



Proceeding to International Workshop

"Urban Climate Change and Community Resilience"

"การเปลี่ยนแปลงภูมิอากาศเมือง และสมรรถนะในการฟื้นตัวของชุมชน"



**Social Research Institute, Chulalongkorn University
in conjunction with
Faculty of Architecture, Kasetsart University
October 24 – 25, 2013**



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1. Background

Rationale:

It is widely known that the continuous discharge of greenhouse gases has led to climate change worldwide. This situation has been intensified by the careless consumption of energy and resources, affecting agriculture, environment, health, rural community and urban lifestyle as witnessed in the 2011 floods in many provinces including Bangkok, which is an economic hub attracting people from every corner of the country. The floods adversely affected not only housing but also income, property, transportation and health. Plus, they interrupted the business, agricultural and industrial sectors.

The urban society crowded with people and housing is definitely affected both directly and indirectly by the climate change; as a result, awareness of and preparation for it is inevitable because the society can assess the situation and adjust itself to effectively handle its impact. Consequently, this workshop will be a platform for academics and interested individuals to exchange ideas and experience so that they can reach practical solutions to urban resilience. Thai and foreign academics from Faculty of Architecture, Kasetsart University, Social Research Institute, Chulalongkorn University, Salzburg University, Austria, and Kiel University, Germany.

The workshop lasts one and a half day in which the workshop takes place at the Faculty of Architecture, Kasetsart University in the morning and the fieldtrip to KoKret, Nonthaburi Province in the afternoon to discuss with relevant organizations. The wrap-up session and further discussion about the preparation for climate change and the urban resilience is taken in the following morning. The case studies are cities in Europe and Bangkok, which were severely flooded.

Objectives:

1. To review concepts and share experience about how climate change affects cities
2. To discuss ways to deal with the change in the past and in the future
3. To discuss urban resilience in case that a city is affected by climate change

Participants:

Instructors, researchers, students from the abovementioned universities and interested individuals, totaling 35 participants.

Note: It is conducted in English and the admission is free of charge. The fieldtrip is limited to 20 persons.

2. Summary of presentations and discussions

on October 24, 2013 at the Faculty of Architecture, Kasetsart University

2.1 "Demand and Potential of Urban Green Infrastructure for the Adaption to the Climate Change in 'Climate Change Sensitive Residential Areas (CCSRA)' of the City of Linz."

By **Prof. Dr. Jürgen Breuste**, Urban and Landscape Ecology, IALE Centre for Landscape Research (CeLaRe) University Salzburg, Dept. Geography/Geology

2.2 "In Whom Do We Trust? Exploring the Role of the Government in Building Community Resilience in the Netherlands and Thailand."

By **Dr. Bart Lambregts**, Faculty of Architecture, Kasetsart University and Department of Geography, Planning and International Development Studies, University of Amsterdam, The Netherlands

2.3 "When Water Becomes an Angry Water : Climate Change or Human Ethics Change"

By **Assoc. Prof. Dr. Eggarin Anukulyudhathon**, Faculty of Architecture, Kasetsart University

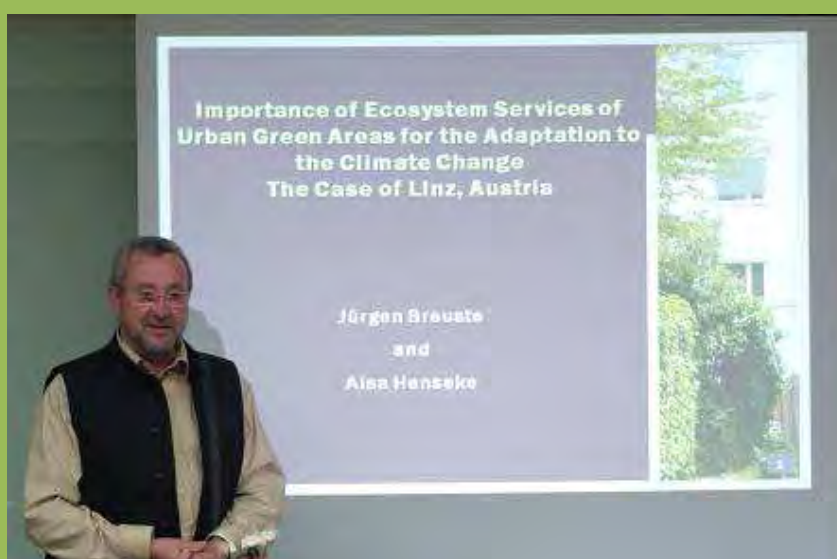
2.4 "Resilience from Bottom-Up: A Community Approach"

By **Prof. Dr. Úrsula Oswald Spring**, Centro Regional de Investigaciones Multidisciplinarias (Regional Center for Multidisciplinary Research) at National Autonomous University of Mexico (CRIM-UNAM)



2.1 “Demand and potential of urban green infrastructure for the adaption to the climate change in ‘climate change sensitive residential areas (CCSRA)’ of the City of Linz.”

By Prof. Dr. Jürgen Breuste, Urban and Landscape Ecology, IALE Centre for Landscape Research (CeLaRe) University Salzburg, Dept. Geography/Geology



We have observed the impact of climate change in several places in the world. There are many people affected by this, so it is important to get the involvement of people in this subject and to interlink the urban population to the urban climate change. The impression from the big flood in 2011, and reaction to urban planning to make Bangkok an archipelago behind dikes. This is to secure certain areas from risks, but with climate change we cannot make islands nor an archipelago within cities. This current research is conducted with the support of Ph.D. student Aisa Henseke.

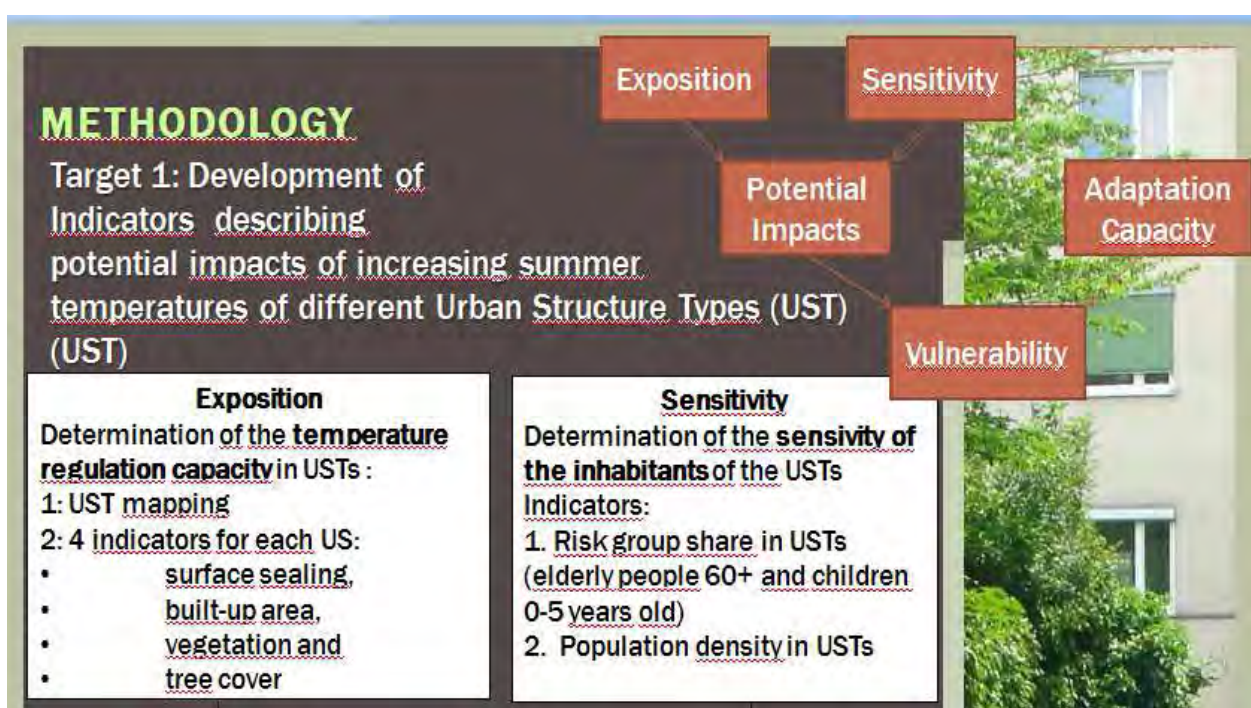
We are affected by the climate change, not only in Austria but worldwide. In central Europe it is connected with a reduction of summer precipitation and increase of heat waves in summer and the urban areas are strongly affected. So we are concentrating our study in the urban areas as the majority of people and the highly affected are also living there. The increasing exposure of risk groups is obvious, like elderly people, people with health risks, and children. So there is a good argument to include these areas in the study. Therefore, there is definitely a need for adaptation.

The target of this study is to look into ecosystem services of urban green and its contribution to the mitigation of high summer temperatures in urban areas.

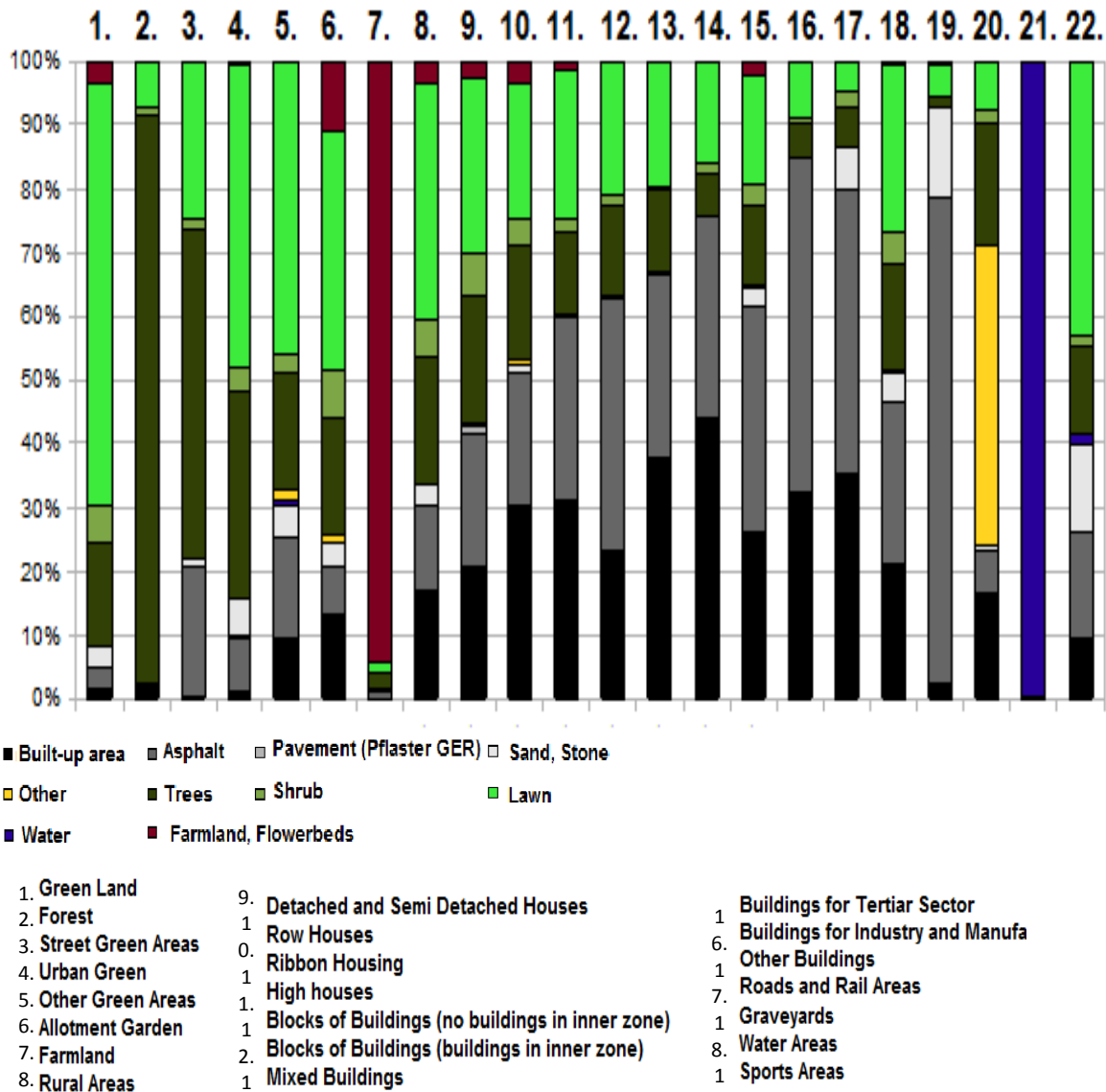
- Target 1: Development of an indicator set describing potential impacts of increasing summer temperatures for different Urban Structure Types

- Target 2: Analysis of acceptance of climate change adaptation measures base by urban green in most climate change sensitive residential areas

The methodology starts with the idea of vulnerability, then traces back to the areas of exposition and sensitivity. The two areas describe potential impacts, and we have the idea of adaptation capacity, which together describes vulnerability. So we have different vulnerable areas within the city as the city is not equal. We then have to identify the most vulnerable based on Urban Structure Types by making a mapping of the areas to determine these Types.

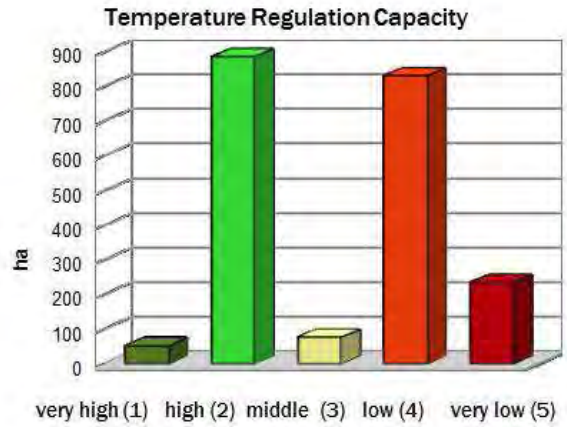
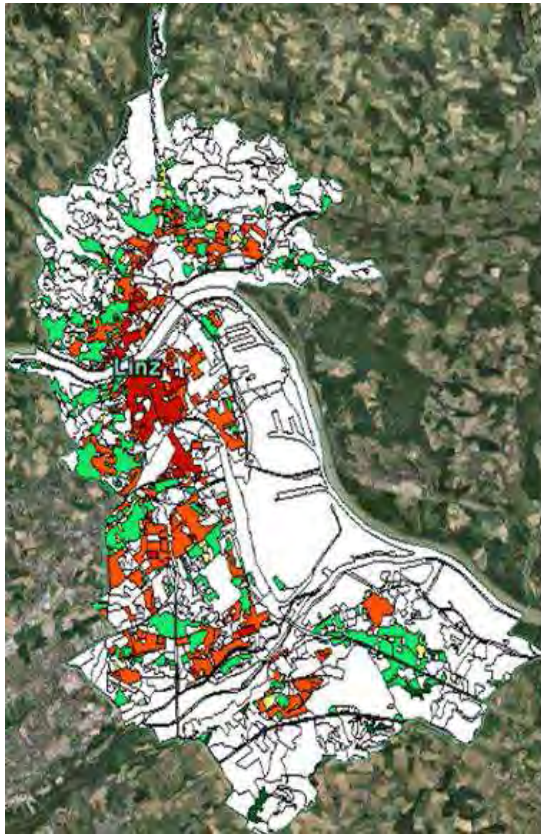


The city of Linz has about 400,000 people. There are different climate relevant surface cover analysis for 22 different structure types of the city or USTs. These types can be identified through surfaces, like covered with more green, less green, more gray, less gray, etc. (please see detail in the slide below).

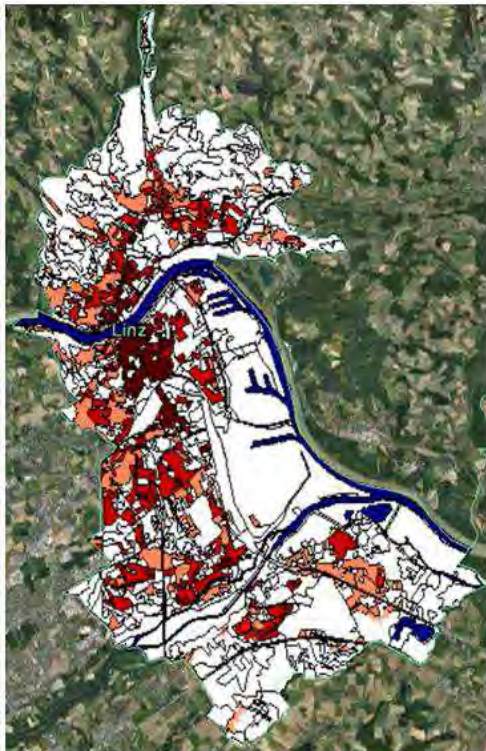


We also identify Temperature Regulation Capacity in residential USTs, with indicators like surface sealing, built-up area, vegetation cover and tree cover. Together with city population data, we see exactly where we have low or high risk group density. We can also include data or indicators if we have them, but certain data are not so easy to get like data on illnesses.

The study then yield the results of potential impacts of thermal effects in residential USTs by looking at Exposition (Temperature Regulation Capacity) and Sensitivity (Risk Group Density). Blocks areas are identified as the most climate sensitive area as seen in the slides below.



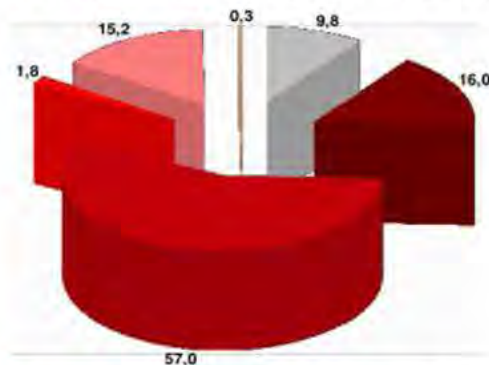
- 1: Rural Areas
- 2: Detached and Semi Detached Houses
- 3: Row Houses
- 4: Ribbon Housing, High Houses, Blocks (no buildings in the inner zone)
- 5: Blocks (with buildings in the inner zone)



- 1: Rural Areas
- 2: Detached and Semi Detached Houses
- 3: Row Houses

Exposition (Temperature Regulation Capacity) and Sensitivity (Risk Group Density)

Potential impacts on residents



- 4: Blocks (no build.) Ribbon and High H.
- 5: Blocks (with building in inner zone)
- not observed

Potential Impacts: 1: very low, 2: low, 3: middle, 4: high; 5: very high

The study then selected 4 study areas for further research by questioning sampled residents about climate change adaptation acceptance. We asked people how they feel under the condition of climate, so the answers were from the “perceptions” of the people not by medical investigation. The results showed that 83 -86 % of the residents said the availability of urban green is important for them; compared to parks, playgrounds and sport areas, the availability of urban green is most important.

As for the acceptance of adaptation strategies based on ecosystem services of urban green, the study found that the people tend to have a high acceptance for already existing green structures, but low acceptance for changes like facade and roof greenery, low acceptance for unsealing measures (less parking opportunities, playgrounds, sealed paths). Therefore, changes are not very welcome especially when the pressure of climate change is not high enough.

With reference to climate mitigating impact of urban green in residential areas, the majority of 72.5–80% saw urban green function as cooling/shadow is important for them, but only 35.0–56.7 % of the residents believe that more green areas would mitigate high summer temperatures. Scientifically more green areas definitely help with the mitigation, but almost half of the sampled residents did not believe so. This shows the lack of knowledge and experience

When asked about participation in decision making on urban green in residential areas, 50.0-63.8 % of the sampled residents want to participate in green related decisions in their residential areas. Most people do not want to spend much time in the meeting but they want to be involved somehow in the decision process. The study concludes that

- There is a high potential impacts of climate change, but low perception of the thermal load in summer.
- Green areas are considered as most important structures in residential areas; the acceptance for an enhancement of green areas is high but the acceptance for the reduction of rival structures is low.
- The importance of the urban green function or cooling/shadow effect is high but the knowledge that they could contribute to the reduction of high summer temperatures is low.
- There is a lack of acceptance for a climate relevant increase of urban green in residential areas as a result of the lack of thermal sensitivity, the lack of information on climate relevant services of urban green and awareness for climate problems.

So the study shows low urban green-based readiness to assimilate to the climate change in the study areas. There is no demand from the urban administrative side though the result will help with the decision making.

The study identifies problems as stemming from absence of concern and scepticism of relevant actors (both city government and residents). The possibilities to enhance urban

green oriented adaption potentials require research and monitoring of climate change at the change at the

local and regional level. There needs to be a knowledge transfer, especially in the aspect of climate change consequences and adaption possibilities. The enhancement of the awareness of the problem and the enhancement of the adaptation willingness is needed. Prof. Dr. Breuste ended his presentation with the following slide with the caption of "**We will need the service of urban green!**"





2.2 “In whom do we trust? Exploring the role of the government in building community resilience in the Netherlands and Thailand.”

By Dr. Bart Lambregts, Faculty of Architecture, Kasetsart University and Department of Geography, Planning and International Development Studies, University of Amsterdam, The Netherlands



Coming from the Netherlands and having been living in Thailand for about 5 years including living through the flood of 2011, Dr. Lambregts has an opportunity to draw on the experiences and talk about them. The focus of the analysis will be the relationship between the people and the government in the two countries in dealing with threats that are induced by climate change and climate events.

It is intriguing how different countries develop different approaches in dealing with environmental issues. Most striking approaches are seen in the case of Thailand and the Netherlands. Thailand and other Southeast Asian countries focus on the element of adaptability, while the Netherlands put a lot of effort in prevention of disaster events. These different approaches depend on factors like resources availability, historical experiences, cultural preferences, political priorities.

Different countries – different ways of dealing with environment/climate related phenomena



Depending on such factors as: resources, historical experiences, cultural preferences, political priorities, etc.

It is also visible in how the people respond to the disaster. Comments from outsiders on how the Thais dealt with flood experiences are that they coped in agreeable ways, they were inventive in finding solutions, they took it easy, kept on smiling, and seemed to recover quickly after the event. If the big flood happens in the Netherlands, people would be much helpless, relying much on the government for help, including during recovery stage. The two photos below reflect how the Thai lady dealt with flood and how the people in the lower Netherlands dealt with similar situation. It is quite an interesting contrast.

Visible – seemingly – also in the ways people respond to extraordinary events



Dr. Lambregts used disaster risk management cycle to structure his analysis which provides a closer look at how Thailand and the Netherlands differ, and to deepen our understanding of strengths and weaknesses, and finally to identify priorities for improvement.

According to the disaster risk management cycle, the first stages represents how a society tries to reduce risk of a particular event by assessing the risk and planning for risk management in terms of prevention and mitigation (please see the slide below). The second stage consists of preparation activities, it is the process where prevention and mitigation fails and the event is approaching, so preparation is needed. And if the event actually strikes then we get into the stage of response to make sure survival and the least damage. After the event passes, it is time to recover, rebuild, and learn from the event by taking the experience into improving the next wave of prevention and mitigation again.

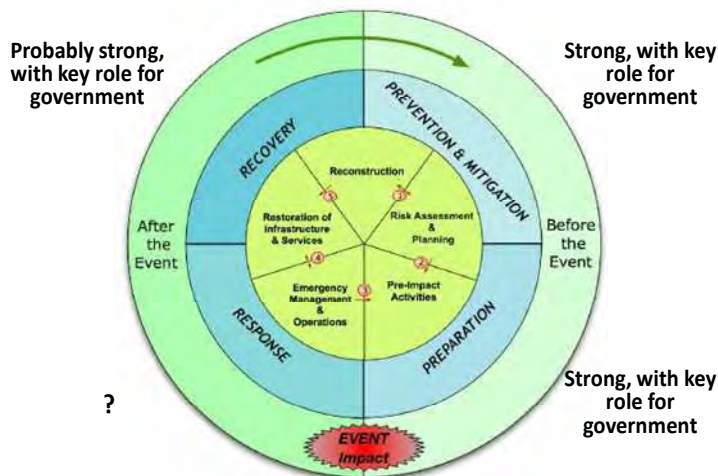
The (flood) disaster risk management cycle:



(source: www.floodsite.net)

To gauge how the Netherlands performs in relations to the 4 stages, and to look at the key actors responsible during these stages, we found that the Netherlands has a strong focus on prevention with the key role for government agencies. They are actually the sole responsible agency. During the second stage of preparation, it is essentially the government again that takes all kinds of measure; the people are passive actors as they expect from the government to prepare. If the event actually takes place and makes the impact, then we have to put the question mark there because we are not sure how the Netherlands government will respond, as prevention has been strong during the past decades, especially since the flood of 1963. In addition, the Netherlands has not experienced major disaster since then. For recovery stage, the key role is still with government because of the strong economy and sufficient resources, so the government will learn from the past experience and be better prepare for the future disaster.

The Netherlands:



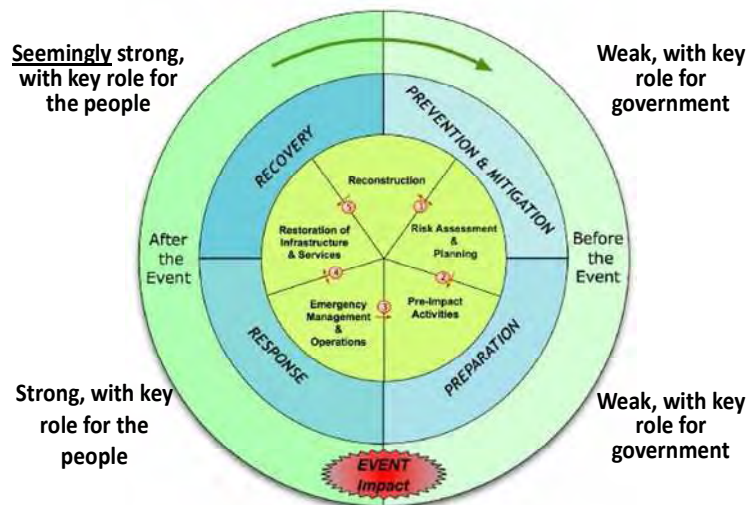
For Thailand, the government is weaker in prevention and mitigation compared to the government of the Netherlands. Flood is a regular event in Thailand, and with normal amount of rainfall, natural disasters may happen, so the government is seen as underperformed. During preparation stage, small things like water pump not well maintained points out to the underperformance of government agencies. When the disaster strikes, the people who are quite experienced are capable of dealing with it. Using their own resources and experiences, the affected people are quite inventive, they keep their normal lives to a certain extent with some help of government agencies. For recovery stage, as seen from the flood of 2011, we see that recovery skills of the people are strong. However, behind the smile and quick rebuilding, there is a big loss. In the past two years, the level of household debt has increased enormously and the flood recovery expenses play an important part in that, as households have to take on loans after they used up their savings to repair the damage. Though many households survive and are back in businesses but they will become financially more vulnerable especially in the next disaster event. We can ask "how resilient is that"?

As a summary, in the Netherlands we have the situation where the people are highly trustful in the government in protecting them from harm when disaster strikes. This also mirrors in the government's belief that it has to be responsible for the task as people cannot be trusted to take care of themselves. It is convenient that the government takes on such a high responsibility, but it creates risk if the disaster exceeds the capacity of the government to cope, or if the government fails to provide for the people, then people would become defenseless.

Climate reduced risks are on the rise, and now there starts to be an increasing awareness (though with limited concrete action) that the government is not infallible. At some point people will have to face and cope with the disaster and become more resilience by themselves and build their own capacity to deal with threats.

In Thailand, there is a limited reason for people to trust that the government can keep them from harm. There is an impression that government also thinks that the people are experienced and can handle the situation, even though people have become "seasoned responders", but it comes with enormous cost that undermine their ability to cope in the future event, so that is not a sustainable situation. Here, the government should become more thoughtful, active, and responsible.

Thailand:



Both in the Netherlands and in Thailand, it is the people themselves that should more actively and consciously engage in these 4 stages of disaster management, to be better capable in dealing with potential disaster event. In the Netherlands, it would be to compensate for the strong government, whereas in Thailand it will be to compensate for the failure or underperformance of the government.

For a more concrete approach that people could adopt to increase their overall performance in these 4 stages, they should

1. Consider risk profiles in different areas and take into their account about where to live and where to locate the businesses, take into account about adaptation measures and responding to the risk profile of the areas that they are building. That is related to Prof. Jürgen's presentation about choosing for a smart or climate friendly design of community space, making more green surface in the neighborhoods, etc.
2. Develop contingencies plan at the household and community level in preparation for a case of disaster and develop arrangement for recovery, like making private saving provision or recovery fund.
3. Focus on local capacity building and "tailor made approaches" for "diverse capacities and needs" within and across communities. The government needs to put their attention to this apart from preparing for the 4 stages of disaster management.



2.3 When Water becomes an Angry Water : Climate change or Human Ethics change

By Dr. Eggarin Anukulyudhathon, Faculty of Architecture, Kasetsart University



Non respectable behavior of mankind

The lose of Natural resource those who guarantee the perfect ecology by un shame behavior of mankind : Deforestation ,non appropriate use of natural resource.



Urban Development agglomerate the natural green field and turn into the urban gray and brown field ,urban ecology has loose it property and value. Unfortunately the high hilly land of Northern region is now become sensitive and fragile area due to deforestation from manmade, the evacuation on the high hill forest for expanding the agricultural land decrease the huge part of rain forest of the Country. In 40 years, Thailand has loosed its natural resource from having the firm rain forest 174 million sq.km. decreasing to 104 million sq.km. so 70 million sq.km. disappear in 40 years since 1970: it is a huge change of mankind for spoiling the main natural resource, the capital resource of the Country. This phenomena might be the main consequence of flood disaster, heavy rainfall since April damage many villages and paddy field to be sink under water during many months and become floodway pass through the other villages and change paddy land in to the rain sea. It is a natural phenomena Which effected the way of life especially for rural area people.



In Urban area : Modernization of the City reduce the green urban space

Modernization of the city by pushing up concrete bulk and pave the vacant land by the concrete covering reduce the value of the urban ecology and increase urban heat temperature. More density in urban land use and chasing away the natural bare land so the people are now living far from the nature and hiding themselves inside the small block of concrete unfortunately. It seem that the city is running fast toward the economic development and leave the tranquility and slow living behind cause the main focus is on the economic growth how to explore the maximum from the natural resource and built more all kind of facilities in order to bring the modernization to the city. Finally the city is now turn its direction to the consumer society and spread out physically its area by agglomerating the green natural land.

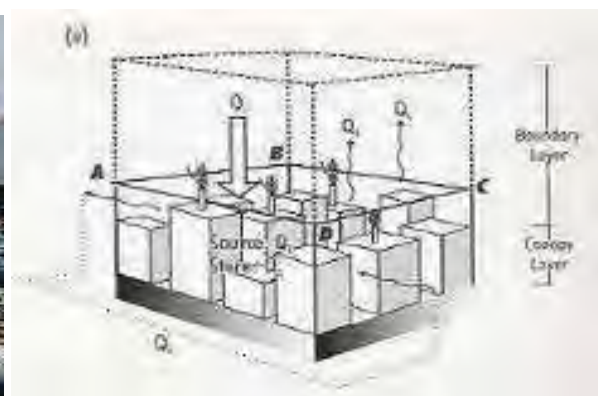
Agricultural land has change into the Industrialization



Free burn fire as to expand the agriculture field but completely harm and damage the natural soil property and produce chemical and toxicity for soil suitability. More and more the agricultural sector has to use the chemical fertilizer which destroy the quality of soil resource. Free burn, deforestation are still the major problem for the environmental preservation, rain forest has disappear and the ground has change into the agro industrial ground with the huge factory at the edge of the terrain.



The strategy on Flood protection by the huge Mega Project: construct all the physical Protection against Flood plain as Retaining barrier, Huge dam ,huge Highway as the barrier and new way of flood diversion way: Mega project rather increase the economic expansion than Flood plain protection. In fact the City can use symbiosis pattern to protect the nature by Reforestation, replant the green and especially greening the City as to bring back urban ecology and infill the green for the environment in the City.



In this new era, the world aims to focus on the quality of the environment. Living in the tranquil and calm environment within the slow city is the privilege for human life. The physical built, urban bulk, concrete pave, vehicles are the main factors of the increasing of urban heat temperature, and unnecessary elements for urban life. Vacant land fill up by the construction of all urban huge bulk and high bulk where increase the high density in urban area become the main cause of urban deficit and constrain where deteriorate the real value of natural soil resource.



Following the paradigm of World Sustainable Development with Clean Development Mechanism CDM (Kyoto Protocol 2006 United Nations) the world emphasize on Developing the world with 3 majors principles such as : Green and Clean Design, Green and Clean Process and finally Green and Clean Benefit which make the high benefit for all

with the minimize natural resource use and greening the city for the better quality of life and environment for human life. It is the new paradigm of human Ethics regarding the mother nature: Slow city where people can live with peace and mindful without spoiling the nature, respecting and having the compassion with the nature or many people use to say: living within the nature with compassion and respect the nature as Slow city with the slow living is now the essence of Human need .

The new concept of City planning is finally come back to the way how the city can settle down with smooth and well blending with the nature and using the principle concept such as:

- 1) **Keeping the ecological balance** in term of land use, respect the natural vacant land and preserve maximum as to be the city heritage for the future.
- 2) **Planning an appropriate Built Environment** by having the appropriate scaling of Built environment responding the real need of urban necessity.
- 3) **Infill and Greening the city** in every vacant land or Brown field spoiling to keep the better quality of urban space.
- 4) **Using Symbiosis ` basing on Nature protects nature** as the protector of the city regarding the natural disaster by green belt and green retention pond for flood protection and reforestation for natural absorption from rain fall.
- 5) **Reordering human Ethics** regarding the way how to live among the nature with the Respect, compassion and affable with the nature for the future Slow living and Tranquil society which are the main essential vertebral for human being.

With this simple concept on developing the city and using the natural resource ,there won't be no accident by the natural disaster as "Deja vue" as in the year 2011 cause man have the learn by the environmental experience and not to repeat the same error.



2.4 “Resilience from Bottom-Up: A Community Approach”

By Dr. Úrsula Oswald Spring, Centro Regional de Investigaciones Multidisciplinarias (Regional Center for Multidisciplinary Research) at National Autonomous University of Mexico (CRIM-UNAM)



The content of Prof. Dr. Oswald Spring's presentation is as followed:

1. What is resilience?
2. How does resilience relate to adaptation and mitigation?
3. What are the local dangers?: disaster risk assessment
4. Why are the risks increasing local and more severe among women and girls?
5. How can local disaster risks reduction (DRR) be improved?
6. How are local and global DRR and DRM (management) related to resilience-building?



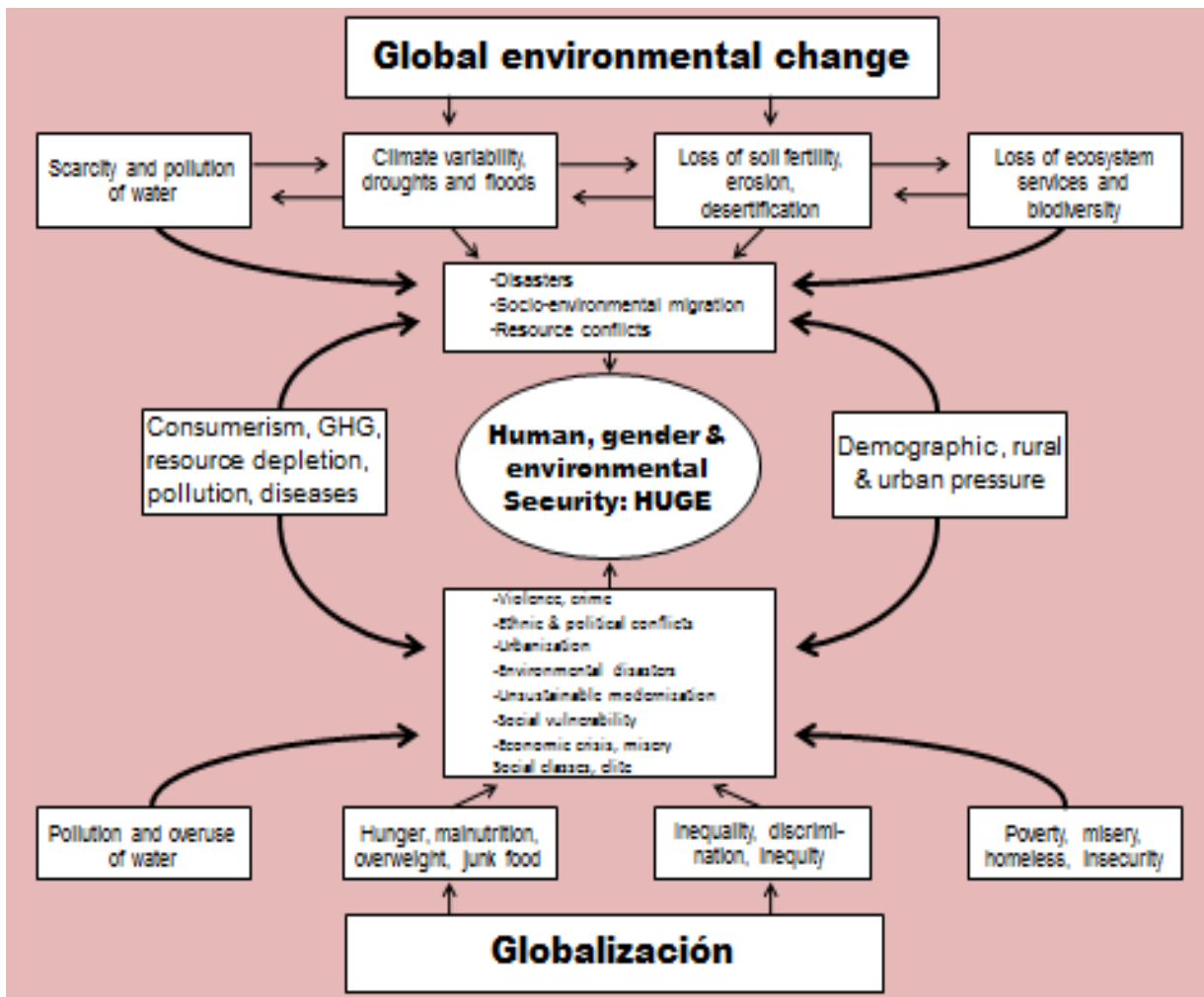
Resilience is the social capacity and ability to anticipate, reduce, accommodate, and recover from the effects of an extreme or a hazardous event in relatively short term and in an efficient manner. Often a resilient society is better organized and prepared after an natural event has occurred and can anticipate future extreme events with better preparedness and less human, natural and financial losses. Resilience manage better hazards and avoids disasters.

- Resilience means in Latin *resilio*, referring to "return from a leap, jump, rebound", and in common acceptance "elasticity".
- In physics, it represents the capacity of a material to recover the same form after having been exposed to extreme pressures.
- In the social field it refers to the "human capacity which permits persons after having passed through adverse situations to be not only safe but also transformed through this experience"
- Gloria Laengle defines it as "the capacity of human being to overcome difficulties and at the same time learning from the errors". Ángela Quintero refers to "the capacity of a family to adapt and reconstruct from the adverse situation."
- Helena Combariza defines human resilience as the capacity of an individual or social system to live well and develop positively, irrespective of the difficult conditions that could oblige them to reinforce or transform such adverse conditions.



Mitigation facilitates human interventions and technology to reduce the sources or enhance the sinks of greenhouse gases and therefore prevent negative impacts on the climate system and as an outcome more and severe hazards. Adaptation refers to the adjustment to actual or expected climate impacts and its effects, which are able to moderate harm on natural and human systems. It includes also the process of prevention and adjustment to adverse climate conditions. It is important to recognize that adaptation and mitigation reduces especially the double: the environmental and social vulnerability.

Human beings are creating their own environmental and social vulnerability. On one hand, human beings are threats, on the other hand, they are also victims. We spend much the money in arms and military sector, but we need to realize that the new threat to security issue is on the human, social, environmental and gender side, and not much on state security.



Regarding resilience, adaptation and mitigation, on one side, we need to reduce exposure. We cannot avoid the event, so we need to learn about what to do, we can transfer or share risk. In the western or developed countries, people use insurance as a way to reduce risk, but poor people in developing countries cannot insure. In addition, in the event of a disaster, we cannot evacuate the entire population, but we can develop building codes, we can have evacuation trainings in every school and factory, we can have early alert system that function to train people to avoid danger.

Resilience, adaptation and mitigation

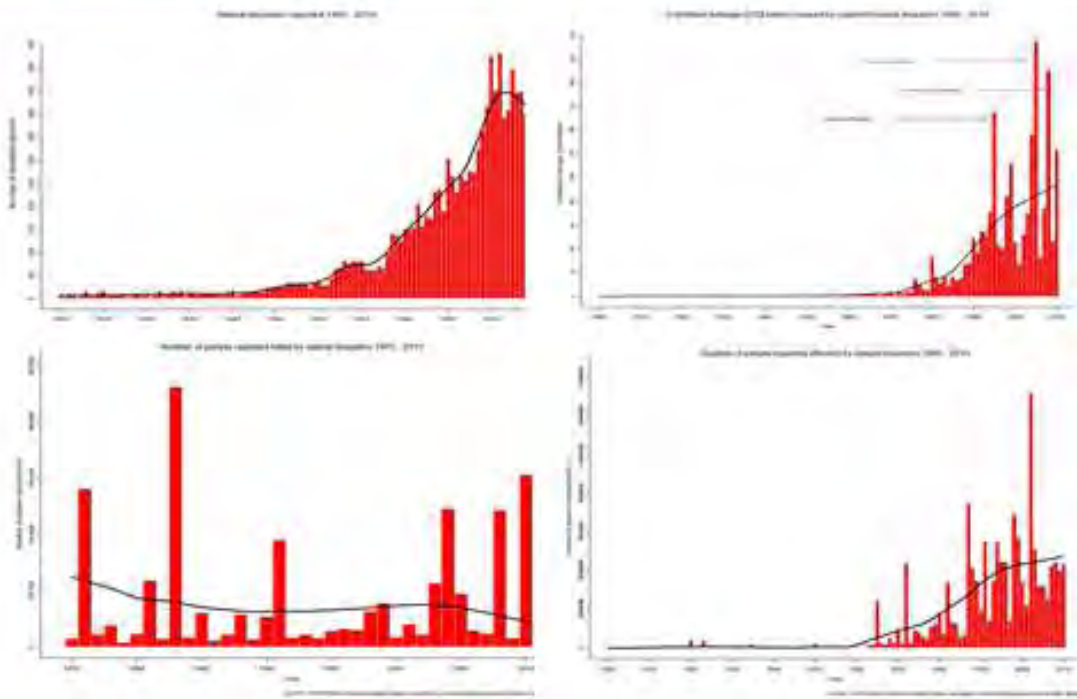


3. What are the local dangers?

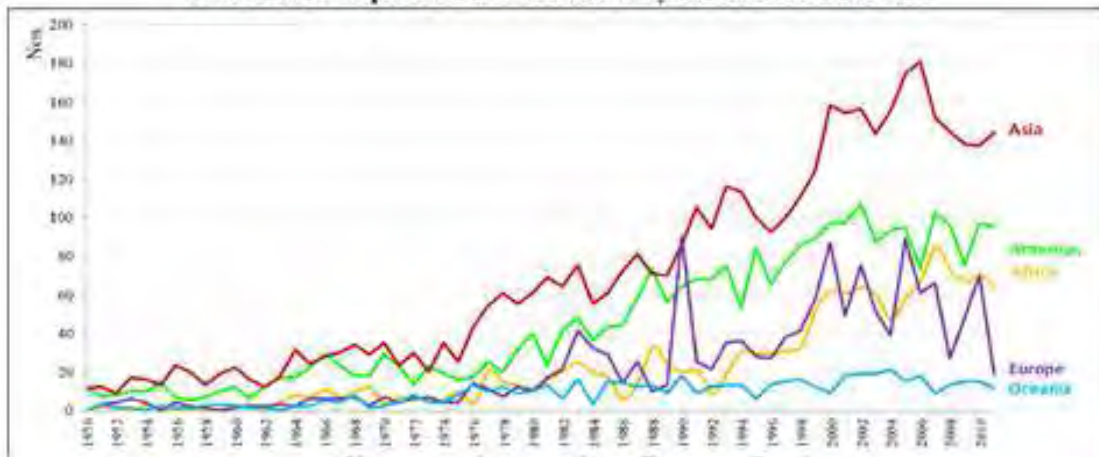


What are the local dangers? Most of the disasters happen in Asia, but we can learn from the past experience and create resilience. There are also information below about the top ten countries by reported event in 2012.

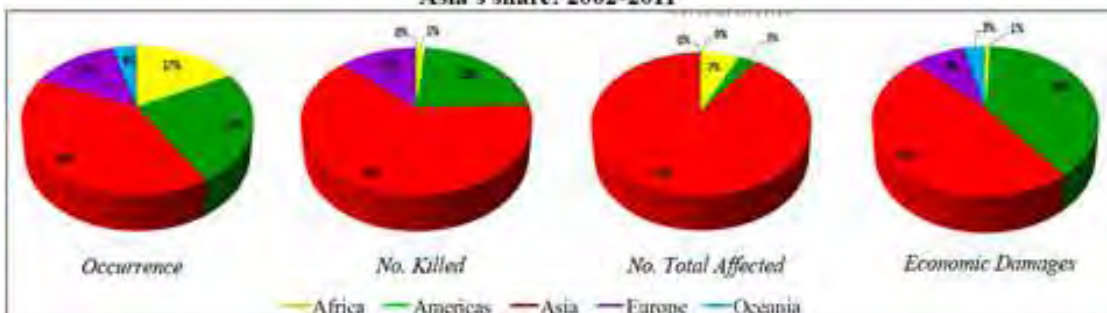
Disaster risks, death, affected and costs



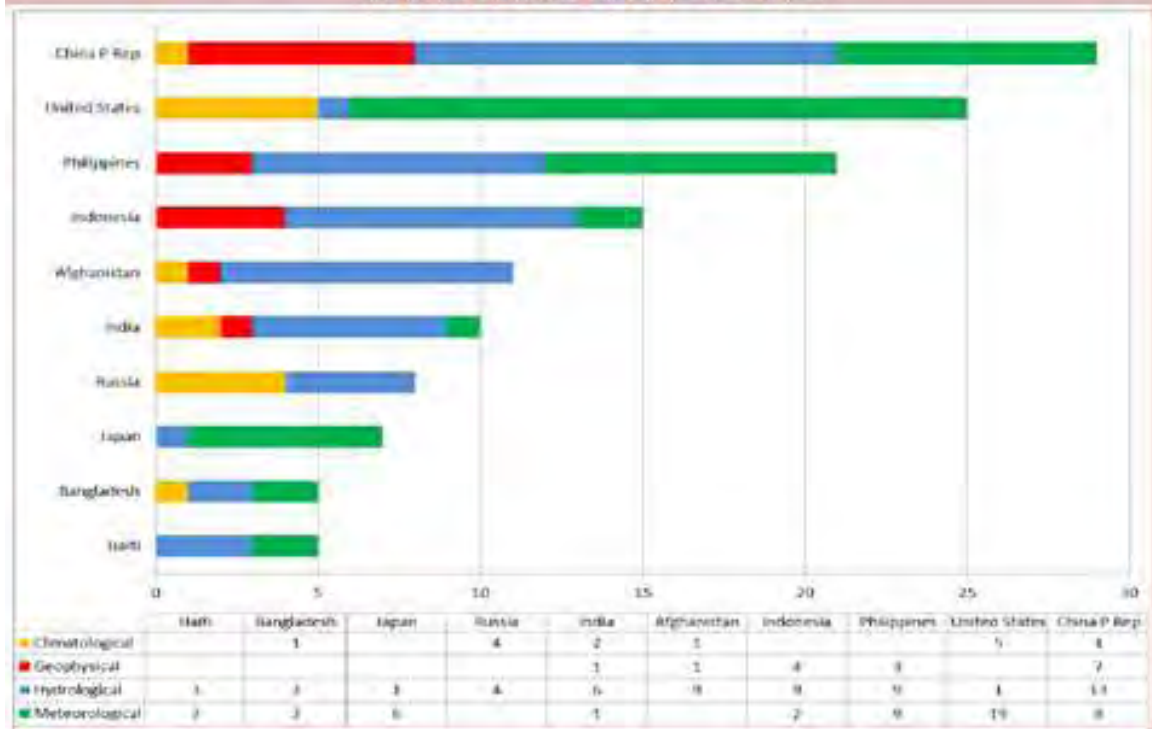
Occurrence of reported natural disasters by continent: 1950 to 2011



Asia's share: 2002-2011



Top ten countries by reported events in 2012



In Thailand, most disasters are climate related, so it's either drought or flood, so we have to focus and prioritize on these issues.

Disaster	Date	No Killed	Disaster	Date	No Total Affected
Earthquake (seismic activity)	26-Dec-2004	8,545	Drought	Apr-2005	10,000,000
Flood	5-Aug-2011	815	Flood	5-Aug-2011	9,500,000
Storm	27-Oct-1982	789	Flood	10-Oct-2010	8,970,655
Flood	19-Nov-1985	664	Drought	Mar-2010	6,482,602
Earthquake (seismic activity)	Jun-1955	500	Drought	Jan-1999	6,000,000
Storm	3-Nov-1989	455	Flood	30-Jun-1996	5,000,000
Flood	10-Oct-2010	295	Drought	Feb-2002	5,000,000
Flood	5-Jan-1975	239	Flood	1-Aug-1995	4,280,954
Flood	1-Aug-1995	231	Flood	Oct-2002	3,289,420
Flood	20-Aug-2006	184	Flood	5-Jan-1975	3,000,095

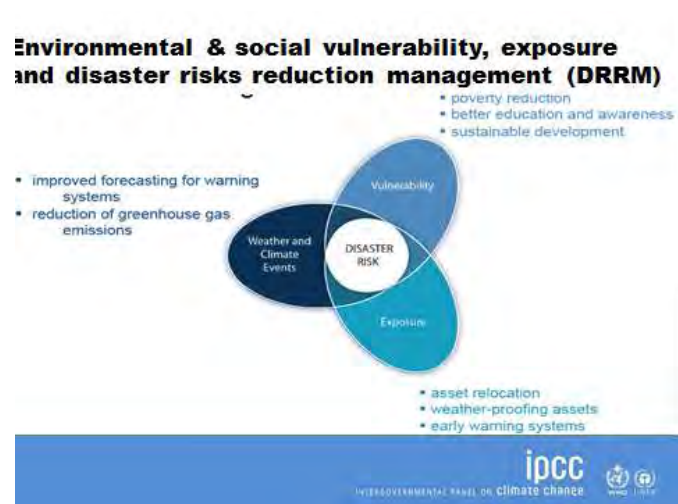
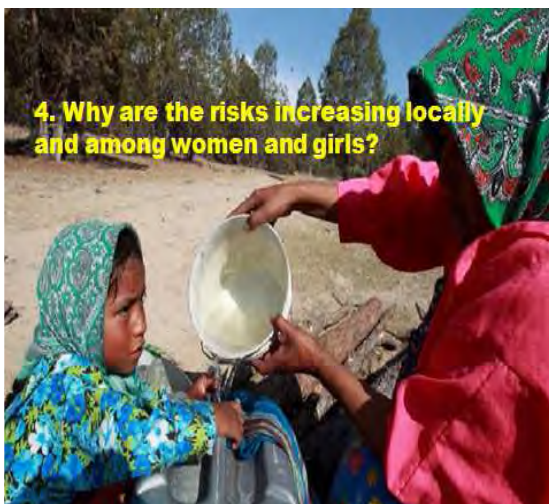
Disaster	Date	Damage (000 US\$)
Flood	5-Aug-2011	40,000,000
Flood	27-Nov-1993	1,261,000
Earthquake	26-Dec-2004	1,000,000
Storm	3-Nov-1989	452,000
Drought	Jan-2005	420,000
Flood	Dec-1993	400,100
Flood	Aug-1978	400,000
Flood	19-Jan-1984	400,000
Flood	10-Oct-2010	332,000
Flood	31-Oct-1993	319,850

Main Disasters in Thailand: recent & CC-related

Why do so many women and girls die? When we pose this question, then we realize that there is a lack of data about social vulnerability. Between 68-89% of deaths occurs among women and girls due to long-term discrimination & self-identity of women to care for others. Women and girls are highly exposed,— many women do not know how to swim, long hair is a problem in the disaster, but women are trained to care for others, often at the cost of their own lives. We should not take this position away but we can reduce social vulnerability and disaster risks by gender empowerment,

- Information & training on vulnerability, exposure, climate extremes, DRR, and resilience-building help people reducing their risks and getting prepared for unknown and unpredictable threats
- Integrated water management, sanitation and drainage improve health, wellbeing and reduce risks of waterborne diseases
- Drought forecasting, sustainable farming practices, drought resistant seeds and early warning reduce risks of hunger
- Adaption to changing climate conditions includes maintenance of draining systems, regional risk pooling, relocation from risky locations, early evacuation and disaster risk reduction training
- Sustainable development in the near term reduces longer term social vulnerability
- Managing risks now help improve livelihood and wellbeing
- Women maintain social networks during normal times and support communities and families during disasters

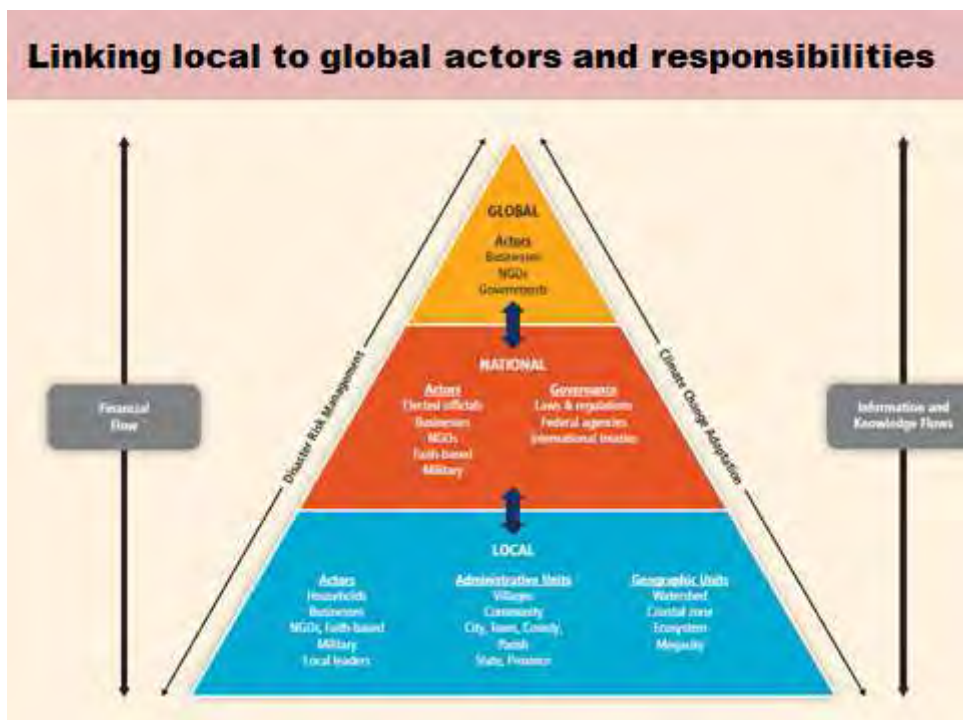
According to the diagram below, we have on one side exposure, the other side vulnerability, and weather, so we can improve forecasting for warning systems, reduction of greenhouse gas emissions while reducing poverty, promoting better education and awareness and sustainable development. For reducing exposure, we can have asset relocation, weather-proofing assets, and early warning systems.

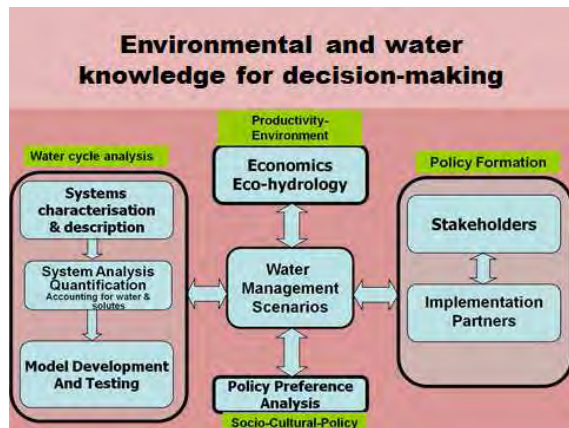
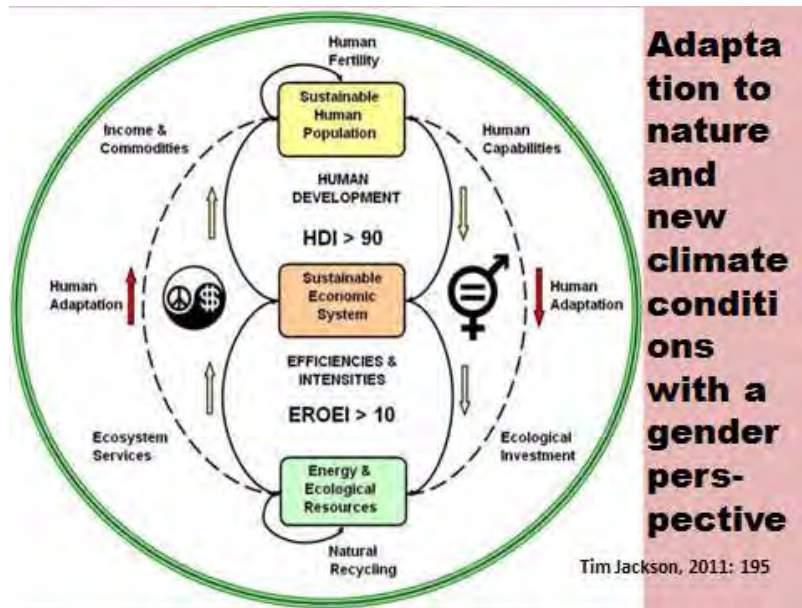
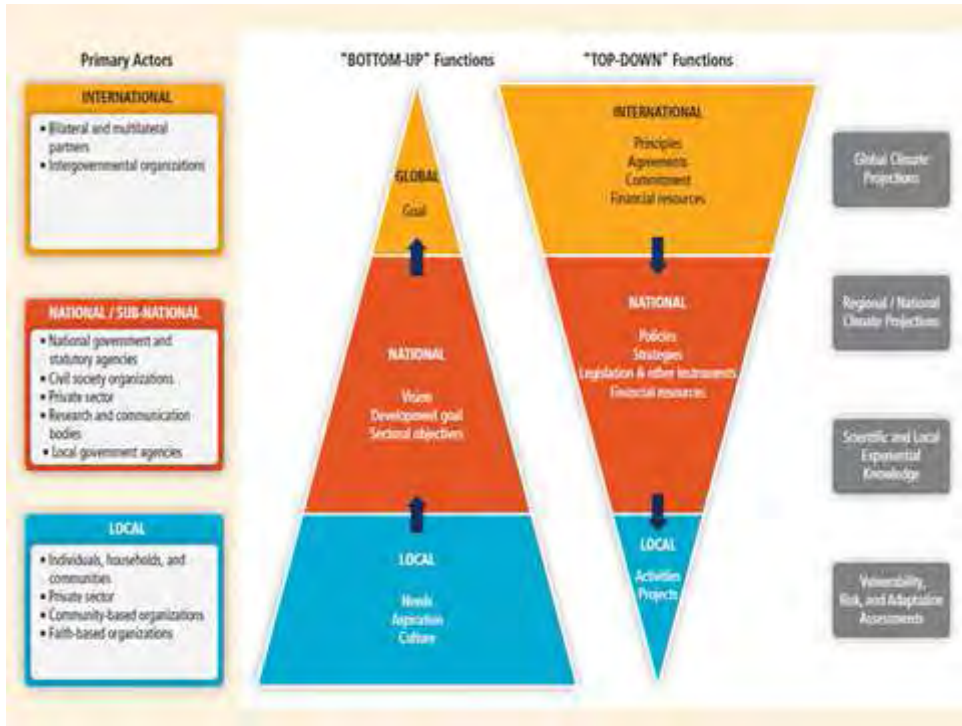


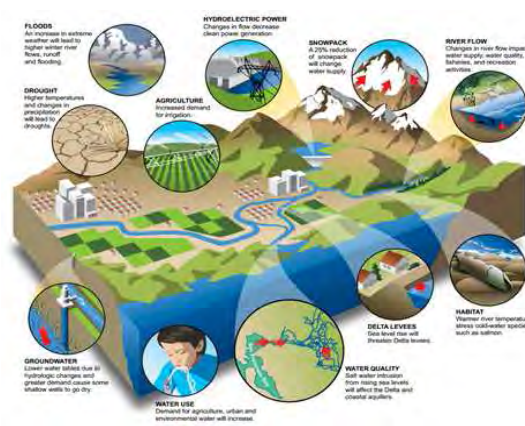
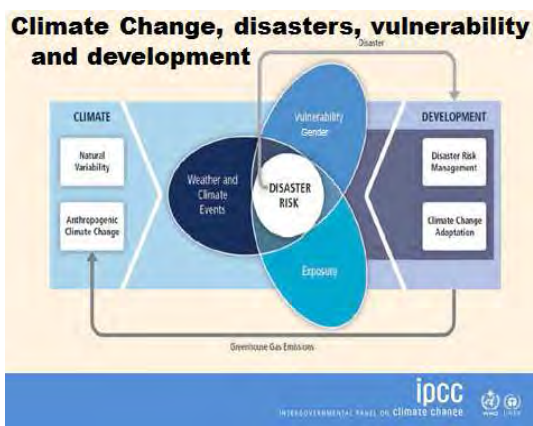
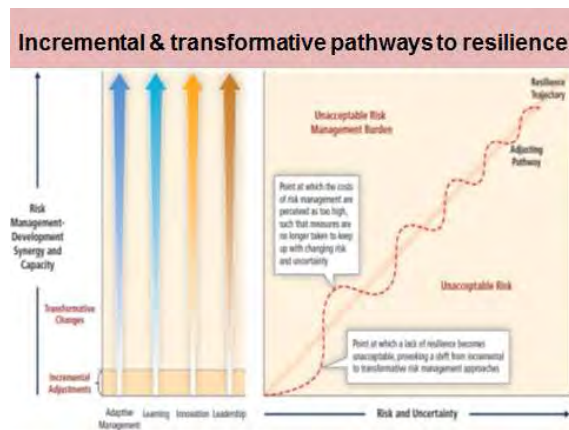


5. How can local disaster risks reduction (DRR) be improved?

We must link global to local actors, on the financial side and on the information and knowledge flows, as illustrated in the slide below.







Peasants, traders, micro-entrepreneurs, business people, social movements, NGO's, citizens, scientists, people affected by disasters, women, children, teachers and the three levels of government developed an integrated basin management of the River Yautepec for reducing risks increased by climate change and are promoting a transition to sustainability from local niches.

We can conclude that,

1. Complex social networks sustain humans in normal times. Human vulnerabilities during change, hazard, disaster or conflict are usually a matter of disruption or failure of these networks.
2. Future research and policy on resilience building during extreme hydro-meteorological events helps to improve theories, data and concrete training about the impacts of climate, disaster, and other disruptions. Existing data overlooks social vulnerability and does not account for gender identity during normal, let alone in crisis situations.
3. Gender analysis will lend a more nuanced understanding of women as social beings aligning in networks of family and community.

4. More accurate understanding and training will facilitate to support networks that underlie a resilient society, where women educate, care and reproduce the historical memory and the cultural background, but increasingly generate also the material family sustain and the food.

5. Active female participation opens the possibility to reduce gender related social vulnerability, improve hazard resilience, and increase the survival of the whole communities frequently affected by hydrological disasters, but reduce also gender violence and insecurity before, during and after disasters.



3. Summary of Discussed on October 25, 2013 at Social Research Institute, Chulalongkorn University

3.1 Summary of issues discussed on October 24 and field trip”

By Dr. Narumon Arunotai

3.2 “The PEISOR Model and Perspectives of Human Security & Peace Ecology”

**By Dr. Hans Günter Brauch, Free University Berlin,
Chair -Peace Research and European Security Studies,
Editor - Hexagon-Book Series on Human, Environmental Security and Peace,
Springer Publishers**



3.1 Summary of issues discussed on October 24 and field trip

By Dr. Narumon Arunotai, Deputy Director of the Social Research Institute



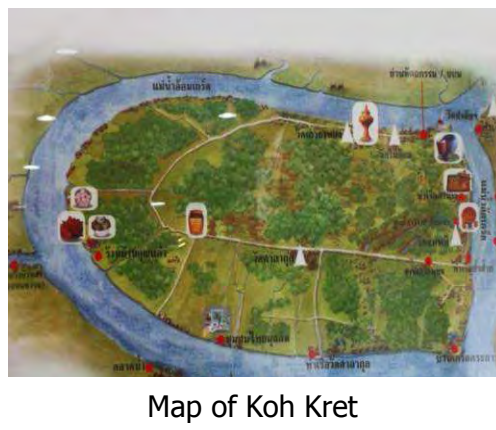
Field visit to Koh Kret, Nonthaburi Province October 24, from 14.30-18.00 hr.

After the seminar on “Urban Climate Change and Communities Resilience” at Kasetsart University in the morning, the participants then travelled to Koh Kret to observe the community affected by flood and to talk to local administrators.



Participants on a boat to Koh Kret, and in front of the Sub-district Administrative Office

First stop was at the administrative office. Video about the community and administration was shown, tracing the history and settlement of the area, the present socio-economic situation. Koh Kret is an island community created by digging a shortcut waterway since early Rattanakosin period.



Map of Koh Kret

Koh Kret has a population of 5,873 in 1,454 households. The main occupation of the people is agriculture like other local communities in the central plain of Thailand. Nevertheless, the number of those who engage in agriculture declines and they tend to be middle aged and elderly group. Younger generations who received higher education usually work outside the community. Another occupation is tourism-related like food and boat services, but this concentrates on weekends when the community becomes lively with tourist visits.



Photos show 2011 flood in Koh Kret (courtesy of Koh Kret Administrative Office)

The big flood of 2011 caused much damage to the property and agricultural land on Koh Kret. Although Koh Kret community used to have regular flood during September to November every year, but the flood usually comes and goes with the tides and does not last long. The flood of 2011 was brought by incoming tides together with overflow from upstream. That flood lasted 3 months. The past big flood in 1995 saw the water as high as 30 cm. above the ground, so the community built 50 cm. wall. The big(ger) flood in 2011 was 80 cm. high. Several households then build 1 meter dike to protect their agricultural land (with 1.5 to 2 meter foundation piles). The materials used to make dikes vary according to financial capacity of each household, some with dirt and some with concrete.

The big flood of 2011 resulted in 99% damage of agricultural and residential land. The only place saved from the flood is Paramaiyikawat Temple. The most costly damage is durian plantation which is Koh Kret's and Nonthaburi's famous produce. Most durian trees were dead, and although the government gave a compensation of 5,000 baht per rai (one rai is equal to 1,600 square meters), it did not cover the real cost of planting and caring for durian trees (which usually take about 5 years to bear fruit). Each household is also compensated 20,000 baht for overall damage, total to 23 million baht for the entire island. The owners of durian orchard made a plea to the government for higher compensation. At the same time, they tried to adapt to the situation by growing herbs, vegetables and fruits like bean, corn, and banana.



Koh Kret Administrative Office makes preparation for the next disaster by develop local warning system through SMS. In case of emergency, the office will be used as coordinating point, temples and schools will be used as temporary shelters. Koh Kret villagers realize that their community is surrounded by the water, so it is impossible to prevent flood, and they have lived with regular flood for a long time, so it is acceptable to have normal seasonal flood.

As for the household level, some houses raised their house posts in order to be safer from high flood, some followed the news and observed the tides and water level very closely, when the water starts to get higher, then they move their furniture and belongings to higher places.

The longer term impact is that some part of agricultural plots have become a waste land, and some were bought up by outsiders for profit speculation. Many agriculturists are elderly people, when their gardens or plantations were damaged by the flood, they got discouraged. Durian plantations take decades to gain enough profit, several plantation owners leave their garden and become financially dependent on their children. It is fortunate that Koh Kret is categorized as "striped green zone" by the Thai Department of Public Works and Town and Country Planning, so development will be quite restricted. However, development pressure is rather strong around Koh Kret area. Several villagers now want road transportation and bridge. They feel that the island should be connected to the mainland and become "developed", with opportunity to have a more convenient life.

As for this year, the flood is a regular event like other normal years. According to the Administrative Office, there is no serious environmental problem on Koh Kret, yet garbage management seems to be problematic. After they are collected, then they were carried on to the mainland municipal area to be taken care of. Our group feels this is not sustainable, and garbage will become problematic during the flood. This is related to the issue of community health and well-being. Another point that was discussed is mosquito and other pests. The Administrative Office uses spray and fumigation as a means for prevention. Right now mosquito and pest is not a serious problem, but once the pressure of climate change becomes stronger, then the island may face a difficult situation.



3.2 “The PEISOR Model and Perspectives of Human Security & Peace Ecology”

By Dr. Hans Günter Brauch, Free University Berlin,
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Research Question & Structure of the Presentation

What can a political scientist specializing in international relations, environmental, security and peace studies contribute to the analysis of the linkage? As a political scientist, I will contribute my reflection and observation to the issue of urban climate change and community resilience. We will take a look at the 3 P's –politics, policy and polity, and assess urbanization trend and climate change impact, and will link global environmental change with policy response, then I will offer a reflection from human security approach and peace ecology.

“Politik” : Politics, Policy, Polity,

Politics is a process of decision-making, with various actors, from state, society, economic sector, and knowledge. With reference to the interests, there are special (lobbies), local, and community interests, then the levels can range from national, regional, to local (community). Meanwhile, **Policies** are where horizontal coordination is suboptimal, we can talk about urban policies (planning), transportation, housing, or environment policies, or disaster management policies like early warning, shelters, resilience. Lastly, **Polity** is legal & institutional frameworks that can be National laws, and need to have implementing agencies, consisting of financial resources and human capacities (training + capacity building -> community resilience).

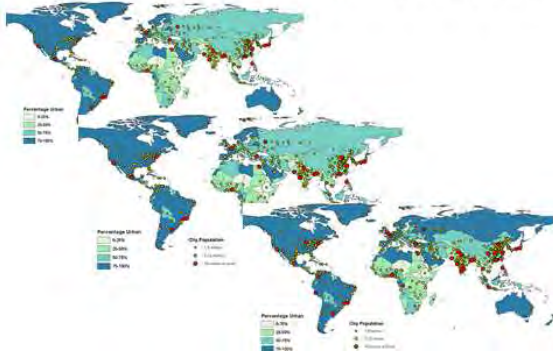
Urban Climate Change: Impact of a Global Process on Local Urban Level (glocal)

When we talk about climate change, we need to differentiate between Climate Variability and Anthropogenic Climate Change. Climate variability represents by warm & cold periods has been with us for billion years since the end of Holocene or Glacier Period. Human intervention on nature has started since the beginning of industrial revolution in 1750 with the burning of hydro carbons, so the accumulation of greenhouse gases (GHG) in the atmosphere has increased since 1958 from 280 to 315 and to 400 ppm in 2013. Therefore, during the last 55 years it has increased more than 2/3, and will continue. The Nobel Laureate in chemistry Paul Crutzen uses the term Anthropocene to describe this entry into the new period of human induced intervention in the earth system. We can look at this in historical, present, and future timeframe.

We (people) are the threat and we are the victims, but we also can be the solution. Urban centres are responsible for high GHG contributions (**threat**) primarily from energy and transportation sectors, industry and housing sectors. At the same time, urban centres have high vulnerability to floods (**victims**) due to population density, and high values (factories, government, hospitals).

Global urbanization trends and projections are shown in slides below. In Thailand between 1950 to today, urbanization rate is doubled, in absolute figure there is 6 times increase of people living in urban centers and in the next 20 years, there will be 20% increase and urban centers will be much more important. This is a challenge for the future.

1.3. Global Urbanization: 1960, 2011, 2025



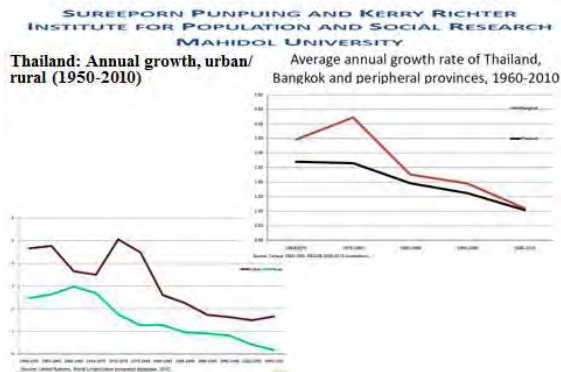
1.4 Urbanization in Thailand (1950-2050)

year	Population	Urban population	% Urban population		An. urban Growth %	An rate change % urban
1950	20 607	3 396	16.5	1950-1955	4.51	1.81
1960	27 312	5 373	19.7	1960-1965	3.59	0.55
1970	36 915	7 711	20.9	1970-1975	6.34	2.57
1980	47 483	12 721	26.8	1980-1985	2.89	0.95
1990	57 072	16 793	29.4	1990-1995	1.46	0.57
2000	63 155	19 669	31.1	2000-2005	1.78	0.69
2010	69 122	23 315	33.7	2010-2015	1.60	1.10
2015	70 876	25 255	35.6	2015-2020	1.61	1.27
2020	72 091	27 375	38.0	2020-2025	1.63	1.41
2025	72 884	29 704	40.8	2025-2030	1.51	1.39
2030	73 321	32 039	43.7	2030-2035	1.34	1.32
2040	72 994	36 274	49.7	2040-2045	0.95	1.18
2050	71 037	39 567	55.7	2050-2055	0.65	1.03

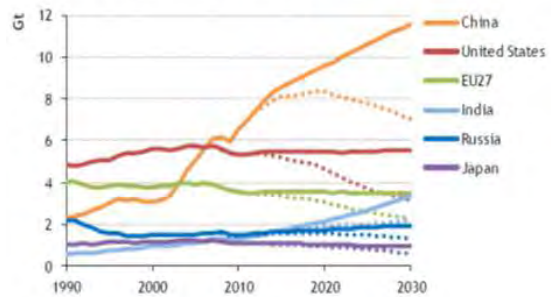
World Population Prospects: The 2010 Revision and World Urbanization Prospects: The 2011 Revision

If the present trend or "business as usual" continues, the GHG emission in OECD countries will slightly increase in the future, the BRIC countries will increase much more. China is the major emitter now, taking over the US in 2007 and if the trend continues it will be more than double in 2030. We are at the level of 400 ppm now, to stabilize it by 2050 is impossible, but it depends on the shift of policy. The carbon intensive development path is still here in Thailand, and the first car policy will make this even worse. We can see that cities are major contributor of GHG. If the emission increases then it is likely that disasters like flood and drought will be intensified. The overall losses will also be increased.

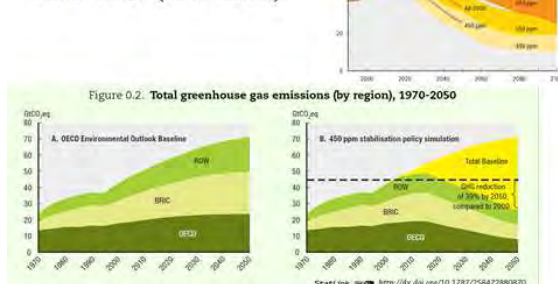
1.5 Urbanization Trends in Thailand & Bangkok



1.6 Energy-related CO2 Emissions for EU27, US, Japan, Russia, China & India (1990-2030)



1.7. Internat. Energy Agency, 2011, Global GHG Emissions (1970-2050)



1.7. Thailand – UNFCCC National Communications (2000, 2010)



1.8 Thailand National Communications to UN Framework Conv. Climate Ch. (2000, 2011)

IEA (2011). GHG em. (energy) 1990-2009:

- Malaysia: +203%, Vietnam: +163%, China: +160%; **Thailand: +146%**, Singapore: 61.3%, Asia: +103%

• **Thailand 1990: 41.9; 2000: 72.4; 2009: 103 mio. tons oil equivalent.**
UNFCCC, National Communications (2000, GHG emissions)

In 2000, Thailand emitted 210.23 million tons of CO₂ and absorbed 52.37 million tons of CO₂. Thus, Thailand's net CO₂ emission in 2000 was 157.86 million tons. The amount was lower than in 1994, when 202 million tons net of CO₂ was emitted. Of the total CO₂ emission in 2000, power generation emitted 150 million tons or more than 90% of net CO₂ emission. The remaining amount was mainly emitted by industrial processes (16 million tons), while an insignificant amount was emitted by waste management (see table below).

In the energy sector, power generation was the largest emitter of CO₂ (64.2 million tons), followed by transportation at 44.4 million tons, and industry at 30.3 million tons. As for industrial processes, almost all CO₂ emission from this sector was emitted by cement production.

1.9 Second National Communication to UNFCCC (2010)

Main Greenhouse Gas	CO ₂ emissions (Gg)	CO ₂ removals (Gg)	CH ₄ (Gg)	N ₂ O (Gg)
Total national emissions and removals	210,231.2	-52,374.0	2,801.5	40.0
1. Energy	149,914.6	0.0	413.9	2.5
2. Industrial processes	16,059.3	0.0	6.4	0.6
4. Agriculture			1,977.0	33.4
5. Land use change and forestry	44,234.1	-52,374.0	10.4	0.1
6. Waste	23.3		393.8	3.3



Figure 2-2 Emissions by type of greenhouse gas in CO₂ equivalents, for 2000

Figure 4: GHG emissions by sector in CO₂ equivalent, for 2000 (21)

1.10. CO2 Emissions in Energy Sector

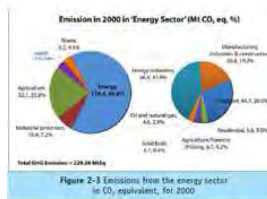


Figure 2-3 Emissions from the energy sector in CO₂ equivalent, for 2000

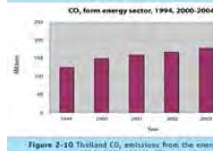


Figure 2-10 Thailand CO₂ emissions from the energy sector, 1994-2004 (million tons)

• Source: Second national communication of Thailand to UNFCCC of 2011 (data of 2000). From 2000-2012 CO₂ emissions increased probably more than 50%)

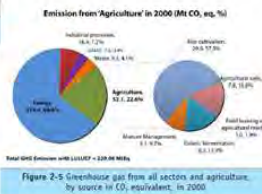


Figure 2-5 Greenhouse gas from all sectors and agriculture, by source in CO₂ equivalent, in 2000

1.11 Tropical Cyclones: Threat to Megacities

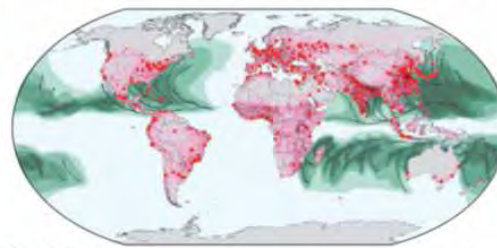


Figure A-8-1 Tropical cyclones threat to various applications. Cartography © World Climate, 2006. Source: WRI/CIU

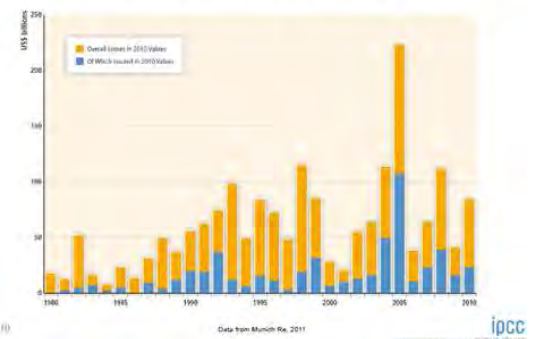
1.12. Disasters: Killed, Affected & Economic Damage

Disaster	Date	No. Killed	Disaster	Date	No. Total Affected
Earthquake (tectonic activity)	26-Dec-2004	8,343	Drought	Apr-2008	30,000,000
Flood	5-Aug-2011	813	Flood	5-Aug-2011	9,500,000
Storm	27-Oct-1962	769	Flood	20-Oct-2010	8,970,858
Flood	19-Nov-1988	644	Drought	Mar-2010	6,482,603
Earthquake (tectonic activity)	Jun-1955	500	Drought	Jan-1999	6,000,000
Storm	3-Nov-1989	458	Flood	30-Jun-1996	5,000,000
Flood	10-Oct-2010	258	Drought	Feb-2002	6,000,000
Flood	3-Jan-1975	239	Flood	1-Aug-1995	4,280,964
Flood	1-Aug-1995	212	Flood	Oct-2002	3,288,430
Flood	20-Aug-2006	184	Flood	9-Jan-1971	3,000,000

Disaster	Date	Damage (million USD)
Flood	5-Aug-2011	40,000,000
Flood	27-Nov-1993	1,261,000
Earthquake	26-Dec-2004	1,000,000
Storm	3-Nov-1989	452,000
Drought	Jan-2005	420,000
Flood	Dec-1993	400,100
Flood	Aug-1978	400,000
Flood	19-Jan-1984	400,000
Flood	10-Oct-2010	332,000
Flood	31-Oct-1993	319,850

Main Disasters in Thailand: recent & CC-related

Economic losses from climate-related disasters have increased, with large spatial and interannual variations



1.13 2nd National Communication (2011)

Table 3-2 Disaster and damages in Thailand, 2001-2006

Year	2001	2002	2003	2004	2005	2006	
Storm	Frequency (times)	1,061	594	3,213	3,834	1,313	1,883
	Provinces (number)	70	67	76	76	57	65
	Household (number)	32,100	23,070	146,024	70,818	32,449	30,296
	Public utility loss (mil.baht)	501.0	213.3	457.4	398.4	148.9	92.4
Drought	Provinces (number)	51	68	63	64	71	61
	Household (number)	7,334,816	2,939,139	1,399,936	1,070,516	2,768,919	2,960,824
	Loss (mil. baht)	72.0	508.8	174.3	190.7	7,565.9	495.3
Flood	Provinces (number)	60	72	66	59	63	58
	Household (number)	919,699	1,373,942	485,436	619,797	763,847	1,673,822
	Loss (mil.baht)	3,666.3	13,385.3	2,050.3	850.7	5,982.3	9,627.4

Source: Department of Disaster Prevention and Mitigation, Ministry of Interior

1.15 IPCC Special Report of 2012 (SREX)



Task of scientific community (knowledge) is to analyse, monitor, evaluate, learn, innovate & produce social and technical knowledge



Learning-by-doing and low-regrets actions can help reduce risks (now) and also promote future adaptation

The conclusions are as followed:

- Population growth will decline after 2030
- Urbanization will increase from 33,7% (2010) to 55,7 (2050)
- Thailand is highly vulnerable to climate related natural hazards: storms, floods, droughts
- Urban regions are very vulnerable (high concentration of people, economic value)
- This vulnerability is to grow due to a) increase in urbanization and b) of hazards (typhoons, floods & sea-level rise), IPCC 5th Assessment Report
- Cities are the major contributor: energy, transportation, industry, domestic sectors
- Challenge for adaptation & mitigation: Need for a sustainability transition in urbanization, energy, transportation, industry sector

2. Analysing Urban Climate Change and Community Resilience from a Political Science Perspective: A Model and Two Perspectives



Analysing Urban Climate Change and Community Resilience from a Political Science Perspective: a Model and Two Perspectives

Resilience Term and Concept -- According to *Oxford Dictionary and Thesaurus* (2001: 645) 'resilient' means, "resuming original form after compression etc., readily recovering from setback". *Chambers Dictionary* (2001) defines 'resilient' as, "recoiling, re-bounding, able to recover form and position elastically, able to withstand shock, suffering, disappointment...". And IPCC's WG II of AR4 (2007a: 880) defined resilience as, "The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change."

Ecosystem resilience is the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. A resilient ecosystem can withstand shocks and rebuild itself when necessary.

Resilience in social systems has the added capacity of humans to anticipate and plan for the future. Humans are part of the natural world. We depend on ecological systems for our survival and we continuously impact the ecosystems in which we live from the local to global scale. Resilience is a property of these linked social-ecological systems (SES). "Resilience" as applied to ecosystems, or to integrated systems of people and the natural environment, has three defining characteristics:

The amount of change the system can undergo and still retain the same controls on function and structure depends on the degree to which the system is capable of self-organization and the ability to build and increase the capacity for learning & adaptation.

Urban Resilience is defined as the "capability to prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to public safety and health, the economy, and security" of an urban area. Contemporary academic discussion of urban resilience focuses on three distinct threats; **climate change**, **natural disasters** and terrorism. The urban impacts of climate change vary widely across geographical and developmental scales. This article will define and discussing the challenges of heat waves, droughts and flooding. Resilience-boosting strategies will be introduced and outlined. Resilience is especially important in urban areas, because over the past century there has been a considerable increase in urbanization and urban sprawl. Half of the world's population now lives in cities, a figure that is set to rise to 80% by 2050. Mass density of people makes them especially vulnerable both to the impacts of acute disasters and the slow, creeping effects of the changing climate; all making resilience planning critically important. <http://www.ask.com/wiki/Urban_resilience?o=2801&qsrc=999 >

World Economic Forum: Working Definition of Resilience (2013)

In the wake of unprecedented disasters in recent years, "resilience" has become a popular buzzword across a wide range of disciplines, with each discipline attributing its own working definition to the term. A definition that has long been used in engineering is that resilience is the capacity for "bouncing back faster after stress, enduring greater stresses, and being disturbed less by a given amount of stress".

This definition is commonly applied to objects, such as bridges or skyscrapers. However, most global risks are systemic in nature,- and a system – unlike an object – may show resilience not by returning exactly to its previous state, but instead by finding different ways to carry out essential functions; that is, by adapting.- For a system, an additional definition of resilience is "maintaining system function in the event of disturbance"

2.5 WEF: Global Risk 2013:

Special Report: Building National Resilience to Global Risks

Figure 21: Resilience is Most Applicable to Unpredictable Risks with Little Knowledge About Effective Measures

Predictability of Risk	High	Emphasize resilience over anticipatory strategies	Use anticipatory strategies
	Low	Strengthen resilience	Emphasize resilience over anticipatory strategies
		Small	Large
		Amount of knowledge of a risk and effective measures to deal with it	

Source: Adapted from Comfort, L. K., Boin, A., & Demchak, C. C. *The Rise of Resilience, in Designing Resilience: Preparing for extreme events*. Pittsburg: University of Pittsburgh Press 2010.

3. Early Pressure – Response Models



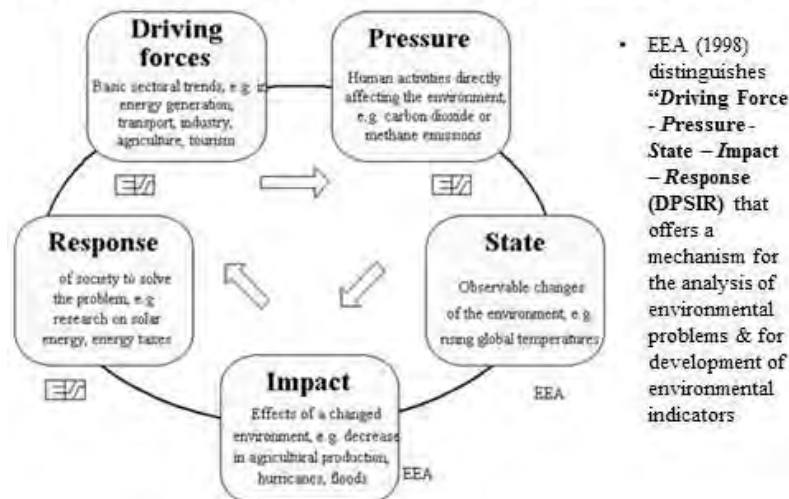
Early Pressure – Response Models

Early Stimulus Response Models: OECD, UNCSO, EEA

OECD: PSR-Model distinguished 'pressure' (P), 'state of environment' (S), & 'response' (R) indicators.

- 'pressure' -key factors are listed (population growth, consumption, poverty),
- 'state' refers to environmental conditions that emerge from this pressure (air pollution, deforestation, degradation) that influence human health, well-being
- 'response' -manifold activities of society to avoid, prevent, reduce negative impacts on environment, and to protect natural resources from these effects.
- Between these three elements of the PSR model there are many complex interactions (resource transfers, information, decisions).
- UN-CSD (Committee for Sustainable Development) used with its DSR (*Driving Force-State-Response*) model a slightly modified framework.

3.1 European Environment Agency: DPSIR Model



PEISOR Model: Linking Global Environmental Change with Environmental Effects, Impacts, Societal Outcomes and Policy Responses

PEISOR: Result of pressure and response models and of debates on environmental security and on natural hazards.

The PEISOR model combines five stages:

- **P (pressure)** refers to 6-8 drivers of global environmental change
- **E to the effects** of the linear, non-linear or chaotic interactions within the 'hexagon' on environmental scarcity, degradation, and stress;
- **I to extreme or fatal impacts** of human-induced and climate-related natural hazards (storms, flash floods, flooding, landslides, drought);
- **SO to societal outcomes:** internal displacement, migration, urbanization, crises, conflicts, state failure, and
- **R to response by society**, business community, state where both traditional & modern technological knowledge can make a difference.

Hazards cannot be prevented, their impact in terms of deaths, affected people, economic & insured damages can be reduced by policies & measures that link protection with empowerment of the people to become more resilient.

PEISOR Model on Climate Change: Geophysical Effects & Societal Outcomes

4 geophysical effects will most likely increase

- Temperature change (2°C stabilization goal by 2100??)
- Sea-level Rise much higher and longer lasting (threat)
- Precipitation change (impact on drought, food security)
- Increase in hydro-meteorological, climatological hazards
- Likelihood of crossing tipping points in climate system may rise

2°C world increasingly unlikely, 4°-6°C world more probable: dangerous, catastrophic Climate Change

- People's movement (displacement, distress migration)
- Domestic, regional crisis & violent conflicts may increase

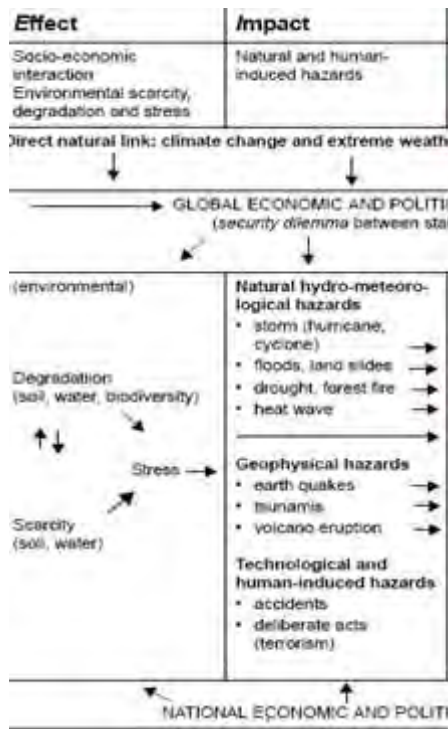
Applying the Model to: Urban Climate Change & Community Resilience

Human pressure: population growth (demand side), rural (agriculture, food) & urban systems (industry), socio-economic processes (production & consumption)

- Environmental pressure: Global Environmental and Climate Change: Soil, water, biodiversity & climate change
- Effects: env. scarcity, degradation & stress (water, soil)
- Impacts: heat waves, storms, floods
- Societal Outcomes: death, affected, economic damage (e.g. big flood of August 2011)
- Policy Response: proactive vs. Reactive
- Infrastructure, early warning & societal community resilience

3.6 P: Pressure: Interactions of GEC: Four Environmental Factors (Quartet)





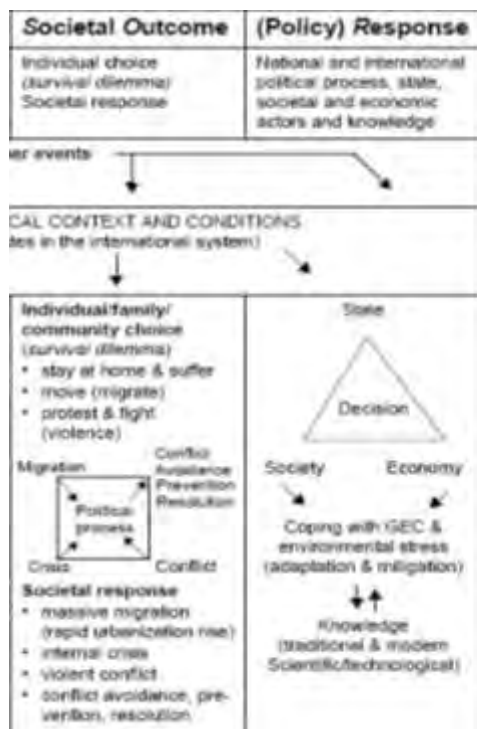
3.7 E: Effect & I: Impact

• **E: Environmental security debate of 1990s**

- Toronto school (Homer-Dixon)
- Swiss school (G. Bächler):
- Soil scarcity > degradation > environmental stress

• **I: climate change -> extreme weather events**

- Hydrometeorological hazards
 - Drought (wind erosion)
 - Heatwaves
 - Forest fires
 - Storms (hurricanes, typhoons)
 - Flash floods & landslides (wind & water erosion)



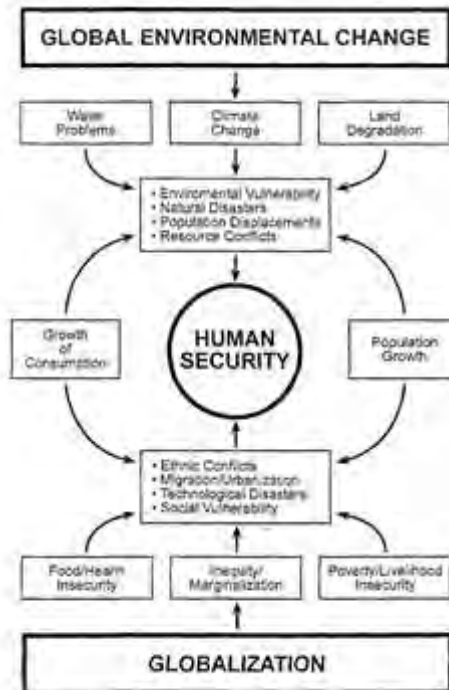
3.8 SO: Societal Outcomes

- **Individual level (choice)**
 - Human security perspective
 - Survival dilemma of humans
- **State/society level**
 - Rural-urban migration
 - Foreign immigration (Myanmar, Cambodia, Laos)
 - Seasonal (labour)
 - Permanent
 - Residence (flood prone areas)
 - Crises: domestic (related?)
 - Conflicts:
 - Peaceful protests
 - Violent clashes
 - Complex emergencies (2004: Sri Lanka, Indonesia: Aceh)

R: Policy Response to Security Dangers posed by Global Environmental Change

- How? Responsive vs. proactive action
 - Response: cost of non-action (Stern Report)
 - Proactive: anticipatory knowledge, learning, action
- What? Addressing Causes (Pressure)
 - Earth system: environmental quartet

- Human: productive & consumptive behaviour
- Responding to Effects and Impacts
- Environmental stress
- Climate-related natural hazards



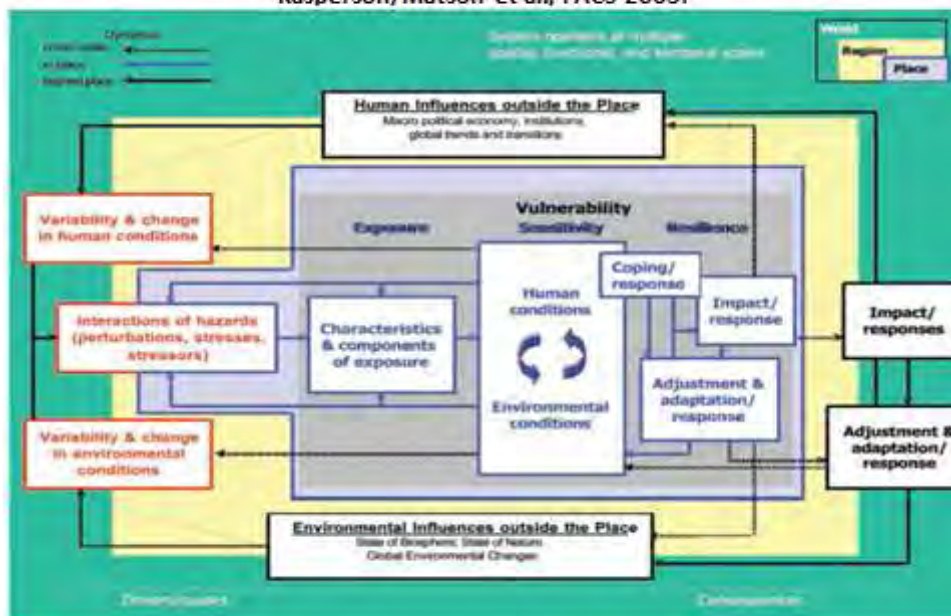
3.10 HG Bohle's Model of Dual Vulnerability

Bohle (2001) distinguished a dual structure of vulnerability

- 'external' or 'environmental vulnerability' that points to exposure (political economy approaches, human ecology perspectives and theories of entitlement),
- 'internal' or 'social vulnerability' -> coping (crisis and conflict theory & influenced by action theory and models of access to assets).

Clark, Crutzen, Schellnhuber (2004) relied on a framework for vulnerability analysis in sustainability science

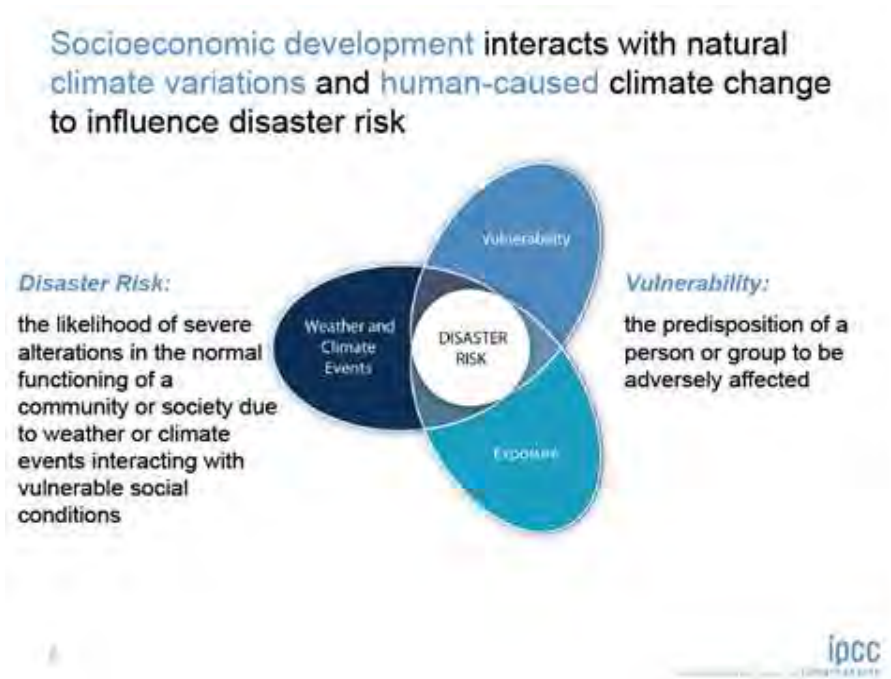
3.11 Vulnerability framework. Components of vulnerability identified and linked to factors beyond the system of study and operating at various scales. Source: Turner/Kasperson/Matson et al., PACS 2003:



Elements of this Vulnerability Model

- (i) linkages to broader human and biophysical (environmental) conditions & processes operating on the coupled system in question;
- (ii) perturbations and stressors/stress that emerge from these conditions and processes;
- (iii) the coupled human-environment system of concern in which vulnerability resides, including exposure and responses (i.e., coping, impacts, adjustments, & adaptation).

These elements are interactive and scale dependent, its analysis is affected by the way in which the coupled system is conceptualized and bounded for study.



3.14 Linking Climate Change, Vulnerability & Exposure to Community Response

Increasing vulnerability, exposure, or severity and frequency of climate events increases disaster risk



Climate Change & Security: Challenges for New Peace & Security Policy in the Anthropocene

- New security challenges require new security & peace policy for the Anthropocene
- We are the threat! Impossible to fight against oneself!
 - threat: our fossil energy consumption and way of life
 - solution: GHG reduction by 2050: -50% (global), -80% ICs
- Electricity, heating, transportation, industry
- Increase in energy efficiency and renewable energy
 - Global responsibility and global action
 - Proactive vs. reactive Policy and Crisis Management
- Reactive: Welt financial crisis: no price is too high
- Dominance of mindset and Worldview of business as usual (BAU) Short term horizon:
 - Reactive political & economic action
- International Climate Policy since 2009, failure of Rio+20
- Proactive: climate change response: sustainability transition strategies

4. A Human Security Approach to Urban Climate Change and Community Resilience



A Human Security Approach to Urban Climate Change and Community Resilience

Human Security: UNDP (1994), HSN (1999), CHS (2003)

- Dual goal:
 - Task of the government: protection: early warning & infrastructure (shelters, urban planning)
 - Empowerment; capacity-building and training
- Four Pillars of human security
 - Freedom from fear (Canadian, Norwegian approach)

- Freedom from want (Japanese, Thai approach)
 - Freedom to live in dignity (Kofi Annan: In Larger Freedom, 2005)
 - Freedom from hazard impact (UNU-EHS: Bogardi/Brauch (2005))
- Dual vulnerability model (H.G. Bohle)
 - Environmental
 - Social
- Dual task of resilience
 - Government: top-down, Infrastructure, shelters
 - Community based: self-organization

Deepening: State- vs. People Centred Human Security

UNDP Human Security Report (1994: 3) by Mabhuq ul Haq, Pakistan: *New Dimensions of Human Security*

Security ... means safety from the constant threat of hunger, disease, crime and repression. It also means protection from sudden and hurtful disruption in the pattern of our daily lives – whether in our homes, in our jobs, in our communities or in our environment.

Human Security Commission: Human Security Now, 2003 (Ogata/Sen)

Human security complements state security, enhances human rights and strengthens human development. It seeks to *protect* people against a broad range of threats to individuals and communities and, further, to *empower* them to act on their own behalf. And it seeks to forge a global alliance to strengthen the institutional policies that link individuals and the state – and the state with a global world. Human security thus brings together the human elements of security, of rights, of development.

The Commission on Human Security's definition of human security: to *protect* the vital core of all human lives in ways that enhance human freedoms and human fulfilment. Human security means protecting fundamental freedoms – freedoms that are the essence of life. It means *protecting* people from critical (severe) and pervasive (widespread) threats and situations. It means using processes that build on people's strengths and aspirations. It means creating political, social, environmental, economic, military and cultural systems that together give people the building blocks of survival, livelihood and dignity.

Human Security Network (1999)

In 1999, a group of like-minded States from different regions of the world, including Austria, Canada (left), Chile, Costa Rica, Greece, Ireland, Jordan, Netherlands (left), Mali, Norway, Panama, Slovenia, Switzerland, **Thailand** & South Africa (observer): **Human Security Network (HSN)**.

The Network defined human security as

"A humane world ... where every individual would be guaranteed freedom from fear and freedom from want, with an equal opportunity to fully develop their human potential ... In essence, human security means freedom from pervasive threats to people's rights, their safety or even their lives ... Human security and human development are thus two sides of

the same coin, mutually reinforcing and leading to a conducive environment for each other”.

Thai presidency (2006): Freedom from hazard impact



4.3 Human Security Commission Report: Sadako Ogata & Nobel Laureate Amartya Sen: Human Security Now (2003)

- *Commission on Human Security (CHS)* established in January 2001 at initiative of Japan. The Commission consisted of twelve persons, chaired by Sadako Ogata (former UNHCR) Amartya Sen (1998 Nobel Economics).
- **CHS goals:** a) promote public understanding, engagement and support of human security; b) develop the concept of human security as an operational tool for policy formulation and implementation; c) propose a concrete program of action to address critical and pervasive threats to HS.
- *Human Security Now* (2003) proposes a **people-centered** security framework that focuses “**on shielding people from critical and pervasive threats and empowering them to take charge of their lives.** It demands creating genuine opportunities for **people to live in safety and dignity and earn their livelihood.** Its final report highlighted that:
- More than 800,000 people a year lose their lives to violence. Ca. 2.8 billion suffer from poverty, ill health, illiteracy & other maladies

Human Security Commission: Human Security Now (2003)

Independent Commission on Human Security (CHS), led by Sadako Ogata and Amartya Sen, in 2001 reached a new consensus on security threats facing contemporary societies in 21st century. CHS in its 2003 report *Human Security Now: Protecting and Empowering People*, defined HS as to *protect* the vital core of all human lives in ways that enhance human freedoms and human fulfilment. Human security means protecting fundamental freedoms – freedoms that are the essence of life. It means *protecting* people from critical (severe) and pervasive (widespread) threats and situations. It means using processes that build on people’s strengths and aspirations. It means creating political, social, environmental, economic, military and cultural systems that together give people the building blocks of survival, livelihood and dignity.

Urban Climate Change requires protection and Community Resilience relies on process of empowerment of the people!

Fourth Pillar of Human Security: Freedom From Hazard Impacts

UNU-EHS: Bogardi/Brauch (2005), Brauch (2005)

Goal: reduce dual vulnerabilities & enhance capacity building & coping capabilities of societies faced with natural & hum. hazards

Threats/Hazards:

Environmental: floods, droughts, other natural disasters, environmental degradation, lack of water, human-induced climate change

Societal: poverty, improper housing, insufficient food and water, malfunctioning of technical systems, traffic accidents, population explosions, terrorism and organized crime

Develop vulnerability indicators & vulnerability mapping to apply to operational realm: working on solutions

- improved early warning systems_capacity-building for early warning
 - disaster preparedness (education and training, infrastructure)
 - coordinated rapid disaster response by local, regional and national level
 - developing clear guidelines for post hazard reconstruction
 - long term strategies: e.g. Kyoto, Montreal Protocol
 - adaptation measures: e.g. dams, switching to renewable energy
 - mitigation measures: restrict housing in hazard areas (coastal areas-flooding, mud slides), charging more for garbage disposal and energy usage, birth control measures
- Support community resilience, sustainable development & sustainability transition (e.g. urban energy, transport)

Climate Change as a Human Security Challenge

From a human security perspective, climate change was addressed by the *Global Environmental Change and Human Security* (GECHS) programme of IHDP in June 2005.

Focus of the Greek Presidency of the Human Security Network (2007-2008)_"to raise the international community's awareness of the impact of climate change and global warming on human security, with regard to vulnerable groups, particularly women, children and persons fleeing their homes due to climate change".

Barnett and Adger (2005) discussed how climate change may under-mine human security, and how human insecurity may increase the risk of violent conflict; as well as the role of states in human security and peace_ building.

Scheffran, Brzoska, Brauch et a. (2012): Climate Change, Human Security and Violent conflict

The linkage between climate change and human security is addressed by *Working Group* (WG) II of the IPCC, that will be released in its fifth assessment report will be released in 2014.

Human Security Network: 10th Ministerial Conference Athens (2008)

Climate Change and Developing Countries -- Developing and Least Developed Countries will pay heaviest toll due to dependence on agriculture & limited capacity to deal with natural disasters, Most vulnerable to climate change impacts.

Climate Change and Women -- Climate change will disproportionately affect lives of poor women in developing world who suffer from limited access to basic goods and rights.

Women are more exposed to dangers when fleeing their homes, due to natural disasters or conflicts, during their resettlement to camps and recipient countries. Girls are most vulnerable to exploitation, human trafficking and other forms of gender-based violence.

Climate Change and Children

Children are physically more vulnerable to malnutrition, disease and hardships. The lives of up to tens of millions of children will be endangered by floods, drought and climate change related diseases over the next decades (malaria, dengue fever). They will also be affected by disasters with long-term impact, such as desertification.

Climate Change and People on the Move

The severe HS effects of climate change will be more acute for the population with high resource-dependency in environmentally & socially marginalized regions.

5 Reflections from an Emerging Peace Ecology



Reflections from an Emerging Peace Ecology

Conceptualising Peace

- European concept: Greek & Roman origins: Eirene & pax
- Asian: Hindu concept of Ahimsa: peace with nature
- Is there a similar concept in Theravati Buddhism?
- Conceptualizing Ecology: The many ecologies
 - 'deep ecology' (Leopold 1949; Naess 1973, 1989),
 - 'human ecology' (Marsh 1864; Young 1974),
 - 'social ecology' (Bookchin 1988, 2005),
 - 'political geocology' (Brauch/Dalby/Oswald Spring 2011).
 - 'peace ecology' (Kyrou 2007, Oswald Spring/Brauch/Tidball)
- Peace Ecology: A new approach
 - Environmental peacemaking
 - 5 pillars of peace ecology:

- negative peace
- positive peace
- cultural peace
- sustainable peace
- engendered peace

Ecology: Term & Concept

Ecology is based on Greek terms 'oikos' (οἶκος) household, house or family and 'logos' (λόγος) speech, philosophy or science. The *ecology* concept was coined by Ernst Haeckel (1834-1919) for the study of living species and their physical and biotic surroundings. In late 19th century it was used for animals, plants, in hydrobiology, while a modern definition includes a) the interactions between organisms (individuals, populations), b) in their abiotic and biotic environment and c) links in energy, material and information flow.

Ecology concept "has been centrally concerned with the concept of adaptation and with all properties having a direct and measurable effect on demography, development, behaviour and spatio-temporal position of an organism." (Ellen 1996)

Human ecology is used in human geography, urban sociology and anthropology. Ellen (1996) argued that "the other major impact of ecological concepts in the social sciences has been in the relation of political environmentalism, and to environment and development...".

Manifold Ecological Approaches

The ecology concept has been conceptualized by many social scientists as

- 'deep ecology' (Leopold 1949; Naess 1973, 1989),
- 'human ecology' (Marsh 1864; Young 1974),
- 'social ecology' (Bookchin 1988, 2005),
- 'ecofeminism' (d'Eaubonne 1974; Shiva/Mies 1997),
- 'political ecology' (Thone 1935)
- urban ecology
- 'political geoecology' (Brauch/Dalby/Oswald Spring).
- Peace ecology (Kyrou 2007, Oswald Spring/Brauch/ Tidball 2014)

Urban Ecology (Wikipedia)

Urban ecology is scientific study of the relation of living organisms with each other & their surroundings in the context of the urban environment. Urban environment refers to environments dominated by high-density residential & commercial build-ings, paved surfaces, & other intense human influences, which create a unique landscape dissimilar to many previously studied environments in ecology

Urban ecology is a recent field of study compared to ecology as a whole. It carries increasing importance because, as by 2050, two-thirds of the world's population will be living in expanding urban centers. The ecological processes in the urban environment are comparable to those outside the urban context. ... Often, explanations for phenomena examined in the urban setting as well as predicting changes because of urbanization are the center for scientific research. Ecology has historically focused on 'pristine' natural

environments, however by the 1970s many ecologists began to turn their interest towards ecological interactions taking place in, and caused by urban environments. Jean-Marie Pelt's 1977 book *The Re-Naturalized Human*, Brian Davis' 1978 publication, *Urbanization and the diversity of insects*, as well as, Sukopp et al.'s 1979 article, *The soil, flora and vegetation of Berlin's wastelands* are some of the first publications to recognize the importance of urban ecology as a separate and distinct form of ecology (different from landscape ecology and population ecology).

The European concept of urban ecology examines the biota of urban areas while to the North American concept which has traditionally examined the social sciences of the urban landscape, as well as the ecosystem fluxes and processes.

Environmental Peacemaking

While both scientific peace and ecology concepts have significantly changed since 1989, the scientific exchange between peace research and ecological approaches has been limited.

Conca (1994) suggested an "environmental agenda for peace studies" and a discussion on whether "ecologically desirable futures include concerns for peace and justice" arguing that it is not enough "to place 'sustainable development' and 'ecological security' alongside peace or social justice as 'world-order values'".

Conca, Carius, Dabelko (2005: 150) argued that environmental peacemaking may help "forestall environmentally induced conflict,... soften group grievances that ... are worsened by ecological injustices", which is also identified as 'negative peace', while a second approach "moves beyond conflicts with a specifically environmental component, seeking to build peace through cooperative responses to shared environmental challenges", thus partly aiming at 'positive peace'.

Towards Peace Ecology

Kyrou (2007) introduced 'peace ecology' as an "integrative, multi-contextual, and case sensitive approach in identifying resources for conflict and violence transformation" with the goal "to include issues of conflict analysis and peacebuilding" into environmental studies". 'A shortcoming of environmental peacemaking is "the lack of a common worldview and of a shared philosophical space in relating ecology with peace".'

Kyrou argues that "peace ecology values the preservation and harmonious interaction of societies with the nature of peace; at the same time, it values a society striving to maintain positive peace as an ecological asset". Peace ecology links the value of biodiversity with that of cultural diversity and aims to protect the environment and to maintain the peace far into the future. Other elements of his peace ecology approach are bioregionalism, the 'do-no-harm' principle that aims at the "preservation of positive peace in society while maintaining ecological integrity". "Peace ecology places environmental peacemaking activities within the context of bio-regions and examines their impact on various forms of violence".

Expanding Peace Ecology

Brauch, Dalby and Oswald Spring (2011) proposed to reconceptualize peace ecology by linking it to the political geology approach.

Peace ecology calls for “peace with nature” that is increasingly being challenged by the manifold anthropogenic interventions into the earth system during the Anthropocene (Crutzen 2000): To achieve ‘peace with nature’ is a domestic and international task where human behaviour has to be brought in line with the holeness of nature.

How human beings respond to these new dangers to the survival of the species but also of plants and animals through a declining biodiversity depends but on the worldview of the scientists but also on the mindset of the elites and on whether the carbon lobbies succeed.

Business-as-usual prevails when the political, economic and military elites are unwilling or unable to act to address the root causes of global environmental and climate change. Many religious leaders, scientists, policymakers have called for an alternative vision aiming for a new scientific revolution, for a fundamentally different worldview shifting to an alternative paradigm of sustainable development and sustainable peace (Scheffran 2011; OECD 2011), where the ethical goal of ‘peace with nature’ can be achieved.

Conceptual Pillars of Peace Ecology

Peace ecology in the Anthropocene may be conceptualized with 5 conceptual pillars consisting of peace, security, equity, sustainability & gender.

To conceptualize the linkages between peace and security we refer to ‘negative peace’ and for the relationship between peace and equity to ‘positive peace’ concept, for interactions between peace, gender and environment ‘cultural peace’ and for the relations between peace, equity and gender we propose the concept of an ‘engendered peace’.

Sustainable peace refers to links among peace, security & environment, where humankind and the environment as 2 key parts of global Earth face the consequences of destruction, extraction and pollution.

Sustainable peace includes also processes of recovering from environmental destruction, reducing the human footprint in nature through a less carbon-intensive - and in the long-term possibly carbon-free and increasingly dematerialized production processes that future generations may still be able to decide on their own resources and development strategies.

Behera, Navnita Chadha; Chourou, Béchir; Krummenacher, Heinz (Eds.), 2009: *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts* (Berlin – Heidelberg – New York: Springer-Verlag): 65-102.

Brauch, Hans Günter, 2011: Informal Thematic Debate of the 65 th Session of the United Nations General Assembly on Human Security , 14 April 2011, 3.00-5.45 pm., Interactive Debate 2: Human Security – Its Application and Added Value - Background paper prepared by Hans Günter Brauch: The Environmental Dimension of Human Security: Freedom from Hazard Impacts, at: <http://afes-press-books.de/html/PDFs/Brauch_UN-GA_Paper_12%204%202011_final%20%282%29.pdf> and talking notes at: <http://afes-press-books.de/html/PDFs/Brauch_UN-GA_Talking%20Points_11%204%202011_final%20%282%29.pdf>.

Oswald Spring, Ursula; Brauch, Hans Günter; Keith G. Tidball, 2014: “Expanding Peace Ecology – Peace, Security, Sustainability, Equity, and Gender”, in: Ursula Oswald Spring; Hans Günter Brauch; Keith G. Tidball (Eds.): *Expanding Peace Ecology: Security, Sustainability, Equity and Peace: Perspectives of IPRA’s Ecology and Peace Commission 1* (Cham – Heidelberg – New York – Dordrecht – London: Springer-Verlag, 2014, i.p.).

Appendix A: International Workshop Program

“Urban Climate Change and Community Resilience”

October 24, 2013	Venue: Thong Phan Room, 2 nd floor Faculty of Architecture, Kasetsart University
8.30 – 9.00	Registration
9.00 – 9.10	Welcome Remarks by the Dean, Faculty of Architecture, Kasetsart University
9.10 – 9.20	Introduction by Associate Professor Dr. Suwattana Thadaniti, Faculty of Architecture, Kasetsart University and Advisor of Chulalongkorn University Social Research Institute
9.30 – 10.00	“Demand and potential of urban green infrastructure for the adaption to the climate change in ‘climate change sensitive residential areas (CCSRA)’ of the City of Linz.” By Dr. Jürgen Breuste, Urban and Landscape Ecology, IALE Centre for Landscape Research (CeLaRe) University Salzburg, Dept. Geography/Geology
10.00 – 10.30	“In whom do we trust? Exploring the role of the government in building community resilience in the Netherlands and Thailand.” By Dr. Bart Lambregts, Faculty of Architecture, Kasetsart University and Department of Geography, Planning and International Development Studies, University of Amsterdam, The Netherlands
10.30 – 10.45	Coffee break
10:45 – 11.15	When Water becomes an Angry Water : Climate change or Human Ethics change By Dr. Eggarin Anukulyudhathon, Faculty of Architecture, Kasetsart University
11.15 – 11.45	“Resilience from Bottom-Up: A Community Approach” By Dr. Úrsula Oswald Spring, Centro Regional de Investigaciones Multidisciplinarias (Regional Center for Multidisciplinary Research) at National Autonomous University of Mexico (CRIM-UNAM)
11.45 – 12.00	Discussion, moderated by Associate Professor Dr. Suwattana Thadaniti
12:00 – 13:00	Lunch
13.00 - 17.00	A field trip to observe community area at Koh Kret, Nonthaburi Province
18.00	Return to Kasetsart University

(*Remark: The workshop and discussion will be conducted in English language. Free registration. The field trip is limited to 20 people only.)

October 25, 2013 Venue: Meeting room, 4th Floor, the Social Research Institute, Wisit Prachuabmoh Building, Chulalongkorn University

- 9.00 – 9.15 Welcome Remarks by **Assoc. Prof. Dr. Vithaya Kulsomboon**
Director, CUSRI
- 9.15 – 9.45 Summary of issues discussed on October 24 and field trip
By **Dr. Narumon Arunotai**
- 9.45 – 10.30 **“The PEISOR Model and Perspectives of Human Security & Peace Ecology”**
By Dr. Hans Günter Brauch, Free University Berlin, Chair -Peace Research and European Security Studies, Editor - Hexagon-Book Series on Human, Environmental Security and Peace, Springer Publishers
- 10.30 – 10.45 Questions and answers
- 10.45 -- 12.00 Discussion by **Professor Dr. Jürgen Breuste, Professor Dr. Ursula Oswald Spring and Associate Professor Dr. Suwattana Thadaniti**
- 12.00 – 12.30 Lunch

Moderated by Dr. Narumon Arunotai

(*Remark: The workshop and discussion will be conducted in English language.

Free registration. Refreshment will be served in meeting room).

Appendix B: Participant Name List

October 24, 2013 **Venue: Thong Phan Room, at the Second floor Faculty of Architecture, Kasetsart University**

1. Dr. Úrsula Oswald Spring National Autonomous University of Mexico
2. Dr. Jurgen Breuste Salzburg University, Austria
3. Dr. Hans Günter Brauch Free University Berlin
4. Dr. Suwattana Thadaniti Chulalongkorn University Social Research Institute
& Kasetsart University
5. Ratchot Chompunich Kasetsart University
6. Dr. Eggarin Anukulyudhathon Kasetsart University
7. Dr. Narumon Arunotai Chulalongkorn University Social Research Institute
8. Dr. Bart Lambregts Kasetsart University & University of Amsterdam
9. Araya Santisan Kasetsart University
10. Nattapol Sothiratviroj Panyapiwat Institute of Management
11. Tripob Boontham Kasetsart University
12. Kamthon Kulachol Kasetsart University
13. Soranart Sinuraibhan Kasetsart University
14. Worameta Yodboon Kasetsart University
15. Prapassorn Siriwichai Chulalongkorn University
16. Ranee Hassarungsee Social Agenda Working Group
17. Rewadee Chuckkasen Chulalongkorn University Social Research Institute
18. Usa Kotsripetch Chulalongkorn University Social Research Institute
19. Kingkaew Buaphet Chulalongkorn University Social Research Institute
20. Paladej na Pombejra Chulalongkorn University Social Research Institute

October 25, 2013 **Venue: Meeting room, 4th Floor, the Social Research Institute, Wisit Prachuabmoh Building, Chulalongkorn University**

1. Dr. Úrsula Oswald Spring National Autonomous University of Mexico
2. Dr. Jurgen Breuste Salzburg University, Austria
3. Dr. Hans Günter Brauch Free University Berlin
4. Dr. Vithaya Kulsomboon Chulalongkorn University Social Research Institute
5. Dr. Suwattana Thadaniti Chulalongkorn University Social Research Institute & Kasetsart University
6. Dr. Narumon Arunotai Chulalongkorn University Social Research Institute
7. Orawan Sukkasam Chulalongkorn University Social Research Institute
8. Sastra Srihabhak Chulalongkorn University
9. Lisa Schimetat MAIDS, Chulalongkorn University
10. Supatsak Pobsuk MAIDS, Chulalongkorn University
11. Pornsiri Chu Mahasarakham University
12. Phinyalakh Weerapatthararatwaraa Chulalongkorn University Social Research Institute
13. Lahpai Nang San Awng MAIDS, Chulalongkorn University
14. Zor Ni Maung MAIDS, Chulalongkorn University
15. Wannipa Coakokkrud Chulalongkorn University Social Research Institute
16. Sothy Lek MAIDS, Chulalongkorn University
17. Wichaya Komin Chulalongkorn University Social Research Institute
18. Kingkaew Buaphet Chulalongkorn University Social Research Institute
19. Nantiya Kakeya Chulalongkorn University Social Research Institute
20. Usa Kotsripetch Chulalongkorn University Social Research Institute
21. Rewadee Chuckkasen Chulalongkorn University Social Research Institute
22. Sukanda Sodditson Chulalongkorn University Social Research Institute
23. Aungkana Chindet Chulalongkorn University Social Research Institute

**“Urban Climate Change
and Community Resilience”
“การเปลี่ยนแปลงภูมิอากาศเมือง
และสมรรถนะในการฟื้นตัวของชุมชน”**

สถาบันวิจัยสังคม จุฬาลงกรณ์มหาวิทยาลัย

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