most developing countries as host countries of REDD+ don't have NFMS and MRV systems for REDD+, and capacity building for building them are being promoted with international cooperation.

Considering the present situation, REDD Research & Development Center of Forestry and Forest Products Research Institute Japan has published "REDD-plus Cookbook". The Cookbook is an easy-to-understand technical manual that provides basic knowledge and technologies required for REDD+ with the main focus on the forest carbon monitoring methods.

The Cookbook comprises of four parts including Introduction, Planning, Technical, and Reference Guide. "Introduction" is designed for the policy makers and their partner organizations working for the introduction of REDD+, "Planning" is intended for the planners and mangers of REDD+ implementing organizations/countries working on REDD+ and "Technical" for the experts who work on the REDD+ activities at national/subnational level. "Reference Guide" provides references of useful documents that assist users to have a better understanding of "Introduction" and "Planning".

In the sections "Introduction", "Planning", and "Technical", knowledge and the sufficient skills required to address REDD+ are compiled in units called "recipe". Users can easily go through the items in each recipe to in-depth recipe or references in accordance with the "Flow Chart". "Reference Guide" aims to provide users with useful information by proposing or showing examples that can be used as a guide when exploring realistic and practical measures for designing and implementing the projects and programs.

References

REDD-plus Cookbook can be downloaded on this page:
http://www.ffpri.affrc.go.jp/redd-rdc/en/reference/cookbook.html

Access to relevant information

REDD Research & Development Center: http://www.ffpri.affrc.go.jp/redd-rdc/en/

3. Abstracts

FAO's Supporting Activities on Activity Data and GHG Estimates on AFOLU sector

Francesco N Tubiello
FAO, Italy

Abstract

FAO supports its member countries identify, assess and report their greenhouse gas (GHG) emissions from AFOLU, in support of key UNFCCC processes including National GHG Inventory, BUR submission, NAMA and REDD+ development. FAO's focus is on improving rural statistics addressing both technical and institutional gaps. The relevant FAO activity is the Monitoring and Assessment of GHG Emissions and Mitigation Potential Project (MAGHG).

The FAOSTAT Emissions database represents the key tool used by FAO in support of its member countries national inventory processes. Used as the basis for the AFOLU chapter analysis of the recent IPCC AR5 WGIII Report, it is available online, providing updated estimates using IPCC 2006 Tier 1 estimates for Agriculture (1961-2011, plus projections to 2030 and 2050) and Tier 1 Approach 1 estimates for Land Use (1990-2010). As an internationally available global database of emissions estimates, it can be used in the processes of QA/QC and verification of GHG National Inventories, according to the IPCC Guidelines.

The FAO presentation will focus on the process followed at FAO to derive relevant activity data and estimate GHG emissions fro the AFOLU sector, using available official country-level data from FAOSTAT, as well as new geospatial data developed by FAO in order to address needs for activity data and GHG estimations in specific key areas such as drained organic soils, peatland and biomass fires. A new FAOSTAT manual illustrating these processes and data availability will also be presented.

References

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FAO, 2014. Agriculture, Forestry and Other Land Use Emissions by Sources and Removals by Sinks: 1990-2011 Analysis. FAO, Rome, Italy

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Access to relevant information

1. Monitoring and Assessment of GHG Emissions and Mitigation Potential Project, FAO:
   http://www.fao.org/climatechange/micca/ghg/en/
2. FAOSTAT Emissions database:
   Agriculture: http://faostat3.fao.org/faostat-gateway/go/to/browse/G1/*/E
   Land Use: http://faostat3.fao.org/faostat-gateway/go/to/browse/G1/*/E
3. Statistical Data at FAO for GHG Estimation:
   http://www.fao.org/news/story/en/item/216137/icode/
4. FAO GHG Infografix
   http://www.fao.org/assets/infographics/FAO-Infographic-GHG-en.pdf
5. IPCC AR5 WGIII AFOLU
   http://www.ipcc.ch/pdf/unfccc/sbsta40/AR5WGIII_Tubiello_140606.pdf

GFOI's Supporting Activities on Sectoral MRV Issues for AFOLU Sector

Simon Eggleston
Global Forest Observations Initiative, Switzerland

Abstract

GFOI supports countries develop national forest monitoring systems that are robust, reliable, achievable at reasonable cost and support planning for national development priorities including, climate change mitigation and adaptation. These systems enable forest measurement, reporting and verification (MRV) that is part of reporting under REDD+ and national greenhouse gas inventories.

GFOI supports other organisations and programmes that are working in this area by

- providing a ***platform for coordinating observations***: in order to assure the systematic, sustained and worldwide acquisition and supply of forest observations the GFOI will work with the space agencies of the Committee on Earth Observation Satellites (CEOS), commercial data providers and researchers collecting relevant ground data; and

- providing ***assistance and guidance on utilising observations***: GFOI will collaborate with national institutions and international bodies such as the FAO and World Bank to ensure that countries are able to utilize the available data by developing methods, guidance and advice; providing capacity building; and promoting ongoing research and development.

GFOI has produced methods and guidance titled ***Integrating remote-sensing and ground-based observations for estimation of emissions and removals of greenhouse gases in forests*** that provides operational advice to countries and international organisations on the use of Earth Observations information in the development of national forest monitoring and Measuring, Reporting and Verifying systems. This guidance is consistent with the decisions made by the United Nations Framework Convention on Climate Change (UNFCCC) meeting in Warsaw, in November 2013, and the IPCC Guidelines on Greenhouse Gas Emission Inventories. It assists in choosing the most appropriate technical solutions. It will be translated into French and Spanish and be available electronically and training tools and web support are being developed.

GFOI also is working with CEOS to provide annual wall-to-wall coverages, as cloud free as possible, using Landsat and Sentinel data free of charge to users, starting with 16 countries in 2013 and ramping up to global coverage in 2016. Additional country specific support is also being provided.

GFOI has the support of 90 countries and many international organisations through GEO and is lead by the FAO, CEOS, Australia, Norway and the USA.

References

GFOI 2014 *Integrating remote-sensing and ground-based observations for estimation of emissions and removals of greenhouse gases in forests* Pub GEO, Geneva

Access to relevant information

Website gfoi.org

3. Abstracts

# Estimation of Carbon Flux and Stock in Tropical Peatland Applying Integrated MRV System

Mitsuru Osaki

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Abstract

Focusing on carbon emission estimation related with the REDD (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) Mechanism, at COP15 in Copenhagen, MRV (Measurement, Reporting and Verification) focused on establishing reference emission levels, national monitoring systems. At COP15 of Copenhagen, it was declared that an MRV system that should be coupled with two components – satellite sensing and grand tools - is urgently required (refer Figure).

Presently, our JST-JICA Project on "Wild Fire and Carbon Management in Peat-Forest in Indonesia" is the only project in the world to propose all aspects of MRV in tropical peatlands, enabling it to contribute significantly to also in tropical wet/low-land. Therefore, this paper describes our MRV system as a sensing standard for REDD+, biodiversity, and LLULUCF in tropical peatland and wet/low-land.
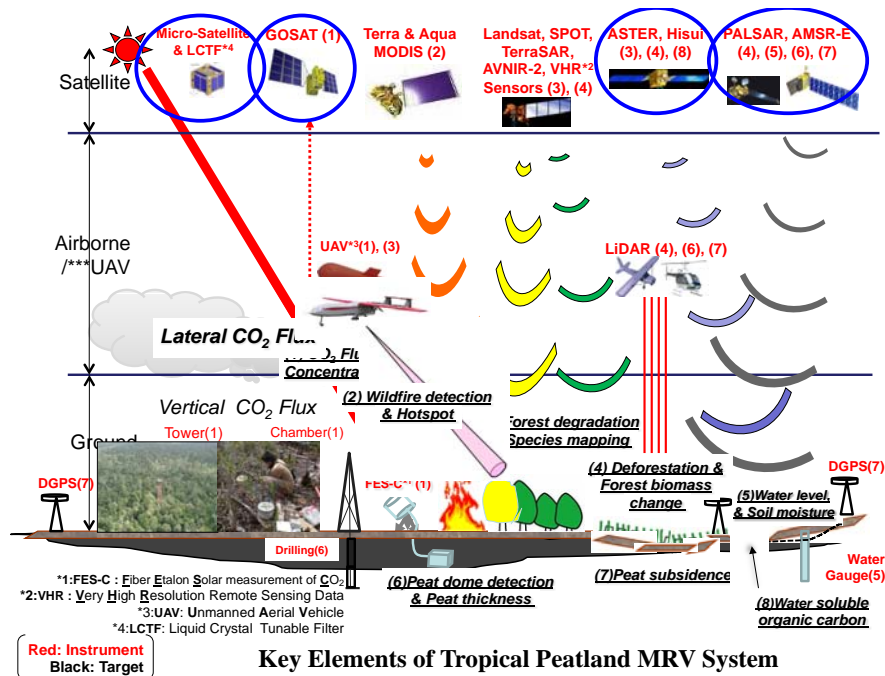
Key Elements of Tropical Peatland MRV System

USAID LEAD Program Support on Carbon Stock Assessment for Forested Wetlands and National GHG Inventory Systems

Amornwan Resanond

USAID Low Emissions Asian Development (LEAD) Program

Abstract

The U.S. Agency for International Development's (USAID's) regional Low Emissions Asian Development (LEAD) program and the USAID-supported Sustainable Wetlands Adaptation and Mitigation Program (SWAMP), in collaboration with the U.S Forest Service (USFS), conducted field training in Thailand for participants from eight Asian countries during April and May 2013, followed by in-country training for Cambodia government officials in April and May 2014, on application of a new protocol developed by SWAMP for measuring and monitoring carbon stocks in, and greenhouse gas (GHG) emissions from, mangroves and other forested wetlands. SWAMP is a collaborative effort by the Center for International Forestry Research (CIFOR), the USFS, and Oregon State University, with support from USAID. The training courses included sessions on the concepts and science of the protocol, a newly developed method that is informing the Intergovernmental Panel on Climate Change (IPCC) 2013 Wetlands Supplement to the 2006 National Greenhouse Gas Inventory Guidelines. The courses included several days in mangrove forests gathering data using the protocol methodologies, and additional days learning how to process field samples and make preliminary calculations of carbon stocks.

The USAID LEAD program, in collaboration with an expert from the United Nations Framework Convention on Climate Change (UNFCCC), provides training and related technical support on the components of a sustainable national GHG inventory system using worksheets developed by the U.S. Environmental Protection Agency (USEPA). The USEPA worksheets support countries in preparing their national GHG inventories, which are used, for example, in National Communications to UNFCCC. Participants practiced inputting data from their respective countries into the USEPA worksheets and reviewed methodologies for data collection and measurement, quality assurance and quality control, and institutional arrangements, among other topics. Country teams also developed action plans for implementing improvements in their respective national GHG inventory systems.

The training was delivered through the Asian Greenhouse Gas Management Center (AGMC), a new capacity building initiative based in Thailand established through the LEAD program.

* Forested wetlands, including mangroves, peat swamps, cypress domes, and related ecosystems, are believed to hold some of the highest carbon densities among terrestrial (soil and vegetation) systems. In the Indo-Pacific region, mangroves cover as much as 6.8 million hectares, or approximately 40 percent of world's total, and it is estimated that these ecosystems store more than five times the amount of carbon compared to tropical upland forested ecosystems (not including peatlands). They provide a wide range of products and services to both the communities living near them and the economies of countries in the region, yet these ecosystems are threatened by conversion to aquaculture and agriculture, urban development, overexploitation, and other deforestation and degradation.

3. Abstracts

References

Kauffman, J.B. and Donato, D.C. 2012. *Protocols for the measurement, monitoring and reporting of structure, biomass and carbon stocks in mangrove forests.* Working Paper 86. CIFOR, Bogor, Indonesia. Available online at the CIFOR website at http://www.cifor.org/online-library/browse/view-publication/publication/3749.html

Access to relevant information

More details available on the USAID LEAD website (http://lowemissionsasia.org/news/cambodia-mangrove-protocol-training-2014)

3.6 Session IV

**Promoting Knowledge-base System for Scientific Low Carbon Development
Policy making in Asia: growing importance of Inventory work**

Shuzo Nishioka
Low Carbon Asia Research Network, IGES, Japan

- IPCC AR5 indicated transforming eventually to zero-emission world is unescapable for stabilizing climate, whatever the target temperature will be. If the target is less than 2 degree rise from industrial revolution as already agreed in UNFCCC, the total amount of allowable GHG emission (budget) from now　is so small that will be spent out within 30 years if we continues present emission rate.
- So, the role of present generation is to achieve low carbon society until the middle of this century, while spending thriftily the remaining budget. IPCC AR5 also indicated that feasible pathway for this is such that reduce emission into half in 2050. Simple calculation shows this is 2 ton CO_2/ Capita world towards which almost all countries need to reduce emission.
- Asia is the key and highly responsible, because in 2050 it shares half of the world in terms of economy, energy and GHG emission.
- GHG inventory work, which is newly identifying basic value of all the human activities in low carbon society, need to be more deepened and expanded to planning of LC Development policy such as PDCA cycle and MRV, LC economy such as C&T and supply chain management and absorption field such as REDD and land-use change.
- Asia is almost establishing effective low carbon knowledge sharing mechanism, in which WGIA plays the key role in paving scientific pathway to achieve low carbon Asia.

Supporting Activities on MRV by Asia Pacific Network

Jariya Boonjawat

Co-Chair of Scientific Panel Group of Asia Pacific Network

Abstract

The Asia-Pacific Network for Global Change Research (APN) is an inter-governmental network of 22 countries in the Asia-Pacific that supports regional cooperation in global change research, strengthens appropriate interactions among scientists and policymakers, and improves the scientific and technical capabilities of nations in the region including through the transfer of know-how and technology.

The APN was established 1996 with a permanent Secretariat in Kobe, Japan since 1999. It receives financial contribution from the governments of Japan, USA, Republic of Korea, and New Zealand. Recently, APN is working closely with developing country members to develop new co-finance partnerships, under which researchers from partner countries will receive direct co-funding support from their national government. In July 2014, Cambodia became the first APN member country to enter into such a partnership and will start supporting selected projects since 2015.

APN has been supporting regional collaborative research projects on greenhouse gas inventories and MRV systems through its core programmes for regional collaborative research and capacity development for member countries, as well as focused activity frameworks with specific focus on biodiversity and ecosystem services.

One project, "MRV system for REDD+: Scaling up from project level to a national level REDD+ MRV systems for Laos and Vietnam" (EBLU2011-02CMY(C)-Skole) focuses on (1) training and capacity building in basic concepts of REDD, REDD+ and MRV systems, (2) developing and testing of scalable MRV methods based on current IPCC guidelines using remote sensing satellite data and geospatial technologies, and (3) enabling technology transfer of national level MRV systems for REDD+.

These are achieved through (1) data collection, which are collected at the field level to validate remote sensing data; or generated by standard forest plot inventory methods; (2) Forest carbon mapping through the development of a method for analysing medium resolution, and (3) training and capacity building of scientists and government agency personnel, as well as university staff and students.

The project designed an online MRV system for project management. Data are stored in a relational database which has redundant back-up and the application has bi-monthly system snap-shots for restore capabilities. The system is available at: http://mrv.carbon2markets.org

Other APN funded projects related to GHG emissions and MRV systems include:

- Strengthening Community Voices in REDD+ Policy
- Project Scoping and Training Workshop for REDD in Indonesia, Cambodia, and Lao PDR
- Capacity Building for Implementing a "Measurable, Verifiable and Reportable (MRV)" Model in a Mid-Sized Thai Municipality
- Critical analysis of effectiveness of REDD+ for forest communities and shifting cultivation based on lessons learnt from conservation efforts in Laos and Thailand
- Integrated Prediction of Dipterocarp Species Distribution in Borneo for Supporting Sustainable Use and Conservation Policy Adaptation
- Evaluation of Trade-offs between conservation and development — Case of land use change in Malaysia and Indonesia

3. Abstracts
- Carbon Governance in Asia: Bridging Scales and Disciplines)

References

Asia-Pacific Network for Global Change Research (APN). (2013). Developing an MRV system for REDD+: Scaling up from project level to a national level REDD+ MRV systems for Laos and Viet Nam. Retrieved from http://www.apn-gcr.org/resources/items/show/1708

Access to relevant information

APN E-Lib, www.apn-gcr.org/resources

The 12th Workshop on GHG Inventories in Asia (WGIA12)
- Enhancement of Network for Supporting Measurement, Reporting and Verification (MRV) -

Dr. Jakkanit Kananurak

Thailand Greenhouse Gas Management Organization (Public Organization), Thailand

Abstract

Thailand Greenhouse Gas Management Organization (TGO) - under the Ministry of Natural Resources and Environment, the Royal Thai Government – with support from the Japan International Cooperation Agency (JICA) establishes the Climate Change International Technical and Training Center (CITC) as a "one-stop technical and training center" on mitigation and adaptation for Southeast Asia region and other developing countries. Furthermore, CITC aims to establish a network of professionals and experts in climate change field and to provide them with a platform to discuss and exchange ideas on this crucial issue. The concept of CITC is to strengthen capacity of key stakeholders in the field of mitigation and adaptation in the sustainable development context in order to achieve low carbon society. The main activity of CITC is to provide training service in the area of Climate Change Mitigation and Adaptation, establish networking platform for Southeast Asia region, disseminate knowledge on Climate Change Mitigation and Adaptation, and to be a learning resource center on climate change mitigation and adaptation. The target groups of CITC are governmental agencies, academic institutions, private companies related to mitigation and adaptation, and general public.

CITC provide capacity development services on climate change mitigation and adaptation to stakeholders in Thailand and Southeast Asian countries. The knowledge clusters of training courses and the targets as following; 1) GHG Inventory Management 2) Mitigation Mechanism 3)Low Carbon Society Development and 4) Sustainable GHG Management. CITC shall work towards achievement of sustainable development as well as promotion of clean and green environment for the ASEAN region. CITC will actively participate in global efforts towards addressing global environmental challenges, including climate change, for development needs and environmental sustainability.

Access to relevant information

www.cict.in.th

3. Abstracts

Introduction of MRV Guidebooks:
One Hundred Questions & Answers about MRV in Developing Countries (IGES version)
&
MRV Guidebook for Policy Makers (IGES-GIZ collaboration version)

Kazuhisa Koakutsu
Climate Change and Energy Area
Institute for Global Environmental Strategies (IGES)

Abstract
In the United Nations Framework Convention on Climate Change (UNFCCC), concepts of measurement, reporting and verification (MRV) become an essential part of international climate policy regime. While provisions of MRV (e.g. scope, procedure, methodological guidance, etc.) are yet to be decided, it is certain that future MRV schemes will be built on existing ones.

Examples of the existing MRV schemes at the national level include national communications (NCs), biennial update reports (BURs) and national GHG inventories. Another example is assessment of emission reductions under the Clean Development Mechanism (CDM) and the Joint Crediting Mechanism (JCM). Some developing countries also have experiences in MRV beyond what is currently established under the UNFCCC.

In order to strengthen understanding of the existing MRV schemes, IGES prepared two guidebooks; one is *One Hundred Questions & Answers about MRV in Developing Countries*, and the other is *MRV Guidebook for Policy Makers* in collaboration with GIZ.

The guidebooks have two-step approaches. Step 1 provides readers with questions and answers (Q&As) for understanding 'why', 'what', 'how', 'who', 'how often', etc. for the existing MRV schemes. Q&As on MRV are comprised of two types: common and scheme-specific. The common Q&As are prepared for all of the six MRV schemes. The scheme-specific Q&As cover aspects of MRV that are considered as unique to a particular scheme.

Based on the understanding of the overall picture of MRV provided by Step 1, Step 2 introduces selected good practices to help developing countries overcome their common challenges, because learning from earlier experiences on MRV by developing countries is also vital to meet their needs and capacities. It is important to get ideas on how challenges may occur, in the course of practicing MRV, as well as what kinds of challenges may occur in the context of developing countries. It is believed that a good practice derived from a particular MRV scheme can also be applied to other MRV schemes. We also intend to increase the examples of good practices in subsequent editions of the books.

References
➢ IGES, *One Hundred Questions & Answers about MRV in Developing Countries* (http://www.iges.or.jp/en/climate-energy/mm/201309mrv.html)
➢ IGES and GIZ, *MRV Guidebook for Policy Makers* (http://www.mitigationpartnership.net/mrv-guidebook-policy-makers)

Workshop on GHG Inventories in Asia
– Supporting Activities on MRV by NEDO JCM –

Genichiro Sawamura
New Energy and Industrial Technology Development Organization (NEDO), Japan

Abstract

NEDO；Following the two oil crises of the 1970s, the need for energy diversification increased. Against this backdrop, NEDO was established as a semi-governmental organization in 1980 to promote the development and introduction of new energy technologies. Research and development of industrial technology was subsequently added, and today NEDO has two missions and is active in a wide variety of areas as Japan's largest public research and development management organization.

About NEDO's JCM; In order to effectively address the issue of climate change and to contribute to the global reduction of GHG emission, the Japanese government has been proposing the "Joint Crediting Mechanism (JCM)" as one of the Framework for Various Approaches (FVA) under the United Nations Framework Convention on Climate Change (UNFCCC).

JCM aims to contribute to the sustainable development of developing countries by facilitating diffusion of leading low carbon technologies and implementing mitigation actions. Japan has held consultations with developing countries since 2011and has succeeded in signing bilateral documents with 12 countries.

In relation to such movement, the NEDO has implemented various Feasibility Studies and Demonstration Projects throughout FY2013. These Studies and Projects not only reveal the effectiveness of low carbon technologies but also aims to explore how these technologies could be disseminated in countries outside of Japan.

The main purpose of conducting these Feasibility Studies is to establish methodologies for evaluation techniques of emission reduction effects, assessing business prospects for dissemination and transfer of low carbon technologies, and conducting research on financial feasibility in disseminating the featured technology. Demonstration Projects, launched in FY2014, takes a step further by implementing the actual technology and measures the amount of emission reduction in a quantitative manner, by applying measurement, reporting and verification methodologies. These projects will be registered and verified as JCM Projects. By conducting Feasibility Studies and Demonstration Projects, NEDO aims to disseminate low carbon technologies that many Japanese companies have acquired, thereby ultimately contributing to the objective of the UNFCCC to reduce GHG emissions.

References

Information on JCM Partner countries (New Mechanisms Platform)
Summary of NEDO JCM demonstration projects Fiscal Year 2013 (Mongolia, Indonesia, Vietnam)
Results of the amount of Destroyed Fluorocarbons pursuant to the law for ensuring the Implementation, recovery and destruction of Fluorocarbons concerning specified products of Fiscal Year 2013 (METI)

Access to relevant information

http://www.mmechanisms.org/
http://www.nedo.go.jp/
http://www.meti.go.jp/press/2014/07/20140718002/20140718002.html

Annex I: Agenda

Annex I: Agenda

The 12th Workshop on GHG Inventories in Asia (WGIA12)

- Capacity building for measurability, reportability and verifiability -
Period: 4th – 6th August, 2014,
Venue: Pullman Bangkok King Power, 8/2 Rangnam Road, Thanon-Phayathai, Ratchathewi, Bangkok, Thailand

Day 1: Morning, 4th August (Mon.)			
08:30-12:00	Mutual Learning (Closed sessions: only the countries participating in the session, chair, facilitators, rapporteur and the WGIA Secretariat can enter conference rooms for the sessions.)		
Sector	Energy	Agriculture	LULUCF
Participating Countries	Indonesia – Myanmar	China – Mongolia	Vietnam
Room	Sigma 1	Sigma 2	Theta
Chair	Mr. Akira Osako (GIO)	Mr. Kohei Sakai (GIO)	Dr. Midori Yanagawa (GIO)
Rapporteur	Mr. Hiroshi Ito (GIO)		
Note: Mutual Learning sessions are closed sessions in order to secure confidentiality of information to be discussed in the sessions so that countries participating in each Mutual Learning session can provide unpublished information to each other reliably and safely. Hence, only participating countries in each session, chair, facilitators, rapporteur and the WGIA Secretariat can enter each room for the sessions. In addition, facilitators shall be registered in advance by receiving acceptances from participating countries in each session and the WGIA Secretariat.			
9:00 – 12:00	SEA Project Informal Meeting		
	Room: Kappa		
12:00-13:30	Lunch		

Day 1: Afternoon, 4th August, 2014 (Mon.)			
13:30-14:00	Participant Registration		
14:00 – 15:15	Opening Session		
	Room: Infinity, Ground Floor	Chair: Mrs. Prasertsuk Chamornmarn (TGO, Thailand)	Rapporteur: Ms. Elsa Hatanaka (GIO)
14:00 – 14:10	Welcome Address		Mr. Yu Kamei (MOEJ)
14:10 – 14:20	Welcome Address		Mr. Suphot Tovichakchaikul (Deputy Permanent Secretary Minister of Natural Resources and Environment of Thailand)
14:20 – 14:30	Overview of WGIA12		Dr. Takefumi Oda (GIO)
14:30 – 14:45	Japan's climate change policies		Mr. Yu Kamei (MOEJ)
14:45 – 15:00	Thailand's climate change policies		Dr. Natthanich Asvapoositkul (ONEP, Thailand)
15:00 – 15:15	Questions and Answers		All
15:15 – 15:45	Group Photo & Tea Break		
15:45 – 17:00	Session I: Progress of National Communications (NCs), Biennial Update Reports (BURs) and International Consultation and Analysis (ICA) for BUR		
	Room: Infinity, Ground Floor	Chair: Dr. Retno Gumilang Dewi (ITB, Indonesia)	Rapporteur: Ms. Elsa Hatanaka (GIO)
15:45 – 16:00	Introduction on topics, points of discussions and presentations in this working group session		Mr. Hiroshi Ito (GIO)
16:00 – 16:20	The MRV framework for developing countries		Alma Jean (UNFCCC) (To be presented via skype.)
16:20 – 16:40	UNEP-GEF programmes & projects for supporting capacity-building in climate change mitigation		Mr. Conrado Heruela (UNEP)
16:40 – 17:00	Questions and Answers		All
19:00 – 21:00	Welcome Reception (hosted by the TGO)		

Day 2 Morning, 5th August (Tue.)		
8:30 – 12:00	Session II: Quality Assurance/Quality Control (QA/QC) Activities in Preparation of NCs and BURs	
	Room: Infinity, Ground Floor	Chair: Dr. Baasansuren Jamsranjav (IPCC/TFI/TSU)	Rapporteur: Ms. Elsa Hatanaka (GIO)
8:30 – 8:40	Introduction on topics, points of discussions and presentations in this working group session	Mr. Naofumi Kosaka (GIO)
8:40 – 9:10	QA/QC activities and ICA	Mr. Kiyoto Tanabe (IPCC/TFI/TSU)
9:10 – 9:30	QA/QC activities for CC enabling activities under UNEP global support programmes	Mr. Conrado Heruela (UNEP)
9:30– 10:00	Discussion	All
10:00 – 10:30	Tea Break	
10:30 – 10:50	QA/QC activities under projects on FAOSTAT by FAO	Mr. Francesco N. Tubiello (FAO)
10:50 – 11:10	Experience on Quality Assurance/Quality Control (QA/QC) activities in preparation of the Second National Communication (SNC)	Thounheuang Buithavong (Lao PDR)
11:10 – 11:40	Discussion	All
11:40 – 13:30	Lunch	

Day 2 Afternoon, 5th August (Tue.)		
13:30 – 17:00	Session III: Sectoral Working Group Sessions	
	Working Group Session 1: Cross-cutting (GHG Inventories at various levels)	
	Room: Infinity 1, Ground Floor	Chair: Asst. Prof. Dr. Bundit Limmeechokchai (Thammasat University, Thailand)	Rapporteur: Asst. Prof. Dr. Chalor Jarusutthirak (Kasetsart University, Thailand)
13:30 – 13:45	Introduction on topics, points of discussions and presentations in this working group session	Dr. Takefumi Oda (GIO)
13:45 – 14:00	Relationship of GHG inventories between national and regional/city level	Dr. Junko Akagi (IGES KUC)
14:00 – 14:15	ICLEI's activities on GHG inventories at regional or city level	Ms. Michie Kishigami (ICLEI Japan)
14:15 – 14:30	Roles of GHG inventories at regional or city level for developing future GHG emission/removal projection	Dr. Shuichi Ashina (NIES/AIM)
14:30 – 14:50	Questions and Answers, Discussion	All
14:50 – 15:20	Tea Break	
15:20 – 15:35	Thailand's GHG inventories at regional or city level: achievements, gaps and necessary supports	Mr. Chessada Sakulku (TGO, Thailand)
15:35 – 15:50	Indonesia's GHG inventories at regional or city level: achievements, gaps and	Mr. Dida M. Ridha (Indonesia)

	necessary supports	
15:50 – 16:10	Questions and Answers, Discussion	All
16:10 – 16:25	National GHG inventory in 2011 and local GHG inventory	Dr. Tae-Hoon Kim (Republic of Korea)
16:25 – 16:40	India's GHG inventories at regional and city level: Achievements, gaps and necessary support required	Dr. Sumana Bhattacharya (India)
16:40 – 17:00	Questions and Answers, Discussion	All
13:30 – 17:00	**Working Group Session 2: Agriculture, Forestry and Other Land Use (AFOLU)**	
	Room: Infinity 2, Ground Floor	Chair: Dr. Rizaldi Boer (Indonesia)	Rapporteur: Dr. Wasinee Wannasiri (TGO, Thailand)
13:30 – 13:40	Introduction on topics, points of discussions and presentations in this working group session	Mr. Kohei Sakai (GIO)
13:40 – 13:55	Vietnam's GHG inventories –LULUCF – Forestland	Ms. Dao Minh Trang (Vietnam)
13:55 – 14:10	Malaysia's GHG inventories on AFOLU sector: achievements, gaps and necessary supports	Dr. Elizabeth M.P. Philip (Malaysia)
14:10 – 14:25	Cambodia's GHG inventories on AFOLU sector	Dr. Chuop Paris (Cambodia)
14:25 – 14:50	Questions and Answers, Discussion	All
14:50 – 15:10	Tea Break	
15:10 – 15:25	REDD+ Cook Book : How to systematically deal with estimation on GHG emissions and removals in forest land sector	Dr. Mitsuo Matsumoto (FFPRI)
15:25 – 15:40	FAO's supporting activities on activity data and GHG estimates on AFOLU sector	Mr. Francesco N. Tubiello (FAO)
15:40 – 15:55	GFOI's supporting activities on sectoral MRV issues for AFOLU sector	Dr. Simon Eggleston (GFOI)
15:55 – 16:05	Questions and Answers, Discussion	All
16:05 – 16:20	Estimation of carbon flux and stock in tropical peatland applying integrated MRV system	Prof. Mitsuru Osaki (Hokkaido University)
16:20 – 16:35	USAID LEAD program support on carbon stock assessment for forested wetlands and national GHG inventory systems	Dr. Amornwan Resanond (US AID)
16:35 – 17:00	Questions and Answers, Discussion	All

Day 3 Morning, 6th August (Wed.)		
9:00 – 12:30	Session IV: Enhancement of Network for Supporting Measurement, Reporting and Verification (MRV) at various levels	
	Room: Infinity, Ground Floor	Chair: Dr. Sumana Bhattacharya (India)	Rapporteur: Ms. Elsa Hatanaka (GIO, Japan)
9:00 – 9:15	Introduction on topics, points of discussions and presentations in this session	Ms. Elsa Hatanaka (GIO)
9:15 – 9:30	Promoting knowledge-base system for scientific low-carbon development policy making in Asia: growing importance of inventory work	Dr. Shuzo Nishioka (LoCARNet)
9:30 – 9:45	Supporting Activities on MRV by Asia-Pacific Network	Dr. Jariya Boonjawat (APN)
9:45 - 10:05	Questions and Answers, Discussion	All
10:05 – 10:20	Supporting activities on GHG inventories at regional or city level by IGES Kitakyushu Urban Center (IGES KUC)	Dr. Junko Akagi (IGES KUC)
10:20 – 10:35	Planned supporting activities to be implemented by the Thailand Greenhouse Gas Management Organization	Dr.Jakkanit Kananurak (TGO)
10:35 – 11:05	Questions and Answers, Discussion	All
11:05 – 11:35	Tea Break	
11:35 – 11:50	Introduction of MRV Guidebooks: One hundred questions & answers about MRV in developing countries (IGES version) & MRV Guidebook for Policy Makers (IGES-GIZ collaboration version)	Mr. Kazuhisa Koakutsu (IGES)
11:50 – 12:05	What's the next step? For Joint Credit Mechanism (JCM) Emission reduction through MRV methodology	Mr. Genichiro Sawamura (NEDO)
12:05 – 12:30	Questions and Answers, Discussion	All
12:30 – 14:00	Lunch	

Day 3 Afternoon, 6th August (Wed.)			
14:00 – 17:00	Wrap-up Session		
	Room: Infinity, Ground Floor		Chair: Dr. Yukihiro Nojiri (GIO)
Mutual Learning Sessions			
14:00 – 14:15	Summary of Mutual Learning Sessions		Mr. Hiroshi Ito (GIO)
14:15 – 14:45	Discussion		All
14:45 – 15:15	Tea Break		
Plenary Sessions			
15:15 – 15:30	Summary of Plenary Sessions		Ms. Elsa Hatanaka (GIO)
	Summary of Working Group Sessions		
15:30 – 15:40		Working Group Session 1 (Cross-cutting issued)	Asst. Prof. Dr. Chalor Jarusutthirak (Kasetsart University, Thailand)
15:40 – 15:50		Working Group Session 2	Dr. Wasinee Wannasiri (TGO,

	(AFOLU)	Thailand)
15:50 – 16:30	Discussion	All
Closing Remarks		
16:30 – 16:45	Closing Remarks	Mrs. Raweewan Bhuridej (Deputy Secretary General, ONEP, Thailand)
16:45 – 17:00	Closing Remarks	Dr. Yukihiro Nojiri (NIES)
Day 3 Evening, 6th August (Wed.)		
17:30 – 18:30	Joint Meeting of the WGIA Organizing Committee and Advisory Board (members of OC and AB, the WGIA Secretariat and voluntary participants)	
	Room: Sigma	Chair: Mr. Hiroshi Ito (GIO)
17:30 – 18:00	Review of activities in WGIA12	All
18:00 – 18:30	Discussion on topics for WGIA13	All
19:00 – 21:00	Farewell Reception (hosted by the GIO)	

Annex II: List of Participants

Annex II: List of Participants

BY PARTICIPATING COUNTRIES

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