

Innovative Tools for Sustainable Forest Management under Climate Change

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Agenda

Innovative Tools for Sustainable Forest Management under Climate Change

1. **Overview of climate change and policy in the Asia-Pacific**
2. Adaptation to climate change in the Asia-Pacific
3. Climate modeling for the Asia-Pacific
4. Application of process-based models to evaluate potential climate change impacts in SE Asia
5. Issues and solutions for SFM and climate change in the Asia-Pacific

Objectives

1. Share knowledge on effective strategies for SFM in the Asia-Pacific based on the research project *Adaptation of Asia-Pacific Forests to Climate Change*
2. Communicate findings from climate and ecological modeling of forests under climate change in the AP
3. Demonstrate models and tools that can be used to improve the capacity of forest managers and policy makers in the AP
4. Help lead to the development of robust adaptation strategies to address climate change in this region

Overview of Climate Change and Policy in the Asia-Pacific

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Outline

1. Climate change impacts in the AP
2. Current climate change policy in the AP
3. Paris Agreement
 - AP commitments
 - Implications for the AP
 - How to meet these commitments
4. Research project: *Adaptation of Asia-Pacific Forests to Climate Change*

Climate Change in the Asia-Pacific

- The Asia-Pacific region is projected to warm faster than the global average and experience some of the most severe climate change impacts
 - Changes have already occurred including decreases in overall rainfall, increased intensity of rainfall events, more frequent heat waves, a higher number of tropical cyclones, and shifts in the onset of rainy seasons



Flooding in Thailand, Vietnam, Cambodia and Laos



Drought in Guizhou and Yunnan provinces

Climate Change in the Asia-Pacific

- Forest ecosystems are particularly vulnerable to climate change
 - Tree species are adapted to specific ranges of temperature, moisture, and nutrient conditions, and may be unable to adapt at the pace with which these conditions are changing
 - There is expected to be an increased risk in extreme forest disturbances, such as forest fires and insect outbreaks
- Many people in the AP region rely heavily on forests for socio-economic needs, ecosystem services, and cultural and traditional practices
 - AP countries vary in their social and economic dependence on forests, as well as their adaptive capacity and vulnerability to climate change
 - There is high uncertainty regarding how forest ecosystems and communities dependent upon them will fare in the future
 - The use of forests as a safety net in 'bad times' may add further stress



Fire damage from the 2009 fires in Victoria, Australia



Deforestation in Laos

Climate Change in the Asia-Pacific

- Currently, deforestation and forest degradation account for ca. 12% of global greenhouse gas emissions
 - However, forests have high climate change mitigation potential
- Increasing realization that forests won't help to mitigate climate change if they can't adapt. In fact, they may become sources (as has happened in Canada)
- Actions to address adaptation will need to vary regionally, as the impacts of climate change are different throughout the AP region

Current climate change adaptation policy

- Although most AP economies have included sustainable forest management in their forestry policies, few have integrated climate change strategies into forestry policy and management
- Current policies often do not adequately address conflicting interests between factors such as economic growth or natural resource extraction and preservation of natural forests or emissions reduction

Timeline of climate negotiations

- **1992** Framework Convention on Climate Change
- **1995** Berlin Mandate (strengthening reduction commitments of developed countries)
- **1997** Kyoto Protocol (detailed reduction targets and mechanisms)
- **2001** Marrakech agreement (finalization of operational details)
- **2010** Cancun Agreements (set up Green Climate Fund)
- **2011** Durban Platform (agreement to seek a new legally binding treaty to replace KP)
- **2015** Paris Agreement

Paris Agreement: Commitments

- Parties aim to limit the increase in global average temperature to well below 2°C above pre-industrial levels
- A major goal is to achieve a balance between anthropogenic emissions by sources and removals by sinks in the second half of the century
 - Forests are acknowledged as playing a key role in conserving and enhancing carbon sinks and reservoirs
- Most Parties outlined their individual plans to address climate change and reduce emissions in their Intended Nationally Determined Contributions (INDCs)
 - 36 Parties in the AP region submitted INDCs



Paris Agreement: Commitments

- The Green Climate Fund is planned to receive \$100 billion (USD) annually until 2020 to aid developing countries in meeting their emissions reductions targets, including forestry related projects
- Private funding commitments were made, some of which specifically support REDD+ activities
- Evaluation of all INDCs indicated that they are not sufficient to achieve the goal of limiting warming below 2°C
 - Parties are expected to update their INDCs before the Paris Agreement commitment period begins in 2020, and reevaluate their INDCs every 5 years after that

Paris Agreement: Implications for the AP

- The commitment to limit warming below 2°C was spearheaded by AP economies
 - This is significant progress for the region as these economies, particularly small island nations, are some of the most vulnerable to climate change
- The focus on adaptation will strengthen the resilience of forest ecosystems and forest-dependent communities in the AP

Paris Agreement: Implications for the AP

- INDCs will become a key planning and guidance document for future climate change adaptation and mitigation action, such as REDD+ and SFM plans
- Parties are encouraged to support existing REDD+ mechanisms set by previous COPs
 - AP economies are already making progress in this regard in the forestry sector

Paris Agreement: How to meet commitments

- Parties need to implement and monitor their INDCs in a manner consistent with the Agreement
- Parties need to assess and improve upon their INDCs, as well as their capacity prior to the start of the commitment period
 - Gaps in technology, personnel, and finances for planning and implementation need to be outlined and addressed
- Inter-disciplinary and integrated approaches will be most effective for implementing INCD commitments and enabling co-benefits such as food security, poverty reduction and increased resilience

Adaptation of Asia-Pacific Forests to Climate Change

Our research project aims to help AP economies meet their Paris commitments by:

- Addressing gaps in technology and capacity
- Focusing on adaptation
- Providing locally-specific tools for economies to meet their INDCs
- Helping to maintain forest ecosystems as an important carbon sink and reservoir into the future

Adaptation of Asia-Pacific Forests to Climate Change

Objective: To help forest managers and policy makers develop effective management strategies to maintain resilient forest ecosystems for adaptation to climate change

This addresses Paris Agreement articles:

- **Article 5.2:** *Parties are encouraged to implement and support... policy approaches and positive incentives for activities relating to reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries*
- **Article 7.1:** *Parties establish the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change*

Adaptation of Asia-Pacific Forests to Climate Change

PHASE I

November 2011 - October 2014

- Temperate focus (China, Canada, Australia)

PHASE II

January 2016 – December 2018

- Tropical and subtropical focus (China, Chinese Taipei, Malaysia, Myanmar, Laos)
- **Objective:** *expand and improve upon the research and tools developed in Phase I, with a focus on communication and capacity building*

Paris Agreement vs. Project Outputs

Article 7.6: *Parties recognize the importance of support for and international cooperation on adaption efforts and the importance of taking into account the needs of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change*

Project Output:

- Research focus on developing economies (such as Myanmar, Laos and Malaysia) that are particularly vulnerable to climate change
- Development of an international network that encourages international cooperation through completion of workshops, seminars, conferences and hosting of visiting scholars



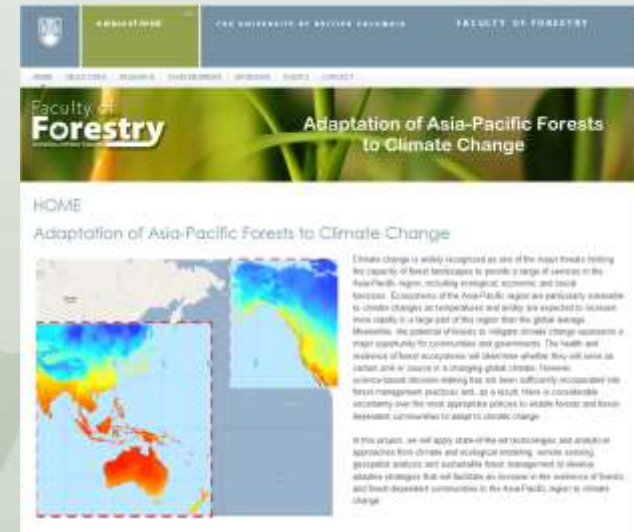
Phase II pilot economies

Paris Agreement vs. Project Outputs

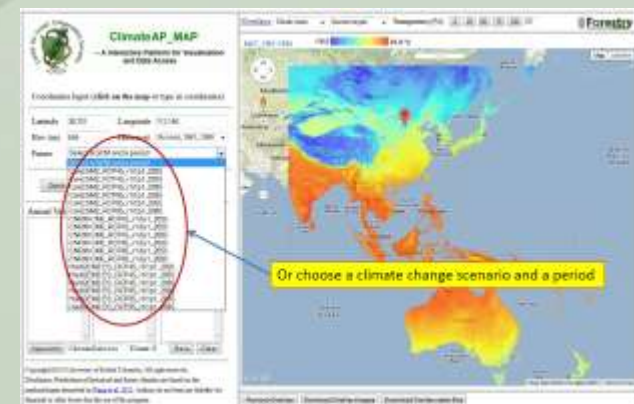
Article 7.7a: *Sharing information, good practices, experiences and lessons learned, including as these relate to the science, planning, policies, and implementation of adaptation actions*

Project Output:

- Communication of results in open access journals and on our project website
 - In Phase I, 19 publications in peer-reviewed journals, 2 literature reviews 1 technical manual for model application, 1 country climate change practice report
- Freely available online models and tools
- Communication and capacity building through conferences, seminars, workshops and visiting scholars



<http://asiapacific.forestry.ubc.ca/>



<http://climateap.net/>

Paris Agreement vs. Project Outputs

Article 7.7.c: *Strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a matter that informs climate services and supports decision making*

Project Output:

- Development and integration of 9 niche-based and process-based ecological models to be used at varying spatial and temporal scales
- Provide a framework for assessing climate change impacts and developing adaptation strategies for forest management and species selection

Niche-based model

- Ecological model

Process-based models

- FORCAST-Climate
- TACA
- LANDIS-II
- 3-PG
- Carbon Budget Model (CBM)
- BEPS-TerrainLab v.20

Model integration

- Landscape Summary Tool (LST)
- Patchworks

Paris Agreement vs. Project Outputs

Article 7.9c: *Assessment of climate change impacts and vulnerability, with a view of formulating nationally determined prioritized actions, taking into account vulnerable people, places, and ecosystems*

Project Output:

- Application and integration of ecological models in 4 pilot sites in Phase I (in China, Canada and Australia) and 5 pilot sites in Phase II (China, Chinese Taipei, Malaysia, Myanmar, Laos)
- Completion of trade-off analyses between ecological and economic benefits
- Provide specific local policy and management recommendations to contribute to development of more appropriate national policies and action plans



Pilot site location in Laos



Pilot site location in Malaysia

Conclusions

- Impacts of climate change are locally diverse throughout the AP and therefore actions to address adaptation will need to vary regionally
- SFM will play an important role in meeting objectives set out by the Paris Agreement
- Our project addresses the lack of tools to support government decision-making and the need for management objectives and model applications to be adapted to local situations
 - The rest of today's presentations go into more detail about this