PhD Workshop preceding Adaptation Research Conference – 27 & 28 August, Helsinki

Climate change adaptation - Analysis, Planning and Implementation

Programme

Venue: Rantapuisto, Ramsinniementie 14, FIN-00980 HELSINKI

directions for travel can be found at the conference web site
http://www.nordicadaptation2012.net/

Informal start at 26 August

On Sunday evening 8pm an informal get-together is organized in the Workshop and Conference venue Rantapuisto. You will be informed about the exact location of the get-together upon arrival.

Two intensive days – 27 & 28 August

As you can infer from the schedule on the next page the days are pretty well 'packed'. The output of the Workshop will also be used in the Conference (see below) and consequently it may be wise to budget for some work to be done on Tuesday evening 28 August.

Short presentations of own dissertation study

All 13 participating PhD students are requested to give an 7 minutes presentation about their own dissertation study. This is done in two batches on Monday and Tuesday morning respectively.

Lectures

The three scheduled lectures concern topics which scored high among the indicated topics in the PhD students' application forms. The provided knowledge will also be of use in the review sessions and the linking tasks for the Conference.

Early August suggested literature will be put on the NONAM website. You will be notified about uploads.

Review sessions

The backbone of the PhD Workshop consists of three sets of five parallel review discussion sessions. In each parallel session a topic cluster (see list below) is dealt with. In the first and second set of parallel sessions the topic clusters are the same. For the first set we have allocated participants according to the information given in the application form and abstract. In the second set it is allowed to switch to another topic set, provided that all topic sets are dealt with. More precise guidelines regarding the structure of the review sessions will be provided at the start of the first review session.

The third set of parallel sessions concerns the linkage to the Conference. The five small groups are merged into two groups. Each group has to come up with a set of messages for the conference based on identified solutions or options regarding the five topics in conjunction with specific dilemmas discussed in the preceding review sessions. The messages can be requests, critical questions, propositions for emphasis on certain topics in future research and/or implementation, educational wishes, etc. In the opening plenary session of the Adaptation Conference on Wednesday morning two PhD students (one from each group) will present the messages (max. 5 minutes each).

Tasks in the Conference

During the conference all of you are requested to act as rapporteur in two or three sessions. A preliminary allocation of rapporteur sessions has been made (see below), while accounting for your expertise in certain areas. Participants can suggest changes in the rapporteur session allocation, on the condition a convincing argumentation is provided as well as a confirmed alternative rapporteur with whom a slot is proposed to be swapped.

In the closing session on Friday afternoon another two Workshop participants will be offered the opportunity of presenting a brief summary of key impressions and messages (2 x 5 minutes). This will require some degree of co-ordination among the rapporteurs. The Conference organizers need to know in time (Friday morning at the latest) who will present the summaries.

It is advised to somehow link the opening and closing presentations. This can be helpful with respect to finding a common structure in presenting as well in session reporting (for which angles mentioned in the opening session statements of the Workshop participants can provide checkpoints). The rapporteurs' session reports will also be valuable for the first phase of the preparations of a few special issues for peer reviewed journals based on the conference. The Conference organization will be grateful for your work.

Schedule

Monday									
8:45	9:00	welcome							
9:00	10:00	short introductions of PhD studies batch 1					(6 x 10)		
10:00	10:15	coffee break							
10:15	11:15	lecture 1	Prof. Jens Christian Refsgaard - uncertainty in adaptation planning						
11:15	12:15	lecture 2	Prof. Adriaan Perrels - information access & transparency						
12:15	13:30	lunch break							
13:30	15:45	1st review session	5 parallel sessions	3 (or 2) PhD + 1 (or 2) moderator					
15:45	16:00	coffee break							
16:00	17:30	reports from reviews + groups for next day							
17:30	19:00	sauna open							
19:15		dinner							
Tuesday									
8:45	10:00	short introductions of PhD studies batch 2					(7 x 10)		
10:00	10:15	coffee break							
10:15	11:15	lecture 3	Prof. Carina Keskitalo - appropriate spatial scales						
10:15	12:45	2nd review session	5 parallel sessions	3 PhD + 1 (or 2) moderator					
12:45	14:00	lunch							
14:00	15:00	reports from reviews and set-up of solution session							
15:00	15:15	coffee break							
15:15	16:45	develop solutions and recommendations by theme area (2 groups)							
16:45	17:30	presentation and discussion							
17:30	17:45	wrap-up, assigment of conference plenary presenters							

Topic clusters for the parallel review sessions

1. responsiveness (of systems, actors) & economic (sector) impacts
2. community based adaptation & indicator choice
3. transparency and information access & uncertainty in decision making
4. critical thresholds & linking multiform uncertainty
5. appropriate spatial scales & combining certified and tacit knowledge

Initial session allocation for 1st round review session:

responsiveness economic (sector) impacts	community based adaptation indicator choice	transparency & information access uncertainty in decision making	critical thresholds linking pluriform uncertainty	appropriate spatial scales combining certified and tacit knowledge
Tommy Chan	Michael Laiho	Patrick Driscoll	Karen Lundgren	Hector Guinea Barrientos
		Eivind Junker	Jussi Ylhäisi	Athanasios Votsis
Karoliina Pilli-Sihvola	Yuang Zheng	Väinö Nurmi	Jiao Xi	Anja Wejs

Participating PhD Students

applicant no.	abstract no.	name	country	discipline (MSc.)	dissertation title
1	3 & 4	Yuang Zheng	Denmark	Forestry & Landscape	Rural households' adaptation to future climate risks
2	10	Athanasios Votsis	Finland	Urban & regional planning	The significance of regulating ecosystem services for sustainable urban development with special reference to real estate value
3	32	Eivind Junker	Norway	Law	Adapting to climate change through land use planning
4	33	Michael Laiho	Finland	European studies	Agency and discourse in European expansion: who holds the reins in EU policy North?
5	20	Hector Guinea Barrientos	Sweden	Natural resouce management	Stakeholder analysis of flood risk management reduction strategies in Paz River catchment, Guatemala-El Salvador
6	58	Patrick Driscoll	Denmark	Civil engineering	Decision-making and Climate Change: Synergies, Conflicts, and Trade-offs
7	78	Anja Wejs	Denmark	Environmental management	Integrating climate change into governance at the municipal scale
8	93	Tommy Chan	Finland	Forest sciences	Physiological and environmental factors affecting growth from climate change effects (working title)
9	140	Karoliina Pilli-Sihvola	Finland	Environmental economics	Economic analysis of extreme weather events and climate change
10	147	Jussi Ylhäisi	Finland	Meteorology	Assessing climate predictions in a multi-model framework
11	(new)	Karen Lundgren	Sweden	Engineering & Design	Effects of Heat on Occupational Health
12	(new)	Väinö Nurmi	Finland	Economics	Coping with climate and weather risks (working title)
13	(new)	Jiao Xi	Denmark	Public policy	Rural livelihoods, climate change vulnerability and micro-level

Moderators

Michael Goodsite:	Center Director and Professor, Aarhus University Center Herning
Sigrún Karlsdottir:	Director of Natural Hazards, Icelandic Meteorological Office, Reykjavik
Carina Keskitalo:	Professor Political Science, University of Umeå – dept. of Geography and Economic History
Ingrid Nessheim:	Researcher and coordinator, University of Oslo, Centre for Development and Environment
Adriaan Perrels:	Research Professor Economics of climate change impacts and of weather service appraisal, Finnish Meteorological Institute, Helsinki
Jens Christian Refsgaard:	Research Professor Hydrology, Geological Survey of Denmark and Greenland, Copenhagen
Oskar Wallgren:	Environmental scientist, Research fellow, Stockholm Environmental Institute, Stockholm

Session rapporteur allocation

Monday 29.8	Yuang Zheng	Athanasios Votsis	Eivind Junker	Michael Laiho	Hector Guinea Barrientos	Patrick Driscoll	Anja Wejs	Tommy Chan	Karoliina Pilli-Sihvola	Jussi Ylhäisi	Karen Lundgren	Väinö Nurmi	Jiao Xi	Hans-Paul Velema
plenary 1 (opening)		X												
session 1.1														X
session 1.2										X				
session 1.3												X		
session 1.4						X								
session 1.5	X													
lunch														
plenary 2				X										
session 2.1														X
session 2.2			X											
session 2.3					X									
session 2.4											X			
session 2.5													X	
Thursday 30.8														
plenary 3									X					
session 3.1			X											
session 3.2		X												
session 3.3								X						
session 3.4												X		
session 3.5							X							
lunch														
plenary panel 1						X	X							
session 4.1	X													
session 4.2											X			
session 4.3					X									
session 4.4									X					
session 4.5													X	
Friday 31.8														
plenary 4													X	
session 5.1							X							
session 5.2								X						
session 5.3									X					
session 5.4											X			
session 5.5										X				
lunch														
plenary panel 2				X										
ER PERSON	2	2	2	2	2	2	3	2	3	2	3	2	3	2

Participant profiles

Yuan Zeng

M.Sc. in Forestry, specialized in Sustainable forest and nature management

Dissertation project started in February 2011 at the University of Copenhagen

Dissertation (working) title:

Rural households' adaptation to future climate risks in Lijiang, Yunnan and its implications for policy designs

Short description:

Accommodating case studies in Yunnan Province of China, the study undertakes to explore how households would respond to future climate risks. The research's innovation lies in its attempts to contribute to the recent literature gap by digging into the motivations of households to take proactive measures against probable future climate risks and their preferences for different livelihood activities against possible future changes, based upon a historical analysis of the coupled human-environment system development as guidance for future investigation. The study will gain insights from the theories outlining the concepts of vulnerability/adaptive capacity/resilience embedded in the framework of sustainable livelihood and theories related to risk perception as well as motivation including Protection Motivation Theory (PMT).

Topics for the review discussions:

In the workshop, I'd like to address the past and present experiences of households' adaptation to climate variabilities and change and its implication for the future. I've conducted questionnaire survey and qualitative interviews in the field and hopefully I can get some feedback on the preliminary analysis based upon the data.

Athanasios Votsis

M.Sc. in Urban and regional planning

Dissertation project started in August 2011 at the Finnish Meteorological Institute and the University of Helsinki

Dissertation (working) title:

The significance of regulating ecosystem services for sustainable urban development with special reference to real estate value formation under a changing climate.

Short description:

The study focuses on the effects of climate change on the formation and spatial distribution of urban real estate values, and on the implications for the use of ecosystem services in sustainable urban planning. Special focus is placed on flooding and climate comfort, as important operationalizations of environmental risks and amenities, respectively, for the context of seven Finnish cities.

From a methodology point of view, a spatial analysis framework is adopted, drawing from the fields of urban economics, urban planning, and human geography. In order to shed light to the researched theme, the main analytical focus of the study is the formal organization of the built environment, and several environmental, economic, and meteorological variables are constructed and analysed.

Topics for the review discussions:

1) Recent advances in econometrics and economic geography have led to the reconsideration of the role of space in socioeconomic studies, and the development of new models, which explicate, e.g. spatial multipliers. This is a welcomed improvement in the study of climate change impacts and adaptation in the city. However, such models require, to varying extents, the a priori conceptualisation of spatial interaction, before one models it statistically. What kinds of theoretically sound spatial interactions are we able to delineate, and from what disciplines, to ensure more accurate empirical analysis?

2) Non-quantitative architectural, urban planning and human geography theories have long studied the behaviour of urban settlements in relation to their climate, natural environment, and similar boundary conditions. The historical record also supplies an abundance of adaptation incidents inside and outside western societies. Given that contemporary climate adaptation research often fails to think outside the paradigms that caused the problem, the aforementioned material seems unusable. Nevertheless, they provide the so called 'big context'. How can such non-empirical knowledge directly influence our climate adaptation strategy?

Eivind Junker

M.Sc. in Law

Dissertation project started in June 2010 at the University of Oslo

Dissertation (working) title:

Adapting to climate change through land use planning

Short description:

My project deals with legal rights, duties and risk related to climate change adaptation, focusing onregulation of land use planning and nature conservation. Financing for the project is provided by the Research council of Norway through the NORKLIMA programme.

The aim of the project is to locate and discuss legal questions arising from climate change adaptation efforts. The topic covers both administative and private duties to prevent harm, and questions related to damage compensation. Furthermore, the research will include an assessment of whether current rules are adequate and sufficient to maintain both the society's and individual needs.

Topics for the review discussions:

1) How should incomplete knowledge about facts (i.e. uncertainty about models, or lack of empirical data) be treated when making decisions?

Everyone make decisions based on incomplete knowledge all the time, from the simple question of whether to bring an umbrella when going outside, to more complex topics like which insurance policy to choose. Incomplete knowledge of facts is also an inherent aspect of planning. However, lack of complete knowledge is not the same as ignorance. People apply different heuristics and strategies (like risk-aversion). When the goverment makes decisions on behalf of the population, it must comply with expectations of predictability, indiscrimination etc. But is this compatible with the best strategies for handling uncertainty? What if new knowledge prescribes a decision contrary to one that has already been made? Should the need for legal certainty and predictability prevail?

2) What is the best way to distribute roles and responsibilities between scientists, politicians and policymakers when analyzing, assessing and managing risk/uncertainty?

In many cases where uncertainty and risk is involved, acts and regulations prescribe different methods of analyses and/or assessments to be carried out before the decision is made. The ideal is that researchers provide objective, neutral facts to the policymakers or politicians. However, research and policy are often closely interlinked. Research is conducted as a result of proposed plans, or policies are developed as a result of scientific results. Neither exists in a vacuum. Should the ideal of the completely neutral and detached scientist be upheld - or are there better models?.

Michael Laiho

M.Sc. in European Studies

Dissertation project started in January 2012 at the University of Lapland, Rovaniemi

Dissertation (working) title:

Agency and Discourse in European Expansion: Who holds the reins in EU Policy North?

Short description:

Research will reveal the hidden power systems within the EU which seem to produce a European single projection of interests. My thesis documents the ways in which agency and dialogue construct the EU's energy and environmental policies.

I use the Arctic as a case-study to test my hypothesis: Europeanisation (homogenization) is taking place in the Arctic among various political actors. If this hypothesis is correct, it will be appropriate to ask how the EU will legitimize the pursuance of its interests in the Arctic vis-a-vis the other actors.

My Ph.D. thesis suggests that sustainable design is an interesting theme which bridges the EU's energy and environmental policies; it also legitimizes the EU's Arctic policy among interest groups and the general public.

Sustainable design can be referred to the adaptation of energy industries to form newer, 'green' methods of producing energy products. (A working paper on this subject will be presented at the NORDCLAD conference.) Also environmental damage reduction, e.g. carbon emissions mitigation policy, is another way which sustainable design bridges the gap between EU energy and environmental policies.

My thesis explores sustainable design as a narrative which draws together various actors to a common directive – as a medium for Europeanisation.

Topics for the review discussions:

1. Presenting empirical research data (interviews with various actors, from various sociological fields of influence) to my audience. This issue is important to me because it would be excellent to engage with innovative techniques to present the findings in a way which would be later used in future research on similar interests.

E.g. if climate scientists have differing opinions, in regard to an impact assessment on energy industries' presence in the Arctic region, then how can this data be presented in a way which displays the conflicts clearly?

My questions to ask others at the Ph.D. workshop would be: how can data best be used in the lay-out of a Ph.D. thesis? I would propose to select some of my empirical research material and describe in which way it relates to my Ph.D. thesis arguments. Then others could give me feedback.

2. Looking at such a wide range of political actors in my research seems to be giving me some practical, as well as theoretical problems. On the one hand, having three sample categories to focus upon – elite (policy making), lobbying and interest groups, and citizens – provides me with a good structure for presenting my

research. On the other hand, having such a wide choice of actors to choose from it is easy to become misled with where to look for empirical date.

I would appreciate being able to propose some practical research methods for gauging several actors' interests in aspects of EU-Arctic policy making, and would look forward to receiving feedback on whether or not people believed these to be viable approaches to my research..

Hector Guinea Barrientos

M.Sc. in Natural Resource Management

Dissertation project started in September 2010 at the University of Uppsala

Dissertation (working) title:

Stakeholder analysis of flood risk management reduction strategies in Paz River catchment, Guatemala-El Salvador

Short description:

This study summarizes the main outcomes of the scenario building exercise performed with stakeholders of Paz River catchment in order to prioritize the best set of strategies to deal with a possible increasing of floods due to climate change in the lower part of the river.

Paz River is a transboundary catchment shared by Guatemala and El Salvador. Due to its transboundary nature Paz River may serve not just as a good example of integrated flood management in Guatemala or El Salvador but for joint flood management in Central American countries.

Topics for the review discussions:

I would like to review the collective action dilemma in managing transboundary freshwaters; I do consider that the analysis, planning and implementation of strategies towards climate change adaptation should properly address issues concerning transboundary resources, especially transboundary water resources.

I would like to review uncertainty in environmental modelling, I do consider fundamental to study sources and assessment of uncertainty in the predictions of environmental models.

Patrick Driscoll

M.SC. in Civil Engineering

Dissertation project started in February 2012 at Aalborg University

Dissertation (working) title:

Decision-making and Climate Change: Synergies, Conflicts, and Trade-offs

Short description:

This research will empirically test a few key theoretical considerations regarding climate change adaptation planning. Firstly, that uncertainty about possible future impacts and climate states inhibits adaptation planning. Secondly, that planners and politicians frequently ignore or downplay scientific knowledge in decision-making and instead often rely upon pre-existing belief structures and cognitive biases to support their decision-making.

The empirical data collection consists of the following data types: 1) document analysis, including an historical survey of climate change strategies dating back to the 1980's, multiple generations of land use, transport, energy, and natural systems plans at both the municipal and regional levels and relevant national/state level policy and strategy documents affecting climate change planning; 2) a state-of-the-art literature review, examining European and American municipal and regional adaptation strategies, 3) interviews (20-30) with municipal and regional planners and policy makers in Copenhagen and Portland; 4) the use of a Multi-Criteria Decision Support (MCDS) software tool to help understand how different groups rank and value competing planning goals within a complex policy matrix, including different social, cultural and economic value considerations; and 5) participant observation, with 2-3 month site visits to the respective planning agencies and departments in the case cities, Copenhagen and Portland.

Topics for the review discussions:

My theoretical frame is built upon cumulative prospect theory (Kahneman and Tversky), focusing on two key principles: distal and proximate attitudes to risk and the role of heuristics and biases in decision-making under uncertainty. One of the immediate problems that I have encountered is that most of the studies that have been done within this field are clinical ones, with comparatively few field studies of decision-making in the day-to-day world. Additionally, planning theory has yet to engage with cumulative prospect theory in a significant fashion, and most of the work has been done in medicine, economics, and psychology. So there is a question about transferability (and underlying issues of reliability and validity of the data) that I would like to explore in the workshop.

A second, related question is how to establish a sound methodological frame to handle the complexity of addressing the manifold biases that are present within decision-making. There are over 30 identified cognitive biases, on top of social biases, memory biases, belief biases, and so on. It would be impossible to create an analytic frame that can adequately encompass this many different variables. So one of the other dilemmas that I would like to explore with other researchers at the workshop is how to practically handle these types of considerations in a scientifically sound and defensible manner.

Anja Wejs

M.SC. in Environmental Management

Dissertation project started in December 2009 at Aalborg University

Dissertation (working) title:

Integrating climate change into governance at the municipal scale

Short description:

My PhD takes point of departure in Danish municipal climate change action plans and the integration of these plans into governance at the local level. The dissertation is article based and will include four to five journal articles that discuss the institutional challenges, solutions, and opportunities that arise in this integration process, and it provides a state-of-the-art analysis of climate change as an emerging field in planning. The research builds on new perceptions within governance and encompasses the role of agents in institutional theory, within this theoretical strand an analytical framework is set up to analyze the interrelations between agency and institutions on both the internal organizational and the external societal level. The project takes its point of departure in two cross-sectorial plan types, the municipal spatial plan and the climate action plans. Furthermore, is the role of the mandatory strategic environmental assessment (SEA) of plans and programs (SEA Directive 2001/42/EC) investigated as a possible regulative tool for climate change integration. The research contributes with insight on the institutional dynamics at the local level in order to implement climate actions in practice and add micro level perspectives to the literature on climate change as a multilevel governance field.

Topics for the review discussions:

Climate change action plans are a new plan type that often incorporates both mitigation and adaptation in the same action plan. In August 2011 70 out of 98 Danish municipalities have committed to the Danish NGO "The Danish Society for Nature Conservation" (shortened to "DN") climate change program "Climate Municipalities" which consist of local mayors sign an agreement to reduce carbon emissions with minimum two per cent per year. A review of these 70 municipalities showed that 48 had a geographical scope and included the municipality as a community in the plan. Of these 48 plans, 26 focus on mitigation, 2 on adaptation and 20 embrace both mitigation and adaptation, and the plans include both public and private actions (Own investigation).

Climate change governance cuts across the internal municipal sectors, often called the organisational silos, demanding cross-sectorial coordination and work tasks that lies besides the municipal jurisdictions and sometimes also challenge the jurisdiction areas. Furthermore, these plans include actions that involve partnerships with private businesses, other authorities, NGOs and citizens. Climate change governance is thus a new and multi-level governance form at the local level, and the following questions are then relevant for discussion: What characterises climate change governance at the local level and how will it develop in the coming years? What are the main challenges and what is needed to solve these challenges? What is the role for research and what are the topics for future research topics?

Tommy Chan

M.SC. in Forest Sciences & Business

Dissertation project started in January 2011 at the University of Helsinki

Dissertation (working) title:

Physiological and environmental factors affecting growth from climate change effects

Short description:

My project is an examination of how climate change effects (drought, increased CO2) impact growth of trees in forests in Finland. These impacts on growth are examined physiologically and environmentally. In terms of physiology, I study how tree processes respond to extreme climatic events as they shut down in order to maintain basic functions. Additionally, I investigate how these influences affect the sugar-water dynamics within the tree. Environmentally, I understand climate change events and which factors contribute to tree physiology adaptations. I hope to answer how increases in CO2 and lowered precipitation, in addition to vapour pressure deficit and soil water potential ultimately affect tree growth. Data is collected from Hyytiälä field station in southern Finland, which includes stem diameter variations, gas exchange measurements and environmental information. While I am still in the infant stages of my dissertation, my plan is to first, understand physiological growth from changes in the environment through diameter changes. Then, I will use this understanding to interpret growth to seasons with drought, and from laboratory experiments, to elevated levels of CO2.

Topics for the review discussions:

Two topics which I would to discuss are related to the first theme, Risk assessment and impact response. The most important is the observed impact in natural systems. Climate change impacts this could pose a risk in how trees readily adapt to sudden effects. Although climate change can positively impact growth (increase in CO2 and temperature), it could also have detrimental effects which may have yield permanent consequences (drought). There has been discussion of how all these environmental changes contribute to the dynamics of tree function, yet not so much on the understanding of growth. However, it is important to note that climate change not only affects tree growth but also physiological and permanent morphological changes, as it adapts to unknown and unforeseen circumstances.

The second topic, which is broader in scope, is the impact of trees and forests on ecosystem services. Finland has an affinity with forests, also having the largest abundance of trees in Europe. Changes in trees and forests will have a serious impact to the country, economically and culturally. How is climate change going to impact the forestry sector economically? Will the market shrink or increase due to tree growth or market demand? Will there be changes in political spheres to adapt to changes from the environment? If tree growth is stunted due to climate change, what are its effects on society? Although there are more questions than arguments, it is important to highlight these questions as they require a multi-disciplinary approach from different sectors and many stakeholders

Karoliina Pilli-Sihvola

M.SC. in Environmental Economics

Dissertation project started in March 2009 at the University of Helsinki & Finnish Meteorological Institute

Dissertation (working) title:

Economic analysis of extreme weather events and climate change

Short description:

The dissertation will include four papers, which will combine analysis on extreme weather events, climate change and economics. The first paper studies the impacts of climate change on electricity consumption with econometric methods (published), and the second paper is on the use of climate change research information in policy making (submitted). The subject was studied by conducting three questionnaires among relevant stakeholders in Finland, Sweden, and Norway. Third paper is on the impact and risk management of extreme weather events in forestry and the fourth is related to similar themes in agriculture. These two are currently under work.

Topics for the review discussions:

1. The importance of studying the negative impacts of climate change in the Nordic countries/Finland?

Nordic countries belong to the wealthiest countries in the world with stable societal structures and high preparedness against extreme weather events. Extreme weather events rarely cause losses in human lives, and losses on capital affect mostly individuals, not the society or the markets as a whole. Hence, is it really necessary to study and put effort on research on the economic impacts of climate change and extreme weather events in Finland or in other Nordic countries, or should we also here be focusing on the impacts of climate change in the Global South? If the effort put on studying impacts of climate change and adaptation measures in the North would be put on studying the same issues in the South, overall global benefits could be substantially higher. Are we wasting time and money with the current research?

2. What adaptation measures can farmers, forest owners, and actors in other economic sectors in Europe use to adapt to climate change?

Climate change will affect economic sectors also in Europe and in Finland. Hence, actors in different economic sectors must adapt to climate change. However, for example in farming and forestry the possibilities to manage climate risk without financial markets may be very limited. Is there enough knowledge of non-market measures and has the knowledge on these reached the actor?

Jussi Ylhäisi

M.SC. in Meteorology

Dissertation project started in September 2009 at the University of Helsinki

Dissertation (working) title:

Assessing climate predictions in a multi-model framework

Short description:

The thesis consists from several different sub-topics. First objective is the evaluation of various statistical/empirical methods for combining the information from multiple climate models. As researchers working with climate impacts often need climate model data, it needs to be interpreted in a meaningful way. My research aims assessing the methods for interpreting climate data and assessing its reliability. Second objective is to analyse the impact-relevant climate data on a daily time scale which still has not been published. Projected changes in the variability are studied and the conclusions of the higher temporal resolution for the climate projections are assessed. Thirdly, the homogeneity of the different climate models is an issue also for the impact research. Often it is assumed that different models can be treated as equally performing, but the different degree of sophistication in different models and consecutive model generations cause issues for the interpretation and combining of the results. The effect of consecutive model generations for the climate predictions is especially a poorly studied topic and is likely to be within the focus of the latter part of my thesis, especially combined with the second objective of using temporally high-resolution climate data.

Topics for the review discussions:

1. *How are the uncertainties in the climate projections acknowledged across the adaptation community?*

Throughout its existence, the ultimate goal of climate modelling community has been to reduce the uncertainties related to climate predictions. However, progress has been slow as the physical processes that define the climatic response to a certain forcing are manifold. Also new sources of uncertainties have emerged, which have further complicated the interpretation of climate projections. Hence, uncertainty is a fundamental and unfortunately large part of any climate projections, independent of the time scale used. Uncertainties cannot be overemphasized and probabilistic estimates would need to be used. However, the related uncertainties are often poorly communicated to the data users even though adaptation essentially is a risk assessment process. We cannot know the precise year or even the decade for many of the climatic changes, not to mention the extent of them. Are the data users overly confident in model predictions?

2. *Is there even a need to pursue for better constrained climate projections?*

Adaptive measures cannot be postponed just because we would like to have more accurate estimates from a changing climate. Climate projections (with or without the related uncertainties) are viewed for many users as boundary conditions, based upon which further adaptive decisions are made. Decision-making process is further complicated by e.g. economic, social, political and moral issues which all affect the adaptive decisions. The weighting of these different factors depend on the specific application and individuals involved in it. Even if we would have a perfect climate forecast, not all would adapt in advance. Is the ultimate goal in the first place to reduce uncertainties related to climate predictions or do the other uncertainties always constitute a larger fraction in the process as a whole? Can these uncertainties even be reduced?

Karin Lundgren

M.SC. in Engineering & Design

Dissertation project started in January 2012 at Lund University

Dissertation (working) title:

Effects of Heat on Occupational Health

Short description:

Human populations have the capacity to adapt to a great extent physiologically and technologically, and by behavioural change, to gradual changes in climate. However, sudden changes in weather can have a significant impact on human health. Health effects from climate change will stem from heat stress, communicable disease, air pollution, food and water security, extreme weather events, malnutrition, stress and mental health issues, vulnerable shelter and population migration among others. Examples of climate-related hazards in the workplace include increased ambient temperature, air pollution, ultraviolet exposure, extreme weather and vector-borne diseases. The research will primarily look at heat stress and its effects on occupational health. The outdoor occupations are most at risk of severe heat exposure in addition to workers required to wear protective clothing which severely impedes heat exchange through evaporation. Most of the heatstroke deaths reported have been associated with occupational exposure at construction sites, agricultural settings, and hot industrial jobs requiring heavy work. In addition, outdoor urban workers may also be exposed to additional heat stress as a result of the 'urban heat island effect' of the urban built environments. The research includes field studies of work places in India, laboratory studies in climate chamber simulating the current and possible future exposure, and finally, to make future projections and develop possible solutions.

Topics for the review discussions:

- *World economic productivity is predicted to decrease as a consequence of increased heat stress in the workplace; on the other hand, this will potentially lead to a reduction in the emissions of greenhouse gases. Then again, this will most probably hit the most vulnerable harder because of their exposure and least adaptive capacity.*

- *Developing countries will be most affected as most countries are in tropical and sub-tropical regions. In addition, many workers lack work security and are paid according to output and as a result, workers might in the future have to work longer hours to reach production targets. When working in heat which limits the ability to produce, stress and serious mental and physical health problems may become a negative outcome. In addition, on the side of paid work, many workers also engage in water and firewood collection, residence building and repair, small-scale agriculture, fishing, cooking and so on. These tasks can add to the heat strain and exhaustion. Moreover, commuting to and from work is a daily source of heat exposure for many people. Urban growth is also extensive in these regions making populations especially vulnerable to climate change. Technical and other short-term fixes are also less likely to be implemented. This adds to the health equity challenges of climate change.*

Väinö Nurmi

M.SC. in Economics

Dissertation project started in May 2012 at the Finnish Meteorological Institute and the University of Helsinki

Dissertation (working) title:

Coping with climate and weather risks

Short description:

In my dissertation I will study the cost-effectiveness and feasibility of various climate change adaptation and risk management solutions at the urban level. These solutions will include risk spreading mechanisms, institutional and managerial structures & legislation, (engineering) investments. In addition to the direct economic effects I will also consider the induced economic effects. An important aspect in the analysis is that the benefits of ecosystem services are more explicitly incorporated. The valuation of ecosystem services can be viewed as an input to a cost-benefit analysis aiming at more efficient adaptation policies including land-use and other related decisions in urban areas.

Topics for the review discussions:

Does state support for non-insurable hazards only make things worse?

Climate change is expected to increase the extreme weather risks as the extreme weather events are predicted to be both more frequent and more severe. Market failure in the insurance markets may decrease overall productivity in the society as hurdle rates for new investment are higher and investment spending is lower. Regards to large-scale natural catastrophes it is striking that so little reinsurance is in place and often the state is the only insurer available. The role of government as an underwriter is problematic as well: for political reasons, its ability to aggregate and segregate risks is limited. State support will also result for bad incentives as those who bear risk try to get someone else to pay for their losses. For example, homebuilders may build to a high-risk coastline (e.g. flood risks) because of subsidized government insurance rates or because they expect to be bailed out by the government if a catastrophe indeed takes place. This behaviour increases the aggregate risk level. What are the solutions to this dilemma and are the capital markets the right way to seek answers?

How to turn adaptation into profitable private investments?

It is often the case that investments for more efficient adaptation are beneficial only the public scale but are not attractive investments for private decision-makers. For example, building a house on an already dense area might be beneficial for the developer and for the buyer, but the decision to build more homes will also entail negative externalities for the public; it might deteriorate urban ecosystem services (e.g. remove parks and trees or block the sea view) and increase the problems that already exist in urban areas (e.g. urban flooding enhanced by nonporous surfaces or the heat-island effect caused by materials which effectively retain heat). Some solutions to holders of real estate to pay for these negative externalities (or get a payment to fix the problems) have already been adopted in some regions (e.g. storm-water fee in Philadelphia, property tax abatements on real estate environmental index in New York, but none of them include all dimensions of the benefits of ecosystem services. What kind of incentives or legislation should be introduced to include the total economic value of ecosystem services in the private decision making?

Jiao Xi

M.SC. in Public Policy

Dissertation project started in October 2010 at the University of Copenhagen

Dissertation (working) title:

Rural livelihoods, climate change vulnerability and micro-level adaptive capacity in the Greater Mekong Subregion

Short description:

The overall objective of my research is to contribute to the emerging body of knowledge on micro-level vulnerability and adaptive capacity to climate change in developing countries. This will be pursued through empirical investigation of rural livelihood strategies, assessment of their vulnerability and adaptive capacity to climate change and appraisal of the options to enhance household-level adaptive capacity through a community-based participatory approach.

Three specific objectives of this research project are to:

i) Identify and quantify household-level livelihood strategies (i.e. assets, activities, and outcomes) and determine a typology of strategies;
ii) Identify existing coping mechanisms and adaptation strategies as the basis for assessing vulnerability of livelihood strategies and household adaptive capacity to climate change;
iii) Identify and develop effective policy interventions through a participatory approach to reduce household vulnerability and enhance micro-level adaptive capacity.

Topics for the review discussions:

1) Community-based climate change adaptation and vulnerability assessments:

The area little explored so far is the practice-relevant research on human dimensions of climate change. The concept of community-based climate change adaptation is now under observation and action-learning in various countries (prominent are coastal and riverine communities e.g. Bangladesh, Viet Nam, and the Philippines. Community-based vulnerability assessments aim to contribute to practical adaptation. These 'bottom-up' participatory vulnerability assessments require active involvement of stakeholders to allow for the recognition of multiple stimuli beyond those related to climate to include political, cultural, economic, institutional and technological factors. It is very essential to engage local communities in the vulnerability assessment and adaptation planning. It offers local community with better understanding and analyzing of their own situation, which may further lead to a more motivated and systematic way in mainstreaming climate vulnerability and adaptation into community development planning.

2) Method and indicators to integrate and assess the three dimensions of vulnerability (exposure, sensitivity, and adaptive capacity):

In my study, efforts have been made to operationalize and visualize three dimensions of vulnerability through the vulnerability cube and PCA approaches which provide a possibility to integrate and assess all three aspects of exposure, sensitivity and adaptive capacity at the same time. However, cautions must be taken; the detailed characteristics of vulnerability may not be directly transferred to other contexts, and 'most vulnerable', 'least vulnerable' and 'not vulnerable' are all in relative terms. Many limitations of the

model and selection of indicators remain. The analysis is currently constrained with only three variables; a set of multi-variables for each dimension can be considered and analyzed for further research in order to address the full complexity of vulnerability. I sincerely look forward to receiving some advice and feedback from the pool of experts and other fellow students.