IPCC Outreach Event on the Fourth Assessment Report

CMA, Beijing , China

May 21 and 22, 2008

FINAL REPORT

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Supporting material prepared for consideration by the Intergovernmental Panel on Climate Change. This material has not been subjected to formal IPCC review processes.

This outreach meeting was agreed in advance as part of the IPCC work plan, but this does not imply working group or panel endorsement or approval of this report or any recommendations or conclusions contained herein.

IPCC Outreach Event on the Fourth Assessment

(CMA, Beijing, China, 21 and 22 May 2008)

1. Opening of the Meeting

1.1 The IPCC Outreach Event on the Fourth Assessment Report, sponsored by IPCC and organized by the China Meteorological Administration (CMA), was held at the CMA Science and Technology Building, Beijing, China from 21 to 22 May 2008. Mr. Yu Jixin, Director-General of International Cooperation Department, CMA, opened the meeting at 9:30 a.m. on 21 May 2008. As the meeting was held during the Chinese National Mourning Days (19-21 May 2008), a minute of silence was observed to honour victims of the severe Wenchuan Earthquake happened in China on 12 May 2008.

1.2 Dr. SU Wei, Director-General, Office of National Coordination Committee for Climate Change, National Development & Reform Commission (NDRC), made a speech on behalf of the Chinese government. Ms. GUO Yaxi, Director-General of the Department for Science and Technology, CMA, made an opening remark on behalf of CMA. She stressed that a huge Chinese involvement in the AR4 process is proved by the contribution of more than 100 Chinese authors. Furthermore, the Chinese government intends to further support the Chinese participation in the IPCC.

1.4 Dr. Jean Palutikof, Head of TSU IPCC Working Group II, thanks CMA for hosting this event on behalf of the IPCC. The chair highlighted that the importance of the IPCC is shown by the last year's Nobel Peace Prize.

1.5 There were 84 participants at the meeting from several Chinese ministries, non-governmental organizations, mass media, research institutions and university. A complete list of participants is given in Appendix II to this report.

2 . Presentations

Twelve speakers were invited to give presentations on the relevant aspects of AR4. These presentations (in powerpoint) may be found at: http://www.mnp.nl/ipcc/pages_media/outreach/China-meeting.html and are summarized below:

2.1 Main Conclusions of the IPCC Report on Vulnerability, Impacts, and Adaptation

Dr Jean Palutikof presented the process of the Working Group II Fourth Assessment as well as the latest findings on the science of climate change and the impacts of climate change. She mentioned that warming of the climate system is unequivocal and that anthropogenic warming has had a discernible influence on many physical and biological systems. The continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century

that would very likely be larger than those observed during the 20th century. Climate change will not only lead to atmospheric warming but also bring increasingly adverse impacts as the magnitude of climate change increases. In particular, she stressed that some regions, namely, the Arctic, Africa, small islands and Asian megadeltas, are likely to be especially affected by climate change. The reason for inclusion of Asian megadeltas is due to their large populations and infrastructure investment, together with high exposure to sea level rise, storm surges and river flooding. However, there is still large uncertainty in the long term (after 2100) associated with projected sea level rise.

2.2 Observed Impacts of Climate Change

Dr. LIU Chunzhen gave a presentation on "Observed Impact of Climate Change on Systems and Sectors". It was indicated that most of the observed increase in global average surface temperature since the mid-20th century is very likely due to observed increase in anthropogenic GHG concentrations and it is likely that anthropogenic warming has a discernible influence on many physical and biological systems. But there are still limitations and gaps preventing more complete attribution of the causes of observed system responses to anthropogenic warming.

Those observed changes might have some implications in China on large river basins, lakes, Tibetan Plateau and North West China. Therefore, understanding and attribution of observed changes gives a challenge in China.

Q&A *The assessment models are all based on the most recent 100 years. What confidence can we have in these models?* 100 years is short indeed, but models are improving year by year. A recent article in Nature even states that models should run for 300 years from now on.
How about the natural cooling of human activity (buffering)? That's a good point: more studies are necessary.

2.3 Technical Paper on Water

Prof. ZHAO Zongci indicated that observed records and climate projections provide abundant evidence that freshwater resources are vulnerable and have the potential to be strongly impacted by climate change, with wide-ranging consequences for human societies and ecosystems.

Q&A *Fresh water availability did not change a lot over last 40 years. How come?* That's true, but the variability is much higher, as well in time as in region.

2.4 Scenarios of Future Climate Change

Prof. LU Xianfu explained the methods and tools for scenario development as well as the difference between climate scenarios and climate change scenarios. She also stated that the warming in China will be above the global mean warming. More frequent, longer-term and intense summer heat waves / hot spells will occur in China. But there will be fewer cold days. The frequency of intense precipitation will increase. Finally she also stressed that there is further need to enhance the spatial resolution of climate models to enable development of regional scenarios of climate change at high spatial resolution, to

underpin policy relevant climate risk assessments, improve scenario information on the frequency and intensity of extreme weather events and promote effective communication and management of uncertainties.

Q&A *Why scenarios instead of projections?* What's the difference? SRES = emission scenarios, these include baselines. Projections are elements of scenarios and have no baselines.

2.5.1 Future Impacts on Sectors and Regions

Dr. Jean Palutikof highlighted the future climate change impacts on sectors, such as ecosystems, coasts, water, food, health as well as on different regions. She mentioned that the magnitudes of such impacts can now be estimated more systematically. In all areas, even those with high incomes, some people (particularly the poor, young children and the elderly) can be at risk. A portfolio of adaptation and mitigation measures is required to diminish the risks associated with climate change.

Q&A *How many studies are used and how are inconsistencies handled?* The amount of literature on impact is not enormous. Differences are handled using a range of uncertainties (all terms of likely).

What's the IPCC view on evolution / restructuring ecological systems related to extinction of species? IPCC has no view, its role is to assess the literature and be policy relevant in its findings. New metrics and tools are needed to understand the risk posed to plant and animal species by climate change, and to cost the impact of climate change on ecosystems.

2.5.2 Introduction to the IPCC AR5: Timing and Structure

Dr. Jean Palutikof introduced the future of a possible IPCC AR5. The 28th session of IPCC resolved that there would be a Fifth Assessment Report. The structure and the terms of reference of the three IPCC Working Groups will remain the same as in the AR4. Taking into account the timings of the UNFCCC negotiations (COP 2014), Working Group I will finish its report in early 2013. The reports of Working Group II and III as well the Synthesis Report will appear as early as possible in 2014. The 29th Plenary in September 2008 will elect the new Bureau and decide the next actions such as holding scoping meetings to discuss report content.

Q&A *What's the expected difference between SRES and the 2014 scenarios?* As explained, the timeline and process will be different. A consortium has already been formed, including IIASA, NIES and EMF, to work on the development of the new scenarios. Considering the outcome: we expect to have new intervention scenarios, and we expect more focus on 2030 and the regional scale.

When is the deadline for literature to be included in the AR5? One year before publishing the report.

WG I results are basis for WG II and III, and cross cutting issues should be better addressed in AR5. Yes, that's right. In the new process, WG II and III can start well before WG I is finished. The interlinkages between WG II and III deserve more attention (e.g. the synergies and trade-off between adaptation and mitigation).

There should be time allocated for the cross cutting issues, and the Special Reports should

be integrated into AR5. Yes, and an interim report of WG I (e.g. in 2012) would help. Chinese representative could bring all this forward at the IPCC Panel later this year.
Grey literature is getting more important: how to handle that? Yes, a systematic procedure needs to be developed for integration of grey literature into IPCC Reports, including a process of review and translation.

2.6 The main conclusions of the IPCC report on mitigation of climate change

Leo Meyer presented the main conclusion in the Fourth Assessment report of Working Group III report on mitigation. The mitigation potential of global GHG emissions over the coming decades could offset the projected growth of global emissions or even reduce emissions below current levels at costs (much) less than 100 USD per tonne avoided CO_2 – equivalent. There are many affordable mitigation options in sectors like industry, buildings, transport, energy, forestry and agriculture. Emissions can also be reduced by changing human behaviour, such as reducing car use by shifting to other modes of transport.

There are also co-benefits of reducing greenhouse gases. Many climate change mitigation measures lead to less air pollution. The resulting health benefits may offset some of the mitigation costs. Furthermore, mitigation can also be positive for: energy security, improving the balance of trade, providing rural areas with modern energy services and sustainable agriculture and employment.

The UNFCCC agreed at Bali (2007) that it is recognized that deep cuts in global emissions will be required to achieve the ultimate objective of the Convention and emphasizing the urgency to address climate change as indicated in the AR4 IPCC.

Q&A *Renewable energy (especially wind) is not stable, how to solve that?* IPCC does not advise, but there is a storage problem indeed: we need a mixture of renewable energy. There will be a Special Report on renewable energy.
How about the AR4 bottom up potentials compared to the TAR? Comparable, but AR4 has more detail.
Does biomass compete with food security? Actual discussion, IPCC assessed literature until 2006. These side-effects should be studied in more detail.
How about limiting economic growth and population growth as mitigation options? This was not the scope of AR4, though it is part of the SRES scenarios.
New scenarios need to include change of lifestyles. This is to be decided by the Panel, thus by the countries, so your country representative could influence this.

2.7 Mitigation in the Energy Sector

Mr. ZHANG Xiliang introduced the potential GHG emission reduction and cost range for major energy resources. The following remarks were made on the China case study:
1) Achieving zero carbon emission growth after 2025 would lead to increase of energy supply cost by 34% in 2030 and 11% in 2050;
2) Based on current scientific knowledge, it is really difficult for China to achieve the target of control CO_2 emission and oil import simultaneously;
3) China needs to develop innovative energy systems and technologies compatible with

the environment to ultimately solve the problems of energy security and carbon emission control;
4) China needs a new philosophy of national energy security strategy in the context of mitigating climate change.

Q&A *What is the confidence on the potentials?* All outcomes go together with an uncertainty range. All countries should choose their own mix of options.
How about the Chinese potentials of biofuels for the energy security? More resources are needed, but potentials are big. It's a choice to be made by the Chinese government.

2.8 Mitigation in the industry sector

Mr ZHOU Fengqi described the GHG emissions from industrial sector, which include carbon dioxide (CO_2) from energy use, non-energy uses of fossil fuels and non-fossil fuel sources(e.g., cement manufacture); as well as non- CO_2 gases. The focus of the mitigation in the industry are energy-intensive industries that account for approximately 85% of the sector's energy-use and the food industry because of its importance in developing nations. The energy-related CO_2 emissions from the industrial sector grew from 6.0 Gt CO_2 in 1971 to 9.9 Gt CO_2 in 2004. However, since energy use in other sectors grew faster, the industrial sector's share of global primary energy use declined from 40% in 1971 to 37% in 2004.

Many options exist for mitigating GHG emissions from the industrial sector. These options can be divided into three categories:(1) sector-wide options; (2) process-specific options; and (3) operating procedures. The largest mitigation potentials are in the steel, cement, and pulp and paper industries and in the control of non- CO_2 gases. Much of the potential is available at <50 US$/t$CO_2$-eq (<180 US$/tC-eq). Application of carbon capture and storage (CCS) technology offers a large additional potential. However, there are some barriers in implementing these options, such as few demands, slow rate of capital stock turnover, lack of financial resources, limited ability of firms to absorb technological information, the rate of technology transfer, etc..

Q&A *How will the risk of Carbon Dioxide Capture and Storage (CCS) be under control, especially after the devastating earthquake in Sichuan, China?* IPCC published a Special Report on Carbon Dioxide Capture and Storage (CCS). CCS is an option in the portfolio of mitigation actions for stabilization of atmospheric greenhouse gas concentrations. CCS has the potential to reduce overall mitigation costs and increase the flexibility in achieving greenhouse gas emission reductions. The CO_2 would be compressed and transported for storage in geological formations, in the ocean, in mineral carbonates, or for use in industrial processes. As the site for the purpose of CCS is carefully selected based on the available subsurface information together with the monitoring programme, regulatory system and the appropriate use of remediation methods to stop or control CO_2 releases if they arise, the local health, safety and environment risks of geological storage would be comparable to the risks of current activities such as natural gas storage, EOR and deep underground disposal of acid gas. But such risks might need to be further accessed taking into account the recent devastating earthquake.
Will the coal-to-liquids be widely deployed in China? Coal-to-liquids (CTL) is a

prospective mitigation measures in improving the energy efficiency and reducing the GHG emission, especially in an era of high oil prices. The Chinese government attached great importance to CTL and some demonstration projects will be carried out in China this year. Meanwhile, some concerns were also noted by the Chinese government, such as the use of large quantity of water in the coal mine where water is insufficient, aggregate cost of CTL,etc.

How about technology transfer assessment? Technology transfer is essential for mitigation, but there is slow progress: who pays? There's also the issue of protection of knowledge.

2.9 Mitigation in the buildings sector

Mr XU Huaqing presented some major conclusions of "chapter 6-Residential and commercial buildings" of WG III AR4. Energy-related CO_2 emissions from the buildings sector were 8.6 Gt/yr, or 33% of the global total in 2004. Measures to reduce GHG emissions from buildings fall into one of three categories: 1) reducing energy consumption and embodied energy in buildings; 2) switching to low-carbon fuels, including a higher share of renewable energy; 3) controlling emissions of non-CO_2 GHG gases. He also introduced some effective mitigation measures in the building sector, i.e. efficient lighting technologies, solar water heating, efficient appliances and energy-management systems, improved cooking stoves in developing countries, improved insulation and district heating in the colder climates, efficiency measures related to space cooling and ventilation in the warmer climates, etc.

In order to achieve the long-term mitigation in the building sector, it is necessary to start the long-term mitigation measures as soon as possible due to the slow turnover of the whole building stock. In addition, non-technological opportunities can play an important role in the GHG mitigation in the sector.

Q&A *What is the incentive for mitigations in the building sector?* A problem is price distortion, but change in behaviour is more important.

2.10 Mitigation in the transport sector

Mr Shigeki Kobayashi introduced the mitigation options in the transport sector, including improvement of vehicle efficiency, increased use of biofuels, modal shifts, as well as land use, urban planning and non-motorized transport. Especially, the biofuels may play an important role in addressing GHG emissions in the transport sector.

However, it was also indicated that the effect of those mitigation options might be counteracted by growth in the sector. Mitigation options are faced with many barriers, such as consumer preferences and lack of policy frameworks.

Q&A *All is aimed at technology, how about behaviour (changes)?* We use quantative analysis.
How to avoid China becoming like the USA? Implement incentives (government) and improve technique (private sector and research).
How can we mitigate the need and amount of transport? By public transport, but that should be very convenient, which it isn't most of the times.

2.11 GHG Mitigation measures in Agriculture

Dr. Cai Zucong introduced that Agriculture accounted for an estimated emission of 5.1 to 6.1 Gt CO_2-eq/yr in 2005, mainly CH_4 and N_2O. The net emission of CO_2 from agriculture is almost zero. There are more than 60 mitigation methods in agriculture that can reduce the GHG emission among over 200 experiments, with a technical potential of 8.2 Gt CO_2-eq/yr by 2030. The soil carbon sequestration is the mechanism responsible for most of the mitigation potential, with an estimated 89% contribution to the technical potential. The potential mitigation of CH_4 and N_2O emissions from soils account for 9% and 2%. But each mitigation methods in agriculture may have impact on the emission of other GHG gases (increase or reduction).

Dr. Cai also introduced the change in organic carbon stock in cropland soils in China since 1990's. The organic carbon stock in cropland soils in China maintains an increasing trend, with an estimated net change in organic carbon of 311-401 Tg C. However, there is an imbalance in different regions. The organic carbon stock in cropland soils in East and North China is increasing while decreasing in North East China.

Q&A *Agricultural management can enlarge sinks, but is this permanent?* No.

2.12 Climate Change Impacts on Agriculture

Prof. Lin Erda described some findings of the WG II AR4. Roughly 20-30% of assessed species are likely to be at high risk of irreversible extinction if global average temperature exceeds 1.5-2.5° C. Crop productivity is projected to increase slightly at mid- to high latitudes for local mean temperature increases of up to 1-3° C depending on the crop, and then decrease beyond that in some regions. At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2° C), which would increase the risk of hunger. Drought conditions, flooding, and pest outbreaks are some of the current stressors to food security that may be influenced by future climate change. Adaptations such as altered cultivars and planting times allow low- and mid- to high-latitude cereal yields to be maintained at or above baseline yields for modest warming.

Globally, commercial timber productivity rises modestly with climate change in the short- to medium-term, with large regional variability around the global trend. Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries. Food and forestry trade is projected to increase in response to climate change, with increased dependence on food imports for most developing countries (medium to low confidence).

2.13 GHG Mitigation Measures in Forestry

Prof. ZHANG Xiaoquan introduced that emissions from forestry account for 17.4% of the total in 2004, mainly from deforestation emissions. Deforestation (2000-2005) continued at a rate of 12.9 M ha/yr, compared to 13.1 M ha/yr in 1990s, mainly as a result of converting forests to agricultural land and expansion of settlements and infrastructure. Key mitigation technologies and practices currently commercially available include

afforestation, reforestation, forest management, reduced deforestation and HWP management (+ bioenergy crops).

Forest-related mitigation options can be designed to create synergies with adaptation and sustainable development (co-benefits in terms of employment, income generation, biodiversity and watershed conservation, renewable energy supply and poverty alleviation). However, this opportunity has not been taken because of the current institutional context, lack of incentives and enforcement of existing regulations. Without better policy instruments, only a small portion of this potential is likely to be realized.

Q&A *What is the highest forest coverage that can be achieved in China and will the policy "Conversion of Cropland to Forest and Grass" affect the food security in China?* The forest coverage in China now stands at 18.21 percent after years of efforts by the Chinese government and due to the increasing public awareness of environmental protection. The maximum coverage is expected to reach 28 % by 2050. With regard to the impact of the policy "Conversion of Cropland to Forest and Grass" in China, this policy will not affect the food security as such croplands are located on the slopes above 30 degrees, which are not suitable for farming.
Food production is a serious matter, why would we replace agriculture by forests? There is no competition: farmers get refunding next 8 years, and basic farmlands stay protected.

3. Closure of the meeting

At the close of the meeting, Mr. Yu Jixin, Director-General of International Cooperation Department, CMA, expressed his appreciation to the invited speakers and participants. Special thanks were given to Dr. Leo Meyer, Dr. Sander Brinkman and Dr. Jean Palutikof for their efforts in organizing this important event after the completion of AR4 in China. He also mentioned that this outreach event would not only promote the awareness of AR4 and the importance of climate change in China, but will also enhance the communication between IPCC and China. The final report of this event as well as the Powerpoint documents will be provided to relevant government agencies, media, research and education institutions. Dr. Leo Meyer also expressed his thanks on behalf of IPCC to CMA for its support in organizing this outreach event. IPCC Outreach Event on the Fourth Assessment Report closed at 17:000 p.m. on 22 May 2008.

Appendix I: Agenda

IPCC Outreach Event on the Fourth Assessment Report
Beijing , China
May 21 and 22, 2008

May 21

9:00	**Registration**
9:30-10:40 Opening Session	**Opening Session** **Chair: Mr. YU Jixin, Director-General of International Cooperation Department, CMA** **Remark** by Ms. GUO Yaxi, Director-General of the Department for Science and Technology, CMA **Remark** by Dr. SU Wei, Director General, Office of National Coordination Committee for Climate Change, National Development & Reform Commission (NDRC) **Remark** by Dr. Jean Palutikof, Head of TSU IPCC WG II
10:00-10:40	**The main conclusions of the IPCC report on vulnerability, impacts, and adaptation** by Jean Palutikof (Head TSU IPCC working group II): **Discussion / Questions & Answers**
10:40-11.00	**Coffee-break**
11.00 – 12.30 Technical Session 1	**WGII Session 1: Scene setting**
11.00 – 11.30 11.30 – 12.00 12.00-12.30	**Observed impacts of climate change,** LIU Chunzhen **Technical Paper on Water** ZHAO Zongci (WGI LA) **Reaction Dr. LIU Hongbin, National Climate Center / Discussion/ Questions & Answers**
12:30 – 14:00	**Lunch**
14:00- 15:30 Technical Session 2 14.00 – 14.30 14.30 – 15.00 15.00 – 15.20	**WGII Session II: Impacts of climate change on sectors** **Chair: ZHAO Zongci** **Scenarios of future climate change** LU Xianfu **Industry, settlement and society** **Discussion / Questions & Answers**
15:20 – 15.50	**Coffee-break**
15:50-17.00 Technical Session 3	**WGII Session III: Update on IPCC and the AR5** **Chair: Dr. LIU Hongbin**
15.50 – 16.10	**Introduction to the IPCC AR5: timing and structure** Jean Palutikof
16.10 – 16.30	**Panel Discussion / Questions & Answers:** Jean Palutikof, Leo Meyer
16.30 - 17.00	**Wrap-up and closing**

May 22

9:00 Registration for participants second day only.	
9:15 **Opening**	**Opening Second day** **(Chair: Dr. XU Huaqing)**
9:20–9:50	The main conclusions of the IPCC report on mitigation of climate change(Leo Meyer) :
9:50 – 10:10	Discussion / Questions & Answers
10:10-10:40	Coffee-break
10:40-12:30 **Technical Session 4**	**Climate change mitigation measures by sectors** (Chair: Leo Meyer, IPCC)
10:40 – 11:10	**Mitigation in the energy sector**: Mr ZHANG Xiliang, Tsinghua University
11:10 – 11:30	**Mitigation in the industry sector**: Mr ZHOU Fengqi (Energy Research Institute)
11:30 – 12:00	**Climate Change Impacts on Agriculture:** LIN Erda
12.00 – 13:30	**Lunch**
13:30- 14:30 Technical Session 5	**Climate change mitigation measures by sectors** (Chair: Sander Brinkman, IPCC)
13:30-13:50	**Mitigation in the buildings sector:** Mr XU Huaqing (Energy Research Institute)
13:50-14:10	**Mitigation in the transport sector** : Mr Shigeki Kobayashi (Japan)
14:10-14:30	Discussion / Questions & Answers
14:30-15:00	**Coffee-break**
15:00-16:10 Technical Session 6	**Climate change mitigation measures by sectors, continued** (Chair: Leo Meyer, IPCC)
15:00 – 15:20	**GHG Mitigation measures in Agriculture**: CAI Zucong (Chinese Academy of Sciences)
15:20-16:10	**GHG Mitigation measures in Forestry**: ZHANG Xiaoquan (Chinese Academy of Forestry)
16:10-16:30 **Closing**	Wrap-up and closing

Appendix II:

Participant List

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53	Ran	Ruikui	China Meteorological News	
54	Li	Tianjiao	China National Radio	
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60	Wang	Xuejian	Science Times	
61	Sun	Xiaohua	China Daily	

			Invited Government Officials	
62	Su	Wei	National Development and Reform Commission	(Director-General)
63	Yu	Jixin	China Meteorological Administration	(Director-General)
64	Guo	Yaxi	China Meteorological Administration	(Director-General)
65	Yang	Chenqing	State Forestry Administration	(Deputy Director-General)
66	Duan	Hongdong	Ministry of Science and Technology	(Deputy Director-General)
67	Meng	Jianhong	Ministry of Foreign Affairs	Second Secretary
68	Sun	Cuihua	National Development and Reform Commission	Director
69	Ma	Xin	Ministry of Science and Technology	Programm Officer
70	Wang	Yong	Ministry of Water Resources	Director
71	Chen	Lie	Ministry of Science and Technology	Programm Officer
72	Gao	Yun	China Meteorological Administration	Director
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