



Building Capacity for Urban Climate Change Adaptation in Southeast Asia

Project Reference : CBA2016-01CMY-Boonjawat

Project Leader : Dr.Jariya Boonjawat

Southeast Asia START Regional Center (SEA START RC)

Chulalongkorn University



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Countries involved:

Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Thailand, USA, Vietnam

Project Duration: 2 yrs (CBA2015-03NMY-Adiningsih; CBA2016-01CMY-Boonjawat)

APN Fund USD: 40,000 (Year 2)

Year of Completion: 2018

Project Output: Participants Guide Book for the 2nd Training of Trainers (TOT2) for Urban Climate Change Adaptation in Southeast Asia, 31 July- 4 August 2017, Bangkok, Thailand, with Case Studies of Adaptation for Flood Protection in BMA; Sustainability@Chula: Smart city, Clean Energy project, CU Zero waste and Green Urban Design of Chulalongkorn University.

Website: <http://www.start.or.th>

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Acronyms

APN	Asia – Pacific Network for Global Change Research
ACCCRN	Asian Cities Climate Change Resilient Network
BMA	Bangkok Metropolitan Administration
CU	Chulalongkorn University
NRCT	National Research Council of Thailand
PPTGC	PTT Global Chemical Public Company Limited
SEA START RC	Southeast Asia START Regional Center
UCCR	Urban Climate Change Resilience

Project Summary

Project Title: Building Capacity for Urban Climate Change Adaptation in Southeast Asia

Project Reference: CBA2016-01CMY-Boonjawat

Project Leader: Dr. Jariya Boonjawat

Project Award: US\$ 40,000 (Year 2)

Background

As urbanization has grown rapidly over recent decades, human activities have led to a warming climate and massive landscape conversion. Are cities sufficiently prepared for impacts of climate change? How can we begin to make more sustainable and resilient cities in Southeast Asia? To fill the gap between climate change adaptation and urban planning, it is essential to enhance the capacity of scientists, academicians, urban planners and practitioners in incorporating climate change science into sustainable urban development and planning. A series of one week training of the urban planners or Training of Trainers (TOT) on building capacity for urban climate change adaptation and resilience in Southeast Asia were conducted. The first TOT was held in 2015 at Depok, Indonesia and TOT2 in 2017 in Bangkok, Thailand.

Objectives:

- To identify the gaps that exists in technical skill necessary for climate adaptation in urban planning in the region among planners, government officials and universities;
- To formulate the activities needed in capacity building for climate adaptation in urban planning and the mode of operation;
- To develop incorporated climate adaptation and urban planning modules for training.

Expected Outcomes:

- An increase in capacity of SEA cities to fill the gaps for integrating climate adaptation and sustainable urban development;
- Long-term program on developing research and education capacities for integrating climate adaptation and urban planning;
- Stronger links between global change science and urban planning communities;
- Development of an ASEAN knowledge network of researchers and planners, with international partners, to share findings, experiences, and practices on urban climate adaptation.

Summary of Project Methodologies:

- International meeting for sharing national policy and master plan including experiences, and practices among cities (Jakarta, Manila and Bangkok) for urban climate impacts, adaptation and resilience by plenary presentations and poster presentations;
- Study tours: 1) Adaptation measures for flood protection along the Chao Phraya River; and 2) Smart city and clean energy project, zero waste and green space for sustainable city ;
- Lectures on climate impacts and adaptation, finance, cost benefit, and resilient landscape and integrated waste management;
- Round table discussion: The main facilitator divides participants into four small groups, each group is provided with flipchart and marker pens and two or more group-facilitators. Understanding your city, future climate change risk and learning from past extreme climatic events by interactive round table discussion to plan for developing future resilient city.
- Working group discussion on mainstreaming waste management and renewable energy for reducing GHG emission for low carbon city.
- Working group discussion and presentation on developing education and research capacities for integrating urban planning and climate change adaptation for resilient and sustainable cities.

Activities:

The first activity was the coupling of (1) The International Meeting on Building Capacity for Urban Climate Change Adaptation in Southeast Asia and (2) The 2nd Training of the Trainers (TOT2), held on 31 July- 4August 2017, in Bangkok, Thailand. There were several partners that support these coupling activities: Southeast Asia START Regional Center (SEA START RC) and Chulalongkorn University (CU) in collaboration with the National Research Council of Thailand (NRCT), the Bangkok Metropolitan Administration (BMA), and the PPTGC.

The International Meeting on the 31st of July, 2017 was held in the Bangkok City Hall, attended by more than 200 participants, including 151 participants from 50 Districts of BMA, 53 participants from NRCT, CU, and TOT2 and co-sponsored by BMA, and NRCT. [The Opening Remarks were given by Professor Kiat Ruxrungham, Vice President for Research and Innovation \(CU\) on behalf of SEA START RC. APN was represented by Dr. Linda Anne Stevenson, Head of Division of Communication and Scientific Affairs of the APN Secretariat and NRCT by Dr. Wiparat De-ong, Deputy Secretary General NRCT for the Welcome Remarks. Likewise, Dr. Kriengpol Padhanarath, Deputy Permanent Secretary for the BMA for Welcome Remarks and the Opening Speech on the plenary session on Resilient future: Cities and Climate Change Adaptation in Southeast Asia. The 3 keynote speakers \(Dr. Erna Sri Adiningsih, Prof. Mario Delos Reyes, Ms. Siriporn Piyanawin\) from coastal mega cities](#)

(Jakarta, Manila, Bangkok) shared their experiences on urban climate change adaptation and resilience, followed by 2 scientists on Building Capacity for Climate Change Adaptation, Disaster Risk Reduction (Dr. Wijitbusaba Ann Marome, Thammasart University) and Green Urban Design Guidelines to Reduce Urban Heat Island (Dr. Pattraranan Takkanon, Kasetsart University), case study of BMA.

In the afternoon participants of the 2nd Training of Trainers (TOT2) enjoyed the Study tour 1. Adaptation measure under BMA Masterplan for flood protection and management along the Chao Phraya river, focusing on cultural tourism (Wat Pho and Flower Market), the following TOT2 agenda was held at the Evergreen Laurel Hotel started by Reception Dinner hosted by CU and APN.

From the 1st – 4th August, TOT2 was held at the Evergreen Laurel Hotel, Bangkok, Thailand. A total of 53 participants attended from Cambodia, Lao PDR, Indonesia, Philippines, Malaysia, Myanmar, Vietnam and Thailand, from which 30 participants were fully-funded by APN, and 11 participants were partially funded by BMA, CU, PPTGC and 11 self-funded local observers (Appendix 2 and 3). To minimize papers and print-out materials, participants were provided with Participants Guide Book (Appendix 1). Others detailed information on plenary presentations, Study tour (1) Visit Adaptation project and Measures Under BMA Master plan along the Chao Phraya River on July 31st, and Study tour (2) Visit Sustainability@Chula in Chulalongkorn University: Smart city /Clean Energy project, CU Zero waste project and green urban design of CU Centennial Park on August 3rd, including pdf-files for lectures and posters presentations during the TOT2 can be accessed and downloaded by scanning QR code, and by E-mail. Participants bring their own notebook, and organizers provide flash drive for dissemination of information.

After self-introduction and lectures on climate change science perspective, climate change adaptation finance, resilient landscape in Southeast Asian cities, trainees and trainers started their cities analysis and group working on three key questions: 1) How does city work?; 2) What are the direct and indirect impacts of climate change; and 3) Who is least able to respond to shocks and stresses (vulnerable groups)? To understand the concept of resilience based on the Asian Cities Climate Change Resilient Network 2013, ACCCRN City Project: Urban Climate Change Resilience, A Synopsis of ADB 2014 has been used as a guide book for city analysis to understand the cities as a system under climate risk and disaster management. Methodologies and tools used in various case studies such as remote sensing, field monitoring, GIS-modeling were exchanged among trainers and trainees.

To build “Urban Climate Change Resilience” (UCCR), Dr. Harin Suchdev lead the interactive discussion and integrated planning process for Group working on selected mega/coastal cities, medium and growing cities, highland/inland cities and tower cities. Roundtable discussion in each group was facilitated for filling the gap between the present state and the desired status by identifying the problem in planning their own resilient cities. Trainees implemented the actions and plans at the community level (university) and city level from both study tours into the planning of their own resilient cities.

The main outcomes of TOT2:

- 1) An increase holistic capability to identify the gap between the present situation and the desired status to plan for “urban climate change resilience”
- 2) Long-term thinking and process for developing research and education capacity for integrating climate adaptation and urban planning.
- 3) Stronger links between scientific community of global change science and urban planning communities.
- 4) Development of knowledge network through interactive discussion, study tours, and social media to share research findings and best practices on climate adaptation among cities.

The main products:

- 1) Guide book on training modules on urban climate change adaptation with some case studies of mega/coastal cities, medium/emerging cities, highland cities in Southeast Asia.
- 2) Development of smart city with green urban design, clean energy system, and adaptive urban water governance system under climate change impacts are the target areas of research and education in this region.

Next steps:

- 1) More training workshops to conduct further in –depth analysis for comparative studies among medium/emerging cities, highland cities.
- 2) A broad range of risk reduction and socioeconomic preparedness should be considered that may need change in policy instrument for implementation.

Self evaluation:

- 1) Overall evaluation forms and specific activity evaluation forms indicated that the content and quality of presentations, study tours, and hand-out information of TOT2 are ranking between good and excellent with no fair and poor quality.
- 2) Possible future topics and areas of discussion in training workshop with high relevant to policy impact are:
 - a. Climate change adaptation, city to city comparison, more case study analysis for best practices.
 - b. Linking climate change adaptation to disaster risk reduction.
 - c. Monitoring environmental quality (air, soil, water pollution), remediation and emergency preparedness.
 - d. Urbanization phenomena and very effective study tour
 - e. Climate change mitigation, financial mechanism, public social networking, private sector participation.

2. Synthesis Workshop

The aim of Synthesis Workshop is to compile, summarize and synthesize all results of the two trainings, since some participants cannot stay until August 7, so that the concurrent Synthesis Workshop was organized in a separate room along with TOT2, during 3-6 August and attended by the following:

1. Dr. Ngo Kim Chi
2. Dr. Erna Adiningsri
3. Dr. Mario Delos Reyes
4. Mr. Jose Bernado B. Gochoco III
5. Dr. Danai Thaitakoo
6. Dr. Harin Sachdev
7. Dr. Penjai Sompongchaikul
8. Dr. Jariya Boonjawat

Outcomes of the Synthesis Workshop:

- The two TOT Workshops, TOT1 in Depok, Indonesia and TOT2 in Bangkok, Thailand were participated by all 8 SEA-SRC member countries plus USA as trainees and trainers: Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, and Vietnam, and USA (project initiator and mentor).
- Self Evaluation based on evaluation forms and feedback from our collaborators and participants ranked between very good and excellent.

Science and Policy

- “New Normal” phenomena of extreme climate variability have been observed such as very strong typhoon, heavy precipitation that caused landslides and flash flood in urban areas, followed by migration and health issues. The future TOT may focus on disaster risk reduction, warning system and climate science related to these phenomena.

Education/Capacity Building

- There should be series of SEA-regional short course like this one, but focus on urban planning in new emerging cities and related to ecotourism, and traditional knowledges.
- The knowledge and lessons-learnt from the project should be cascaded to the local government units (LGUs) in each of the country in SEA.
- Building capacity on Urban Climate Change and Resilience should be from project preparation to action planning together with local investments to possibly fund these projects.

Networking

- Social network and internet of things have become the current system for communication among scientific and non-science community, which provide platform for exchange of information more rapidly and can be promoted for stronger links between global change science and policy makers.

Photos of TOT2 & Synthesis Workshop Activities



Group photo at BMA City Hall - Plenary session

APN
Sustainable Asia
Regional Center

ptt
GLOBAL CHEMICAL

QR Code provided for
2nd TOT for Urban Climate Change Adaptation
in Southeast Asia
International Meeting on Building Capacity for Urban
Climate Change Adaptation in Southeast Asia

Pictures of our activities and presentation slides
are provided in this link.

QR code for information dissemination at the Evergreen Laurel Hotel

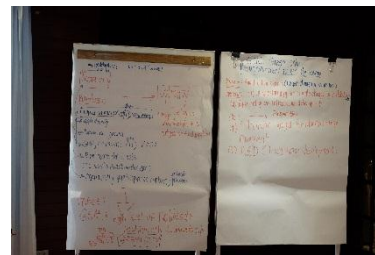


31 Jul 2017 Activities





1 Aug 2017 Activities



2 Aug 2017 Activities

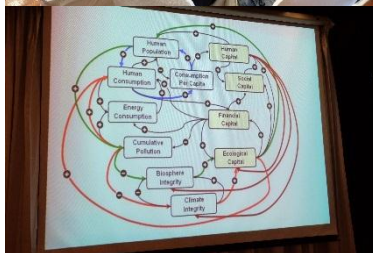


3 Aug 2017 Activities





4 Aug 2017 Activities



Appendix 1: PARTICIPANT GUIDE BOOK



PARTICIPANT GUIDE BOOK

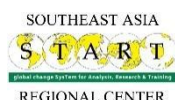
2nd TOT for Urban Climate Change Adaptation in Southeast Asia

International Meeting on Building Capacity for Urban Climate Change

Adaptation in Southeast Asia

Bangkok, Thailand

31 July – 4 August 2017



AGENDA

2nd TOT for Urban Climate Change Adaptation in Southeast Asia International Meeting on Building Capacity for Urban Climate Change Adaptation in Southeast Asia

TIME	AGENDA	TRAINER/SPEAKER	VENUE
Day 0	July 30		
	Participants arrival		EGL Hotel
Day 1	July 31		
0700	Bus pick up participants from EGL Hotel to BMA		EGL Hotel
0800-0830	Registration		BMA
0830-0845	<ul style="list-style-type: none"> - Opening Session Report from CU - Welcome Remark from APN - Welcome Remark from NRCT - Opening Remark from BMA 	<ul style="list-style-type: none"> - CU Vice President (Prof. Kiat Ruxrungtham) - APN Secretariat (Dr. Linda Anne Stevenson) - Deputy Secretary-General , NRCT (Dr. Wiparat De-ong) - Deputy Permanent Secretary of the BMA (Dr. Kriengpol Padhanarath) 	BMA
0845-0900	Photo Session & Press Release		BMA
0900-1030	Plenary presentations: RESILIENT FUTURE: CITIES AND CLIMATE CHANGE ADAPTATION IN SOUTHEAST ASIA <ul style="list-style-type: none"> - Urban Climate Change Adaptation in Jakarta, Indonesia Dr. Erna Sri Adiningsih National Institute of Aeronautics and Space (LAPAN) Indonesia - Urban Climate Change and Resilience in Manila, Philippines Prof. Mario Delos Reyes Dean School of Urban and Regional Planning, Universities of the Philippines - Bangkok Master Plan on Climate Change Adaptation 2013-2033 Ms. Siriporn Piyanawin Director of Air quality and Noise Management Division, BMA 	Moderator: Dr. Danai Thaitakoo, Department of Landscape Architecture, Chulalongkorn University	BMA

TIME	AGENDA	TRAINER/SPEAKER	VENUE
1030-1045	COFFEE BREAK	Host by BMA/NRCT	BMA
1045-1135	<p>Plenary presentations (cont.):</p> <p>RESILIENT FUTURE: CITIES AND CLIMATE CHANGE ADAPTATION IN SOUTHEAST ASIA</p> <ul style="list-style-type: none"> - Building Capacity for Climate Change Adaptation, Disaster Risk Reduction Asst. Prof. Dr. Wijitbusaba Marome <p style="text-align: center;">Faculty of Architecture, Thammasart University (representing BMA & SEA START RC)</p> <ul style="list-style-type: none"> - Green Urban Design Guidelines to Reduce Urban Heat Island: A case of BMA Dr. Pattranant Takkanon <p style="text-align: center;">Faculty of Architecture, Kasetsart University (representing NRCT)</p>	<p>Moderator:</p> <p>Dr. Danai Thaitakoo,</p>	BMA
1135-1200	<p>QUESTIONS AND ANSWERS:</p> <p>All speakers</p>	<p>Moderator:</p> <p>Dr. Danai Thaitakoo,</p>	BMA
1200-1215	<p>CONCLUSION:</p> <p>Dr. Monthip Sriratana Tabucanon, Thailand National Focal Point Asia Pacific Network (APN)</p>	<p>NFP for Thailand and Director, Center of Climate Change Strategic Center, NRCT</p>	BMA
1215-1315	LUNCH		BMA
1330-1800	<p>STUDY TOUR 1: Bus tour left from BMA 1</p> <p>Visit Adaptation Project and Measures under BMA Master Plan</p>	<p>Host by BMA</p> <p>Brief and lead by Mr. Visnu Charoen</p> <p>Chief of Project Management Section, Main Drainage System Development Division, Department of Drainage and sewerage</p>	
1900-2200	RECEPTION DINNER	Host by Chulalongkorn University And APN	EGL Hotel

TIME	AGENDA	TRAINER/SPEAKER	VENUE
Day 2	August 1		
0830-0915	Climate Change Science from Global to Regional and Local Perspectives: Future Climate Change Impact in Southeast Asia	Asst. Prof. Dr.Jirasorn SantisirisomboOn, RU	EGL Hotel
0915-1000	Climate Change Adaptation Finance	Dr. Robert Dobias USAID ADAPT Asia	
1000-1030	COFFEE BREAK		
1030-1115	Cost and Benefit Analysis of Urban Resilience	Prof. Dr. Er Ah Choy/Malaysia	
1115-1200	Resilient Landscape in Southeast Asian Cities	Dr. Danai Thaitakoo, Chulalongkorn University	
1200-1300	LUNCH		
1300-1500	My Cities and Climate Change (approx. 5-10 minutes each) <ul style="list-style-type: none"> - Cambodia - Indonesia - Laos - Malaysia - Myanmar - Philippines - Thailand - Vietnam 		
1500-1530	COFFEE BREAK		
1530-1730	CITIES ANALYSIS: Participants select type of cities and separate into group for further works <ul style="list-style-type: none"> - Mega/Coastal Cities - Medium and Growing Cities - Highland/Inland Cities - Tower Cities 	Process facilitators: <ul style="list-style-type: none"> - Dr. Harin Sachdev - Dr. Danai Thaitakoo - Dr. Puntita Tanwattana - Dr. Suthirat Kittipongvises - Asst. Prof. Dr.Penjai Sompongchaiyakul - Asst. Prof. Dr. Somporn Kamolsiripichaiporn 	

TIME	AGENDA	TRAINER/SPEAKER	VENUE
Day 3	August 2		
0830-0915	UNDERSTANDING THE CITIES – Carbon Neutral Cities, Resilient Cities: the roles of states and private sectors in planning for resilient city/low carbon city	Process facilitators: – Dr.Harin Sachdev – Dr.Danai Thaitakoo – Dr. Puntita Tanwattana	EGL Hotel
0915-1000	UNDERSTANDING THE CITIES – Risk and Disaster Management/Urban Risk & Vulnerability Assessment: Climate risk and vulnerability analysis	– Dr.Suthirat Kittipongvises – Asst. Prof. Dr.Penjai Sompongchaiyakul – Asst. Prof. Dr. Somporn Kamolsiripichaiporn	
1000-1030	UNDERSTANDING THE CITIES – Urban Ecology: Green Urbanism and Healthy City		
1030-1100	COFFEE BREAK		
1100-1145	Integrated Waste Management and Renewable Energy for GHG Emission Reduction	Dr. Kim Chi Ngo/Vietnam	
1145-1230	ICLEI - Methodologies and tools – Climate Change Adaptation Experience	Mr. Jose Bernardo B. Gochoco III	
1230-1330	LUNCH		
1330-1730	ROUNDTABLE DISCUSSION BY ROTATION (COFFEE BREAK included)		
	METHODOLOGIES AND TOOLS 1 :From Data to Information –Remote Sensing	LAPAN (Dr.Erna Adiningsih)	
	METHODOLOGIES AND TOOLS 2 :From Data to Information – GIS-Modelling	Dr. Wirote Laongmanee and Ms. Alisa Sahavacharin	

TIME	AGENDA	TRAINER/SPEAKER	VENUE
Day 4	August 3		
0830-1030	GROUP WORKING: Developing Your Own Resilient Cities		
1030-1100	COFFEE BREAK		
1100-1230	GROUP WORKING (cont.): Developing Your Own Resilient Cities		
1230-1330	LUNCH		
1330-1800	STUDY TOUR 2: Visit Sustainability@Chula, Chulalongkorn University <ul style="list-style-type: none"> - Smart Cities- Clean Energy Project - CU Zero Waste Project - CU Centenary Park 	Host by CU Brief and lead by Mr. Korb Limsuwan Energy and Environment Unit, Office of Physical Resources Management Chulalongkorn University	
1800-2000	WORKING DINNER		
Day 5	August 4		
0830-1030	GROUP WORKING (cont.): Developing Your Own Resilient Cities		
1030-1100	COFFEE BREAK		
1100-1230	GROUP WORKING (cont.): Developing Your Own Resilient Cities		
1230-1330	LUNCH		
1330-1500	GROUP PRESENTATION: Presenting Your Own Resilient Cities		
1500-1530	COFFEE BREAK		
1530-1700	Working groups Presentation resilient cities		
1800-2200	CLOSING DINNER for 2 nd TOT Workshop Certification awarded by SEA START RC Director on behalf of APN and Chulalongkorn University	Host by PTTGC	

Background

As climate change and variability has serious impacts in urban areas, urban planning has become an interest among climatologists and planners, as well as local government officials. Since there are still gaps between climate adaptation and urban planning, the project will basically consist of trainings for trainers to develop training modules on climate change adaptation and urban planning.

The project is aimed to conduct training for trainers on climate adaptation and urban planning in SEA region. The main objective is to enhance the capacity of lecturers and practitioners (planners) in planning schools to incorporate the issues of climate change adaptation for urban planning, and to develop training modules on urban climate adaptation. The topic is very relevant with APN science agenda, particularly Climate Change and Variability, Land Use, and Sustainable Development.



Vision

An Asia-Pacific region that is successfully addressing the challenges of global change and sustainability.

Mission

The mission of APN is to enable investigations of changes in the Earth's life support systems and their implications for sustainable development in the Asia-Pacific region through support for research and science-based response strategies and measures, effective linkages between science and policy, and scientific capacity development. APN, therefore, supports investigations that will:

- Identify, explain, project and predict changes in the context of both natural and anthropogenic forcing;
- Assess potential regional and global vulnerability of natural and human systems; and
- Contribute, from the science perspective, to the development of policy options for appropriate responses to global change and sustainable development.

Goals

Goal 1. Supporting regional cooperation in global change research on issues particularly relevant to the region

Goal 2. Enhancing capabilities to participate in global change and sustainability research and support science-based decision-making

Goal 3. Strengthening appropriate interactions among scientists and policy makers, and providing scientific input to policy decision-making and scientific knowledge to the civil society and the public

Goal 4. Cooperating with other global change and sustainability networks and organizations

Organizer

The TOT2 for Urban Climate Change Adaptation in Southeast Asia is organized by Southeast Asia START Regional Center in collaboration with Chulalongkorn University.

The local partner of the 2nd TOT is PPT Global Chemical.



Southeast Asia START Regional Center

The Southeast Asia START Regional Center is the regional research node of the Southeast Asia Regional Committee for START (SARCS). Southeast Asia is one of the eight existing regions of the Global Change SysTem for Analysis, Research and Training (START) network, jointly initiated by the International Geosphere-Biosphere Programme (IGBP), International Human Dimension Programme (IHDP), and World Climate Research Programme (WCRP).

START is a global network that supports multidisciplinary research on the interactions between humans and the environment. Other START regional networks represent Pan-Africa, South Asia, Temperate East Asia, Mediterranean, and Oceania.

SEA START RC was established in 1996 under a Memorandum Of Understanding between Chulalongkorn University (CU), National Research Council of Thailand (NRCT), and International START. The center is located on Chulalongkorn Campus in Bangkok, Thailand.

The objectives of SEA START RC include:

1. to develop integrated scientific and socio-economic approaches to reduce uncertainties of forecasting and assessing impacts of environmental change for the Southeast Asia region;
2. to provide recommendations and expert advice to governments and the private sectors to cope with long-term environmental changes;
3. to encourage and support the sharing and exchange of environmental data and information within and between regions; and
4. to promote public awareness on global environmental issues.

Key terms

A hazard is a human-made or a natural danger that causes damage to people, property and the environment.

A disaster is a human-made or a natural hazard that cause such great damage and loss of life that the affected community cannot cope.

A risk is the potential for something to go wrong or for something harmful to occur.

A risk assessment is a survey or a study that investigates, monitors and anticipates factors that combine to create a potential for something to go wrong and thereby harm children and adults in a community.

Managing or reducing risk means acting to limit the possibilities for something to go wrong, being prepared so that the risk of disaster is reduced.

Vulnerability is the potential to be easily hurt or harmed.

Capacity is an ability to cope with a difficult situation. It means having skills and knowledge to respond and prepare for a risk.

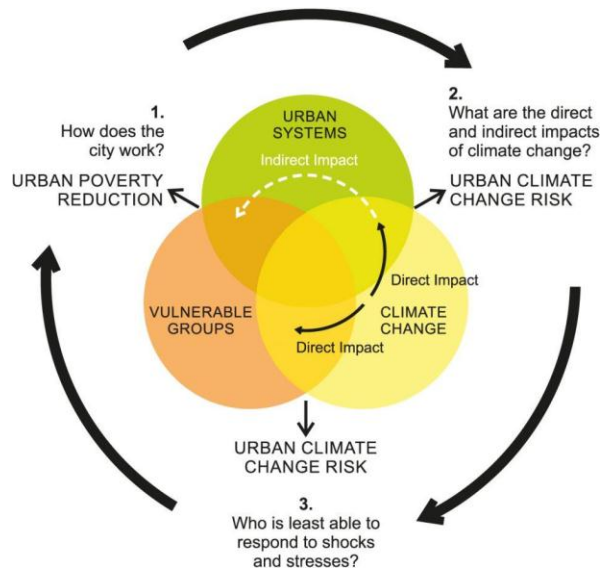
Climate change adaptation is adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. (IPCC)

Climate change mitigation is actions to reduce emission of greenhouse gasses. (IPCC)

Capacity building (or capacity development) is the process by which individual and organizations obtain, improve, and retain the skills and knowledge needed to do their jobs competently.

An urban heat island (UHI) is an urban area or metropolitan area that is significantly warmer than its surrounding rural areas due to human activities. The temperature difference usually is larger at night than during the day, and is most apparent when winds are weak.

Urban climate change resilience is a capacity of cities to function, so that the people living and working in cities – particularly the poor and vulnerable – survive and thrive in the face of shocks and stresses related to climate change.



Maintaining essential urban functions

Actions to build resilience should respond to three key questions:

1. How does the city work (the urban systems)?
2. What are the direct and indirect impacts of climate change (climate change)?
3. Who is least able to respond to shocks and stresses (vulnerable groups)?

highlights that the action focusing on disaster risk reduction and/or urban poverty reduction is necessary but insufficient to maintain urban functions in the face of direct and indirect climate change impacts.

Maintaining essential urban functions. Source: Da Silva et al. (2012)

Planning for Resilience

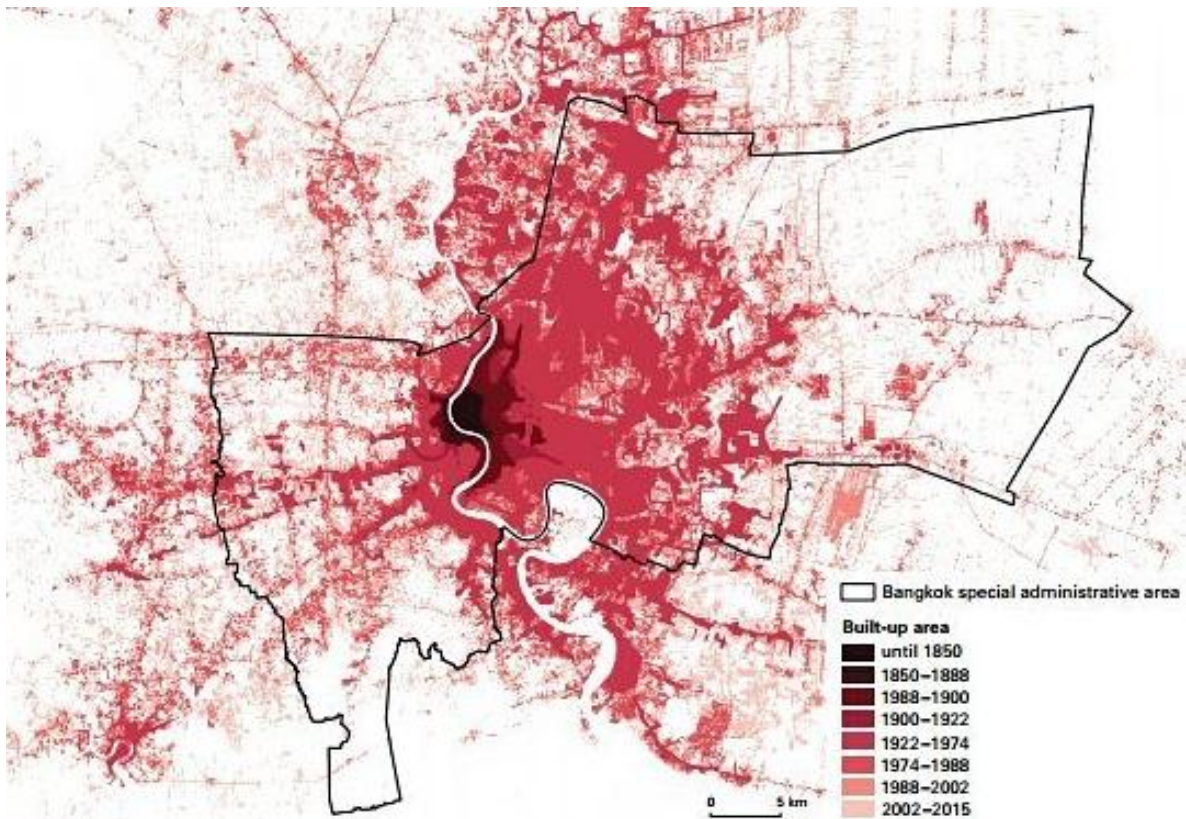
Action to build UCCR should be informed by an iterative, inclusive, and integrated planning process which responds to three interlocking frameworks of analysis:

- Urban Analysis, particularly understanding how the city works and examining its current status and future trends (such as population growth and economic development);
- Climate Change Risk Analysis, particularly projections of direct and indirect climate impacts; and
- Vulnerability Analysis, particularly of the urban population that faces high exposure risk to climate change impacts and has limited coping capacity with which to weather these impacts.

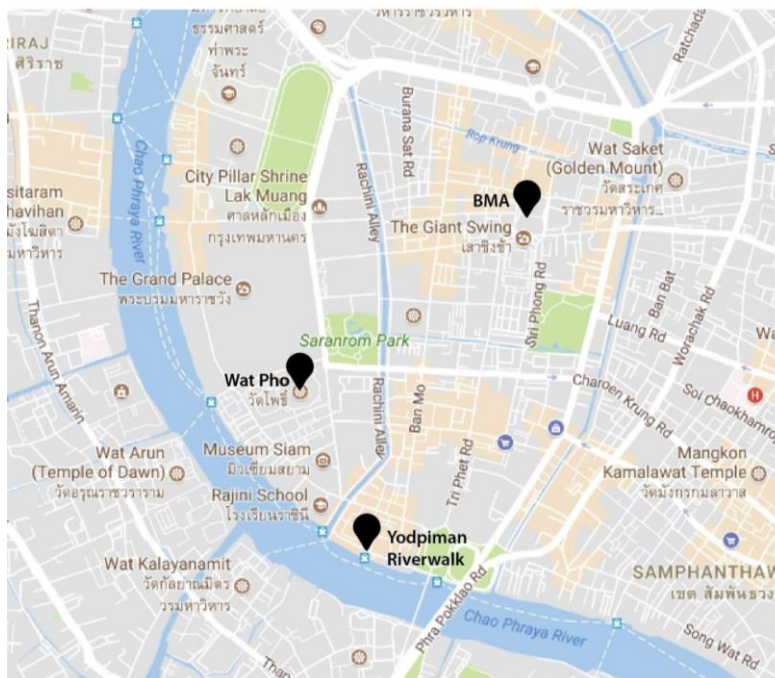
The process of bringing these elements together in identifying actions to build urban climate change resilience is known as climate change resilience planning, and is outlined in more detail in this section.

STUDY TOUR 1

Visit Adaptation Project and Measures under



Urbanization and Changes of settlement patterns in Bangkok Metropolitan (source: LSE Cities 2016, from <https://www.theigc.org/wp-content/uploads/2016/09/LSE-Cities-YUGA-Final.pdf>)



BMA Guild Map



Bangkok Town Hall



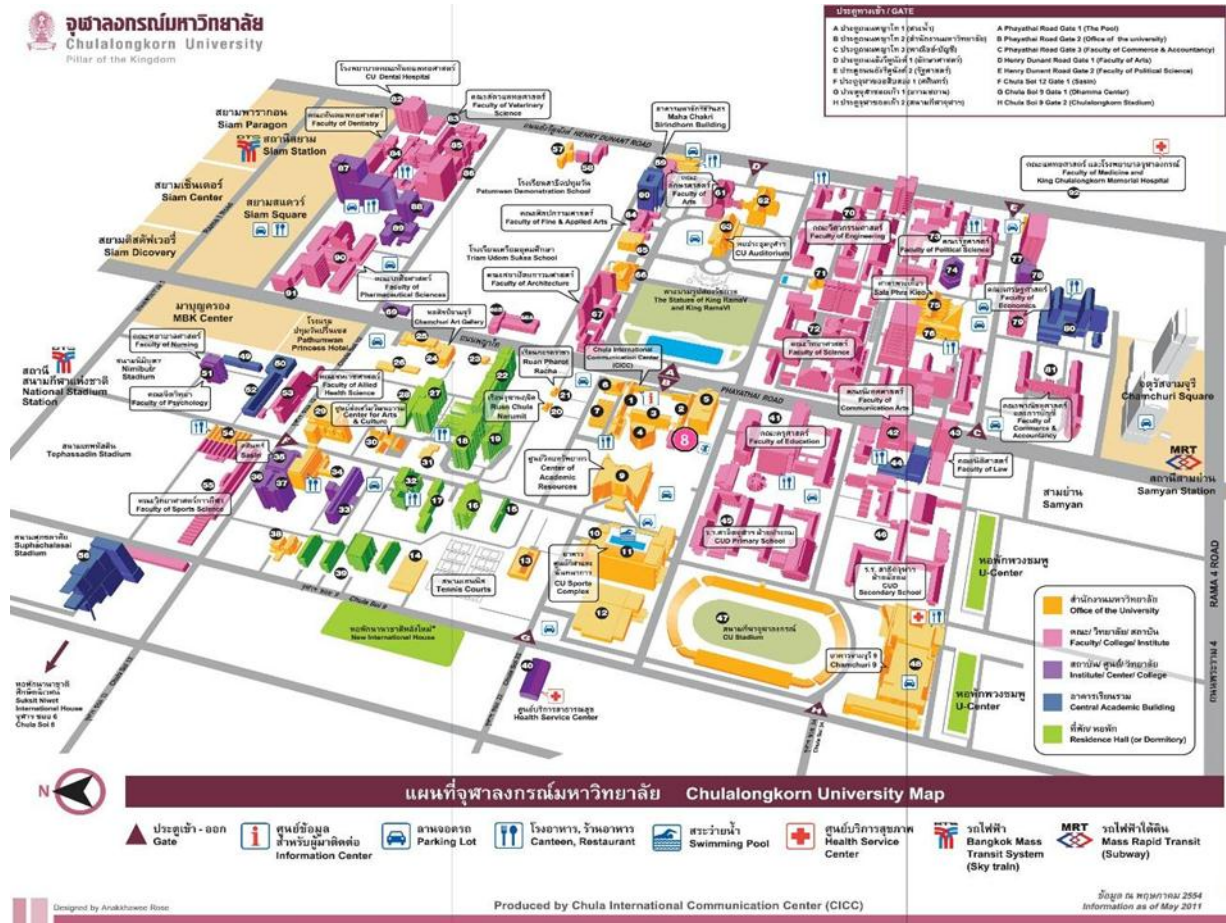
Wat Pho



Yodpiman Riverwalk

STUDY TOUR 2:

Visit Chulalongkorn Smart Cities – Clean Energy Project



CU Centenary Park

Lists of Participants

No.	Name	Affiliation	Country
Trainers (Speakers)			
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26 APN-Fully funded participants + 4 Staff = 30 Persons
 * APN – Representative = 1 Person
 ** Partially funded participants = 11 Persons
 *** Self-funded local participants = 11 Persons

Venue

Evergreen Laurel Hotel, Bangkok, Sathorn, Thailand

Map:



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Appendix 2 : List of Participants

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* APN – Representative = 1 Person

** Partially funded participants = 11 Persons

*** Self-funded local participants = 11 Persons

Appendix 3: Summary of Financial Report for CBA2016-01CMY-Boonjawat (as of 18 July 2018)

Exchange Rates in 02 Aug 2017
USD 1 = THB 33

Resources	USD		THB	
	Estimated budget	Allocation	Total	Allocation
APN	40,000	32,000	1,320,000	1,056,000
Chulalongkorn University	1,212	1,212	40,000	40,000
PTT Global Chemical Public Company Limited (PTTGC)	3,030	3,030	100,000	100,000
Total	44,242	36,242	1,460,000	1,196,000

Use of APN budget

Descriptions of Expenditure	USD		
	Estimated budget	Expenditure	Balance
A. Meeting cost	6,500	5,583	917
B. Accommodation	14,400	7,248	7,152
C. Per Diem	3,300	2,680	620
D. Study tour and Training	4,400	3,193	1,207
E. Report preparation, Printing and dissemination	1,050	3,500	-2,450
F. Travel foreign & domestic airfare	7,500	4,496	3,004
G. Domestic transport (Airport - Hotel) x 2	400	1,080	-680
H. Part-time Fees	2,450	2,450	0
J. Other direct costs	0	5,736	-5,736
Total (A+B+C+D+E+F+G+H+J)	40,000	35,966	4,034